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PREFACE

The eleventh annual edition of SWEET'S ARCHITECTURAL CATALOGUE comprises informative data and illustrations concerning the products of eight hundred manufacturers of building materials and equipment.

SWEET'S CATALOGUE has, during the past eleven years, become increasingly useful as the one medium through which the building interests of the country may, in an effective and economical manner, place their data before architects and others who need it.

It is, each year, meeting more fully the requirement of the architectural profession for an adequate form of keeping and indexing desired information relating to materials and methods in the ever changing art of building construction.

Manufacturers are coming more and more to realize that catalogues are not properly vehicles for mere "advertising," but if made available for reference and comparison are potential agencies for the dissemination of information to which other forms of advertising may be made valuable adjuncts. To achieve the maximum results these catalogues should be uniform in size and typography, periodically revised and indexed, permanently bound in a readily usable and always findable form.

SWEET'S CATALOGUE provides the medium through which is assembled this information concerning building materials and appliances, in the most practical and convenient form for quick reference.

The active support is invited of all who are interested in the further development of this co-operative catalogue of the building trades, to the end that subsequent editions may be made increasingly representative of the best materials and equipment and of the most scientific methods employed in building construction.

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Smith Metal Window Hardware Co., Frank F. (McWatters Co., Agts.), 588.
Sprague Electric Works, 1336.
Sturtevant Co., B. F., 1478.
Tropical Paint & Oil Co., 1673.
Trus-Con Laboratories, 46.
Trussed Concrete Steel Co., 228; 652.
Tuttle & Bailey Mfg. Co., 1180.
Tyler Co., W. S., 806.
Tylose Products Company, 45.
Union Products Co. (Bagnal-Taylor Co., Licensees), 48.
Union Products Co. (Cleveland Plastering Co., Licensees), 48.
Union Products Co., 48.
United Cork Companies, 1544.
United States Gypsum Company, 170.
U. S. Light & Heat Corp., 1345.
Van Dorn Iron Works Co., 336; 1761.
Van Kannel Revolving Door Co., 554.
Variety Manufacturing Co., 518; 546.
Vitrolite Co., 1070.
Vonnegut Hardware Co. (A. R. Stoeffler, Agt.), 597.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co., 1337.
Westinghouse Lamp Co., 1388.
Williams Pivot Sash Co., 694.
Windshield Scupper Co. (McWatters & Co., Agts.), 845.
Yeomans Brothers Co. (Cleveland Pump & Supply Co., Agts.), 1279.
Yoder-Thomas Mfg. Co., 1212.
Youngstown Iron & Steel Co. (J. F. Corlett & Co., Agts.), 252.

Clinton, Iowa.
Curtis Service Bureau (Curtis Bros. & Co.), 740.

Clinton, Mass.
Clinton Wire Cloth Co., 264; 1177.

Clinton, N. Y.
Clinton Metallic Paint Co., 1711.

Cloverport, Ky.
Murray Roofing Tile Company, 312.

Coffeyville, Kan.
Denison Interlocking Tile Manufacturers (The Denison Clay Co., Agts.), 290.
Ludowici-Celadon Co., 310.

Moninger Co., John C., 1774.

Cohoes, N. Y.
Cohoes Iron Foundry & Machine Co., 1415.
Columbus, Ohio.
American Blower Co., 1470.
American Terra Cotta & Ceramic Co. (Columbus Brick & Terra Cotta Co., Agts.), 122.
Bayley Co., William, 606.
Cabot, Inc., Samuel (Columbus Macadam Co., Agts.), 1707.
Chamberlin Metal Weather Strip Co., 720.
Coulson & Co., J. W., 928.
Crittall Casement Window Co. (A. W. Frank, Agt.), 612.
Denison Interlocking Tile Manufacturers (Gaddis-Harrison Brick Co., Agts.), 290.
Ebinger Sanitary Mfg. Co., 1014.
Flexstone Construction Company, 360.
Garden City Sand Co. (Hamilton-Parker Fuel & Supply Co., Agts.), 152.
General Electric Co., 1321.
Gillis & Geoghegan (R. L. Watson, Agt.), 1430.
Grant Pulley & Hardware Co. (B. M. Freeman Co., Reps.), 670; 730.
Huntington Roofing Tile Co., 308.
Johns-Manville Co., H. W., 430.
Kinnear Mfg. Company, 480.
Kinnear & Gager Manufacturing Co., 511.
Majestic Co. (M. S. Seibert Co., Agts.), 848.
Monument Plaster Co. (Columbus Builders' Supply Co., Agts.), 164.
Richmond Safety Gate Co., 502; 1444.
Solar Metal Products Co., Inc., 514.
Trussed Concrete Steel Co., 228; 652.
Van Kannel Revolving Door Co., 554.
Vitrolite Co., 1070.
Vonnegut Hardware Co. (R. L. Watson, Agt.), 597.
Westinghouse Electric & Mfg. Co., 1337.
Westinghouse Electric & Mfg. Co. (Avery-Loeb Elec. Co., Agts.), 1337.
Westinghouse Lamp Co., 1388.
Concord, N. H.
Swenson Granite Co., John, 70.
Connersville, Ind.
Connersville Blower Co., 1256.
Corey, Ala.
American Cement Tile Mfg. Co., 460.
Corpus Christi, Tex.
Denison Interlocking Tile Manufacturers (The Nueces Builders' Supply Co., Agts.), 290.
Council Bluffs, Iowa.
Kimball Brothers Co., 1438.
Covington, Ky.
Moeschl-Edwards Corrugating Co., Inc., 634.
Cumberland, Md.
Taylor Company, N. & G., 454.

D

Dallas, Tex.
American Elevator & Machine Co. (J. Peyton Hunter, Rep.), 1416.
American Luxfer Prism Co., 885.
Art Metal Construction Co., Inc., 1588.
Asbestos Protected Metal Co., 440.
Atlantic Terra Cotta Co., 116.
Cabot, Inc., Samuel (Sumner & McCreight Co., Agt.), 1707.
Carter White Lead Co., 1661.
Champion Metal Weather Strip & Parting Bead Co. (T. J. Thornhill, Agt.), 721.
Chicago Bridge & Iron Works, 1514.
Crittall Casement Window Co. (S. A. Ellsberry, Agt.), 612.
Dayton Malleable Iron Company (S. A. Ellsberry, Agt.), 276.
De Soto Paint Mfg. Co., 1666.
Decatur Cornice & Roofing Co., Inc. (Gaines & Dewees, Agts.), 860; 1491.
Dallas, Tex.—Continued.
Denison Interlocking Tile Manufacturers (Fraser Brick Co., Agts.), 290.
Edwards Manufacturing Co., 476; 828.
Follansbee Brothers Company, (Edwards Mfg. Co.), 444.
General Electric Co. (Southwest General Electric Co.), 1321.
Globe Automatic Sprinkler Co., 1512.
Hunt & Company, Robt. W., 9.
Hunt-Helm-Ferris & Co. (Huey & Philip, Agts.), 1778.
Hydraulic-Press Brick Company (Fraser Brick Co., Agts.), 92.
Johns-Manville Co., H. W., 430.
Johnson Service Co., 1195.
Lamson Co. (Lamson Company of Texas), 1462.
Macbeth-Evans Glass Co., 1383.
Majestic Co. (Gaines & Dewees, Agts.), 848.
Master Builders Company, 372.
Meurer Bros. Co., 446.
Ohio Blower Co., 1501.
Pitcairn Varnish Co. (Texas Glass & Paint Co., Agts.), 1692.
Saino Fire Door & Shutter Co., 512.
Southern Seating & Cabinet Co., 1600.
Sturtevant Co., B. F., 1478.
Trus-Con Laboratories, 46.
Trussed Concrete Steel Co., 228; 652.
United Cork Companies, 1544.
Variety Manufacturing Co., 518; 546.
Western Conduit Co., 1354.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co., 1337.
Westinghouse Lamp Co., 1388.
Youngstown Sheet & Tube Co., 1236.
Danville, Ill.
Allith-Prouty Co., 566.
Western Brick Company, 112.
Danville, Va.
Dayton Malleable Iron Company (Plumer Wiseman, Agt.), 276.
Westbrook Elevator Co., 1466.
Dark Hollow, Ind.
Consolidated Stone Company, 62.
Darlington, Pa.
Darlington Brick & Mining Co., 84.
Davenport, Iowa.
Denison Interlocking Tile Manufacturers (John Benedict, Agt.), 290.
Dunham Co., C. A., 1075.
Garden City Sand Co. (John Benedict, Agt.), 152.
Hydraulic-Press Brick Company, 92.
Pittsburgh Plate Glass Co., 936.
Dayton, Ohio.
Atlas Portland Cement Co., 130.
Bayley Co., William, 606.
Cabot, Inc., Samuel (Delscamp & Roemhildt Co., Agts.), 1707.
Crittall Casement Window Co. (A. W. Frank, Agt.), 612.
Dayton Malleable Iron Company (Blanchard Structural Products Co., Agt.), 276.
Denison Interlocking Tile Manufacturers (Gaddis-Harrison Brick Co., Agts.), 290.
General Electric Co., 1321.
Huntington Roofing Tile Co., 308.
Johns-Manville Co., H. W., 430.
Kramer Bros. Foundry Co., 846.
Lowe Brothers Co., 1668.
Westinghouse Electric & Mfg. Co., 1337.
Decatur, Ill.
Garden City Sand Co. (V. H. Parke & Son Co., Agts.), 152.
Leader Iron Works, 1268.
Delaware, Ohio.
Denison Interlocking Tile Manufacturers (Delaware Clay Mfg. Co., Agts.), 290.
Denver, Colo.
Allen Mfg. Co., W. D., 1507.
American Mailing Device Corp., 1641.
American Sheet & Tin Plate Co., 438.
American Steel & Wire Co., 20; 262; 1348.
Denver, Colo.—Continued.
Asbestos Protected Metal Co., 440.
Bayley Co., William, 606.
Bostwick Steel Lath Company, 238.
Cabot, Inc., Samuel (Colorado Builders' Supply Co., Agts.), 1707.
Crampton-Farley Brass Co. (M. J. O'Fallon Supply Co., Agts.), 1064.
Crittall Casement Window Co. (Geo. W. Summers & Co., Agts.), 612.
Dayton Malleable Iron Company (Colorado Builders' Supply Co., Agts.), 276.
Deming Co. (Hendrie & Bolthoff Mfg. Co., Agts.), 1258.
Dreadnought Flooring Company (Geo. W. Summers & Co., Agts.), 356.
Dunham Co., C. A., 1075.
Edison Lamp Works, 1373.
General Electric Co., 1321.
Grant Pulley & Hardware Co. (Centennial School Supply Co., Agts.), 730.
Grant Pulley & Hardware Co. (W. H. Clark, Rep.), 670.
Hart Mfg. Co., 1364.
Hubbell, Inc., Harvey, 1367.
Hydraulic-Press Brick Company (Colorado Builders' Supply Co., Agts.), 92.
International Heater Co. (Crosta Bros., Agts.), 1138.
Johns-Manville Co., H. W., 430.
Johnson Service Co., 1195.
Kimball Brothers Co. (Western Engineering & Specialties Co., Agts.), 1438.
Kinnear Mfg. Company, 480.
Lamson Co., 1462.
Link-Belt Co., 1460.
Lupton's Sons Co., David (Geo. P. Heinz & Co., Agts.), 631.
Majestic Co. (Queen City Wire & Iron Works, Agts.), 848.
National Tube Co., 1218.
Peelle Co. (Peerless Iron & Wire Works, Agts.), 496.
Pitcairn Varnish Co. (Midland Glass & Paint Co., Agts.), 1692.
Pittsburgh Plate Glass Co., 936.
Reliance Ball Bearing Door Hanger Co. (Geo. P. Heinz Co., Agts.), 578.
Richmond Safety Gate Co., 502; 1444.
Spencer Heater Co., 1157.
Trussed Concrete Steel Co., 228; 652.
Van Kannel Revolving Door Co., 554.
Variety Manufacturing Co., 518; 546.
Vonnegut Hardware Co. (W. H. Clark, Agt.), 597.
Western Conduit Co., 1354.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co., 1337.
Westinghouse Lamp Co., 1388.
Wilson Corp., J. G., 526.
Yeomans Brothers Co. (Hendrie & Bolthoff Mfg. & Supply Co., Agts.), 1279.
Youngstown Sheet & Tube Co., 1236.
Des Moines, Iowa.
Atlas Portland Cement Co., 130.
Chamberlin Metal Weather Strip Co., 720.
Crittall Casement Window Co. (Monarch Engineering Co., Agts.), 612.
Dunham Co., C. A., 1075.
Elaterite Paint and Manufacturing Co., 31.
Garden City Sand Co. (Meredith & Perkins, Agts.), 152.
General Electric Co., 1321.
Grant Pulley & Hardware Co. (L. H. Kurtz Co., Reps.), 670.
Hydraulic-Press Brick Company (C. A. Baker Brick Co., Agts.), 92.
Kawneer Mfg. Co., 930.
Majestic Co. (Century Lumber Co., Agts.), 848.
Pittsburgh Plate Glass Co., 936.
Prox Co., Frank, 1126.
Reliance Ball Bearing Door Hanger Co. (C. C. Dawson Co., Agts.), 578.

Des Moines, Iowa.—Continued.
Schwab & Sons Co., R. J., 1132.
Spencer Heater Co., 1157.
Trussed Concrete Steel Co., 228; 652.

Des Plaines, Ill.
Lord & Burnham Co., 1764.

Detroit, Mich.
American Blower Co., 1470.
American Luxfer Prism Co., 885.
American Sheet & Tin Plate Co., 438.
Asbestos Protected Metal Co., 440.
Automatic Electric Co., 1389.
Barnum, E. T., 766.
Barnum Iron Works, E. T., 1760.
Barrett Co., 420.
Basman & Co., A. M., 1485.
Beaver Board Companies, 1740.
Berry Brothers, 1690.
Best Register Co., 1172; 1486.
Bolles Iron & Wire Works, J. E., 770.
Brennan & Co., John, 1094.
Bruner Granitoid Co., P. M., 370.
Cabot, Inc., Samuel (United Fuel & Supply Co., Agts.), 1707.
Carnahan Tin Plate & Sheet Co., 442.
Carter White Lead Co., 1661.
Chamberlin Metal Weather Strip Co., 720.
Chicago Bridge & Iron Works, 1514.
Concrete Waterproof Paint Co., 30.
Crittall Casement Window Co., 612.
Curtis Service Bureau (Curtis Door & Sash Co.), 740.
Custodis Chimney Construction Co., Alphons, 114.
Dayton Malleable Iron Company (Wm. H. Cameron, Agt.), 276.
Deming Co. (David M. Kerr Machinery Co., Agts.), 1258.
Detroit Graphite Co., 1718.
Detroit Lubricator Co., 1243.
Detroit Mausoleum Equipment Works, 772.
Detroit Roofing Tile Company, 317.
Detroit Show Case Co., 925; 1644.
Detroit Steel Products Co., 614.
Douglas Co., John (W. A. Stoneman), 949.
Dreadnought Flooring Company (Geo. R. Mehling, Agt.), 356.
Dunham Co., C. A., 1075.
Follansbee Brothers Company, 444.
Garden City Sand Co. (A. J. Smith Construction Co., Agts.), 152.
General Electric Co. (General Electric Co. of Michigan), 1321.
General Roofing Manufacturing Co., 428.
Gillis & Geoghegan (Geo. T. Wallace Sales Co., Agts.), 1430.
Grant Pulley & Hardware Co. (A. Gloetzner Co., Reps.), 670; 730.
Grauer & Company, Albert, 370.
Hart Mfg. Co., 1364.
Hill Pump Co. (William L. Rutledge, Agt.), 1264.
Houghton & Co., E. F., 1192.
Huntington Roofing Tile Co., 308.
Hydraulic-Press Brick Company (United Fuel & Supply Co., Agts.), 92.
Johns-Manville Co., H. W., 430.
Johnson Service Co., 1195.
Kawneer Mfg. Co., 930.
Kerr Machinery & Supply Co., 1267.
Kinnear Mfg. Company, 480.
Kushequa Brick Company (Puritan Brick Co., Agts.), 106.
Kushequa Keramic Company (Puritan Brick Co., Agts.), 318.
Lamson Co., 1462.
Lavigne Mfg. Co., 1248.
Link-Belt Co., 1460.
Lupton's Sons Co., David (Malcomb J. McLeod), 631.
Lyon Metallic Mfg. Co., 1626.
MacArthur Concrete Pile & Foundation Co., 16.
Marbleloid Co., 366.
Marshall & Stearns Co. (Portal Wall Bed Co., Agts.), 1637.

Detroit, Mich.—Continued.
Martin Brick Company (Thomas Bros. & Co., Ltd., Agts.), 108.
Master Builders Company, 372.
Michigan Engine Valve Co., 677.
Morgan Co., 560.
National Fire Proofing Co., 300.
National Roofing Co. (National Supply Co., Agts.), 436; 1727.
National X-Ray Reflector Co. (A. R. Morey, Eng.), 1386.
New Jersey Terra Cotta Company (F. B. Holmes & Co., Agts.), 124.
Penberthy Injector Co., 1062.
Permutit Co., 1285.
Pfaudler Co., 1562.
Pitcairn Varnish Co., 1692.
Pittsburgh Plate Glass Co., 936.
Powers Regulator Co., 1210.
Pratt & Cady Co., Inc., 1246.
Reliance Ball Bearing Door Hanger Co. (J. E. Bolles Iron & Wire Wks., Agts.), 578.
Richmond Safety Gate Co., 502; 1444.
Saino Fire Door & Shutter Co., 512.
Sherwood Brass Works, 948.
Smith-Matthews Foundry Co., 852.
Spencer Heater Co., 1157.
Stevens, Frederic B., 44.
Trus-Con Laboratories, 46.
Trussed Concrete Steel Co., 228; 652.
Union Products Co. (Thos. H. Jenkins, Jr., Licensee), 48.
U. S. Light & Heat Corp., 1345.
Van Kannel Revolving Door Co., 554.
Variety Manufacturing Co., 518; 546.
Vitrolite Co., 1070.
Western Conduit Co. (J. W. McNair Electric Co., Agts.), 1354.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co., 1337.
Westinghouse Lamp Co., 1388.
Whitaker-Glessner Co., 834.
Wilson Corp., J. G., 526.
Windshield Scupper Co. (L. T. Ollesheimer, Agt.), 845.
Youngstown Iron & Steel Co. (W. A. Munger, Agt.), 252.

Dixon, Ill.
Sandusky Portland Cement Co., 42; 137.

Dubois, Pa.
Hydraulic-Press Brick Company, 92.

Dubuque, Iowa.
Loetscher-Ryan Mfg. Co., 847.

Duluth, Minn.
American Luxfer Prism Co., 885.
Cabot, Inc., Samuel (Thomson & Stewart, Agts.), 1707.
Carter White Lead Co., 1661.
Crittall Casement Window Co. (H. D. Bullard, Agt.), 612.
Denison Interlocking Tile Manufacturers (Standard Salt & Cement Co., Agts.), 290.
General Electric Co., 1321.
Hydraulic-Press Brick Company (Standard Salt & Cement Co., Agts.), 92.
Johns-Manville Co., H. W., 430.

Dunbar, Pa.
Pennsylvania Wire Glass Co., 884.

Dunellen, N. J.
Pierce Co., F. O., 1706.

E

East Chicago, Ind.
Transfer Stained Shingle Co., Inc., 404.

East Dedham, Mass.
Union Metal Corner Co., 258.

East Orange, N. J.
New York Blower Co., 1482.

East Point, Ga.
Atlantic Terra Cotta Co., 116.

East Sparta, Ohio.
United States Roofing Tile Co., 314.

East St. Louis, Ill.
General Roofing Manufacturing Co., 428.
Phelan-Faust Paint Mfg. Co., 1672.

East Walpole, Mass.
Bird & Son, 424.

Easton, Pa.
Alpha Portland Cement Co., 129.
Asbestos Protected Metal Co., 440.

Edmonton, Canada.
Dayton Malleable Iron Company (Gorman, Clancey & Grindley, Ltd., Agts.), 276.
Grant Pulley & Hardware Co. (Sommerville Hardware Co., Reps.), 670.

El Paso, Tex.
General Electric Co. (Southwest General Electric Co.), 1321.
Majestic Co. (Rathbun Mix Co., Agts.), 848.
Peelle Co., 496.
Trussed Concrete Steel Co., 228; 652.
Vonnegut Hardware Co. (C. C. Gaines, Agt.), 597.
Westinghouse Electric & Mfg. Co., 1337.

Elizabeth, N. J.
Hitchings & Co., 1768.
Jenkins Bros., 1244.

Elkhart, Ind.
Inner Braced Furniture Co., 1609.

Elmira, N. Y.
Doane & Jones Lumber Company, 339.
General Electric Co., 1321.

Elwood, Ind.
Macbeth-Evans Glass Co., 1383.

Erie, Pa.
Bruner Granitoid Co., P. M. (W. J. Carson, Agt.), 370.
Denison Interlocking Tile Manufacturers (Pennsylvania Fireproofing Co., Agts.), 290.
General Electric Co., 1321.
Grauer & Company, Albert (W. J. Carson, Agt.), 370.
Pennsylvania Fireproofing Co., 306.

Evansville, Ind.
Denison Interlocking Tile Manufacturers (Indiana Builders' Supply Co., Agts.), 290.
Huntington Roofing Tile Co., 308.
Hydraulic-Press Brick Company (Indiana Builders' Supply Co., Agts.), 92.
Never Split Seat Co., 1022.
Saino Fire Door & Shutter Co., 512.
Westinghouse Electric & Mfg. Co. (Varney Elec. Supply Co., Agts.), 1337.

F

Fair Haven, Vt.
Penrhyn Slate Co., 1412.
Vermont Structural Slate Co., 1073.

Fairfield, Iowa.
Louden Machinery Co., 1787.

Fall River, Mass.
Boston Lightning Rod Co., 1403.

Fitzwilliam, N. H.
Webb Granite & Construction Co., 72.

Flemington, N. J.
Mallory Manufacturing Co., 715.

Florence, Italy.
Erkins Studios, 1744.

Fogelsville, Pa.
Lehigh Portland Cement Company, 135.

Follansbee, W. Va.
Follansbee Brothers Company, 444.

Ft. Atkinson, Wis.
James Mfg. Co., 1782.

Fort Dodge, Iowa.
Acme Cement Plaster Company, 142.
American Cement Plaster Co., 144; 458.
Pyrolin Products Co., Inc., 1670; 1710.

Fort Lauderdale, Fla.
Denison Interlocking Tile Manufacturers (East Coast Lumber & Supply Co., Agts.), 290.

Ft. Madison, Iowa.
Larsen Ice Machine Co., Inc., 1526.

Fort Pierce, Fla.
Denison Interlocking Tile Manufacturers (East Coast Lumber & Supply Co., Agts.), 290.
Fort Recovery, Ohio.
Garden City Sand Co. (Emil Wagner, Agt.), 152.
Fort Wayne, Ind.
Bruner Granitoid Co., P. M. (Jocquel-Schulz Co., Agts.), 370.
Crittall Casement Window Co. (The Fireproofing Co., Agts.), 612.
General Electric Co., 1321.
Grauer & Company, Albert (Jocquel-Schulz Co., Agts.), 370.
Van Arnam Mfg. Co., 1020.
Wayne Oil Tank & Pump Co., 1798.
Fort Worth, Tex.
Dunham Co., C. A., 1075.
Van Kannel Revolving Door Co., 554.
Whitaker-Glessner Co., 834.
Wilson Corp., J. G., 526.
Franklin, Ohio.
Patent Vulcanite Roofing Co., 406.
Frederick, Md.
Zimmerman Co., Inc., G. F. S., 699.
Freeport, Ill.
Stover Mfg. Co., 857.

G

Galesburg, Ill.
Denison Interlocking Tile Manufacturers (M. C. Lescher, Agt.), 290.
Galt, Ont., Canada.
Sturtevant Co., B. F. (B. F. Sturtevant Co., of Canada, Ltd.), 1478.
Union Metal Mfg. Co. (Canadian Union Metal, Ltd.), 807.
Galveston, Tex.
American Chemical & Mfg. Co., Inc., 22.
Johns-Manville Co., H. W., 430.
Garbutt, N. Y.
Empire Gypsum Company, 151.
Garden City, Kan.
Hill Pump Co. (Well Works Mfg. Co., Agts.), 1264.
Garwood, N. J.
Anchor Post Iron Works, 813.
Thatcher Furnace Co., 1123.
Geneva, Switzerland.
Newman Clock Co., 1645.
Zibell Damp Resisting Paint Company (F. Bonnet & Co., Agts.), 52.
Gladys, Okla.
Acme Cement Plaster Company, 142.
Grand Rapids, Mich.
Acme Cement Plaster Company, 142.
Alabastine Co., 1724.
American Cement Plaster Company, 144.
American Metal Weather Strip Co., 718.
Bayley Co., William, 606.
Bruner Granitoid Co., P. M. (Frank L. Dykema Co., Agts.), 370.
Cabot, Inc., Samuel (W. P. Williams, Agt.), 1707.
Denison Interlocking Tile Manufacturers (S. A. Mormon & Co., Agts.), 290.
Garden City Sand Co. (S. A. Mormon & Co., Agts.), 152.
Globe Automatic Sprinkler Co., 1512.
Grand Rapids Plaster Company, 156.
Grand Rapids School Equipment Co., 1608.
Grant Pulley & Hardware Co. (A. B. Zierleyn & Co., Reps.), 670; 730.
Grauer & Company, Albert (Frank L. Dykema Co., Agts.), 370.
Huntington Roofing Tile Co., 308.
Insular Lumber Co. (Zorns Lumber Co., Agts.), 750.
Macey Co., 1596.
Martin Brick Company (Michigan Face Brick Co., Agts.), 108.
Pitcairn Varnish Co., 1692.
Pittsburgh Plate Glass Co., 936.
Rapid Heater Co., 1297.
Grand Rapids, Mich.—Continued.
Reynolds Asphalt Shingle Co., H. M., 408.
Richmond Safety Gate Co., 502; 1444.
Saino Fire Door & Shutter Co., 512.
Smith Metal Window Hardware Co., Frank F. (Michigan Fire Appliance Co., Agts.), 588.
Terrell's Equipment Co., 1634.
"White-Steel" Sanitary Furniture Co., 1048.
Wolverine Brass Works, 1045.
Grand Rapids, Wis.
American Carbonic Machinery Co., 1524.
Grand Rapids Foundry Co., 835.
Granville, N. Y.
Sheldon Slate Company, F. C., 396.
Greensboro, N. C.
Grant Pulley & Hardware Co. (J. D. Wilkins, Agt.), 730.
Southern Seating & Cabinet Co., 1600.
Greenville, Pa.
Chicago Bridge & Iron Works, 1514.
Guelph, Ont., Canada.
Kawneer Mfg. Co., 930.
Gypsum, Ohio.
American Cement Plaster Company, 144.
Gypsum, Ore.
Acme Cement Plaster Company, 142.

H

Hagerstown, Md.
Jamison Cold Storage Door Co., 1534.
Halifax, N. S., Canada.
Barrett Co. (Paterson Manufacturing Co., Ltd.), 420.
Dunham Co., C. A., 1075.
Hamburg, Germany.
Brecht Co., 1531.
General Roofing Manufacturing Co., 428.
Pratt & Lambert, Inc., 1694.
Hamilton, Ohio.
Meyers Mfg. Co., Fred J., 790.
Hamilton, Ont., Canada.
Bird & Son, 424.
National Fire Proofing Co., 300.
Westinghouse Lamp Co. (Canadian Westinghouse Co., Ltd.), 1388.
Hammond, Ind.
Federal Cement Tile Co,. 462.
Hannibal, Mo.
Atlas Portland Cement Co., 130.
Hanover, Germany.
Penberthy Injector Co., 1062.
Hanover, Pa.
Saino Fire Door & Shutter Co., 512.
Hardwick, Vt.
Woodbury Granite Co., 71.
Harrisburg, Pa.
Chamberlin Metal Weather Strip Co., 720.
Denison Interlocking Tile Manufacturers. (Mentzer-Romberger Mfg. Co., Agts.), 290.
Harrison, N. J.
Edison Lamp Works, 1373.
General Electric Co., 1321.
Monument Plaster Co., 164.
Hartford, Conn.
A. B. See Electric Elevator Co., 1414.
Anchor Post Iron Works, 813.
Automatic Refrigerating Co., 1522.
Davis & Son, I. B., 1163.
Globe Automatic Sprinkler Co., 1512.
Hart Mfg. Co., 1364.
Hart & Hegeman Mfg. Co., 1362.
Houghton & Co., E. F., 1192.
King & Company, J. B., 161.
Pratt & Cady Co., Inc., 1246.
Presbrey-Coykendall Co., 67.
Spencer Turbine Cleaner Co., 1395.
Sturtevant Co., B. F., 1478.
Vitrolite Co., 1070.
Wadsworth, Howland & Co., Inc., 1676.
Whitlock Coil Pipe Co., 1170 .
Harvard, Ill.
Hunt-Helm-Ferris & Co., 1778.
Hastings-on-Hudson, N. Y.
Hastings Pavement Company, 361.
Havana, Cuba.
American Elevator & Machine Co., (C. H. Thrall Electrical Contracting Co., Rep.), 1416.
Cahill Iron Works, 946.
Carbolineum Wood Preserving Co., 1726.
Hydraulic-Press Brick Company (Lane & Sons, Galiano, Agts.), 92.
Vitrolite Co., 1070.
Helena, Mont.
Denison Interlocking Tile Manufacturers. (Western Clay Mfg. Co., Agts.), 290.
Grant Pulley & Hardware Co. (Archibald J. Mahan Co., Reps.), 670; 730.
High Point, N. C.
Pittsburgh Plate Glass Co., 936.
Hillsborough, N. B., Canada.
King & Company, J. B., 161.
Hoboken, N. J.
Marx, John, 1730.
New York Silicate Book Slate Co., 1615.
Hoechst-on-the-Main, Germany.
Lincrusta Works "Pallas," Inc., 1732.
Holland, Mich.
Holland Furnace Co., 1136.
Holyoke, Mass.
Newton Paper Company, 467.
Youngstown Iron & Steel Co. (J. Russell & Co., Agts.), 252.
Houghton, Mich.
Johns-Manville Co., H. W., 430.
Houston, Tex.
Cabot, Inc., Samuel. (W. L. Macatee & Sons, Agts.), 1707.
Carter White Lead Co., 1661.
Crittall Casement Window Co. (Everett, Bradt & Wright, Agts.), 612.
Dayton Malleable Iron Company (Everett Bradt & Co. Agts.), 276.
Garden City Sand Co. (Vandaveer Clay Products Co., Agts.), 152.
General Electric Co. (Southwest General Electric Co.), 1321.
General Roofing Manufacturing Co., 428.
Goulds Mfg. Co., 1262.
Grant Pulley & Hardware Co. (C. A. Bryant Co., Agts.), 730.
Johns-Manville Co., H. W., 430.
Pitcairn Varnish Co. (Texas Glass & Paint Co., Agts.), 1692.
Vitrolite Co., 1070.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co. (Tel-Electric Co., Agts.), 1337.
Wilson Corp., J. G., 526.
York Mfg. Co., 1530.
Hudson, N. Y.
Atlas Portland Cement Co., 130.
Gifford-Wood Co., 1458.
Hunter Valley, Ind.
Consolidated Stone Company, 62.
Huntington, Ind.
Majestic Co., 848.
Huntington, W. Va.
Garden City Sand Co. (Kentucky Fire Brick Co., Agts.), 152.
Huntington Roofing Tile Co., 308.
Hyde Park, Boston, Mass.
Sturtevant Co., B. F., 1478.
Hydeville, Vt.
Penrhyn Slate Co., 1412.

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Ilion, N. Y.
Library Bureau, 1594.
Independence, Kan.
Atchison Revolving Door Co., 549.
Indianapolis, Ind.
American Blower Co., 1470.
American Chemical & Mfg. Co., Inc., 22.
American Luxfer Prism Co., 885.

Indianapolis, Ind.—Continued.
Bayley Co., William, 606.
Beaver Board Companies, 1740.
Cabot, Inc., Samuel (Builders' Supply Corp., Agts.), 1707.
Chamberlin Metal Weather Strip Co., 720.
Crittall Casement Window Co. (The Fireproofing Co., Agts.), 612.
Dayton Malleable Iron Company (The Fireproofing Co., Agts.), 276.
Denison Interlocking Tile Manufacturers (A. B. Meyer & Co., Agts.), 290.
Dreadnought Flooring Company (National Flooring Co., Agts.), 356.
Dunham Co., C. A., 1075.
Follansbee Brothers Company, 444.
General Electric Co., 1321.
Gillis & Geoghegan (Vonnegut Hardware Co., Agts.), 1430.
Grant Pulley & Hardware Co. (Van Camp Hardware & Iron Co., Reps.), 670; 730.
Heinicke, Inc., H. R., 115.
Hill Pump Co. (J. E. Kamps, Agt.), 1264.
Hydraulic-Press Brick Company, 92.
Johns-Manville Co., H. W., 430.
Johnson Service Co., 1195.
Kawneer Mfg. Co., 930.
Kinnear Mfg. Company, 480.
Lamson Co., 1462.
Link-Belt Co., 1460.
Luminous Specialty Co., 1379.
McCain, W. W., 1560.
Majestic Co. (Ewald Over Foundry, Agts.), 848.
Marshall & Stearns Co. (Philip Voorhees & Son, Agts.), 1637.
Master Builders Company, 372.
Permutit Co., 1285.
Prox Co., Frank, 1126.
Reliance Ball Bearing Door Hanger Co. (Lilly & Stalnaker, Agts.), 578.
Richmond Safety Gate Co., 502; 1444.
Trussed Concrete Steel Co., 228; 652.
Van Kannel Revolving Door Co., 554.
Variety Manufacturing Co., 518; 546.
Vonnegut Hardware Co., 597.
Western Brick Company, 112.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co., 1337.
Westinghouse Electric & Mfg. Co. (Varney Elec. Supply Co., Agts.), 1337.
Windshield Scupper Co. (F. O. Duvall Co., Agts.), 845.

Ironton, Ohio.
Garden City Sand Co. (Kentucky Fire Brick Co., Agts.), 152.

Irvington-on-Hudson, N. Y.
Lord & Burnham Co., 676; 1764.

Ishpeming, Mich.
Denison Interlocking Tile Manufacturers (Consolidated Fuel & Lumber Co., Agts.), 290.

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Jackson, Mich.
Garden City Sand Co. (I. N. DeLamater, Agt.), 152.

Jackson, Tenn.
Southern Seating & Cabinet Co., 1600.

Jacksonville, Fla.
Best Register Co., 1172; 1486.
Cabot, Inc., Samuel (Gill & Mulholland, Agts.), 1707.
Carter White Lead Co., 1661.
Denison Interlocking Tile Manufacturers (Gamble & Stockton Co., Agts.), 290.
General Electric Co., 1321.
Hydraulic-Press Brick Company (Baker & Holmes Co., Agts.), 92.
Leigh Portland Cement Company, 135.
Monument Plaster Co. (Carolina Portland Cement Co., Agts.), 164.

Jacksonville, Fla.—Continued.
Permutit Co., 1285.
Pratt & Cady Co., Inc. (Cameron & Barkley Co., Agts.), 1246.
Vonnegut Hardware Co. (Beaullieu & Applewhite, Agts.), 597.
Southern Cypress Manufacturers' Ass'n, 760.
Southern Seating & Cabinet Co., 1600.

Jacksonville, Ill.
Garden City Sand Co. (D. E. Sweeney, Agt.), 152.

Jamestown, N. Y.
Art Metal Construction Co., Inc., 1588.
Dahlstrom Metallic Door Co., 542.
Grant Pulley & Hardware Co. (Dahlstrom Metallic Door Co., Reps.), 670.
Interior Metal Mfg. Co., 507.
International Casement Co., Inc., 622.
Insular Lumber Co. (Warren Ross Lumber Co., Agts.), 750.
Kushequa Brick Company (A. M. Cobbe, Agt.), 106.
Watson Mfg. Co., 714.

Jeannette, Pa.
North Western Expanded Metal Co., 248.

Jeffersonville, Ind.
Garden City Sand Co. (R. Hansen, Agt.), 152.

Jersey City, N. J.
A. B. See Electric Elevator Co., 1414.
Lowe Brothers Co., 1668.
Lutton Co., William H., 1770.
National Kellastone Co., 162.
National Sheet Metal Roofing Co., 448.
Snead & Co. Iron Works, Inc., 803; 1632.

Johannesburg, South Africa.
General Electric Co. (South African General Electric Co.), 1321.

Johnsonburg, Pa.
Martin Brick Company (Yingling-Martin Brick Company, Plant.), 108.

Jones Point, N. Y.
Asphalt Ready Roofing Co., 405.

Jonesport, Me.
Rockport Granite Co., 68.

Joplin, Mo.
General Electric Co., 1321.
Westinghouse Electric & Mfg. Co., 1337.

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Kalamazoo, Mich.
Humphrey Co., 1298.

Kane, Pa.
Kane Blind & Screen Co., 710.

Kansas City, Kan.
Vitrolite Co., 1070.

Kansas City, Mo.
American Blower Co., 1470.
American Elevator & Machine Co. (C. L. Colby, Rep.), 1416.
American Elevator & Machine Co. (King Supply & Equipment Co., Reps.), 1416.
American Luxfer Prism Co., 885.
American Mailing Device Corp., 1641.
American Mason Safety Tread Co., 378.
American Terra Cotta & Ceramic Co. (Reliance Brick Co., Agts.), 122.
Art Metal Construction Co., Inc., 1588.
Asbestos Protected Metal Co., 440.
Ayer & Lord Tie Company, 344.
Barrett Co., 420.
Bayley Co., William, 606.
Beaver Board Companies, 1740.
Cabot, Inc., Samuel (Day K. Smith, Agt.), 1707.
Carnahan Tin Plate & Sheet Co., 442.
Carter White Lead Co., 1661.
Chamberlin Metal Weather Strip Co., 720.
Concrete Waterproof Paint Co., 30.
Crampton-Farley Brass Co., 1064.
Crittall Casement Window Co. (H. Lee Jones, Agt.), 612.

Kansas City, Mo.—Continued.
Custodis Chimney Construction Co., Alphons, 114.
Dayton Malleable Iron Company (J. P. Sprague Co., Agts.), 276.
Deming Co. (English Tool & Supply Co., Agts.), 1258.
Detroit Graphite Co., 1718.
Dunham Co., C. A., 1075.
Federal Sash & Door Co., 552.
Follansbee Brothers Company (Excelsior Heating Supply Co.), 444.
General Electric Co., 1321.
General Roofing Manufacturing Co., 428.
Gillis & Geoghegan (Jos. T. Walsh & Co., Agts.), 1430.
Grant Pulley & Hardware Co. (T. B. Easton, Rep.), 670; 730.
Gyp Steel Products Company, 231.
Hunt-Helm-Ferris & Co. (Stowe Supply Co., Agts.), 1778.
Hydraulic-Press Brick Company, 92.
Johns-Manville Co., H. W., 430.
Johnson Mfg. Co., Geo. W., 510.
Johnson Service Co., 1195.
Kawneer Mfg. Co., 930.
Kewanee Boiler Co., 1110.
Kimball Brothers Co. (G. S. Montgomery, Agt.), 1438.
Lamson Co., 1462.
Lansing Co., 1800.
Lowe Brothers Co., 1668.
Ludowici-Celadon Company, 310.
Majestic Co. (Townley Metal & Hardware Co., Agts.), 848.
Merchant & Evans Co., 450; 490; 1500.
Milwaukee Artistic Metal Ceiling Co., 831.
Milwaukee Corrugating Co., 451.
Minneapolis Heat Regulator Co., 1206.
National Tube Co., 1218.
National X-Ray Reflector Co. (H. B. Wheeler, Eng.), 1386.
Ohio Blower Co., 1501.
Patent Vulcanite Roofing Co., 406.
Pitcairn Varnish Co., 1692.
Pittsburgh Plate Glass Co., 936.
Powers Regulator Co., 1210.
Raymond Concrete Pile Co., 18.
Richmond Safety Gate Co., 502; 1444.
Saino Fire Door & Shutter Co., 512.
Schwab & Sons Co., R. J., 1132.
Sturtevant Co., B. F., 1478.
Trussed Concrete Steel Co., 228; 652.
United States Gypsum Company, 170.
U. S. Light & Heat Corp., 1345.
Universal Ventilating Co., 1506.
Van Kannel Revolving Door Co., 554.
Variety Manufacturing Co., 518; 546.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co. (Satterlee Electric Co., Agts.), 1337.
Westinghouse Lamp Co., 1388.
Wheeling Corrugating Co., 832.
Windshield Scupper Co. (Builders Material Supply Co., Agts.), 845.
Youngstown Iron & Steel Co. (James P. Sprague & Co., Agts.), 252.

Keene, N. H.
Dodds & Sons Granite Co., George. 67a.
Victoria White Granite Co., 67a.

Kendallville, Ind.
McCray Refrigerator Co. 1545.

Kenosha, Wis.
Marshall & Stearns Co., 1637.

Kensico Cemetery, N. Y.
Presbrey-Coykendall Co., 67.

Kewanee, Ill.
Kewanee Boiler Co., 1110.
Kewanee Private Utilities Co., 1580.

Kittanning, Pa.
Martin Brick Company (Kittanning Brick & Fire Clay Co., Plant), 108.

Knoxville, Tenn.
Cabot, Inc., Samuel (W. W. Woodruff & Sons, Agts.), 1707.
General Electric Co., 1321.
Murray Roofing Tile Company (Chandler & Co., Agts.), 312.

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Rose & Co., D. M., 759.
Saino Fire Door & Shutter Co., 512.
Kohler, Wis.
Kohler Co., 1016.
Kouts, Ind.
Garden City Sand Co. (Rosenbaum & Kosanke, Agts.), 152.
Kushequa, Pa.
Kushequa Brick Company, 106.
Kushequa Keramic Company, 318.

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La Porte, Ind.
American 3-Way Prism Co., 889.
La Salle, Ill.
Marquette Cement Mfg. Co., 136.
Lancaster, Pa.
Denison Interlocking Tile Manufacturers (Lancaster Lime & Supply Co., Agts.), 290.
Kewanee Private Utilities Co., 1580.
Trussed Concrete Steel Co., 228; 652.
Lansing, Mich.
Bruner Granitoid Co., P. M. (W. T. Britten, Agt.), 370.
Grauer & Company, Albert (W. T. Britten, Agt.), 370.
Hydraulic-Press Brick Company (The Briggs Co., Agts.), 92.
Lansing Co., 1800.
New Jersey Terra Cotta Company (The Briggs Co., Agts.), 124.
Laramie, Wyo.
Acme Cement Plaster Company, 142.
Lawrence, Kan.
American Cement Plaster Co., 144; 458.
Lawrence, Mass.
Holt Roof Connection Co., 457.
Lebanon, N. H.
Rockport Granite Co., 68.
Lexington, Ky.
Crittall Casement Window Co. (E. B. Oldham, Agt.), 612.
Long, George Baker, 10.
Lima, Ohio.
Bruner Granitoid Co., P. M. (Logarill Fuel & Builders Supply Co., Agts.), 370.
Garden City Sand Co. (Fidelity Coal & Supply Co., Agts.), 152.
Grauer & Company, Albert (Logarill Fuel & Builders Supply Co., Agts.), 370.
Monroe Screen, Blind & Partition Co., 732.
Lime, Ore.
Acme Cement Plaster Company, 142.
Lincoln, Neb.
American Terra Cotta & Ceramic Co. (Nebraska Material Co., Agts.), 122.
Curtis Service Bureau (Curtis, Towle & Paine Co.), 740.
Garden City Sand Co. (Nebraska Material Co., Agts.), 152.
Kawneer Mfg. Co., 930.
Schwab & Sons Co., R. J., 1132.
Lincoln, N. J.
American Cement Tile Mfg. Co., 460.
Little Rock, Ark.
Arkansas Soft Pine Bureau, 744.
Cabot, Inc., Samuel (W. L. Clippard, Agt.), 1707.
Crampton-Farley Brass Co. (Crane Co., Agts.), 1064.
New Jersey Terra Cotta Company (Salco Sand & Gravel Co., Agts.), 124.
Saino Fire Door & Shutter Co., 512.
Liverpool, England.
Automatic Electric Co. (Automatic Telephone Mfg. Co.), 1389.
International Casement Co., Inc., 622.
Lockland, Cincinnati, Ohio.
Carey Company, Philip, 28; 427.
London, England.
American Chain Co., Inc. (Moorefields), 663.
Beaver Board Companies, 1740.
London, England.—Continued.
Bishop-Babcock-Becker Co., 1252.
General Electric Co., 1321.
General Roofing Manufacturing Co., 428.
Hunt & Company, Robt. W., 9.
Jenkins Bros., 1244.
Kohler Co., 1016.
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Lincrusta Works "Pallas," Inc., 1732.
Master Builders Company, 372.
Newman Clock Co. (Newman Clock Co., Ltd.), 1645.
Penberthy Injector Co., 1062.
Pratt & Cady Co., Inc. (Edw. Le Bas & Co., Agts.), 1246.
Pratt & Lambert, Inc., 1694.
Russell & Erwin Mfg. Co., 596.
Standard Varnish Works, 1696.
Sturtevant Co., B. F. (Sturtevant Engineering Co.), 1478.
Thomas Clock Co., Seth, 1648.
Toch Brothers, 1722.
Trus-Con Laboratories, 46.
Vitrolite Co., 1070.
Vonnegut Hardware Co. (George Grant & Co., Agts.); (H. G. McMicken, Agt.), 597.
Wilson Corp., J. G., 526.
London, Ontario, Canada.
Richards-Wilcox Mfg. Co., 581.
Long Island City, N. Y.
Calman & Co., Emil, 1684.
General Kompolite Co., 358.
Howell, Field and Goddard, Inc., 478.
Irving Iron Works, 843.
Jeter & Company, Inc., A. H., 910.
Jewett Refrigerator Co., 1536.
Meurer Bros. Co., 446.
New York Architectural Terra-Cotta Co., 128.
Polachek Bronze & Iron Co., John, 794.
Sexauer & Lemke, 864.
Toch Brothers, 1722.
Loogootee, Ind.
Carnahan Mfg. Co., 558.
Lorain, Ohio.
Hoffman Heater Co., 1300.
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Acme Cement Plaster Company, 142.
Allith-Prouty Co., 566.
American Blower Co., 1470.
American Laundry Machinery Co., 1552.
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American Mailing Device Corp., 1641.
American Sheet & Tin Plate Co. (United States Steel Products Co., Reps.), 438.
American Steel & Wire Co. (United States Steel Products Company), 20; 262; 1348.
Atlantic Insulated Wire & Cable Co., 1357.
Barrell Co., William L. (Pacific Building Materials Co., Agts.), 419.
Beaver Board Companies, 1740.
Burdett-Rowntree Mfg. Co., 1418.
Cabot, Inc., Samuel (Matthews Paint Co., Agts.), 1707.
Chicago Bridge & Iron Works, 1514.
Clinton Wire Cloth Company (L. A. Norris Co., Agts.), 264; 1174.
Crittall Casement Window Co. J. E. Dwan, Agt.), 612.
Dayton Malleable Iron Company (Waterhouse & Price Co., Agts.), 276.
Denison Interlocking Tile Manufacturers (Los Angeles Denison Block Co., Agts.), 290.
Douglas Co., John, 949.
Dunham Co., C. A., 1075.
General Electric Co., 1321.
Hartmann-Sanders Co. (A. J. Koll Planing Mill, Rep.), 340.
Hill Pump Co. (Chas. C. Moore & Co., Agts.), 1264.
Hubbell, Inc., Harvey, 1367.
Johns-Manville Co., H. W., 430.
Johnson Service Co., 1195.
Los Angeles, Cal.—Continued.
Kawneer Mfg. Co., 930.
Kewanee Boiler Co., 1110.
Kinnear Mfg. Company, 480.
Lamson Co., 1462.
Link-Belt Co., 1460.
Luminous Unit Co., 1380.
Meurer Bros. Co., 446.
Monument Plaster Co. (Howard & Bohn, Agts.), 164.
National Fire Proofing Co., 300.
National Tube Co. (U. S. Steel Products Co.), 1218.
North Western Expanded Metal Co., 248.
Ohio Blower Co. (U. S. Metal Products Co.), 1501.
Permutit Co., 1285.
Pitcairn Varnish Co. (Patton Paint Co., Agts.), 1692.
Rapid Heater Co., 1297.
Reliance Ball Bearing Door Hanger Co. (B. V. Collins, Agt.), 578.
Richards-Wilcox Mfg. Co., 581.
Saino Fire Door & Shutter Co., 512.
Smith Metal Window Hardware Co., Frank F. (C. N. & F. W. Jonas, Agts.), 588.
Sprague Electric Works, 1336.
Trus-Con Laboratories, 46.
Trussed Concrete Steel Co., 228; 652.
Twin City Varnish Co., 1704.
Variety Manufacturing Co., 518; 546.
Vitrolite Co., 1070.
Vonnegut Hardware Co. (W. H. Steele, Agt.), 597.
Western Conduit Co. (Electric Agencies Co., Agts.), 1354.
Western Electric Co., 1402.
Westinghouse Electric & Mfg. Co. (Illinois Electric Co., Agts.), 1337.
Westinghouse Lamp Co., 1388.
Whitaker-Glessner Co., 834.
Wilson Corp., J. G., 526.
Winslow Bros. Co., 657; 812.
Yeomans Brothers Co. (F. C. Millard, Agt.), 1279.
York Mfg. Co., 1530.
Youngstown Iron & Steel Co. (Union Lime Co., Agts.), 252.
Louisville, Ky.
American Elevator & Machine Co., 1416.
Atlantic Insulated Wire & Cable Co., 1357.
Automatic Refrigerating Co., 1522.
Barrett Co., 420.
Cabot, Inc., Samuel (National Roofing & Supply Co., Agts.), 1707.
Concrete Waterproof Paint Co., 30.
Crittall Casement Window Co. (Warren Brothers, Agts.), 612.
Dayton Malleable Iron Company (Thomas L. Barret, Agt.), 276.
Denison Interlocking Tile Manufacturers (Louisville Builders' Supply Co., Agts.), 290.
Dow Wire & Iron Works, 861.
Dreadnought Flooring Company (Brecher-Buck Co., Agts.), 356.
Dunham Co., C. A., 1075.
Follansbee Brothers Company, 444.
Garden City Sand Co. (R. Hansen, Agt.), 152.
General Electric Co., 1321.
Grant Pulley & Hardware Co. (Belknap Hardware & Mfg. Co., Reps.), 670.
Grant Pulley & Hardware Co. (Tyler Building Supply Co., Agts.), 730.
Huntington Roofing Tile Co., 308.
Hydraulic-Press Brick Company (Tyler Building Supply Co., Agts.), 92.
Johns-Manville Co., H. W., 430.
Kushequa Brick Company (R. B. Tyler Co., Agts.), 106.
National Roofing Co. (Central Paint & Roofing Co., Agts.), 436; 1727.
Peerless Mfg. Co., Inc., 856.
Prox Co., Frank, 1126.
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Vitrolite Co., 1070.

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Westinghouse Electric & Mfg. Co. (H. C. Tofel Elec. Co., Inc., Agts.), 1337.
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Lamson Co., 1462.
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Hydraulic-Press Brick Company (Adams Bros.-Paynes Co., Agts.), 92.
Lyndhurst, N. J.
United Cork Companies, 1544.
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Macon, Ga.
Standard Brick Co., 109.
Malden, Mass.
Wadsworth, Howland & Co., Inc., 1676.
Manchester, England.
Wragge, Ltd., George, 658.
Manchester, N. H.
Chamberlin Metal Weather Strip Co., 720.
Manheim, W. Va.
Alpha Portland Cement Co., 129.
Manila, P. I.
Insular Lumber Co., 750.
Mankato, Minn.
Carney's Cement Co., 150.
Manlius, N. Y.
Cheney & Son, S., 338.
Mansfield, Ohio.
Denison Interlocking Tile Manufacturers (Voegele Bros. Co., Agts.), 290.
Garden City Sand Co. (Voegele Bros., Agts.), 152.
Hughes-Keenan Co., 864.
Marietta, Ga.
Kennesaw Marble Co., 56.
Marietta, Ohio.
Safe-Cabinet Co., 1599.
Marion, Ind.
Macbeth-Evans Glass Co., 1383.
Marlboro, N. H.
Webb Granite & Construction Co., 72.
Marquette, Mich.
Denison Interlocking Tile Manufacturers (N. G. DeHass, Agt.), 290.
Marseilles, Ill.
General Roofing Manufacturing Co., 428.
Marshalltown, Iowa.
Dunham Co., C. A., 1075.
Martins Creek, Pa.
Alpha Portland Cement Co., 129.
Mason City, Iowa.
Lehigh Portland Cement Company, 135.
Schwab & Sons Co., R. J., 1132.
Maspeth, N. Y.
Richey, Browne & Donald, Inc., 646.
Maurer, N. J.
Maurer & Son, Henry, 298.
Meadville, Pa.
Page Boiler Co., Wm. H., 1120.
Mebane, N. C.
American Chemical & Mfg. Co., Inc., 22.
Medicine Lodge, Kan.
Best Bros. Keene's Cement Co., 146.
Melbourne, Australia.
General Electric Co. (Australian General Electric Co.), 1321.
Pratt & Cady Co., Inc. (Richardson Orr & Co., Agts.), 1246.
Standard Varnish Works, 1696.
Memphis, Tenn.
Ayer & Lord Tie Company, 344.
Cabot, Inc., Samuel (Fisher Lime & Cement Co., Agts.), 1707.

Memphis, Tenn.—Continued.
Carter White Lead Co., 1661.
Clinton Wire Cloth Co. (Fisher Lime & Cement Co., Agts.), 264; 1174.
Concrete Waterproof Paint Co., 30.
Crittall Casement Window Co. (Noble M. Crawford, Agt.), 612.
De Soto Paint Mfg. Co., 1666.
Follansbee Brothers Company, 444.
Garden City Sand Co. (John A. Denie's Sons Co., Agts.), 152.
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Gum Lumber Manufacturers' Ass'n, 746.
Hydraulic-Press Brick Company (Memphis Brick Supply Co., Agts.), 92.
Johns-Manville Co., H. W., 430.
Kinnear Mfg. Company, 480.
New York Blower Co., 1482.
Peelle Co. (Flower & Bush, Agts.), 496.
Pittsburgh Plate Glass Co., 936.
Reliance Ball Bearing Door Hanger Co. (DeSoto Hardware Co., Agts.), 578.
Saino Fire Door & Shutter Co., 512.
Southern Seating & Cabinet Co., 1600.
Westinghouse Electric & Mfg. Co., 1337.
Meriden, Conn.
Miller & Co., Edward, 1382.
Metaline Falls, Wash.
Lehigh Portland Cement Company, 135.
Mexico City, Mexico.
Carbolineum Wood Preserving Co., 1726.
General Electric Co. (Mexican General Electric Co.), 1321.
Macbeth-Evans Glass Co., 1383.
Miami, Fla.
Denison Interlocking Tile Manufacturers (S. J. De Silva, Agt.), 290.
Middle Granville, N. Y.
Penrhyn Slate Co., 1412.
Middlebury, Vt.
Middlebury Marble Co., 53.
Milford, Mass.
Dodds & Sons Granite Co., George, 67a.
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Milwaukee, Wis.
American Luxfer Prism Co., 885.
American Terra Cotta & Ceramic Co. (Ricketson & Schwarz, Agts.), 122.
Asbestos Protected Metal Co., 440.
Best Register Co., 1172; 1486.
Bishop-Babcock-Becker Co., 1252.
Carbolineum Wood Preserving Co., 1726.
Carter White Lead Co., 1661.
Concrete Waterproof Paint Co., 30.
Consolidated Sheet Metal Works, 610.
Crittall Casement Window Co. (Jos. D. McCord, Agt.), 612.
Denison Interlocking Tile Manufacturers (Ricketson & Schwarz, Agts.), 290.
Dreadnought Flooring Company (J. Doubrawa & Son, Agts.), 356.
Dunham Co., C. A., 1075.
Ernst's Sons, C. F., 1794.
Follansbee Brothers Company, 444.
General Electric Co., 1321.
Grant Pulley & Hardware Co. (Kiefer-Haessler Hardware Co., Reps.), 670; 730.
Hill Pump Co. (Fred H. Dormer, Agt.), 1264.
Hoffman & Billings Mfg. Co., 1042.
Hydraulic-Press Brick Company (Ricketson & Schwarz, Agts.), 92.
Johns-Manville Co., H. W., 430.
Johnson Service Co., 1195.
Kerner Incinerator Co., 1576.
Marble Mosaic Co., 58.
Matthews Brothers Mfg. Co., 1750.
Milwaukee Artistic Metal Ceiling Co., 831.
Milwaukee Corrugating Co., 451.

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Grant Pulley & Hardware Co. (Honeyman Hardware Co., Reps.), 670
Hubbell, Inc., Harvey, 1367.
Hunt-Helm-Ferris & Co. (Monroe & Criswell, Agts.), 1778.
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Johnson Service Co., 1195.
National Tube Co. (U. S. Steel Products Co.), 1218.
Peelle Co. (P. L. Cherry Co., Inc., Agts.), 496.
Pittsburgh Varnish Co. (Timms, Cress & Co., Agts.), 1692.
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National Roofing Co. (Narragansett Supply Co., Agts.), 1727.
U. S. Gutta Percha Paint Co., 1674.

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AMERICAN DRAFTING FURNITURE CO.

ROCHESTER, N. Y.

Products.

Manufacturers of Drawing Tables and Attachments; Drawing Boards; Sectional Filing Cabinets; Paragon Blue-Printing Machines; Blue-Print Frames and Cars, etc., for drafting rooms in factories, schools and offices.

Co-operation with Architects.

This Company desires to establish a status of co-operation with architects for the purpose of designing special equipments in drafting furniture and allied lines, to meet special requirements for schools throughout the country, as well as to satisfy local conditions existing anywhere.

On receipt of drawings, sketches or specifications, quotations will be gladly furnished on special furniture of any kind.

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All materials entering into the above products are well seasoned, properly kiln-dried and manufactured under correct conditions. Construction is first-class in every particular, and will conform to architects' specifications, when desired; but in the majority of such products all glued joints are tongue and groove; drawers are dovetailed front and back, and fitted with three-ply veneer bottoms. All workmanship is done by experts, thus insuring best construction throughout.

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The illustrations here are those of only a few of many special designs in drafting furniture manufactured during many years of experience in this line. Regular stock is represented by the No. 820 Leader table.

Prices.

Full particulars as to construction, cost and further desired information will be promptly forwarded to architects and other interested persons.

References.

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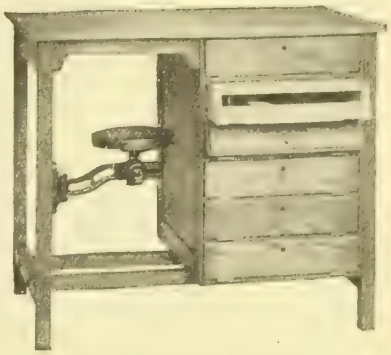
City Departments of Education—New York, Philadelphia, Chicago, Detroit, Pittsburgh, Schenectady and Rochester.

Universities and Institutes—University of Illinois; University of Rochester; Union University; Carnegie Institute; Wentworth Institute, and many others.

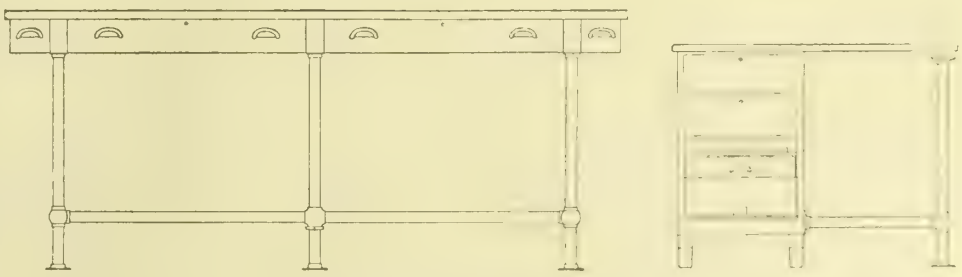


FIVE-DRAWER TABLE
With space in drawer for the drawing board

SIX-DRAWER AND BOARD CUPBOARD TABLE

NO. 820 LEADER TABLE

SPECIAL DRAWING FURNITURE
For Schools, Colleges, etc.



TWO TYPES OF PIPE BASE TABLES
Special tables made in large quantities with other equipment for the Massachusetts Institute of Technology, Boston, Mass.

DEFIANCE MANUFACTURING COMPANY

Architects', Engineers' and Artists' Supplies

22 East 41st Street
NEW YORK, N. Y.

BRANCHES
BOSTON PHILADELPHIA CHICAGO

Products.

High-grade Tracing Cloths, Tracing Papers, Drawing Papers, Blue-Print Papers, Black-Print Papers; Drawing Instruments, "Defiance" Parallel Straight Edge, T-Squares, Triangles, Curves; Printing Frames; Cross-Section Papers; Field Books; Scales; Rules; Slide Rules, Section Liners; Pantographs; Protractors; Drawing Boards, Drawing Tables, Drawing Inks; Colors, Pastes, Brushes, Pencils, Pens; Surveyor's Transits, Theodolites, Levels, Plane Tables, Sight Poles, Chains, Arrows, Plumb Bobs, Leveling Rods, Compasses, Planimeters, Anemometer, Current Meters, Barometers, Prism Binoculars; Blue and Black Prints, Lithographic Reproductions, and Compo-Board.

TRADE-MARK

Defiance Automatic T-Square.

The "Defiance" Parallel Straight Edge or automatic T-square can be mounted on any board or table in a very few minutes. It is freely moved up and down the board, and is guaranteed to remain parallel to its original setting, regardless of temperature. By a slight adjustment of the cord it can be placed at any angle to the board, and parallel lines can be drawn from the top to the bottom. There is no thought or anxiety on the part of the operator as to the ultimate accurate results. One finger does the work, leaving the other nine to execute the drawing. Fifty per cent of the labor of drafting is eliminated by its use.

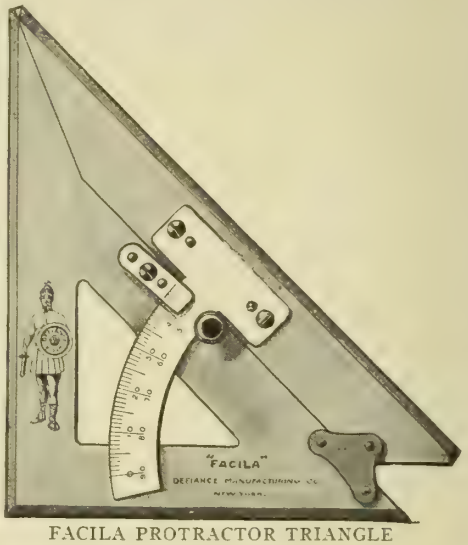
DEFIANCE AUTOMATIC T-SQUARE

Defiance Tracing Cloth.

The Defiance Tracing Cloths are unequalled for brilliancy, transparency, and erasing quality. The "Stirling" brand has justly been called "next to glass." The finest pencil lines are plainly visible, and prints from pencil drawings can be reproduced with the brilliancy of an ink drawing on other cloths.

Tracing and Lithographic Productions.

In addition, we have the largest plant in America for the reproduction of tracings, either on blue paper, white paper with black lines, or black paper with white lines. Our lithographic process not only enables the architect or engineer to get a perfect print, but where necessary to preserve the original tracing, we can make reproductions of such on tracing cloth equal to the original. The above applies also to linen, as well as paper and tracing cloth.



FACILA PROTRACTOR TRIANGLE

Defiance Triangle and Protractors.

The Defiance special celluloid triangles and protractors are made of a very heavy transparent, beveled celluloid which will not warp nor become distorted by heat or moisture. The "Facila" triangle, or protractor triangle, is a new and novel form which is most useful for plotting roof pitches, earth work, letters, or any class of work where rapid angular measurements are necessary.

Compo-Board.

Compo-Board

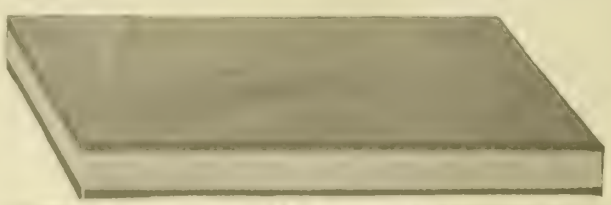
TRADE-MARK

Compo-Board is used by many architects to take the place of lath and plaster. It is made from small slabs of well seasoned wood placed between two layers of fiber board. This is cemented together under heavy pressure, which gives it a very smooth hard surface. The scientific method used in its manufacture produces a slab which is perfectly flat, strong, slow burning, durable, sanitary, economical and easily put up.

Every slab of compo-board is marked with dots showing the places at which it should be nailed to the studding. These marks are so spaced that they will come in the proper line with the studding as commonly laid out by the architect.

After the compo-board is securely nailed to the studding, if paper is to be used, it is only necessary to plaster the joints with any commercial filler, then paper.

If it is to be painted, it should be sized with shellac in addition.



SECTION OF COMPO-BOARD SHOWING CONSTRUCTION

ECONOMY DRAWING TABLE CO.

Drawing Tables, Sectional Filing Cases and Special Furniture

TOLEDO, OHIO

Products.

Manufacturers of Drawing Tables, Sectional Filing Cases, Special Furniture for Schools, Colleges, Offices and Public Buildings.

Facilities.

We operate the largest special furniture factory in Ohio, and carry a large variety of styles in stock for immediate shipment. All work is of the highest grade.

Specifications for Standard Tables and Cases.

Material—Drawing boards and tops of tables made of soft white pine. All other exposed parts of standard tables, plain oak. All exposed parts of filing cases oak, except backs, which are plain beaded work. Drawers and slides of cherry or other hardwood. Drawer bottoms a single panel of three-ply veneer. Other unexposed parts of light, soft wood. All material air-seasoned, kiln-dried and kept at an even temperature during manufacture. Material heated before gluing.

Construction—Workmanship is best cabinet work, all joints mortised, tenoned and glued. Drawer sides dovetailed to front and back. Tops fastened to frames with buttons in slots, allowing expansion and contraction. Frame of tables independent of top, firmly constructed and thoroughly braced.

Finish—Three-coat, dull-rubbed. Unless otherwise requested, work is finished in antique oak, but any kind of finish can be made.

Standard Drawing Tables.

Standard Drawing Tables have a frame of braces about six inches from floor, insuring rigidity and providing foot rest for the draftsman. There are wide rails at the ends and back of table tops. Across the front there is a rubbing strip, and a flat rail dovetailed into the top of the legs. A guard ¼ inch high runs along top of table at back to prevent pencils and papers from falling off. Vertical adjustment of tables Nos. 0 to 4 is secured by raising blocks.

Tops can be made to tilt if desired, and when so ordered a panel is placed under the top to protect the contents of drawers.

Standard Filing Cases.

Standard Filing Cases are made with same care and class of work as the tables. Drawers are dovetailed together, and not doweled or nailed. Drawers work smoothly, and are provided with a 6-inch cover at the top and back to prevent contents falling out. Sections are held in position in all directions

Adjustable Iron Tables.

The distinguishing features of Economy Adjustable Tables are their stability, the large range of adjustments, and the ease and rapidity with which changes of adjustment are accomplished. Stands are made of best gray cast iron, accurately machined and finished with several coats of black enamel.

Double-column tables have a positive vertical adjustment, with racks and pinions, operated through a spring ratchet by the foot lever at the front. Small handle at the right clamps the top at any angle. A perfect system of braces and reinforcements assures stability. Notice that every adjustment is made from the front or drawing position.

Single Pedestal Table No. 21 is extra heavy and has a positive vertical adjustment, with rack and pinion, operated entirely by the large hand-wheel. The top can also be inclined or revolved independently of the height. The weight of the top on tables No. 22 and No. 23 is counterbalanced by a steel spring.

Defiance Parallel Ruler Attachment.

This is a new and improved parallel ruler that is rapidly replacing the old style "T" square. Its ball-bearing pulleys and silk-covered tinsel cord give a smooth and accurate motion to the straightedge, that cannot be obtained in any other way. The straightedge does not project beyond the edges of the board, and can be attached to the whole or any part of the surface.

Drawing Board.

Loose inclined Drawing Board is made of selected soft pine, ⅞ inch thick, with 2 by 1¼ inches dovetailed hardwood ledges to prevent warping. Board is inclined by means of turned raising blocks 2½ inches high.

Tool Tray and Frame.

Tray Frame is 7¾ by 18 inches with four compartments for scales, etc. Over this slides a tray 7¾ by 7¾ by 1 inches, with five compartments for pencils, erasers, tools, etc. Made to fit in the small drawers of any table if desired.

Holding Down Wires and Spring Cover.

Either device can be attached to the inside of any drawer. They increase the capacity of drawers, and prevent drawings from catching when opening and closing drawers. The fuller the drawer the more effective they become.

Locks.

It is desirable to have one small drawer with lock. Two keys are furnished with each ordinary lock. Locks may be master-keyed for a number of tables.

Specialties.

A specialty is made of large orders.

Besides a life-long experience in the manufacture of furniture, we have been making a specialty of high-grade drawing tables and filing cases for over fifteen years. The Economy type of tables and cases embraces a range of styles and sizes that is designed to meet every need.

References.

We have built thousands of tables and cases, as illustrated on the following pages. Our customers include the largest and most prominent manufacturers, contractors, architects, engineers and colleges in the country. The testimonials on file from these sources are proof of the fact that the Economy Tables and Cases are the best and most economical in the market.

Continued on next page

PRICE LIST OF TABLES AND FILING CASES

Heavy Standard Drawing Tables

Table	Size	Drawers	Price	Shpg. Wgt.
No. 0	39″ x 84″	8	$48.00	400 lbs.
No. 0-A	39″ x 84″	5	35.00	300 "
No. 1	39″ x 84″	8	45.00	350 "
No. 1-A	39″ x 84″	3	32.00	275 "
No. 2	34″ x 72″	8	42.00	300 "
No. 2-A	34″ x 72″	3	30.00	250 "
No. 3	33″ x 60″	2	20.00	175 "
No. 4	33″ x 60″	6	30.00	225 "

Price of any table with an adjustable top, extra $3.00.
Prices are for plain tables only, with raising blocks.

Adjustable Iron Tables

Table	Size	Price	Shpg. Wgt
No. 5	37″ x 60″	$37.00	200 lbs.
No. 5	37″ x 72″	40.00	210 "
No. 5	43″ x 72″	43.00	220 "
No. 5	43″ x 84″	46.00	240 "
No. 5	48″ x 96″	52.00	260 "

The price of Table No. 6 is $18.00 more and weighs 50 lbs. more than Table No. 5, each size respectively.
Table Nos. 5 or 6, with wooden foot rest, extra $1.00.

Table	Size	Price	Shpg. Wgt.
No. 20	23″ x 26″	$10.50	80 lbs.
No. 21	23″ x 26″	13.00	90 "
No. 22	20″ x 24″	9.00	60 "
No. 23	18″ x 24″	9.00	60 "

Tables Nos. 20 to 23, with horizontal shelf, extra $1.50.

Special Tables

Tables Nos. 7 to 14 are made to order. Prices quoted on application, depending on quantity required.

Standard Filing Cases

	Price	Shpg. Wgt.
Drawers 32″ x 44″		
Section of 6 drawers 2″ deep	$24.50	160 lbs.
Section of 4 drawers 3 5/16″ deep	22.50	160 "
Section of 2 drawers 4″ deep, half size	7.50	80 "
Section with 1 drawer 4″ deep	5.50	80 "
Loose cap	6.00	45 "
Plain base	3.00	35 "
Sanitary base 8″ high	5.50	40 "
Base with 4″ deep drawer	7.25	80 "
Drawers 26″ x 38″		
Section of 6 drawers 2″ deep	$22.00	125 "
Section of 4 drawers 3 5/16″ deep	20.00	125 "
Section of 2 drawers 4″ deep, half size	7.00	60 "
Section with 1 drawer 4″ deep	5.00	60 "
Loose cap	4.75	30 "
Plain base	2.75	25 "
Sanitary base 8″ high	5.00	30 "
Base with 4″ deep drawer	6.50	60 "

Dustproof Filing Case

	Price	Shpg. Wgt.
Drawers 32″ x 44″		
Section of 7 drawers 1½″ deep	$33.00	200 lbs.
Loose cap	6.00	50 "
Plain base	3.25	40 "
Base with 4″ deep drawer	7.50	90 "
Drawers 26″ x 38″		
Section of 7 drawers	$30.00	175 "
Loose cap	4.75	35 "
Plain base	3.00	25 "
Base with 4″ deep drawer	7.00	70 "

Filing cases are not fitted with holding-down wires or spring covers unless ordered as extras.

Extras

	Price
Loose inclined board 32″ x 44″	$ 3.75
Loose inclined board 26″ x 38″	2.70
Tool tray and frame fitted in drawer	1.50
Lock, ordinary, 2 keys	.50
Lock, master keyed 2 keys each, 1 master key with eight or more locks	1.00
Holding-down wires, per pair	.20
Spring covers, per drawer	.40
Label holders, per dozen	1.00
Extension parallel ruler attachment	Depends on size and style.
Straightedge	
T Squares, Triangles and Stools	Depend on size and style.

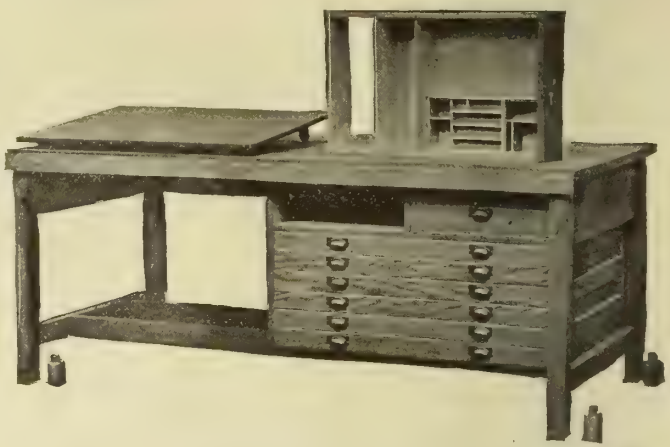
All prices are f.o.b. cars Toledo, and are subject to change without notice.

Catalogue.

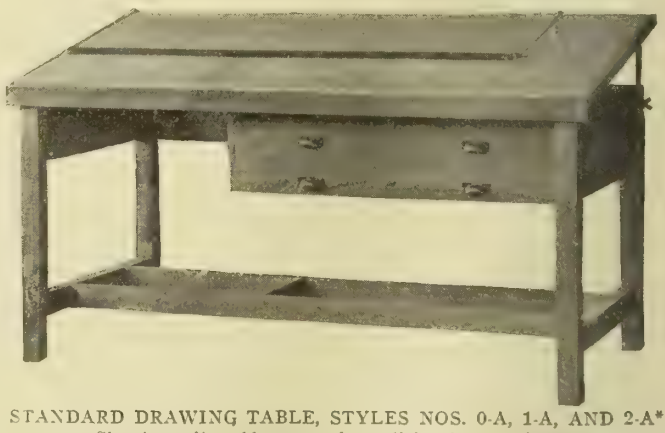
Our forty-eight-page catalogue, with full information and illustrations, sent on request.

Special Designs.

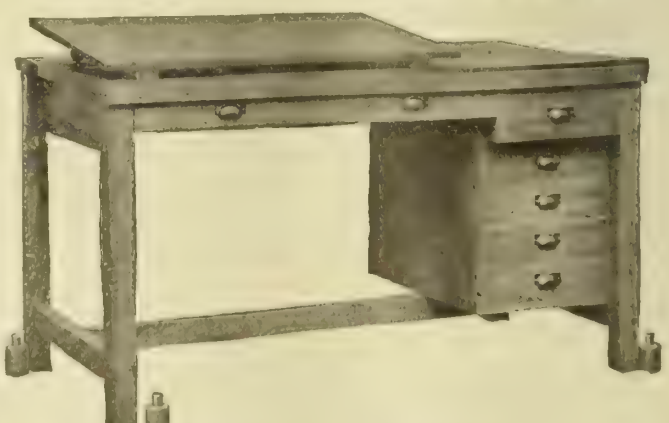
Designs furnished for special work upon receipt of information.



STANDARD DRAWING TABLE, STYLES NOS. 0, 1 AND 2*
Style No. 0—Top, 39″ x 84″
2 Drawers, 21″ x 24″ x 5¼″; 6 Drawers, 32″ x 44″ x 2″
Style No. 1—Top, 39″ x 84″
2 Drawers, 18″ x 24″ x 5¼″; 6 Drawers, 26″ x 38″ x 2″
Style No. 2—Top, 34″ x 72″
2 Drawers, 18″ x 24″ x 5¼″; 6 Drawers, 26″ x 38″ x 2″



STANDARD DRAWING TABLE, STYLES NOS. 0-A, 1-A, AND 2-A*
Showing adjustable top and parallel ruler attachment
Style No. 0A—Top, 39″ x 84″
2 Drawers, 21″ x 24″ x 5¼″; 1 Drawer, 32″ x 44″ x 2″
Style No. 1A—Top, 39″ x 84″
2 Drawers, 18″ x 24″ x 5¼″; 1 Drawer, 26″ x 38″ x 2″
Style No. 2A—Top, 34″ x 72″
2 Drawers, 18″ x 24″ x 5¼″; 1 Drawer, 26″ x 38″ x 2″

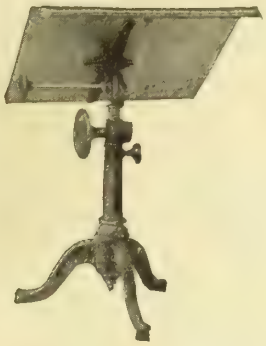


STANDARD DRAWING TABLE, STYLE NO. 4*
Style No. 4—Top, 33″ x 60″; 1 Drawer, 26″ x 38″ x 2½″; 1 Drawer, 13″ x 26″ x 4″; 4 Drawers, 13¾″ x 21¼″ x 3¾″
Style No. 3—Same as No. 4; without drawers, 13¾″ x 21¼″
* Note—Standard Drawing Tables are 34″ high

Continued on next page

STYLE NO. 6

Double-Column Adjustable Table
Style No. 6—Top, 37″ x 60″ to 48″ x 96″, as ordered
Height, 32″ to 48″
2 Drawers, 18″ x 24″ x 4″; and 1 Drawer, 26″ x 38″ x 1½″
Style No. 5—Same as No. 6, without drawers



STYLE NO. 21, WITH HORIZONTAL SHELF

Top, oak, 23″ x 26″
Very heavy and rigid
Style No. 20 has not the rack and pinion raising device

STYLE NO. 23

Top, pine, 18″ x 24″
Four distinct and independent adjustments
Style No. 22 has a clamp like No. 21 for inclining top

STYLES NOS. 7, 8 AND 9

Style No. 7—Top, 30″ x 40″
2 Drawers, 26″ x 33″ x 3″
Style No. 8—Top, 30″ x 48″
2 Drawers, 19½″ x 26″ x 4¼″
Style No. 9—Top, 30″ x 40″
Without drawers

STANDARD SECTIONAL FILING CASE:

Made in following sizes:
Section of 6 drawers 26″ x 38″ x 2″
Section of 6 drawers 32″ x 44″ x 2″
Section of 4 drawers 26″ x 38″ x 3 5/16″
Section of 4 drawers 32″ x 44″ x 3 5/16″
Section of 2 drawers 18″ x 24″ x 4″
Section of 2 drawers 21″ x 32″ x 4″
Section of 1 drawer 26″ x 38″ x 4″
Section of 1 drawer 32″ x 44″ x 4″
Loose cap and base. Base plain, 8″ sanitary or with 4″ deep drawer

STYLE NO. 10

Top, 30″ x 36″; 4 Drawers, 6¼″ x 27″ x 3¾″
Drawing Board Cabinet for four boards
Can be built with 2, 4, 6, or 8 Drawers, and with 1 or 2 Cabinets for from 4 to 16 boards

DUSTPROOF SECTIONAL FILING CASE

Similar to standard case. A sliding door covers front of each section, leaving an air-space between drawer fronts and door. Made in two sizes:

Section of 7 drawers 26″ x 38″ x 1½″
Loose cap, plain or 4″ deep drawer base
Section of 7 drawers 32″ x 44″ x 1½″
Loose cap, plain or 4″ deep drawer base

STYLE NO. 13

Top, 34″ x 56″ x 1¼″
6 Drawers, 11″ x 23″ x 3¼″
Drawing Board Cabinet for 6 boards
Other styles similar

Note—All drawer dimensions are inside dimensions

NEW YORK BLUE PRINT PAPER COMPANY

MAIN OFFICE AND FACTORY
58-60 Reade Street
NEW YORK, N. Y.
BRANCH OFFICE, 50 Church Street

AMERICAN BLUE PRINT PAPER COMPANY

MAIN OFFICE
335 Plymouth Street
CHICAGO, ILL.

Manufacturers of Sensitized Papers, Drawing Papers and Materials, Etc.

Products and Services.

Manufacturers of SENSITIZED PAPERS and CLOTHS, including the "SUPERIOR" and "AMERICAN" BRANDS of BLUE and BROWN PROCESS; Importers of DRAWING and TRACING PAPERS, TRACING CLOTH, DRAWING MATERIALS, etc.

NYB
TRADE-MARK

DRAWINGS reproduced by all processes; LYTHO-ZINC REPRODUCTIONS, EUREKA LYTHOS, and STEEL PRINTS on any stock of paper and cloth; BLUE, BLACK and BROWN PRINTS on Paper and Cloth; BLUE LINE PRINTS on Paper and Cloth; PHOTO REDUCTIONS of Tracings; HECTOGRAPH COLOR COPIES; DRAWINGS and MAPS MOUNTED.

Also, DRAUGHTING ROOM FURNITURE, BLUE-PRINT EQUIPMENTS, SURVEYING and DRAUGHTING INSTRUMENTS; SCIENTIFIC PUBLICATIONS, etc.

Blue-Printing Departments.

These departments are fully equipped with the latest and most practical types of blue-print apparatus, so that there is no possibility of any work being delayed, irrespective of quantity, whether from out of town or in the city. The present combined equipments include the following electric blue-printing machines:

Sixteen upright printing machines, each having a capacity for making two prints, size 42 by 72 inches, at one time.

Seventeen continuous blue-printing, washing and drying machines, sixteen of which are 54 inches wide —two of these being equipped with an attachment for making direct blue line prints—the other is 66 inches wide.

Four continuous blue-printing machines 54 inches wide.

Eight continuous, steam, blue-print drying machines.

The combined organizations are therefore in a position to turn out a larger quantity of blue-prints (in the shortest possible time) than any other establishment in the United States.

All inquiries are respectfully solicited. Prices will be gladly given upon request.

Lytho-Zinc and Eureka Photo Printing Departments.

These departments are equipped with the latest and most improved types of machinery for turning out large quantities of black and white prints (absolutely true to scale). Any desired number of reproductions of original tracings can be made upon drawing paper, cardboard, tracing cloth and white cloth, tracing paper, etc., almost as quickly as blue-prints, and *at but a fraction of the cost* of copying by hand. The reproductions are not washed, and therefore *can not shrink*. The lines will not fade as they are of a *solid black ink* that is absolutely permanent, and will not smudge or rub off with customary handling.

Lytho-Zinc and Eureka Lytho reproductions on tracing cloth make as clear blue-prints as can be made from the original tracings. With these processes, it is possible to block out any portion of the original tracings that is not desired on the reproductions, without injury to the original.

This system is also very well adapted for specifications or any form of typewritten work, originals being carbon backed on transparent paper.

Drawing Materials, etc.

A large and complete stock of draughting-room requisites is always carried on hand for immediate delivery. This stock includes:

Draughting-room stationery, drawing inks, water colors, brushes, pencils, erasers, etc.

Scales, protractors, triangles, T-squares, curves, etc.

Field Equipment such as tapes, rods and compasses, etc.

Delivery.

All orders are shipped the same day as received, irrespective of quantity.

RECTIGRAPH COMPANY

ROCHESTER, N. Y.

Product.

The RECTIGRAPH, a Photographic Copying Machine.

Description.

The Rectigraph is a simple and practical apparatus for the rapid photographing of printed or written documents, maps, drawings, records, etc., directly upon the surface of sensitized paper with the image in correct position. Copies made with equal facility from either loose sheets or bound volumes. It is just as simple to operate as a blue-print apparatus and may be run by any office boy of ordinary intelligence.

It differs from the blue-print apparatus, inasmuch as the drawings may be reduced or enlarged as well as reproduced full-size. Furthermore, it is not necessary that the drawings be made on tracing or any special paper, as the Rectigraph will reproduce perfectly drawings, written documents, maps, plans, etc., made on any material and in either ink, pencil or tone.

Application.

The Rectigraph is used by hundreds of enterprising architects, manufacturing concerns, railroads, public service, government and municipal departments, etc., for copying a great variety of work. A few of its important uses are given below.

Reducing or Enlarging Drawings—A drawing may be enlarged or reduced with the Rectigraph. Through this feature the scale of a drawing may easily be changed. You can reduce your drawings, tracings, blue-prints, etc., to a uniform size suitable for binding in loose-leaf books. Show your client a book of attractive plans and elevations, not a pile of curled up tracings or prints.

Inking Drawings Not Necessary—As the Rectigraph will reproduce clearly and distinctly all pencil drawings, a drawing need not be carried beyond the pencil stage.

Tracings Need Not be Made—It is not necessary to trace a drawing in order to get copies, as the Rectigraph will reproduce copies direct from the original.

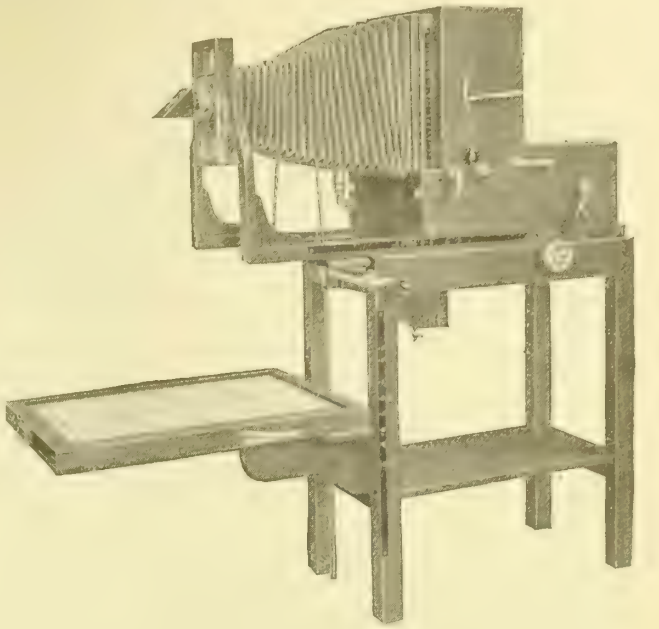
No Checking or Comparing—No one is infallible. When a drawing is traced or a document is copied errors frequently "slip through," although it may have been carefully compared. A Rectigraph *cannot* make a mistake, as it cannot reproduce anything which is not on the original. A wrong dimension copied on a drawing may mean spoiling a set of castings; a map distance copied wrong may necessitate re-surveying a piece of property; a mistake in a legal document may lose a lawsuit.

Borrowed Drawings—Architects and engineers frequently borrow maps, plans and drawings from other offices so as to make a copy for their own files. With a Rectigraph an exact copy may be made and the original returned within five minutes.

Office Records—As a matter of space economy, office copies of plans, drawings, etc., may be reduced to as small as letter size, or even smaller; and should a larger copy be needed at any time, it may be enlarged to desired size.

Copying Blue-Prints—This is the only machine which will copy blue-prints. A Rectigraph print of a blue-print has strong black lines on a white background.

Colored Work—By the use of a ray filter, provided with each machine, any color or combination of colors may be readily reproduced, the results appearing in grays and blacks according to depth of original colors. This is a valuable feature, as all colored inks may be recognized in the reproduction through natural variation of tone.



COMPLETE RECTIGRAPH UNIT

Advertising Department—In making layouts for advertisements and catalogues, it is often desirable to see how a certain photograph would look reduced. With a Rectigraph a reduced copy of the photograph or drawing may be made and pasted on the layout, showing graphically just how the finished advertisement or catalogue will appear.

Reference Letters—Instead of giving salesmen a "copy" of a good reference letter, you can give them actual reproductions which show the letterhead, body and signature as natural as the original. This may be done for less money than typewritten copies cost you.

Operation.

The magazine holds a roll of sensitized paper, sufficient for three hundred to five hundred prints. The drawing or blue-print to be copied is placed on the copy board; an exposure is made; a turn of the crank runs the paper into the developer; a turn of another crank cuts the paper and places it in the hypo—ready to be washed and dried—the entire operation taking but a fraction over a minute.

Lighting.

The Rectigraph will give perfect results with natural light, or may be used with a special mercury vapor lamp, which will permit the use of the machine on dark, cloudy days as well as at nighttime. The cost of operating these lights is very low, as they may be attached to an ordinary lamp socket.

Co-operative Service.

This organization will be pleased to submit samples of Rectigraph prints (preferably from drawings you may submit), and show you just how this machine may be applied to your business.

THE CONCRETE STEEL PRODUCTS CO.

Engineers

McCormick Building

CHICAGO, ILL.

Service.

This Company specializes in the DESIGN of REINFORCED CONCRETE STRUCTURES and offers to Architects expert and prompt service of this nature.

ENGINEERING DESIGNS which we prepare are accompanied by complete steel lists, bending details and setting diagrams, and, in addition, specifications covering the reinforced concrete work.

The wide range of our experience makes it possible for us to prepare the most economical designs, and at the same time to comply with the highest standards of engineering.

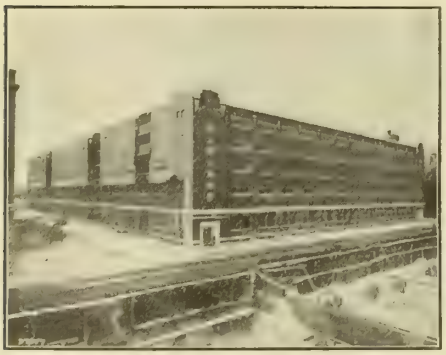
The large volume of work which we do has made it possible for us to standardize our designing and detailing methods. These standards are prepared with the object of providing a set of plans which can be the most readily and easily followed and executed with accuracy.

We are indebted to many of our clients for the courtesy of permitting us to use their names as references. A list of these names will be sent on request.

The standing of these firms is, in itself, a testimony to our Engineering Service. We are always willing to submit, without obligation, preliminary designs accompanied by cost estimates.

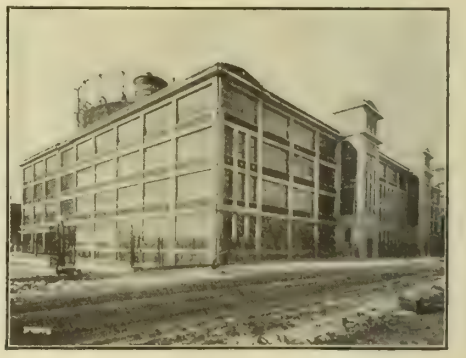
SOME 1915 CLIENTS

In-bound Freight House for the Pennsylvania R. R Co., Philadelphia, Pa.
Midland Storage Warehouse for the Central Manufacturing District, Chicago, Ill., S. Scott Joy, Architect
McCurdy Hotel, Evansville, Ind., H. Ziegler Dietz, Architect; W. E. Russ, Consulting Architect
Garage and Stable for the Wells Fargo Company, Kansas City, Mo., Henry F. Hoit, Architect
Second Regiment Armory for the State of Illinois, Chicago, James B. Dibelka, Architect
The Federal Warehouse, Peoria, Ill., Reeves & Baillie, Architects
Service Building and Garage for The Packard Motor Car Company, Chicago, Mundie & Jensen, Architects
Telephone Exchange for the Marion County Telephone Company, Marion, Ohio, Frank D. Chase, Architect
The Island Hotel, Aurora, Ill., H. Ziegler Dietz, Architect
Warehouse for The Robert Simpson Company, Ltd., Regina, Sask., Can., N. Max Dunning, Architect
Stable and Warehouse for The Standard Oil Company, Elgin, Ill., H. P. Beers, Architect
Packing Plant for the Farmers Co-Operative Packing Company, Wausau, Wis., Gardner & Lindberg, Engineers
Shawnee Hotel for The Link Hotel Company, Springfield, Ohio, H. Ziegler Dietz, Architect
Passenger Terminal for The Delaware, Lackawanna & Western R. R. Co., Buffalo, N. Y.
Cooler Building for Sulzberger & Sons Company, Sao Paulo, Brazil.
Bridge for the Minneapolis, St. Paul & Sault Sainte Marie Railway Company, Minneapolis, Minn.



MIDLAND STORAGE WAREHOUSE, CHICAGO, ILL.

REID, MURDOCK & CO. WAREHOUSE, CHICAGO, ILL.



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Consultation Services in all Engineering Fields—Mechanical, Civil, Hydraulic, Electrical and Chemical.

The Supervision and Detail Inspection of Concrete Construction, including Examinations and Reports upon the suitability of aggregates.

Reports on existing conditions of buildings and other structures.

Testing, Physical and Chemical.

Duty and efficiency tests of entire plants—Engines, boilers, pumps, compressors and other machinery.

Strength tests of materials and systems of construction—Steel, iron, cement, brick; columns, beams, floor slabs, partitions and other members.

Chemical tests of all building materials, including steel, iron, cement, paints, oils, slags, limestones, marls and clays.

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The inspection of structural material at the mills and foundries, including the identification and witnessing of physical tests.

The supervision and inspection of workmanship, checking the sections, dimensions and detail connections during the course of fabrication at the shops, insuring the proper handling of the material, first class workmanship, accurate construction, thorough painting and distinct marking, thus facilitating the erection at the site.

Estimating the weights from detail drawings and checking shipped weights of finished work.

The supervision and detail inspection of the structure during erection.

Cement Inspection.

The testing of cement, including the sampling in car load or bin lots at the mills or warehouses, or when delivered on the work.

Complete cement and chemical laboratories at Chicago, New York, Pittsburgh, St. Louis, San Francisco, Cincinnati, Seattle, Los Angeles, Montreal, Vancouver, and London.

Specification Forms.

The following is a form for incorporation in specifications for buildings and other structures covering relationship between inspectors and contractors concerning matters of inspection:

General—All materials of construction shall be subjected to inspection and tests wherever and whenever desired by the architect or engineer.

This inspection service shall be placed in the hands of competent inspectors appointed by the architect or engineer. They shall be the agents of said parties, and they shall report to them the results of inspection and the progress of the work, and otherwise facilitate the prompt and early delivery of satisfactory materials.

The cost of inspection is to be borne by the contractor.

The inspection, acceptance, or failure to inspect shall in no way relieve the contractor from his responsibility to furnish satisfactory materials; and the architect or engineer reserves the right to reject any material, at any time, before the completion and acceptance of the structure, if in his judgment it does not comply with the terms of the specification or of good practice.

Standard Specifications.

A copy of a recommended specification for structural steel for building construction and a booklet containing standard specifications for Portland cement adopted by American Society for Testing Materials may be obtained on request at our General Office, 2200 Insurance Exchange, Chicago.

GEORGE BAKER LONG

General Contractor

WORCESTER, MASS.

BRANCH OFFICES

LEXINGTON, KY. BUFFALO, N. Y.

Services.

GENERAL CONTRACTOR and ENGINEER.

Personal Attention.

Our success is largely due to careful personal attention to every detail. We take what we believe to be a pardonable pride in stating that we have never had a lawsuit on a contract.

Territory.

We accept contracts throughout the United States and Canada.

Facilities.

Our years of experience and complete equipment enable us to handle contracts of any size.

STATE CAPITOL, FRANKFORT, KY.
F. M. ANDREWS & Co., Architects

References.

The following is a list of some important contracts we have executed, and we would draw special attention to the number of times we have received a second contract from the same owners and architects:

Office Building, Lexington, Ky. City National Bank, Owner. J. Will Stoll, President. Richards, McCarty & Bulford, Architects, Columbus, Ohio

Architectural Terrace Work, State Capitol, Frankfort, Ky. F. M. Andrews & Co., Architects, New York City

Hotel Patten, Chattanooga, Tenn. J. T. Lupton, Treasurer. W. T. Downing, Architect, Atlanta, Ga.

Department Store Building, Akron, Ohio. M. O'Neill, Owner. Harpster & Bliss, Architects, Akron, Ohio

Hotel Portage, Akron, Ohio. M. O'Neill, President. Esenwein & Johnson, Architects, Buffalo, N. Y.

Public Library, Niagara Falls, N. Y. E. E. Joralemon, Architect, Buffalo, N. Y.

South Park High School, Buffalo, N. Y. Green & Wicks, Architects, Buffalo, N. Y.

Power House and Reservoir, Depew, N. Y. Gould Car Coupler Company, Owners, New York City. Wellman-Seaver-Morgan Company, Engineers, Cleveland, Ohio

Passenger and Freight Depot, Winchester, Ky. Lexington & Eastern Railroad, Owners. Richards, McCarty & Bulford, Architects, Columbus, Ohio

Elizabeth Apartment House, Chattanooga, Tenn. J. T. Lupton, Owner. W. T. Downing, Architect, Atlanta, Ga.

Freight Houses and Office Building, Birmingham, Ala. Southern Railway Company, Owners and Engineers, Washington, D. C.

Bancroft Hotel, Worcester, Mass. Bancroft Realty Company, Owners. Esenwein & Johnson, Architects, Buffalo, N. Y.

Cast Steel Plant, Depew, N. Y. Gould Car Coupler Company, Owners, New York City. Wellman-Seaver-Morgan Company, Engineers, Cleveland, Ohio

Manufacturing Plant, Niagara Falls, N. Y. Carter-Crume Company, Owners. George M. Miller & Company, Architects, Toronto, Ont., Can.

Municipal Building, Leominster, Mass. Frost & Chamberlain, Architects, Worcester, Mass

Continued on next page

SOUTH PARK HIGH SCHOOL, BUFFALO, N. Y.
GREEN & WICKS, Architects

HOTEL PATTEN, CHATTANOOGA, TENN.
W. T. DOWNING, Architect

BANCROFT HOTEL, WORCESTER, MASS.
ESENWEIN & JOHNSON, Architects

MUNICIPAL BUILDING, LEOMINSTER, MASS.
FROST & CHAMBERLAIN, Architects

HOTEL PORTAGE, AKRON, OHIO
ESENWEIN & JOHNSON, Architects

R. GUASTAVINO, President WM. E. BLODGETT, Treasurer F. M. SUMMERVILLE

R. GUASTAVINO COMPANY

INCORPORATED UNDER THE LAWS OF THE STATE OF MASSACHUSETTS

Designing and Installing the System of Timbrel Vault Construction and Installation of "Rumford" Tile for Improving Acoustic Properties

BOSTON, MASS.
60 STATE STREET

Fuller Building
NEW YORK, N. Y.

FACTORY
WOBURN, MASS.

TELEPHONE, Gramercy 6567

Products and Services.

The business of this Company is that of Designing and Installing the System of Timbrel Vault Construction with which its name has been identified for many years. Also, "Rumford" Tile, for use in Auditoriums, to improve acoustic properties.

It is equipped for work in any section.

Timbrel Tile.

The Company owns and operates for its sole use, as contractors, a factory for the manufacture of the finer grades of Timbrel Tile required in its exposed or finished work, thus having unexcelled facilities for prompt installation and the making of special pieces in connection with its contracting business.

Ceilings, Roofs, Floor Construction.

A large portion of our business is the construction of large vaulted Ceilings and Roofs in all forms, and Floor Construction for very heavy loads.

Construction—In nearly all [illegible] the small amount of steel required is used in tension only, and thoroughly embedded in the masonry. This system of construction has been approved by the New York Building Department.

ST. THOMAS'S CHURCH, NEW YORK, N. Y.
View showing Tile Ceiling
Cram, Goodhue & Ferguson, Architects

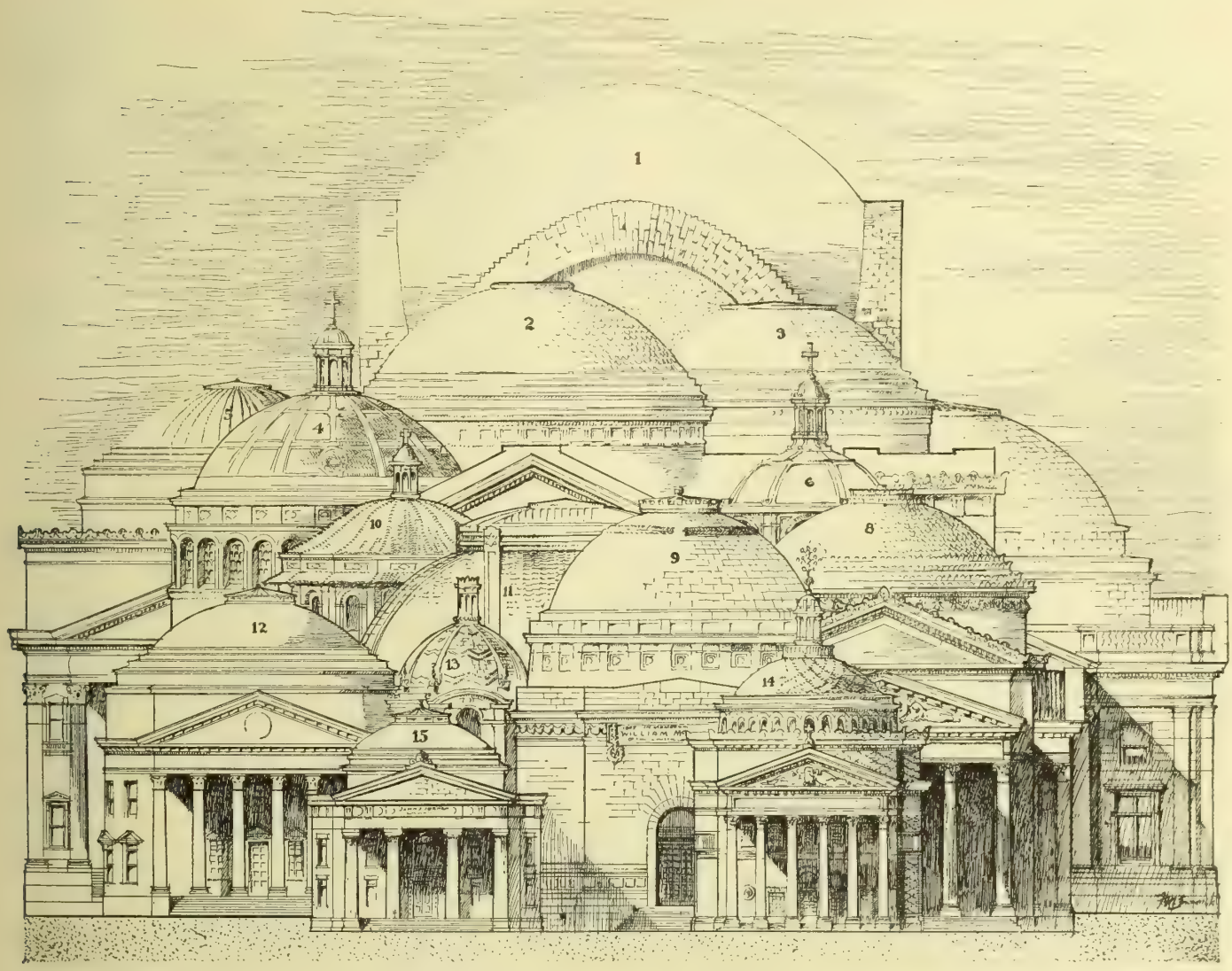
Continued on next page

Adaptability.

The class of work for which this system is particularly adapted is that of buildings of a monumental type, State Houses, Court Houses, Churches, Libraries, etc., in which the vaulted ceiling is notably acceptable, especially when laid in finished repressed tiles of designs as required, either unglazed or glazed, of any color desired.

Co-operative Service.

Owing to the varied uses of our construction, involving engineering and architectural features, the more satisfactory method is to send us, before the plans are fully drawn, a sketch outline of the requirements, which will enable us to indicate the most approved method of treatment and the approximate cost.



SOME DOMES CONSTRUCTED BY R. GUASTAVINO COMPANY

	BUILDING AND LOCATION	SPAN	ARCHITECT
1.	Cathedral, St. John the Divine, New York, N. Y.....	135 ft. at base	Heins & La Farge
2.	National Museum, Washington, D. C.....	80 " " "	Hornblower & Marshall
3.	Institute of Arts and Sciences, Brooklyn, N. Y.....	64 " " "	McKim, Mead & White
4.	St. Francis de Sales Church, Philadelphia, Pa.....	61 " " "	Henry D. Dagit
5.	Bank of Montreal, Montreal, Can.....	69 " " "	McKim, Mead & White and A. T. Taylor
6.	Church of St. Barbara, Brooklyn, N. Y.....	43 " " "	Helmle & Huberty
7.	Girard Trust Co., Philadelphia, Pa.....	64 " " "	McKim, Mead & White
8.	University of New York, New York, N. Y.....	70 " " "	McKim, Mead & White
9.	McKinley National Memorial, Canton, Ohio.....	56 " " "	H. Van Buren Magonigle
10.	St. Paul's Chapel, Columbia University, New York, N. Y..	52 " " "	Howells & Stokes
11.	Rodef Sholem Synagogue, Pittsburg, Pa.....	90 " " "	Palmer & Hornbostel
12.	University of Virginia, Charlottesville, Va.....	70 " " "	McKim, Mead & White
13.	Elephant House, Bronx Park, New York, N. Y.....	34 " " "	Heins & La Farge
14.	Madison Square Presbyterian Church, New York, N. Y..	46 " " "	McKim, Mead & White
15.	J. J. Jermain Memorial Library, Sag Harbor, N. Y.....	30 " " "	Augustus N. Allen

GEO. W. JUMP, PRESIDENT

INCORPORATED

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Wreckers and General Contractors

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LONG ISLAND CITY, N. Y.
TELEPHONE, HUNTERS POINT 3750

Services.

The JUMP HOUSE WRECKING CO. are WRECKING SPECIALISTS in the following classes of work: Alteration of Buildings; Salvage Work of all kinds; Removal of Walls, Foundations and Debris, in Fire Jobs; Wrecking and Removal of Buildings, of brick, stone or any other material, including the most difficult operations, high buildings, dangerous and hazardous risks; and Removal of Tall Chimneys, old Reservoirs, etc.

GENERAL CONTRACTORS.

HOTEL TRAYMORE, ATLANTIC CITY, N. J.
Wrecked by the Jump House Wrecking Co.

A FEW OF THE BUILDINGS WRECKED BY THE JUMP HOUSE WRECKING CO.

NUMBER OF BUILDINGS, ON SITE OF, WITH OWNER'S OR BUILDER'S NAME	
1	Traymore Hotel, Atlantic City, N. J., Cramp & Co., Philadelphia, Pa.
30	Plant of General Chemical Co., Manitou, N. Y., General Chemical Co.
5	Burrell Bank Building, Little Falls, N. Y., Wells Bros. Co.
450	Pennsylvania R. R. Terminal, New York, N. Y., Pennsylvania R. R. Co.
10	Walker and Lispenard Streets, New York, N. Y., N. Y. Telephone Co.
5	Five-story brick buildings taken down in six days, at No. 238 W. 44th Street, New York, N. Y., Mark Eidlitz & Sons
15	R. H. Macy Co., Broadway and 34th Street, New York, N. Y., Geo. A. Fuller Co.
12	Stern Bros., 42nd Street and Sixth Avenue, New York, N. Y., C. T. Wills Co.
1	Burden Mansion, 72nd Street and Fifth Avenue, New York, N. Y., Wells Bros. Co.

And hundreds of other large buildings in New York City and vicinity

Appraisements.

This Company will, on request, send its expert appraisers anywhere to make special valuations of material in buildings intended to be wrecked, cost of removal, and to give expert advice in each case. Write or telephone for further information, and the Company's representative will call.

SOME OF THE 450 BUILDINGS WRECKED BY THE JUMP HOUSE WRECKING CO., FOR THE PENNSYLVANIA R. R. TERMINAL IN NEW YORK

RESIDENCES BEING ERECTED WITH JUMP HOUSE WRECKING CO.'S MATERIAL SIMULTANEOUSLY WITH WRECKING OPERATIONS

THE FOUNDATION COMPANY

Woolworth Building, 233 Broadway
NEW YORK, N. Y.
TELEPHONE, BARCLAY 7800

Services.

SUBAQUEOUS and UNDERGROUND CONSTRUCTION.

Scope and Methods.

Difficult substructures, bridges, manufacturing plants, dams, and tunnels are constructed by this Company. They also have an expert organization, skilled in shoring and underpinning heavy buildings and restoring structures to position where settlement has occurred. Methods used are pneumatic caissons, dredging caissons, cofferdams, piling, rock and general excavation. THE FOUNDATION COMPANY are specialists in underground construction, and have developed and patented many methods now used by them to overcome the obstacles frequently met with in foundation work.

Facilities and Territory.

Facilities consist of a half million dollar plant, all modern machinery, and a skilled force of three thousand men.

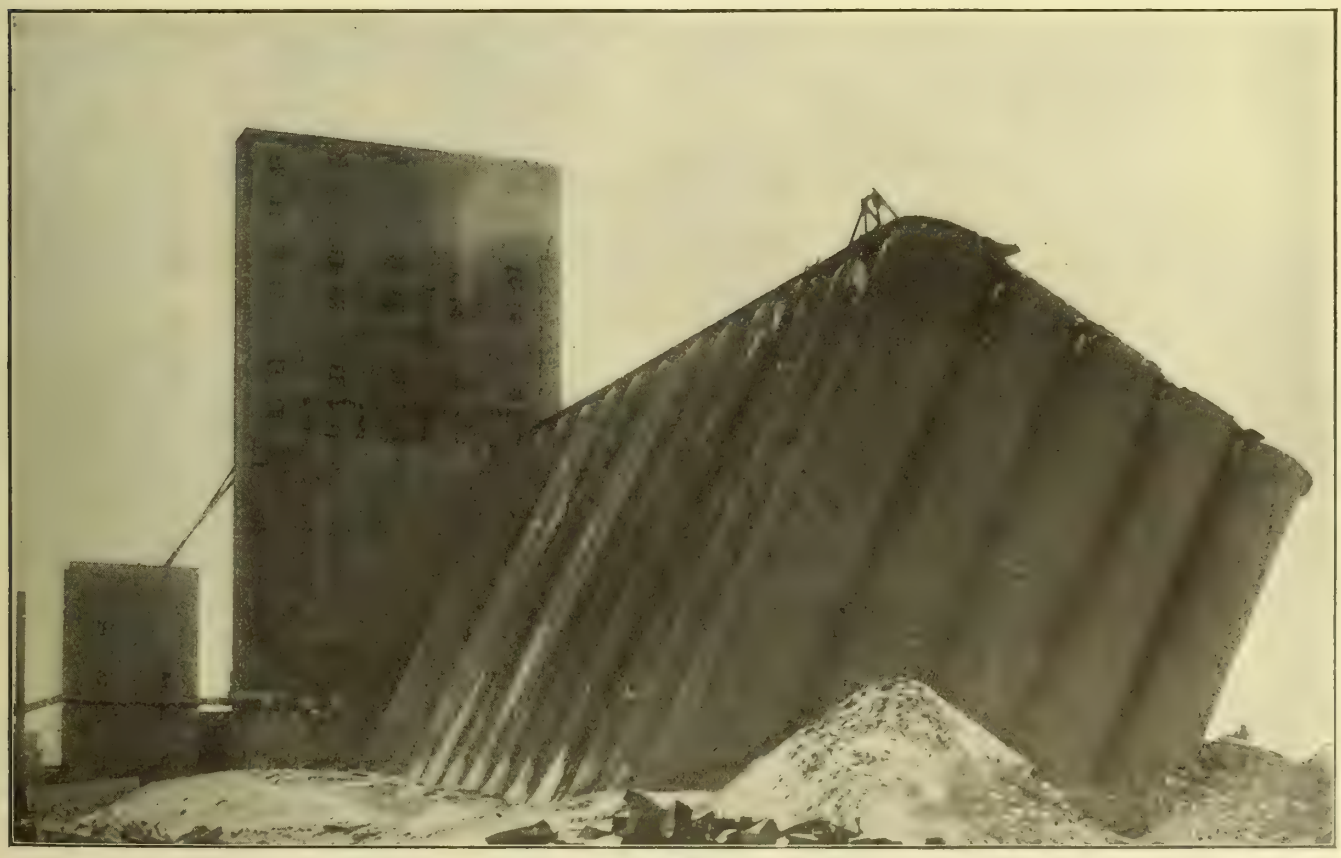
The territory covers all the United States and Canada.

Co-operative Service.

THE FOUNDATION COMPANY will take contracts to construct any of the above kinds of work, and their Engineering Department is always ready to co-operate with architects and engineers in designing.

References.

Among many are the following:
Woolworth Building, New York, N. Y.
Chicago & Northwestern Railway Station, Chicago, Ill.
Railway Exchange Building, St. Louis, Mo.
Examining Warehouse, Montreal, Can.
Municipal Building, New York, N. Y.
Hauser Lake Dam, Helena, Mont.
Ohio River Dam No. 12, Wheeling, W. Va.
Calgary Power Dam, Banff, Alberta, Can.
Sandy Hill Diversion Dam, Hudson Falls, N. Y.
Pitt River Bridge, Vancouver, B. C., Can.
Pennsylvania Railroad Bridge, Tyndall, Ohio
Illinois Central Bridge, East Omaha, Neb.
Passaic River Bridge, Paterson, N. J.
Mohawk River Bridge, Schenectady, N. Y.
Smith Shaft, Princeton, Mich.
Woodward Shaft, Wilkesbarre, Pa.
St. Albert Shaft, St. Albert, Alberta, Can.
Bronx Terminal Development, New York, N. Y.
Shoring Mills Building, New York, N. Y.
Power Tunnel, Shawinigan Falls, Can.



NORTH TRANSCONA ELEVATOR
As difficult work as can be undertaken is the placing of new supports under a finished structure
Above structure now stands plumb on supports extending to rock. Each difficulty was foreseen, each step planned; the work was completed within three days of the estimated time and for a definite cost

MacARTHUR CONCRETE PILE & FOUNDATION CO.

11 Pine Street
NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL.
CLEVELAND, OHIO
MONTREAL, CAN.
BOSTON, MASS.
NEW ORLEANS, LA.
QUEBEC, CAN.
SAN FRANCISCO, CAL.
ATLANTA, GA.
DETROIT, MICH.

Products and Services.

PEDESTAL CONCRETE PILES.
PRE-MOULDED CONCRETE PILES.
STEEL PIPE PILES.

This Company contracts to install Pedestal Concrete Pile Foundations for buildings and other structures in any part of North America; also install premoulded reinforced concrete piles and steel pipe concrete filled piles where conditions make these types desirable. In fact, they are equipped to handle the complete foundation ready for column bases and brick walls.

The reputation and financial standing of this Company insures satisfactory handling and prompt completion of all work. Our experience assures most effective results at minimum cost.

Co-operative Engineering Service.

This Company is prepared to send its engineers to any part of the country to investigate soil conditions and for consultation at its own expense.

On receipt of data on soil conditions and blueprints of any proposed structures, together with loads to be carried, plans for Pedestal Pile Foundations suitable for the requirements, together with approximate cost estimates, will be promptly supplied.

Pedestal Concrete Piles.

The Pedestal Pile is a distinct and radical improvement in piling construction. It differs from the ordinary wood or concrete pile in that a large carrying capacity, in addition to that due to frictional resistance, is derived from the direct bearing power of a broad base resting in firm and compressed subsoil.

The formation of the enlarged base or foot is simple and direct. Little additional labor is required and but small added time. The total time required for the complete formation of the pile is about thirty minutes. The cost per linear foot is no greater than in the case of piles of the ordinary type.

Advantages.

This pile provides a carrying capacity 50 to 100 per cent greater than that of other types of piles of the same length and under the same soil conditions.

Actual experience teaches that under many soil conditions a given load can be carried by fewer and shorter Pedestal Piles than would be required with other types.

CARRYING CAPACITY OF VARIOUS TYPES OF PILES FOR AVERAGE SOIL CONDITIONS (BASED ON PATTON'S FORMULA)

Size of Pile	Surface Area, square feet	Frictional carrying capacity at 300 lbs. per sq. ft.	Bearing Area at foot or point, square feet	Direct bearing capacity at 5 tons per sq. ft.	Total carrying capacity of Pile
		Tons		Tons	Tons
Wooden Pile 30 ft. long, Diameters 12" and 7".	74.5	11.2	.270	1.35	12.6
Concrete Pile 30 ft. long, Diameters 18" and 6".	94.3	14.2	.205	1.03	15.2
Concrete Pile 30 ft. long, Diameters 14" and 14"	110.0	16.5	1.07	5.35	21.9
Concrete Pile 30 ft. long, Diameters 16" and 16"	125.7	18.8	1.395	6.96	25.8
Pedestal Pile 30 ft. long, Diameters 16" and 3 ft.	125.7	18.85	7.10	35.5	54.35

Cost of Pedestal Piles.

Exact figures as to the price of Pedestal Piles depend on the length and number of piles in each job and on surrounding circumstances. The price will average from $1.00 to $1.25 per linear foot of piling, but on small or large jobs may run higher or lower. In gen-

ALL THE STRUCTURES SHOWN HERE AND HUNDREDS OF OTHERS ARE SUPPORTED ON PEDESTAL CONCRETE PILES

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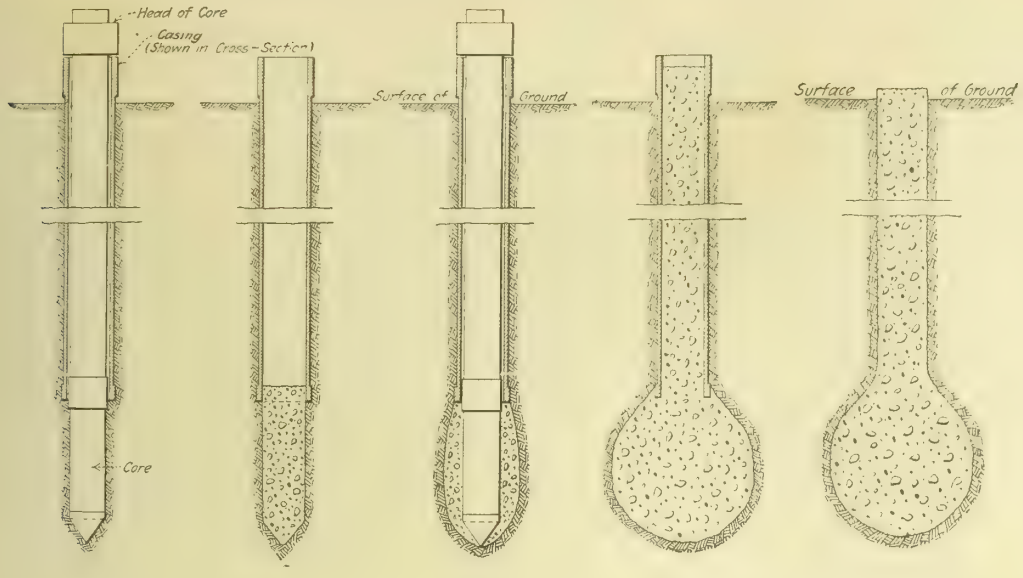


FIG. 1 — Cylindrical core and casing first driven to the required depth

FIG. 2 — Core removed and concrete dumped into hole at bottom of casing

FIG. 3 — Core used as rammer to bulge out and compress the concrete into surrounding soil

FIG. 4 — Base completed and casing filled to top with wet concrete

FIG. 5 — Complete pedestal pile consisting of monolithic concrete column, 16-in. diameter. Base, about 3-ft. diameter

FORMING THE PEDESTAL PILE

eral, the price per linear foot of Pedestal Pile is as low or lower than any other cast-in-place pile and much lower than the cast-above-ground pile. As the Pedestal Concrete Pile carries from 50 to 100 per cent more load than piles *without* an enlarged base, less piles or shorter piles are needed for any given foundation load, thus reducing the ultimate cost.

Specifications for Concrete Piles.

Piles shall be driven for foundations as shown on drawing.

Concrete Piles—All piles shall be formed in place, and shall have a stem or shaft not less than sixteen inches in diameter, with an enlarged foot or base about three feet in diameter.

Concrete—Concrete for piles shall consist of one part of Portland cement, two parts of sand and four parts of broken stone or gravel, measured by volume, and shall be thoroughly and properly mixed.

Cement shall be of some well-known brand, and shall pass the Standard Tests of the American Society of Civil Engineers.

Sand shall be sharp and clean, containing not more than 5 per cent of clay or other deleterious matter, and shall preferably contain a considerable percentage of coarse grains.

Broken stone shall be of granite or other hard stone, and shall have a diameter of not more than 1½ inches, and not less than ¼ inch. If gravel is used, it shall be of same size as mentioned for the broken stone.

Formation—The pile forming apparatus shall be driven into ground until a penetration of not more than one inch is obtained by 10 blows of a No. 2 Vulcan steam hammer. The concrete at bottom of pile shall be thoroughly tamped and rammed out into contact with surrounding soil with a suitable rammer, until the enlarged foot or base is formed. The tops of piles shall be brought to the elevation as shown on Drawing No. ...., and shall project 3 inches into concrete capping of same.

Length—The length of the piles shall be in general .... feet, measured from bottom of base to top of pile, but may be increased or decreased from time to time as ordered by the architect or his representative.

Information.

Tables of pile capacities in various soils, and much valuable engineering data appears in our Hand Book. Sent on request.

We also have standard drawings showing complete construction details of reinforced concrete pile caps, giving economic number and grouping of piles for all ranges of column and wall loads. These drawings save much time and labor in the preparation of pile plans and architects will find them of considerable value.

References.

Write us for names of architects of the buildings shown below and others for whom we have performed work.

ALL THE STRUCTURES SHOWN HERE AND HUNDREDS OF OTHERS ARE SUPPORTED ON PEDESTAL CONCRETE PILES

RAYMOND CONCRETE PILE CO.

NEW YORK CHICAGO

BRANCHES

BALTIMORE PHILADELPHIA PITTSBURGH SAN FRANCISCO KANSAS CITY PORTLAND, ORE. ST. LOUIS

Products.

We design, make and place CONCRETE BEARING PILES and CONCRETE SHEET PILES to meet any condition where piling is necessary. This includes STANDARD RAYMOND CONCRETE PILES for Foundations on Land; PRE-MOULDED CONCRETE PILES for Docks, Piers, etc., and both PLAIN and INTERLOCKING REINFORCED CONCRETE SHEET PILING.

We also design and construct difficult FOUNDATIONS, DOCKS, PIERS, BULKHEADS, SEA WALLS, RETAINING WALLS and special REINFORCED CONCRETE STRUCTURES.

Service.

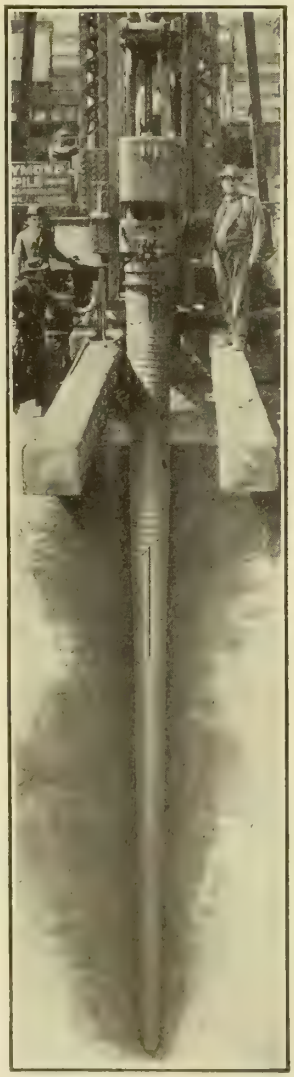
We will take pleasure in submitting plans and estimates for foundations embodying concrete piles, upon receipt of the general foundation plans, accompanied by data regarding soil conditions, loads to be carried, etc. We favor taking up questions of this character with engineers and architects, and will be glad to co-operate with them in submitting plans and estimates covering any work in which our experience may prove of assistance. Upon request, we will send a representative anywhere, at any time, and at our expense, to figure on prospective work.

Experience.

Our experience extends over a period of thirteen years, during which time we have placed more than six million lineal feet of Raymond concrete piles, which are in service in the foundations of structures of almost every class, from one-story buildings to skyscrapers. These piles have been driven in practically every kind of soil and combination of strata where piling can be used.

Making and Placing of Raymond Concrete Piles.

Raymond concrete piles are placed by means of a collapsible steel core, or mandrel, which is incased in a spirally reinforced sheet steel shell. The shell covered core is driven to proper resistance in accordance with the Engineering News Formula for pile driving. The core is then collapsed and withdrawn from the shell, leaving a steel-lined hole in the ground. The shell remains in the ground, and after careful inspection, is filled with concrete.



STANDARD RAYMOND CONCRETE PILE SHOWING METHOD OF DRIVING

TRADE-MARK

SECTION OF SPIRAL SHELL SPLIT IN HALF, SHOWING HOW SHEET STEEL IS GROOVED OVER WIRE
Note strength of section lying on ground

In the majority of cases Raymond concrete piles are used for compressive loads only, and are not reinforced vertically. Should conditions be such, however, that the piling would be subject to lateral strains, reinforcing steel is placed in the shell prior to the placing of the concrete.

Features.

The reinforced steel shell or form which is driven for every pile and which remains in the ground, is the most important feature of the Standard Raymond Pile. The purposes of this reinforced shell are multifold.

(1) It maintains the compression set up in the soil by driving.

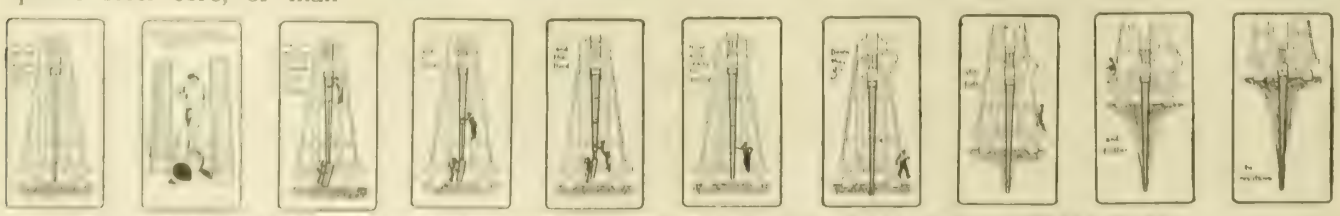
(2) It prevents the admixture of extraneous matter with the concrete.

(3) It prevents distortion or complete severance due to driving adjacent piles.

(4) It prevents the washing away of cement from the concrete mixture by surplus ground water, or the absorption of the water from the concrete by dry or porous soils.

RAYMOND PILE READY FOR CAPPING

(5) It provides a strong form for the green concrete. (6) It insures an absolutely perfect concrete pile of known size, shape, and carrying capacity.



TYPICAL ILLUSTRATIONS SHOWING METHOD OF INSTALLING RAYMOND CONCRETE PILES

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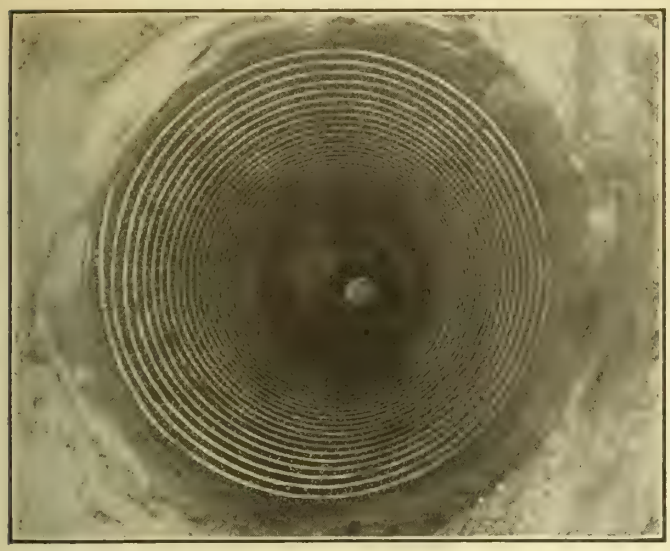
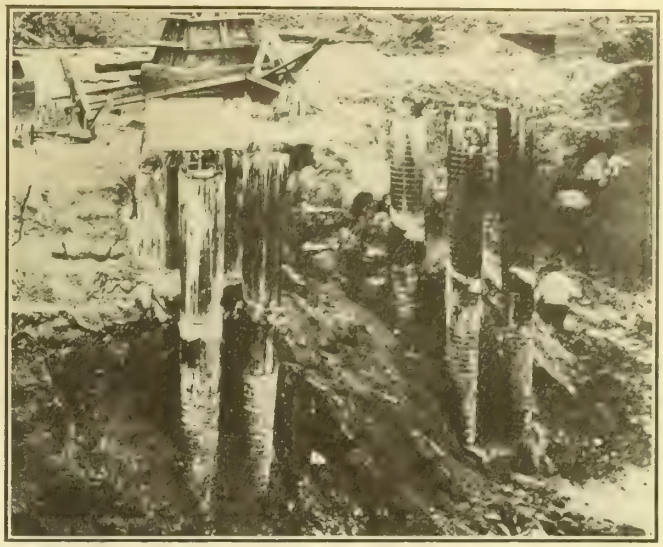


A RAYMOND SPIRALLY REINFORCED SHELL OF SHEET STEEL, IN PLACE, READY TO BE FILLED WITH CONCRETE



RAYMOND CONCRETE PILES DISCLOSED BY EXCAVATION AT PLANT OF YOUNGSTOWN SHEET & TUBE COMPANY, YOUNGSTOWN, OHIO

No engineer will permit the placing of concrete in unstable material without the use of substantial forms. How much more important it is, when the concrete is placed below ground, where it is subject to the back pressure of various strata of soil which have been compressed to their limit and have not had time to assume an ultimate set under the new conditions.

Cost of Raymond Piles.

Raymond concrete piles are made in place, and not sold by the foot, f. o. b. cars, consequently it is impossible to quote prices without knowing the conditions under which the work is to be done.

For even approximate prices it is necessary to know the number and lengths of piles required, the approximate spacing, soil conditions, accessibility of the site, with reference to railroad siding, cost of concrete materials and labor conditions.

It is therefore highly desirable that the necessary information be given to our nearest office and an opportunity afforded for an examination of the site.

Specifications for Raymond Concrete Piling.

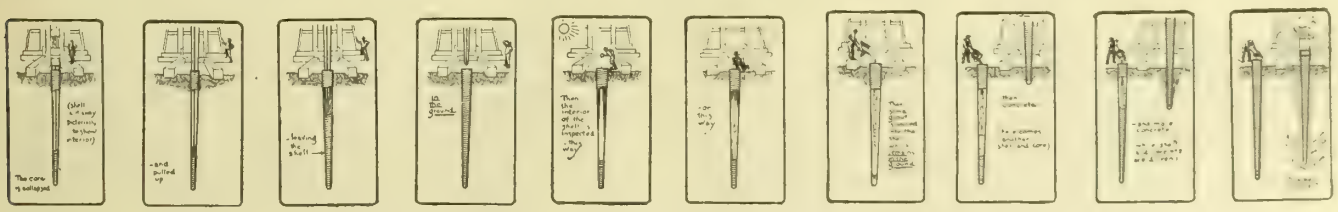
We are frequently asked by architects and engineers who wish to be certain of securing satisfactory concrete pile work to submit specifications for Raymond piles. If "Raymond Concrete Piles" are called for, this is, of course, sufficient. On the other hand, if it is for any reason inadvisable to name them specifically, the following specifications will cover them:

"Concrete piles shall be of a type specifically approved by the architect or engineer and shall be placed in the following manner:

"A collapsible steel mandrel or pile core eight inches in diameter at the small end, and twenty inches in diameter thirty feet from that point, shall be incased in a spirally reinforced steel shell, and driven to a proper penetration. The pile core shall then be collapsed and withdrawn from the shell. Before placing the concrete, each shell shall be inspected and, being found perfect, shall thereupon be filled with concrete placed in accordance with the best practice.

Some Users of Raymond Concrete Piles.

Witherspoon Englar Co., Engineers, Chicago, Ill.
Ernest Flagg, Architect, New York, N. Y.
C. Montgomery Anderson, Architect, Baltimore, Md.
Haskell & Barnes, Architects, Baltimore, Md.
E. H. Glidden & C. N. Friz, Architects, Baltimore, Md.
Owens & Sisco, Architects, Baltimore, Md.
Arthur Tufts, Engineer and Architect, Baltimore, Md.
Quincy Bent, Assistant to President, Maryland Steel Co., Sparrows Point, Md.
Ballinger & Perrot, Architects, Philadelphia, Pa.
Lockwood, Greene & Co., Architects, Boston, Mass.
Smith, Hinchmann & Grylls, Detroit, Mich.
G. H. Webb, C. E., Michigan Central R. R., Detroit, Mich.
Supervising Architect, U. S. Treasury, Washington, D. C.
Barnett, Haynes & Barnett, Architects, St. Louis, Mo.
John V. Hanna, Chief Engineer, Kansas City Terminal Ry. Co., Kansas City, Mo.
J. H. Fox, C. E., Pittsburgh Plate Glass Co., Pittsburgh, Pa.
John T. Rowland, Jr., Architect, Jersey City, N. J.
Maynicke & Franke, Architects, New York, N. Y.
Ford, Bacon & Davis, Engineers, New York, N. Y.
Stephenson & Wheeler, Architects, New York, N. Y.
Wm. Higginson, Architect, New York, N. Y.
Esenwein & Johnson, Architects, Buffalo, N. Y.
N. M. Loney, Engineer, New York, N. Y.
M. Wilson, Architect, Denver, Colo.
Geo. F. Hardy, Engineer, New York, N. Y.
Jenney, Mundie & Jensen, Architects, Chicago, Ill.
Pond & Pond, Architects, Chicago, Ill.
Wm. Ernest Walker, Architect, Chicago, Ill.
F. E. Davidson, Architect, Chicago, Ill.
H. R. Wilson & Co., Architects, Chicago, Ill.
Rudolph Schenck, Engineer, Chicago, Ill.
Henry J. Schlacks, Architect, Chicago, Ill.
C. A. Morse, Chief Engineer, R. H. Ford, Engineer, Track Elevation, C., R. I. & P. R. R., Chicago, Ill.
Chatten & Hammond, Architects, Chicago, Ill.
Postle & Fischer, Architects, Chicago, Ill.
W. D. Price, Superintendent of Construction, International Harvester Co., Chicago, Ill.
A. U. Leonhauser, C. E., Wisconsin Steel Co., Chicago, Ill.
G. C. Kimball, Chief Engineer, American Sheet & Tin Plate Co., Pittsburgh, Pa.
D. A. Bohlen & Son, Architects, Indianapolis, Ind.
H. Koppers Co., Engineers, Chicago, Ill.
Proudfoot, Bird & Rawson, Des Moines, Iowa



TYPICAL ILLUSTRATIONS SHOWING METHOD OF INSTALLING RAYMOND CONCRETE PILES

AMERICAN STEEL & WIRE CO.

Manufacturers of Wire Rope

CHICAGO NEW YORK PITTSBURGH CLEVELAND DENVER

EXPORT REPRESENTATIVES, United States Steel Products Company, New York
PACIFIC COAST REPRESENTATIVES, United States Steel Products Company, San Francisco, Los Angeles, Portland, Seattle

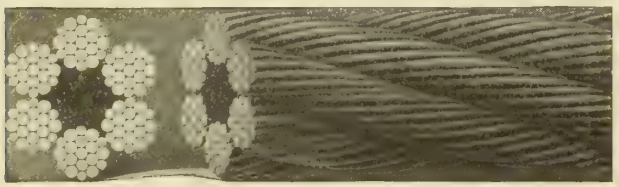
Products.

We make all kinds of Wire Rope in the following qualities: Iron, Crucible Cast Steel, Extra Strong Crucible Cast Steel, Plow Steel and Monitor Plow Steel or Tico Special.

Wire Rope.

The following illustrations and descriptions show some of the uses to which our wire rope can be put:

Iron Elevator Hoisting Rope—The wires in our Iron Rope are made from the best quality iron, being soft, tough and flexible. Iron Hoisting Rope is most generally used for elevator hoisting, where the strength is sufficient. It is almost universally employed for counterweight ropes, except on traction elevators. For traction elevators we recommend mild steel hoisting rope.

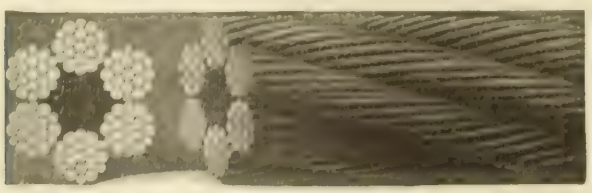


IRON ELEVATOR HOISTING ROPE

Crucible Cast-Steel Hoisting Rope—This rope is applicable to a great variety of uses, among which may be noted, mine hoisting, logging elevators, derricks, hay presses, dredges, cableways, inclined planes, coal hoists, conveyers, ballast unloaders, skip hoists and many other uses.

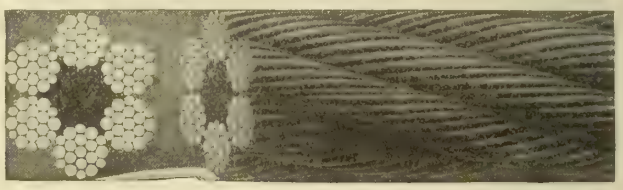
CRUCIBLE CAST-STEEL HOISTING ROPE

Extra Strong Crucible Cast-Steel Hoisting Rope—This rope is made from selected steel wires of higher tensile strength than the Crucible Steel. It has been found particularly useful for oil-well, drilling and tubing lines. Its other general uses are similar to those of the Crucible Steel, except that it may be used where loads are somewhat heavier.



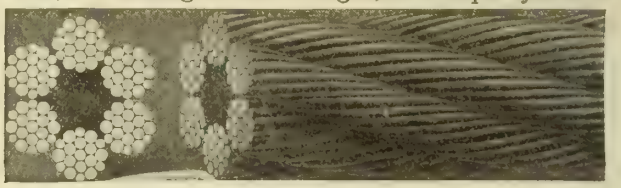
EXTRA STRONG CRUCIBLE CAST-STEEL HOISTING ROPE

Standard Plow-Steel Hoisting Rope—This is a very strong type of hoisting rope, used particularly for heavy mine hoisting, derricks, inclined planes, dredges, cableways, for heavy logging and similar uses. It is the most economical rope to use where the weight of the rope has to be considered, or where the capacity of the machinery is to be increased without a corresponding increase in sheaves and drums.



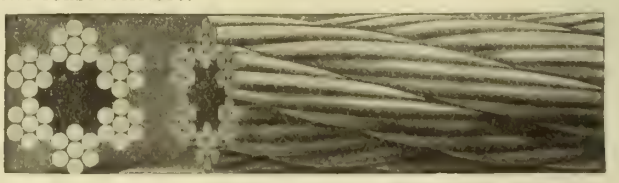
STANDARD PLOW-STEEL HOISTING ROPE

Monitor Plow-Steel Hoisting Rope—This is the highest-strength rope manufactured; being very strong, a smaller rope may be used than any of the preceding qualities of this construction. It is somewhat stiffer in the same diameter than the Plow and Crucible Steel grades, but strength for strength, it is equally flexible.



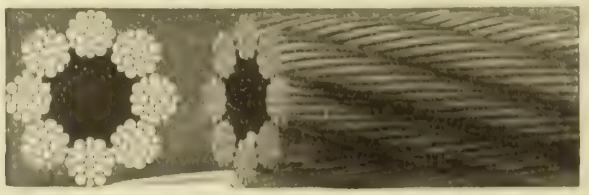
MONITOR PLOW-STEEL HOISTING ROPE

Haulage Rope—The coarsest rope, i.e., 6 by 7 construction, is a relatively stiff rope with large wires, capable of resisting external wear or abrasion; but it is the least flexible.



HAULAGE ROPE

Extra Flexible Steel Hoisting Rope—This rope is composed of eight strands of nineteen wires each, laid around a hemp core. The addition of these two strands over the Standard Hoisting Rope increases the flexibility and permits the rope being used over comparatively smaller sheaves and drums.



EXTRA FLEXIBLE STEEL HOISTING ROPE

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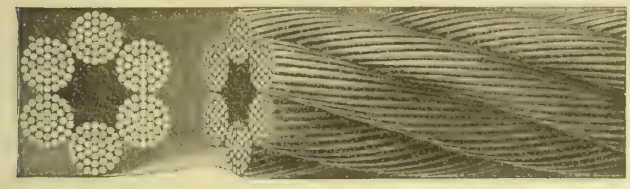
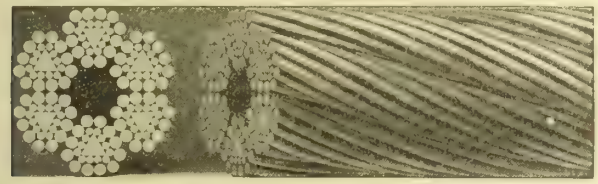
Special Flexible Steel Hoisting Rope—This rope is composed of six strands of thirty-seven wires each, laid around a hemp core. This is a very flexible rope, and used largely on cranes and similar machinery where sheaves, of a necessity, are small.



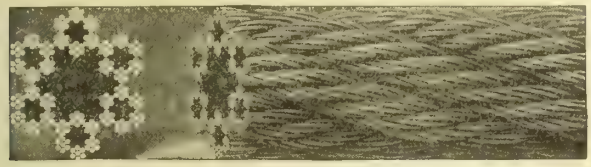
SPECIAL FLEXIBLE STEEL HOISTING ROPE

Flattened Strand Hoisting and Haulage Ropes—These ropes are designed to give increased wearing surface above that to be obtained from a round strand rope.



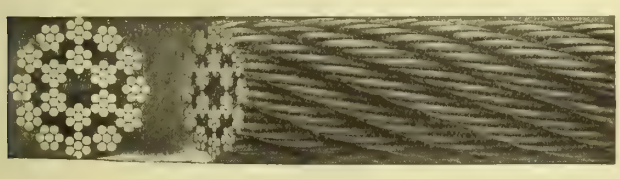
FLATTENED STRAND HOISTING AND HAULAGE ROPE

Tiller Rope or Hand Rope—This rope is used for starting and stopping elevators, and also for steering-lines on yachts and motor boats.



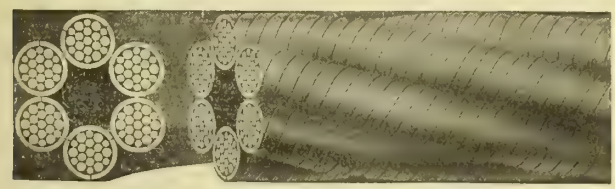
TILLER ROPE OR HAND ROPE

Non-Spinning Hoisting Rope—This type of rope is so constructed that it prevents a free load suspended on the end of a single line from rotating. We recommend this type of rope for "back haul" or single-line derricks.



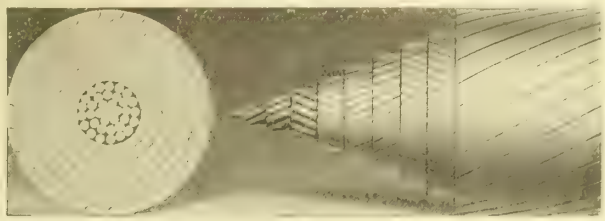
NON-SPINNING HOISTING ROPE

Steel-Clad Hoisting Rope—This kind of hoisting rope has each strand spirally served with flat steel strips, which gives considerable wearing surface over the ordinary type. When the flat strips of a steel-clad rope have worn through, there still remains the complete hoisting rope with unimpaired strength. Where ropes wear out quickly, this feature is a distinct advantage.



STEEL-CLAD HOISTING ROPE

Round Wire Track Cable and Locked Wire Cable for Aerial Tramways and Cableways—There have been devised two special cables which present fairly smooth surfaces for wheels to run upon. The better is the locked type, as it presents the smoother external surface.

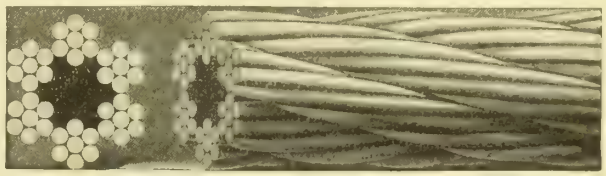


LOCKED WIRE TRACK CABLE FOR AERIAL TRAMWAYS

Flat Rope—A remarkably strong hoisting rope, used to a great extent by the large mines of the West. It is composed of a number of wire ropes called "flat rope strands" of alternate right and left lay, placed side by side, then secured or sewed together with soft Swedish iron wire, thus forming a completed rope.

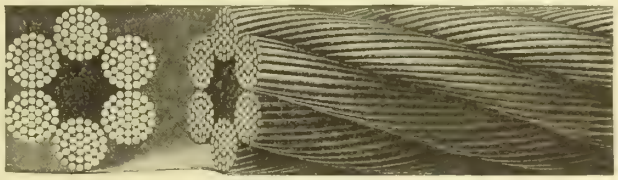
FLAT ROPE

Galvanized Iron or Steel Guy Rope—For supporting derricks, and for general standing rope service; it is not designed to run over drums or sheaves.



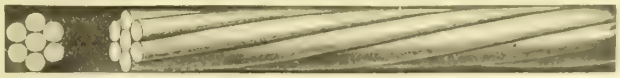
GALVANIZED IRON OR STEEL GUY ROPE

Galvanized Steel Deep-Sea Towing Hawsers—Used in connection with automatic steam towing machines for sea, river and lake towing, where greatest strength, flexibility and durability are demanded.



GALVANIZED STEEL DEEP-SEA TOWING HAWSER

Galvanized Steel Wire Strand—For guying stacks, telegraph and telephone poles; signal strand, for suspending trolley wire; messenger strand, for telephone cables. Seven steel wires twisted into single strand, galvanized or extra galvanized.



GALVANIZED STEEL WIRE STRAND

AMERICAN CHEMICAL AND MANUFACTURING COMPANY, INC.

"Hippo" Waterproofing and Protective Coatings

MAIN OFFICE AND LABORATORIES
NORFOLK, VA.

BRANCH OFFICES

NEW YORK, N. Y.
PHILADELPHIA, PA.
ST. LOUIS, MO.
GALVESTON, TEX.
CHICAGO, ILL.
BOSTON, MASS.
PITTSBURGH, PA.
MEBANE, N. C.
SAN FRANCISCO, CAL.
PORTLAND, ORE.
INDIANAPOLIS, IND.
SOUTH AMERICA

Products.

"Hippo" Waterproof Filler Grade "C," a transparent filler for waterproofing masonry surfaces of every description after they are up; "Hippo" Impervious Powder, a finely pulverized mineral powder for mixing with cement and concrete at the time of construction; "Hippo" Flat Coat, a perfect waterproof filler combined with necessary pigments to give color and an added body to the surface, leaving a soft flat tone.

"Hippo" Permanent Pliable Oil, "Hippo" Paints, Enamels, Varnishes, Stains, and Lacquers.

TRADE-MARK

"Hippo" Waterproofing Products.

"Hippo" is rapidly becoming recognized as the System of Waterproofing for all purposes. The simplicity and economy of application and the absolute assurance of results produced have successfully demonstrated its superior merits.

"Hippo" Waterproof Filler, Grade "C."

This is a highly specialized liquid filler for waterproofing, damp-proofing, and protecting exterior and interior concrete, brick, granite, marble, sandstone, and masonry surfaces of all kinds.

It is compounded with a vehicle of the most powerful penetrability known. It permeates every part of the masonry mass to which it is applied, and penetrates to a depth of from one eighth to one quarter of an inch; hence abrasions or scratches do not affect its efficiency. Moreover, the principal base, being water repellants with a combination of solvents, is held in suspension until applied. Then, when the carriage begins to evaporate, the water repellant microscopic particles naturally start to follow it along the lines of least resistance, but, owing to their inherent chemical properties, they expand, hermetically filling the minute pores of the masonry, and really becoming a component part thereof.

This waterproofing is not a paint or mere surface coating; it is a transparent, colorless filler. It does not contain oil of any kind, and is immune to water, acids, oil, sea-water, alkaline water, frost, and elementary heat. It is not affected by either atmospheric changes or climatic conditions.

In "Hippo" Waterproofing Filler Grade "C" is provided a waterproofing of the maximum durability and efficiency to combat the elements, prevent disintegration, and eliminate the possibility of unsightly stains, and that eyesore, efflorescence.

"Hippo" Impervious Powder.

This is a dry, white powder, and consists of mineral acids chemically combined under heat and perfectly pulverized. It is purely a mineral product, and therefore not subject to deterioration by age and exposure (as are all other waterproofing powders on the market, composed principally of vegetable matter and animal fats, which decay very rapidly). "Hippo" Powder, being extremely fine, can be easily and effectively mixed with cement, and, when thoroughly mixed in the proper proportions, becomes a part of the cement mixture. Moreover, it increases the tensile strength of the concrete, whereas other waterproofing powders reduce it anywhere from five to eight per cent.

It is necessary to use water in making cement or concrete walls, and also for curing them. When evaporation takes place, it leaves the concrete or cement full of air-spaces or -cells, and this cellular condition is the cause of concrete taking water rapidly, and its ultimate seepage through the wall. "Hippo" Impervious Powder is so compounded that it combines perfectly with cement; and on evaporation of the water in it, the lighter substance composing the powder, follows the lines of least resistance and closes up these air-cells or -ducts, making the concrete or cement wall a perfectly solid mass throughout, and absolutely impervious to moisture. This powder does not in any way affect the color, or decrease the hardening qualities and strength of the concrete; but it will prevent hair cracks, discoloration from rains, and the white efflorescence which is so unsightly, yet is generally seen on concrete walls.

The Integral Method of waterproofing makes a great saving in cost, the work being accomplished by simply proportioning the materials properly and adding to the cement about two per cent of "Hippo" Impervious Powder, which is an absolute water repellant. This powder, combining with the cement uniformly throughout the entire mixture, means permanence without any additional cost for labor to apply or excavations to be made.

"Hippo" is absolutely insoluble and unaffected by water, even after years of contact. Permanent water-resisting qualities are obtained with the same quantity of "Hippo" Powder as is required by other so-called waterproofing materials to produce a temporary effect.

This powder has been used in buildings throughout the country, and also extensively in burial vaults and other underground work, to determine its waterproofing and lasting qualities. Its unequalled efficiency

Continued on next page

has been fully demonstrated by the successes obtained with it.

"Hippo" Flat Coat.

This extraordinary product, in both Interior and Exterior Grades, was produced and tested thoroughly by our chemists, with all the essentials of an ideal flat coat in view as a criterion, before it was placed on the market.

"Hippo" Interior Flat Coat—"Hippo" Interior Flat Coat is absolutely waterproof, so that it is not only unaffected by water drops accidentally splashed on it from within, but successfully resists any dampness which seeps through the brick or plaster from the outside, during heavy rains.

Moreover, it is of such a nature that grease spots will not penetrate it, but, with other soiled places and dust, can be readily washed off with ordinary soap and water.

Furthermore, it is impervious to all temperature changes; that is, it will never crack, flake nor peel, on either a smooth or a rough finished wall, no matter how extremely hot or cold the weather may be.

Although it is made up in standard colors, it can be produced on request in any shade to suit the general color scheme of any individual house or room.

It has a stronger bond and heavier body than any other flat coat in existence.

"Hippo" Exterior Flat Coat—The main characteristics of "Hippo" Flat Coat for exterior masonry are almost identical with those for interior, with a few exceptions. "Hippo" Exterior Flat Coat, besides the above mentioned qualities, possesses marvelous vitality or combative strength to resist the enormous pressure with which water is forced against it in heavy storms. It will stand up successfully under weather conditions, no matter how severe, for a reasonable length of time; and by "reasonable" we mean three times as long as the ordinary flat coat on the market.

Only one coat of either of these products is required to secure results superior to anything which has ever been obtained in this line. "Hippo" Flat Coat sets up in about thirty minutes, and dries in from three to four hours.

"Hippo" Permanent Pliable Oil, Etc.

Attention is called to the line of "Hippo" Oils, Paints, Enamels, Varnishes, Lacquers, and Stains, whose superiority is steadily gaining widespread recognition. This is due to the wonderful water-, acid-, cold-, and heat-resisting qualities of these products.

Of course, the paint qualities just referred to can only be obtained through the use of an exceptional oil possessing those qualities in mixing the paint. This is due to the fact that the efficiency and durability of a paint do not depend on the wearing power of the pigment but on the strength and life of the oil. So, by using our "Hippo" Permanent Pliable Oil as a basis of these products, its marvelous qualities to a great degree are imparted to them.

"Hippo" Permanent Pliable Oil is a chemical oil, principally mineral in composition, which is processed chemically and thus becomes endowed with a number of marvelous qualities. It is absolutely waterproof, acid-proof, brine-proof and alkali-proof. It is very elastic, adapting itself readily to contraction and expansion of metal due to temperature changes. It is a non-conductor of electricity, which fact opens up a wide field for its use. It is absolutely impervious, consisting of a thin, tough, adhesive, continuous film coating that protects metal successfully against the inroads of corrosive influences. So by using it in the mixing of all "Hippo" protective coating, it endows them with its unequalled qualities.

Testimonials.

Stamford, Conn.,
November 29th, 1915.

Gentlemen:

We, as members of the Fire Commission of Stamford, Conn., are pleased to testify to the merits of your "Hippo" Impervious Powder as a waterproofing when mixed with cement for making concrete or mortar of any kind waterproof.

The basement of the Central Fire Station of Stamford, Conn., was a place of severest test which in our opinion speaks for itself.

When your company undertook to do the work of waterproofing this basement, there were 48" of water in it. Other companies had tried to waterproof this cellar but had failed.

The water pressure was so great that it took three engine pumps working night and day to keep the cellar dry for the work to proceed and it looked hopeless of ever accomplishing the results desired.

The work was completed March 20, 1915, and is at the present time as dry as an upper floor. Your company has given us a guarantee and bond that this cellar will be dry for five years.

With such a monument of proof of the efficiency of your waterproofing product, we would have no hesitancy in recommending the same to any one who has or may have to contend with the same problem which we had.

Yours very truly,
Wm. F. Joyce,
(Signed) Frederick C. Oefinger,
Warren F. Cressy,
Fire Committee

Norfolk, Va.,
January 29, 1916.

Gentlemen:

Your waterproofing flat coat which I used on the Exterior of the Freemason Street Baptist Church has proven satisfactory, and I recommend it to any one in need of a waterproof paint.

Yours very truly,
(Signed) Edw. T. Friend,
Painting Contractor

Norfolk, Va.,
December 18th, 1915.

Gentlemen:

Having thoroughly tested your waterproofing liquid on practically every kind of exterior surface and having found it to give entire satisfaction to every customer, I do not hesitate to say that I consider it will absolutely waterproof the walls of any building without in the least changing the appearance of the building.

Your waterproof paint I find to give entire satisfaction in every particular, as the office walls in the Royster Building will show. I consider them the best finished walls in the city.

Yours very truly,
(Signed) C. Ross Weller,
General Contractor

Co-operative Services.

We maintain an Engineering Department and Chemical Laboratory for the convenience of architects and engineers, and they are ready at all times to work out problems and give expert advice without cost.

Literature.

Circulars containing detailed information regarding any of our products, as well as samples, will be gladly furnished on request.

ANTI-HYDRO WATERPROOFING CO.

Manufacturers of "Anti-Hydro"

TELEPHONE, MARKET 5069

170 Washington Street
NEWARK, N. J.

Products and Services.

"ANTI-HYDRO," a Liquid Compound to be used with Portland cement for Waterproofing, Damp-proofing, Hardening, and other purposes.

CONSULTING WATERPROOFING ENGINEERS. The consulting engineers are ready at all times to advise concerning difficult waterproofing problems. Correspondence is invited.

Approval.

The Bureau of Standards of the Department of Commerce, United States Government, made comparative tests of leading waterproofing compounds. In Technical Papers No. 3, which in pages 95 to 127, inclusive, describe these tests, "Anti-Hydro" is designated as "Compound No. 40." On page 60 of the report, just referred to, is the statement: "It is the most impermeable of any of the mortars." The tests were made by Rudolph J. Wig, associate engineer chemist, and P. H. Bates, chemist of the Bureau of Standards.

Description.

"Anti-Hydro" is a liquid compound that is neutral to cement. When it is added, in a certain percentage, to the water used is gauging Portland cement in the usual way, it makes the cement in all kinds of masonry impervious to water, moisture, frost, gas, oils, odors, etc.

"Anti-Hydro" excites and brings into service all the cohesive properties of Portland cement, which are themselves the best and most efficient waterproofing mediums. It does this without the use of alums, greases, oils, acids or decomposible ingredients; neither are there any iron admixtures which are sure to disintegrate the concrete in time. "Anti-Hydro" has a calcium base and improves with age. It combines chemically with the cement, is insoluble, and becomes an *integral* part of it. It crystallizes at the same time as the cement, and because of its penetrating qualities fills the voids or pores with cement crystals which expand and effectually seal the mass, preventing the passage of liquids even under heavy pressure. It increases the density and consequent tensile strength of the cement fully twenty-five per cent, and hardens the wearing surfaces to a degree that makes them *dustless and adamant* without any discoloration. In color, the surfaces are light gray. They can, however, be given almost any color.

Architects, engineers and contractors are now realizing, after many years' experience, that true, *integral, permanent* and *economical* Portland cement waterproofings can be had only through the medium of the water used in gauging, together with a compound that readily assimilates with it and chemically combines with the cement. The "Hausling System" accomplishes this with "Anti-Hydro." It has been on the market twelve years and has received only words of commendation from its many users throughout the country. It is guaranteed.

The bond of "Anti-Hydro" cement coatings to brick, stone, concrete or cement finished surfaces is perfect, and it adheres permanently against any head of water.

Adaptability.

To a considerable degree, "Anti-Hydro" prevents freezing, and permits the hydrating of cement in weather of temperature lower than that in which it can ordinarily be done.

Walls—"Anti-Hydro" cement coatings, for walls of every kind, positively prevent disintegration. Because they are fireproof non-conductors they provide an excellent means of insulation where electric apparatus is located. In cold-storage plants they are an absolute necessity to prevent the entrance of moisture and consequent frost, and the absorption of noxious gases and vapors. By virtue of their antiseptic properties they improve the sanitary conditions of hospitals when used on interior walls and floors. They overcome in a measure the non-resilience of cement mixtures to strains and shocks. They have a resistance to acid and alkali conditions that is found in no other cement waterproofing compositions.

Tunnels, Foundations, etc.—The value of "Anti-Hydro" for cement waterproofing of tunnels, subways, foundations, cellars, reservoirs, vaults, concrete floors, walls; in setting tile; and wherever a water-resisting or water-holding quality is required, can be easily appreciated. For finish coatings for floors, walls and roofs, "Anti-Hydro" is added to the water used in mixing the cement mortars, and then the coatings are applied as in any ordinary finish work. No skilled labor is required for mixing; "Anti-Hydro" mixes itself. It so enriches the mortars that the cement worker can easily trowel in a day twice as much surface as he could without it. This labor-saving practically pays the cost of "Anti-Hydro."

Backing—For the backing of limestone, granite, marble and all other stones, and for structural iron work to prevent stains and exclude dampness, "Anti-Hydro" damp-proofing will be found cheaper than bitumen and asphalt paint compounds and superior to them.

Floors—Attention is drawn particularly to the fact that, to produce a finished cement floor, *dustless and adamant*, "Anti-Hydro" has no equal in the market. It is inexpensive and pays its own cost in labor-saving. No extra troweling and no expert supervision are needed. All that is required is the adding of one part "Anti-Hydro" to ten parts water used in gauging the top-surface mixture. "Anti-Hydro" automatically does the rest itself. For these reasons it is now used extensively for floors and roofs in office buildings, factories, garages, hospitals, and schools, and for sidewalks, terraces, platforms, etc.

Two facts are emphasized: first, that "Anti-Hydro" dustless adamant concrete floors are integrally and permanently what their name expresses; and second, that their actual cost is less than one cent per square foot as against four to eight cents cost incurred in almost all other compounds for which the same results are claimed.

Shipment.

"Anti-Hydro" is shipped in five- and ten-gallon steel-jacketed cans and in fifteen-, twenty-, and thirty-gallon steel barrels, f.o.b., Newark, N. J.

Continued on next page

Directions for Use.

Waterproofing—Amounts required may be estimated on the basis of a mixture one part cement to two parts sand. One gallon of "Anti-Hydro" to ten gallons of water (when water is properly used), with one barrel of cement and two barrels of sand, should cover one hundred square feet of surface one inch in thickness.

"A. H." Cold Water Paint (Damp-proofing and Stain-proofing)—For brick, stone, stucco or concrete-block walls. Portland cement is gradually stirred into a mixture of one part "Anti-Hydro" to three parts water, to a creamlike consistency, to be applied in three coats with a brush or a spray. First coat is a penetrating one. Mixture for it should be as thick as the brush will carry and should be well rubbed in, particular care being taken to fill all joints and cracks. The second coat is a further filler; the third is a finish coat, to which any color can be given. The natural color is light gray. These coats are a permanent check to efflorescence. They will not crack nor peel off and are the most economical that can be had, as they cost less than half a cent per square foot for labor and materials.

"A. H." Concrete Floor Re-facing "Dustless" Preparation—To assure a perfect bond to underlying masonry all surfaces shall be first washed with a solution of one part muriatic acid to four parts water. Solution should be allowed at least three hours for its action. This to be followed by a good washing with clear water to stop further acid action. Surfaces shall then be thoroughly roughed with a stiff steel brush and well dampened before additional coatings are applied.

Coatings—Portland cement is gradually stirred into a mixture of one part "Anti-Hydro" to three parts water, to a creamlike consistency, and applied in three coats with a brush.

First coat is a penetrating one, the mixture for which should be as thick as the brush will carry and well rubbed in. Particular care should be taken to fill all joints, holes and cracks. While this coat is still wet, a fine, sharp sand (granite or corundum, 20- to 30-mesh screening) should be dusted on it. This is allowed to set for about twenty minutes and is then followed by second and third coats without any sand mixtures. Third coat is the finish coat and should be floated or troweled.

CAUTION—It is imperative that surfaces to which any of these coatings are applied be absolutely clean of all paint, whitewash or other foreign substances, and that they be sufficiently roughed for a cement bond and well dampened.

It is recommended in waterproofing and in floor work that one coat of damp-proofing be first applied and then followed by the regular coatings. Strong, faithful troweling is always essential. Careful mixing should never be neglected.

It is well to bear in mind that water is stubborn and will, if stopped at one place, seek an outlet somewhere else; and that, therefore, a complete pocket of waterproofing is necessary.

"A. H." Colorless Weatherproofing—This is a method of weatherproofing and preserving masonry without changing the appearance or the texture of the surfaces.

Apply to a clean, dry surface with an ordinary whitewash brush two separate solutions ("A. H." Primer and plain "Anti-Hydro").

"A. H." Primer should be applied first; then, after at least twelve hours, the plain "Anti-Hydro." The result will be the formation of a colorless, insoluble silicate, which will penetrate and fill pores, bind particles together, permanently increase strength and weathering qualities, and bring out and preserve original colors.

For surfaces of stone, brick, terra-cotta, etc., this process will be found the most economical and satisfactory.

General Specifications.

Material—Interior surfaces of all exterior walls, upper surface of concrete floor slab of basement or cellar, all pits, piers, etc., as shown on plans, shall be waterproofed by the addition of "Anti-Hydro" liquid waterproofing compound (manufactured by the ANTI-HYDRO WATERPROOFING CO., Newark, N. J.) to all water used in tempering the dry mixture of one part cement and two parts sand, in proportion of one gallon "Anti-Hydro" to ten gallons water.

The Bond—To assure a perfect bond to underlying masonry, all surfaces, before application of waterproof coating, shall be thoroughly roughed, cleaned and dampened; and coatings shall be applied not later than twenty-four hours after surfaces have been so prepared.

Wall Coatings—Wall coatings shall be ⅝ inch in thickness from floor level, where they should be properly coved and bonded to floor, and carried up at least one foot above the grade level. A slush or grout of neat cement, in which one part "Anti-Hydro" is used to three parts water, is first applied, and then followed by a one-cement and two-sand mixture. The first to be a scratch coat. Second to be a finish coat, thoroughly floated and troweled to a smooth and even finish free from all imperfections.

Floor Work—Shall be one inch in thickness and to serve the double purpose of a waterproofing agent and dustless wearing surface; finished as described above in "Wall Coatings," except as to scratch coat.

A FEW OF THE "ANTI-HYDRO" USERS

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F. C. Noble, R. T. Commission, New York, N. Y.
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Degnon Contracting Co. (Sixth Avenue McAdoo Subway), New York, N. Y.
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Whitney Co., New York, N. Y.
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Westinghouse, Church, Kerr Co., New York, N. Y.
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Industrial Engineering Co., New York, N. Y.
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National Fire Proofing Co., New York, N. Y.
Rockefeller Institute, New York, N. Y.
Interborough R. T. Co. (Power-Houses), New York, N. Y.
New York Edison Co. (Power-Houses), New York, N. Y.
New York Telephone Co., Newark, N. J., and New York, N. Y.
East River Tunnel, New York, N. Y.
Singer Building, New York, N. Y.
Scribner Press Building, New York, N. Y.
Waldorf-Astoria Hotel, New York, N. Y.
Greenwood Cemetery (Vaults), Brooklyn, N. Y.
Niagara, Lockport & Ontario Power Co., Buffalo, N. Y.
Iroquois Construction Co., Buffalo, N. Y.
Standard Optical Co., Geneva, N. Y.
New York Richmond Gas Co., Stapleton, N. Y.
Public Service Corporation (Power-Houses), Newark, N. J.
Ballantine Brewery, Newark, N. J.
American Concrete Steel Co., Newark, N. J.
Booth & Flinn (Passaic Valley Sewer), Newark, N. J.
Crocker-Wheeler Co., Ampere, N. J.
City Hall, Montclair, N. J.
Bernardsville Bank Building, Bernardsville, N. J.
T. J. Wasser (County Engineer), Jersey City, N. J.
Peter F. Redfern & Son, Jersey City, N. J.
Pentsch Compressing Co., Jersey City, N. J.
Castle Ice Cream Factory, Perth Amboy, N. J.
Joseph Sharp Construction Co., Paterson, N. J.
J. W. Bishop Co., Worcester, Mass., and Providence, R. I.
Central Building Co., Worcester, Mass.
Fred T. Ley Co., Springfield, Mass.
Woodruff Co., San Francisco, Cal.
J. Dubrawn & Sons, Milwaukee, Wis.
Noel Construction Co., Baltimore, Md.
United States Naval Academy, Annapolis, Md.
Atlanta Water & Electric Co., Atlanta, Ga.
New Battle House, Mobile, Ala.
New Denechaud Hotel, New Orleans, La.
General Builders' Supply Co., Fort Worth, Tex.
State House, Frankfort, Ky.
Pottsville Union Traction Co., Palo Alto, Pa.
Fred G. Bourne, Oakdale, L. I., N. Y.
Alfred Vanderbilt, Newport, R. I.
Jacob A. Schiff, Rumson, N. J.
O. J. Jennings, Fairfield, Conn.
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Also, "REGAL" COATINGS and FINISHES, for Floors, Walls and Ceilings.

Where desired, we will contract for the application of our materials.

Antakwa Paints.

"Antakwa" Damp-Resisting Paints are known as "the Better Damp-proofing."

"Antakwa Plaster Key."

"Antakwa Plaster Key" applied to the inner walls of masonry dispenses with furring and lathing. Being plastic it expands and contracts in unison with the surface to which it is applied, and permits scratch coat of plaster to absorb sufficiently so as to form a perfect permanent bond between wall and plaster.

Verminproof—There being no space between wall and plaster, vermin are eliminated.

Prevents Discoloration—Being damp-proof, "Antakwa Plaster Key" prevents discoloration of plaster.

Insulation—"Antakwa Plaster Key" used on interior of brick walls seals wall air-tight, transforming it from simply a wind-stop into a perfect heat and cold insulating barrier. The millions of air-cells in the brick permit cutting down very materially the radiation necessary for heating the building. The saving in the first cost of heating much more than pays for the applying of "Antakwa Plaster Key."

Saving in Space—"Antakwa Plaster Key" eliminates furring and lathing, resulting in a saving in space.

Fireproof Construction—Where the object is to secure a fireproof construction, "Antakwa Plaster Key" dispenses with metal lath on walls and ceilings, at a saving of about fifty per cent.

"Antakwa Medium."

"Antakwa Medium" is for the prevention of discoloration on marble, limestone, etc.

Applied cold with a brush in the same manner as paint to unexposed parts of stone to within one inch of the exposed face, it prevents discolorations due to brick backing, and chemical action due to the dampness in the mortar or cement in which stone is set. "Antakwa Medium" is more economical than non-staining cements.

"Antakwa Colorless."

A paint composed of waterproof, airproof and acidproof materials, with slightly heavier body than water, and applied with a brush. On first application, paint penetrates the pores (carried *under* surface), where it becomes as indestructible as the surface itself.

Used for damp proofing of walls, stone, or cement, preventing penetration of moisture to plaster; for waterproofing swimming-pools, concrete reservoirs, fountains, etc.; for the treatment of cement or patent floors, preventing absorption of moisture.

SPECIFICATION

Surface to be in a clean, dry condition. "Antakwa Colorless" to be applied in liberal quantities to seal pores to as great a depth as possible.

"Antakwa Heavy."

Practically a cement, with heavier body than "Antakwa Medium." Elastic always. Used effectively for heavy waterproofing of foundations under ground, cellars, etc., alone or in combination with burlap or felt, against any ground-water pressure.

"Regal" Coatings.

For Cement Floors—"Regal" Floor Coatings prevent cement floors from dusting, and lessen the wear and tear on machinery, especially dynamos, due to the settling of the fine particles of cement on them. They are oil- and grease-proof, preventing the disintegrating action of same on such floors, and are also waterproof and permit of their being properly cleaned.

For Cement, Stucco or Brick Walls and Ceilings—These Coatings are manufactured in a number of soft, harmonious colors that not only waterproof the surface, but appeal to the artistic sense as well. As a rule cement or stucco valls are seldom uniform in color, due to the variations in mixing, or being charged with moisture, especially after a rain storm. This can be remedied by the use of "Regal" Coatings, as they effect a chemical change in the surface of the cement or stucco, filling the pores with an insoluble material that is impervious to the action of water, gas or oil.

"Regal" Flat Finishes.

"Regal" Flat Finishes, for interior decoration, take the place of cheap water colors, kalsomine and wall-paper. They are not only hygienic, for they can be kept clean at all times with just soap and water, but they afford a combination of beautiful, soft colors that are pleasing as well as restful to the eye.

References.

The following is a list of some of the architects who use Antakwa Products, and the buildings where specified:

George W. Beaumont, Gunther Building, Chicago, Ill.
A. G. Brown, 8-story Mercantile Building, Chicago, Ill.
Shepley, Rutan & Coolidge, Presbyterian Hospital, Chicago, Ill.
Geo. W. Maher, University Building, Evanston, Ill
Geo. W. Maher, Swift Hall of Engineering, Northwestern University, Evanston, Ill.
C. F. Jobson, Roseland State Savings Bank, Chicago, Ill.
H. J. Gaul, St. Ann's Home, Techny, Ill.
H. J. Gaul, St. Francis Hospital, Evanston, Ill.
H. J. Gaul, St. Margaret's Hospital, Hammond, Ind.
Jennings & Kroneberg, Public School, Glencoe, Ill
Huehl & Schmid, Central Masonic Temple, Chicago, Ill.
F. M. Barton, Hope Publishing Co., Austin, Ill.
Howard Shaw, Elm Street Apartments, Chicago, Ill.
R. E. Schmidt, Garden & Martin, Office Building, Chicago, Ill.
E. E. Roberts, Y. M. C. A. Building, Oak Park, Ill.
Beers & Beers, Wells Fargo Building, Chicago, Ill.
Talmadge & Watson, two residences, Chicago, Ill.
S. N. Crowen, Western Newspaper Union Building, Chicago, Ill. And many other Architects.

THE BITU-MORTAR WATERPROOFING COMPANY, INC.

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"B-M No. 78" BITU-MORTAR LIQUID WATERPROOFING COMPOUND, "B-M No. 123" BITU-MORTAR POWDER WATERPROOFING COMPOUND.

Also "B-M No. 208" and "B-M No. 212" BITU-MORTAR DAMP-PROOFING and FURRING COMPOUNDS.

Contractors for the EXECUTION OF WATERPROOFING AND DAMP-PROOFING WORK in all sections of country, making specialty of difficult operations where other materials have failed. Will furnish bond from any Bonding Company guaranteeing work to remain absolutely water-tight for long term of years.

An Engineering Department is maintained, which is at service of all seeking advice on any questions concerning waterproofing or damp-proofing of Tunnels, Subways, Foundation Walls, Sewers, Reservoirs, etc.

BITU-MORTAR WATERPROOFING
WATERPROOFS PERMANENTLY

TRADE-MARK

"B-M No. 78" Bitu-Mortar Liquid Waterproofing Compound.

This is a chemically prepared compound which can be readily incorporated in ordinary Portland cement mortar, rendering same absolutely and permanently impervious to water, even under severe pressure.

Mortar so prepared will bond perfectly to either old or new concrete, brick, stone or iron, and can be applied to wet surfaces even under pressure.

"B-M No. 123" Bitu-Mortar Powder Waterproofing Compound.

This compound is manufactured in form of extremely fine powder, which, when thoroughly mixed with dry Portland cement (two pounds of powder to one bag of cement), makes mortar or concrete waterproof. Does not affect strength, color, or setting and hardening of concrete. Especially adapted for reservoirs, sea walls, dams, tanks and foundations of buildings.

SUGGESTIONS FOR APPLICATION

NATURE OF WORK	CONDITIONS	MATERIAL REQUIRED
Tunnels, subways, cellar walls.	Already constructed. Water coming through floors, ceilings or sidewalls.	Bitu-Mortar Liquid Waterproofing Compound, "B-M No. 78."
Foundation walls of buildings, sewers, reservoirs.	In course of erection.	Bitu-Mortar Powder Waterproofing Compound, "B-M No. 123."
Damp-proofing substructure and superstructure walls of buildings.	After erection and before plaster has been applied, and before backfilling.	Bitu-Mortar Damp-Proofing Compound, "B-M No. 208" or "B-M No. 212."

References.

Partial list of buildings where Bitu-Mortar Products have been used:

Swift & Co. Meat Vats, 13th St. Market, New York
Ward Bread Co., 165th St. and Park Ave., New York
United States Express Co. Stables, Jersey City, N. J.
Residence, B. C. Hoppin, Islip, L. I., Cross & Cross, Architects
Sewer System, Fairview, N. J.
Public School No. 5, West New York, N. J., Siefert & Webb, Architects
Ice Mfg. Co. Plant, 184th St. and Amsterdam Ave., New York, Mortenson & Co., Engineers
United Electric Light & Power Co., 201st St. and Broadway, New York
Park & Tilford Building, 76th St. and Madison Ave., New York, Herbert M. Baer, Architect
Garage, Southold, L. I., Jas. L. Burley, Architect
Post Office, Ansonia, Conn., Westchester Engineering Co.
Pope-Whittemore Building, Cleveland, Ohio, Tidewater Building Co.
Knickerbocker Club, 62nd St. and Fifth Ave., New York
Passaic Valley Sewer, Belleville, N. J.
Shults' Bread Co. Building, 165th St. and Park Ave., New York
Willow Tree Poultry Farm, East Rockaway, L. I.
Cortland House, Bayshore, L. I., Jas. L. Burley, Architect
Hudson & Manhattan R. R. Tunnels, H. & M. Co., Engineers
Glens Falls Insurance Co. Building, Geo. B. Post & Sons, Architects
Samaritan Hospital, Troy, N. Y., Geo. B. Post & Sons, Architects
Power-House, Elizabeth, N. J., Public Service Electric Co.
Y. M. C. A. Building, Warren, Pa., Louis E. Jallade, Architect
Y. M. C. A. Building, Portsmouth, Va., Louis E. Jallade, Architect
Residence, H. B. Good, South Orange, N. J., John Capen, Architect
Ross Building, Maplewood, N. J., L. C. Main, Architect
Central Engine House, Holyoke, Mass., O. Beauchemin, Architect
Residence, C. C. Merritt, Larchmont, N. Y.
Public School No. 1, Linden, N. J., Runyon & Carey, Engineers
Quaker Ridge Station, N. Y., W. & B. R. R., Stem & Fellheimer, Architects
Garage, 553-557 West 57th St., New York, Herbert M. Baer, Architect

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Ninety feet underground, partly under Hudson River, waterproofed with Bitu-Mortar Compound

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Percoproof Damp-proofing Compound; Ceil-Board

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Products.

PERCOPROOF, a Damp-proofing Compound.
CEIL-BOARD, a substitute for Lath and Plaster.

Percoproof.

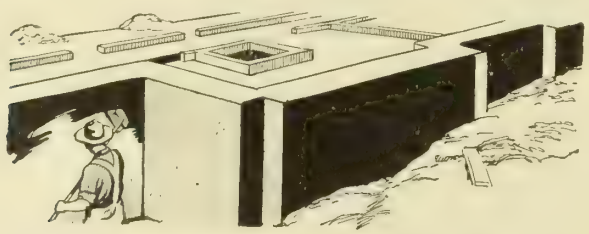
Description—Percoproof is a black liquid compound, which is applied cold (in the same manner as paint) to concrete, brick, stone, stucco, plaster or tile walls, above or below grade, inside or outside, to render them damp- and moisture-proof.

It is not an asphalt product, nor is it cut back with oils such as linseed, and it contains no oils that can be destroyed by the acids and alkalies found in the soil.

Advantages—It penetrates the surface of the wall material to a depth of at least $\frac{1}{32}$ of an inch, forming an even, unbroken and uniform skin over the entire wall surface. Percoproof is always thoroughly set, but never brittle; and on account of this permanent elasticity, it expands readily with the wall to which it is applied without cracking, flaking or peeling. It can be applied under cement, mortar or plaster, which make a perfect permanent bond with it without discoloration.

Percoproof comes ready for application and needs no oils for thinning. When found too heavy in body for proper application, it should be slightly warmed.

Application—It is applied with a large, heavy paint brush in the same way that paint is spread.



APPLICATION OF PERCOPROOF TO FOUNDATION WALLS

Covering Capacity—Its covering capacity depends upon the condition of the surface to be treated. One gallon will cover one hundred square feet, one coat, on ordinary concrete.

How Supplied—It is packed in all size containers, from one to fifty gallons.

Specifications and Estimates—Special specifications and estimates supplied upon receipt of full information regarding work to be done.

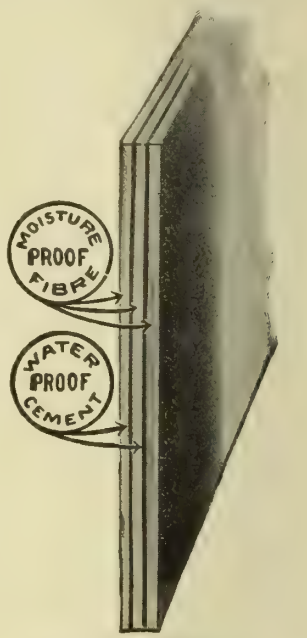
Ceil-Board.

Description—Ceil-Board is three layers of special chip-stock held in bond with a waterproof cement. It is $\frac{3}{16}$-inch thick and furnished in large panels. It is moisture-proofed, and will not absorb atmospheric moisture at any point, which means *dry walls*. It is an effective insulator against heat and cold, and is sound-deadening.

Adaptability—Ceil-Board finds its largest use as a wall and ceiling covering; but it is also largely used for insulating between inner and outer walls, for sound-deadening between flooring, for lining varnish dry kilns, for display-window backgrounds, as a core for wood veneers, etc.

Advantages — Ceil-board cannot crack or fall as plaster; will not absorb or hold moisture, and is applied without dirt or damage. It can be applied in freezing weather, and requires no special skill in its application. Rooms may be occupied immediately after Ceil-Board is up, and may be painted or papered at once. Ceil-Board is sanitary and safe.

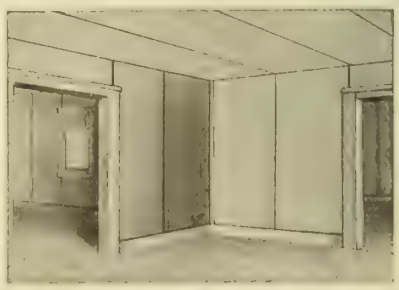
Application — Ceil-Board is applied directly to studding and joists, over cracked plaster or to any flat surface. Joints are covered with wood strips for painting and with gummed paper or canvas strips for wall-papering.



CEIL-BOARD
Showing actual thickness

Finishes—Plain Gray, Plain Tan, Golden Quartered Oak, Mission Quartered Oak, Circassian Walnut and Waterproof. All finishes, except Waterproof, may be used wherever plastered or wood panels have heretofore been used. Waterproof Ceil-Board is used for siding, sheathing and roofing small buildings and for use in the interior where contact with water, steam or dense vapors may occur. This finish takes asphalt paints only.

APPLYING CEIL-BOARD TO STUDDING



THE COMPLETED ROOM PANELED AND PAINTED

Sizes — Plain Gray, Plain Tan and Waterproof in widths of 32 and 48 inches. Quartered Oak and Circassian Walnut in 32-inch width only. All styles in even foot lengths from 5 to 12 feet. Special sizes on factory orders.

Samples, etc. Samples of all styles and descriptive booklets supplied on request.

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CERESIT
TRADE MARK REGISTERED
TRADE-MARK

C. W. Co. Damp-proof Plaster Bond.

For damp-proofing inside of exposed walls, and providing a bond for cement, lime or gypsum plaster. To be applied in continuous coating as per manufacturer's specifications. Covering capacity about 75 square feet per gallon.

C. W. Co. Damp-proof Coating.

A black asphaltic material for damp-proofing foundation walls against surface water seepage. To be applied in one or two coats as necessary, in accordance with manufacturer's specifications. Also to be applied on concrete floors as damp-proof protection where wood floors are to be laid. Covering capacity about 75 square feet per gallon.

C. W. Co. Damp-proof Stone Backing.

For stain-proofing and damp-proofing building stone. To be painted on five unexposed surfaces in accordance with manufacturer's specifications. Covering capacity about 150 square feet per gallon.

C. W. Co. Floor Hardener.

To harden and dust-proof concrete floors by means of a ground, iron hardener, to be incorporated in the top finish of floor in accordance with manufacturer's specifications. Made in two colors, steel gray and tile red.

Ceresitol.

A transparent liquid, applied with a brush, rendering cement mortar, stone, brick, roof tile, porous stone, earthenware, etc., moisture-proof; makes an excellent foundation for application of oil paints; comes ready to use, and one gallon covers from 150 to 200 square feet of surface.

Advertising Data.

Folders describing each product, and general catalogue and literature as usually supplied, sent on request.

A monthly bulletin, "The Ceresit Waterproofer," which will be mailed regularly to those interested in the solution of waterproofing and kindred problems.

A comprehensive and a complete specification data book (8½ by 11 inches) gives adequate and dependable specifications for all classes of waterproofing, damp-proofing and floor hardening work, with numerous drawings made to scale.

Ceresit Waterproofing Compound.

Ceresit is a plastic paste, and has two general uses, as follows:

(a) The waterproofing of substructure work, including foundation walls, basements, elevator and boiler pits, tunnels, swimming pools, dams, tanks, etc.

(b) Protecting and making permanent above ground cement work, with Ceresit, including cement stucco, retaining walls, pergolas, balustrades, concrete bridges and all ornamental cement construction.

The two methods of use are the incorporation of Ceresit in mass concrete, and waterproofing by means of a cement mortar coating mixed with Ceresit.

Condensed Specifications.

(1) All substructure concrete shall be waterproofed by the use of Ceresit waterproofing compound in the mass concrete, to be used in accordance with the manufacturer's general specifications for this particular class of work.

(2) All substructure work shall be waterproofed by the use of Ceresit waterproofing compound by means of a ceresitized cement mortar coating, to be applied in accordance with the manufacturer's general specifications for this class of work.

(3) All cement stucco shall be waterproofed with Ceresit waterproofing compound, in accordance with manufacturer's specifications; pergolas, and ornamental cement work shall be waterproofed and protected against disintegration by the use of Ceresit waterproofing compound in accordance with the manufacturer's specifications.

Quantities Required.

For mass concrete, 10 to 13½ pounds Ceresit per cubic yard of concrete.

For cement mortar, 12 pounds Ceresit per 100 square feet, 1 inch thick, and proportionate quantities for fraction of an inch thickness.

CONCRETE WATERPROOF PAINT CO.

MANUFACTURERS OF

Waterproofing and Damp-proofing Materials and Cement Coatings

EXECUTIVE OFFICES

829-835 North 3rd Street

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BOSTON	KANSAS CITY	MINNEAPOLIS	NEW YORK	ROCHESTER	WILMINGTON
BUFFALO	LOUISVILLE	MOBILE	OMAHA	ST. LOUIS	

Products.

HYDROSEAL DAMP-PROOFING COMPOUNDS: No. 330, a Plaster Bond; No. 640, a Foundation Waterproofing; No. 309, for Preventing Staining of Limestone, etc.; No. 304, for Protection of Woodwork and Tanks; No. 352, a Metal Preservative.

PENETRITE INTEGRAL WATERPROOFING PASTE; PENETRITE TRANSPARENT COMPOUND, a Colorless Waterproofing for Concrete, Cement, etc.; PENETRITE FLOOR FINISH, for Preventing Dusting of Cement Floors; KLING KOAT CEMENT COATING, a Decorative Waterproofing Paint; "HEALTHTONE," a Damp-proofing Interior Decorative Paint for Walls; CANVASOID, a Paint for Coating Canvas.

Advantages.

Hydroseals are so prepared that they remain elastic indefinitely. No coal-tar products are used. Special paints made to meet specific requirements, and any proposition offered will be submitted to our chemical laboratories.

Penetrite Transparent Compound enters into the pores of concrete and cement one quarter inch. It seals the pores so the surface effectually sheds water.

Kling Koat Cement Coating withstands climatic changes, and beautifies any surface. It is made in twelve harmonious colors.

Catalogues and Samples.

Catalogues containing information and samples may be obtained free upon request, by any architect.

References.

Our various materials have been approved by the office of the Supervising Architect of the United States for Government work.

The character of our products may be judged by the type of buildings on which they have been used successfully for years.

State locality in which you live, and we will forward to you desirable references.

BRANDS, USES AND SPECIFICATIONS

PURPOSES	MATERIAL	SPECIFICATIONS
FOR DAMP-PROOFING AND WATERPROOFING CONCRETE, BRICK AND CEMENT		
To damp-proof exposed walls to be plastered—unfurred or furred with hollow brick or furring tile	Hydroseal No. 330	Coat the interior of all exposed walls one coat; and, if necessary, two
To prevent surface infiltration and dampness in basements and cellars	Hydroseal No. 640	Apply one heavy, continuous coat
To prevent and resist severe conditions of dampness and water below sub-level	Hydroseal No. 640, in conjunction with canvas or felt	Apply No. 640, and canvas, etc., alternately 3- to 5-ply until the hydrostatic pressure is equalized
To prevent water penetration through old walls of stucco, cement-faced brick or stone by an exterior application	Penetrite Transparent Compound	Apply one coat after having pointed all joints
To render waterproof by physical mixture with concrete and cement	Penetrite Integral Waterproofing Paste	For ordinary work add one gallon to sixteen gallons of water
FOR STAIN-PROOFING LIMESTONE AND MARBLE		
For the protection of limestone, marble, etc., against stain caused by the cement through surrounding masonry	Hydroseal No. 309	Apply to all unexposed sides of stone, one continuous coat
FOR THE PROTECTION OF WOOD		
For the insulation and protection of woodwork, tanks, etc.; i.e., to prevent the warping and deterioration of sleepers, wainscoting, etc.	Hydroseal No. 304	Apply to surface one heavy coat
FOR THE PROTECTION OF METAL		
For prevention against electrolysis and corrosion of exposed structural steel	Hydroseal No. 352	Apply one shop coat, to be followed by a field coat
For protection against brine drippings of salt water, gas, etc.	Hydroseal No. 352B	Remove all loose particles, then apply one heavy coat
FOR BEAUTIFYING AND WATERPROOFING CONCRETE AND PLASTER SURFACES		
To beautify and protect exterior walls of brick, stucco cement, and concrete	Kling Koat Cement Coating (flat and gloss)	Apply one or more coats
MISCELLANEOUS		
To prevent the dusting and abrasion of concrete floor	Penetrite Floor Finish	Apply two coats, and allow twenty-four hours between applications
To protect and make washable canvas pipe coverings, etc.	Canvasoid	Apply two coats of this material

THE ELATERITE PAINT AND MANUFACTURING CO.

Waterproofing and Bonding Materials

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Products.

Manufacturers of CEMENT WATERPROOFING and BONDING "DES MOINES ELATERITE" and "ELATERITE" WATERPROOFING GUM.

Also, of PRESERVATIVE PAINTS for every class of surfaces.

No. 60 Cement Waterproofing and Bonding "Des Moines Elaterite."

This is both a waterproofing and a bonding material. Its base is an intensely adhesive, extremely elastic, non-porous, acid-resisting, absolutely waterproof pure carbon, known as "mineral rubber." It seals the pores of cement, brick or stone; destroys capillary attraction, and provides a continuous film which completely shuts out dampness. Besides giving permanency as a waterproofing and resistance to water pressure, its intensely adhesive quality gives it bonding character. Plaster coats are applied directly over it, the adhesive quality binding the plaster firmly and permanently. Tests show a bonding strength of 160 pounds per square inch.

Advantages.

Its advantages are: Intensely adhesive, permanent character; extreme resistance to all acids, preventing disintegration; permanent pliability and elasticity, preventing breaking of the waterproof film from hair cracks or expansion and contraction; smooth liquid character, providing a continuous, rubbery blanket; absolute waterproof character, sealing the surface against passage of dampness; combination of waterproofing and bonding, permitting doing away with lath or furring, economizing room, saving in labor and material costs.

Uses.

Applicable for every character of waterproofing uses in connection with cement, concrete, brick or stone construction, for buildings, reservoirs, swimming-pools, bridges, etc.; as a backing for stone to prevent discoloration; as a bonding for plaster on walls, ceilings, metal I-beams or wooden partitions, beneath tiling or cork linoleums, or between new and old cement.

How Applied.

It is applied cold, spreads rapidly with broad, flat brushes, no hot swabbing or layers of felt required, and any workman can apply it.

Covering Capacity.

One gallon will cover from 125 to 200 square feet, one coat, or from 80 to 100 square feet, two coats, on cement, brick, or stone, depending on porosity; from 400 to 500 square feet on metal and from 250 to 300 square feet on wood.

But One Specification Necessary.

There is no necessity for the architect specifying a different material for outside foundations, inside walls and bonding of plaster if No. 60 Cement Waterproofing and Bonding "Des Moines Elaterite" is specified. It meets every waterproofing and bonding requirement in construction work. And the money advantage in purchasing a large quantity of one material adapted to all waterproofing or bonding uses, rather than a small quantity of a half dozen with limited adaptation, will be apparent.

APPLYING PLASTER COAT DIRECTLY TO WATERPROOFING AND BONDING COAT OF "DES MOINES ELATERITE"

Specification.

For Inside Walls and as Bonding for Plaster—Apply to the inside of all exposed walls (and over concrete ceilings) two coats of No. 60 Cement Waterproofing and Bonding "Des Moines Elaterite," as made by THE ELATERITE PAINT AND MFG. CO., Des Moines, Iowa. When last coat is "set" but still "tacky" apply plaster coat directly over it.

For Outside Foundations—Apply to all outside foundation walls two coats No. 60 Cement Waterproofing and Bonding "Des Moines Elaterite," as made by THE ELATERITE PAINT AND MFG. CO., Des Moines, Iowa, carrying it over all footings, piers, and to a point six inches above grade line.

For Stain-Proofing Stone—All stone to be coated on five unexposed sides before setting with No. 65 Stone Backing "Des Moines Elaterite."

APPLYING "DES MOINES ELATERITE" TO OUTSIDE OF FOUNDATION WALL

PROTECTING STONE FACING FROM DISCOLORATION WITH NO. 65 STONE BACKING "DES MOINES ELATERITE"

References.

No. 60 "Des Moines Elaterite" has gone into very many important constructions throughout the United States, under specification of leading Architects.

Among these constructions are:

Southern Pacific Hospital, Houston, Tex.; Idaho State Capitol, Boise; Minnesota State Penitentiary, Stillwater; U. S. Government Reservoir, Naval Station, Key West, Fla.; Plant of the Baltimore County Water & Electric Co., Baltimore, Md.; Louisiana State Hospital; School Buildings of the City of Minneapolis; Plant of the Corn Products Refining Co., Argo, Ill.; Municipal Building and Concrete Bridges of the City of Des Moines, and many others.

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EXPORT DEPARTMENT: NEW YORK, N. Y., 395 Broadway

Products.

INTEGRAL WATERPROOFING PASTE, GF No. 10; INTEGRAL WATERPROOFING POWDER, GF No. 11; MOP COATING, GF No. 17; WATERPROOF FELT, GF No. 18; SATURATED FABRIC, GF No. 21; FOUNDATION BRUSH COATING, GF No. 16; TROWEL COATING, GF No. 15; STAINPROOF STONE BACKING, GF No. 220; DAMPPROOFING COATING, GF No. 200; COLORLESS WATERPROOFING, GF No. 100; BRICK and CEMENT COATING, GF No. 101; CRYSTALROX, GF No. 145; MASTIC CEMENT, GF No. 250; CONCRETE HARDENER, GF No. 140; BONDING COMPOUND, GF No. 400; ACIDPROOFING, GF No. 99; FLOOR PRIMER, GF No. 150; FLOOR COATING (in colors), GF No. 151; WALL SIZE, GF No. 499; INTERIOR WALL COATING, GF No. 500; STEEL COATING, GF No. 300; PROTECTIVE COATING (for steel), GF No. 325; GALVANIZED IRON COATING, GF No. 350.

For other products see our name in General Index.

Service.

A Waterproofing Service Department is maintained, in which are practical engineers who have had wide experience on waterproofing jobs. Their time is devoted to studying actual conditions and recommending the right method along with the most suitable material for the job. This department will give complete specifications if informed regarding nature of the work.

GF No. 10 Integral Waterproofing Paste.

A smooth white paste mixed with the gauging water for concrete and cement. The proportion is two per cent by weight of the amount of cement.

GF No. 10 effectively fills all pores rendering mass permanently water-tight. The small quantity required and the ease of using GF No. 10 make it an effective and inexpensive waterproofing for many jobs.

Uses—For waterproofing concrete foundations, floors, tanks, silos, etc., as an integral part of the mix; for waterproof coating when mixed with cement plaster; for waterproofing stucco exteriors over masonry or metal lath.

GF No. 11 Integral Waterproofing Powder.

For the same work as GF No. 10 Paste. The only difference is the form and method of application.

GF No. 17 Mop Coating, GF No. 18 Waterproofing Felt and GF No. 21 Saturated Fabric.

For membrane waterproofing courses.

Uses—Nos. 17 and 18 used for waterproofing basements, floors, roofs, etc; Nos. 17 and 21, for swimming-pools, steel and concrete bridge decks, etc.

GF No. 15 Trowel Coating and No. 16 Foundation Brush Coating.

The former a thick paste like compound, the latter a heavy bitumen which can be swabbed on with a brush.

Uses—For waterproofing substructures on the outer surface before refilling with soil. Also for floors and tanks.

GF No. 220 Stainproof Stone Backing.

Applied on the back and joint surfaces of limestone, marble, etc., before erection to prevent staining and efflorescence.

GF No. 200 Dampproofing Coating.

A heavy bitumen which is applied cold to rough brick or masonry walls. The strong "tack" aids in bonding the plaster.

Uses—As a dampproofing on walls to which plaster is applied directly, or over lath and furring; also on the back of wood trim when set over wet plaster.

GF No. 100 Colorless Waterproofing for Exteriors.

A permanent pore-filling liquid, which in no way changes the appearance of walls while rendering them water-tight. GF No. 100 never turns white or flaky and does not collect dirt.

Uses—For waterproofing exterior walls of brick, stone or stucco; for copings, parapets, cornices; for cisterns, water-tanks and pools.

GF No. 101 Brick and Cement Coating.

For uses similar to GF No. 100, except that it imparts a lasting color to the surface. Furnished in colors—White, Old Ivory, Buff, Bedford Gray, Portland Gray, Concrete Gray, Tile Red, Brownstone.

GF No. 145 Crystalrox.

A concentrated liquid for hardening and dustproofing concrete floors, both new and old. Also used to prevent streaking and staining on the face of granite and limestone.

GF No. 150 Floor Primer and No. 151 Floor Coating.

Together they make a pleasing sanitary floor coating, furnished in several colors. This coating renders the floor non-dusting, and increases considerably its resistance to wear. Colors—Bedford Gray, Portland Gray, Concrete Gray, Tile Red and Brownstone.

GF No. 499 Wall Size and No. 500 Interior Wall Coating.

A sanitary coating for walls and ceilings, rendering them waterproof, dust free, and easy to clean or wash. For homes, hospitals, offices, public buildings, etc. Colors are furnished from stock as follows: White, Light Yellow, Light Sage, Old Ivory, Colonial Yellow, Pea Green, Buff, French Ochre, French Gray, Light Delft Blue, Dark Delft Blue, Scarlet Lake.

GF No. 99 Acidproofing.

A thin transparent liquid which effectively resists dilute acids and acid gases.

Used for coating acid tanks and containers, in laboratories and industrial plants, on hospital walls, etc.

GF No. 250 Mastic Cement.

A thick cement-like waterproofing for pointing up roof joints, window and door casings, etc.

GF No. 300 and No. 325 Structural Steel Coatings.

For structural steel, both permanently exposed, and to be encased in masonry or concrete.

GF No. 350 Galvanized Iron Coating.

A protective and beautifying paint that will adhere permanently to galvanized sheets and wire. A good protection for eaves spouting, etc., to be put on before erecting.

Handbook.

The Waterproofing Handbook containing complete Specifications furnished on request.

THE HYDREX FELT & ENGINEERING CO.

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Hydrex Waterproofing Felt.

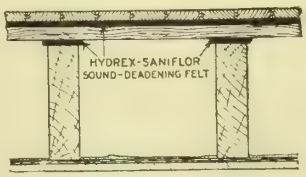
This well-known waterproofing felt is an absolutely impervious leather-like sheet, first saturated and then given a *glazed coating* on both surfaces. Used in two or more layers (as the conditions may require) for waterproofing foundations, tunnels, subways, reservoirs, swimming-pools, dry docks, fortifications, battery room floors, etc.

For general waterproofing work, four layers of the felt are used, cemented together with hot Hydrex Compound (*The Membrane Method of Waterproofing*), which has been successfully used in the most difficult water-pressure work throughout the world.

For waterproofing upper floors in mills, warehouses, etc., specify two layers of Hydrex Felt "*Penna. Special*" grade, cemented together with hot Hydrex Compound.

Detailed specifications, suited to particular needs and conditions, will be promptly supplied, upon request. As Engineers and Experts in Structural Waterproofing, we furnish estimates, plans and specifications for waterproofing any kind of construction.

Hydrex-Saniflor Sound-Deadening Felt.



METHOD FOR SOUND-DEADENING FLOORS WITH HYDREX-SANIFLOR

A thick, soft felt *coated* on both surfaces so as to hermetically seal in the felt and render it non-absorbent, clean, sanitary and absolutely vermin-proof. Moths, mice and other vermin will *not* and can *not* eat the coating, because gnawing causes the teeth to stick. The well-known sound-deadening quality of Hydrex-*Saniflor*, together with its vermin-proof features, makes in unequaled for use in hospitals, residences, apartment houses, schools, etc.

Also widely used as a warmth-giving, blanket-like lining under clapboards and roofs, and for cold-storage, ice-house and refrigerator car insulation.

Hydrex-*Saniflor* is put up in rolls 36 ins. wide, containing 300 sq. ft.

Hydrex-Novento Waterproof Sheathing Paper.

An extra heavy *felt-paper*, first waterproofed through and through and then given a *glazed coating* on both sides. *Is further improved by a coating of powdered soapstone* on the weather side, the soapstone being a great water-repellent and preservative. When used under clapboards, slate, tile, stucco, tin, etc., the gray or soapstoned surface should be turned outward towards the weather; and when used under floors, the soapstone surface should be turned upward.

Hydrex-*Novento* contains no *coal-tar or acids* to corrode tin, nails or other metal. Being unaffected by alkali, it is specially adapted for use under stucco. Made in 1-ply, 2-ply, 3-ply. Put up in rolls of 500 sq. ft.

Hydrex-Bikota Waterproof Sheathing Paper.

A low-priced, waterproof sheathing paper, coated on both sides, but *not* saturated. Widely used under floors and parquet flooring. Made in 1-ply, 2-ply, 3-ply. Put up in rolls of 500 sq. ft.

Hydrex Preservative Paint.

A heavy-bodied black paint for damp-proofing the interior surface of exterior walls, and also the outside of hollow terra cotta tile walls to be stuccoed.

It excels in acid-resisting qualities, especially against sulphuric acid, and is therefore standard for use in electric storage boxes and battery rooms, for coating walls and all exposed metal.

This paint forms a heavy, tenacious, impervious coating to which plaster and stucco tightly bond. For the best results, two coats should be used. One gallon covers about 100 sq. ft. of brick surface.

Also used as a preservative coating for structural iron and steel work, because of its being unaffected by the lime in cement and mortar.

Hydrex Waterproof Canvas.

A heavy, strong canvas, impregnated and coated with an elastic waterproof compound. Used on porch roofs, boat decks, piazza floors, etc., where there is considerable walking. Shipped in rolls 29 ins. wide, containing 216 sq. ft.

Hydrex Burlap, "New York Subway Brand."

A saturated and coated burlap accepted and used for waterproofing New York Subway. Put up in rolls of 400 sq. ft.

Hydrex Waterproof Cloth.

A waterproofed woven fabric used for waterproofing in connection with (hot) Hydrex Compound. Shipped in rolls 36 ins. wide, containing 500 sq. ft.

Hydrex-Pluvinox Ready Roofing.

A high-grade, smooth-surfaced, durable roofing. Made in 1-ply, 2-ply, 3-ply. Rolls contain 216 sq. ft.

HYDRO-BAR WATERPROOFING CO.

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Products.

Manufacturers of HYDRO-BAR INTEGRAL (a waterproofing paste), HYDRO-BAR TRANSPARENT (a waterproofing liquid), HYDRO-BAR ELASTIC CEMENT (a cement for pointing), HYDRO-BAR ANTI-RUST PAINT, HYDRO-BAR DAMP-PROOF PAINT and HYDRO-BAR CONCRETE HARDENER.

Hydro-Bar Integral.

A thin paste easily dissolved in water, used for wetting down cement and concrete. Absolutely waterproofs foundations, cellars, swimming pools, cisterns, tunnels, dams, bridges, stucco and concrete, insuring a water-tight condition; acid resistant.

Hydro-Bar Transparent.

A transparent (colorless) liquid water- and weather-proofer for brick, stone, stucco or concrete, exterior surfaces above grades. Seals all pores and prevents efflorescence.

Hydro-Bar Elastic Cement.

A permanent plastic waterproof cement for expansion joints and pointing up stucco, around windows, cornices, doors, skylights, etc.

Hydro-Bar Anti-Rust Paint.

Preserves steel against sulphur dioxide and carbon dioxide, elements present in air and water, causing corrosion of metal.

Hydro-Bar Damp-Proof Paint.

An Elastic Compound of natural bitumen and mineral rubber—flexible, acid-resisting and non-porous.

Hydro-Bar Concrete Hardener.

A mineral powder which, when incorporated under our process in cement, makes an absolutely wear-, dust- and vermin-proof surface. It will bond perfectly with concrete, and will increase its tensile strength.

Application.

As engineers and contractors for waterproofing we make a specialty of waterproofing and preserving of exterior and interior stone, brick, concrete and stucco masonry walls. Also, the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools and window calking, etc.

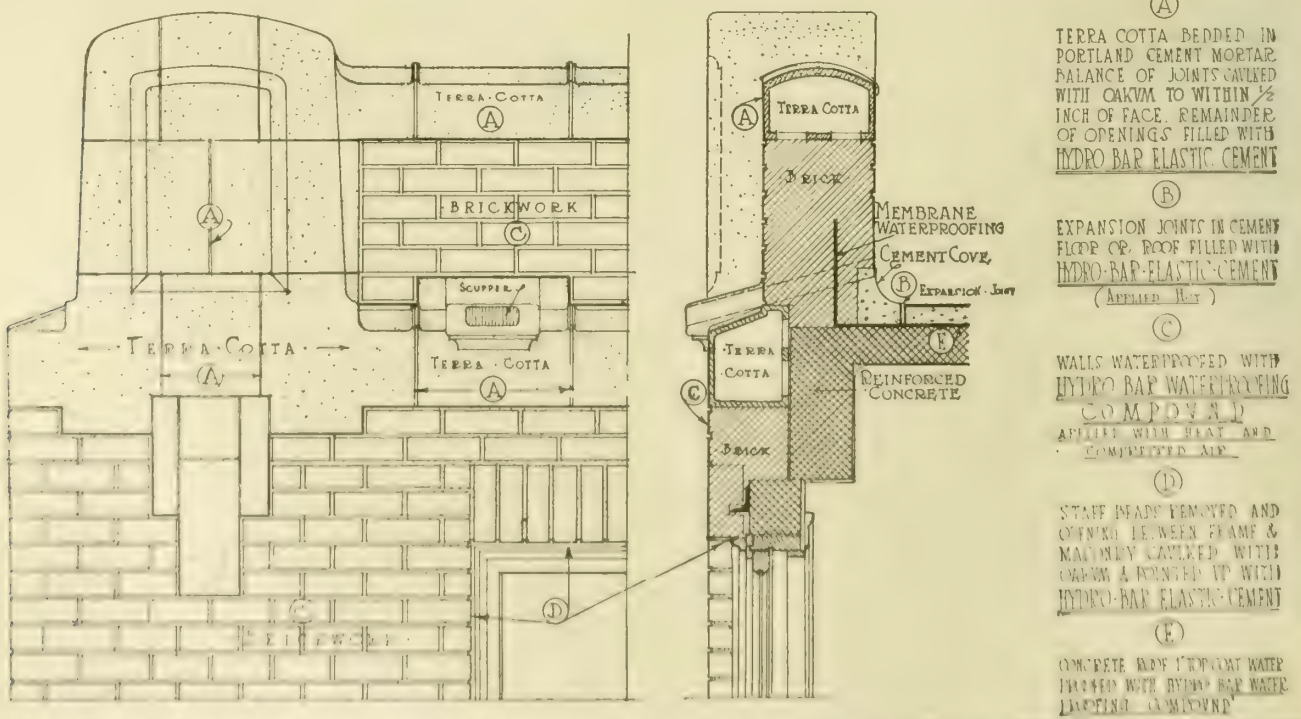
Our method of waterproofing and preserviug of exterior and interior masonry walls is by removing and replacing the defective or missing parts, then applying a coating of our Hydro-Bar Transparent Solution (a combination of prepared waxes), by means of heat and compressed air, thereby driving this solution well into the masonry, rendering same impervious to water, acid, alkalis or other destructive influences which cause disintegration.

Cement Waterproofing Process.

In waterproofing of basements, subways, dams, bridges, swimming pools and tunnels, elevator pits and boiler pits—our method consists principally of the application of waterproof cement coating applied to the surfaces of the walls. This work should be done under contract by skilled men. We also furnish material which can be mixed with the concrete while in course of construction. These materials should be used under the supervision of our engineering department.

Co-operative Service.

Engineers and contractors are cordially invited to submit their waterproofing problems to our engineering department. Designs and specifications furnished on application. All work contracted for by us fully guaranteed for a term of years.



DETAILS SHOWING METHOD OF APPLYING THE HYDRO BAR PRODUCTS TO WALLS, WINDOWS, COPINGS, BUTTRESSES, ETC.

Sweet's Catalogue

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TRADE-MARK

We are ENGINEERS and SPECIALISTS for WATERPROOFING.

We take and execute contracts for the WATERPROOFING of all kinds of SUBSTRUCTURES, such as Subways, Tunnels, Reservoirs, Vaults, Swimming Pools, Boiler Rooms, Cellars, etc., giving a guarantee against any percolation, whether structures are of concrete, brick or stone.

We also call your attention to a new concrete, HYDRO-CRETE, of which we are sole owners.

Winslow's Hydrolithic System.

All our work is executed in the well-known Winslow's hydrolithic system, using either hydrolithic cement or hydrolite as the conditions may require. Hydrolithic coatings contain all the good points of a first class true Portland cement mortar, with the addition of their water-repellent and waterproofing qualities.

Application.

Hydrolithic waterproofing is applied on the interior of exterior walls and floor forming one monolithic shell, and the adhesive qualities of our work are such that it will withstand any water pressure, and will last just as long as the structures waterproofed will last. Hydrolithic waterproof coatings, five-eighths inch thick on brick, have withstood a laboratory test of 1200 pounds per square inch; and actual successful work has been done 162 feet below grade, representing a hydrostatic pressure of over 70 pounds per square inch.

Advantages.

The advantages of our hydrolithic system over the old membraneous method are many: Repairs of any defects can be made easily, as the work is always in sight; it gains floor space, taken up in the membraneous method by protecting brick walls, not necessary under our hydrolithic system; the waterproof coat constitutes the finish of the walls and floors, and being impervious, is absolutely sanitary. Hydrolithic coatings are perfectly bonded to waterproofed structures, forming a part of such, and thereby add strength to walls, and especially to floors. Hydrolithic coatings are not affected by heat, and can be used in boiler rooms where heat would melt many of the substances used in other methods of waterproofing.

REFERENCES

Delaware & Hudson Office Building, Albany, N. Y. J. Henry Miller, Inc., Contractors, Baltimore, Md. M. T. Reynolds, Architect, Albany, N. Y.

Royal Bank of Canada, Liverpool, N. S. Purdy & Henderson, Engineers, New York, N. Y.

Astor Market, 95th Street and Broadway, New York, N. Y. Tracy & Swartwout, Architects

Goodyear Rubber Tire Co., Jackson Avenue and Honeywell Street, Long Island City, N. Y. A. H. Bowditch, Architect, Boston, Mass.

Residence of Architect James Gamble Rogers, 164 E. 70th Street, New York, N. Y.

Bridgeport Trust Co., Bridgeport, Conn. G. A. Freeman, Architect, New York, N. Y.

St. Paul's Cathedral, Pittsburgh, Pa. Duquesne Construction Co., General Contractors

First National Bank, Scranton, Pa. Fred. S. Holmes, Engineer, New York, N. Y.

Crafton High School Building, Crafton, Pa. Schuts, Schreiner & Clyde, General Contractors, Pittsburgh, Pa.

Third National Bank Building, Springfield, Mass. Architects, Hoggson Bros., New York.

Queensboro Subway Stations (Steinway Tunnel), at Long Island City and at Lexington Avenue and 42nd Street, New York. Rapid Transit Subway Con. Co., General Contractors. Geo. H. Pegram, Chief Engineer.

D. & H. OFFICE AND WAREHOUSE BUILDING, ALBANY, N. Y.
Waterproofed with Hydrolithic Cement

Hydro-Crete.

HYDRO-CRETE
TRADE-MARK
Patent applied for

Patent and copyright for Hydro-Crete have been applied for and are now pending. This concrete is especially recommended where security against fire, water and burglars is required. It is practically a burglarproof concrete.

Mr. Frederick S. Holmes, 2 Rector Street, New York, N. Y., vault engineer and expert, recently made a practical test of our Hydro-Crete in the presence of prominent engineers and safe manufacturers.

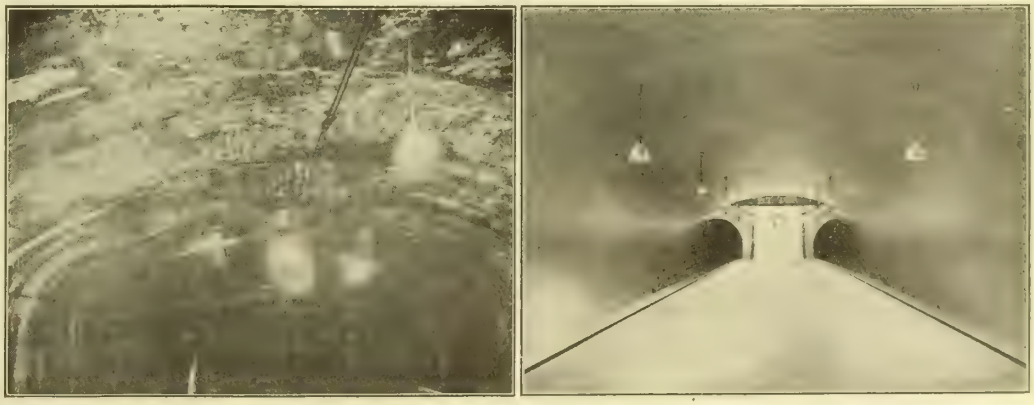
Hydro-Crete was submitted to the blast of blaugas and oxy-acetylene torches, producing 6,000 to 7,000 degrees heat Fahrenheit, to a drilling, and to a heating and sudden cooling with cold water. It withstood successfully all these efforts at destruction.

Record.

Winslow's hydrolithic system has been used for twenty years; has stood the test of time, and we can truly say there is nothing superior to it on the market today.

Estimates.

Write us your requirements, and specifications and estimates will be gladly furnished, no matter how large or small the job may be.



Before applying waterproofing — After being waterproofed

42ND STREET (NEW YORK) STATION, STEINWAY TUNNEL

IMPERIAL WATER PROOF CO., LTD.

Manufacturers, Engineers and Specialists of Waterproof Compounds and Damp-Resisting Paints

105 West Monroe Street
CHICAGO, ILL.

231 Water Street
NEW YORK, N. Y.

8 Beacon Street
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FACTORIES
NEW YORK, N. Y. CHICAGO, ILL.

REPRESENTED IN EVERY LARGE CITY IN UNITED STATES AND CANADA
Local Address of Agencies Furnished Upon Application

Products.

I. W. P. Waterproof Compounds and Damp-Resisting Paints: I. W. P. Hydraliquid, for Waterproofing Concrete and for Plaster Coatings; I. W. P. Impervios Powder, for Concrete, for Mortar Mix and for Plaster Coating; I. W. P. No. 10, for Damp-proofing Superstructures, a Plaster Bond; I. W. P. No. 15, for Backing Stone and Marble; I. W. P. No. 20 and No. 40, for Waterproofing Foundations and Retaining Walls, Concrete Basement Floors, etc.; I. W. P. Transparent, a Colorless Liquid Compound for Exterior Brick, Stone, Cement and Concrete Blocks; I. W. P. Membraneous System of Waterproofing: I. W. P. Waterproof cloth in connection with specially prepared Asphaltum for Sub-basements, Tunnels, etc.; I. W. P. No. 40 in connection with Felt and Burlap for Sub-basements, Tunnels, etc.; I. W. P. Art-O-Fin Concrete Floor Enamel; I. W. P. Liquid Concrete Hardener; Imperial Mastic Linoleum, etc.; Exterior and Interior Wall Finishes; Structural Steel Paint for Protecting Steel and Iron; Shingle Stain for Waterproofing and Coloring Wood Shingle and Tile; I. W. P. Impervios Calking, for Window Frames, Door Jambs, etc.

Limited
TRADE-MARK

I. W. P. Hydraliquid.

I. W. P. Hydraliquid is a fluid lixivious compound for fusing; that is, liquefying and thereby increasing the efficiency of Portland cements. It is a leaching chemical, the purpose of which is to excite the production of colloids in the cement, thereby bringing into service all the colloid possibilities of Portland cements, which in themselves are the best and most efficient waterproofing medium.

It is manufactured in concentrated form to be reduced on the job to one part I. W. P. Hydraliquid to sixteen parts of water. About 1½ gallons of I. W. P. Hydraliquid are required for each barrel of cement.

It is used to waterproof the concrete in the mass, and also in the cement plaster coatings applied after building is erected.

Specifications—All parts of the concrete used for basement floors, areas, piers, the footings under same and also concrete used for basement walls coming in contact with the earth, shall be waterproofed with I.W.P. Hydraliquid as manufactured by the Imperial Water Proof Co., Ltd., New York and Chicago. This waterproof liquid shall be mixed with the water used for mixing the above concrete in proportion of one part Hydraliquid to sixteen parts of water and no other water shall be used in mixing the concrete.

All concrete shall be mixed under the supervision of an inspector furnished by the manufacturer.

This work shall be guaranteed by the contractor to be water-tight for a period of three years after completion.

Note—Special data covering installation, resistance to pressure tests, costs, labor expense, composition and durability, and references, furnished promptly on request.

I. W. P. Hydraliquid Plaster Coat.

This system is particularly adapted to waterproofing existing structures where leaks have developed in walls, and if properly executed and if structure to which it is applied is capable of withstanding hydrostatic pressure ensuing, it is unquestionably the most practical of all systems for the purpose.

Its advantages are: application to interior surfaces when other systems have failed; immediate detection of necessity for repair, if any; economy and speed of repairs; it also permits perfect and easy connection of floor and wall coatings.

The I. W. P. Hydraliquid Plaster Coat System will admit nothing short of thoroughness in the preparation of surfaces to be plastered, in mixing coats and in workmanship of applying them. Owing to the fact that seventy-five per cent of the value of this system is in the method of its application, we do not guarantee same except when applied by our skilled workmen.

Specifications — Wall Work: After building is erected and under roof the contractor shall have the Imperial Water Proof Co., Ltd., apply their I.W.P. Hydraliquid Plaster Coat System. Interior surfaces of all walls coming in contact with earth shall receive a ⅝-in. coating of I.W.P. Hydraliquid Plaster Coat from floor line to grade. This coating must be applied so as to obtain a perfect bond with the masonry, and so as to effectually stop all seepage through walls.

Floor Work: All floors resting on earth to be waterproofed with a 1-in. topping of I. W. P. Hydraliquid Cement. This topping shall be laid by the waterproofing contractor, following concrete slab before it has set. This 1-in. topping must be placed so as to obtain a perfect bond with surfaces of the rough concrete slab, forming a cove which will secure a perfect bond between the floor topping and the ⅝-in. wall coating, and also must

SECOND NATIONAL BANK BUILDING, TOLEDO, OHIO
D. H. Burnham & Co., Architects
H. Bentley & Sons Co., Contractors
Foundation walls and basement floors waterproofed with I. W. P. Hydraliquid in the aggregate

Continued on next page

THIRTEENTH REGIMENT ARMORY, BROOKLYN, N. Y.
Armory Board, New York City
I. W. P. Membrane System

be bonded perfectly by our own special method to all iron columns, pipes, etc., passing through floors. It must be floated and trowelled at the proper time so as to obtain a finished wearing surface.

The waterproofing must be applied by the contracting department of the Imperial Water Proof Co., Ltd., or under the direction of a competent superintendent furnished by them. The Waterproofing Company shall furnish a guarantee covering the maintenance of this work for a period of three years from date of completion.

I. W. P. Membraneous System of Waterproofing.

This system is applied where there is a possibility of shifting soil, such as sand, quicksand, etc., and a danger of much settling.

It requires the use of our specially prepared closely woven Cotton Cloth, two layers in conjunction with three moppings of our prepared Asphaltum.

Specifications—As soon as a body layer of concrete has set, thoroughly mop the wall or floor to be treated with a coat of our specially prepared Asphaltum, heated and melted on the job, after which apply first layer of previously prepared Waterproof Cloth. Over this apply another mopping of Asphaltum, following same with a second ply of Waterproofed Cloth, after which apply the last and finish mopping of hot Asphaltum. At all seams an 18-in. lap shall be maintained throughout the job.

After the above treatment, the general contractor shall follow up the work by applying a 1-in. protecting coat of cement mortar. This system is very elastic, and will afford from 1 to 2 inches of strain from settlement cracks or other causes without giving away.

Note—Special data covering installation, resistance to pressure tests, costs, labor expense, composition and durability, and references, furnished promptly on request.

I. W. P. Impervios Waterproof Powder.

For mortar mix, cement block, concrete walls, floors, etc. This powder is manufactured with the design of meeting the great demand for a waterproof in powdered form. It is recommended for all uses to which waterproof powders are subjected, especially in the waterproofing of cement block where the mix is required to be less moist than the mix in concrete in the mass.

Specifications—Two pounds of I. W. P. Impervios Waterproof Powder shall be used to each bag of cement entering the mix. This powder shall be mixed thoroughly with the cement and sand dry, before adding water.

Note—Special data covering installation, resistance to pressure tests, costs, labor expense, composition and durability, and references, furnished promptly on request.

PENNSYLVANIA RAILROAD STATION, NEW YORK, N. Y.
Owners, Pennsylvania Railroad Co.
I. W. P. Mastic, I. W. P. Calking over vault lights

I. W. P. No. 10.

A damp-resisting paint for damp-proofing brick and concrete walls which are to be plastered, completely filling the pores on the surfaces so they are damp-proof and stain-proof. When the brown plastered coat is applied, the surface of this damp-proof coating softens and becomes partially absorbed by the body coat of plaster, forming a permanent bond or key between plaster and brick or concrete walls.

This eliminates furring and lath, saves one and one half to two inches in thickness of walls, provides a fireproof and sanitary structure. This coating can also be applied to interior tile partitions and ceilings; prevents saltpeter coming to the surface and discoloring finished plaster.

Covering capacity, per gallon, 85 square feet, one coat.

Specifications—Inner surfaces of all weather-exposed walls [whether brick, stone or terra cotta] to be thoroughly coated with I. W. P. No. 10, as manufactured by the Imperial Water Proof Co., Ltd., New York and Chicago. This coating is to be carefully applied with a four-knot roofers' brush without the addition of any thinner. This also covers its use on interior brick or terra cotta walls. Any portion not thoroughly covered after application is completed should be retouched so as to obtain a uniform blackness throughout entire job.

I. W. P. No. 15.

An alkali-proof compound for backing limestone, marble or granite facing, preventing discoloration and protecting face work from chemical action caused by surrounding masonry.

Covering capacity, per gallon, 100 square feet, one coat.

Specifications—All unexposed surfaces of stone shall, before delivery to the building, be thoroughly covered to within one inch of face with I. W. P. No. 15 Stain-Proofing Compound as manufactured by the Imperial Water Proof Co., Ltd., New York and Chicago. After stone is set in place, before backing is carried up, the entire surface, including joints, shall be coated with I. W. P. No. 15.

I. W. P. No. 20.

The same as No. 10, but heavier, and adapted for exterior surfaces of concrete foundation walls and tunnel construction.

Covering capacity, per gallon, 100 square feet, one coat.

Specifications—All walls that are to be waterproofed must first be pointed up and allowed to dry and, if concrete walls, must be allowed to thoroughly set, then apply two coats of I. W. P. No. 20, as manufactured by the Imperial Water Proof Co., Ltd., New York and Chicago, to the exterior surfaces of same, allowing twenty-four hours intermission between coats.

Note—Special data covering installation, resistance to pressure tests, costs, labor expense, composition and durability, and references, furnished promptly on request.

I. W. P. No. 40.

Our heaviest compound, especially adapted to abattoirs, laundries, swimming tanks, concrete slab roofs, etc. Laid between two layers of concrete and forms permanent bond. Often used between two sections of concrete in connection with one-ply of 8-ounce open-mesh burlap.

Covering capacity, per gallon, 40 square feet, one coat.

Continued on next page

Specifications—All surfaces to be waterproofed must be thoroughly dry. If water is present, it must be drained off by pumping or other means. Over surface of footings, apply two coats of I. W. P. No. 40; over this, one layer of eight-ounce open-mesh burlap, mopping same with a third coat of I. W. P. No. 40.

All burlap to project on both sides to at least six inches. On outside of wall turn up burlap and mop with I. W. P. No. 40, and then apply one continuous mop coat to grade level, on exterior surfaces of walls.

NOTE—Special data covering installation, resistance to pressure tests, costs, labor expense, composition and durability, and references, furnished promptly on request.

I. W. P. Transparent.

An almost colorless liquid compound for use on exterior surfaces of superstructures of brick, concrete, cement block, stone and stucco. Prevents penetration of dampness into masonry, and appearance of alkali salts on surface; adds a soft, rich appearance to the building; brings out and preserves original color, and thoroughly waterproofs.

Covering capacity, 250 square feet to the gallon.

Specifications—After the exterior surfaces have been thoroughly cleaned and tuck-pointed, they shall receive two coats of I. W. P. Transparent as manufactured by the IMPERIAL WATER PROOF CO., LTD., New York and Chicago. Surface must be dry before applying first coat, and ten hours intermission allowed between coats.

I. W. P. Art-O-Fin Exterior Wall Finish.

This is a beautiful, soft-tone flat finish, designed for the purpose of damp-proofing and beautifying all exterior walls, whether concrete, cement block, brick or stucco. Color card, showing thirteen colors, sent upon application.

Covering capacity, 200 square feet per gallon, one coat.

Specifications—Exterior surfaces of all walls, whether of cement, stucco, brick or concrete, should be allowed to become thoroughly dry before material is applied. This material should be delivered on the job in sealed packages. The top of package should be cut out completely, thoroughly stirring the pigment with the carrier. (This is best accomplished by using a separate vessel.)

The first coat of I. W. P. Exterior Wall Finish should be applied with the best quality wall brush and thoroughly brushed out smoothly and evenly. After the first coat has had twenty-four hours to dry and harden, apply second coat in same manner as first.

I. W. P. Art-O-Fin Interior Wall Finish.

A sanitary flat finish for all interior walls. Gives a varied and attractive color effect without artificial appearance of paint. Color card sent upon application.

Covering capacity, per gallon, 200 square feet, two coat work.

Specifications—Before the application of two coats of I. W. P. Art-O-Fin Interior Wall Finish, all cracks and uneven places in the plaster must be filled with Plaster Paris and allowed to become perfectly hard and dry. Before first coat of Wall Finish is applied, the walls shall receive a coat of I. W. P. Art-O-Fin Wall and Floor Filler. Two hours after the application of the Wall Filler, the first coat of I. W. P. Art-O-Fin Interior Wall Finish shall be applied with the best quality wall brush and must be brushed out smoothly and evenly. Twenty-four hours after first coat is applied, apply second coat of I.W.P. Art-O-Fin Wall Finish.

IMPERIAL FLOORING MATERIALS

Art-O-Fin Concrete Floor Enamel.

For dust proofing, waterproofing, and beautifying concrete floors, a most penetrating and long lived concrete floor finish. Two coats will stop disintegration and dusting in any concrete floor at once.

One gallon covers 200 to 250 square feet, two coats. Colors, terra cotta red, light and dark tan, grays, white and transparent.

Imperial Mastic Linoleum.

This is a plastic material that is laid over wood or concrete without joints or seams; resembles the best grade of linoleum when set up. For every building that requires a noiseless, dustless, acid- and water-proof floor at a reasonable price. Can be trucked over; will stand the elements or chemicals. Is elastic, never becomes hard and brittle, is not slippery, will not bulge up, is sanitary and can be laid monolithic over any area without cracks. It will bond to steel, wood, stone, brick, tile or cement, and can be patched with a putty knife or refreshed like new at any time. It is held in suspension with volatile oils, which evaporating between application, allows coatings to harden up.

Specify Imperial Mastic $\frac{3}{16}$ inch thick for banks, churches, schools, offices, hospitals, restaurants, if you desire a resilient ever enduring flooring that is absolutely sanitary. Can be had in brown, red and green.

Specifications—First give the floor to be covered a thorough cleaning, removing all grease and loose particles; allow to dry, and paint on one coat of I. W. P. No. 15.

Second: After the No. 15 coat has set up three hours, apply with a trowel, one coat Mastic, as smooth as possible; allow to set several hours or until set has taken place, sprinkle with lime and roll with a heavy roller, working both ways to remove all trowel marks.

Third: Next apply second Mastic coat in the same manner. Leave out the lime.

Fourth: The following day apply third Mastic coat and trowel just as evenly and smoothly as possible; roll carefully, thoroughly removing every trowel mark and allow to set twelve hours. Then apply evenly and smoothly with a trowel, one coat of Imperial Mastic Topping (Red, Brown or Green Color, as desired). This is the finish coat and should be allowed to harden at least twenty-four hours before being walked over. Care should be taken for the first few days that the floor is not subjected to hard usage more than is absolutely necessary.

LUMBERMEN'S EXCHANGE, CHICAGO, ILL.
HOLABIRD & ROCHE, Architects
GEO. A. FULLER CO., Contractors

I. W. P. Liquid Concrete Hardener.

A liquid that is added to the water to be used through the topping of concrete floors, its chemical action being to not only waterproof the mass, but harden it without the discoloration often noticed from the use of a metallic hardener.

References.

WATERPROOFED WITH I. W. P. HYDRALIQUID IN THE AGGREGATE

BUILDINGS AND LOCATION	ARCHITECT
Lumbermen's Exchange Building, Chicago, Ill.	Holabird & Roche
Wisconsin Hotel, Milwaukee, Wis.	Holabird & Roche
Continental & Commercial National Bank Building, Chicago, Ill.	D. H. Burnham & Co.
John P. Starks Building, Louisville, Ky.	D. H. Burnham & Co.
Olean General Hospital, Olean, N. Y.	Mowbray & Uffinger
National Bank of Pottstown, Pottstown, Pa.	Mowbray & Uffinger
Nurses' Home, Olean, N. Y.	Mowbray & Uffinger
City of Newark, Oliver Street School, Newark, N. J.	E. F. Guilbert
Commonwealth Edison Building, Chicago, Ill.	D. H. Burnham & Co.
Bingham Building, Cleveland, Ohio	Walker & Weeks
Katsenholt Hotel, Chicago, Ill.	Marshall & Fox

Continued on next page

FORE RIVER SHIP BUILDING CORP., QUINCY, MASS.
BETHLEHEM STEEL CORP.
MONKS & JOHNSON, Architects. ABERTHAW CONSTRUCTION CO., Contractors. System: Plaster-coat

BUILDINGS AND LOCATION	ARCHITECT
Elks National Home, Bedford, Va.	Ottenheimer, Stern & Reichert
Blossom Street School, Lynn, Mass.	M. F. Burk
Mercantile Building, Boston, Mass.	Funk & Wilcox
C. A. Briggs Factory, Cambridge, Mass.	William M. Mowll
Industrial School for Boys, Roxbury, Mass.	James E. MacLaughlin
Olympia Theater, New Bedford, Mass.	William M. Mowll

WATERPROOFED WITH I. W. P. HYDRALIQUID PLASTER COAT

New England Telephone & Telegraph Building, Boston, Mass.	R. Clipston Sturgis
Mercantile Building, Boston, Mass.	Charles K. Cummings
Municipal Building, Charlestown, Mass.	James E. MacLaughlin
Starrett Building, Athol, Mass.	Funk & Wilcox
Boston Woven Hose & Rubber Co. Building, Cambridge, Mass.	John O. DeWolf
U. S. Custom House, Boston, Mass.	Peabody & Stearns
Ryerson Laboratory, University of Chicago, Chicago, Ill.	Shepley, Rutan & Coolidge
Amoskeag Bank Building, Manchester, N. H.	Hutchins & French

DAMP-PROOFED WITH I. W. P. No. 10

Hotel Building, New York, N. Y.	J. M. Baker
Residence, Flushing, L. I., N. Y.	Slee & Bryson
Residence and Garage, Westbury, L. I., N. Y.	Delano & Aldrich
Y. M. C. A. Dormitory, Chicago, Ill.	E. Stanford Hall
Ayres National Bank Building, Jacksonville, Ill.	Jarvis Hunt
Presbyterian Hospital, Chicago, Ill.	Shepley, Rutan & Coolidge
Three Apartment Houses, Astoria, L. I., N. Y.	Sunswick Building Co.
Apartment House, Brooklyn, N. Y.	Absol Realty Co.
Maryland Hotel, Milwaukee, Wis.	F. B. Newell
F. A. Griffin Residence, Chicago, Ill.	Howard B. Shaw
Chicago Municipal Tuberculosis Sanitarium, Chicago, Ill.	Otis & Clark

STAIN-PROOFED WITH I. W. P. No. 15

Roanoke Municipal Building, Roanoke, Va.	Verus T. Ritter
U. S. Post Office, Sycamore, Ill.	Oscar Wenderoth
U. S. Post Office, Ames, Iowa	J. Knox Taylor
U. S. Post Office, Massillon, Ohio	J. Knox Taylor
Christian Science Church, Chicago, Ill.	L. Stanhope

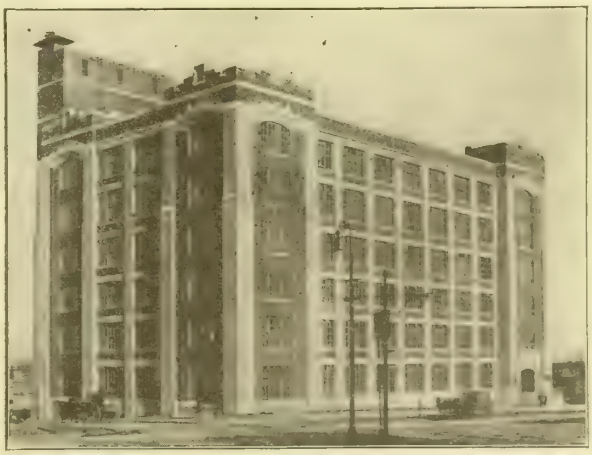
FOUNDATION WALLS WATERPROOFED WITH I. W. P. No. 20

State of New York, College of Forestry, Syracuse, N. Y.	Lewis F. Pilcher
Westminster Church, Washington, Ill.	Bullard & Bullard
Hiram Kelley Branch, Chicago Library, Chicago, Ill.	Frost & Granger
Deering Harvester Building, Chicago, Ill.	W. G. Uffendell

I. W. P. No. 40 IN CONNECTION WITH BURLAP

Y. M. C. A. Building, Chicago, Ill.	Nimmons & Fellows
Western Electric Co.'s Building, Hawthorne, Ill.	F. B. Chase
Cudahy Residence, Chicago Ill.	Marshall & Fox

BUILDINGS AND LOCATION	ARCHITECT
I. W. P. IMPERVIOS MEMBRANEOUS SYSTEM	
First Field Hospital, New York, N. Y.	Armory Board, City of New York
City of Brooklyn, Sewage Pumping Station, Brooklyn, N. Y.	Edwin J. Fort
U. S. Post Office, Stamford, Conn.	Government Supervising Archt.
U. S. Post Office, Glens Falls, N. Y.	Government Supervising Archt.
Storm and Sanitary Sewer Pumping Station, Brooklyn, N. Y.	N. Y. Sewer Dept.
Wengler & Mandell Building, Chicago, Ill.	Mundie & Jensen
U. S. Post Office, Rochelle, Ill.	Oscar Wenderoth
Goodman Residence, Chicago, Ill.	H. V. Shaw
I. W. P. TRANSPARENT	
Cliff Haven Apartments, New York, N. Y.	Chas. E. Force & Co.
McCormick Building, Chicago, Ill.	Holabird & Roche
Imperial Hotel, Atlanta, Ga.	H. Bleckley
Public School, Newark, N. J.	E. F. Guilbert
Public School, Bayonne, N. J.	Guilbert & Betelle
Residence, Mt. Kisco, N. Y.	Foster & Gade
BUILDINGS WATERPROOFED WITH I. W. P. CALKING MATERIAL	
Cliff Haven Apartments, New York, N. Y.	
State Normal School, Newark, N. J.	E. F. Guilbert
City of Newark, Barringer High School, Newark, N. J.	E. F. Guilbert
Jos. Rodman West School, Washington, D. C.	Engineer Commissioner of the D. of C.
I. W. P. ART-O-FIN EXTERIOR FINISH	
Residence, Yonkers, N. Y.	M. J. Hubert
Hotel Gramatan, Bronxville, N. Y.	Wm. A. Bates
St. Joseph's Orphan Asylum, Chicago, Ill.	Wm. F. Gibbons
I. W. P. ART-O-FIN FLOOR ENAMEL	
Candler Building, New York, N. Y.	Willhauer, Shape & Bready
Club House, Dallas, Tex.	Lang & Witchell
Synagogue, Ansche Israel, Chicago, Ill.	Aroner & Somers
BUILDINGS ON WHICH I. W. P. IMPERIAL MASTIC LINOLEUM HAS BEEN APPLIED	
Wesleyan Building, Boston, Mass.	Blackall, Clapp & Whittemore
Wimmer Building, Indianapolis, Ind.	Condron & Co., Engrs
Soo Line National Bank Building, Minneapolis, Minn.	Robert Gibson
Turnblad Printing Building, Minneapolis, Minn.	Erected by J. A. & W. A. Elliott Co.
H. C. Davis Residence, Staten Island, N. Y.	Owner, H. C. Davis
Butler Bros. Mail Order House, Chicago, Ill.	D. H. Burnham & Co.
Sears-Roebuck Mail Order House, Chicago, Ill.	Geo. C. Nimmons
Kaiserhoff Hotel, Chicago, Ill.	Marshall & Fox
Johnson Soap Co.'s Building, Milwaukee, Wis.	Lockwood, Green & Co.
M. & M. Building, Dallas, Tex.	Owners, Merchant's Mercantile Co.



YOUTHS COMPANION BUILDING, BOSTON, MASS.
DENSMORE & LECLEAR, Architects. W. F. KEARNS CO., Contractors
System: Plaster-coat and Integral

H. W. JOHNS-MANVILLE CO.

Waterproofing and Mastic Materials, and Cork Tile

NEW YORK AND EVERY LARGE CITY
SEE BRANCH ADDRESSES IN OUR CATALOGUE IN ROOFING SECTION

Products and Services.

J-M Asphalt Waterproofing Cement; J-M Asphalt Saturated Fabric; J-M Waterproofing Asbestos Fabric; J-M Asphalt Mastic Flooring.

Also, J-M Liquid Waterproof Coating; J-M Concrete Primer; J-M Cut Stone Backing; J-M Plaster Bond; J-M Asphalt Flux, etc.

For complete list of J-M Building Materials, see our name in Roofing Section.

Because no other phase of building work requires so much confidence in skill and materials as waterproofing, a knowledge of the splendid equipment of Johns-Manville Waterproofing Service, both as to skill and to materials, is valuable to architects. J-M Waterproofings are prescribed by J-M Engineers, the materials are J-M Materials, the installation is made by J-M men.

This service is maintained in J-M branches all over the country.

J-M Waterproofing Materials.

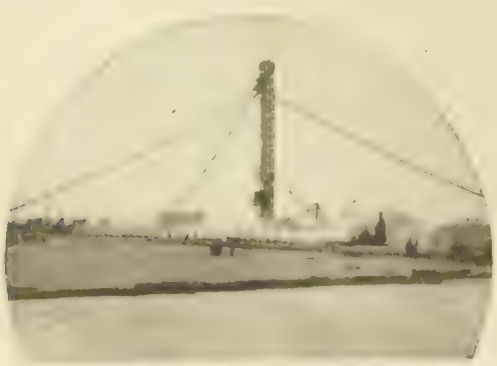
The base of all J-M Waterproofing is Gilsonite, the purest form of asphalt. By special processing it is made ductile and adhesive, so that it is applicable generally for waterproofing.

J-M Asphalt Waterproofing Cement—A bituminous preparation, 99.5 per cent pure, containing no organic, vegetable, or other matter that will disintegrate or decay. Is superior to ordinary asphaltic compounds because of the raw material used, the method of preparation, and its great purity. Proof against the action of acid, alkali, brine and water.

Between melting and brittle points it has a range of 150°, as compared with 40° for coal-tar products and 80° for ordinary asphalts. The material is heated in suitable boilers to a temperature of 350°, and mopped on while hot. For estimating, figure that one ton of the Waterproofing Cement will cover 3,000 square feet of surface, one eighth inch thick.

J-M Asphalt Saturated Fabric—Composed of an especially strong, loosely woven fabric, thoroughly impregnated with our Waterproofing Cement, and used in building up a waterproof membrane in as many plies as are required to meet conditions. Being an open-mesh material, the Waterproofing Cement, which is mopped on hot, thoroughly saturates, cements and bonds together the plies of reinforcements, making a waterproof membrane of great strength and elasticity.

J-M Waterproofing Asbestos Fabric—Made of pure asbestos fiber thoroughly impregnated with pure asphalt. Contains nothing to decay or deteriorate, consequently will last indefinitely. It forms a plastic, bituminized stone sheet and is the only all-mineral fabric made. Used in same manner as saturated fabric, in connection with J-M Waterproofing Cement.



[illegible] TERMINAL, CHICAGO, ILL.
J-M Waterproofing

J-M Asphalt Mastic Flooring.

A Trinidad Lake asphalt material, that is waterproof and practically wearproof under ordinary service conditions. It will not originate dust; and while supplied in all degrees of hardness, never loses its resiliency. It does not cause fatigue, like unyielding floors; and it is resistant to the action of brine, acids or alkalies.

It is easily laid and readily taken up. Laid in all thicknesses and consistencies according to the conditions. For use in any commercial or industrial building.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD FREIGHT HOUSE
J-M Asphalt Mastic Flooring

J-M Pure Cork Floor Tile.

An ideal flooring for public buildings, commercial institutions and residences; and generally for stairways, ramps and ship decks.

The wearing surface of J-M Cork Tile is made of clear selected cork shavings; while the body is of a coarser granulation of same material, pressed under hydraulic pressure. The heat generated in this process causes the natural gum in the cork to flow out and cement the whole into a dense mass.

How Applied—J-M Pure Cork Tile is set in special waterproof cement that holds equally well on a wood, metal or cement backing.

Advantages—J-M Cork Tile outwears even a hardwood floor. It is practically noiseless to the tread, and its resilience minimizes foot soreness and fatigue. It is highly fire-resistant. It is waterproof and non-absorbent, therefore suitable for sanitary applications, kitchens, etc.

Decorative Application—J-M Pure Cork Tile can be successfully used with any decorative scheme, as there is no limit to variety of patterns or shapes produced.

Colors—Supplied in light, medium and dark colors. No artificial coloring is used in J-M Tile.

THE OBELISK WATERPROOFING COMPANY

"Caffall Process" Waterproofing and Preserving Structures

1 Madison Avenue
NEW YORK, N. Y.

TELEPHONE:
GRAMERCY 2710, 2711

Services.

SCIENTIFIC TREATMENT for the PRESERVING and WATERPROOFING of EXTERIOR and INTERIOR STONE, MARBLE, BRICK, CONCRETE and STUCCO, by the "CAFFALL PROCESS." BUILDINGS CLEANED and RENOVATED. CONCRETE FLOORS MADE SANITARY.

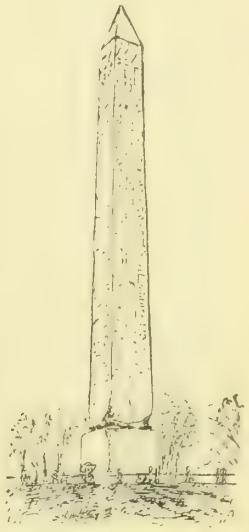
Process.

The "Caffall Process" is a method of treating stone, brick, terra cotta and concrete walls (including joints), marble monuments, garden statuary, etc., to permanently prevent penetration of dampness and preserve against damage by weather. It consists in remedying surface or structural defects, such as open or cracked joints, applying heat to surface, brushing on a hot paraffin compound to saturation, and removing superfluous wax by special process, leaving treatment invisible.

Thus surfaces of buildings are sealed against absorption of water, consequently are unaffected by frost, and rendered impervious to gases and other influences tending to disintegration and defacement.

It will be understood that application of heat to buildings, particularly to fine marble and granite, requires expert skill. Heat serves the double purpose of drying out surface and forcing penetration of preservative material. On cooling, the wax congeals and becomes an integral part of material at and below surface.

MANHATTAN LIFE INSURANCE BUILDING
Side and rear walls treated in 1894-95



"SAVED CLEOPATRA'S NEEDLE"
Treated 1885

Leaks in Buildings Prevented and Cured.

The problem of preventing buildings leaking, which confronts all architects and builders, is solved by this process. Buildings which previously were damaged by water leaking through the walls have been restored and made perfectly dry. Buildings without furrings are kept dry by use of this process on exterior walls.

Disintegration and Decay.

Architects are using more exterior color decoration in modern buildings, often very delicate and extremely sensitive to ravages of time and weather. Dangers of disintegration are proportionately increased, and the value of a successful preservative treatment becomes more apparent.

Durability.

The principal components can not be easily oxidized and are insoluble in water, or acidulated or alkaline solutions and gases. This is the only preservative process having a history covering any considerable period. Buildings treated 46 years ago are still dry.

Marble Treatment.

Delicate marble, ordinarily used only for interior decoration, can be used for exterior if treated with the "Caffall Process." The fact that such delicate marble can be preserved has caused dealers and architects to realize that an entirely new field is open to them in the way of exterior decoration with high-grade colored marble.

Cost.

Cost can be ascertained upon application to Company. It is determined by character of material to be treated; condition, whether newly erected, old or requiring renovation; superficial area requiring treatment; character of surface, whether plain or ornamental; and location of building or monument.

CASTLE GOULD, SANDS POINT, L. I.
Treated 1911-12

COMMODORE JAMES' RESIDENCE, NEWPORT, R. I.
Treated in 1912

THE SANDUSKY PORTLAND CEMENT CO

CLEVELAND, OHIO

FACTORIES

BAY BRIDGE, OHIO SYRACUSE, IND. DIXON, ILL. YORK, PA.

Product.

MEDUSA WATERPROOFING (Powder and Paste).

Description.

The Powder should be thoroughly mixed dry with dry cement before sand and water are added, thus becoming an inseparable part of the concrete.

The Paste is identical with the powder in resulting composition and waterproofing effect. The sole difference between the two is the greater ease and convenience of mixing which the paste form offers, although, if the mixing of the powder with the cement is thoroughly and carefully done, equally good results can be obtained with either form.

Medusa Waterproofing Powder and Medusa Waterproofing Paste make concrete impervious to water and prevent discoloration and efflorescence. They give absolutely permanent results and do not affect strength, setting or color of Portland cement.

TRADE-MARK

Catalogue and Sample.

Write for sample and catalogue illustrating and describing work in which Medusa has been used, and containing tests, testimonials and specifications.

Uses.

Powder—For most purposes 1½ per cent of the weight of cement will be found sufficient, which is equivalent to 6 pounds of Waterproofing Powder to one barrel of cement.

Paste—For best waterproof qualities, one gallon of Waterproofing Paste, or 8 pounds, should be used to each barrel of cement, dissolved in the water with which concrete or mortar is to be mixed.

Medusa Waterproofing will be found especially useful in making building blocks, cement plastering, roofing tile, cellar walls, cistern and reservoir linings, conduits, sewer pipe, elevator pits, etc.

NELA PARK REINFORCED CONCRETE RESERVOIR, CLEVELAND, OHIO

120 feet in diameter, 11 feet deep, 1,000,000 gallons capacity. Medusa Waterproofing used to prevent leakage
The SAMUEL AUSTIN & SON CO., Cleveland, Ohio, Builders; WALLIS & GOODWILLE, New York, N. Y., Architects

REFERENCES

Standard Oil Co., Concrete block buildings
Waltham, Mass., 2,000,000-gallon reservoir
Inland Steel Co., Reinforced concrete tunnels
John S. Metcalf Co., Montreal, Que., Grain elevators
Indianapolis Motor Speedway, Subways under track
Toledo, Ohio, Municipal bathing pools, F. E. Wirebaugh, Engineer
Young Men's Christian Association, Chicago, Ill., Swimming pools, Shattuck & Hussey, Architects
Young Men's Christian Association, New York, N. Y., Swimming pools, Louis E. Jallade, Architect
Montreal, Que., Public market, Marius Dufresne, City Architect
San Francisco, Cal., Municipal pumping station
Union Station, Kansas City, Mo., George A. Fuller Construction Co., General Contractors
Grand Trunk Pacific Hotel, Winnipeg, Can., Ross & Macdonald, Architects; George A. Fuller Co., General Contractors
United States Government, Artillery fire-control structures
English, Canadian, New Zealand, and Queensland Governments
Warren, R. I., Pumping station and disposal plant, Charles F. Chase, Engineer
East St. Louis, Ill., Municipal pumping station
Young Men's Christian Association Buildings in Providence and Central Falls, R. I.; Rock Island and Moline, Ill.; Covington and Paris, Ky.; New London, Conn.; Erie, Pa.; Wheeling, W. Va.; Staunton, Va.; Elyria, Ohio; Atlanta, Ga.; Eau Claire, Wis.; and Kellogg, Idaho, Basement walls, floors, and swimming pools

THE STANDARD PAINT COMPANY

BOSTON, MASS. NEW YORK, N. Y. CHICAGO, ILL.

Products.

IMPERVITE INTEGRAL WATERPROOFING COMPOUND, and FLOOR HARDENER.

For general description of our products see our name in General Index.

Discovery and Efficiency of Impervite.

Impervite is an asphaltic emulsion, and was developed in 1907 by our chemists, Abraham and Haines, after an extended research. Impervite is a bituminous material ground together with water and oxides to form an emulsion, which will mix easily with the gauging water.

TRADE-MARK

Impervite is more than twice as efficient as compounds using calcium-stearate or other soap. Impervite moreover does not reduce the strength or delay the set of cement even when used ten pounds to the bag. Soap compounds, on the other hand, cannot be used more than two pounds to the bag of cement without injuring the strength and setting qualities of the cement.

Since Impervite, weight for weight, is more efficient, and since a larger amount can be used, it is possible to secure a higher degree of waterproofing than with any other known material. Impervite is the only waterproofing compound which gives a factor of safety.

Our standard specifications use enough Impervite to make results absolutely certain, even under the most severe conditions. The quantity can be reduced if a high factor of safety is not required.

Mass Concrete Waterproofing.

Under ideal conditions of mixing and placing, concrete can be made waterproof without any compound. Under practical conditions, however, the results are very uncertain, particularly if the work is interrupted at night.

The addition of compound is useful, but the inherent difficulties of securing uniform work on a large scale are such that we do not consider a 3-foot thickness of mass concrete as good as a ¾-inch *Waterproof Facing* of Impervite mortar.

If for any reason the Mass Concrete system of waterproofing must be chosen, Impervite is nevertheless the most efficient agent. We advise 1:2:4 Concrete and specify at least one pound of Impervite to the bag of cement.

Waterproof Facings.

A facing of cement mortar containing Impervite, plastered on *inside* of old or new structures, will waterproof against extreme pressure from the outside.

Incorporated in the regular one-inch topping, Impervite makes floors dense and very hard. Will resist salt water, hot water and chemicals. The Impervite system is accessible for repairs or changes to piping, etc. It does away with the backing wall and the double floor needed for membrane. It has been used to repair scores of membrane failures.

Write us about our new method for concrete bridges and roofs, subject to vibration. We use simple flexible joints, connecting rigid waterproof areas, and giving a wearing surface, as well as waterproofing.

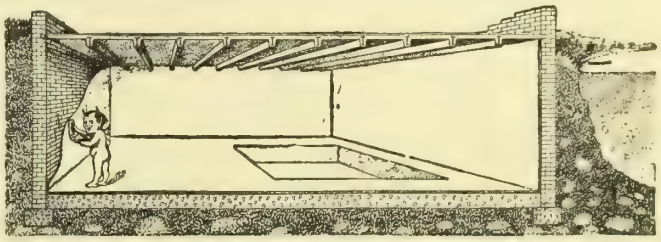
THE STANDARD PAINT CO. will supply Impervite or will contract for work, guaranteed waterproof against 10-foot or 100-foot head of water. (See "Engineering Record," Oct. 10, 1914, for description of an Impervite job withstanding 200-foot head of water.)

Waterproofing Specifications—All walls and floors where indicated on plans are to be waterproofed with Impervite Cement mortar.

All mortar shall be in proportion of 1 bag cement to 2 bags sand. Instead of plain water, use "Impervite Solution" (1 part Impervite to 2 parts water).

Walls to be plastered ¾ inch thick, two-coat work, using one third pound of Impervite per square foot. Floors plastered 1 inch thick, in one coat, using one half pound of Impervite per square foot. Where wall meets floor a rounded cove shall be provided struck on a 4-inch radius.

All work to be carefully executed in a workmanlike manner, according to manufacturer's directions and shall be guaranteed by contractor to be waterproof.



IMPERVITE MORTAR ON THE INSIDE
Guaranteed to stop water from the outside

Tests—(a) Impervite mortar, ¾" thick, has been tested to 150 lbs. pressure per sq. in. (nearly 400-foot head of water) without any percolation taking place. The precision instruments of this company for testing permeability are for sale or loan to those wishing to test Impervite, in comparison with other materials.

(b) The U. S. Department of Agriculture reports as follows:

CRUSHING STRENGTH 6" CYLINDERS, AGE 28 DAYS

Plain	1350 pounds per square inch
With Impervite	1470 pounds per square inch

LEAKAGE IN 5 HOURS AT 40 LBS. WATER PRESSURE

Plain	17 cubic centimeters
With Impervite	No leakage

(c) Dr. Seger's Laboratory of Ceramics in tests of 1:3 Mortar, reports the following leakage for 24 hours, expressed in cubic centimeters:

No Compound	384	2% Impervite	56
2% Material "B"	216	5% Impervite	5
2% Material "C"	240	10% Impervite	0

(d) Impervite facing bonded on to old concrete shows an average bonding strength of 290 lbs. per sq. in.

(e) At the San Francisco Exposition, as the result of comparative tests, Impervite received the Gold Medal, highest award.

Non-cracking Stucco.

THE STANDARD PAINT CO. is the first to show that rich mortar is the principal cause of hair-cracking (see "Architecture," Aug., 1913). Impervite stucco is positively waterproof and non-cracking. This point is of vital importance to all users of stucco.

Stucco Specifications—All stucco shall be in proportion of 1 bag cement, 3 bags sand and 4 pounds of Impervite. One pound of Impervite is required per square yard of stucco one inch thick. *No lime or hydrated lime will be permitted.* (Lime contracts on hardening and increases tendency to hair-crack.)

Keep the stucco from drying out until it is a week old. A man shall be designated to spray the stucco three times a day or oftener, to keep it moist.

Price.

Regular Impervite costs 10 cents per pound. White, Terra-Cotta and Yellow, 11 cents. Green, 15 cents.

FREDERIC B. STEVENS

Manufacturer of Mortar Colors and Moisture Preventives

DETROIT, MICH.

Products.

MORTAR COLORS.
MOISTURE PREVENTIVES.

Mortar Colors.

Mortar Colors ground by us from Nature's own pigments. We also make Mortar Stains of permanent and lasting colors which show no white exudations in mortar joints after weather exposure.

These colors are a dry powder, ground fine and bolted through silk bolts and sold under the trade-mark of "Signal Brand." They are made to use with the modern styles of face brick, with rough exteriors, are known as "Velvet," "Rug," "Fern-Leaf," etc., and are equally adapted to smooth-faced face brick where a hair-line joint is required.

Double-Strength Colors.

Here are colors of red, brown, buff, double-strength chocolate, standard black, double-strength black and silver-grey.

Double-strength colors are, as the words imply, of double strength in coloring matter.

"Silver-Grey" is a distinctive mortar color which gives a grey joint with a beautiful sheen effect, wholly unlike the dull, cold effect produced with ordinary grey stains. Silver-Grey Mortar Color gives the effect of life; the ordinary grey color is dull, sombre and repelling. Packed in 100-pound burlap, paper lined, waterproof sacks and shipped to any destination. Prices quoted when requested.

Stevens' "Submarine" Moisture Preventive.

"Submarine" is a waterproofing substance—a thick black fluid—and can be applied to foundation walls of brick, concrete or stone, and in any climate and during any season. It remains plastic in temperature ranging from 20 degrees below to 125 degrees above zero. As it requires no heating the use of tar kettles is obviated.

When used as a damp-proofing on interior walls it protects plaster boards and prevents deterioration and decay. When applied to a brick wall and then plastered over it holds plaster intact. It gives the same good service when used on reservoirs, tanks, etc., for both hot and cold water.

Covering Capacity—One gallon of Stevens' "Submarine" will cover, approximately, 125 feet of concrete surface. Shipped in casks of fifty-two gallons and sold subject to approval after trial.

Nothing is more unsightly than the effect of moisture on an outside wall extending, through capillary attraction, from foundation to roof, and similar effect on a brick partition wall to which neither paint nor paper will adhere is alike objectionable. The use of Stevens' "Submarine" is a sure preventive.

Testimonial.

CITY OF TOLEDO, DEPARTMENT OF PUBLIC SAFETY.
J. Geo. Kapp, Jr., Director.
Sub-Department.
Fire and Police Alarm Telegraph and Outside Electrical Inspection.
J. Tyler Greene, Superintendent.

TOLEDO, OHIO, June 22, 1914.

AUGSBACH & OSBORN,
110 Michigan St., Toledo, Ohio.

Enclosed find order No. 1486 B, for a five-gallon can of Stevens' "Submarine" Waterproofing Paint, to be delivered at No. 3 Engine House.

For your information will state that this paint has done remarkable work in relieving some of our troubles due to dampness and corrosion.

We have had the experience of using same with 500-volt submarine power cables, painting joints after they were properly spliced, and same were submerged in thirty feet of water. We find that no dampness impregnated through paint to core of cable, which shows it is a thorough moisture repellant.

It looks to me as if you had a great paint for electrical construction work of various kinds.

Will assure you that if the paint proves as good as in the past, we will continue using same for all our construction work.

Yours very truly,

(Signed) J. T. GREENE, Superintendent.

TYLOSE PRODUCTS COMPANY

SOLE AGENTS FOR

"Tylose" Concrete and Wood Preservatives

BOSTON, MASS.

AGENTS

TYLOSE CONTRACTING COMPANY

WORCESTER, MASS. PHILADELPHIA, PA. NEW YORK, N. Y. NEWARK, N. J. WASHINGTON, D. C.
BOSTON, MASS. PROVIDENCE, R. I. CHICAGO, ILL. AUBURN, N. Y. CLEVELAND, OHIO

Products.

Manufacturers of Tylose Preservatives, for Wearproofing Concrete, Wood, Stone, Brick, Stucco, Terrazzo, Composition Floors, Linoleum, etc.

Tylose Preservative.

Tylose is a liquid which penetrates beneath the surface of the material to which it is applied, filling up its pores, thoroughly hardening it, and thus producing a floor surface that will effectually withstand severest service.

TRADE-MARK
(Reg. U. S. Pat. Off.)

Its use is recommended for the floors of residences, apartment houses, stores, factories, office buildings, schools, churches, theaters, clubs, hotels, hospitals, kitchens, porches, shipping and station platforms, armories, stables, etc., and also for general concrete, brick aud stucco work, rough timbers and planking.

Tylose surfaces never become slippery, and can be readily washed with soap and water.

Tylose is supplied in three forms: one for application to concrete, brick, stucco, terrazzo, etc.; another for application to wood, composition and cork flooring, linoleum, etc., and the third for factory floors, timbers, and rough planking.

Tylose for Concrete.

Tylose Preservative penetrates concrete from one quarter to three quarters of an inch, filling the voids and forming an additional bond therein. Soft spots, so common in concrete, are quickly rendered hard by its applicaton. Tylose toughens concrete to such an extent that dusting and disintegration, even under the heaviest traffic, are almost entirely eliminated.

On new work, best results are obtained by applying Tylose about four weeks after the concrete is poured. Floors may be used after a few hours. On old work, Tylose may be applied at any time, floors being ready for almost immediate use.

Tylose for Wood.

Tylose penetrates wood from one quarter to three quarters of an inch, filling the pores, prolonging the life, retarding splintering; toughening, preserving and retaining the natural color. By the use of Tylose one half the expense of cleaning is saved.

Wood treated with Tylose becomes practically immune from dry-rot, fungus growth and decay. Wood floors thus treated are not readily affected by heavy trucking, hard usage, or change of temperature, either in or out of doors.

Tylose (for factory floors and timbers) will penetrate entirely through hardwood floors in a few days.

Tylose for New Wood Floors.

On new wood floors, it gives an eggshell luster so much desired and is not slippery.

Floors harden and improve with wear and age, and Tylose becomes a part of the wood itself and can not be removed by washing or scraping. Floors are impervious to water, soap or grease.

The most economical and sanitary treatment for floors.

Tylose for Old Wood Floors.

Tylose, when applied to old wood floors, will tie down the splinters, check the action of dry-rot and fungus growth, and kill the wood worms.

It hardens old floors to such an extent that they will wear almost indefinitely.

All surface coatings, such as shellac, varnish, wax or paint, must be removed before the material is applied.

Tylose may be applied on old or new work with equal success.

Application.

Exhaustive tests have proven that only by the proper application of Tylose are best results obtained. For this reason Tylose Preservative is not sold in bulk, but is applied by our agents. They employ experienced men, qualified to meet the varied conditions encountered in every floor. This insures protection to our customers and to our products.

Architects' Specifications.

All [Wood, Concrete, Terrazzo, Linoleum] floors to be treated with Tylose Products by Tylose Contracting Company (in your vicinity).

Our distributor will furnish you with any further information regarding specifications you may desire.

References.

Write us, and we will send you names of buildings where Tylose has been applied in your immediate vicinity, and of other structures of national reputation.

Indorsements—The following is from one of the many letters of indorsement received by the Company:

"The test that we gave your material we considered to be the most severe that you could possibly put any floor preservative to. We had a large section of Granolithic floor that was affected by the *frost* when it was laid, so that the top surface of the floor was ruined.

"After this surface was removed, however, the body of the Granolithic was good but very porous, with the exception that it left a rough surface which dusted readily, and on account of the roughness would not stand any wear. We had the rough surface ground off over a large area and the remaining body treated with two coats of your floor preservative, and this application not only stopped the dusting but hardened the floor so that it is wearing down to a smooth and perfect finish at the present time.

"We would like to say that the application of your material saved the ripping up of the Granolithic finish and the relaying of it, which would not only have been a costly operation to the contractors but would have been a great source of annoyance and delay to the owners of the building.

"This testing proved to us that the results obtained by the application of your floor preservative on Granolithic floors is excellent, and we intend to use it in the future in connection with our work wherever the use of a material of this kind is required."

Funk & Wilcox, Architects, Boston.

THE TRUS-CON LABORATORIES

Waterproofings, Damp-proofings and Technical Paints

DETROIT, MICH.

BRANCH OFFICES

ATLANTA, GA., 600 Forsyth Building
BOSTON, MASS., 141 Milk Street
BUFFALO, N. Y., 900 Prudential Building
CHICAGO, ILL., 2nd Floor Insurance Exchange Building
CINCINNATI, OHIO, 316 Johnson Building
CLEVELAND, OHIO, 609 Union Building
DALLAS, TEXAS, 738-739 Wilson Building
LOS ANGELES, CAL., 1106 Central Building
MINNEAPOLIS, MINN., 845 McKnight Building
NEW YORK, N. Y., 110 West 40th Street (For City)
PITTSBURGH, PA., No. 4 Terminal Office Building
PHILADELPHIA, PA., 810 Commonwealth Building
PORTLAND, ORE., 194 North 13th Street
SAN ANTONIO, TEXAS, 604 Bedell Building
SAN FRANCISCO, CAL., 1100 First National Bank Building
ST. LOUIS, MO., 1013 Syndicate Trust Building
WASHINGTON, D. C., 1128 Woodward Building
WEBSTER, N. Y. (For State)
LONDON, ENGLAND, Central House, Kingsway

Products.

TRUS-CON CHEMICAL PRODUCTS, including DAMP-PROOFINGS, WATERPROOFINGS, and TECHNICAL PAINTS described below.

TRADE-MARK

Trus-Con Waterproofing Paste, Concentrated.

An integral waterproofing compound, in paste form, for waterproofing concrete and cement mortar. Being perfectly mixable with water it diffuses readily throughout the concrete mixture, giving absolute and uniform results. Has a very general application in concrete work of all kinds, such as foundations, dams, tunnels, reservoirs, tanks, floors and similar structures where absolute waterproofness is essential.

SEWAGE DISPOSAL PLANT, ROCHESTER, N. Y.
50 tons of Trus-Con Waterproofing Paste Used

Specifications.

For Waterproofing Mass Concrete by Integral Method—The dry mixture of cement, sand and stone (1:2:4 mix) shall be tempered to a medium wet consistency with water, to which one (1) part of Trus-Con Waterproofing Paste, Concentrated, has been added as directed by the manufacturers for every twenty-four (24) parts of water. All the concrete shall be placed in one continuous operation, each pouring being thoroughly spaded to insure uniform density.

For Waterproofing Concrete and General Masonry Structures by Means of Waterproofed Plaster Coat Method—The waterproofed cement mortar shall be prepared by thoroughly tempering (to the required consistency) a dry mixture of one (1) part of cement and two (2) parts of sand, with water to which Trus-Con Waterproofing Paste, Concentrated, has been added in the proportion of one (1) part of Paste to eighteen (18) parts of water as directed by the manufacturers.

Before plastering the cement mortar on the hardened concrete, the surface of same shall be mechanically roughened by chipping and thoroughly cleaned so as to afford a satisfactory bond. Further treatment of such surface as directed by manufacturers.

The plaster coat shall be applied to the walls in two coats, each of which shall be ⅜ inch in thickness. The second coat shall be applied just before the first coat shall have reached its final set.

For detailed specifications, see "Science and Practice Combined in Waterproofing," furnished free on request.

Trus-Con Stonetex.

A specialized liquid cement coating for damp-proofing, protecting and beautifying exposed stucco, concrete and masonry surfaces of all kinds. Applied with a brush like any paint. Seals pores and hair checks, prevents absorption and penetration of moisture, and gives a handsome stonelike appearance to the coated surface. Especially formulated to meet the exact physical and chemical requirements of exposed walls.

Specifications.

The surface to be coated must be absolutely dry. Surface must be freed from dirt and loose particles that would interfere with a perfect bond.

Apply Trus-Con Stonetex in two coats; the second coat to be applied seventy-two hours after the first.

For full information and color card, see Trus-Con Stonetex Booklet, furnished free on request.

Trus-Con Por-Seal.

A transparent colorless liquid for damp-proofing exterior masonry walls without changing the physical appearance and texture of the coated surfaces. Effectively seals the pores, rendering the porous surface positively repellent to moisture. Applied with a brush.

Specifications.

All surfaces to be perfectly dry at the time of application to insure thorough penetration and absorption of Por-Seal into the pores.

It is to be applied in two coats; the second coat to be applied not less than twelve hours after the first.

Trus-Con Plaster Bond.

A special bituminous coating for damp-proofing all exposed walls. Its use provides a continuous damp-proofing element in all such walls, and perfectly insulates the interior from any evidence of dampness. On application to the surface it is partially absorbed

Continued on next page

into the pores, thoroughly sealing them and establishing a most inseparable bond.

Also furnishes a bond for the plaster, and eliminates the necessity for furring or lathing.

METHOD OF APPLYING TRUS-CON PLASTER BOND

Specifications.

Trus-Con Plaster Bond shall be applied with a brush to a clean dry surface. Very porous places should be retouched the following day to insure an even, uniform coating. Special care should be taken to make the coating of Trus-Con Plaster Bond perfectly continuous over the entire surface. Should be used only on vertical surfaces. Plaster shall not be applied until twenty-four hours after the surface has been coated. Free booklet on request.

Trus-Con Foundation Coat.

A liquid, bituminous cement, of heavy consistency, adapted for damp-proofing general substructural work under earth filling. To be used where hydrostatic pressures are comparatively light, and where more complicated waterproofing methods are not considered necessary.

Specifications.

The surface shall be dry and free from any adhering earth or foreign matter, so as to insure thorough penetration and perfect bond. Trus-Con Foundation Coat shall be applied in a continuous coating with a large mop or brush.

The product should be applied in two coats; the second coat shall be applied not less than twenty-four hours after the first. The coated surface should be allowed to dry at least twelve hours before being back-filled. Free booklet furnished on request.

Trus-Con Floor Enamel.

This product produces a tough, hard, elastic and reasonably durable finish on cement floors. Affords a perfect and attractive enamel finish that prevents dusting and granulation of floor surfaces. Protects floor from stain due to absorption of oils, greases and other foreign matter. It is applied with a brush, and should only be used on floors subjected to light traffic, such as office buildings, garages, etc.

Specifications.

Surface should be absolutely dry and thoroughly cleaned. Trus-Con Floor Enamel shall be applied in two coats; forty-eight hours should be allowed between application of the first and second coats. The finishing coat shall be allowed to dry forty-eight hours before being subjected to any use. For floors laid directly upon the ground, a coat of Trus-Con Floor Primer is required before the coating of Floor Enamel. For full details and color card, see Trus-Con Floor Enamel Booklet, furnished free on request.

Trus-Con Bar-Ox No. 7.

A protective coating for structural steel bridges and all exposed iron and steel surfaces. Formulated in strict accordance with the electrolytic theory of corrosion. This product forms an absolutely impenetrable film that completely excludes the moisture necessary for the beginning of corrosion.

Specifications.

All steel shall receive a thorough coat of Trus-Con Bar-Ox No. 7 Red well brushed on.

All surfaces to be riveted in the shop shall receive two thorough coats of Bar-Ox No. 7 Red before assembling.

All surfaces to be riveted on the field shall receive two thorough coats of Bar-Ox No. 7 Green, in addition to the priming coat, before leaving the shop.

After erection, all abrasions shall be touched up with Bar-Ox No. 7 Red

The entire structure shall then receive a second coat of Trus-Con Bar-Ox No. 7 Black or Green.

No painting shall be done in wet weather, and no paint applied to a wet or damp surface. Free booklet sent upon request.

Trus-Con Floor Hardener.

This product provides a simple and economical method of producing wear-proof and dust-proof floors. It gives a hard, dense surface that will be dustless and wear-resisting, suitable to floors subjected to trucking and the heaviest traffic.

Specifications.

After the floating of the topping and preceding troweling, a dry mixture of twenty (20) pounds of Trus-Con Floor Hardener and fifteen (15) pounds of Portland cement, mixed thoroughly to an even, uniform color, shall be sprinkled over each 100 square feet of surface.

The dry mixture of cement and Floor Hardener shall be well floated to insure its perfect combination and assimilation with the concrete, and then troweled to an even, smooth surface.

The surface shall receive a second troweling when the finish has set sufficiently to finish smoothly.

For detailed specifications and further descriptive matter, see Trus-Con Floor Hardener Booklet, furnished free upon request.

Trus-Con Agatex.

Chemically transforms a soft, dusting cement floor to a hard, dense, impenetrable surface without changing its color or appearance. Actually enters into chemical reaction with the constituents of the cement and forms entirely new compounds, that are hard, enduring and resistive to wear. Affords three indispensable factory requirements—dustproof, wearproof and sanitary floors.

Specifications.

All cement floors shall be given three liberal treatments of Trus-Con Agatex as manufactured and recommended by The Trus-Con Laboratories, Detroit, Mich.

Condition of the Surface—The floor shall be free from all dust, dirt, and oil, or other foreign matter that would retard the penetration and absorption of the Agatex into the pores of the surface.

Application—The product as supplied shall be diluted with water in the following proportions, and applied in liberal saturating coats with a long-handled brush.

For the first application, use one part Trus-Con Agatex and two parts water.

For second application, use one part of Trus-Con Agatex and one part of water.

For the third application, use two parts Trus-Con Agatex and one part of water.

An interval of twenty-four hours shall be allowed between coats.

One gallon of Trus-Con Agatex will cover from 100 to 125 square feet for three applications, depending on the porosity of the surface.

THE UNION PRODUCTS CO.

MANUFACTURERS OF

Waterproofings, and Brick and Concrete Coatings, Enamels, Etc.

CLEVELAND, OHIO

LICENSEES AND APPLIERS

For Eastern Canada, Atlantic Coast States east of Buffalo, N. Y., and Pittsburgh, Pa.—
NEW YORK, N. Y., Mastic Bond Co. (and Branches), 18 East 41st Street

For Ohio, Eastern Michigan, Western New York, Western Pennsylvania, Northern Kentucky, Eastern Indiana—
CLEVELAND, OHIO, Bagnal-Taylor Co. (and Branches), 555 Hippodrome Building

For Cuyahoga County, Ohio—
CLEVELAND, OHIO, Cleveland Plastering Co., Sincere Building

For Northern Illinois and Western Indiana—
CHICAGO, ILL., Waterproof Plaster Key Co., 723 Chamber of Commerce Building

For Wisconsin, Northern and Western Michigan and Minnesota—
MILWAUKEE, WIS., Bleuel & Stephens, First National Bank Building

For Southern Michigan—
DETROIT, MICH., Thos. H. Jenkins, Jr., Builders' Exchange

Products.

Par-Lock Waterproofing Finish. Also, Lifekote Damp-Proof Bond; Roofing Cement; Roof Paint; Prepared Roofing, and various other Exterior and Interior Finishes for Concrete, Brick, Plaster, Wood or Metal; High-Grade Enamels; Varnishes.

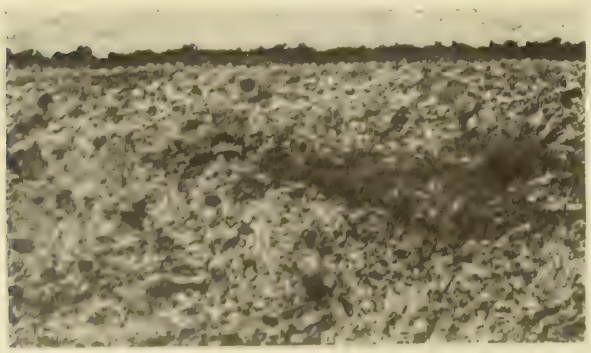
PAR-LOCK

TRADE-MARK
(Registered, Patents and Patent Pending)

Par-Lock.

Par-Lock is a mechanically built-up, waterproof rock, asphalt, mastic subcoating and finish. High air pressure is the means used to build up the mastic, over which the plastic finish is applied by other trades. This mastic gradually hardens until it develops an adhesive strength of not less than one hundred and fifty pounds to the square inch, with an elasticity of at least five per cent.

Par-Lock is applied to green, damp or dry concrete or masonry surfaces with equal efficiency. It consists of the application of a heavy binder coating of Lifekote Damp-proof Bond, into which a closely graduated crushed rock is driven, forming a key or clutch, which, when dry, receives any specified plaster finish.



ENLARGED SECTIONAL VIEW OF CONCRETE PLASTERED UNDER PAR-LOCK SPECIFICATIONS

(A) Concrete slab. (B) Mechanical Key or Clutch secured only under Par-Lock specification. (C) Plaster finish.

Note particularly formed Key (B), and resultant increased area of bonding surface, also possibility of binder into pores of concrete slab. Illustrates manner in which Par-Lock overcomes plane of cleavage.

Waterproofing.

The cold, high pressure air brush application of the Par-Lock binder, which is a carefully refined amalgamation of asphalt materials, insures both a freeing of dirt and moisture from the surface cracks and voids, and a thorough filling of them with the binder, which is uniformly spread over the surface to the thickness required in the desired specifications. This material thoroughly binds to the surface with its full adhesive strength, insuring uniformity of adhesion as well as waterproofing. Resistance to dampness and hydrostatic pressure are in this manner provided for with a determined strength developed in Par-Lock application.

Plaster and stucco materials applied as finished coat for Par-Lock are unexcelled, being uniform in their set throughout, dense in texture, free from stains, map crack, etc., and afford a perfect surface to receive decoration.

Specifications.

Call upon your nearest licensee or write The Union Products Co. for specification forms, which have been carefully, technically and practically developed, and insure to the architect economy and efficiency on each special section of work required.

Guarantee.

The Union Products Co., manufacturers, contract solely with the Licensees and Appliers for the application of Par-Lock, to whom they guarantee the uniformity, strength and purity of materials and by whom they are guaranteed the correct application according to Par-Lock specifications. This insures the architect safe business relations and efficiency in application.

ESTABLISHED 1883

THE BILLINGS-CHAPIN CO.

House Paints, Cement Coatings, Varnishes, Stains and Enamels

438 Pearl Street
NEW YORK
TELEPHONE, Worth 1354

1163 East 40th Street
CLEVELAND, OHIO
TELEPHONE, North 1608

146 High Street
BOSTON, MASS.
TELEPHONE, Main 4137

Products.

We manufacture Coatings, Transparent and Opaque, covering all departments of Exterior and Interior treatment of surfaces—Wood, Metal, Cement, Stucco, Brick, Plaster.

TRADE-MARK

Cement Coatings, "Driwal" (Waterproofing), "Bilchaco" Cement Floor Coating, "Rostnicht" (Anti-Rust and Insulator for Structural Steel).

Also, House Paints, Shingle Stains, Roof Paint, "Flexo-Flint Finish," "Rubeffect" (a Flat Finish Varnish), "Artone" (for Wall Decoration and Plaster, Wood or Metal Ceilings), "Flo-Rite" (The Perfect White Enamel).

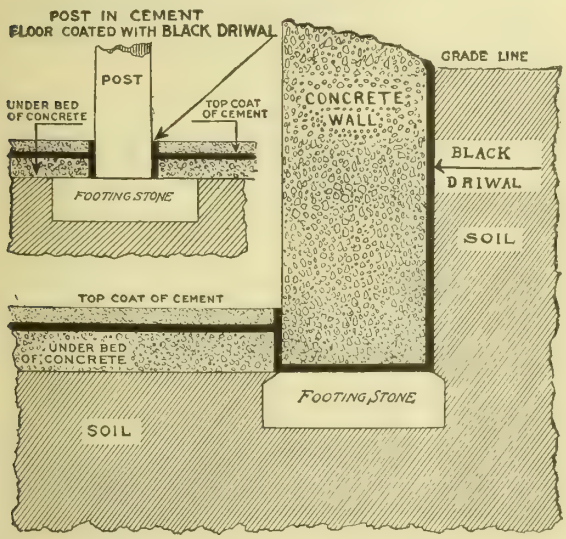
"Driwal" Decoration for Concrete and Brick.

A waterproofing and decorative coating for Cement, Stucco, Brick and similar surfaces. "Driwal" prevents dampness, efflorescence and staining. Made in fourteen colors, including greens, browns, reds, yellows and stone colors; white and black; also, transparent. The colors are alkaliproof and limeproof. *They will not blister or peel if properly applied. They penetrate and stain and preserve the texture of the surface. Have no disagreeable odor.*

Driwal
TRADE-MARK

Waterproofing for Heavy Pressure.

Black "Driwal," unlike tar, will not become brittle, and may be applied without heating. Made in three forms: No. 1, Standard Body; No. 2, Extra Heavy, especially desirable on rough work; and No. 3, Paste for filling cracks and crevices.



APPLICATION OF "DRIWAL"

Showing where Black "Driwal" should be used in waterproofing cement floors and foundation walls in damp locations, and also proper treatment of posts setting in cement floor

Interior Painting—Walls, Ceilings, etc.

"Artone" produces the beautiful velvet-like flat finish so much desired for interior decoration of hospitals, schools, hotels, theaters, public buildings, apartment houses and residences. It is designed for use over "Artone First Coater" on smooth or rough plaster, cement, brick, wall-board, metal or wood. It is sanitary, durable, and can be cleaned with soap and water or disinfectants. For three-coat work, one coat of "Artone First Coater" and two of "Artone," the cost averages eight to nine cents per square yard for material. Tiffany Blends or French Glaze effects are obtained with "Artone French Glaze."

ARTONE
TRADE-MARK

"Rostnicht."

"Rostnicht" is a protective coating for steel, iron and other metals against rust. This coating is made along the lines indicated as best by the results of the investigation of the Cushman Laboratories as to the best protective coatings for structural iron, bridges, etc. It contains ingredients best calculated to act as insulators. It contains no asphaltum nor tar. It will successfully resist sulphuric acid fumes, brine and lubricating oil.

ROSTNICHT
TRADE-MARK

"Rostnicht" is also especially suitable for metal roofs and other metal surfaces exposed to severe weather conditions, as it is an antirust coating of greatest durability. Six colors and black.

Specification and Estimate Book.

We have compiled a very practical specification book for architects and engineers. It is complete in every detail, giving full data on the different surfaces and woods and how best to treat them. A reliable cost guide is also included. Many architects insert this book in Sweet's opposite this page for ready reference. Send for your copy.

References.

The following is a list of a few of the many prominent buildings where "Bilchaco" Paints, Varnishes, and kindred products have been used.

BUILDING	LOCATION
Yale University	New Haven, Conn.
West Baden Springs Hotel	West Baden, Ind.
New Willard Hotel	Washington, D. C.
Lincoln Memorial Hall	Hodgenville, Ky.
Cuyahoga County Court House	Cleveland, Ohio
The Alling & Cory Co.	Pittsburgh, Pa.
The New Greenbrier Hotel	White Sulphur Springs, W. Va.
Johns Hopkins University	Baltimore, Md.
University of Michigan	Ann Arbor, Mich.
Hotel Wentworth	Portsmouth, N. H.
Eastman Kodak Co.	Rochester, N. Y.
Hotel Champlain	Bluff Point, N. Y.
New Kaiserhof Hotel	Chicago, Ill.

THE WATERPROOFING COMPANY

Engineers and Contractors for Waterproofing

345 East Thirty-Third Street
NEW YORK, N. Y.

BRANCH OFFICES
BOSTON, MASS., 65 Albany Street PITTSBURGH, PA., Benedum-Trees Building

Services.

We are ENGINEERS and CONTRACTORS for WATERPROOFING, making a specialty of CEMENT WATERPROOFING.

We contract for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming-pools, etc., guaranteeing a positive and permanent waterproofing for all kinds of masonry construction. We also design and contract for reinforced concrete constructions.

THE WATERPROOFING CO. ESTABLISHED 1909 NEW YORK COW BAY WATERPROOF CEMENT

TRADE-MARK
Reg. U. S. Pat. Office

"Cow Bay" Waterproof Cement.

We manufacture "Cow Bay" Waterproof Cement, which is a true cement—not one of the numerous compounds advertised for mixing with cement or concrete. The properties of "Cow Bay" Waterproof Cement include all the advantages of a first-class Portland cement with the addition that it is a water repellent.

Application.

Wherever practicable, "Cow Bay" Waterproof Cement is placed upon the inner face of the wall, and over the upper surface of the floor, where it serves not only as a waterproof medium but a wearing surface as well. So great is the adhesive power of "Cow Bay" Waterproof Cement that it withstands, without cracking or showing the slightest evidence of percolation, a pressure of 140 pounds per square inch.

BANKERS TRUST BUILDING
TROWBRIDGE & LIVINGSTON, Architects
Waterproofed with "Cow Bay" Waterproof Cement

WOOLWORTH BUILDING
CASS GILBERT, Architect
Swimming-pool and all space below water level waterproofed with "Cow Bay" Waterproof Cement

Advantages.

(1) Ease and economy with which repairs may be made should leakage occur through settlement of the structure or accidents of any kind.

(2) With "Cow Bay" Cement Waterproofing, no extra supporting walls are required.

(3) Not only is the expense of supporting walls obviated, but there is a large gain in floor space.

(4) In basements and sub-basements, no furring and plastering are necessary.

(5) The walls are left with a neat finish.

(6) Where applied to floors, no further floor finish is necessary.

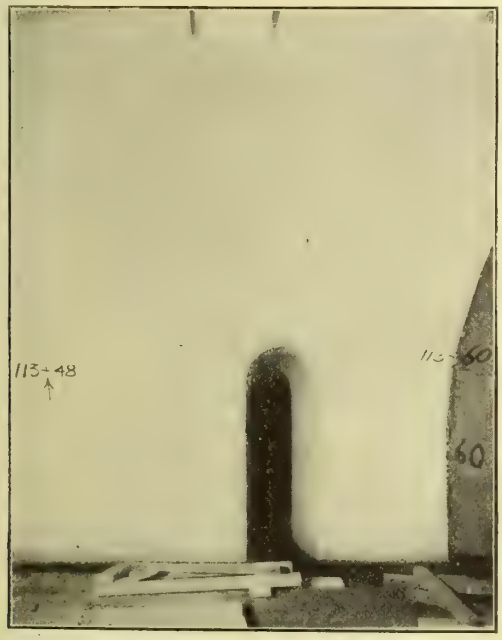
(7) "Cow Bay" Cement Waterproofing is applied independent of and without delay to other work upon the structure.

(8) "Cow Bay" Cement Coating adds to the strength and durability of walls or floors to which it is applied.

(9) As this system employs neither paper nor

Continued on next page

PENNSYLVANIA TUNNELS BEFORE BEING WATERPROOFED



SAME POINT IN PENNSYLVANIA TUNNELS AFTER BEING WATERPROOFED WITH "COW BAY" WATERPROOF CEMENT

cloth, and as the material is mineral, the coating is a positive and permanent waterproofing agent, no decomposition or disintegration being possible—the cement becoming harder with age.

(10) "Cow Bay" Cement Waterproofing is fireproof, and may be used to advantage in close proximity to boilers, furnaces, or other places where heat would cause tar waterproofing to melt and run.

(11) Our "Cow Bay" Waterproof Cement, when set, is as hard as the best Portland cement mortar, and may be placed beneath grillages and column bases without danger of settlement—eliminating the metal pans used with tar and felt waterproofing.

(12) "Cow Bay" Cement Waterproofing may be carried directly through walls, eliminating the trouble and expense of forming a key; the danger from slipping in retaining walls, so common with tar and felt seal, being overcome.

Experience.

"Cow Bay" Cement Waterproofing is beyond the experimental stage, having been employed since 1900. During the past ten years, more important buildings in New York, Boston and Pittsburgh have been waterproofed by this company with this cement than by all other methods combined.

Specifications.

Material—All interior surfaces of all exterior walls, and the upper surface of the concrete floor slab throughout the basement (or sub-basement), elevator pits, machinery foundations, trenches, etc., as shown on plans, shall be waterproofed with "Cow Bay" Waterproof Cement.

The Waterproof Cement must be delivered at the building ready for mixing with water. In no case will liquid or powdered compounds mixed with ordinary cement and sand mortar be allowed.

Workmanship—All surfaces, before the application of the waterproof coating, shall be thoroughly chipped or cleaned, and the coating applied not later than twenty-four hours after the surface has been prepared. A perfect bond must at all points be secured with the underlying masonry.

Wall coating shall be 5/8 inch in thickness, applied in two coats, thoroughly floated and troweled to a smooth and even finish, free from imperfections. Floor work shall be 1 inch in thickness, and is to serve the double purpose of a waterproofing agent and wearing surface. Floor coating shall be floated and finished as described for wall coating.

Guarantee—The waterproofing contractor shall furnish a written guarantee that his work will be waterproof; that during a period of five (5) years after the completion of the waterproofing, he will promptly repair any leaks appearing through same which are not due to causes beyond his control.

References.

The following are a few of our important contracts:

J. P. Morgan & Co. Building, New York, N. Y., Trowbridge & Livingston, Architects
Joralemon Street Tunnel, Brooklyn, N. Y., George H. Pegram, Chief Engineer
Hudson Terminal Buildings, New York, N. Y., Clinton & Russell, Architects
United States Express Company Building, New York, N. Y., Clinton & Russell, Architects
City Investing Building, New York, N. Y., Francis H. Kimball, Architect
Adams Express Company Building, New York, N. Y., Francis H. Kimball, Architect
Singer Building, New York, N. Y., Ernest Flagg, Architect
Western Union Telegraph Company, New York, N. Y., Wm. Welles Bosworth, Architect
Municipal Building of New York, N. Y., McKim, Mead & White, Architects
Guarantee Trust Building, New York, N. Y., Yorke & Sawyer, Architects
Aeolian Building, New York, N. Y., Warren & Wetmore, Architects
Turks Head Building, Providence, R. I., Howell & Stokes, Architects
New York State Educational Building, Albany, N. Y., Palmer & Hornbostel, Architects
School of Mines Building, Pittsburgh, Pa., Palmer & Hornbostel, Architects
Liberty Tower, New York, N. Y., Henry Ives Cobb, Architect
Union Bank Building, Pittsburgh, Pa., MacClure & Spahr, Architects
Jones & Laughlin Building, Pittsburgh, Pa., MacClure & Spahr, Architects
New York Telephone Co., Office Building, New York, N. Y., McKenzie, Voorhees & Gmelin, Architects
Fort Pitt Hotel, Pittsburgh, Pa., Janssen & Abbott, Architects
Oliver Office Building, Pittsburgh, Pa., D. H. Burnham & Co., Architects
Colgate Buildings, "H," "I" and "K," Jersey City, N. J., William P. Fields, Engineer
College of City of New York, New York, N. Y., George B. Post & Sons, Architects
Copley Plaza Hotel, Boston, Mass., Henry J. Hardenbergh, Architect

ZIBELL DAMP RESISTING PAINT COMPANY

Manufacturers of Waterproofing and Damp-proofing Paints and Compounds
Waterproofing and Damp-proofing Contractors

273 Water Street
TELEPHONE, BEEKMAN {2420 2421 NEW YORK, N. Y.
BRANCH WAREHOUSES
AMSTERDAM, HOLLAND, J. LINGEMAN, Damrak 16 GENEVA, SWITZERLAND, F. BONNET & Co.

Products and Services.

Manufacturers of "ALKACENE" WATERPROOF POWDER for WATERPROOFING CEMENT and CONCRETE; "ALKO FREEZ-PROOF," rendering Concrete and Masonry absolutely freeze-proof; "PROTECTORINE," White, Black and Colorless; WATERPROOF PAINT in all Colors; ALKACENE WATERPROOF STUCCO.

Consulting Experts for WATERPROOFING and DAMP-PROOFING WORK. Our staff of practical Waterproofing Engineers and men experienced in building construction work is continually at your service.

Waterproofing Problems.

By a skilful and scientific treatment we successfully solve difficult or complex waterproofing and damp-proofing problems, in new or old buildings, foundations, weather-exposed walls or roofs of residences, mercantile buildings, tunnels, subways, reservoirs, aqueducts or concrete tanks.

"Protectorine."

Our colorless concrete cement coating, for wearing quality, is superior to any concrete, cement or stucco coating in existence. Plugs up the pores, strengthens and hardens the cement, concrete, stucco, terra cotta and brick, renders same absolutely waterproof and rainproof, and sets as hard as porcelain.

Concrete Floors.

Concrete Floors treated with one or two coats of Colorless "Protectorine," well brushed in, will be rendered dustproof, wearproof, waterproof, oilproof and acidproof.

Concrete Waterproof Paint.

Concrete Waterproof Paint is a high grade of waterproof paint, highly elastic, made of the best material, and possesses remarkable qualities as a finishing coat. Concrete Waterproof Paint is tough, tenacious and durable; becomes an integral part with the object applied to; is quick drying; can be washed with soap and water without injury.

Concrete Waterproof Paint applied to concrete, cement, stucco, brick or wood, has the tendency to force itself deeply into the pores, plugs up the pores, rendering them absolutely waterproof and wearproof, will not crack, blister or chip off. Concrete Waterproof Paint is made in colors. Ask for catalogue.

Inside Damp-proofing.

Black "Protectorine," made from a combination of highly elastic waterproof gums, is a viscid, leathery liquid, absolutely poreless, waterproof, windproof, frostproof and weatherproof. Applied by means of a flat brush to inside of exposed walls of a building, it forms a tough, continuous, elastic, glossy surface, impenetrable by rain and storms; the plaster is applied direct to the "Protectorine," eliminating the fur and lath air-space. Architects please specify.

Mural Decoration.

As an efficient protection for ceiling and mural decoration, white "Protectorine" is unsurpassed; it prevents discoloration, efflorescence and exudation of dampness. Saltpetre is held in check and all possibility of staining is eliminated.

"Alkacene" Waterproof Powder.

"Alkacene" Waterproof Powder, a powder intensely water-repellent, waterproof and hydrolithic, for mixing with Portland cement.

For 1 to 3 mixture: To one bag of Portland cement mix 2 pounds of "Alkacene" Waterproof Powder.

For lime mortar, same formula.

Alkacene Waterproof Stucco.

Alkacene Waterproof Stucco applied over cement and concrete or wood produces a monolithic slab as hard as porcelain; guaranteed not to crack; absolutely impervious to rain and frost; rich in color and texture.

Alkacene Waterproof Stucco is made in white, marble, sandstone, terra cotta or cement texture. Ask for samples.

Alkacene Waterproof Stucco is made by the same process as fluxing or baking terra cotta, the difference being that terra cotta is fluxed at the temperature of from 1800 to 2400 degrees, while Alkacene Waterproof Stucco gives the same result under a cold process.

We manufacture, sell and apply Alkacene Waterproof Stucco.

"Alko Freez-proof."

Cement, concrete, lime mortars and plaster are made not only frostproof, but increased in strength by at least fifty per cent, and made sixty per cent impermeable to moisture. This latter feature is particularly valuable in stucco buildings; freezing is eliminated cracking done away with, and the entire building made waterproof and moistureproof.

Directions.

At fifteen to thirty-two degrees Fahr. use one pail of "Alko Freez-proof" to four pails of water.

At fifteen degrees Fahr., or under, use "Alko Freez-proof" undiluted.

Cement Floors.

By the use of "Alko Freez-proof" cement floors are made very hard and dustproof, and do not require subsequent surface application.

Information.

We advise all users to write, asking for full specifications. Samples, literature, or any information desired, may be had by writing to main office.

MIDDLEBURY MARBLE COMPANY

INCORPORATED

Producers and Shippers of Vermont Marble

MAIN OFFICE

185 Devonshire Street

BOSTON, MASS.

SALES OFFICE
7 EAST 42D STREET
NEW YORK, N. Y.

QUARRIES
MIDDLEBURY, VT.

Products.

Mill Blocks of Middlebury Pavonazzo, Middlebury Crême Antique, Middlebury Crême Statuary, Middlebury Light Riviera, Middlebury Dark Riviera and Jardin de Fleur Marbles, for the highest types of Interior Marble Work, and in full-sized slabs of any desired thickness.

Services.

The Middlebury Marble Company maintains a Service Department for the assistance of architects in the selection of Vermont Interior Marble. This Department co-operates with architects and with marble contractors.

The Middlebury Marble Company produces only rough mill blocks and full-size slabs. Its marble is sold exclusively to the outside, or independent, marble sawing and finishing plants located in various cities throughout the country.

It does not finish marble, and does not contract direct for marble work. For that reason, by specifying Middlebury Marble, the architect or general contractor is assured competitive bids and open competition is maintained in securing estimates.

Middlebury Marble can be supplied by any marble manufacturer, marble contractor, or marble and tile dealer.

Physical Properties.

Middlebury Marble is a true calcite, and has a particularly fine and uniform texture, with a grain diameter of 0.02 to 0.37 and principally from 0.12 to 0.25 millimeters (Rosiwal method).

Because of its even, fine grain and resultant hardness, it takes an unusually brilliant and lasting polish; and shows only grade 2 in carmine test for moisture absorption, far surpassing any other Vermont marbles.

Middlebury Marble, with its warm color tones, is especially adapted for the better classes of interior decorative work, particularly for bank counters, wall panels, theater entrances, art mantels, apartment house entrances, corridor facings, and stair work.

Middlebury Pavonazzo.

Has a cream to pink-cream ground mass, with striking veinings of olive-green. When sawn with the bed, the appearance is particularly pleasing in matched-panel effects for counters, dado and wall facings.

Sawn across the bed, the veining runs in almost straight, parallel lines, for columns, pilasters and casings, in connection with the matched-panel effects noted above.

Slabs of any size can usually be supplied, the average sizes running 6 feet 6 inches by 7 feet 6 inches.

Lengths for columns and pilasters can be supplied up to eighteen feet.

Middlebury Crême Statuary.

Has a delicate cream-white ground mass, with occasional tints of pink or light salmon. No veining. This marble is adapted for high grade stair balusters, rails, fountains, art mantels and statuary. Not desirable for extended wall areas. Holds a sharp arris.

Middlebury Crême Antique.

Similar to Crême Statuary, with the exception that it has a light golden-brown veining. Adapted for the same class of work as Crême Statuary, and also works well in wall areas.

Middlebury Light Riviera.

White ground mass, with delicate olive-green pencil veinings. Adapted for a wide range of general interior work. Can be supplied in any sizes up to 6 feet 6 inches by 7 feet 6 inches, and larger on three weeks' notice.

Middlebury Dark Riviera.

Similar to Light Riviera, but with more pronounced veinings of olive-green.

Jardin de Fleur.

Ground mass of dark olive-green, with broad, striking veinings of pink. This marble is quarried on the angle, permitting diamond-matched wall panels. The veining is too pronounced for general interior work; but when used for wall areas, running 8 feet by 10 feet and larger, where two or four matched panels can be set (preferably with stiles or border of Crême Statuary or Crême Antique), the effect is rich, distinctive and highly artistic.

Inquiries will be answered promptly; and samples of any of these marbles, in any size or finish desired, will be shipped, express prepaid, to established architects, on application.

THE GEORGIA MARBLE CO.

TATE, GA.

NEW YORK OFFICE, 1328 Broadway
Telephone, 2193 Greeley

CLEVELAND OFFICE, Citizens Building
Telephone, 3109 Main

Products.

GEORGIA MARBLE in rough QUARRY BLOCKS and SAWED STOCK only. Sole producers of "LIGHT CHEROKEE," "SILVER GRAY," "MEZZOTINT," "CREOLE," "KENNESAW," and "ETOWAH."

Durability.

Georgia Marble, on account of its crystal formation, is non-absorbing, therefore does not disintegrate, and its high crushing strength makes it the most durable stone on the market.

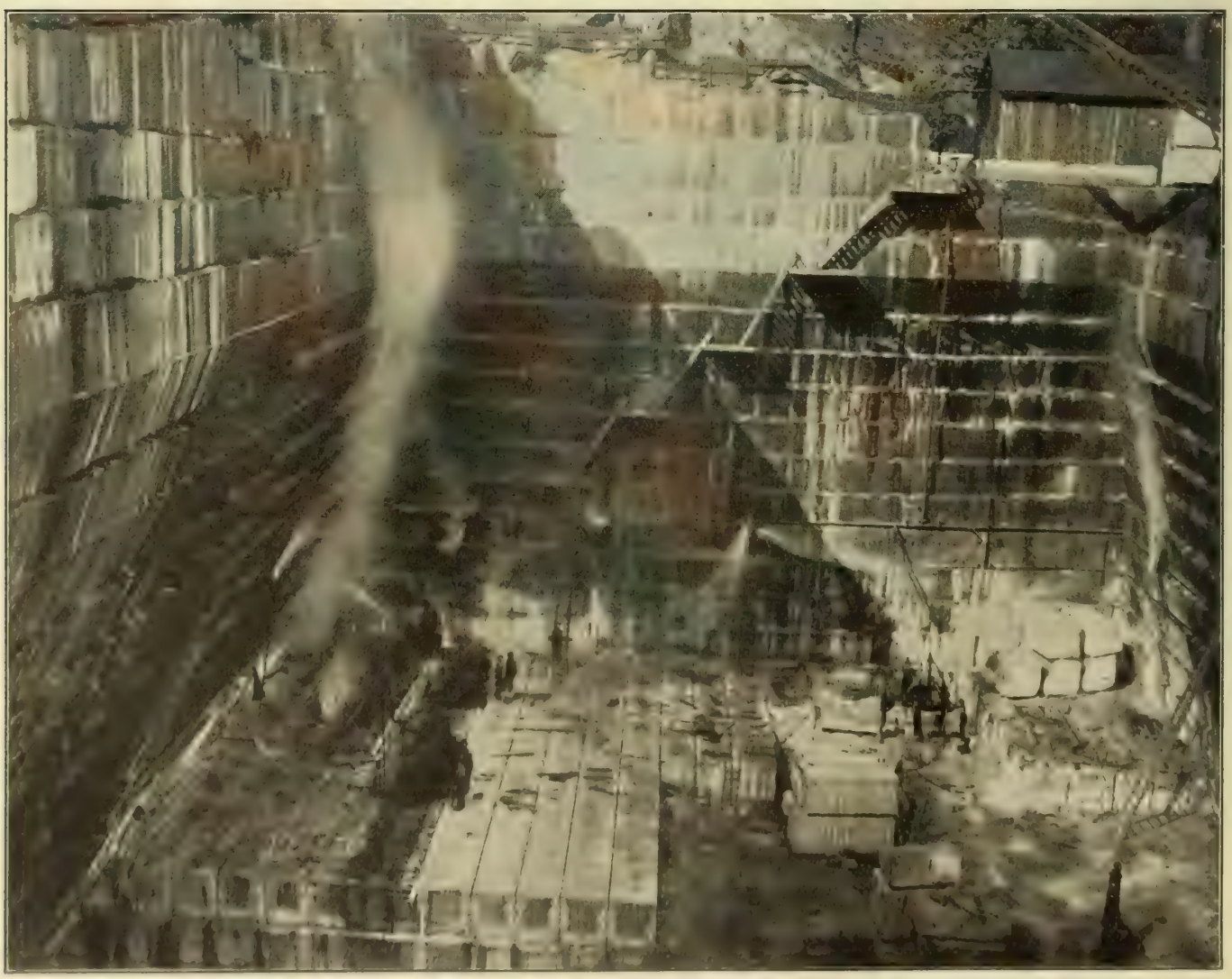
Colors.

White with gray clouds and veinings, even-colored silver gray, gray with blue veinings, blue and white mottled, white with blue veinings, and pink, banded and mottled with gray and black.

Crushing Strength.

The following is an extract from the report of physical tests on specimens of Georgia Marble made by J. B. Johnson, professor of civil engineering and director of testing laboratory, Washington University, St. Louis, Mo.:

"Six three-inch cubes were tested upon a U. S. Standard Riehle Testing Machine of 100,000 pounds' capacity. The details of these tests are given in the accompanying certificate. I was only able to break four of the specimens. The other two stood 112,000 and



CREOLE QUARRY NO. 4

Continued on next page

109,300 pounds, respectively, without crushing; which was a much greater load than the machine should be allowed to carry.

"The lowest test was 76,200 pounds, or 8,330 pounds per square inch, but since two of the six specimens remained uncrushed, it is perhaps fair to say the average crushing strength is not less than 10,500 pounds per square inch. This is equivalent to 750 tons per square foot.

"The fractures showed a remarkably uniform composition without seams or lines of cleavage.

"The strength of granite is from 700 to 1,000 tons per square foot; the strength of limestone and marble varies from 350 to 700 tons per square foot.

"The average strength of the best sandstone is about 500 tons per square foot.

"The average strength of the St. Louis pressed brick is about 250 tons per square foot.

"It is thus seen that the strength of 'Kennesaw' Marble is about equal to that of granite, and greater than any other form of building stone or brick."

Absorption.

This marble absorbs only 4/100 of one per cent of moisture, the lowest per cent of absorption in stone known, as shown in the following report of test:

"University of Wisconsin,
Department of Geology,
Madison, January 9, 1906.

Sample of marble from The Georgia Marble Co., submitted to me by Professor Leith, has been analyzed and tested for its absorption power. The results obtained are almost the same as those printed in their handbook. Following is the chemical analysis:

$CaCO_3$	97.95 per cent
$MgCO_3$	.57 per cent
SiO_2 (insoluble matter)	.54 per cent
Iron	traces
Aluminum	traces
Total	99.06 per cent

In determining the absorption, a piece weighing 15 gr. was dried for ten hours at a temperature of 150° C. and weighed, then soaked in distilled water for twenty-four hours and re-weighed. The difference in weight divided by the dry weight gave the absorption of the stone, or .04%, which is very small.

The rock is white and coarsely crystalline. Because of its purity, especially the absence of iron, the marble will retain its white color, and due to its low absorption power, the agents of disintegration will have but little effect upon the stone.

Very truly yours,
E. B. Hall, Assistant in Geology."

Statuary.

Silver Gray Georgia Marble is well adapted for sculptors' use, as, on account of its characteristic crystalline formation, it is very translucent and imparts "life" to sculptured work, which can not be obtained in other marbles.

Facilities.

Having an unlimited supply of marble and excellent facilities for production, we can fill any size order and ship anywhere.

Columns and Monoliths.

Can be furnished in any color to size of the capacity of transportation.

Special attention is given to the production of blocks for long columns in one piece. Have furnished monoliths 30′ x 4′ x 4′.

Co-operative Service.

We shall take pleasure at all times in giving any information in regard to our marbles and will furnish samples. Kindly state size desired.

Medals.

Georgia Marble was awarded a gold medal at the St. Louis Exposition, the highest award; also, received the highest award at the Jamestown Exposition, a silver medal.

References.

A few representative buildings where our work has been used:

BUILDING	LOCATION	ARCHITECT
House of Representatives, Office Building	Washington, D. C.	Elliott Woods (Superintendent Capitol Buildings and Grounds) Thomas Hastings
Municipal Building	Washington, D. C.	Cope & Stewardson
Girard Trust & Banking Co. Building	Philadelphia, Pa.	McKim, Mead & White Furness, Evans & Co.
State Capitol	Frankfort, Ky.	Frank M. Andrews & Co.
Court House	New Orleans, La.	Frederick W. Brown A. Ten Eyck Brown P. Thornton Marye
Royal Insurance Co. Building	San Francisco, Cal.	Howell & Stokes
Northwestern National Bank Building	St. Paul, Minn.	
Hotel Patten	Chattanooga, Tenn.	W. T. Downing
Post Office	New Orleans, La.	Jas. Gamble Rogers J. Knox Taylor, Sup. Architect
Museum of Art	Cleveland, Ohio	Hubbell & Benes
McKinley Memorial	Niles, Ohio	McKim, Mead & White
State Capitol	Salt Lake City, Utah	R. Kletting

THE KENNESAW MARBLE CO.

Contractors and Finishers of Georgia Marble

MARIETTA, GA.

Products.

GEORGIA MARBLE, including SILVER GRAY, CREOLE, CHEROKEE, KENNESAW, ETOWAH and VERD ANTIQUE. Also, BLUE and ENGLISH VEINED ITALIAN.

We furnish these Marbles in sawed and finished forms for all Interior and Exterior uses, including MONUMENTS, COLUMNS and CAPS—Corinthian, Ionic or Runic; WAINSCOT, BASE (moulded or plain), STAIRS, RAILS, BALUSTERS, NEWEL POSTS, FLOOR TILE, COUNTERS; PLUMBING MARBLE—PARTITION, FLOOR SLABS, LAVATORY SLABS; BANK and OFFICE FIXTURES.

Description.

Georgia Marble possesses qualities which make it superior to any other American marble. It can be classified as follows:

Strength—Its strength is something marvelous, as will be seen by the examination of scientific tests which have been made.

Durability—Durability naturally follows strength. This marble being practically non-absorbent will not disintegrate as do the softer marbles and limestone.

Beauty—Pages might be written concerning the beautiful effects that can be produced by the proper handling and matching of the many different colors. Special care should be used in matching slabs. We employ experts for this purpose, thus assuring perfection in beauty.

Specific Gravity.

The specific gravity of Georgia Marble is 2.724, or its weight is 170 pounds per cubic foot.

Colors.

Silver Gray, a bluish gray with some dark markings in it.

Creole, dark blue and white mottled.

Cherokee, a grayish blue background with dark coloring.

Kennesaw, a white background with some dark color in it.

Etowah, a pink background with greenish black marking.

Verd Antique, dark and light green.

Facilities.

Our facilities for the prompt turning out of work are unsurpassed. Our new mill is equipped with the most modern machinery that money can buy. We employ only the most skilled mechanics and spare neither time nor expense in furnishing first-class work.

Supply.

Any amount of Georgia Marble can be secured, the supply being inexhaustible.

Installation.

Where desired we contract for installation, or furnish complete setting plans.

Co-operative Service.

We will cheerfully give architects all desired information regarding our products, quoting approximate prices upon request.

Samples.

Samples will be furnished upon request.

INTERIOR VIEW OF HOTEL YOUREE, SHREVEPORT, LA.
Georgia Marble used exclusively

Continued on next page

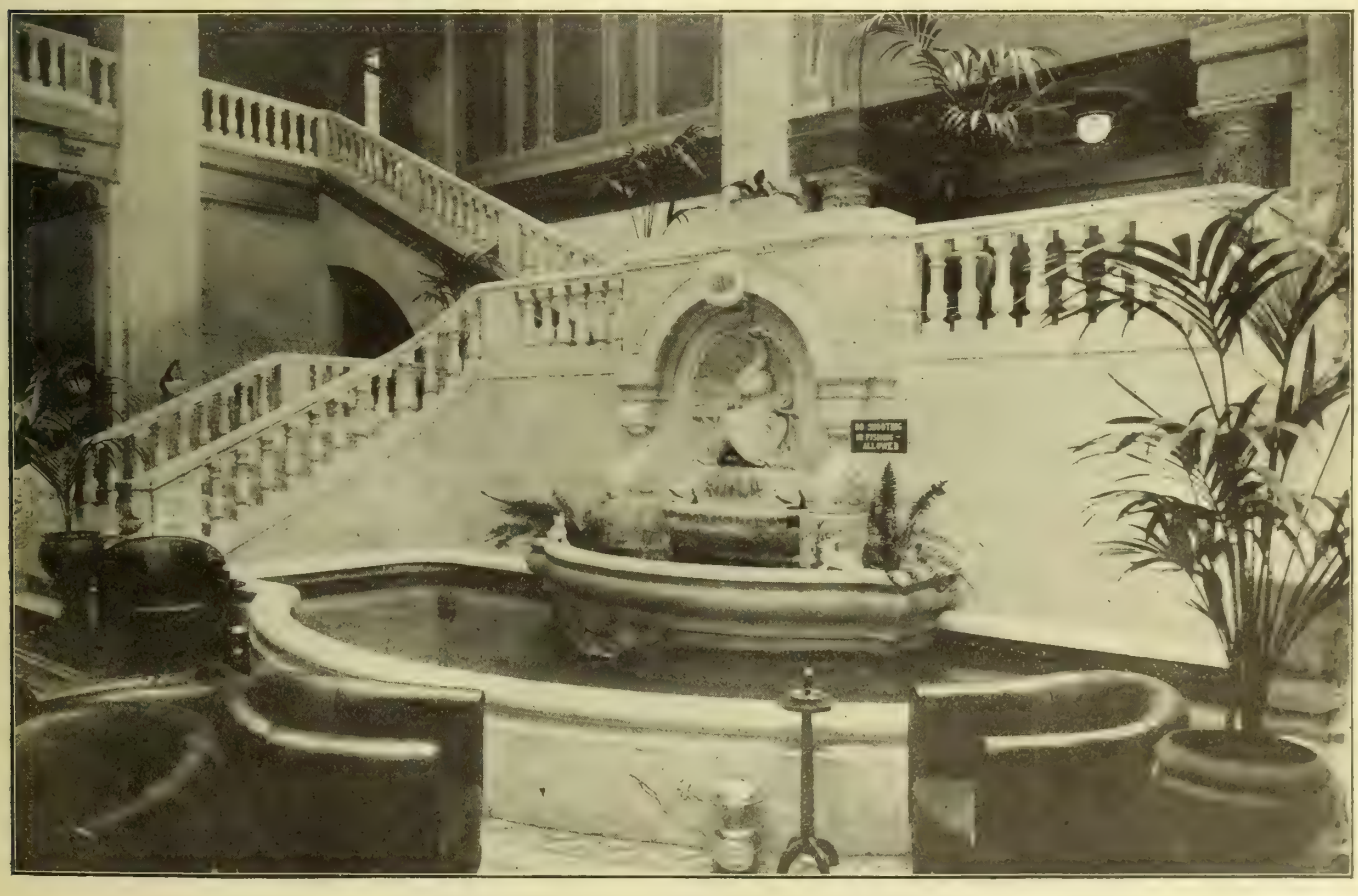
A PARTIAL LIST OF REPRESENTATIVE INSTALLATIONS

BUILDING, LOCATION AND ARCHITECT

Atlanta Terminal Station, Atlanta, Ga., P. Thornton Marye
Carnegie Library, Atlanta, Ga.
Frankfort State House, Frankfort, Ky
Wesley Memorial Church, Atlanta, Ga.
United States Post Office, Jacksonville, Fla., J. Knox Taylor, Supervising Architect
United States Post Office, Tampa, Fla., J. Knox Taylor, Supervising Architect
Tampa Free Library, Tampa, Fla.
Struve-Love Hotel, Huntsville, Ala.
Citizens-Southern Bank, Savannah, Ga.
Lee County Court House, Fort Myers, Fla.
Bay County Court House, Panama City, Fla.
Gibraltar Hotel, Paris, Tex.
United States Post Office, LaFayette, La.
Bexar County Court House, San Antonio, Tex.
Capital City Country Club, Atlanta, Ga.
Ocean Steamship Building, Savannah, Ga.
Municipal Building, Rome, Ga.
United States Post Office, Mobile, Ala.
Trans-Mississippi Terminal Station, New Orleans, La.
De Soto County Court House, Arcadia, Fla., Bonfoey & Elliott
Citrus County Court House, Inverness, Fla., Willis R. Biggers
Tift County Court House, Tifton, Ga., W. A. Edwards
Vermilion County Court House, Danville, Ill., Lewis & Sterbe
United States Post Office, Raleigh, N. C.
United States Post Office, Hickory, N. C.
United States Post Office, Tarboro, N. C.
Comfort Stations, Dallas, Tex.
Administration Building, U. S. Penitentiary, Atlanta, Ga., Eames & Young
Taylor County Court House, Abilene, Tex.
Nueces County Court House, Corpus Christi, Tex.
Horticulture and Forestry Building, Ohio State University, Columbus, Ohio
Bell County Court House, Belton, Tex.
York County Court House, Yorkville, S. C., Wm. A Edwards
Henderson County Court House, Athens, Tex.
United States Post Office, Reidsville, N. C.
Christian Science Church, Atlanta, Ga.
Madison County Court House, Huntsville, Ala.

BUILDING, LOCATION AND ARCHITECT

Hotel Patten, Chattanooga, Tenn., W. T. Downing and R. H. Hunt
Lupton Apartments, Chattanooga, Tenn., W. T. Downing
Third Avenue Hotel, Cedar Rapids, Iowa
Prudential Building, Atlanta, Ga., Thos. Morgan
Bisbee Office Building, Jacksonville, Fla., H. J. Klutho
Rhodes Office Building, Atlanta, Ga., J. H. Pittman
Beckham Hotel, Abilene, Tex.
Union Real Estate & Trust Co. Building, Texarkana, Ark.
Alston Building, Tuscaloosa, Ala., E. J. Ostling & Son
Citizens National Bank, Tampa, Fla., Jos. C. Llewellyn, Architect; Francis J. Kenard, Associate Architect
Hotel Ansley, Atlanta, Ga., Brenton B. Davis
Herndon Barber Shop, Atlanta, Ga., L. P. McGee
Hotel Youree, Shreveport, La., Geo. R. Mann
Palmetto Bank, Columbia, S. C., Jos. Harder
First National Bank, Dublin, Ga., A. Ten Eyck Brown
Cotton Exchange Building, Dallas, Tex., Lang & Witchell
Third National Bank Building, Atlanta, Ga., Morgan & Dillon
Lanier Hotel, Macon, Ga., Alex. Blair
Southern Railway Freight & Office Building, Atlanta, Ga., Southern Railway
Campbell Hotel, Dallas, Tex., Lang & Witchell
Slaughter Building, Dallas, Tex.
Skirvin Hotel, Oklahoma City, Okla.
Chronicle Building, Augusta, Ga., G. Lloyd Preacher and W. L. Stodard
Melrose Hotel, Darlington, S. C.
Athletic Club, Atlanta, Ga.
The Bank of South Carolina, Sumter, S. C. (Exterior)
American Trust & Savings Bank, Evansville, Ind.
Y. M. C. A. Building, Atlanta, Ga.
Bailey Office Building, Greenwood, S. C., A. Ten Eyck Brown
Silvey Building, Atlanta, Ga.
Holman Building, Athens, Ga.
Aragon Hotel, Jacksonville, Fla.
Colored Masonic Building, Jacksonville, Fla.
Pine Bluff Hotel, Pine Bluff, Ark.



INTERIOR VIEW OF HOTEL YOUREE, SHREVEPORT, LA.
Georgia Marble used exclusively

MARBLE MOSAIC COMPANY

MANUFACTURERS AND CONTRACTORS

Interior Marble Mosaic Work

MILWAUKEE, WIS.

Products.

MARBLE MOSAIC SLABS and PIECES for COVE BASE, STAIR TREADS, TOILET PARTITIONS, WAINSCOTING, FLOORING, etc.

Description.

Marble Mosaic is a composition of marble chips and cement, so prepared, cast and sawed that its strength is equal, if not superior, to that of natural marble.

This product can be made in any color, and given a high polish equal to that of the best marble, emphasizing the fine surface texture and aggregate pattern.

Marble Mosaic is the result of long and careful study and experiment, and has successfully withstood many practical laboratory and service tests.

Adaptability.

Marble Mosaic is recommended for all interior services for which natural marble is logically suitable. Beautiful, durable and sanitary results are definitely assured.

The following are some of the purposes for which Marble Mosaic has been successfully used:

Toilet and showers, for schools and office buildings.

Wainscot, for vestibules, corridors, garages, etc.

Wainscot and counter, for bank work.

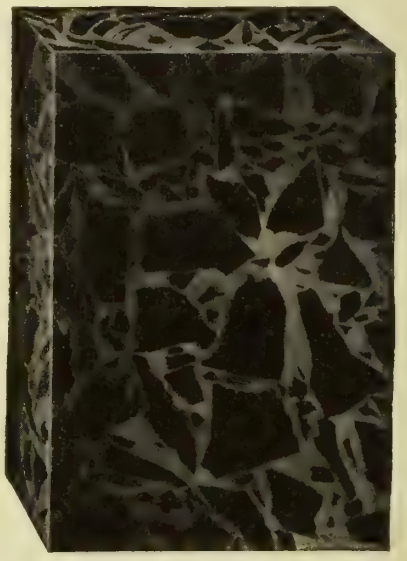
Treads, risers, stringers, etc.

Beauty.

The beauty of Marble Mosaic will meet the most exacting artistic requirements. It is possible to reproduce in this material a large range of rich and varied figurings and colorings equal to any requirements.

Durability.

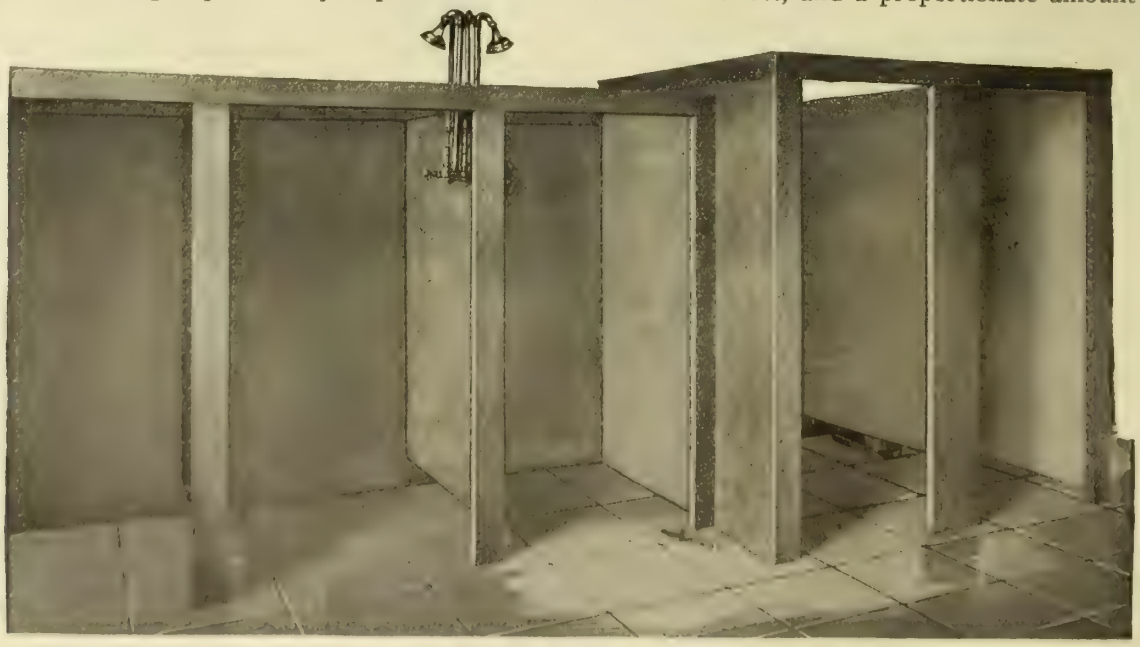
Marble Mosaic has all the structural and decorative qualities that have caused marble to take and hold the remarkable position it has in the building world, yet it will not crack, chip or stain as readily. It can also safely withstand a higher temperature than can natural marble.



SECTION OF MARBLE MOSAIC
Composed principally of Black Marble Chips and Golden Buff Cement

Manufacture.

Marble Mosaic is composed of chips of marble of character as specified to produce the desired figure and color effect, and a proportionate amount of high-



SHOWING INSTALLATION OF SHOWER AND TOILET STALLS

Sweet's Catalogue

Continued on next page

grade cement carefully mixed. This is cast in blocks; and these blocks, when thoroughly set and hardened, are sawed to any desired thicknesses, into slabs up to 8 feet by 6 feet.

After testing and inspection, to make sure the slab contains no imperfections, it is polished by the same process used in polishing natural marble.

Specialization.

This organization is especially equipped for the construction and installation of shower, urinal and toilet stalls; also, general lavatory, wainscoting, base and border work.

Installation.

Marble Mosaic is installed in the same manner as marble or slate.

Cost.

Marble Mosaic is twenty-five per cent lower in cost than the regular American marbles.

How to Specify.

Shower Stalls—Furnish and set Marble Mosaic shower stall with sanitary reinforced one-piece shower base as manufactured by the MARBLE MOSAIC COMPANY, Milwaukee, Wis.

Ingredients of Marble Moaic to be pink Tennessee marble and gray cement [white Italian marble and gray cement] [white Italian marble and white cement].

All exposed surfaces to be highly polished, except inside of base, which is to be honed.

All joints to be filled with litharge and glycerine, and guaranteed waterproof. Opening to be provided with nickel-plated brass curtain rod and white duck curtain.

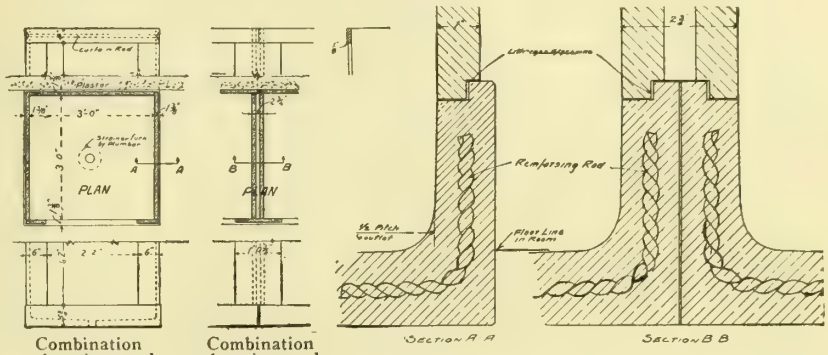
Urinal Stalls—Partitions for urinal stalls are manufactured to sizes specified.

Waterproofed partitions and backs made to a standard size —one foot six inches by five feet, and two feet by five feet, respectively.

Toilet Stalls—The standard thickness for toilet stall material is one inch, one and three quarter inches and two inches for partitions, header (stiles) and rail, respectively; but can also be made to special sizes, if required.

References.

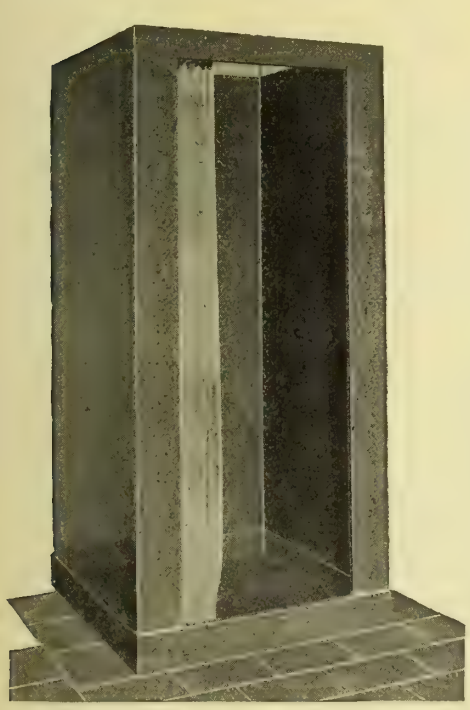
Municipal Hospital, Milwaukee, Wis., Chas. Malig, Architect
High School, Oshkosh, Wis., Henry Auler, Architect
Wisconsin Telephone Co., Milwaukee, Wis.
Johnson Soap Co., Milwaukee, Wis.



Combination elevation and plan of single shower

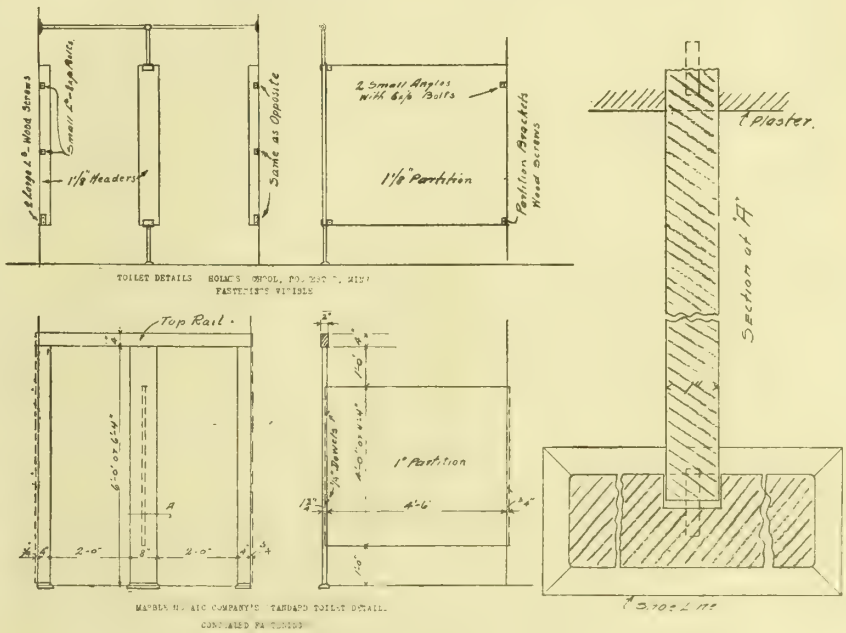
Combination elevation and plan of division style for double shower

COMBINATION ELEVATIONS AND PLANS AND DETAILS OF MARBLE MOSAIC SHOWER STALLS



SINGLE SHOWER STALL WITH ONE-PIECE RECEPTOR

Made throughout of Marble Mosaic



DETAILS OF TOILET STALLS

Showing Construction with Concealed and with Visible Fastenings

INDIANA LIMESTONE

BEDFORD, IND. BLOOMINGTON, IND.

MEMBERS INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION

BEDFORD STONE & CONSTRUCTION CO.
Bedford, Ind.

CONSOLIDATED STONE CO.
Bedford, Ind.

CRESCENT STONE CO.
Bloomington, Ind.

FURST-KERBER CUT STONE CO.
Bedford, Ind.

J. HOADLEY & SONS CO.
Stinesville, Ind.

MAHAN & CO.
Bloomington, Ind.

W. McMILLAN & SON
Bedford, Ind.

NATIONAL STONE CO.
Bloomington, Ind.

SHEA, DONNELLY & GIBERSON CO.
Bedford, Ind.

For Individual Catalogues see Pages Following

Product.

BUFF, GRAY, BLUE, and VARIEGATED ("Mixed") INDIANA LIMESTONE (sometimes called "Bedford Stone").

INDIANA LIMESTONE
The ARISTOCRAT of BUILDING MATERIALS
TRADE-MARK

Colors.

Buff varies from a very light creamy color to a distinctly buff shade.

Gray is a light silvery gray stone, with a distinctly bluish cast.

Blue is much like the gray, but is darker and has a more pronounced bluish cast.

Gray and Blue (blue-gray), like the Buff, vary in shade, but are in general fairly represented by these color designations which have been long in use and are now universally recognized.

Variegated (often called "Mixed") is a mixture of Buff with Blue or Gray.

The Buff Indiana Limestone is the shade most used. The Variegated, or "Mixed," occurs in the quarries only at the irregular junction of the Buff and the Gray or Blue (without cleavage plane)—it is thus comparatively rare, and is in great demand for producing the homelike, informal atmosphere in dwellings, the effect of age and "textured" walls. (See under "Service Bureau.")

Textures.

The surface textures vary from fine as marble to rather coarse. The stone is extremely homogeneous, which fact formerly led many architects into the error of insisting on absolute uniformity throughout a building, much to the detriment of its beauty. The general (and better) practice at present is to mix finer and coarser textures in due proportion, or to use the finer texture for the lower courses and the coarser above. Any quantity of perfectly homogeneous stone may be had, however, when desired for special reasons. (See under "Service Bureau.")

Finishes.

All finishes, except polish, may be applied to Indiana Limestone. Hand-tooled, planer-dressed, machine-tooled and rubbed finishes are all successfully applied to flat, turned and moulded work. Bush-hammering is rarely done, and only for special effects. Rubbing is but little practiced, since the planer alone leaves a fine surface. For residence work, churches, etc., rock face finish has long been popular, being often strikingly used with smooth or machine tooled trim.

Structure and Chemistry.

Indiana Limestone is *not crystalline*. It is composed of shells and fragments of shells of microscopic and somewhat larger sizes, cemented together with a film of pure calcium carbonate. It is therefore a homogeneous, massive formation without cleavage planes. It is practically pure carbonate of lime.

Its average chemical analysis follows:

Carbonate of Lime	97.26 per cent
Silica	1.69
Oxide of Iron	.49
Magnesia	.37
Water and Loss	.19

Durability.

Indiana Limestone is extremely durable. The oldest known structures built of it show the original tool marks and perfect arrises everywhere. Its great chemical purity, especially the negligible proportion of magnesia, makes it practically inert and therefore entirely unaffected by the corrosive gases of city atmosphere. Its wide use for railway stations is "enough said" on this point. It is practically untouched by weather erosion. Inspection of the outcroppings at the quarries, where natural, sharp arrises have been exposed for centuries, proves this.

Strength Plus Softness.

Indiana Limestone is, comparatively, a soft stone. It is nevertheless of a strength second only to granite, which is many times harder and more difficult to work. After exposure Indiana Limestone becomes much harder than when freshly quarried. Its safe load is (conservatively) 135,000 pounds per square foot, vastly more than enough for the very heaviest structures.

Ease of Working.

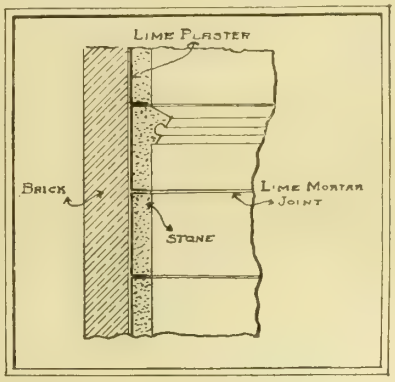
No other commercial building stone is worked so easily as Indiana Limestone in spite of its great strength. It can be freely carved, sawed, planed and turned. It splits either up and down or crosswise.

Fire Resistance.

Indiana Limestone is to all intents and purposes fireproof. It calcines at about 1,500 to 1,700 degrees Fahr.; and any fire which attains this temperature over any considerable area of the *outside* of a building means a total loss even to the most perfect fireproof structure.

Continued on next page

Indiana Limestone up to 1,000 degrees Fahr. does not spall, crumble, slit, nor check *when doused with cold water.* Damage to contour, when it occurs, is therefore strictly local; and damaged units may be replaced.



MANNER OF SETTING AND BACK-PLASTERING LIMESTONE WALL

Setting.

Indiana Limestone should not be set in Portland cement, which often stains the exposed surfaces. Usually no artificial means will prevent this.

It should be set in lime mortar and may be pointed in La Farge or other non-staining cement, or with putty made of lime mortar and a non-staining cement. It had best, in any case, be back-plastered with lime mortar. It is sometimes set in La Farge or other non-staining cement and back-plastered with lime mortar. Often for interior pointing, and sometimes even for setting, Keene cement is used.

The lime mortar used should be made of very carefully slaked lime and clean, sharp sand, in the proportion of three parts sand to one part lime. The same proportions are usually adhered to for the non-staining cements. Such lime mortar has all the strength of cement mortar and often more. Europe is full of masonry hundreds of years old, which was set in lime mortar. Many old American buildings thus constructed have had to have the walls blasted when it became necessary to wreck them.

Uses.

Indiana Limestone, to the extent of many millions of cubic feet, is used each year for all classes of buildings. A great proportion of United States post offices are now being built of it. Office buildings, churches, residences, apartments, monumental buildings of all sorts use it in quantities. It is unsurpassed as a material for trim, porches, etc., for use with brick or other materials. Many factories use it for trim. Wherever used it is a most satisfactory material through its pleasing tone, its air of great dignity and refinement, and its all-round practicability.

The best grades of Indiana Limestone are much used for interior work in churches, public buildings, fine residences, etc. The fine-grained buff stone, when in place, can scarcely be distinguished from the Caen stone of France; and is often selected as its superior, e.g., University Club Interior, Chicago, Holabird and Roche, Architects. The finest and most elaborate carved work is easily, beautifully and permanently expressed in this material.

For architectural sculpture, statuary, gateways, copings, garden ornaments, pergolas, it is widely and successfully used. A great advantage it has for such uses is the practically unlimited size of the perfect units which may be had. It is especially adapted to monolithic columns up to any size which can be transported. The length of supporting columns should be not more than eight times their diameter.

Distribution.

Good sized stocks of Indiana Limestone are carried by cut stone contractors in nearly all the principal cities of the United States and Canada. It is, therefore, easily available at all times. Inquiring architects will also be referred by this Association to all of its members. (See also pages following.)

Transportation.

Owing to its fortunately central location and unsurpassed railroad facilities, Indiana Limestone can be transported to all points with exceptional promptness and minimum cost.

Prices.

Indiana Limestone compares very favorably in price with all other good building stones, and is often fully as low priced as any of the many substitutes which are offered for it—sometimes even lower. The Association does not quote prices, but will gladly put inquirers in touch with its members. (See also pages following.)

References.

So many important buildings have been constructed wholly or in part of Indiana Limestone that anything like a list would be impossible here. Such a list would include a substantial proportion of the finest public buildings, office buildings, churches, apartments, clubs, hotels, railway stations, factories, museums, bridges, libraries, hospitals, schools, colleges and residences in the United States.

Specifications.

The following form of specification (which the architect will easily vary to suit the various finishes possible) is suggested, and will be found to be serviceable for nearly all structures:

Kind and Quality—All stone work shall be executed in Buff (or other color) Indiana Oölitic Limestone, free from structural defects, well seasoned, of selected color and good texture. No variations except such as are generally found in first-class work will be permitted.

Finish—All exposed faces shall be [here describe finishes: smooth; *or,* tooled four or five, etc., up to ten bats to the inch, tooling to run with the run of the planer on moulded units; *or,* rock-faced, bush-hammered, etc., as desired]. The exposed arrises (except in rock face units) of all stone shall be straight, sharp and true, and the exposed faces shall be out of wind and free from lumps or holes. Beds and joints on all stone shall be perpendicular to the face of same; and the joints generally shall be of such a nature that when the stone is properly set, the jointing will run as reasonably uniform as is generally found in first-class stone work.

Setting—The stone shall be set in, and back-plastered with lime mortar consisting of three parts of good, clean, sharp sand and one part lime, which has been slaked for not less than two weeks. Pointing shall be done with an approved non-staining cement. All anchors and dowels shall be galvanized.

Literature.

Volume 1, in the Indiana Limestone Library, is a handsome booklet printed in colors and finely illustrated. It is a treatise, rather than an advertisement, and architects not only find it interesting and informative to themselves, but often desire to put a copy in a client's hands. It is free. Please mention "Sweet's," when writing.

Service Bureau.

Impartial and practical advice and help of any sort, relating to the uses of Indiana Limestone (including advice as to where it should not be used), samples, photographs of buildings, setting, handling, etc., gladly furnished, gratis, by any one of the firms, members of this Association, named in this advertisement or advertising herein.

THE CONSOLIDATED STONE COMPANY

MEMBER INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION

Indiana Limestone
BEDFORD, IND.

QUARRIES AND MILLS
BEDFORD, DARK HOLLOW,
HUNTER VALLEY

Products.

INDIANA LIMESTONE ("BEDFORD STONE"): "DARK HOLLOW" BUFF, GRAY, BLUE, and VARIEGATED ("MIXED"); "HUNTER VALLEY" BUFF, LIGHT BLUE, LIGHT GRAY and VARIEGATED ("MIXED").

MILL BLOCKS, rough or scabbled; CUTSTONE, sawed, planed, turned, carved, and finished for all exterior, interior and structural purposes.

INDIANA LIMESTONE The ARISTOCRAT of BUILDING MATERIALS

TRADE-MARK

Description.

Full general description of Indiana Limestone and its qualities appears in pages preceding of the Indiana Limestone Quarrymen's Association.

"Dark Hollow" Quarries produce a vast quantity of stone of an exceptional density, fineness and closeness of grain, of the highest non-absorbent and weather-resisting quality; also of a somewhat darker and richer tone than the usual, both as to the Buff, Blue and Gray.

"Hunter Valley" Quarries also produce stone of fine and even texture, but of somewhat lighter color.

Capacity.

Maximum capacity is about 2,000,000 cubic feet per annum. Quarries and mills are both fully equipped with every modern device for economical production of high-class work.

Price.

The price of this stone is based on economical handling. It is fixed, thus protecting architects and builders on closed specifications.

Specifications.

To insure the use of our superior stone, architects may write specifications as follows:

"Dark Hollow" Buff, Gray, or Dark Blue, Indiana Oölitic Limestone, *or* "Hunter Valley" Buff, or Light Gray, Indiana Oölitic Limestone from the quarries of THE CONSOLIDATED STONE COMPANY, Bedford, Ind.

References.

The following important buildings have been constructed from stone from these quarries:

State Capitol of Indiana, Indianapolis, Ind.
Public Library, Milwaukee, Wis.
State Historical Library, Madison, Wis.
Emigrants' Industrial Savings Bank, New York, N. Y.
Michigan Central R. R. Terminal, Detroit, Mich.
Intake Tower, St. Louis, Mo.
Montana Apartments, New York, N. Y.
Bank of Commerce, Pierre, S. D.
Traders Bank, Toronto, Ont.
Second National Bank, Warren, Ohio
First National Bank, Appleton, Wis.
Children's Court, New York, N. Y.
House of Hope, St. Paul, Minn.
Ryerson Residence, Lake Forest, Ill.
Bell Telephone Building, Philadelphia, Pa.
The Walters Art Gallery, Baltimore, Md.
Interior of City Hall, San Francisco, Cal.
Court House, Walla Walla, Wash.

In addition we can refer to from four to a dozen considerable buildings scattered over the United States and Canada, in each of the following classes: Office Buildings, Municipal Buildings, Court Houses, Hotels, Churches, Post Offices, Art Galleries, Hospitals, Residences, Schools.

STATE CAPITOL, INDIANAPOLIS, IND.
[illegible] MAY, 1878-1880, and ADOLPH SCHERRER, 1880-1888, Architects
[illegible] from quarries of the CONSOLIDATED STONE COMPANY

THE FÜRST-KERBER CUT STONE COMPANY

Producers of Indiana Limestone

2301 South La Salle Street

CHICAGO, ILL.

QUARRIES AND MILLS: BEDFORD, IND.

Products.

Buff Bedford Indiana Limestone.

Analysis.

See preceding pages under heading of Indiana Limestone.

Specifications.

Architects are requested to specify, as follows: "Fürst-Kerber Buff Indiana Limestone."

Quarries.

The quarries are located in Lawrence County, of which Bedford, Ind., is the county seat. The finest grades of Indiana Limestone are found in the quarries of Lawrence County.

Equipment.

Ample machinery of modern type, both in quarries and mills, enables the prompt fulfillment of any sized orders, either in mill blocks, sawed slabs, planed stone, columns, balusters, etc., or stone finished, ready to set.

References.

The following are some of the buildings in which Fürst-Kerber Indiana Limestone is used:

Apartment Building, S. E. Corner 72d Street and Fifth Avenue, New York, N. Y.
Bureau of Engraving and Printing, Washington, D. C.
Widener Office Building, Philadelphia, Pa.
Widener Memorial Library, Cambridge, Mass.
Interior Banking Room, Marine National Bank, Buffalo, N. Y.
Textile Building, Rhode Island School of Design, Providence, R. I.
Classics Building and Ida Noyes Hall, University of Chicago, Chicago, Ill.
Harris Hall, Northwestern University, Evanston, Ill.
First National Bank, Appleton, Wis.
Samuel Insull Residence, Libertyville, Ill.
Oliver Crosby Residence, St. Paul, Minn.

VIEW OF ONE OF THE "FÜRST-KERBER" QUARRIES

MATTHEWS BROTHERS COMPANY

Cut Stone Contractors for Indiana Limestone

BLOOMINGTON, IND.

Product.

INDIANA LIMESTONE in the finished state, executed in strictest accord with architect's plans and details, delivered cut ready to set, on cars destination, or erected in place.

INDIANA LIMESTONE
The ARISTOCRAT of BUILDING MATERIALS
TRADE-MARK

Description.

For detailed description of Indiana Limestone please refer to pages preceding of the Indiana Limestone Quarrymen's Association.

Reliability.

This Company is the pioneer of the Indiana Limestone Industry, having been established in 1862, and controlled and managed by the same family since that date; and the broad conception of "real service to the customer" has won for us an enviable reputation. Every piece of stone leaving the plant is absolutely guaranteed to fill the requirements in quality, workmanship, and date of delivery.

Facilities.

Our facilities are unexcelled, the plant being a model of efficiency. Machinery is all of the latest and most improved type, electrically operated; and each department head is a man of long experience. There is no contract too large for us to handle satisfactorily, and none too small to receive our best attention.

Estimates.

The estimating department will, upon receipt of plans, prepare an estimate on requirements for Indiana Limestone and submit it for your consideration. This service is rendered free to architects and owners interested, for it is our only means of quoting prices. The sizes and quantities of different moulds required form such an important factor in determining prices, that the actual plans and details must be in evidence before we are justified in making quotations.

References.

The work we have executed is scattered throughout practically every State in the Union, and upon request we will gladly furnish citations nearest the point of inquiry.

CUT STONE PLANT OF MATTHEWS BROTHERS CO., BLOOMINGTON, IND.

JOHN A. ROWE CUT STONE COMPANY

Indiana Limestone for all Construction Purposes

BEDFORD, IND.

Products.

INDIANA LIMESTONE ("BEDFORD STONE"), in any size, design or finish, for any constructional or ornamental purpose.

INDIANA LIMESTONE SETTEES, VASES, STATUARY, CARVINGS, MONUMENTS and CEMETERY WORK.

INDIANA LIMESTONE The ARISTOCRAT of BUILDING MATERIALS
TRADE-MARK

Description.

See foregoing pages of the Indiana Limestone Quarrymen's Association, for description, properties and uses.

Facilities and Services.

The plant is one of the best equipped in the Indiana Limestone district, both as to capacity, experienced and skillful men, and machinery. We are therefore able to handle with promptness and complete success contracts of any size and for the very highest grade of stone work.

All stone is shipped ready to set in the building. We solicit contracts for supplying only, or for both supplying and setting, stone anywhere in the United States or Canada.

Government Work.

We make a specialty of Post Office Buildings and other government work. Wide experience in this line enables us to be of exceptional value to architects and to general contractors who are figuring on government buildings and we will gladly furnish estimates and all possible service. (See references.)

Cemetery and Garden Work.

This is another successful specialty of ours. Gateways, monuments, mausoleums, mortuaries, public monuments, fountains, garden statuary, settees, vases and ornaments, balustrades, copings, etc., beautifully executed from architects' designs and specifications.

Estimates.

We are glad to assist architects and contractors with preliminary estimates on stone work of any building where the use of Indiana Limestone is contemplated.

Samples.

Samples to suit your needs will be furnished on application.

References.

Especial attention is called to the fact that we have furnished the stone, cut and ready to set, for thirty-four United States Post Office Buildings, from New Hampshire to California. List on request. A partial list of other buildings follows:

Interior, National Museum, Washington, D. C.
Cash Register Convention Hall, Dayton, Ohio
Garrett Banking Building, Baltimore, Md.
Colorado Building, Washington, D. C.
Hotel Sinton, Cincinnati, Ohio
St. Elmo Club, New Haven, Conn.
Hotel Raleigh, Washington, D. C.
Hotel Taft, New Haven, Conn.
Supreme Court Building, Springfield, Ill.
Franklin Life Insurance Building, Springfield, Ill.
St. Elizabeth's Hospital, Covington, Ky.

A CORNER OF OUR PLANT

SHEA, DONNELLY & GIBERSON COMPANY

MEMBER INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION

Indiana Limestone

MAIN OFFICE

LYNN, MASS.

MILLS AND QUARRIES
BEDFORD, IND

BRANCH OFFICES

BOSTON, MASS. NEW YORK, N. Y., 52 Vanderbilt Avenue BEDFORD, IND.

Products.

INDIANA LIMESTONE: "REAL BEDFORD" BRAND, BUFF, BLUE and VARIEGATED ("MIXED"), Rough, or Cut and Finished, ready to set.

INDIANA LIMESTONE The ARISTOCRAT of BUILDING MATERIALS

TRADE-MARK

Description.

For full general description of Indiana Limestone see pages preceding of the Indiana Limestone Quarrymen's Association.

The stone from our "Real Bedford" quarries shows, upon analysis, not only the highest purity but the greatest perfection of grain, texture and color. On account of these facts both architects and contractors often express a decided preference for this stone for use in the highest class construction.

Colors.

The Buff stone is of a peculiarly soft tone, while the Blue is lighter than most—really a silvery bluish gray. Variegated is, of course, a mixture of the above.

Facilities and Service.

Cut ready to set in the wall—capacity, ten carloads per day.

Mechanical and personal equipment is complete and capable of handling contracts of any size.

We have executed some of the largest contracts in the country, and our plants and quarries are equipped in such a manner as to enable us to give prompt and satisfactory attention, and quote attractive prices on large, as well as small, contracts.

It is the policy of this Company to see to it that no work leaves the plant which does not do full justice to the excellence of the unsurpassed material we have to work with.

Estimates.

Estimates are gladly furnished on receipt of sufficient data sent to our nearest office.

Samples.

Architects or contractors are promptly served with adequate samples of our stone on request. We respectfully solicit your inquiries.

A FEW OF OUR RECENT CONTRACTS

Massachusetts Institute of Technology, Cambridge, Mass. (One of the largest limestone contracts ever awarded at one time, and finished two months ahead of contract time)
Albany County Court House, Albany, N. Y.
Vassar Art Building, Poughkeepsie, N. Y.
Court House, Greeley, Colo.
City Hall Annex, Boston, Mass.
Merchants National Bank, Boston, Mass.
Dormitories (3), Harvard College, Cambridge, Mass.
Harvard Club, Boston, Mass.
Drummond Building, Montreal, P. Q., Can.
H. C. Frick Residence, Prides Crossing, Mass.
Federal Building, Indianapolis, Ind.
Hotel Chateau Laurier, Ottawa, Ont., Can.
Fort Gary Hotel, Winnipeg, Man., Can.
Hotel MacDougal, Edmonton, Alberta, Can.
Copley-Plaza Hotel, Boston, Mass.
Columbian Life Insurance Building, Boston, Mass.
Boston Mutual Insurance Building, Boston, Mass.

We are now working on the State Capitol at Oklahoma City, Okla., which is also one of the largest limestone contracts ever awarded.

NEW COLLEGE BUILDINGS FOR MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.
500 carloads of Indiana Limestone in these buildings

THE PRESBREY-COYKENDALL CO.

Designers and Builders of Monuments and Mausoleums

198 Broadway
NEW YORK, N. Y.
BRANCH OFFICES
KENSICO CEMETERY, VALHALLA, N. Y. HARTFORD, CONN.

Products.

MAUSOLEUMS, MONUMENTS, SARCOPHAGUS MONUMENTS, MEMORIALS, HEADSTONES, etc., designed, constructed and erected, complete.

Co-operative Service.

This Company places the results of its many years of experience in this specialized field at the disposal of architects and of contractors, with whom correspondence is solicited. Expert advice pertaining to the design, details or construction of monuments or mausoleums in any locality will be extended as an assistance in eliminating any features which experience has demonstrated might, if not corrected before erection, produce objectionable results in the completed structure.

Plant and Equipment.

The plant and equipment of THE PRESBREY-COYKENDALL COMPANY at Barre, Vt., comprise one of the largest works of its kind in this country. The entire plant, which is under the direct supervision of the Vice-President of the Company, as resident manager, includes within its large area all of the most modern devices for cutting, carving and polishing stone. The Chase patent granite saw is capable of slicing from the quarry block (60 feet long by 6 feet 6 inches high), if desired, a slab as thin as one inch, the full length of the stone.

Other facilities, such as air hammers, surfacing machines, and large electric polishers, as well as every appliance demanded in the execution of work of the highest quality, place this Company in a position to supply and construct monuments, mausoleums and memorials of any size, from design to completion, with unequalled rapidity of execution.

Architects' Requirements.

A most important factor in this Company's business in furnishing, cutting and erecting its granite in accordance with architects' drawings and specifications, for all types of work previously mentioned. That architects who entrust the execution of their designs to THE PRESBREY - COYKENDALL COMPANY may feel certain of securing only the best materials, honest and intelligent workmanship, and a refined interpretation of their detailed drawings, is evidenced by the approval given its work by so many of the leading members of the profession in this country.

References.

A letter from the architect of the Core Mausoleum, at Norfolk, Va., which cost approximately $85,000, and which is illustrated on this page, is reproduced with justifiable satisfaction by this Company.

H. VAN BUREN MAGONIGLE, F.A.I.A.
ARCHITECT
Architects' Building, 101 Park Avenue, New York
J. A. F. CARDIFF

In re. Core Mausoleum March 19, 1915.

THE PRESBREY-COYKENDALL CO.,
198 Broadway,
New York City.

GENTLEMEN:

When men do a good piece of work for me I like them to know how I feel about it. I have just come back from Norfolk, Va., and it is a pleasure to make you my compliments upon your part of the work in the Core Mausoleum. Both cutting and setting are the finest examples of granite workmanship I have ever seen. There has been practically no trimming whatever; every piece has fitted like jewelry and after the most careful inspection I failed to find any variation in joint widths. The stone was so carefully boxed and shipped that there was only one extremely small spall reported and that was easily worked out. The twelve big monolithic columns are perfect, the entasis true and the fluting beyond praise. Greek profiles in granite are usually sad sights, but in this case are absolutely true to my drawings.

Your foreman setter and rigger, Legner, seems to be a genius, and he had a fine crew.

After my visit to your plant and an inspection of your methods and equipment last fall, I had high hopes of the success of the work; these have been completely fulfilled.

It is rare to find such quality added to rapid execution and pleasant business relations, and this experience I trust will not be our last.

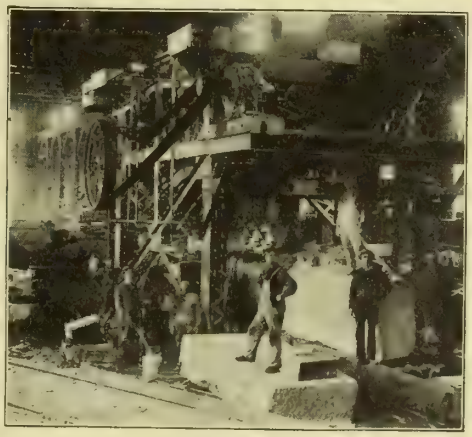
Very truly yours,
H. VAN BUREN MAGONIGLE.

Among other practitioners for whom this Company has executed contracts are:

McKim, Mead & White, New York
Henry Bacon, New York
H. P. Knowles, New York
Harry A. Jacobs, New York
John T. Windrim, Philadelphia
J. C. M. Shirk, Philadelphia

Estimates.

This Company solicits the opportunity to figure on the designs of architects for mausoleums or monuments of any size.



GRANITE SAW
Installed in Plant at Barre, Vt.

MAUSOLEUM FOR JOHN H. CORE ESTATE AT NORFOLK, VA.
H. V. B. MAGONIGLE, Architect
Granite cut and erected by the PRESBREY-COYKENDALL CO.

THE GEORGE DODDS & SONS GRANITE CO.

MILFORD, MASS. XENIA, OHIO KEENE, N. H.

THE MILFORD PINK GRANITE CO.

MILFORD, MASS.

THE VICTORIA WHITE GRANITE CO.

KEENE, N. H.

Products.

MILFORD PINK GRANITE and VICTORIA WHITE GRANITE, for Exterior and Interior Building purposes, Bridges, Monuments, Mausoleums and Statuary.

Also, PAVING BLOCKS, and CRUSHED GRANITE for Stucco Work.

Milford Pink Granite.

This is a fine and close-textured granite of a pleasing pink color, toned down by gray quartz and diversified by dark, greenish black flecks of a chloritic black mica.

Milford Pink Granite has a low absorption tendency, and a compressive strength of about 30,000 pounds per square inch.

It is admirably adapted for rock faced tool-dressed and polished work, and permits the production of sharp corners and angles.

"The stone," writes George P. Merrill, in his "Stones for Building and Decoration," "is strong beyond all possible requirements, and is justly regarded as one of our best and most desirable granites for general building, ornamental or decorative work."

Victoria White Granite.

This is of a light warm gray, nearly white, color, and is as fine in texture as many marbles. It is eminently durable, free from flaws and from sap, iron, sulphur and all other mineral stains.

Victoria White Granite is recommended for statuary, general building and monumental work.

PENNSYLVANIA TERMINAL STATION, NEW YORK, N. Y.
McKIM, MEAD & WHITE, Architects
Built of Milford Pink Granite from THE MILFORD PINK GRANITE Quarries and Plants, Milford, Mass.

C. W. POST MAUSOLEUM, OAK HILL CEMETERY, BATTLE CREEK, MICH.
CARRERE & HASTINGS and THEODORE E. BLAKE, Architects
Built entirely of Victoria White Granite from Quarries and Cutting Plants of THE VICTORIA WHITE GRANITE Co., Keene, N. H.

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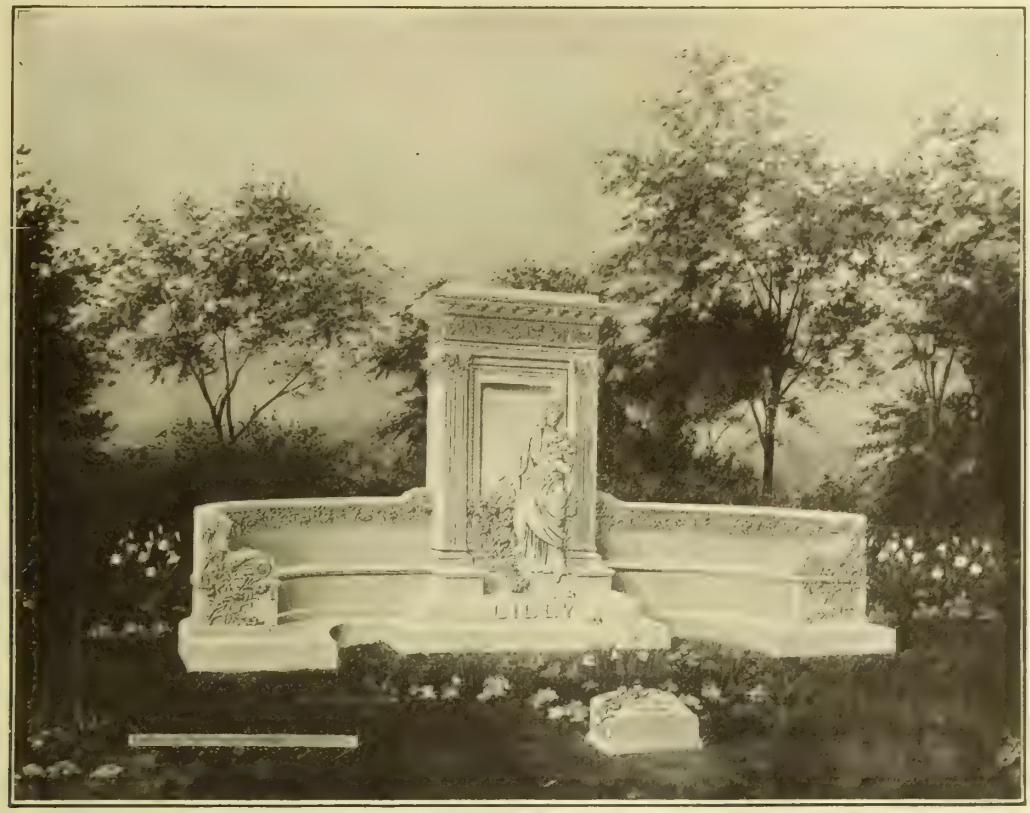

LILLY EXEDRA MEMORIAL, MAPLE GROVE CEMETERY, ANDERSON, IND.
Designed and executed by The George Dodds & Sons Granite Co. of Victoria White Granite

A PARTIAL LIST OF REPRESENTATIVE INSTALLATIONS

MILFORD PINK GRANITE

Building	Location	Architects
Madison Square Garden	New York, N. Y.	McKim, Mead & White
Boston Public Library	Boston, Mass.	McKim, Mead & White
Equitable Building	Baltimore, Md.	Chas. L. Carson and Jos. Evans Sperry
City Hall	Worcester, Mass.	Peabody & Stearns
Columbia University Library	New York, N. Y.	McKim, Mead & White
Allegheny County Court House	Pittsburgh, Pa.	H. H. Richardson and Shepley, Rutan & Coolidge
Lafayette Monument	Paris, France	Carrère & Hastings
Adams Memorial	Washington, D. C.	Augustus St. Gaudens, Sculptor

VICTORIA WHITE GRANITE

New Manhattan Bridge Pylons	New York, N. Y.	Carrère & Hastings
L. C. Smith Mausoleum	Syracuse, N. Y.	Gaggin & Gaggin
Earnshaw Memorial	Spring Grove Cemetery, Cincinnati, Ohio	
Springfield B. & L. Association Building	Springfield, Ohio	W. K. Shilling
Whaler's Monument	New Bedford, Mass.	George Julian Zolnay, Sculptor, Washington, D. C.
Foster Memorial Statuary	Middleburgh, N. Y.	Henry Bacon
Post Office Building	Saratoga Springs, N. Y.	
Carnegie Library	Burlington, Vt.	
Naval Hospital	Newport, R. I.	
Carew Mausoleum	Spring Grove Cemetery, Cincinnati, Ohio	Tietig & Lee

THE GEORGE DODDS & SONS GRANITE CO.

Hartley-Given Mausoleum	Pittsburgh, Pa.
J. A. J. Brunt Mausoleum	Anderson, Ind.
Wm. H. Hayner Mausoleum	Troy Ohio
George W. Harper Mausoleum	Cedarville, Ohio
Kitselman Mausoleum	Muncie, Ind.
St. Clair Memorial	Greenville, Ohio
McCleary Monument	Ashland, Ky.
Wood Mausoleum	Washington, D. C.
Soldier's Monument	St. Mary's, Ohio
Houston Mausoleum	South Charleston, Ohio
Onions Monument	Youngstown, Ohio
Schaefer Memorial	Dayton, Ohio

ORGANIZED 1864

C. HARRY ROGERS, Treasurer and Manager

ROCKPORT GRANITE COMPANY

Dealers in Rough and Finished Granite

NEW YORK, N. Y., 21 Park Row
BOSTON, MASS., 31 State Street
CHICAGO, ILL., Chamber of Commerce Building
WINNIPEG, CAN., Represented by N. J. Dinnen Co.

ROCKPORT MASS.

QUARRIES
ROCKPORT, MASS., BAY VIEW, MASS., PIGEON COVE, MASS., LEBANON, N. H.
JONESPORT, ME.

Products.

Quarriers and producers of Rockport Red, Gray and Sea-Green Granites for the better class of buildings, and for Bridge Work, Breakwaters, Wharves, etc.

Also, manufacturers of Granite Paving Blocks.

Facilities.

The plant of the Rockport Granite Company consists of more than 800 acres of quarry land, finishing, cutting and polishing sheds, wharves, and a fleet of sloops, schooners, barges, towboats, and lighters. The Company also charters the best class of coasting schooners, barges and steamers up to 2,500 and 3,000 tons. This enables them to handle contracts of any size promptly and at moderate cost, particularly to the seacoast cities, where water transportation gives them a decided advantage over inland competitors. At the quarries and sheds every modern appliance is utilized that will facilitate the quarrying, building-stone cutting, and carving work. These appliances include air compressors with an aggregate capacity of 6,500 cubic feet of free air per minute, forty large modern steam derricks, many of which are capable of hoisting over seventy-five tons, hoisting engines of the latest type. Newly equipped electric-drive polishing mill, with large polishing wheels, lathes, surface cutters, etc. From 800 to 1,000 men are employed.

Rockport Granite.

Rockport Granite—"the Granite of Character"—is a true Hornblende granite, composed as indicated in test data below, and resembling in composition the Egyptian granite from which ancient obelisks and sarcophagi were built. It is of decided toughness, firm and uniform in texture, of high crushing test, free from impurities, enduring in color, and susceptible to a beautiful and lasting polish.

Tests.

(I) Characteristics. (Compare with General Test III, below):

United States Department of Agriculture
Office of Public Roads, Washington, D. C.
Division of Tests. July 18, 1913.

Report on Sample No. 6893 No. 4 of road material from Essex County, Mass.

Rockport

Made at the request of Rockport Granite Company.
Material—Plutonic Rock. Name—Biotite Granite.

Determinations

Specific gravity	2.65	
Weight per cubic foot	165.	pounds
Water absorbed per cubic foot	0.24	pounds
Per cent of wear	3.8	
French coefficient of wear	10.5	
Hardness	18.8	
Toughness	10.	

Crushing strength 22,670 pounds per square inch (* Note)

Remarks—This is a very hard rock, showing average resistance to wear.

* Note—Crushing strength tests made on cylinders 1.75 inches in diameter and 2 inches high

(II) Composition:

United States Department of Agriculture
Office of Public Roads, Washington, D. C.
Division of Tests. July 16, 1913.

Mineral Analysis of Sample No. 6893 No. 4 of rock from Essex County, Mass.

Rockport

Made at the request of Rockport Granite Company.
Character of Material Plutonic Rock Name—Biotite Granite.

Essential Minerals

Name	Composition	Per Cent
Orthoclase	silicate of alumina and potash—	65.4
Plagioclase	silicate of alumina and soda —	
Quartz	silica	22.3
Biotite	hydrous silicate of alumina, iron, magnesia and potash	8.3
	Accessory Minerals	
	Secondary Minerals	
	hydrous silicate of alumina	4.0
	Total	100.0

Remarks—Specimen is a light gray granite.

(III) General Test:

United States Department of Agriculture
Office of Public Roads
Division of Tests

MAXIMUM AND MINIMUM RESULTS ON ROCK SAMPLES

No. of Samples	Name	Specific Gravity Max.	Min.	Av.	Weight, Pounds per Cubic Foot Max.	Min.	Av.	Water Absorbed, Pounds per Cubic Foot Max.	Min.
223	Granite	3.00	2.00	2.65	187	125	165	2.77	0.04

Per Cent of Wear Max.	Min.	French Coefficient of Wear Max.	Min.	Hardness Max.	Min.	Toughness Max.	Min.	Cementing Value Max.	Min.	Name
24.6	1.1	37.0	1.6	19.6	13.6	32	2	255	2	Granite

Co-operation and Estimates.

Samples furnished to architects. Opportunity is solicited to submit prompt and reliable estimates from plans and specifications.

Carving Qualities.

Particularly significant of the toughness and carving quality of Rockport Granite is the fact that Prof. John H. Sears, Peabody Academy of Science, was able, in his microscopic studies of this stone, to make sections of it 1/700 of an inch thick.

References.

Among the recent contracts in which Rockport Granite has been used are the following:

Buildings

Boston Custom House Tower, Light Gray Granite; Peabody & Stearns, Architects
Woolworth Building, New York, N. Y., Polished "Sea Green"; Cass Gilbert, Architect
Registry of Deeds and Probate Court, Salem, Mass., Light Gray Granite; Clarence Blackall, Architect
National State Bank, Newark, N. J., Polished "Sea Green"; Cass Gilbert, Architect
Dr. A. G. Thomson Residence, Grassland, Pa., Red Moose-a-bec Granite; H. Brooks Price, Architect
Cook County Hospital, Chicago, Ill., Light Gray Granite; Paul Gerhardt, Architect
Washington Trust Co., Chicago, Ill., Polished "Sea Green"; C. A. Eckstrom, Architect
Delaware, Lackawanna & Western R. R. Terminal, Buffalo, N. Y., Moose-a-bec Red Granite; Kenneth Murchison, Architect
Lehigh Valley Railroad Terminal, Buffalo, N. Y., Light Gray Granite; Kenneth Murchison, Architect
Old State National Bank, Evansville, Ind., Polished Moose a-bec Granite; Adolf Scherrer, Architect
And many others.

Monuments

Schenley Memorial, Pittsburgh, Pa., Polished "Sea Green"; Victor Brenner, Sculptor
President Tyler Monument, Richmond, Va., Light Gray Granite; Raymond A. Porter, Sculptor

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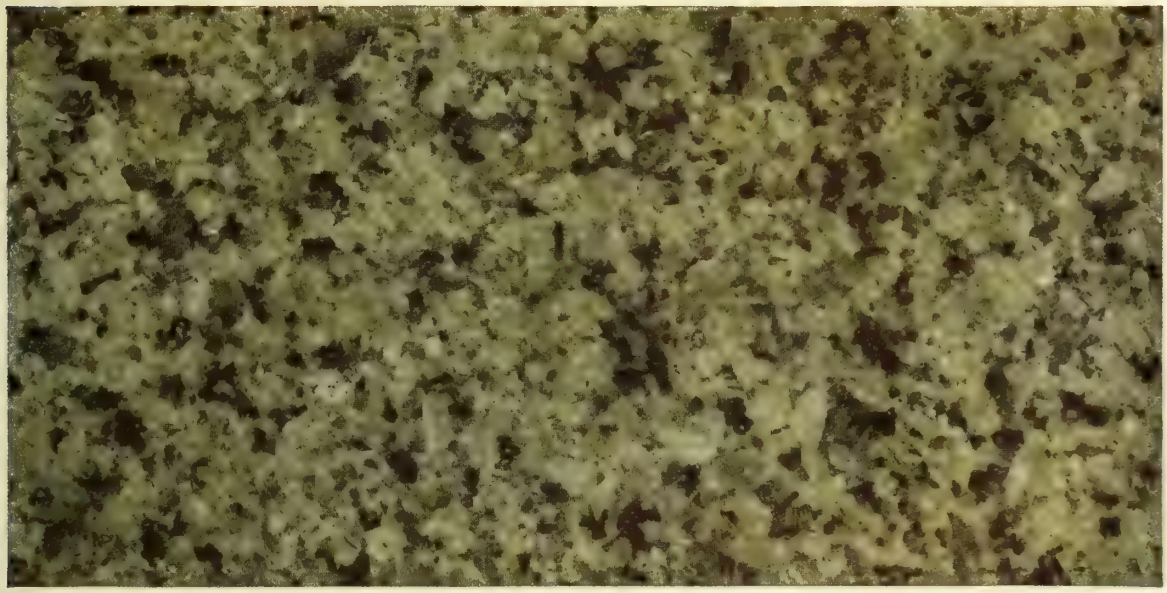
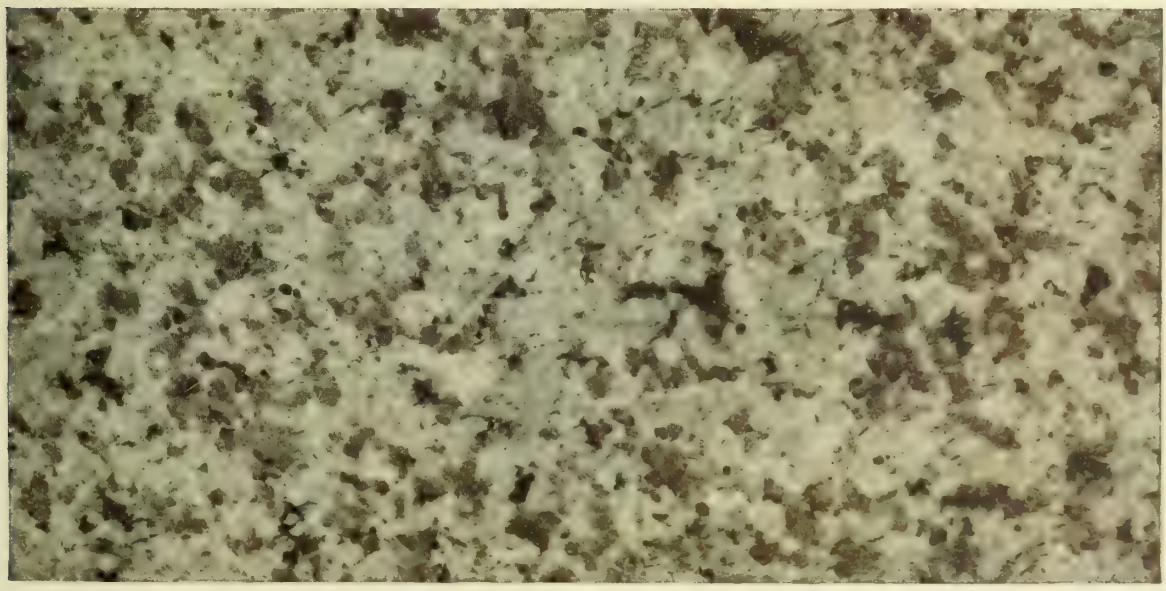
Pink



Green



Gray

TYPICAL COLOR EXAMPLES OF ROCKPORT GRANITE

THE JOHN SWENSON GRANITE CO.

Concord Granite

CONCORD, N. H.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue ST. LOUIS, MO., Fullerton Building

Product.

CONCORD GRANITE, ROUGH or FINISHED, for Buildings and Memorials.

Co-operative Service.

Granite is, without doubt, the most enduring and dignified of all building stones. Its possibilities for effective use are, however, greater than is commonly recognized. This is because its cost is often unnecessarily increased by the adoption of too fine a finish and of a system of jointing not characteristically practical for granite.

This organization will gladly co-operate with architects and others in the study of their granite problems, and places the entire facilities of its "Service Bureau" at their disposal.

Concord Granite.

Concord Granite is light gray and of fine, firm and remarkably even texture. The normal essential components are quartz, feldspar, muscovite (white mica), and biotite (black mica). Muscovite, although commonly called the white mica, is here of a soft, brownish shade, giving the stone as a whole a warmer tone than is usual with granites of this class. Concord Granite is susceptible of a good and lasting polish, and is remarkable for the ease with which it can be worked.

Strength—Definite tests have been made to determine the resistance to compression. A three-inch cube was crushed at the Watertown Arsenal, with the following results: On bed, or at right angles to the rift, total load 289,500 lbs., or 30,830 lbs. per square inch. On edge, or parallel with the rift, total load 224,000 lbs., or 23,860 lbs. per square inch.

Durability—Specially contributing to make this granite durable and weatherproof, are: *first,* its unusual strength; *second,* the absence of sensible porosity, making it non-absorptive and insusceptible of injury by frost action; and *third,* the absence of pyrite or other oxidizable or perishable minerals.

Finishes and Relative Cost.

Cost of granite depends considerably upon the character of cutting of exposed faces. The types of finish for exposed faces from coarsest to finest are: (1) rock-face (natural quarry face); (2) pointed; (3) pean-hammered; (4) four-cut; (5) six-cut; (6) eight-cut; (7) ten-cut; (8) rubbed; (9) polished. The cost of these finishes rises in numerical succession, No. 1 being the cheapest, and No. 9 the most expensive.

To finish No. 6, which is eight-cut, costs approximately ten per cent more than to finish No. 5, which is six-cut; to finish No. 5, which is six-cut, costs approximately ten per cent more than to finish No. 4, which is four-cut. The relative costs of the other finishes vary in the same ratio.

Ten-cut and rubbed finishes are used principally for monumental purposes. These finishes, and even eight-cut finish, are unnecessarily fine for building purposes. Six-cut work for the lower portion of a building and four-cut work for the upper portion produce an excellent effect. Four-cut finish at approximately fifteen feet above the ground level will have about the same appearanc as six-cut work on a line with the eye.

A polished base-course, where the base is along a walk, is ultimately cheap, as it remains clean.

Ashlar Facing.

For the ashlar facing of a building, alternate courses of four inches and eight inches produce a perfect bond with the backing; and as four inches of ashlar can be sawed, a considerable saving is made in stock, freight and hauling.

Specification Notes.

Finish—The main walls up to (certain height or course) shall have a six-cut finish; all granite above that point shall have a four-cut finish.

Thickness of Courses—All granite to be of thickness as shown on detail; ashlar facing to be four inches and eight inches thick in alternate courses.

Beds and Joints—All stones to be cut at right angles to face for a distance of one inch from face; balance of beds to be cut so that one stone when set on another will balance without wedging from the back. Joints may fall away not over two inches from a point one inch back of face.

Facilities.

The exceptional facilities of this Company's plants including power saws of the latest model, insure economy and dispatch in the filling and shipping of all orders.

Shipments can economically be made to all parts of the United States.

REFERENCES

BUILDING AND ARCHITECT

Office Buildings

Germania Life Insurance Co., New York, N. Y., D'Oench & Yost
Railway Exchange, St. Louis, Mo., Mauran, Russell & Crowell
Amicable Insurance Co., Waco, Tex., Sanguinet & Staats

Banks

German Savings Bank, Davenport, Iowa, F. G. & R. J. Clausen
[illegible] Pa., Samuel Hannaford & Son
Citizens' National Bank, Frederick, Md., J. A. Dempwolf

Residences

Mrs. Eleanor Elkins Widener, Newport, R. I., Horace Trumbauer
Adolphus Busch, St. Louis, Mo., Widmann & Walsh

BUILDING AND ARCHITECT

Public Buildings

Post Office and Court House, Dayton, Ohio, James Knox Taylor
State House, Concord, N. H., Peabody & Stearns
City Hall, Yonkers, N. Y., E. A. Quick & Son
Ives Memorial Library, New Haven, Conn., Cass Gilbert
Lehigh County Court House, Allentown, Pa., R. S. Rathbun

Churches

Roman Catholic Cathedral (Portion of), St. Louis, Mo., Barnett, Haynes & Barnett
First Church of Christ, Scientist, Providence, R. I., Howard Hoppin
Rodef Sholem Synagogue, Pittsburgh, Pa., Palmer & Hornbostel

WOODBURY GRANITE COMPANY

Vermont Granites for Building, Monumental and Structural Purposes

SELLING OFFICE
NEW YORK, N. Y., 101 Park Avenue

HARDWICK, VT.

QUARRIES
WOODBURY, VT.
BETHEL, VT.

CUTTING PLANTS: HARDWICK, NORTHFIELD, BETHEL, VT.

Products.

GRANITES FOR BUILDING PURPOSES:

WOODBURY GRAY GRANITE, a standard light gray granite—"The Stone of the Chicago City Hall."

VERMONT WHITE GRANITE, a white gray granite. See the Northwestern Insurance Building, Milwaukee.

BETHEL WHITE GRANITE, the whitest and purest granite known—"The Stone of the Wisconsin State Capitol."

GRANITES FOR MONUMENTAL PURPOSES:

BASHAW GRANITE, a clean light gray Woodbury granite—"The Monumental Granite of the Age."

IMPERIAL BLUE GRANITE, a fine-grained, dark bluish-gray granite—"The Blue That Will Not Fade."

PEERLESS WHITE GRANITE, from Bethel, Vermont—"Century Endurance; Ivory Whiteness."

GRANITES FOR CONSTRUCTION PURPOSES:

CRUSHED GRANITE, either WOODBURY GRAY or BETHEL WHITE, screened to size, for concrete or artificial stone, at a low price.

BRIDGE STONE, GROUT, RIP RAP, RANDOM ASHLAR, and QUARRY WASTE, shipped promptly in any desired quantity.

PAVING BLOCKS, in any quantity.

Rough Granite.

Any of our granites furnished in the rough, in carload shipments, to the monumental or building trade, in sizes up to the limit of transportation. Quick deliveries.

Polished Granite.

Our polishing equipment is the largest in the trade. No material is more suitable for a city building than polished granite, for it retains its color and brilliance, and remains clean. Quick deliveries.

ANALYSIS OF GRANITES

	WOODBURY GRAY	BETHEL WHITE
Silica	70.75	72.70
Oxides of Iron	2.70	Trace
Alumina	15.80	18.35
Lime	2.03	2.80
Magnesia	1.35	....
Soda	3.88	4.52
Potash	3.46	.95
Loss at red heat	.35	.60
	100.32	99.92

Granite Columns and Monoliths.

Our heavy sheet quarries are especially suitable for producing large columns or monoliths. Any size to the limit of transportation can be had promptly. We have lathes that will turn columns 36 feet in length and 7 feet in diameter.

Setting.

We maintain our own setting crews and equipment, and are prepared to contract for granite work set in place. This method of placing granite contracts, definitely fixes responsibility for the work and enables our organization to achieve satisfactory results.

Organization.

Our capital is $1,000,000. No contract too large or too small. Careful draughting, well-equipped plants and quarries, efficient methods of production. We have handled many of the largest granite contracts of recent years.

Deliveries.

We operate four large quarries and two modern stone-cutting plants, equipped with electric power and unit motor drives. Overhead electric cranes, McDonald machines, surfacers, saws and air tools for rapid production and handling of our products. The capacity of our plants is 3,500 cubic feet of finished work per eight-hour day. Blocks of any size.

References.

The following is a partial list of prominent public buildings in which Woodbury Granite Company's Products were used:

WOODBURY GRAY GRANITE

Pennsylvania State Capitol, Harrisburg, Pa.
Kentucky State Capitol (base course and interior polished columns)
Iowa State Capitol (steps and platforms)
Idaho State Capitol (main entrance)
Michigan State Capitol (steps and platforms)
City Hall, Chicago, Ill.
City Hall, Cleveland, Ohio

VERMONT WHITE GRANITE

Northwestern Insurance Building, Milwaukee, Wis.
Museum of Fine Arts, Minneapolis, Minn.
Bridgeport Trust Co., Bridgeport, Conn.
Soldiers and Sailors Memorial, Wichita, Kan.

BETHEL WHITE GRANITE

Union Station, Washington, D. C.
Post Office, Washington, D. C.
Wisconsin State Capitol, Madison, Wis.
State Library, Hartford, Conn.
City Hall, Hartford, Conn.
Western Union Building, New York, N. Y.

C. F. WEBB, President H. H. SHERMAN, Vice-President L. E. THOMPSON, Treasurer

WEBB GRANITE & CONSTRUCTION CO.

QUARRIES
MARLBORO, N. H.
FITZWILLIAM, N. H.

WORCESTER, MASS.

CUTTING PLANT
FITZWILLIAM, N. H.

BRANCH OFFICES

PHILADELPHIA, PA., Frank H. Schilling, Representative, 614 Hale Building

CHICAGO, ILL., Donald S. Michelsen, Representative, People's Gas Building

Products.

Webb Gray Granite, for all Building purposes.

Marlboro Granite, for Building and General Construction purposes.

Crushed Granite, for Concrete Work and Road Building.

Bridge Stones, for Caisson work—abutments, arches, railings, etc.

Paving Blocks, for Street Paving.

Curbing, all widths and depths, dressed and rough.

Description of Granite.

Webb Gray Granite—Quarried at Fitzwilliam, N. H., is a very light gray, fine-grained granite, uniform in color and texture. In compression and absorption tests it compares favorably with any of the better grades of granite. Recent analysis and result of tests made are printed on opposite page. Being of finer grain and lighter color than the average gray granite, this combined quality of tone and texture makes Webb Gray Granite particularly adaptable for fine mouldings, delicate carving and other ornament.

Marlboro Granite—Quarried at Marlboro, N. H., is a little deeper gray than the Fitzwilliam, and the grain, while more pronounced, is not quite so fine.

Finishes.

While a polished surface on either of these granites may be obtained in instances where contrast is required, this Company does not recommend polishing to any extent, but prefers to supply the gray granite only in the cut finish for which its qualities pre-eminently fit it.

Any one of several finishes may be selected, according to design or use intended: pointed; 4-cut, 6-cut, 8-cut, 10-cut; rubbed, polished or rock face. For suitable finishes, this Company offers the following recommendations:

Cut Work (or Hammered)—Produced by patent bush hammer, with interchangeable sets of cutting blades, 4 blades for 4-cut finish, 6 blades for 6-cut, etc. Hammers are wielded by hand or in surfacing machines, the latter method being less costly owing to the fact that larger surfaces can be thus more economically worked than if done by hand. Mouldings, chamfers, washes, arrises, returns, checks and rebates are produced by hand methods, and are, consequently, more expensive.

The 6-cut finish is recommended for the average run of work; 4-cut, for large scale work; 6-cut, for reveals and work close to the eye; 8-cut, for small scale design, with fine mouldings and delicate ornaments. The 10-cut finish is not desirable or necessary, except for very fine, close work, such as monuments or memorials with very delicate detail and ornaments.

Cost—For work done by hand, the cost ranges from the 4-cut (lowest cost) to the 10-cut (highest); but the Webb Granite & Construction Co. will, with its special sawing equipment, produce the larger plane surfaces (either 4-, 6- or 8-cut) with very little difference in expense.

Rock Face—This finish is produced by splitting vertically with shims and wedges, leaving a fresh split face free from tool marks, and showing the natural color and texture of the granite. Both of the above described granites are well adapted for this treatment, either flat or bold rock faces being produced at minimum cost. Rock faced work in conjunction with cut work has a decidedly ornamental value.

Rubbed and Polished Finish—Methods of producing these finishes are described under Milford Granite in the pages of the Webb Pink Granite Co. This Company does not recommend the rubbed finish on its gray granite except in special cases. Experience shows that a rubbed surface is more quickly and noticeably soiled than any other finish.

Polished finish is recommended on these granites only when contrast is desired; and the best and most uniform results are obtained if the sizes of the individual stones be kept down to a minimum, with the course heights preferably not greater than two feet.

Facilities.

Quarries—The quarries at Fitzwilliam and Marlboro, N. H., comprise about one hundred acres each. Both quarries are completely equipped with derricks, with ample capacity for handling blocks varying from ordinary size to thirty tons. Complete compressed air plants are installed at each quarry, and all hoisting and drilling is done by steam or compressed air. Each quarry is connected to railroad trunk lines by our own private tracks.

Plant—The Fitzwilliam plant is now fully equipped and possesses every possible facility for handling building contracts of largest size. The new cutting plant installed at Fitzwilliam has been in operation since April 1, 1915, and has greatly reduced the cost of production.

This plant is also completely equipped with modern granite working tools, including a "Chase" saw, and all work is handled by overhead electric cranes. The arrangement of this plant and its equipment is such as to insure unusual promptness in executing contracts, large or small.

Special Note—The combination use of the "Chase" saw and surfacing machines produces a more perfect plane surface than can be produced commercially any other way, and at less cost. It almost entirely eliminates the possibility of a so-called

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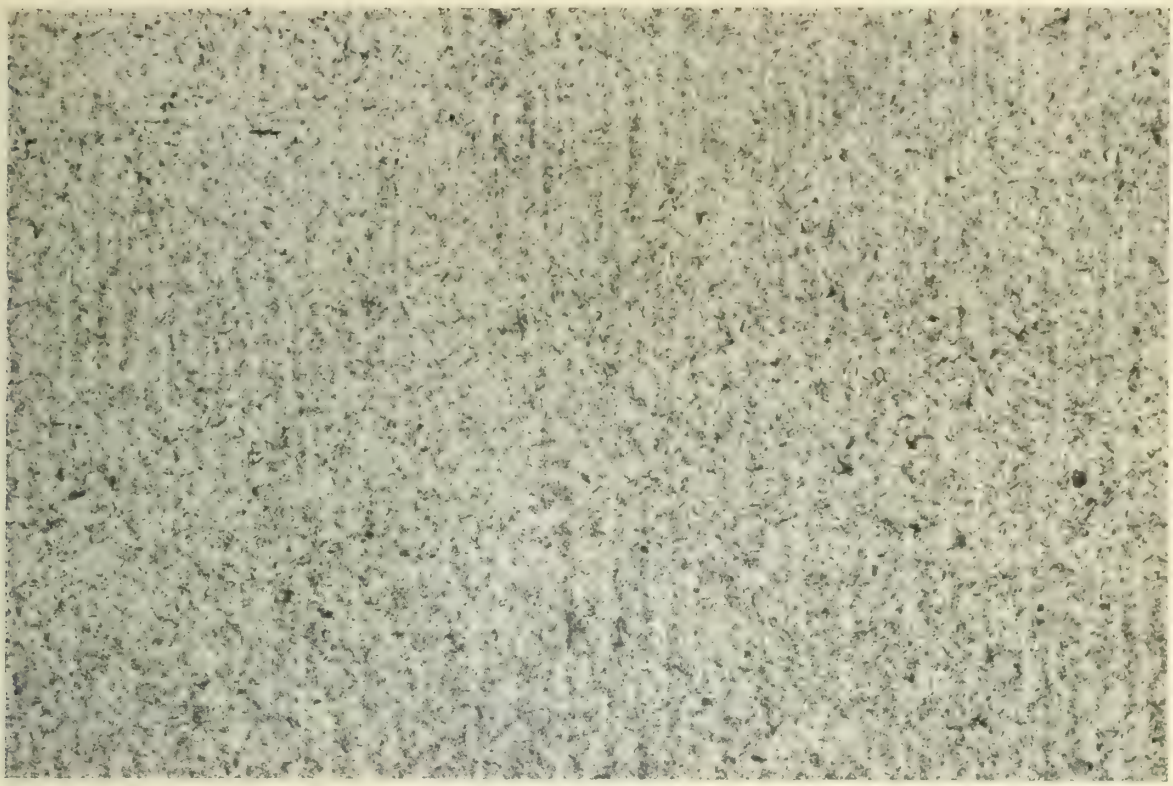


WEBB GRAY NEW HAMPSHIRE GRANITE
Illustrating 6-Cut Finish

"wave" in cut work, and the surface is absolutely out of wind.

Crushing Strength.

The Watertown Arsenal has conducted tests on the granites of this Company. Six 3-inch cubes of Webb gray New Hampshire granite showed an average compression strength of 21,260 pounds per square inch.

Illustration.

This color sample of Cut Work, which is a faithful reproduction of tone and finish, is illustrated for the convenience of architects and others where it may be available for reference without the necessity of keeping individual samples of the material on hand. When desired for any purpose, this Company will be glad to furnish pieces of the actual granite.

Some Contracts Executed.

The following brief list gives the names and locations of some of the buildings in which this Company's granite has been used, together with the names of the architects of each:

BUILDING AND LOCATION	ARCHITECT
Newark City Hall, Newark, N. J.	J. H. & W. C. Ely Mowbray & Uffinger Associated
Cathedral of the Sacred Heart, Newark, N. J.	I. E. Ditmars
Gardner Savings Bank, Gardner, Mass.	Frost, Briggs & Chamberlain
Nanticoke National Bank, Nanticoke, Pa.	Reilly & Schroeder
Allentown Trust Co., Allentown, Pa	A. L. Leh
Industrial Trust Co., Pawtucket, R. I.	Angell & Swift
Montgomery Trust Co. Building, Amsterdam, N. Y.	Jackson & Rosecrans
First Church of Christ, Scientist, Boston, Mass.	Brigham, Coveney & Bisbee
First Congregational Church, Nashua, N. H.	A. P. Cutting
Terrace Work, Mt. St. Vincent on the Hudson, N. Y.	I. E. Ditmars
Onondaga County Court House, Syracuse, N. Y.	Archimedes Russel
Masonic Temple Base, Worcester, Mass.	Geo. C. Halcott
Worcester County Court House, Addition, Worcester, Mass.	Andrews, Jaques & Rantoul
Atlantic City Fire Station (Pol Base), Atlantic City, N. J.	S. Hudson Vaughn
U. S. Treasury Building (East Front), Washington, D. C.	J. Knox Taylor, Supervising Archt.
Central State Bank, Des Moines, Iowa	Mowbray & Uffinger

H. H. SHERMAN, President C. F. WEBB, Vice-President L. E. THOMPSON, Treasurer

WEBB PINK GRANITE COMPANY

WORCESTER, MASS.

BRANCHES

PHILADELPHIA, PA., F. H. Schilling, Representative, 614 Hale Building

CHICAGO, ILL., D. S. Michelsen, Representative, Peoples Gas Building

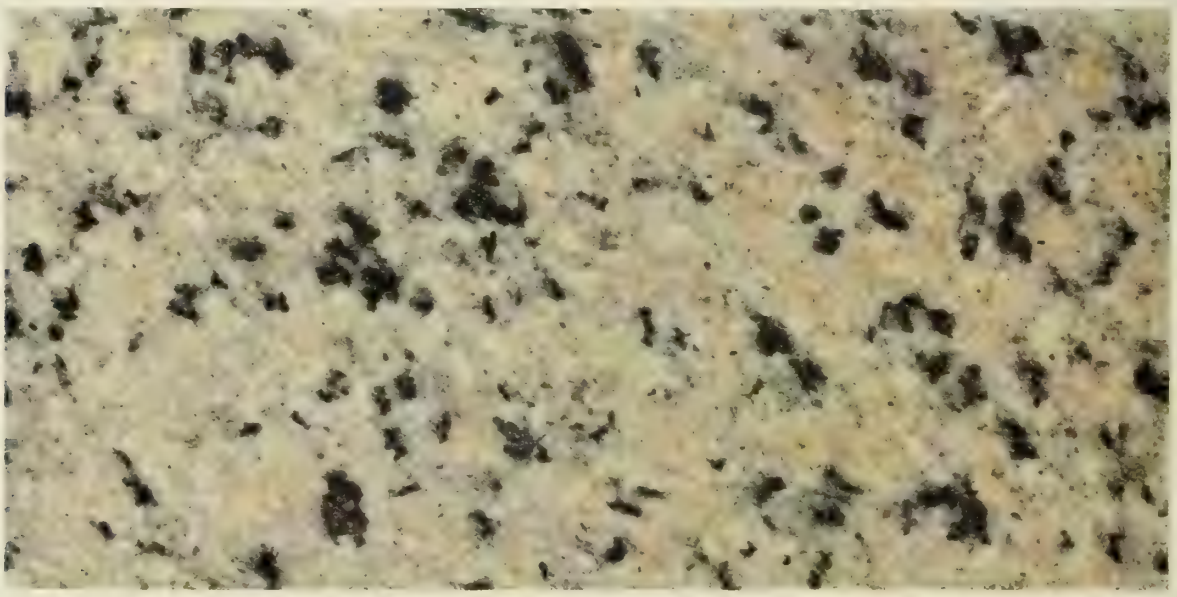
QUARRIES AND CUTTING PLANT: MILFORD, MASS.

Products.

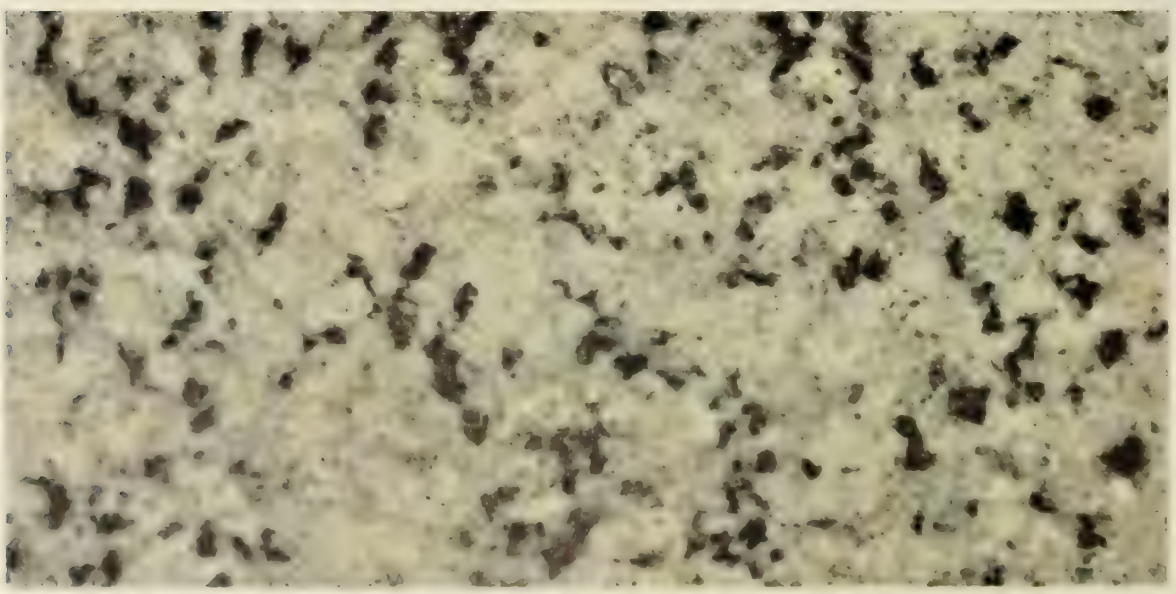
Webb Pink Milford Granite, Webb White Milford Granite—both from Milford, Mass.—Rough, Cut or Polished, for facings and constructional work of Commercial Buildings, Memorials, Balustrades, Approaches, and for other adaptable uses.

Description.

Webb Pink Milford—The Webb Pink Milford is a distinctive, warm-toned pink granite, having a uniform distribution of clear black spottings. This desirable combination contributes to the clean, clear-cut appearance of Milford Granite, which has made it a



WEBB PINK MILFORD GRANITE—POLISHED FINISH



WEBB WHITE MILFORD GRANITE—POLISHED FINISH

Sweet's Catalogue

Continued on next page

famous building material. It does not take a cold appearance with age; rather, grows warmer, more pleasing, as it ages.

Webb White Milford—The Webb White Milford has all the qualities of the Pink, except that the general cast of color is Creamy White, giving a clean whitish result, without losing its warmth of tone. It does not darken with age as do some lighter building stones.

Both grades are compact, close-grained granites, lending themselves equally well to fine moulding and carving, or to bold plain members and spaces.

Both are the hardest of building granites, take a beautiful polish, and have a very low absorptive tendency.

Color Samples.

The illustrations on opposite page give a faithful reproduction of tone and finish. When desired, pieces of the actual granite will be furnished. The example of White Milford illustrated, being polished, does not reveal its beautiful white cast when hammered. No illustration or sample gives an adequate idea of its appearance in mass in a building.

Finishes.

The following descriptions and recommendations, based upon long experience, are offered as an aid in selecting the most suitable finishes.

Both the Pink and the White Milford are adapted equally well to any of the various finishes used on granite, the selection being governed by the character of the detail and the scale of the design.

Cut Work—The process of producing cut or hammered work described in the pages of the Webb Granite & Construction Co., apply equally to both the Milford granites, except that owing to the greater hardness of the latter, each process takes longer and is therefore slightly more expensive than in the case of the gray granite. Fine detail and small scale designs call for the finer grades, while a larger scale design with bold detail and large spaces is more effectively brought out by using the coarser cuts.

Plane surfaces are produced at very low cost with our modern sawing equipment and surfacing machines, and with a maximum quality unequalled by any other method except at prohibitive cost. By making a proper study of the jointing it is possible to supply these high-class granites at prices very little above those of inferior granites.

Polished Finish—Plane polished surfaces are made from nearly perfect planes as produced by "Chase" saws, by rubbing these planes under large rotary polishing wheels with fine steel shot and carborundum, with water, to a perfectly smooth "honed" surface. The "honed" surface is then glossed with a heavy rotating "felt" wheel, using a specially prepared "putty powder," gradually bringing the surface to a perfect gloss and revealing all the beauties of color and grain.

Rubbed Finish—Produced by same treatment described for polished finish, omitting the "glossing," and the extent of the rubbing is determined by the grade of finish desired, from the coarse or "sand rubbed" to the "honed" surface which is as smooth and silky as the polished surface, without the gloss.

Relative Cost of Finishes.

In both rubbed and polished work, all members, checks, small returns and such are brought to the desired finish by hand methods from surfaces previously hammered with fine bush hammers, and consequently are much more expensive than larger plane surfaces produced by machine.

Rubbed work costs a little more than fine cut work, and polished work slightly more than rubbed, the differences due mainly to the amount of hand work required, while plane polished surfaces, by our methods, can be supplied at slightly greater cost than either rubbed or hammered.

We would emphasize the fact that the successive grades of hammering on these Milford Granites are equal generally to the next successive grades of hammering on finer grained or light or gray granite. For example, a 6-cut surface on our Milford would give a result equivalent to an 8-cut surface on a granite similar to the Fitzwilliam granite described in the pages of the Webb Granite & Construction Co. This is presumably due to the characteristic texture and marking of the Milford Granite.

Crushing Strength.

The Watertown Arsenal has conducted tests on the granites of this Company. Six 3-inch cubes of Webb Pink Granite showed an average compression strength of 29,235 pounds per square inch.

Facilities and Service.

The Webb Pink Granite Company owns about 350 acres of quarry land in Milford, Mass., with connections with main line of railroad. Quarries are equipped with electric power, compressed air and heavy duty derricks.

All the handling in the cutting plant is done with electric cranes and crane cars, affording economy and promptness in production. Two "Chase" saws are employed, each having an output equal to ten ordinary saws, enabling us to produce high-class Milford Granite at a price competitive with cheaper granites.

The quarries are always in shape to produce the requirements of any contract, no matter how large, in the shortest possible time. Time schedules are maintained religiously, service being our specialty. We offer suggestions on constructional jointing, which need not alter the design, whereby material economy is effected.

Some Contracts Executed.

The following brief list gives the names and locations of some of the buildings in which this Company's granite has been used, together with the names of the architects of each:

BUILDING AND LOCATION	ARCHITECT
New Post Office, New York	McKim, Mead & White
Cuyahoga Co. Court House, Cleveland	Lehman & Schmitt
New Castle Co. Court House, Wilmington, Del.	John D. Thompson, Jr.
Municipal Bldg., Wilmington, Del.	Palmer, Hornbostel & Jones, Associated Archts.
Allegheny Co. Court House (Alterations), Pittsburgh, Pa.	Alden & Harlow
New Equitable Bldg., New York	E. R. Graham
People's Gas Bldg., Chicago	D. H. Burnham & Co.
Buffalo Gas Bldg., Buffalo	Wood & Bradney
Jefferson Co. Savings Bank Bldg., Birmingham, Ala.	William C. Weston
First National Bank, Cleveland, Ohio	J. Milton Dyer
U. S. National Bank, Johnstown, Pa.	Mowbray & Uffinger
Union Station, Baltimore, Md.	Kenneth Murchison
Stock Exchange, Philadelphia	Horace Trumbauer

AMERICAN ENAMELED BRICK & TILE CO.

INCORPORATED 1893

Manufacturers of Enameled Brick Exclusively

Vanderbilt Concourse Building

TELEPHONES:
8787-8788 Murray Hill

52 Vanderbilt Avenue

CABLE ADDRESS:
"Amerebrick"

NEW YORK, N. Y.

Products.

Enameled Brick in Standard Sizes and Ornamental Shapes. (See plates.)

Territory.

The business operations of this firm cover the entire United States, Canada and South America.

Personal Representatives.

With our customers scattered over the United States and Canada, we have, in order to keep in closer touch with them, located representatives in all the principal cities to attend personally to inquiries, orders and deliveries.

Dispatch of Shipments.

Factory and office are in constant telephone connection with each other, and we have a local telephone exchange connecting every department of the factory for quick and systematic dispatch of business.

Shipping Facilities.

Our works, located but an hour's travel from the New York office, are situated so as to enable shipping over two of the largest railroads, viz., the Pennsylvania and the Central of New Jersey, and their connecting lines. We are also situated on tide water, so that shipments can be made by vessel.

Precaution Against Delay.

Every part of our factory, including machinery, has its duplicate, which prevents any possibility of delay caused by breakdowns, should they occur.

Capacity.

Our present capacity is *eight million brick* per annum, which will be increased as occasioned by the demand.

Stock.

The average stock on hand at our factory is more than *two million brick*, giving a large assortment for immediate delivery.

Illustrations of Stock Designs.

Much delay is saved by use of stock designs of moulded brick. In the following pages are shown designs that we recommend as being most satisfactory in manufacturing results. We try to keep a stock of these on hand, in standard colors and in English and American sizes.

These designs are chosen to reduce manufacturing difficulties and delays to a minimum; to enable composite mouldings to be made up; and to enable prompt filling of orders. No other manufacturer offers the variety we do. (See plates.) Two stock sheds are devoted exclusively to these specials.

As we are always improving our designs and adding new features, it is well to write us at the inception of your work.

Special Designs.

New designs of special moulded shapes are always an enigma when untried, and frequently afford insurmountable difficulties in avoiding the troubles they give, although an explanation of the cause is usually easy to find.

Colors, Bright, Medium or Matt Finish.

The accompanying color sheet shows but a few of the various colors and shades that we manufacture, it being impossible to illustrate all. We have therefore selected a few of the most popular.

This is particularly applicable to the Matt or Dull Finish product, of which there is a wide range of variety. If you have in mind at any time a particular color, shade or finish of enameled brick for interior or exterior purposes, and you find nothing shown on the color sheet that satisfies you, advise us of your ideas and requirements and we will be pleased to submit samples.

Catalogue

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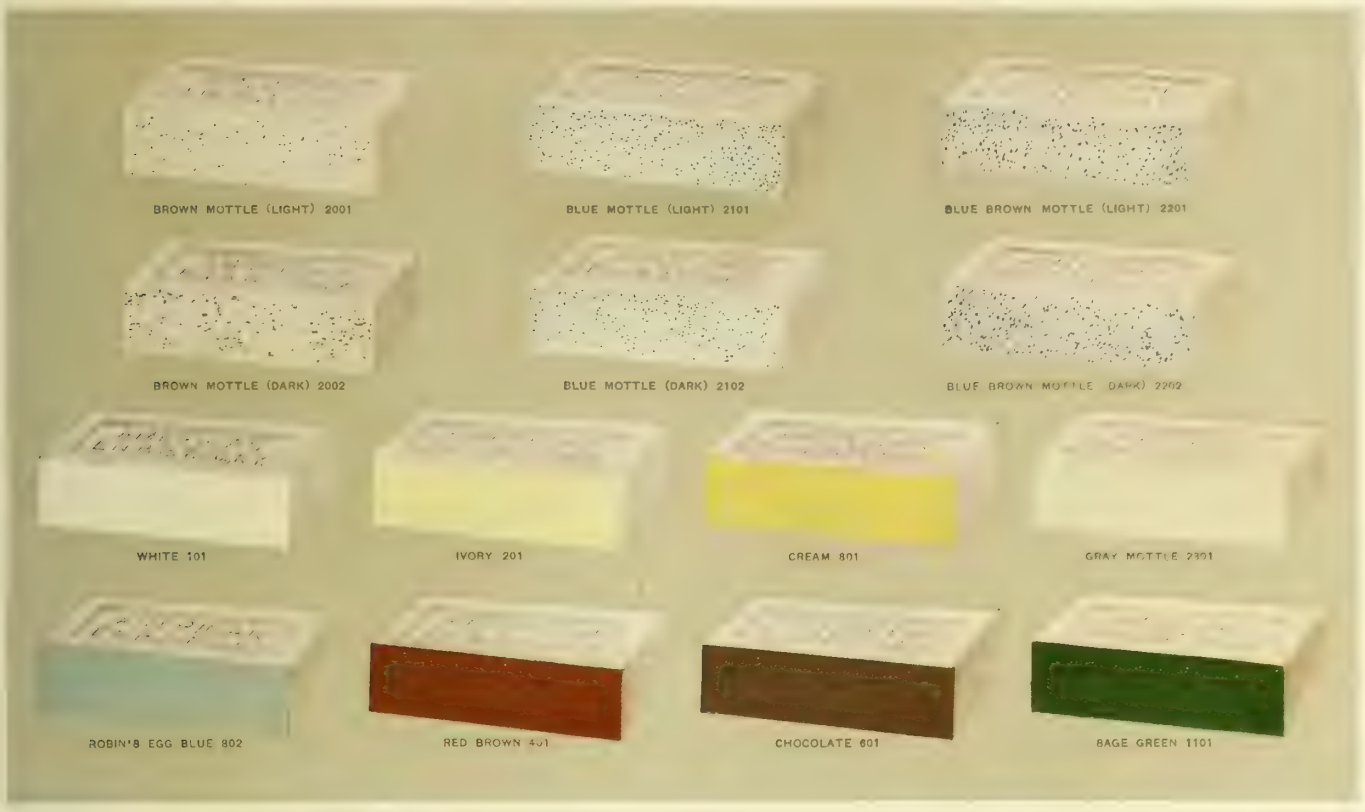

ABOVE COLORS CAN BE FURNISHED IN EITHER BRIGHT, MEDIUM OR MATT FINISH

Please note that each brick is numbered; this refers to the color or shade. Kindly refer to same when corresponding. The color is indicated by numerals, and shade by unit numerals. For example: we indicate White by No. 101, No. 102, No. 103 and No. 104. No. 101 is the lightest shade and No. 104 the darkest.

Uniformity of Shade.

We guarantee uniformity of shade in all first quality deliveries to the limit of practicability. Colors giving most uniform results are, in order of degree of uniformity, White, Sage Green and Red Brown. Other colors follow in irregular positions.

We will try on orders of moderate size, or on larger orders, if ample time be given, to match in shade the moulded and stretcher stock on any order, but can not always guarantee to uniformly shade shipments of specials, particularly on hurry orders.

N. B.—Uniform Shading in First Quality White, Brown, Sage Green, and Chocolate a specialty.

Special Features and Advantages of Our Enameled Brick.

In making our product we follow the English and Scotch systems, working by the soft mud process. This is without question the only process which insures durability and the closest relation of bond obtainable between body and glaze.

Our brick are burnt in but one fire, thus making the chemical change in the body and the glaze simultaneous.

Where manufacturers use the dry pressed process, the brick have to be burnt first as front brick before the enamel can be applied, and fired again for the fluxing of the glaze.

Where the enamel is applied on an already burnt brick and fluxed in a second fire, the bond is weak and peeling is sure to follow.

We use hard and durable glazes, not soft lead glazes frequently seen on inferior grades of Enameled Brick.

There has not been a single case during our twenty-two years of business where any peeling or discoloring has been seen or reported. This is better than any guarantee which we might be asked to give, as it covers a distributed output of over one hundred million brick, located all over the United States, Canada and South America, and subject to all varieties of climatic conditions.

Cleaning and Acids.

Enameled Brick are best cleaned with some alkaline solution, such as caustic soda or sodium carbonate. This cleans the enamel and does not affect the cement or lime mortar.

Acids—Sulphuric, nitric or hydrochloric acids, even in concentrated form, will not affect our glazes; but if used as a wash, even when diluted, they will attack the cement or lime mortar. The only commercial acids which will attack and destroy our enamel are hydrofluoric and hydrofluosilicic.

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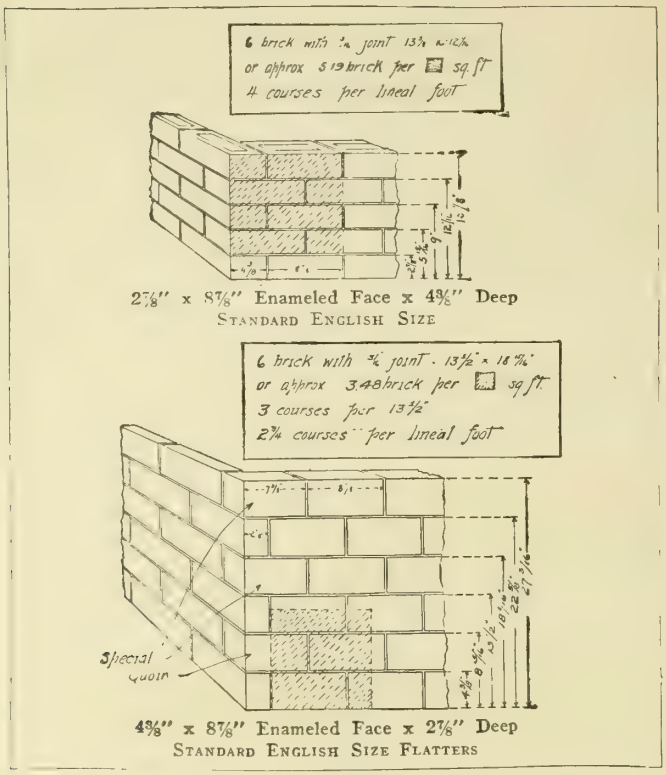
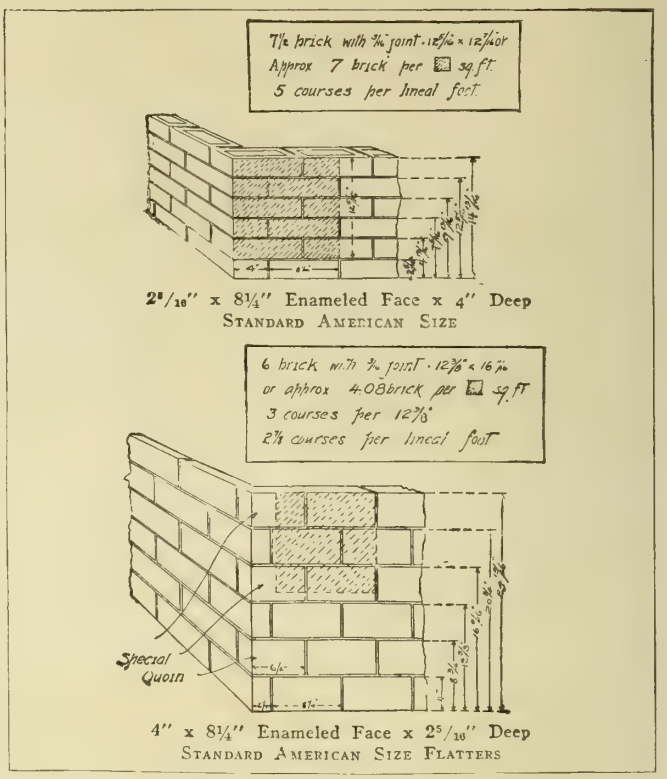


2⅞" x 8⅛" Enameled Face x 4⅜" Deep
STANDARD ENGLISH SIZE

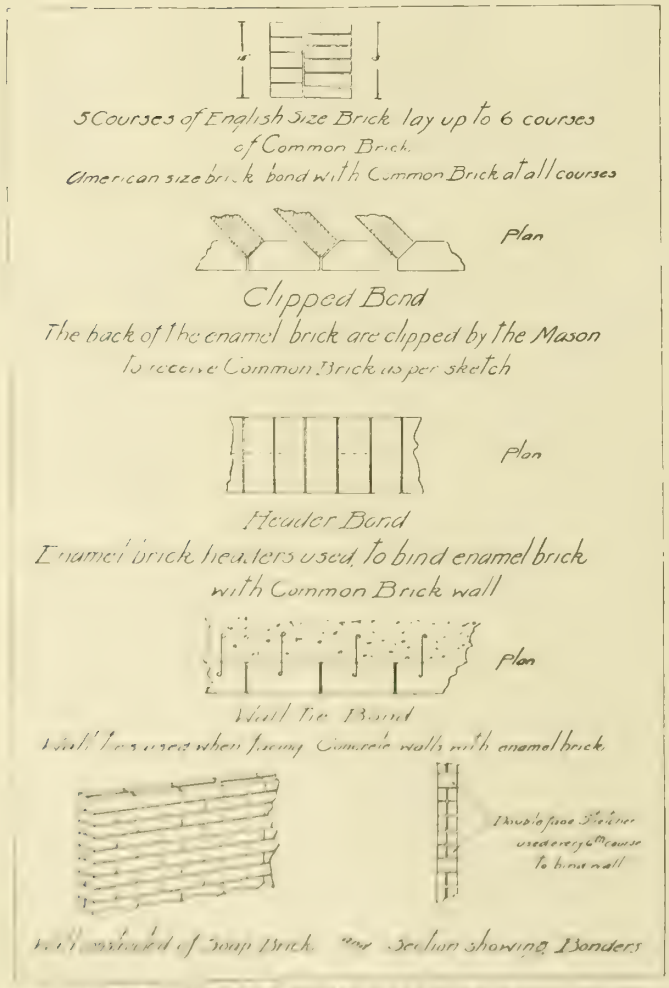
4⅜" x 8⅛" Enameled Face x 2⅞" Deep
STANDARD ENGLISH SIZE FLATTERS



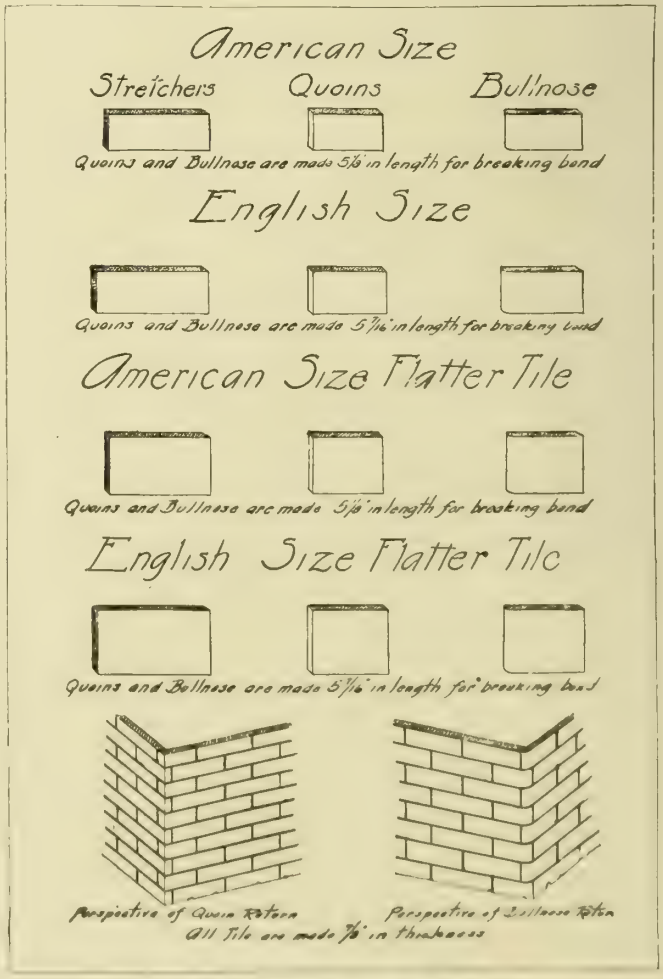
2⁵/₁₀" x 8¼" Enameled Face x 4" Deep
STANDARD AMERICAN SIZE

4" x 8¼" Enameled Face x 2⁵/₁₀" Deep
STANDARD AMERICAN SIZE FLATTERS

COMPARISON OF SIZES, SHOWING NUMBER OF BRICK PER SQUARE FOOT
All dimensions are approximate



SYSTEM OF BUILDING OR TYING ENAMELLED BRICK TO COMMON BRICK OR CONCRETE BACKING, ALSO METHOD OF BONDING SOAP BRICK FOR 4 INCH PARTITION



SPECIAL ⅞ INCH THICK SOAP TILE
Illustrating Stretchers, Quoins and Bullnose Returns; latter fabricated special size to break bond as shown

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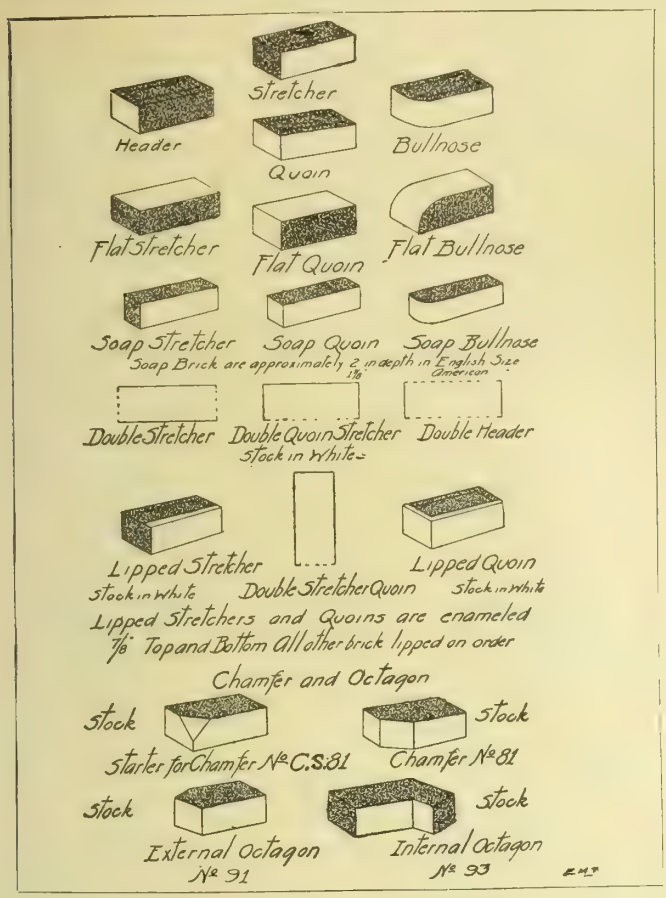
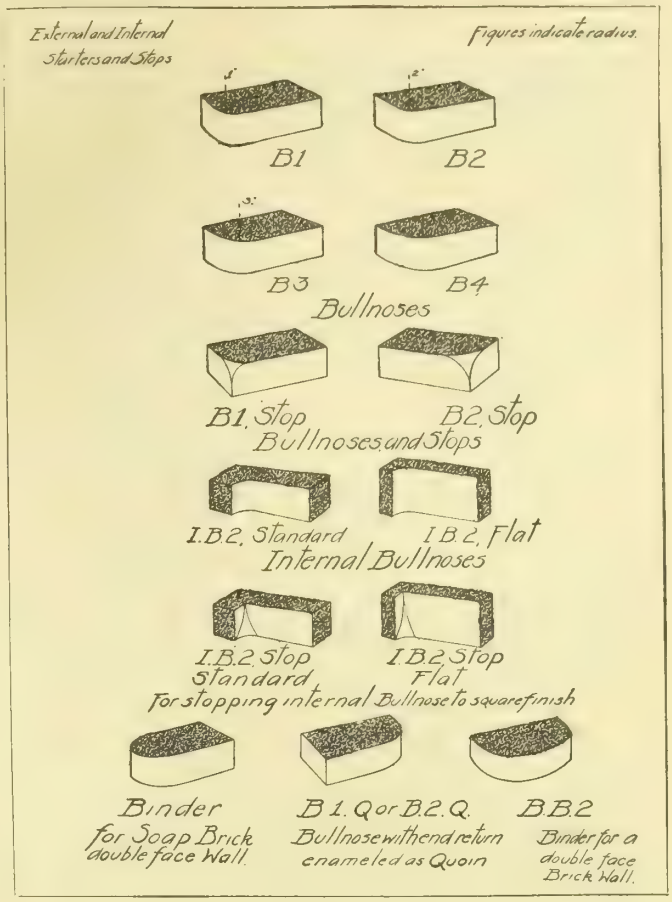
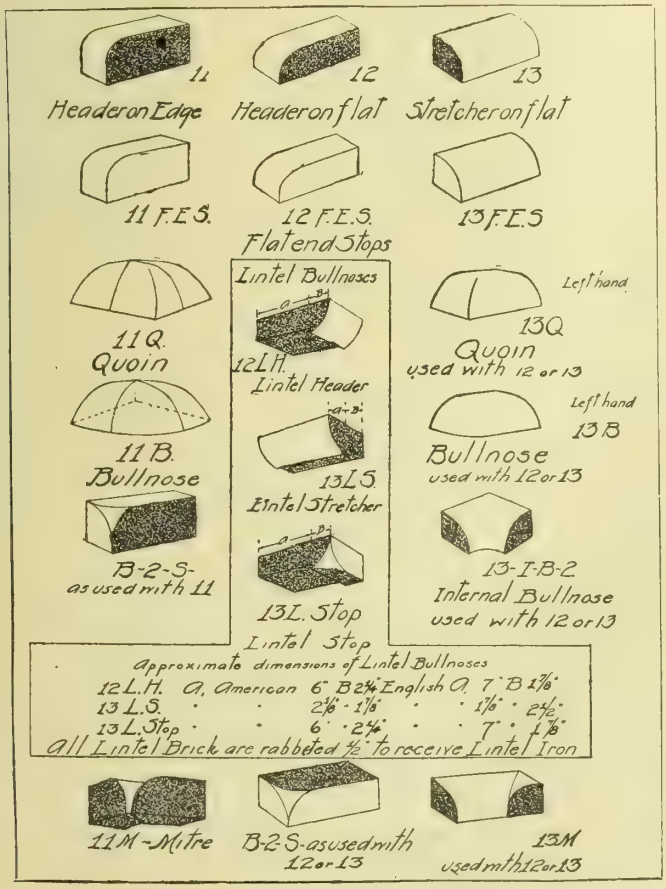


ILLUSTRATIONS OF TYPES

For projections and dimensions, see key, second page following
On Double Brick, shown above in plan, solid lines represent faces enameled; dotted lines represent faces not enameled



BULLNOSES AND STARTERS



BULLNOSE SPECIALS

COVE MOULD

For projection and dimensions, see key, second page following

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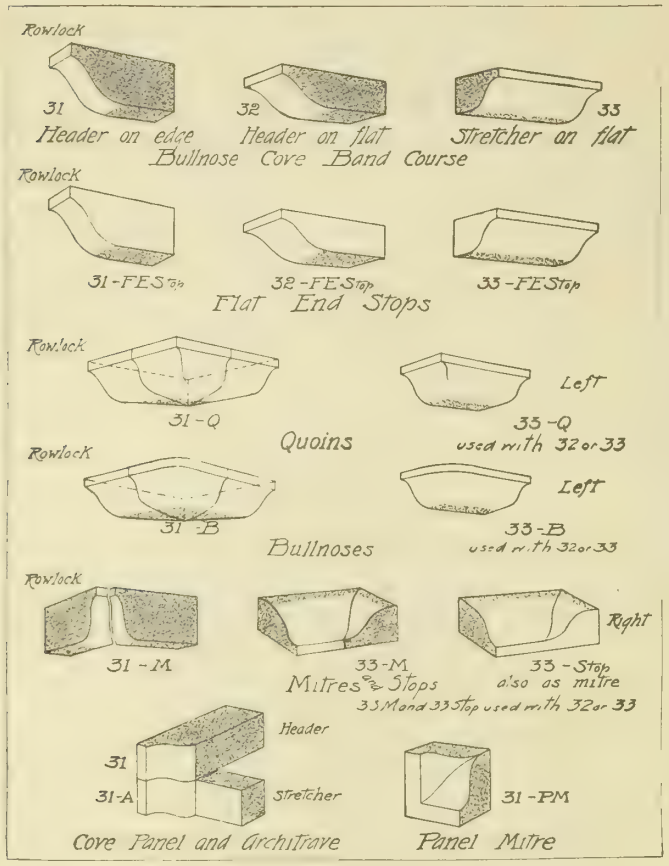
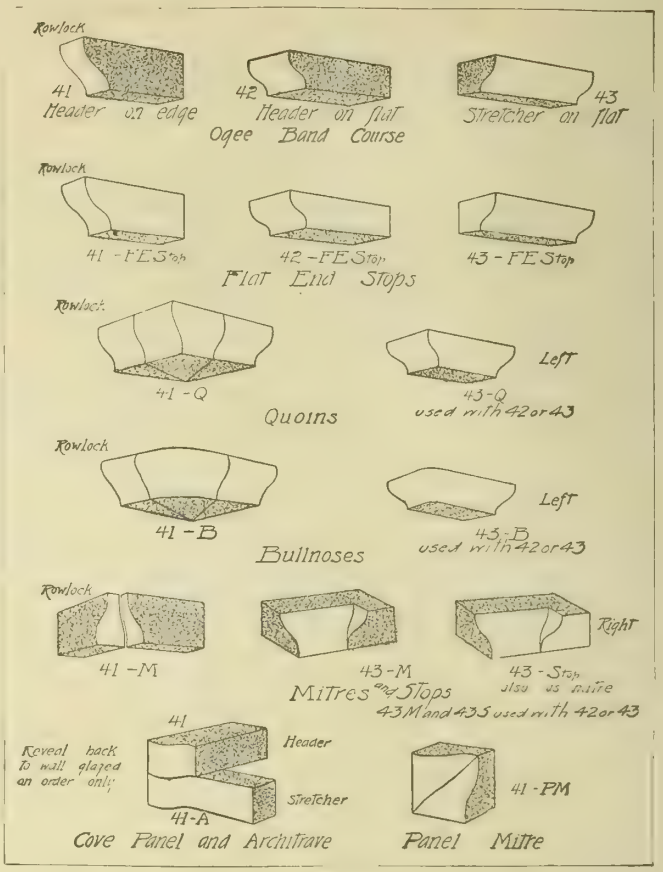
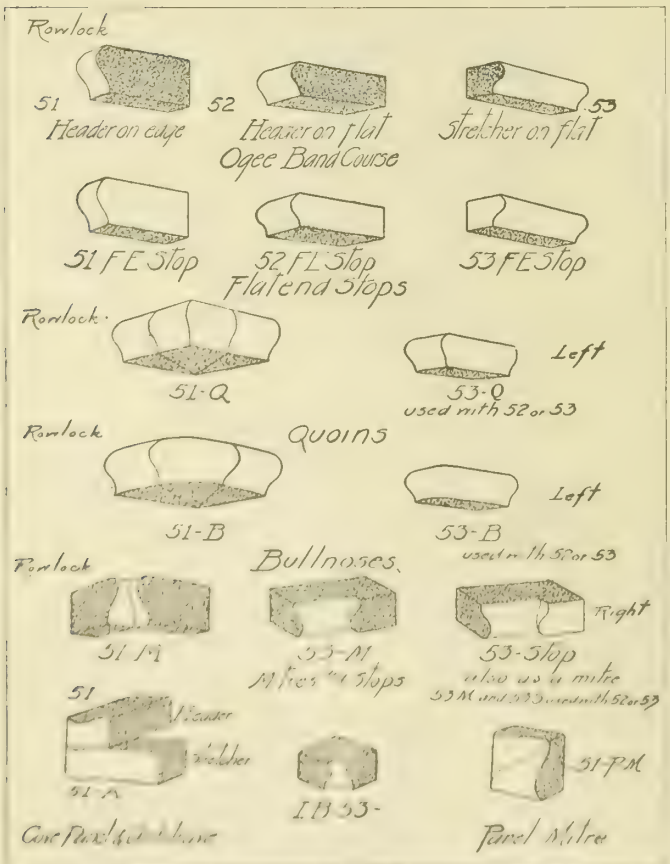


BULLNOSE COVE MOULD
For projection and dimensions, see key, next page



OGEE MOULD
For projection and dimensions, see key, next page



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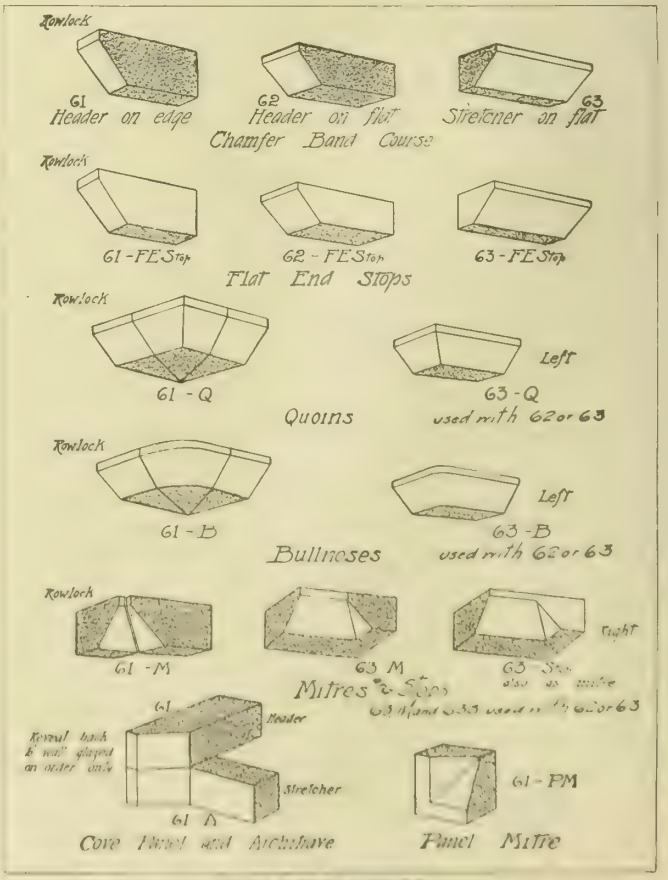

CHAMFER MOULD
For projection and dimensions, see key, next page

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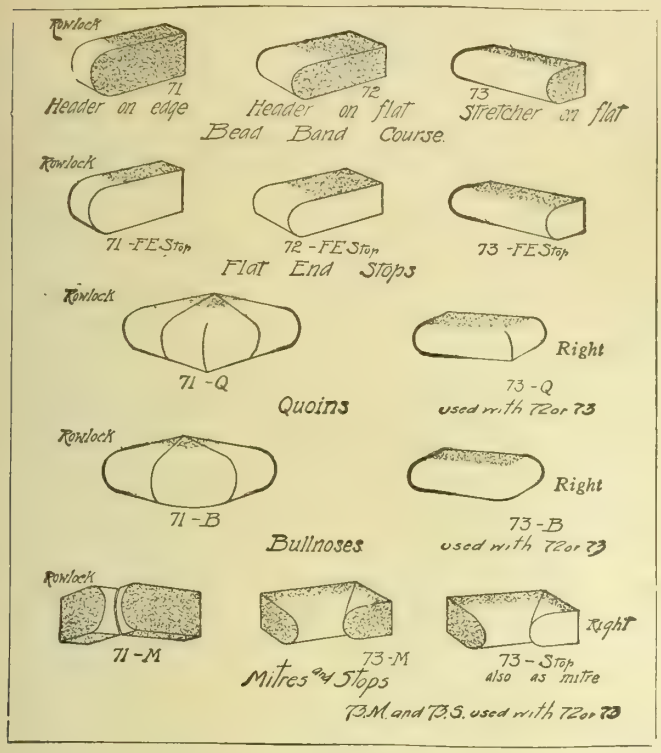


BEAD MOULD
For projection and dimensions, see key, this page

Details Required for Special Arch Brick Work.

When ordering Special Arches please consult the following cuts and give all necessary information as to details.

Furnish details as long as possible in advance of time the arches will be required. We should be allowed from four to six weeks' time to make up Arch Brick to conform with detail. We keep no arches in stock.

We cannot always guarantee uniformity of shade in arches as in regular deliveries of first-quality plain stock brick, therefore strongly recommend the use of Stock Specials for Lintels of doors and windows.

You send scale blue-prints—we do the rest, viz.:

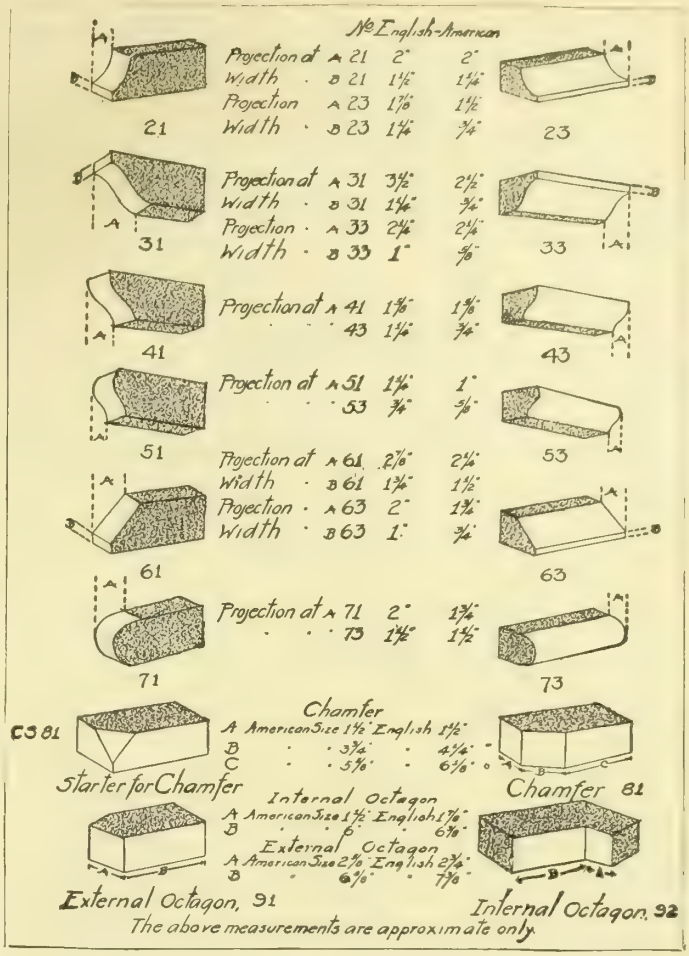
We make full-sized working drawings (shrinkage scale).

We mark drawing so that each different brick has its own designating letter or number in arch, and make typewritten schedules.

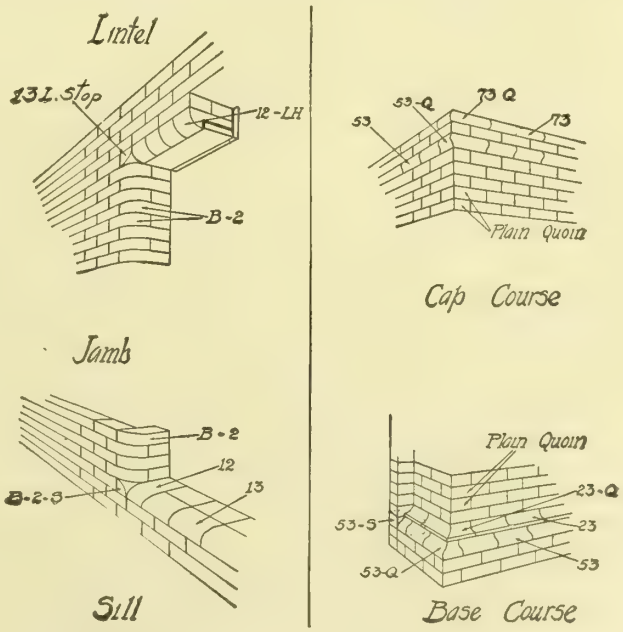
We make every brick as per drawing, each brick marked with designating letter or number as per schedule and drawing.

We ship you copy of drawing and schedule with the brick to serve as guide in setting. The mason should lay each brick in its place on drawing before attempting to set the arch.

We pack arches separately in barrels, and mark barrels distinctly to avoid confusion at job. What can be simpler for you?



KEY OF SIZES AND PROJECTION OF SPECIAL SHAPES



A suggestion for the use of Stock Specials, eliminating particularly Flat and Circular Arches, which have to be made specially to order, often causing annoying and sometimes serious delays

STUDY OF A WINDOW OPENING

STUDY OF A BASE AND CAP COURSE

BRADFORD PRESSED BRICK CO.

WILLIAM HANLEY, PRESIDENT

BRADFORD, PA.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products.

"BRADFORD PRESSED BRICK" (both dry-press and impervious Red), (Trade-Mark Reg. U. S. Pat. Office), including "BRADFORD REDS," carefully sorted to shade and size, and "BRADFORD RUFFS," rough-textured face and of beautiful shade variation; HOLLOW BRICK, PARTITION TILE, and PAVING BLOCKS.

We are specialists in RED BRICK of various shades.

"Bradford Pressed Brick."

"Bradford Pressed Brick" are made of the famous Bradford red shale and popularly known as "Bradford Reds" and "Bradford Ruffs."

"Bradford Reds."

A smooth-faced brick, adapted for fine buildings. Wherever a distinctive unfading red, combined with remarkable durability of material, is desired, "Bradford Reds" are admittedly superior. They are carefully sorted to insure uniformity of shade, and the texture and size are invariable. They also lend themselves admirably to the construction of artistic mantels, pilasters, arches, etc. They are made in both Dry Pressed and Impervious.

Shapes.

Standards, Romans, 8-inch Romans, Tiles, and Brickettes; also, in Ornamental designs.

"Bradford Ruffs."

"Bradford Ruffs" are our rough-textured face brick, made in beautiful shade variations and adapted for producing unusual effects. The material is the same distinctive Bradford red shale used in "Bradford Reds," and they produce a beautiful flat red finish. Laid with mixed shades and wide mortar joints they give an appearance that is both artistic and unique.

In these two products we have specialized for years, to the end that we have earned the name throughout the United States and Canada of "The Red Brick People."

We also make Fireproofing, Hollow Brick and Hollow Block.

Moulded Brick, Arches.

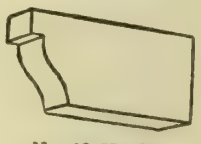
We carry in stock a large line of Moulded and Ornamental Brick and are in a position to make any special shape not shown in the catalogue. When special moulds are required, we should be given from four to six weeks to insure good work. We are pleased to correspond with architects regarding their requirements at any time. Full-sized detail sketches should accompany any order for special moulds or arches. We can produce arch brick of any size or style from drawings submitted by architects.

Hollow Tile Construction.

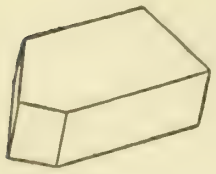
Owing to its undoubted economical advantages, Hollow Tile construction is rapidly displacing common brick for backing-up purposes. Among other things it saves forty per cent of the cost of material and labor, and produces a drier wall, making it practicable to apply the plaster direct to the wall and avoiding the expense of furring.

We manufacture tile for partition walls, and also furnish a dovetailed tile suitable for exterior walls of residences.

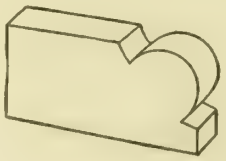
Samples and prices furnished on application.



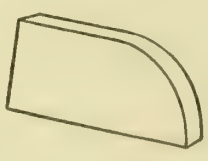
No. 62 Header
Projection 1⅞ in.



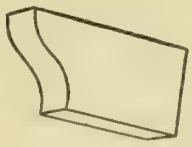
No. 2 Octagon or
Bay Window Brick



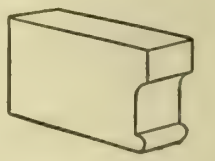
No. 6 Jamb Brick
3-inch Bead



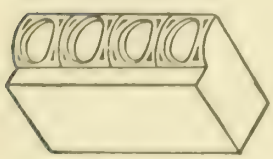
No. 11 Jamb Brick
4-inch Radius



No. 56 Header
Projection 2⅛ in.



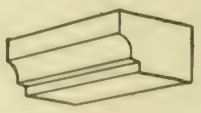
No. 54 Header
Projection 1⅝ in.



No. 100 Stretcher
Projection 1 in.

No. 112 Stretcher
Projection 1⅜ in.

No. 12 Radius or
Circle Brick



No. 46 Stretcher
Projection 1 in.

No. 48 Stretcher
Projection 1¾ in.

SOME DESIGNS OF ORNAMENTAL BRICK

Continued on next page

Open Fireplaces.

In the construction of the back, the key to the whole fireplace, it is important that it should not be drawn forward at all sharply until well up toward the top of the fireplace opening, otherwise, even with an excellent draught, smoke will strike the top of the opening, particularly if it is of square cross-section, as is the case with a brick arch, allowing an occasional puff of smoke to be deflected into the room, particularly when a fresh fire is started.

Dimensions are subject to conditions. For a cord stick the opening should be 4 feet 4 inches in the rear by 34 to 36 inches high, with sloping sides at an angle of forty-five degrees, or a little less, to the front of the opening, and not less than 20 inches deep.

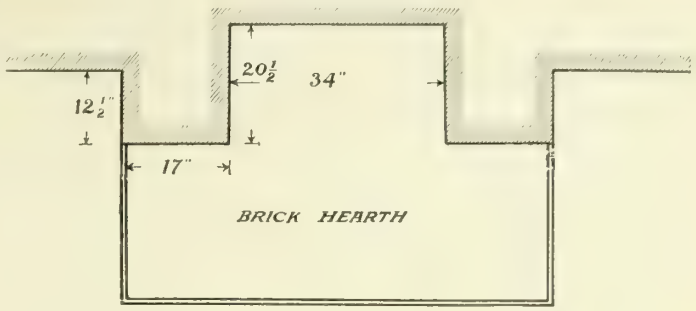
32 inches wide by 30 inches high by 18 inches deep is a common opening allowing two stretchers, and a header for piers in a 6-foot breast.

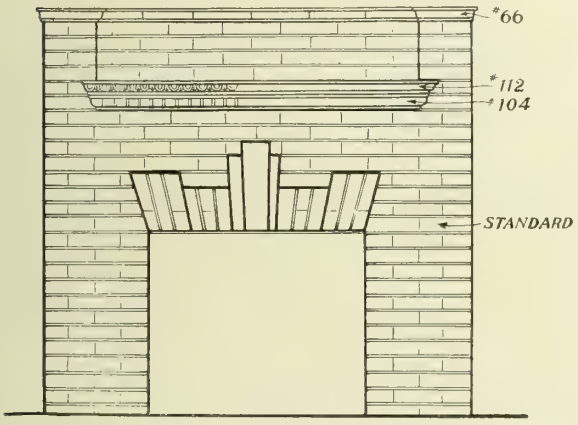
The flue is one of the most important factors, and a very good rule is to allow 13 square inches for every square foot of opening. Thus in a fireplace 4 feet wide by 3 feet high or 12 square feet you would have 156 square inches of flue or approximately 9 by 18 inches, and in the above 32 inches by 30 inches a flue 8 by 12 inches. Each fireplace should have its own flue by all means.

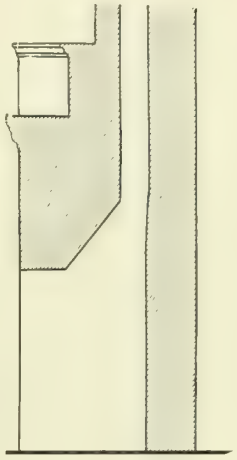
References.

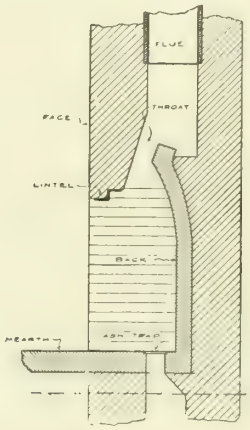
Some buildings made of "Bradford Reds."

Ford Office Buildings throughout the country
Scribner Building, 311 West 43rd Street, New York, N. Y.
Residence of Bishop Hoban, Scranton, Pa.
St. Mary's Hospital, Niagara Falls, N. Y.
Garfield Public School, Garfield, N. J.
Mother House of Sisters of Mercy, Buffalo, N. Y.
Residence of F. O. Whistler, Niagara Falls, N. Y.
J. S. McKay, Residence, Windsor, Ont.
14th District School, Cincinnati, Ohio
Burrell Building, Buffalo, N. Y.
Town Hall, Perry, N. Y.
City Hall, Geneva, N. Y.









Detail Showing Back and Throat of Fireplace

Note — Throat is drawn together, leaving passage for flames not more than 3 or 4 inches

ELEVATION, SECTIONAL AND FLOOR PLANS OF SPECIMEN MANTEL DESIGN

Information, Prices and Catalogues.

We will furnish estimates, samples, and all other information necessary for specifying "Bradford Pressed Brick."

Mantel Catalogue, also Catalogue of Ornamental Brick, sent on request.

Ford Buildings.

The accompanying illustration shows one of the numerous Ford buildings throughout the United States and Canada, built of "Bradford Reds."

The fact that these have been specified by John Graham, architect, for all Ford buildings, regardless of location, and freight differentials, is a strong testimonial to their merit.

The latest Ford building to be constructed of these brick is that at Minneapolis, a twelve-story structure.

ONE OF THE NUMEROUS FORD BUILDINGS

DARLINGTON BRICK & MINING CO.

Manufacturers of High-Grade Face Brick

6366 Frankstown Avenue

PITTSBURGH, PA.

FACTORY: DARLINGTON, BEAVER CO., PA.

Products.

FACE BRICK in Gray, Buff, Cream, Flashed Gray, Rug and Devonshire (Rough Texture), and Smooth Face, Standard or Norman Size.

SPECIAL SHAPE BRICK to order.

Texture and Color.

Rug and Devonshire give a most pleasing color effect, due to their soft velvety appearance, although hard impervious bricks.

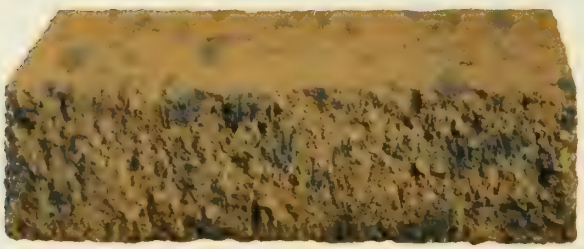
Smooth Surface Brick is very perfectly manufactured and of a rich tone, rarely found in a gray, buff or cream shade impervious brick.

Distinction.

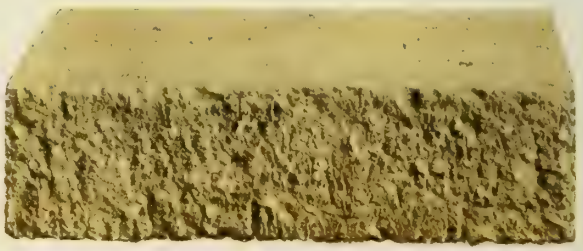
The texture of Rug brick is produced by mechanical devices and skilled artisans.

The finest admixtures of clays and other minerals are used in all our shades, giving colors and tones never produced before.

Rug brick is manufactured under Patentee's License.



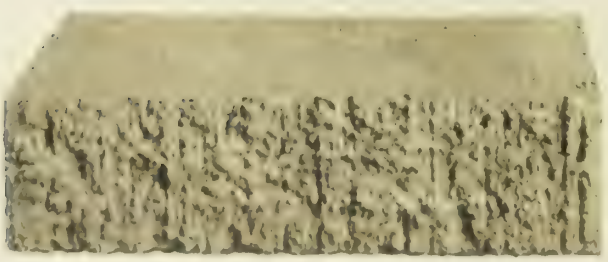
No. 16. Devonshire, Dark Flashed



No. 50. Devonshire Buff

No. 82 Rug, Rich Cream

No. 32. Smooth Face, Manganese Spot



No. 72 Rug, Medium Gray

No. 40 Smooth Face, Cream

EXAMPLES OF FACE BRICK MANUFACTURED BY DARLINGTON BRICK & MINING CO.

FISKE & COMPANY, INCORPORATED

SOLE MANUFACTURERS OF

"Tapestry" Brick and "Fisklock"-"Tapestry" Brick

Promoters and Designers of Artistic Brickwork

25 Arch Street
BOSTON, MASS.

Arena Building
NEW YORK, N. Y.

AGENCIES IN ALL LEADING CITIES

Products and Trade-Marks.

The business of this Company is the manufacture and sale of "Fisklock"-"Tapestry" Brick—the interlocking channel brick which is broadly and fully covered and protected in the United States and foreign countries by the Hardoncourt-Fiske Patents. Also, the manufacture and sale of "Tapestry" Brick; "Caledonian" Brick; "Tapestry" Tile; "Garden" Tile; Repressed Floor Tile; all kinds of Smooth Surface Face Bricks; Terra Cotta; Fire Bricks and other Clay Products.

TRADE-MARK Tapestry Brick REG. U.S. PAT. OFF. & CANADA

TRADE-MARK

"FISKLOCK"-"TAPESTRY" BRICK
HARDONCOURT-FISKE PATENTS

The trade-marks "Fisklock" and "Tapestry" guarantee Fiske manufacture, are our exclusive property, and cannot be legally used in connection with any other clay products.

"Fisklock"-"Tapestry" Brick.

This is not a hollow tile; it is an interlocking channel brick.

It provides a double, hollow wall with a brick face. It consists of two solid masonry walls, each three inches thick. The double walls are separated by a two-inch air-space, yet are bound inseparably together by webs made integral with the brick itself. There are no metal ties to corrode, break, or pull out. Every brick is both a "header" and a "stretcher."

"Fisklock" construction has the lowest possible fire risk of any known building system. There is absolutely nothing that can burn—no frame, boarding, furring or paper—not even a lath.

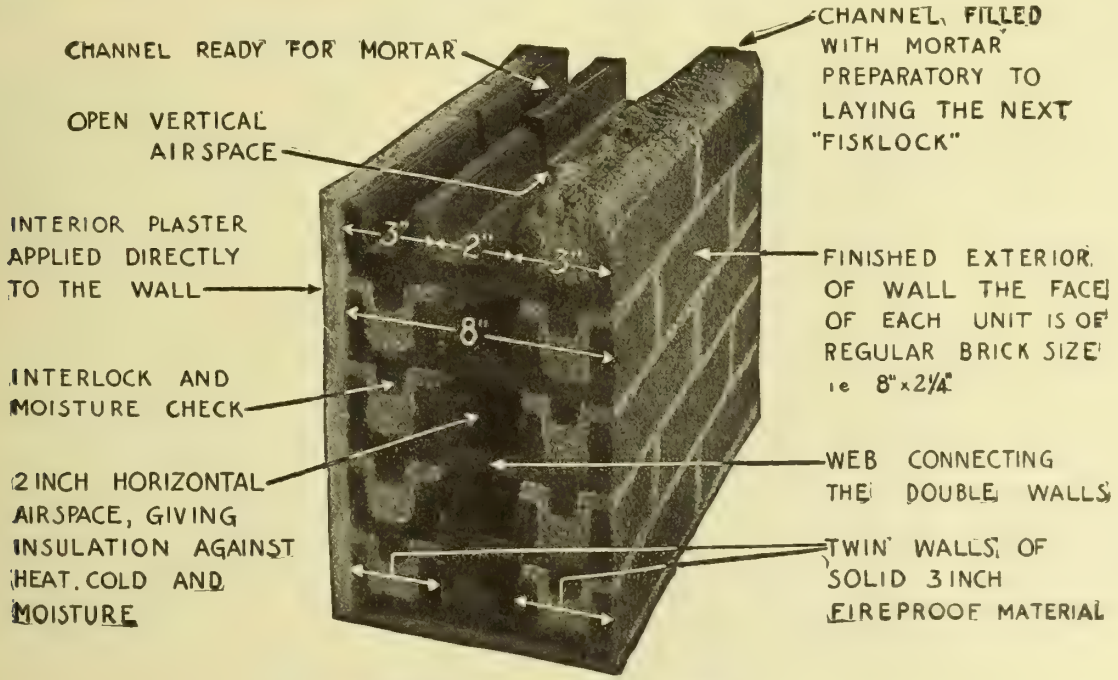
"Fisklock" walls are indestructible. They never rot, disintegrate, settle, or, in any other way, give out; there is absolutely nothing to repair.

Beauty of "Fisklock."

"Fisklock" possesses the artistic characteristics of the highest grade modern face brick—shape, size, texture and richness of color—and it employs the same interesting texture and color as mortar joint.

Cost of "Fisklock" Construction.

A "Fisklock" wall costs much less than any other face brick wall, whether solid or brick veneer; it costs less than terra-cotta hollow tile covered with stucco, about the same as an equal grade of stucco-on-frame, and only 3½ per cent to 5 per cent more than frame clapboard construction. Its ultimate cost is far less because of its low upkeep.



"FISKLOCK"-"TAPESTRY" BRICK
(Hardoncourt-Fiske Patents)

Continued on next page

Laying "Fisklock."

"Fisklock" should be laid to a line exactly like solid brick.

While "Fisklock" may, like any face brick work, be laid from an inside scaffold, it should, as in the case of all good work, invariably be laid from an outside scaffold to insure proper quality of workmanship. Note that no inside scaffolding is required, as there is no "backing-up" wall to lay.

PILING, SPLITTING AND HODDING "FISKLOCK"

Only three kinds of brick are required—"Fisklock," a few solid "Tapestry" Brick to match, and a few common brick for "backing up" the solid brick. With these three units, the bricklayer can carry out all the details of ordinary brick construction, such, for instance, as corners, window and door openings, panels, soldier courses, rowlock courses, gable ends, flat and circular arches, etc. Some typical details are herein shown.

ILLUSTRATING THE EASE WITH WHICH "FISKLOCK" CAN BE HANDLED

To secure the maximum advantages and minimum cost of "Fisklock" it should be laid in "running" bond. Other bonds, such as English, Flemish, or Dutch, may be secured by using solid "Tapestry" Brick headers; but this introduces considerable extra expense and the possibility of "through" mortar joints.

Because of its freedom from "through" mortar joints—an absolutely novel feature in brick construction—furring and lathing are unnecessary on the inside of the wall. The plastering may be put directly on the brickwork, thereby eliminating fire risk and chance for vermin.

LAYING UP A "FISKLOCK" "TAPESTRY" BRICK WALL

It is remarkable how quickly the bricklayer "takes" to "Fisklock." The men in the accompanying picture, who were entire strangers to the material, found, after a few hours' experience, that they could easily lay as many "Fisklock" in a day as they could lay of solid face brick. As each "Fisklock" is equivalent to one face brick and one "backing-up" brick, the economy of this construction will readily be seen.

Insulating Qualities of "Fisklock."

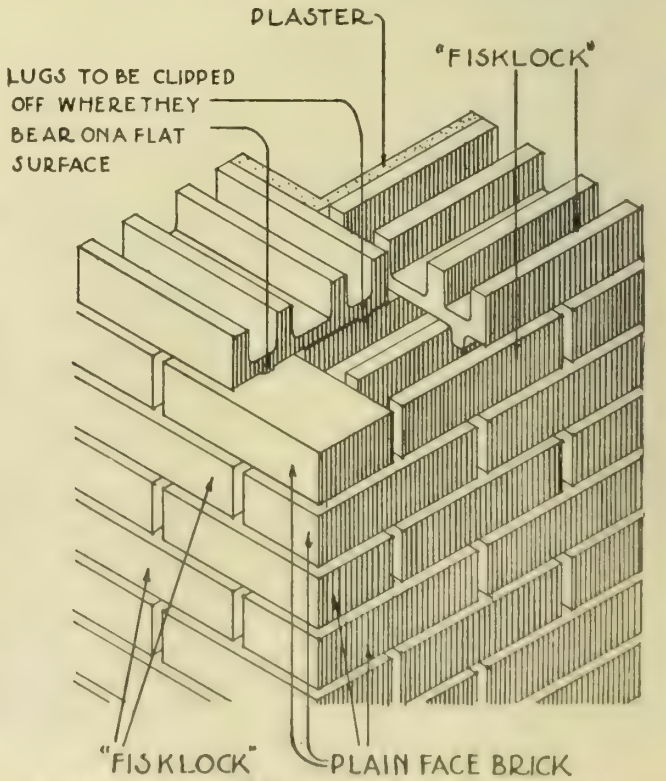
The solid double walls, separated by closed air-cells, provide maximum heat and cold insulation. The air-cells in "Fisklock" construction are horizontal, thereby eliminating internal air circulation caused by the up and down drafts which are common within most hollow walls.

Even hollow-tile or solid-brick construction saves fifteen per cent to twenty-five per cent of the heating expense necessary for a frame house. Tests by the Engineers of Columbia University indicate that the heat transmission through "Fisklock" walls is considerably less than that through walls of hollow tile or solid brick.

Moisture-proof and Air-tight Features of "Fisklock."

It is a well-known fact that dampness traverses a brick wall through the mortar joints, which are much more porous than hard-burned clay. "Fisklock" itself has no continuous mortar joints through the wall, either horizontally or vertically. There is no possibility of moisture "striking through."

Attention is called to the necessity of keeping the



METHOD OF BUILDING A CORNER IN A "FISKLOCK" "TAPESTRY" WALL

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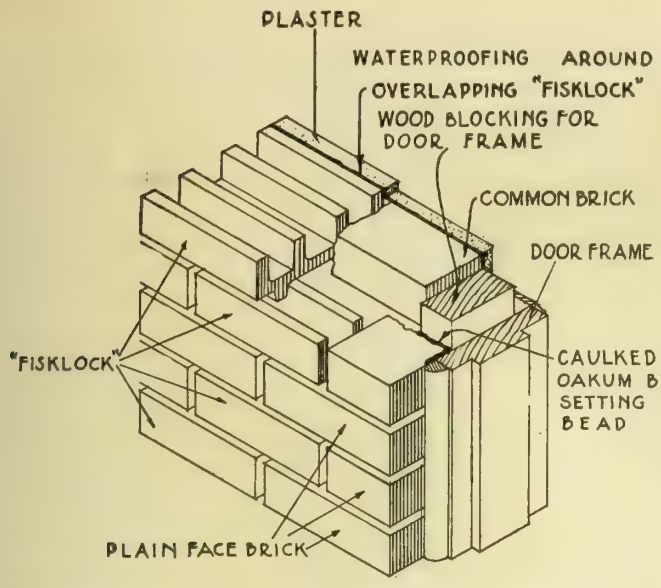
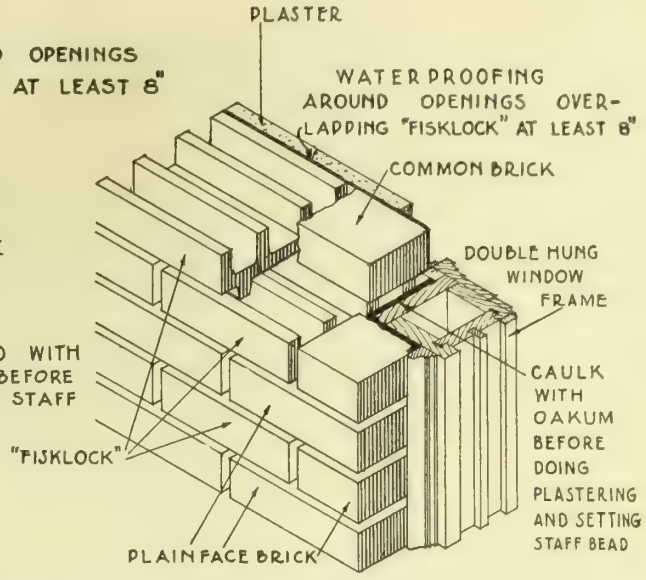


METHOD OF BUILDING A DOOR FRAME IN A "FISKLOCK"-"TAPESTRY" WALL
Use same method for casement window



METHOD OF BUILDING A DOUBLE-HUNG WINDOW FRAME IN A "FISKLOCK"-"TAPESTRY" WALL

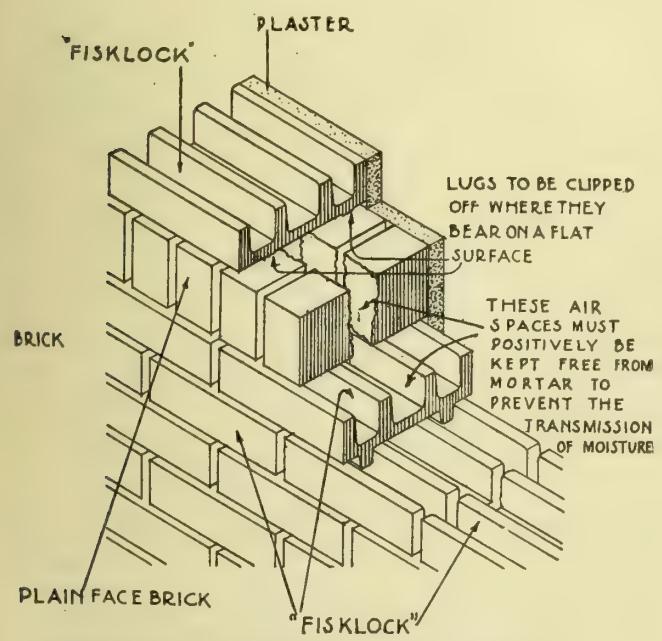
center channel free from mortar. If mortar is put into the center channel, thereby filling it up and creating "through" mortar joints, one of the principal advantages of "Fisklock" construction is lost. Where blind headers or other sólid "Tapestry" Brick are used, backed up with common brick, an air-space must be left between the "Tapestry" Brick and the "backing-up" brick, as shown, for the reasons mentioned.

To insure at every point the same moisture-proof and air-tight features which "Fisklock" itself secures for the plain wall surfaces, it is necessary to apply waterproofing to the back of the solid brickwork around window and door openings or wherever there are "through" mortar joints by reason of solid brick being used. (See detail drawing.)

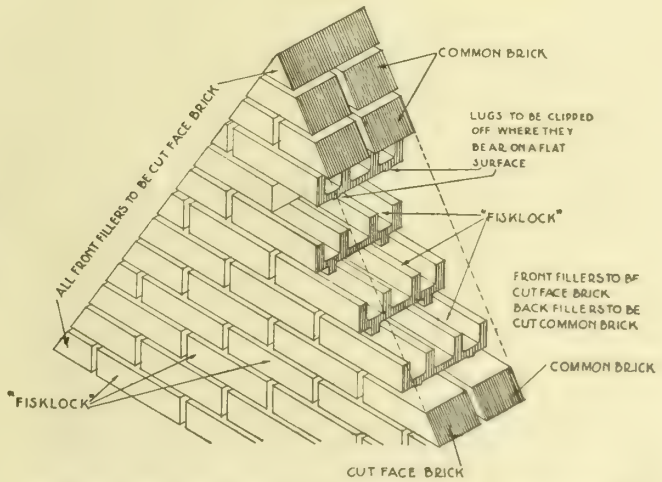
Around window and door openings all cracks between brickwork and wood frames should, as in the case of any good masonry house, be carefully calked with oakum in order to prevent transmission of air and water through open crevices. This can easily be accomplished from the front and back of the wall before the staff beads and plastering are put in place. (See detail drawing.)

"Fisklock" Construction Drawings.

The drawings herewith illustrate some of the more common details of construction and show how simply and naturally "Fisklock" performs all the required functions without undue complication or expense. All plain brick surfaces are constructed with "Fisklock" without any cutting or fitting. Corners, window jambs, arches, belt courses, ornamental panels, gables, etc., are built with solid "Tapestry" Brick of the same color, which are easily cut to shape if necessary, thereby obviating the complication arising from the great variety of shapes and sizes usually necessary in hollow tile construction and the great expense of cutting hollow tile to shape.



METHOD OF BUILDING A ROWLOCK COURSE IN A "FISKLOCK"-"TAPESTRY" WALL



METHOD OF BUILDING A GABLE END IN A "FISKLOCK"-"TAPESTRY" WALL

Continued on next page

Tests on "Fisklock."

Careful tests have been conducted on "Fisklock" by the Engineers of Columbia University and the Massachusetts Institute of Technology, to determine its vertical load-bearing strength, lateral strength, resistance to fire and water, etc.

Six-foot piers of hollow tile, of common Hudson River brick (of the standard quality required by New York City), and of "Fisklock" were constructed and were subjected to vertical loads until they collapsed. The average of three piers each of these materials disclosed the following ultimate strength per square foot, gross area:

Hollow tile	86.2 tons
Common brick	58.4 tons
"Fisklock"	109.0 tons

The complete tests above referred to showed that "Fisklock" is equal to common brick and to terra-cotta hollow tile in its resistance to fire and water, and superior in every other particular. Full and complete details regarding these tests will be furnished on application, and will thoroughly satisfy the intending user that it will meet to the highest degree every requirement of a first-class building material.

Comparative Cost of "Fisklock" vs. Cost of Other Constructions.

It very seldom happens that two buildings are constructed under precisely the same conditions—of exactly the same size, design and interior finish, in the same location, at the same time of year, with the same labor, with the same degree of efficiency in management, etc. To determine the relative cost of buildings constructed of different materials, it is therefore necessary to depend upon the accumulation of accurate data by reliable engineers and contractors over a long period of years and upon careful and logical deductions therefrom.

Much attention has been given to this question during the last few years and, after conference with reliable builders, figures of this character have been compiled by engineers, architects, and civic authorities in many parts of the country. As a whole they are found to agree to a remarkable extent with the figures presented herewith.

Arthur W. Joslin (Treasurer of MacDonald & Joslin Co., the well-known building contractors of Boston), one of the best-known experts in the country on cost of construction, has compiled the following figures on comparative cost, not as an "estimate," but as the result of twenty years of careful time-keeping and record-keeping on a very large number of buildings of all sizes and types.

The figures on "Fisklock" were compiled partly from data furnished by Mr. Joslin, and partly from experience in actual "Fisklock" construction by other contractors.

All figures are based on prevailing prices for material and labor in and about Boston and New York, respectively.

All figures include inside plastering.

All figures represent *net cost to the contractor;* i.e., they do not include his profit, which must be added in each case.

Fiske Service.

The intelligent choice of colors, to blend together properly and produce an effect in harmony with the character of the building, its style of architecture and its surroundings, is a matter of vital importance. It is a part of our service in connection with "Fisklock"-

COMPARATIVE COSTS

No.	Type	Cost per Square Foot of Exterior Wall Surface		Excess Over Type No. 1					
				For the Exterior Walls Only		For the Whole Building—A "Three Decker" *		For the Whole Building—A Single House *	
		Boston	New York	Boston	New York	Boston	New York	Boston	New York
1	Frame, Clapboard	27.3c.	30.0c.	.....	.....	.....	.....	.....	.....
2	Frame, Shingled	28.2c.	31.6c.	3.3%	5.3%	.6%	.9%	.3%	.5%
3	8-inch Common Brick	38.3c.	37.3c.	40.3%	24.3%	6.9%	4.1%	4.0%	2.4%
4	8-inch Brick, Face Brick Exterior	49.4c.	50.0c.	81.0%	66.7%	13.8%	11.3%	8.1%	6.7%
5	8-inch Brick, Harvard Brick Exterior	48.3c.	53.8c.	76.9%	79.3%	13.1%	13.5%	7.7%	7.9%
6	12-inch Common Brick	51.3c.	49.7c.	87.9%	65.7%	14.9%	11.2%	8.8%	6.6%
7	12-inch Brick, Face Brick Exterior	63.0c.	63.0c.	130.8%	110.0%	22.2%	18.7%	13.1%	11.0%
8	Brick Veneer on Frame	43.3c.	45.8c.	58.6%	52.7%	10.0%	9.0%	5.9%	5.3%
9	**"Fisklock"-"Tapestry" Brick**	**39.4c.**	**39.9c.**	**44.3%**	**33.0%**	**7.5%**	**5.6%**	**4.4%**	**3.3%**
10	Stucco on 8-inch T. C. Hollow Tile	42.9c.	42.8c.	57.1%	42.7%	9.7%	7.3%	5.7%	4.3%
11	Stucco on Frame	38.2c.	39.8c.	40.0%	32.7%	6.8%	5.6%	4.0%	3.3%
12	10-inch, Face Brick Exterior—2-inch air-space	56.0c.	56.4c.	105.1%	88.0%	17.9%	15.0%	10.5%	8.8%

* NOTE—Experience has shown that the cost of the exterior walls in a three-flat apartment house of frame is practically 17 per cent of the cost of the entire building, while in the case of a $6,000 to $8,000 single house it is practically 10 per cent.

NOTE—The above figures on "Fisklock"-"Tapestry" are based on a price of $30 per thousand brick f.o.b. cars Boston, and $29 per thousand brick f.o.b. cars New York. Owing to variations in freight rates to different points and the consequent variations in the cost of "Fisklock"-"Tapestry" at different destinations, the above figures should be adjusted to suit the conditions, thus:

For a difference of each $1 per thousand brick f.o.b. cars your nearest freight station, add to or subtract from the above "Cost per square foot of exterior wall surface," the sum of 65 100 cents.

Continued on next page

DETAILS OF "TAPESTRY" BRICK HOUSE AND "TAPESTRY" FLAGGING TERRACE, AUBURNDALE, MASS.

"Tapestry" and "Tapestry" Brick to study this question with the owner and his architect and to suggest appropriate shades in the proper proportion to suit the condition of each case. Where necessary, we have our mason lay up sample walls in different styles of bonds and mortar joints until the very best possible combination of all details is obtained. In many cases we make colored sketches, showing pattern work and special bondings, which greatly aid in a wise choice of materials. The wonderful success of "Tapestry" Brick and "Fisklock"-"Tapestry" is in no small degree due to the painstaking study which we have given every important operation where it has been used. It is perhaps needless to add that we are the only brick manufacturers, in modern times at least, who have undertaken to render such advice and service to customers.

"Tapestry" Brick.

Wherever the quality of brick is discussed, "Tapestry" is the one standard to which all other makes are referred. Whether it be an artistic little bungalow of red brick, or a skyscraper of gray, "Tapestry" Brick is the one material which fulfils to the highest degree the requirements of the designer, builder and owner.

While "Fiske" publications are issued, portraying in colors different combinations of "Tapestry" brick, it is recommended that intending users view with their own eyes the wonderfully soft tones and play of color obtained by the use of "Tapestry," either at any one of our agencies or preferably in the structures themselves, which abound plentifully throughout the United States.

Immediately on request we will furnish a list of buildings in any given territory where "Tapestry" has been used.

Prices.

Prices will be furnished on application. They are no higher than those of other high-grade bricks.

"Tapestry" Brick Fireplaces.

"Tapestry" Brick Fireplaces cost from $15.00 upward, depending upon the size and design.

Prices of "Tapestry" Brick Fireplaces include all plain and special brick and tile required for the facing hearth, underfire and lining..

Prices include proper packing in barrels with delivery f.o.b. cars factory.

We are glad at all times to make quotations on an architect's special design, being responsible for the amount of material required and quoting a lump-sum price therefor.

Literature.

Architects are respectfully requested to send for our literature, illustrated in colors, describing "Tapestry" Brick, "Fisklock"-"Tapestry" Brick, Bonds and Mortar Joints, etc., as follows:

No. 33A.	"Fisklock"-"Tapestry" Brick	Free
No. 11F.	Tapestry Brickwork	Free
No. 23.	Tapestry Brick Fireplaces	Free
No. 28.	Through the Home of Tapestry Brick	Free
No. 29.	Tapestry Brick and Tilework for Floors and Interior Walls	Free
No. 25.	Bonds and Mortar Joints	Free
No. 24.	The Cost of a House	Free
No. 27.	One Hundred Bungalows	50c
No. 20.	A House of Brick of Moderate Cost	50c
No. 13.	A House of Brick for Ten Thousand Dollars	25c

Photographs.

We have on file in our New York office a collection of photographs of fine brickwork. This includes not only American work, but much of the historic brickwork of England, France, Italy and Persia. We own the negatives of these photographs and can furnish prints. We cordially invite the architects to make such use of this collection as may be of service to them.

B. MIFFLIN HOOD BRICK COMPANY

MANUFACTURERS OF

"Pottry" Tile and Brick

1014-15-34 Candler Building

ATLANTA, GA.

REPRESENTED BY LEADING DEALERS IN PRINCIPAL CITIES

Products.

"Pottry" Tile and Brick for Buildings, Terraces, Walks, Steps, Floors, Sun Parlors, Fireplaces, Walls, Inserts, Friezes, Roofing and Landscape Effects.

Quality.

"Pottry" is the name of our product, because it is made of pulverized pottery or *whisky jugs*, mixed with high-grade shale. The pottery acts as the backbone, like steel in reinforcing concrete, thus enabling us to burn at very much higher temperatures, producing a wealth of beautiful colors and rich textures heretofore unequalled, and at the same time preserving trueness as to shape and size.

Textures.

"Pottry" products are made in three textures. The roughest is a twisted wire-cut called "Oriental"; medium is a straight wire-cut called "Matt," and the least rough is a comparatively smooth texture made by the die surface called "Old Flemish." All shapes with the Old Flemish texture possess the Matt texture on the reverse side.

Stock Shapes.

Eighty different sizes and shapes in the three artistic textures are carried in stock for immediate shipment. The triangular shapes are perfectly cut and especially adapted for diagonal patterns in walls, fireplaces and floors in any of the three textures.

Guarantee.

Our product is guaranteed to stand Canadian winters. It is used extensively in acid tower construction, because it is insoluble in boiling nitric and sulphuric acids. Due to its vitrification and toughness, it is used as a lining for ladles in steel plants.

Estimates and Co-operation.

We will gladly render assistance in the adaptation of "Pottry" material to architects' designs and in estimating costs for appropriations. To secure the best results, "Pottry" should be specified under allowance, reserving to the architect the right of selection. Samples sent on request. Special shapes other than our stock specials will be executed in accordance with architects' designs. A free service department is at your command.

Other Clay Products.

Quarrie Tile in standard shapes. Also, following brands of brick: Hood's Oriental, very rough texture; Old English, conservative texture; Southern Harvards, Smooth Impervious and Dixie Nap.

New products are being developed. Special sizes are being standardized and carried in stock. Ask to be put on our mailing list.

Fireplaces.

Hood's Fireplaces are furnished in tile of one inch and two inch thicknesses, also brick thickness. Thousands of interesting designs can be executed from our stock mantel shapes, in either smooth or rough texture.

DRUID HILLS GOLF CLUB, ATLANTA, GA.
10,000 Square Feet of 8 x 4 x 1 inch "Pottry" Tile on Terraces

Specify.

Hood's "Pottry" Tile and brick.
Stock Mantel Design No. .....
Floor Tile, 1 by 1 by 1 inch, ranging to 12 by 12 by 2 inch.
Hood's Quarries, 6 by 6 by 1 inch.
Landscape Tile, 12 by 12 by 2 inch.
Landscape Tile, 8 by 8 by 2 inch and 6 by 12 by 2 inch.
Hood's "Pottry" treads and risers.
Hood's "Pottry" Tile, Matt Finish, 6 by 6 by 1 inch, 8 by 8 by 1 inch, 3 by 6 by 1 inch, 4 by 4 by 1 inch.
Hood's "Pottry" Tile, Old Flemish, 6 by 6 by 1 inch, 8 by 8 by 1 inch, 3 by 6 by 1 inch, 4 by 4 by 1 inch.
Hood's "Pottry" dark red flashed, 6 by 6 by 1 inch.
Inserts—Hood's "Pottry" Tile and Brick standard and specials as per detail.
Interior—Hood's "Pottry" Oriental, Old Flemish and Matt Textures in standard and special sizes as per detail.

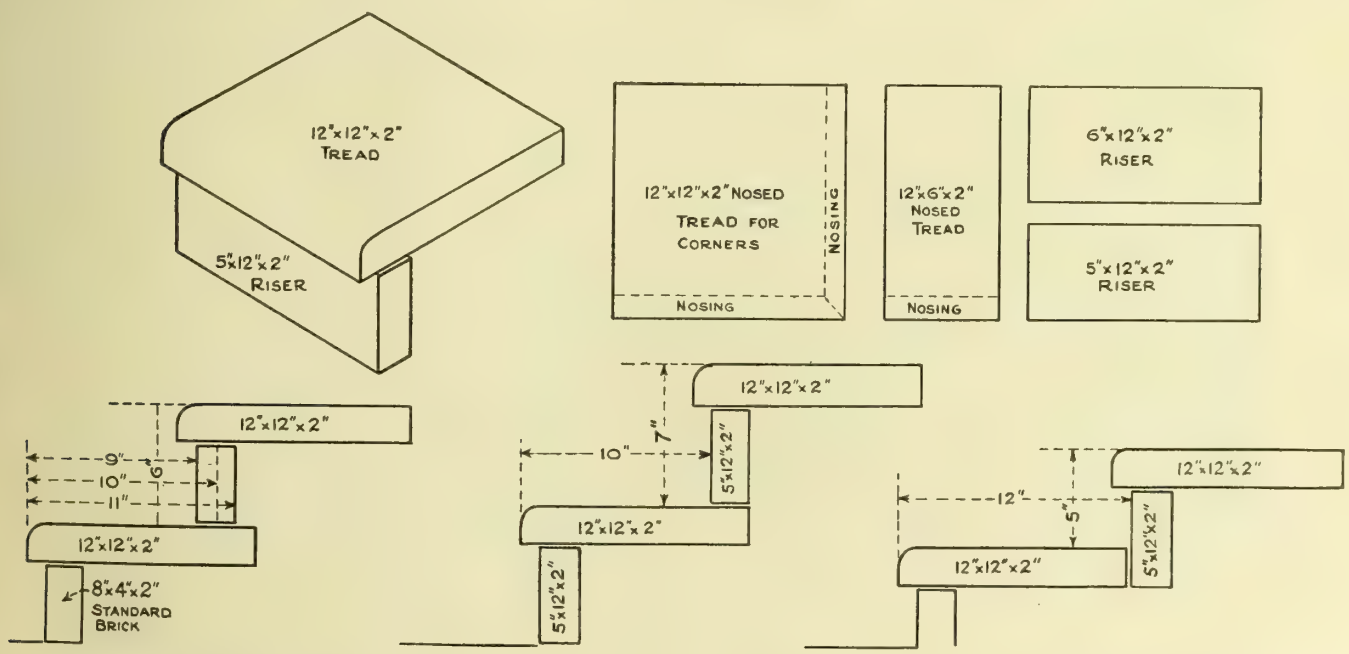
Representation.

This Company is represented in all the principal cities by the leading mantel and tile dealers for "Pottry" Fireplaces and Tile, and by brick agents for brick, inserts and landscape work.

Sweet's Catalogue

Continued on next page

HOOD'S "POTTRY" TILE AND BRICK IN INTERIOR TREATMENT OF DAHL FLORAL CO., RETAIL STORE, ATLANTA, GA.
No Cutting of Shapes. Built from Stock Sizes



DETAILS SHOWING USE OF "POTTRY" TILE STANDARD STAIR UNITS IN STAIR CONSTRUCTION
See Pages 108-109, SWEET'S CATALOGUE, 1915, for Stock Sizes and Shapes, which Range from 1 x 1 x 1 to 12 x 12 x 2 inches Square, Triangular and Rectangular

HYDRAULIC-PRESS BRICK COMPANY

MANUFACTURERS AND DISTRIBUTORS OF

Hy-tex

The Standard of Quality in Brick

SAINT LOUIS

BRANCH OFFICES AND CENTERS OF MANUFACTURE AND DISTRIBUTION

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NEW YORK, 381 Fourth Avenue, Page 103
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PRINCIPAL SELLING AGENCIES, Page 103

Home Office, St. Louis
F. C. Aschemeyer, Sales Manager

Products.

SMOOTH TEXTURE

HY-TEX GRAY RANGES‡ (Plate I)
No. 105, Spotted, Light, Medium, and Dark.
*No. 115, Mosaic**, No. 105 with slight flash.
No. 503, Steel, Light, Medium, and Dark.
*No. 513, Mosaic**, No. 503 flashed, dark heads.
No. 504, Dark Mottled, Light, Medium, and Dark.

HY-TEX BUFF RANGES‡ (Plate I)
No. 102, Spotted, Light, Medium, and Dark.
*No. 112, Mosaic**, No. 102 with slight flash.
No. 500, Old Gold, Light, Medium, and Dark.
No. 506, Mottled, Light, Medium, and Dark.
No. 507, Light Cream, Light, Medium, and Dark.
*No. 517, Mosaic**, No. 507 flashed, brown heads.

HY-TEX RED RANGES
No. 100, Speckled Granite, all shades.†
No. 101, Brown to Purple Speckled, all shades.†
Red Stock, "St. Louis Red Stock." ‡
Brown Stock, clear rich Brown.‡
Venetian Red, Impervious Red to Coffee-Brown.†
No. 509, Pink Granite, Light, Medium, and Dark.‡
*No. 519, Mosaic**, No. 509 with slight flash.‡
Nos. 1, and *2 and 3 Hard,* wire-cut Shale in Reds and Browns.† Suitable for rustic effects.
Splits, in Brown Shades, impervious shale.
Pavers, Repressed and Wire-Cut Lug, meet highest tests, all stock sizes.

HY-TEX FLAT SET RANGE (Plate II)
No. 110, Bronze Ironspot, Tan to Gun Metal.‡
No. 508, Mahogany Ironspot, in three shades.†

HY-TEX COMMON RANGE
Red, Medium and Dark, and *Hard Dark.*†
These are higher grades of a Common Brick used for facing in the St. Louis market.

HOLLOW BUILDING TILE
Heavy web, deep dovetail scoring, suitable for Walls, Partitions, Flooring. All stock sizes.

ROUGH TEXTURE (Impervious)

HY-TEX RED MATT RANGE (Plate III)
Reds, Browns, Gun Metals, clear and flashed.†
Varied mixtures, kiln-run, or sorted to shades.
Splits, in Brown Shades, impervious shale.

HY-TEX CHALDEAN RANGE
Ideal Rough Texture, color-tones of Matt Range.†

HY-TEX FERN LEAF RANGE
Rough Vertical Texture resembling fern leaf, in Brown Shades.

FIREPLACES AND MANTELS
A wide variety of choice. Send for catalogue.

HY-TEX ENAMEL RANGES (Plate IV)
Hy-namel, White, Cream, Green, Brown, Blue, Agate, Onyx, Delft and Speckled.
Hy-namel Court, same, but graded slightly lower.
Hy-namel Transparent, showing in Speckled Browns and Canary Yellows.

HY-TEX EQUITABLE RANGE (Plate XII)
No. 205, Pure White; No. 69, with large, *No. 77,* with small black specks.
Information about other shades on request.

Hy-namels and Hy-tex Equitable are made in Standard English, Norman, and Roman sizes, and in a great variety of moulded forms. See our "Catalogue of Moulded and Ornamental Bricks."

* Particularly attractive laid in Flemish Bond.
† Standard size. ‡ Standard and Roman sizes.

Description.

Our HY-NAMEL BRICK are unapproached in quality and durability by any similar brick of domestic or foreign manufacture. They are absolutely opaque and are GUARANTEED NOT TO CRAZE, PEEL, OR DISCOLOR UNDER THE SEVEREST CLIMATIC TESTS. They are eminently suitable for Fine Fronts; various Ornamental Features, such as Pilasters, Panels, Friezes, etc.; Hotel Corridors; Courts; Kitchens; Markets; Swimming Pools; Garages; Dairies; Hospital and School Hallways; Dressing Rooms, etc. They have been served in such structures as the METROPOLITAN BUILDING, SHUBERT THEATER, PEVELY DAIRY, St. Louis; WELLS BUILDING, Milwaukee; STOWERS FURNITURE CO., San Antonio; STATE NATIONAL BANK, Ft. Smith, Ark.; GRUENEWALD HOTEL, New Orleans; CUSTOM HOUSE, San Francisco; FEDERAL PRISON, Atlanta; BELL TELEPHONE, Richmond, Va.; CREAM OF WHEAT BUILDING, Minneapolis; CHRONICLE BUILDING, Houston; WESTMINSTER, CONWAY, EIGER BUILDINGS, Chicago; CITY HALL, Cleveland.

HY-NAMEL COURT BRICK are in every respect the same brick, as to make and durability, as Hy-namels, except that, in sorting first quality, these have been set aside because of slight surface defects which are not noticeable in courts or areas. Unless closely examined, they make the same appearance as Hy-namels and render exactly the same service. They have been used in many large buildings with complete satisfaction.

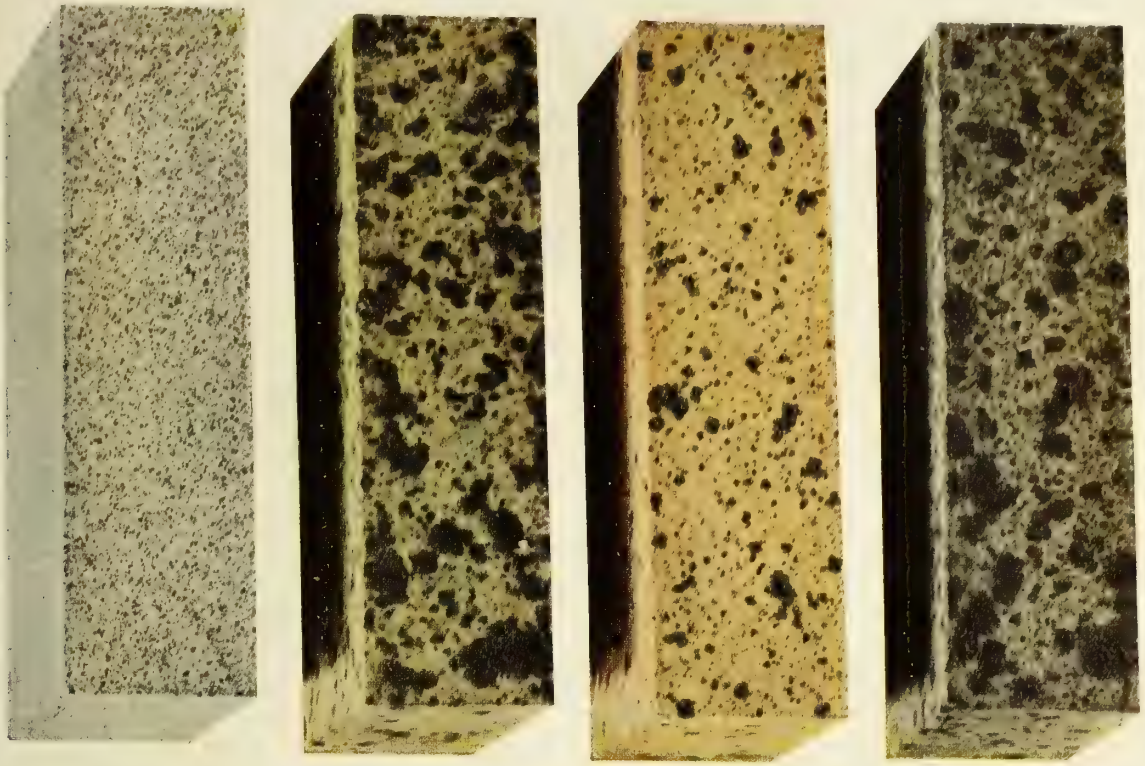
The HY-NAMEL TRANSPARENT BRICK, as the name indicates, is made by applying a glaze so as to permit the natural color of the brick to show through.

The HY-TEX EQUITABLES have become justly celebrated because of their clean impervious surface and

Letter's Catalogue

Continued on next page

PLATE I



Hy-tex Gray and Buff Ranges, Nos. 502, 506, 500, 504

PLATE II

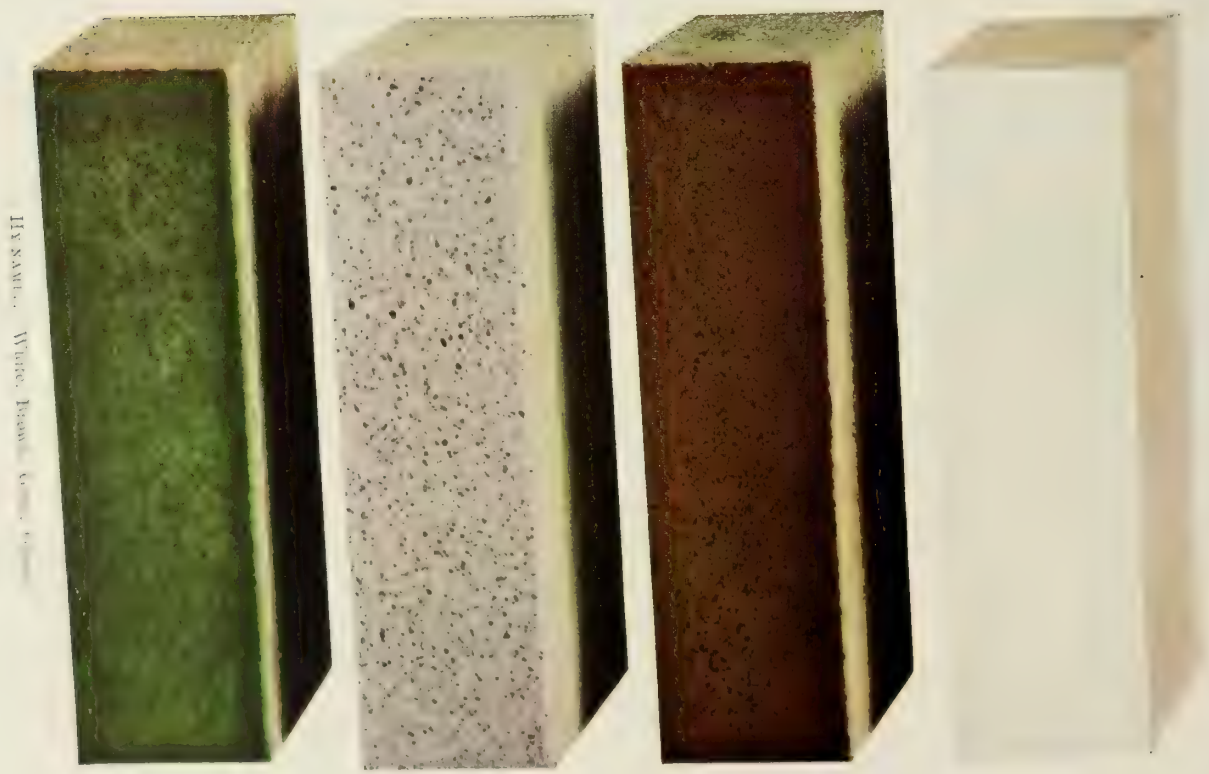
Hy-tex [illegible], No. 110. Tan to Gun Metal

Continued on next page

PLATE III

HAVEN RED MATT, Nos. 17, 16, 14, 17

PLATE IV



HAVEN... White, Buff, Gray, Gray

Continued on next page

beauty of texture, harmonizing in color-tone with light granites, marbles, and sandstones. They have been used in such notable structures as the EQUITABLE BUILDING, New York City, and BOATMEN'S BANK BUILDING, St. Louis.

In ordering Hy-namels or Equitables, GREAT CARE MUST BE TAKEN to indicate the number of *headers, quoins,* and *returns* which are to be used; otherwise only enameled or coated stretchers will be shipped. Hy-namels and Hy-namel Courts, in all sizes, *except English,* are also furnished on the flat when so desired.

Material and Manufacture.

Hy-tex Brick are made of a great variety of fire clays, red clays, and shales, which are either used separately or mixed in varying proportions. After due tempering and grinding, this material is subjected to one of three processes of manufacture: Dry-press, under a forty-ton hydraulic pressure; wire-cut, in stiff-mud machines; or sand mould.

Color and Texture.

The great range of color covered by Hy-tex is due (1) to the clays and shales used, in their simple or mixed condition; (2) to the nature of the burn; and (3) to the admixture of varying quantities of manganese, viking ore, or iron scale. The results are bewildering in their beautiful variety. These results are greatly enhanced by the exquisite effects of the surface texture, whether it be that of the dry-pressed, the wire-cut, or the sand moulded brick. More particularly it is the wire-cut brick, with its warp and woof scorings, or cross tare, that produces the subtlest modifications of color shadings, and wins the various popular names applied to bricks, indicative of various woven textures.

Sizes and Special Forms.

All Hy-tex Brick, except pavers (from 2¼ x 8½ x 4 in. to 3¼ x 9 x 4 in.), are made Standard size. English, Norman, and Roman sizes are carried in certain types of brick suitable to such dimensions or, when desired, manufactured to order, as are also all special sizes and shapes. Approximate sizes are as follows:

Std. (Standard) 2¼ x 8¼ x 4 in.
Rom. (Roman) 1⅝ x 11⅝ x 3⅞ in.
Eng. (English) 2⅞ x 8⅞ x 4⅜ in.
Norm. (Norman) 2¼ x 11⅞ x 4 in.
Split, 1⅞ x 4 x 8 in., especially suitable for interior work.

For MOULDED or SPECIAL FORMS, which are either kept in stock or made to order as desired, please consult our "Catalogue of Moulded and Ornamental Bricks" and "Suggestions for Special Shapes in Hy-tex Matt," which will be sent on application.

Important—The architect is urged not to write his specifications until he secures from the manufacturer the *exact* sizes of the particular brick he intends to use, as brick vary from $\frac{1}{16}$ to ¼ inch in dimensions, dependent on the run of clay or the kiln-burn.

Samples from any of the ranges given above will be gladly sent on request.

Service.

As large manufacturers of face brick, operating twenty-two plants in the best clay and shale fields of the country, and with Branch Offices and Agencies in the principal cities of the United States and Canada, our capacity for prompt and responsible service to the architect or the builder is unequaled. It is our especial aim to cooperate, so far as we can, with the architect in furthering the development of a better brick architecture in this country.

Architectural Merits of Brick.

There is no other material, except stone, that for individuality and character can compare with brick as a building material. But stone is limited to structures of a pretentious character; while brick not only lends itself equally well to these, but is suitable for every kind of structure, down to the bungalow or humble cottage. Besides, brick, especially as it is now manufactured, offers what stone cannot approach, the widest range of texture and color, and thus offers to the artist a plastic medium of great architectural possibilities.

Our Exhibit Rooms.

The services of our experts in brick at any of our Centers of Distribution are always at the disposal of the architect or intending builder. Their long experience often enables them to offer helpful suggestions on the subject of bond, mortar joint, and color scheme of the wall texture. At all of our Branch Offices may be found extensive Exhibits of Hy-tex Brick. Here may be seen various bonds and mortar joints, together with textures and color-tones, as they will appear in the living wall, to aid in the most satisfactory selections.

Brick Scales and Tables; Literature.

To further the ease of design in beautiful brickwork, we strongly recommend our "Bonds and Mortars in the Wall of Brick," together with "Brick Scales and Tables," which practically amount to a necessity for the designer in brickwork. They were devised by a member of the American Institute of Architects as an aid in drawing brick patterns and in lightening the otherwise toilsome labor of the draughting room. Our "Brick Church and Parish House," just off the press, will be of value to those interested in ecclesiastical building. No architect can afford to be without these accessories. They will be sent by any of the offices to architects, on application. We also issue "The Hy-tex House of Moderate Cost," "Suggestions for Small Hy-tex Homes" and "Genuine Economy in Home Building," especially to cultivate better types of domestic architecture.

Please apply to the Office *nearest* you.

Davenport Branch Office

J. L. Buckley, Manager

Products.

ROUGH TEXTURE

HY-TEX ALEDO MATT RANGE

No. 800, Olive	*No. 812, Oak Leaf*
No. 810, Mahogany	*No. 840, Ox Blood*
No. 811, Bronze	*No. 850 Cherry Red*

HY-TEX RUSTICO RANGE (Plate V)

No. 900, Green	*No. 910, Purple*
No. 911, Bronze	*No. 912, Autumn Leaf*

HY-TEX OLD OAK RANGE

No. 400, Green	*No. 410, Purple*
No. 411, Bronze	*No. 412, Autumn Leaf*

HY-TEX ALEDO MIXTURES (In equal proportions).
Aledo, Antique (Matt Range).
Variegated, Dark Variegated (Rustico, Old Oak).
All the above show a greater or less range of beautiful variation. Std. size, approx. 2⅜ x 8⅛ x 4 in.

The new HY-TEX RUSTICOS are receiving wide favor because of their texture, which, by its soft glowing effects, gives life and character to the wall surface.

The new HY-TEX OLD OAKS, our latest production, are creating a great demand, because of their beautiful range of forest shades and their textures which resembles that of oak bark, producing a wall effect of rare beauty.

Continued on next page

Buildings served with our Hy-tex Aledo Matts, Rustico, and Old Oaks, are such as the High and Grade Schools, Burlington, Grundy Center, Clarence, Winthrop, and Nichols, Iowa; High Schools, Moline, Milan, Altona, and the Irving School, Rock Island, Ill.; County Home, Tipton, Iowa; Hotels, Black Hawk, Davenport, Julian, Dubuque, Iowa, and Fontanelle, Omaha, Neb.; Elk's Club, Sterling, Williams Garage, Bloomington, Ill.; Carnegie Libraries, Toulon, Wyoming, and Aledo, Ill., and Traer, Iowa.

We also handle to advantage from this Center the St. Louis, Chicago, and Indianapolis Ranges of Hy-tex and Hy-namel Brick.

Minneapolis Branch Office

S. J. Hewson, Manager

Products.

Smooth Texture

Hy-tex Red Press Range

Nos. 4 to *8*, Light to Dark Reds, uniform shades. Std. size, approx. $2\frac{5}{16}$ x 8½ x 4 in.

Hy-tex Red Sand Mould Veneer Range

Nos. 4 to *7*, running to soft deep Reds. Std. size, approx. 2¼ x 7¾ x 3¾ in.

Hy-tex Colonial Range

Same as Sand Mould Veneers, but with great variety of color and kiln-set markings.

Rough Texture

Hy-tex Menomonie Velours

Light to Dark Reds, clear and edge flashed. Std. size, approx. 8¼ x 2¼ x 4 in.

Hy-tex Chenille

Bright to Dark Reds, shading into Deep Brown. Std. size, approx. 8¼ x 2¼ x 4 in.

The Hy-tex Sand Mould Veneers are eminently suitable for Residences, but produce fine effects as well in more pretentious structures, as may be seen in such buildings as South High School, St. Barnabas and Northwestern Hospitals, Women's Club, Alice Shevlin Hall (Univ. of Minn.), Minneapolis; St. Thomas College, St. Paul; Royal Alexandra Hotel and Manitoba Club, Winnipeg; Post Offices at Charlottesville, Va., Douglas, Wyo., New Iberia, La., and Abilene, Texas.

The Hy-tex Colonials are particularly attractive when laid in Dutch Bond with a black ½-in. raked mortar joint. A few of the more prominent buildings served with these brick are North High School, Minneapolis Club, Arts and Crafts Guild, French Building, Abbott, Hillcrest, and Elliott (Univ. of Minn.) Hospitals, Roman Catholic Orphanage, Minneapolis; Kitchi Gammi Club and Harriet Beecher Stowe School, Duluth; St. Anthony Park Congregational Church, St. Paul.

The Hy-tex Menomonie Velours are made in wire-cut texture in a range of Reds, some showing edge flashing. A few of the buildings furnished with these brick are the Nevins Laundry and the Dan Patch Railway Freight House, Minneapolis; the Overland Automobile Factory, St. Paul, and numerous residences.

The Hy-tex Chenilles have a soft velvety appearance in a range of Reds from Bright Red to Dark Brown, and produce a wall texture full of warmth and life. They can be furnished in full variation or straight shades of Red. These bricks are well adapted for residences, apartment and business buildings, as well as for schools, churches, and other public buildings.

We also handle to advantage from this center the St. Louis, Omaha, Chicago, and Indianapolis Ranges of Hy-tex and Hy-namel Brick.

Omaha Branch Office

R. W. Besley, Manager

Products.

Smooth Texture

Hy-tex Ironspot Range (Plate VI)

No. 550, Light, Medium, Dark, Tan to Black
No. 540, Dark, of wide variation
No. 530, Light, of wide variation
Made Std. size, approx. 2¼ x 8⅜ x 4 in.

Rough Texture

Hy-tex Quivera Range (Chinchilla Texture)

No. 460, Black
No. 450, Brown, Dark, and Medium
No. 440, Brown, Light, and Tan
No. 430, Red Centers with Brown edges
No. 4654, Mixture, full range of above shades

In addition to these colors, we manufacture Greens, Browns, Purples, and Red Centers with Green edges.

The Omaha Hy-tex Ironspots are being used in some of the finest buildings throughout the Middle West, private and public, such as the Chicago, Burlington & Quincy Stations on the entire system; Hotel Farnam, Colonial Apartments, Omaha; Fleming Building, Des Moines, Iowa; Crane Company Building, Seattle, Wash., and hundreds of the finest homes in the West.

The Hy-tex Quiveras have become justly popular by reason of their rough texture, and varied color-tones which offer the soft pleasing effects of harmonious polychrome blendings in the wall surface.

We also handle to advantage from this center the St. Louis, Kansas City, Davenport, Indianapolis, and Chicago Ranges of Hy-tex and Hy-namel Brick.

Kansas City Branch Office

H. H. Crowell, Sales Manager

Products.

Rough Texture

Hy-tex Diamond Chaldean Range

Nos. 300, 305, 306, 307, Reds, Browns, Blacks

Hy-tex Diamond Matt Range

Nos. 400, 405, 406, 407, Reds, Browns, Blacks
Varied or even shades. Std. size

Smooth Texture

Hy-Tex Oxford Range

Red and Brown. Std. size

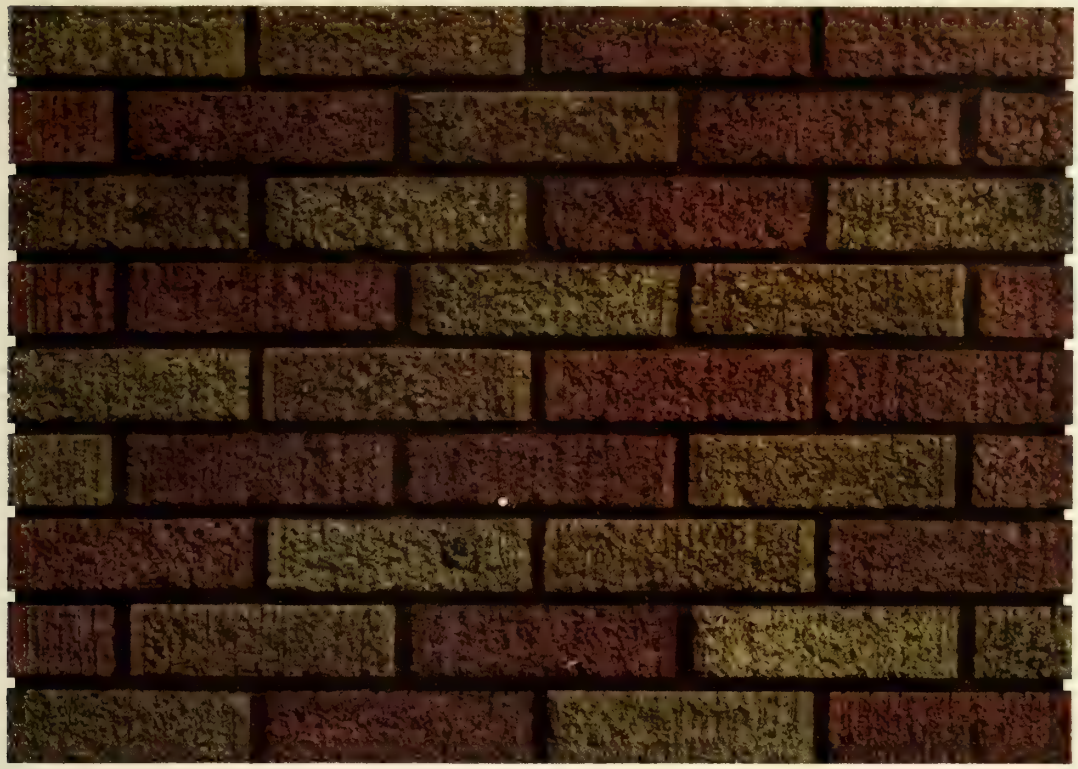
The Hy-tex Diamond Ranges of brick may be seen in such buildings as the Kansas City Star, New Central High School, Belmont and Muehlebach Hotels, New St. Joseph Hospital, Nettleton Home, Helping Hand Institute, the Shields, Graphic Arts, Case, Rumley, and Morbros Buildings, Kansas City; Union Station, Salina, Kan., and Government Buildings at Excelsior, Mo., Garden City, Kan., and Casper, Wyo.

The Hy-tex Oxford Range is an improvement on the old-fashioned round edge brick, having sharp, square edges, and smooth surface, adaptable for all types of buildings where rough textured brick would not be suitable.

We also handle to advantage from this center the St. Louis, Omaha, Davenport, Chicago, and Indianapolis Ranges of Hy-tex and Hy-namel Brick.

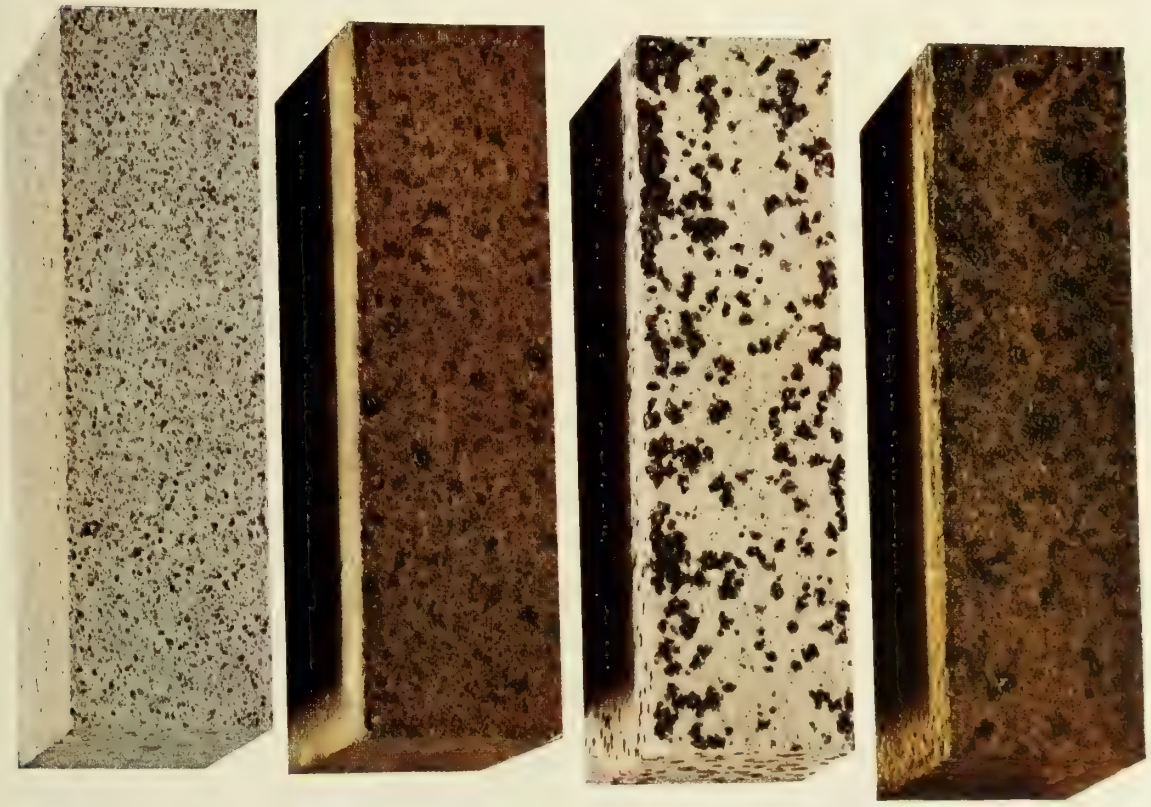
Continued on next page

PLATE V



Hy-tex Dark Variegated Rustico Mixture, Nos. 900 and 910

PLATE VI



Hy-tex Steel Gray, Ironspot, Buff Mottled, Ironspot

Continued on next page

PLATE VII

HY-TEX VELOUR, FULL RANGE. Stretcher Bond, Wide Raked Mortar Joint

PLATE VIII

HY-TEX LIGHT GRAY MATT. Wide Raked Mortar Joint

Continued on next page

Chicago Branch Office

W. P. Varney, Manager

Products.

SMOOTH TEXTURE

HY-TEX LOMBARD RED RANGE
Light, Medium, Dark.

HY-TEX CALVERT COLONIAL RANGE
Red, Brown, Green, Black, in variation.

ROUGH TEXTURE

HY-TEX VELOUR RANGE
Maroon, a clear Red, in three shades.
Antique, red center, varied flashed borders.
Bronze, reddish center, varied flashed edges.

HY-TEX CHALDEAN RANGE (Plate VII)
A rough texture of striking effect. Made in Std. size, light shades running ⅛ in. longer, dark shades ⅛ in. shorter.

The HY-TEX CALVERT COLONIALS, being sand faced, have a soft pleasing texture. They are very effective laid in Flemish Bond with wide white or gray mortar joints.

The HY-TEX VELOUR RANGE presents great beauty of surface texture and color-tone. The Antiques and Bronzes are assorted to light and dark shades or mixed in full range, resulting in very striking color effects. The depth of feeling, due to the warmth and life of their shadings, is unrivalled. They have won an enviable reputation among architects in and around Chicago, and especially lend themselves to the requirements of residential architecture.

The HY-TEX CHALDEAN RANGE baffles description with its unusually pleasing cross texture which gives many subtle nuances to the color shading, not obtained in other rough-textured brick. The effects are characterized by the varied lights and shades due to the peculiar nature of the surface scorings.

We also handle to advantage from this center the St. Louis, Indianapolis, Cleveland, and Davenport Ranges of Hy-tex and Hy-namel Brick.

Indianapolis Branch Office

E. C. Hervey, Sales Manager

Products.

SMOOTH TEXTURE

HY-TEX GOLDEN SALT GLAZE RANGE
Nos. 1 and *2, Light*
Nos. 3 and *4, Medium*
No. 5, Dark
All with slight variation.

HY-TEX BUFF AND GRAY RANGE

No. 600, White	*No. 608, Gray Mottled*
No. 601, Cream	*No. 610, Light Buff*
No. 602, Steel Gray	*No. 611, Dark Buff*

All in uniform shade, except No. 608.

HY-TEX RED OXFORD STANDARD RANGE
Nos. 1 and *2, Light*
No. 3, Medium
Nos. 4 and *5, Dark*

ROUGH TEXTURE

HY-TEX BRAZIL MATT RANGE (Plate VIII)
Ivorys, Light or Dark.
Grays, Pearl, Puritan, or Flashed.
Golden Mottles, Light or Mosaic Blend.
Mosaics, full variation in any Matt brick.
All with slight variation, except *Mosaics.*

HY-TEX CHINCHILLA RANGE

Maroon Reds, Medium, varied.	*Pearl Grays.*
Seal Browns, in two shades.	*Gun Metals.*
Ivorys, Light, Dark, Mosaic.	*Black Missions.*
Sarabands, varied dark shades.	*Golden Mottles.*

All the above ranges enjoy a very wide distribution, being equally suitable for every class of building. They have been served in such important structures as the PALACE HOTEL (No. 601), San Francisco; the WHITE, HENRY, COBB, and STEWART BUILDINGS (No. 608), Seattle; BOYS' HIGH SCHOOL (Oxford Std.) and the URSULINE CONVENT (Gray Matt), New Orleans; ILLINOIS CENTRAL R. R. STATION (Round Edge Oxford Std.), Memphis; QUEBEC BANK OFFICE BUILDING (No. 608), Winnipeg; HIGH SCHOOL (No. 601), Lincoln, Neb.; CHICAGO & NORTHWESTERN R. R. STATION (No. 602), Chicago; SECOND NATIONAL BANK BUILDING (Ivory Matt), Toledo; CITY HOSPITAL (No. 601), Louisville; BARNES HOSPITAL (No. 602), St. Louis.

The HY-TEX SALT GLAZE BRICK is noted for its durability, cleanliness, and beauty. These bricks are in great favor where interior sanitary conditions are desirable. They are also eminently suitable for exterior walls as proof against city smoke and dust. They have been served for the interior of such High Schools as those in WEST PHILADELPHIA; MEMPHIS (Central); MINNEAPOLIS (New Central); KANSAS CITY (Westport and Central); NASHVILLE; CROOKSTON, Minn.; LA FAYETTE and GARY, Ind.; IOWA CITY, Iowa; MORGANTOWN, W. Va.

We call especial attention to our CHINCHILLAS which during the past year have won a wide popularity, because of a texture that gives a very deep soft effect to the fundamental color-tone of the brick. The SARABANDS produce an especially pleasing combination of varied color-tones.

We also handle to advantage from this center the St. Louis, Chicago, Cleveland, and DuBois Ranges of Hy-tex and Hy-namel Brick.

Toledo Branch Office

S. W. Moore, Manager

Products.

HY-TEX TOLEDO SAND MOULD RANGE
Deep Red, and *Kiln-Run* (85 per cent hard).
Made Std. size, approx. 2¼ x 8¼ x 3⅞ in., or on order, in Radius, Octagon, and Bull-nose forms.

These high-grade sand mould brick are growing in popularity for facing work and have been used in such structures as the TOLEDO SUGAR CO.'S FACTORIES, Rossford, Ohio; INTERNATIONAL HARVESTER CO.'S BUILDING, Springfield, Ohio; STATE HOSPITAL BUILDINGS, Lima, Ohio.

The PHILADELPHIA EQUITABLE GRAY RANGE is meeting with great favor in this market. These brick have been served for the ADMINISTRATION BUILDING of the OVERLAND AUTOMOBILE CO., the BOCK ITALIAN VILLA, and the interior walls of the new TOLEDO HIGH SCHOOL.

We also handle to advantage from this center the St. Louis, Chicago, Cleveland, and Indianapolis Ranges of Hy-tex and Hy-namel Brick.

Continued on next page

Cleveland Branch Office

F. H. Chapin, Manager

Products.

Smooth Texture

Hy-tex South Park Cherry Red Range

Cherry Reds, Light, Medium, Dark (Maroon).
Blackstones, Nos. 21 to *23,* flashed Cherry Reds.

Hy-tex Independence Range

Cherry Reds, but in darker shades, with roughish texture.

Hy-tex Round-Edge Paver Range

Repress Shale, similar to Hy-tex Independence.

Old English

Sand texture, either with or without pebbles, made in reproduction of Early English brickwork. Made in three shades, as follows:

Pinkish or salmon color, known as *Light Old English.*

Medium to dark red, known as *Medium Old English.*

Brown to black, known as *16th Century Old English.*

In the pink and red selections, about eight per cent black headers are included.

Rough Texture

Hy-tex Bokhara Range

Reds (in three shades), *Greens, Blues, Antiques* (unusual beauty of shadings), *Red Hearts.*

Hy-tex Shirvans

Rough texture brick of exceptional color, ranging from light red through to brown, copper, tans, to dark blue. This brick in the seal brown possesses unusual beauty.

Guaranteed Against Efflorescence.

The Hy-tex Cherry Reds, in purity of color, clearness of line, absolute imperviousness, and entire freedom from efflorescence, are a faultless facing material, unequalled on the market. In the Blackstone shades, they have been extensively used for large buildings.

The Hy-tex Bokharas are a uniformly reliable product in texture, color-tone, and proportionate shade-blendings, so that the architect can use them in his wall surface with the same assurance of result as the Oriental rug weaver uses his colored wools. Their exquisite softness and richness of color-tone and texture, running through a wide range of shadings, have made them widely popular among architects. We always suggest the use of a variation of harmonious color-tones, but can furnish any predominating shade in quantities desired by the purchaser.

The architect's attention is especially called to our facilities at this center for producing on order large Ornamental Forms in Special Sizes and Shapes (see cut), thus giving him a wide latitude in brickwork that frees him from combinations of incongruous materials, and enables him to give not only a harmonious unity of color and texture but also a character and individual touch to his artistic effort never before attained in brick architecture.

We also handle to advantage from this center the Indianapolis and DuBois Ranges of Hy-tex, and the St. Louis Hy-namels.

Du Bois, Pa., Branch Office

H. W. Simpkins, Manager

Products.

Smooth Texture

Hy-tex Falls Creek Reds (Wire cut and Repress)

No. 2, Red *No. 56, Red Centers*
Nos. 150, Full Color Range

Rough Texture

Hy-tex Falls Creek Velours (Plate IX).

Nos. 2 to *10, Light Reds, Golden Browns, Red and Olive Centers* with blue edges, Gun Metals; all with vertical or horizontal texture.

The blue flashed edges in the full range of these brick, make them unique among brick of their kind. For uniformed wall use Shade No. 3 alone.

Hy-tex Cowan Gray and Brown Ranges

No. 210, Ivory Gray.
No. 220, Golden Mottled (Plate X).
No. 230, Pearl, very light.
No. 240, Steel Gray.
No. 242, Tannish, slight flash.
No. 245, Brown, flashed.
No. 248, Dark Brown, flashed.

An equal blending of *Nos. 230* and *240* is beyond description for clear and transparent coloring. Laid in a ⅜ in. raked mortar joint, these brick make a wall of unusual beauty.

All brick in Std. or, on order, in Norm. sizes.

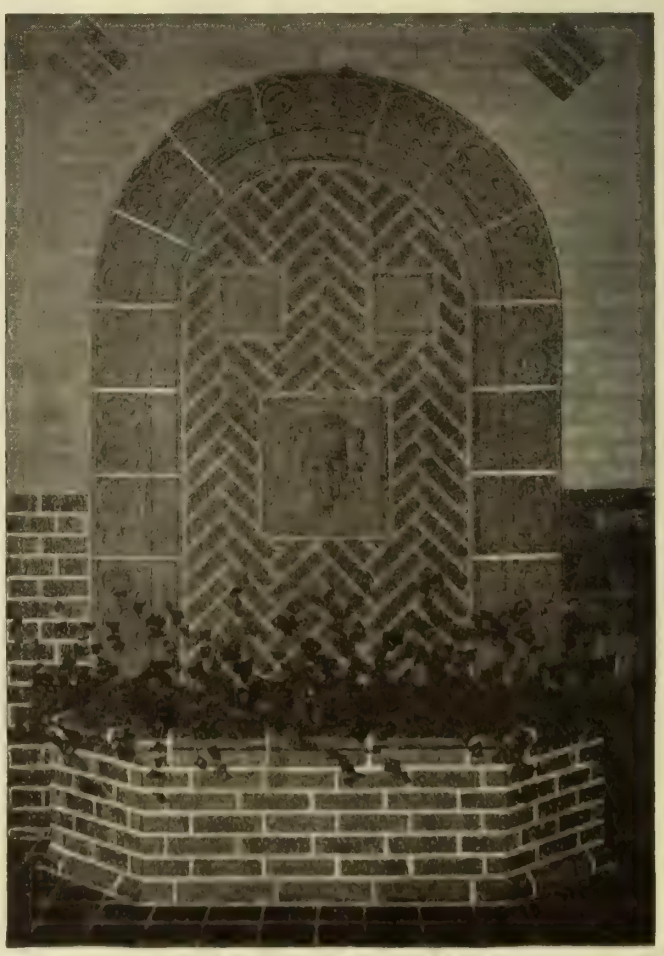
Special Sizes and Shapes

Artistic ornamental forms for rough textured brickwork; can be made in any sizes; sketches furnished on application.

Rough Texture and Repressed Flooring Tile

In 6 x 6 x 1 in. and other sizes; various shades, suitable for Porches, Terraces, and Hearths.

We also handle to advantage from this center the Philadelphia, Washington, and Cleveland Ranges of Hy-tex, and the St. Louis Hy-namels.

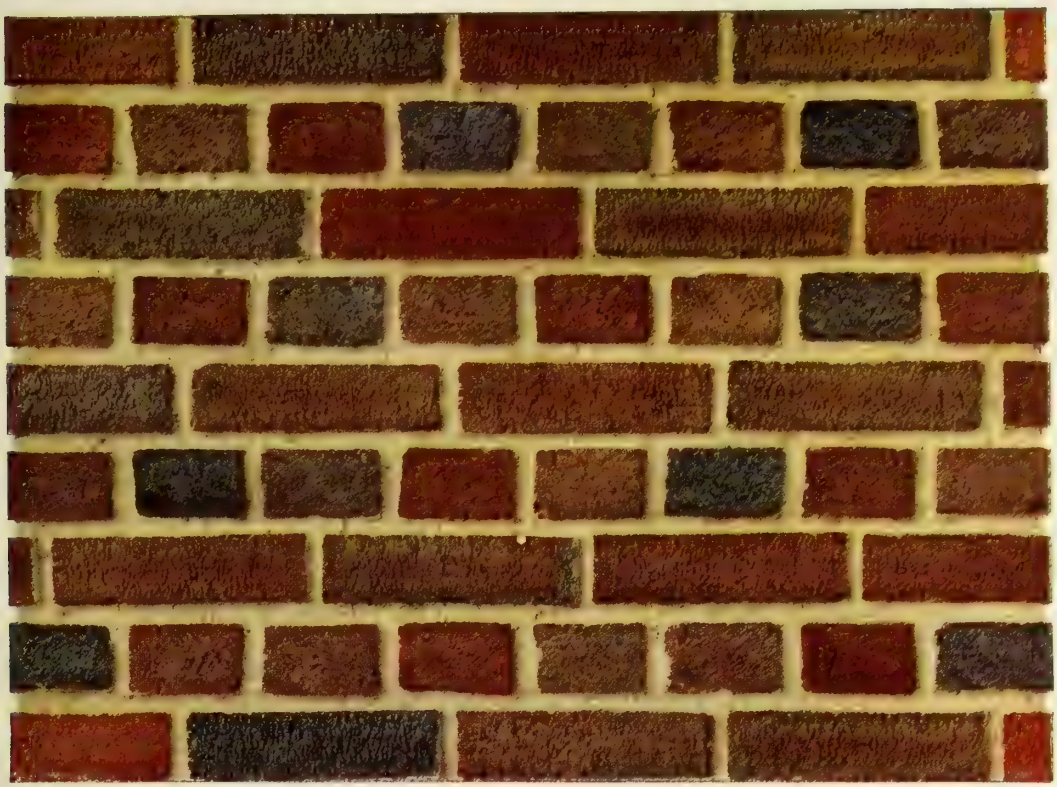


HY-TEX ORNAMENTAL FORMS

Send for Catalogue

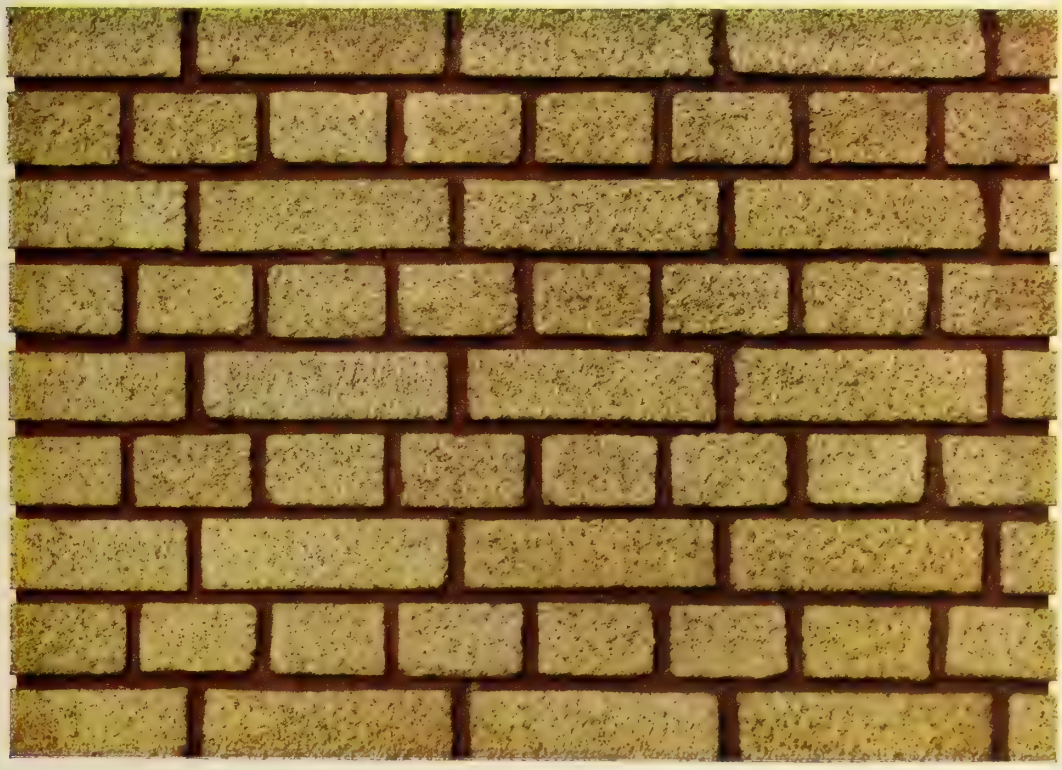
Continued on next page

PLATE IX



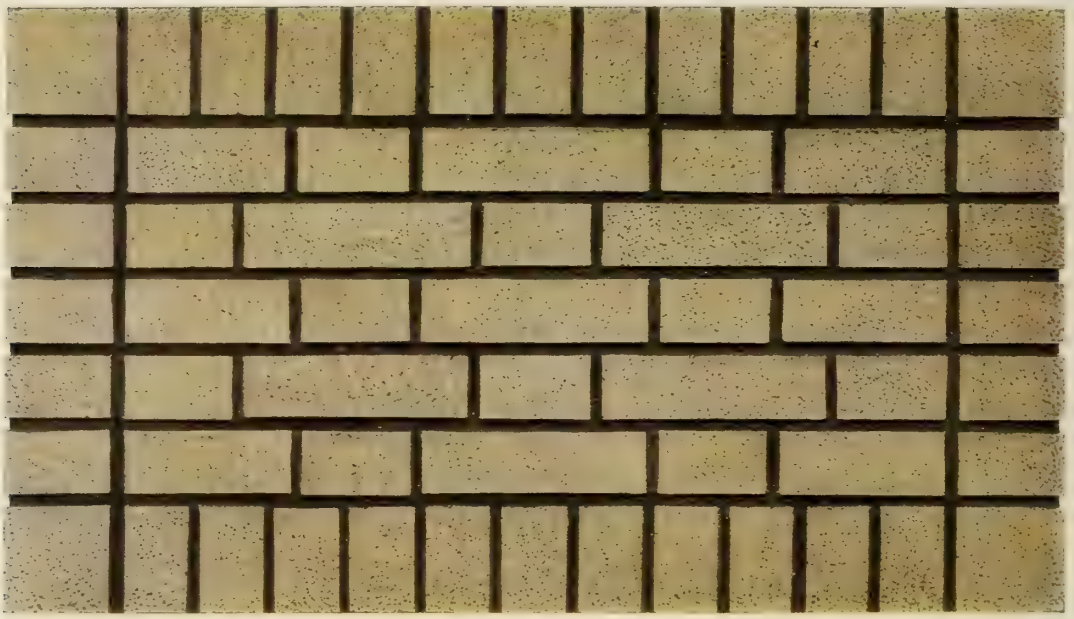
Hy-tex Falls Creek Velour, Vertical Texture, Full Range. Dutch Bond, Wide Raked Mortar Joint

PLATE X



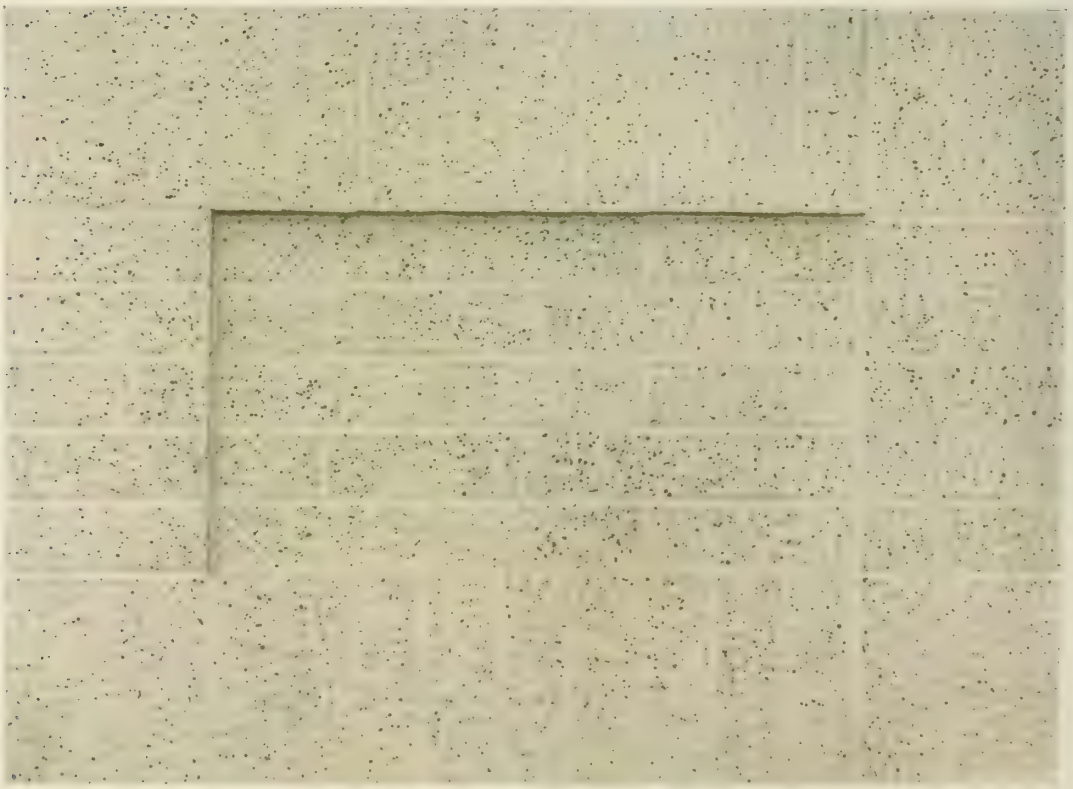
Hy-tex Cowan Golden Mottled. English Bond, Wide Raked Mortar Joint

PLATE XI



Hy-tex Washington Gray, No. 48. Flemish Bond, Wide Raked Mortar Joint

PLATE XII



Hy-tex Equitable Gray, No. 120. Stretcher Bond, Tooled Joint
This panel extensively used in facing the Equitable Building, New York City

Continued on next page

New York Branch Office

Fredenburg & Lounsbury

Products.

SMOOTH TEXTURE

HY-TEX WASHINGTON, PHILADELPHIA, and ST. LOUIS HY-NAMEL RANGES

ROUGH TEXTURE

HY-TEX DUBOIS and PHILADELPHIA RANGES

See Plates IV, IX, X, XI, and XII.

The smooth surfaced WASHINGTON and PHILADELPHIA RANGES, with their refined and finished effect, similar to that of dressed stone, have been used largely in uniform color shadings during the past. But within the last few years mixed shadings with considerable variation have become popular, and when laid up with a raked joint produce strikingly beautiful effects.

Rough faced brick, scored vertically or horizontally, such as our DUBOIS and PHILADELPHIA RANGES, reproduce the warm textile or rug effects of Oriental tapestries. They run through a rich variety of color-tones both in Reds and Grays; and always lend to the wall surface a warm living tone.

For delicate effects, and for walls that wash clean, the Hy-tex Equitables are preeminent. Many buildings of great size and monumental type are faced with them, notably, the EQUITABLE BUILDING, New York City.

Philadelphia Branch Office

R. Simpkins, Vice-President

Products.

SMOOTH TEXTURE

HY-TEX WINSLOW IRONSPOT RANGE

Nos. 59, 69, 79, and *89,* soft rich tones, both in Orange and Peach-blow blends of every variety.
Nos. 55, 65, 75, and *85,* similar to above, but more somber in tone, furnished on order.

HY-TEX EQUITABLE RANGE

No. 100, White.
No. 110, Light Gray, with small spot.
No. 120, Light Gray, with large spot (Plate XII).
Made in Std. size; and, on order, in Norm., Eng., and Rom. sizes, and in various moulded forms.

ROUGH TEXTURE

HY-TEX WINSLOW BELGIAN RANGE

Tannish, Copper, Bronze.

The varied shadings of the HY-TEX WINSLOW IRONSPOT must be seen to be appreciated. Send for color cards or samples. It has been extensively used in ambitious residential architecture, and shows to great advantage in large wall expanses.

Our justly celebrated HY-TEX EQUITABLES, of which we specially manufactured 2,750,000, *No. 120,* for the EQUITABLE BUILDING of New York City, present a smooth impervious surface and wash with the rain to their original clear appearance. They are guaranteed against crazing, scaling, or discoloring under the severest climatic conditions.

The Flemish color-tones of our HY-TEX BELGIAN RANGE offer unusual opportunities for refined effects in the wall surface.

We also handle to advantage from this center the DuBois and Washington Ranges of Hy-tex, and the St. Louis Hy-namel.

Washington, D. C., and Baltimore Branch Offices

A. B. Lyon, Manager

Products.

SMOOTH TEXTURE

HY-TEX WASHINGTON RANGES

Nos. 1 to *10, Reds.*
Nos. 4 to *14, Browns.*
Nos. 45 to *49, Gray Spots* (Plate XI).
Nos. 75 to *79, White Mottles.*
Nos. 81 to *86, Dark Gray Mottles.*
Nos. 145 to *149, Light Grays.*
Nos. 175 to *179, Plain Whites.*
Nos. 195 to *198, White Mottles,* fine spot.
No. 190, Light Mottles, Kiln-Run.

Made in Std., Eng., Rom. and Norm, sizes; also in Moulded and Ornamental shapes.

The HY-TEX WASHINGTON REDS and GRAYS have held an enviable position among face brick for nearly twenty-five years, and have, during that time, been served to innumerable public and private buildings along the Eastern seaboard from New York City to St. Augustine. The cleanliness and beauty of Washington City are not a little due to the prevalent use of these beautiful light toned brick.

We also handle to advantage from this center the Indianapolis Salt Glaze, Philadelphia and DuBois Ranges of Hy-tex, and the St. Louis Hy-namels.

THE BALTIMORE BRANCH OFFICE is affiliated with the Washington Office and handles the same products.

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TORONTO, ONT., BLACK BUILDING SUPPLY CO., Mail Bldg.
UTICA, N. Y., AMERICAN HARD WALL PLASTER CO.
WINNIPEG, MAN., N. J. DINNEN & CO., LTD.
WICHITA, KAN., LUMBERMEN'S SUPPLY CO.

THE KANSAS BUFF BRICK & MANUFACTURING CO.

High-Grade Face Brick in Smooth and Rough Texture
Common Brick and Hollow Building Tile

GENERAL SALES OFFICE AND WORKS

BUFFVILLE, KAN.

BRANCH SALES OFFICES AND REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products.

Manufacturers of all designs and colors of VITRIFIED and DRY PRESS FACE BRICK, Smooth and Rough Texture; BUILDING BLOCK.

Our Specialties: We furnish, in any quantity or size, HOLLOW BUILDING TILE, as well as COMMON BRICK, HOLLOW BRICK, GLAZED BRICK, ENAMEL BRICK, GRAY BRICK, ORNAMENTAL BRICK, TERRA COTTA, ROOFING TILE, the celebrated FT. SCOTT BRICKLAYERS' CEMENT, WALL TIES and MORTAR COLOR.

Quality and Facilities.

The different designs, styles and colors of brick as outlined in the following paragraphs are manufactured only by this Company. No adulteration or coloring matter is used. It is possible for us, with our natural advantages, modern equipments and large capacity, to put our brick on the market at a remarkably low price.

Size and Colors.

All of our different styles and designs of brick are manufactured the same size, i.e., approximately 8¼ by 4 by 2⅜ inches. In making selection of the different shades and colors to be used in trimming where the brick are to be toothed in, it should be borne in mind that there will be some slight variation between the extremely hard burned brick and the lighter shades of the same color.

"Navajo Brick" Group.

The words "Navajo Brick" stand for quality and artistic beauty in rough texture brick. Produced in all colors and shades known to facing brick, except in the Gray.

Our Golden Green "Navajo Brick" are easily the leaders in rough texture facing brick both as to distinction and richness of color as well as fineness and beauty of texture. No better description can be given to this brick than that which the name implies.

Mingled shades of "Navajo Brick" produce an unlimited field for artistic effect, and we highly recommend this combination for any and all classes of building.

"Navajo Brick" are furnished in the straight colors or any desired combinations.

"K-B" Granulated Mottled Group.

This group, made in dry press only, comprises a range of colors and shades (light to dark) that make them the leaders in our smooth texture brick, ranking next to our "Navajo" group in beauty of color and variation.

The Granulated Mottled is very attractive brick in that it represents more a granite effect and is especially pleasing for facing purposes. This brick is produced in both square and round edge. These shades vary from light granite, bordering almost on a gray, through intermediate shades to a Bronze effect.

"Brocade Brick" Group.

This is something entirely new in a very rough texture brick, which gives the desired effect and at the same time eliminates many of the objectionable features heretofore found in material of this class.

The same effect on the entire face of the brick is carried out; and on account of the roughened face not being separated from the body of the brick in process of manufacture, it is not damaged in handling nor deteriorates after being put in the wall, but retains its original bond as part of the brick, insuring permanency and uniformity of texture.

The design, method of manufacture, as well as the machine for manufacturing, are all fully covered by patents; and the brick is furnished in the same range of shades and colors as our Navajo brick.

Buff Group.

This group, especially desirable for corridors or light courts, comprises smooth texture round and square edge, dry press buff brick, varying from very light cream tint through medium shades to a deep Canary color.

Light Mottled Group.

A dry press brick in square edge effect having a Buff background with dark Chocolate speckles, producing a Buff speckled brick, some of the shades (when laid in the wall) producing the effect of a Gray brick. Well adapted for corridors and light courts, and can be highly recommended for any facing purpose where a light effect is desired.

Chocolate Group.

In this group we have the round and square edge smooth texture brick varying from a light pinkish tint through medium shades of red effect to a deep chocolate and red center color. Manufactured in both vitrified and dry press.

Cherry Red Group.

This group comprises various shades of cherry red, varying from light red to a deep Oxblood color, and is produced in both vitrified and dry press, round and square edge.

Color Plates and Samples.

We will be pleased to receive inquiries for color plates or samples of any of the foregoing brick.

KEY-JAMES BRICK COMPANY

Manufacturers of Brick for Building

OFFICE AND WORKS

Alton Park

CHATTANOOGA, TENN.

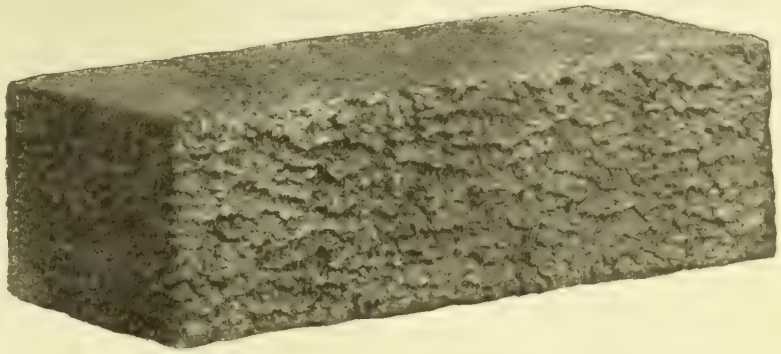
Products.

IMPERVIOUS FACE BRICK: ROUGH TEXTURE, in Reds, Ox Blood, Brown and Gun-Metal; also, SMOOTH TEXTURES, in Red and Brown. ROUND CORNERED PAVERS and SAND FACE "SOUTHERN COLONIALS."

Capacity.

We have the largest stiff-mud plant in the South. It is modern in every respect, and has a capacity equal to the prompt handling of orders of any size.

We turn out 50,000 brick per day, and try to keep on hand a large stock of all the different shades, so that we can furnish large orders on short notice.



TEXTURE OF BRICK USED IN BUILDING SHOWN BELOW

Shades and Textures.

Our line of textures is made in various shades of reds, browns and gun-metal, and will be furnished either sorted to shades or kiln-run.

A great deal of favorable comment is attracted by our mingled shades, or full yard variation, and we take unlimited pains to give the architect the exact amount of variation desired. We cater especially to architects, and have made friends wherever we have sold brick.

The texture of our brick is unique, and is secured by a special apparatus that gives more of a nap than is given by the usual method.

The shales burn a much darker gun-metal and a much darker red than any other shales in the South, and the brick produced is on a par with any made in the North.

Our rough textures measure 2½ inches by 8¼ inches by 4 inches. Weight 6 pounds. We make "specials" when desired. The absorption is remarkably low and the crushing strength has met every test.

NEW Y. M. C. A. BUILDING, ATLANTA GA.
SHATTUCK & HUSSEY, Chicago, Ill., Architects
A. T. E. BROWN, Atlanta, Ga., Associate Architect

Shipping Facilities.

Our shipping facilities are unsurpassed, as our plant is located centrally to all Southern territory, and is accessible to four lines of railroad.

Samples.

Average samples, with prices, will be submitted on request.

Experience.

Our entire organization has had ten to fifteen years' actual experience in the brick business, and we consider ourselves especially "face brick" people.

Co-operative Service.

We are glad at any time to lay up panels of brick in the actual mortar and ship by express, charges prepaid, to the prospective customer.

Some Representative Jobs.

Below are given names of some buildings in which our brick has been used:

Interior Decoration of Rathskeller, Ansley Hotel, Atlanta, Ga. B. B. Davis, Architect, Louisville, Ky.

Holman Office Building, Athens, Ga., A. Ten Eyck Brown, Architect, Atlanta, Ga.

Elks Club, Tampa, Fla.

Dormitory Building, Athens, Tenn., Adams & Alsup, Architects, Chattanooga, Tenn.

Y. M. C. A. Building, Atlanta, Ga., Shattuck & Hussey, Chicago, Ill., A. A. Ten Eyck Brown, Atlanta, Ga., Associated Architects.

Presbyterian Church, Lexington, Ky., Richards, McCarty & Buford, Architects, Columbus, Ohio

Municipal Building, Tarpon Springs, Fla., E. D. Ivey, Architect, Atlanta, Ga.

Berry School, Rome, Ga., Coolidge & Carson, Architects, Boston, Mass.

Residence of Carter Snow, Richmond, Va., Corneal & Johnson, Architects, Richmond, Va.

University of Cincinnati Building, Cincinnati, Ohio, Tietig & Lee, Architects, Cincinnati, Ohio

Residence of Sam Hicks, Richmond, Ky., David Davies, Architect, Cincinnati, Ohio

Residence of William S. Hatch, Sheffield, Ala., Bem Price, Architect, Birmingham, Ala.

Seamen's Chapel and Home, Charleston, S. C., Walker & Burdon, Architects, Charleston, S. C.

Residence of S. H. Trezevant, Memphis, Tenn., S I. Weigle, Architect, Memphis, Tenn.

Georgia School of Technology Power House, Atlanta, Ga. Francis P. Smith, Architect, Atlanta, Ga.

KUSHEQUA BRICK COMPANY

Manufacturers of Face Brick and Paving Materials

KUSHEQUA, PA.

DEALERS

NEW YORK, N. Y., C. T. Willard Co., Inc.
BOSTON, MASS., Waldo Bros.
CHICAGO, ILL., Thomas Moulding Brick Co.
ATLANTA, GA., Roper & Strauss Co.
CLEVELAND, OHIO, Euclid Builders Supply Co.
SYRACUSE, N. Y., Cummins Brick & Tile Co.
DETROIT, MICH., Colonial Brick Co.
JAMESTOWN, N. Y., A. M. Cobbe
LOUISVILLE, KY., R. B. Tyler Co.
CINCINNATI, OHIO, Shorey-Wills Brick & Supply Co.
And other dealers

Products.

Vitrified Shale Face Brick Flooring and Paving Materials.

Kushequa Face Brick.

The characteristics of Kushequa Face Bricks are their deep color (specially dark red), great strength and high vitrification. Kushequa Face Bricks are made in the following types: Kq Paver, Wire-Cut, Ox-blood Devonshire, Velours, Saruk, Smyrna and Black Headers.

Kq Paver—2¼ by 8¼ by 3⅞ inches; weight 6⅛ pounds. This brick is repressed, with bevel edges and resembles a small paving block. It gives the effect of massive strength and is particularly pleasing in large buildings. Two shades, dark and light. In second quality it makes a handsome front at low cost.

Wire-Cut—2¼ by 8 by 3¾ inches; weight 6 pounds. A standard red brick with smooth face and wire-cut sides, in four shades. Shade 1, exceptionally dark and strong; Shade 2, a dark red brick of moderate cost; Shade 3, a clear red brick for sidewalks and fronts not requiring dark red; and Shade 4, a light red brick, sufficiently vitrified to withstand wet and frost. Shades 3 and 4 in mixture form our cheapest face bricks.

Ox-blood Devonshire—2¼ by 8 by 3¾ inches; weight 5¾ pounds. Very rough texture and a clear, uniform red color. Shade 1, the darkest clear red on the market; Shade 2, a fine deep red; Shade 3, a bright red. The second quality in mixed shades is amply good for any large front and is recommended where price is an object.

Velours—Similar to Ox-blood, but of finer texture, giving a velvety appearance.

LOUIS SELLBACH RESIDENCE, LOUISVILLE, KY.
Faced with 80,000 Wire Cut Shade 2
McDonald & Dodd, Architects, Louisville, Ky.

HOTEL SHERMAN, CHICAGO, ILL.
Faced with 500,000 Kq Pavers
Holabird & Roache, Architects.

Saruk—2¼ by 8 by 3⅞ inches; weight 5¾ pounds. The rough texture and variegated color gives this brick an Oriental rug effect. The hues harmoniously blend from deep red through old rose to greenish gray, and from bronze to tan. To get the best effect, it should be laid with dark mortar joints, not exceeding one half inch, raked. Saruks are choice enough for a parlor mantel, yet cheap enough for a fine hotel front. Second quality Saruks look well in large buildings, especially where "tapestry" effects are desired.

Smyrna or Redbreast—This brick is of rough texture, with red center, gray edges and glossy black sides.

Paving Materials.

This Company commenced business in 1904 with the manufacture of paving blocks out of a strongly ferruginous mountain shale highly vitrified by natural gas. The beauty of color and finish of the product created such demand for building purposes that the capacity of the factory is now principally taken for face bricks. The high vitrification of our products makes them acid-proof and electric-insulating. The paving products comprise:

Continued on next page

WESTMINSTER PRESBYTERIAN CHURCH, ROCHESTER, N. Y.
Faced with 100,000 Saruk and Ox-blood mixed

Kushequa Repressed Paving Block—3½ by 8¾ by 4 inches; weight, 10 pounds. Tough, durable, impervious and handsome in finish. Guaranteed to lay forty per square yard, street measure.

Kq Panel—2¼ by 8⅛ by 3⅞ inches; weight, 6⅛ pounds. Repressed, smooth face and sharp edges, countersunk panel on one side. Usually laid on side for floors of packing houses, storage-battery rooms, boiler rooms and porches.

Brickette—2¼ by 8 by 2 inches; weight, 3 pounds. A dark red, thoroughly vitrified brick, useful for floors where hard wear is desired but unnecessary depth is objectionable. It is beautiful for porch floors and hallways. The Mall or concourse at Staten Island end of New York's Municipal Ferry is paved with Kushequa Brickettes. It is a favorite for packing-house floors.

Floor Brick—4 by 8 by 1¾ inches; weight, 4⅔ pounds. Specially made for packing-house floors to resist grease, hot water and heavy trucking. One side and two edges smooth; wire-cut back and ends. Durability and lightness are combined. For equal wearing surface the depth and weight are only half as great as with standard brick. The second quality looks well for porch or vestibule floors or hearths.

Battery Room Floor Tile—8 by 8 by 2 inches; weight, 11 pounds. Specially made for the purpose of the insulating, acid-proof floors of electric storage-battery rooms. Lugs on two opposite sides project one fourth inch. Highly vitrified and very strong.

Shipping Facilities.

Daily output 25,000 face brick. Two hundred thousand carried in stock of each of four best sellers (Kq Paver Dark, Ox-blood Devonshire Shade 1, Saruk and Wire-cut Shade 3) to insure promptness. Local railroad connecting direct with Buffalo, Rochester & Pittsburgh Railway, Erie R. R., Pennsylvania R. R., Baltimore & Ohio R. R. and P. S. & N. R. R., secures competition in freight rates and prompt car supply.

References.

The following is a partial list of buildings in which Kushequa products were used, giving the location, architect, kind and quantity:

FACE BRICK

Thorp School, Lockwood and Berteau Streets, Chicago, Ill., A. F. Hussander, Brown Saruk, 60,000.

San. Dist. Pump Sta., Mohawk and Menominee Streets, Chicago, Ill., F. J. Barrett, Ox-blood Devonshire, 40,000.

Collins Apartments, 54th and Cornell Streets, Chicago, Ill., H. L. Newhouse, Kq Paver dark, 60,000.

Y. M. C. A. BUILDING, LOUISVILLE, KY.
Faced with Saruk and Ox-blood Devonshire mixed
McDonald & Dodd, Architects, Louisville, Ky.

G. S. Bridge Res., Evanston, Ill., Geo. W. Maher, Velours Shade 2, 30,000.

Hotel Sherman, Clark and Randolph Streets, Chicago, Ill., Holabird & Roache, Kq Paver dark, 500,000.

Stock Yards Inn, Chicago, Ill., R. L. Lindstrom, Ox-blood Devonshire Shade 1, 450,000.

Highlands Co., 6811 Euclid Avenue, Chicago, Ill., J. R. Stone, Kq Paver dark, 25,000.

Callahan Apartments, 1622-4 Garfield Boulevard, Wortmann and Steinback, Kq Paver Light, 35,000.

Y. W. C. A., Brooklyn, N. Y., Frank Freeman, Saruk and Ox-blood (Gardens), 180,000.

Erie R. R. Station, Ridgewood, N. J., Graham King, Saruk, 40,000.

Electric Power Plant, So. Framingham, Mass., Kq Paver (2nds), 90,000.

Fire and Truck House No. 8, Germantown Avenue and Bringhurst Street, Philadelphia, Pa., W. B. Powell, 50,000 Wire-cut Shade 3; 52,000 Blackheaders.

8th District Police Station, 10th and Buttonwood Streets, Philadelphia, Pa., W. B. Powell, 47,000 Wire-cut Shade 3; 48,000 Blackheaders.

Church of Our Lady of Rosary, Yonkers, N. Y., John V. Van Pelt, Saruks.

Boys' High School, Louisville, Ky., J. E. Henry, Ox-blood and Saruk mixed, 225,000.

Louis Seelbach Residence, Louisville, Ky., McDonald & Dodd, Wire-cut Shade 2, 65,000.

Westminster Presbyterian Church, Rochester, N. Y., Saruk and Ox-blood Devonshire mixed, 100,000.

Colonial Theater, Dayton, Ohio, Ox-blood Devonshire Shade 1, 27,000.

Eagles' Temple, Jamestown, N. Y., Freeburg & Fidler, Saruk.

United Evangelical Church, Oil City, Pa., J. C. Brenot, Saruk, 90,000.

Mayo Bros. Clinic Hospital, Rochester, Minn., Kq Paver, 125,000.

Mayer Bros.' Block, Erie, Pa., Richard Irvin, Velours, 250,000.

PAVING MATERIALS

D. B. Martin Co., Packing House, Claremont, Baltimore, Md., Brickette, 57,000.

J. J. Felin Packing House, Philadelphia, Pa., C. B. Comstock, Floor Brick, 140,000.

Solvay Process Co., Syracuse, N. Y., Battery Room Floor Tile.

Electric Storage Battery Co., No. Philadelphia, Pa., Willard Floor Tile.

G. K. Billings, Driveways, Riverside Drive, New York, N. Y., Kq Paver (Spl.)

W. M. Rice Institute, Courts and Cloisters, Houston, Tex., Cram, Goodhue & Ferguson, Kq Paver, 25,000.

MARTIN BRICK COMPANY

OFFICE
PITTSBURGH, PA.

KITTANNING BRICK & FIRE CLAY COMPANY

PLANT
KITTANNING, PA.

YINGLING-MARTIN BRICK COMPANY

PLANT
JOHNSONBURG, PA.

AGENTS

BOSTON, MASS., Waldo Bros. Co.
BUFFALO, N. Y., John H. Black Co.
CHICAGO, ILL., Thomas Moulding Brick Co.
CINCINNATI, OHIO, The Moores-Coney Co.
CLEVELAND, OHIO, The Queisser-Bliss Co.
DETROIT, MICH., Thomas Bros. & Co., Ltd.
GRAND RAPIDS, MICH., Michigan Face Brick Co.
MINNEAPOLIS, MINN., Hydraulic-Press Brick Co.
MONTREAL, CAN., Dartnell, Ltd.
NEW ORLEANS, LA., Salmen Brick & Lumber Co.
NEW YORK, N. Y., Pfotenhauer-Nesbit Co.
NORFOLK, VA., J. C. Grinnan
PHILADELPHIA, PA., O. W. Ketcham
ROCHESTER, N. Y., T. H. Swan
WINNIPNEG, CAN., Waite-Fullerton Co.

Products.

Vitreous Face Building Brick, Repressed and Wire-Cut; Standard Moulded Brick, Johnsonburg Artbrick, Art Tile and Promenade Brick.

TRADE-MARK

Facilities—Located on the Pennsylvania Railroad, about forty-five miles north of Pittsburgh, deliveries can be made on any of the principal railroads in the United States and Canada.

Management.

The above named companies are under one management.

Description.

The Kittanning Brick & Fire Clay Company was incorporated in 1893, and has been continuously operated by the original management in the manufacture of vitreous face building bricks, repressed and wire-cut, in all shades of gray, buff and manganese spot.

The material used in producing these brick is the very best Pennsylvania plastic fire clay. All clays are mined on the premises, with an unlimited reserve supply. Gas is used exclusively for burning, insuring a clean, bright, vitreous surface.

Capacity—We have two fully equipped factory buildings separated seven hundred feet, eliminating all danger of delay from fire or other accident. Average daily capacity, 150,000 face bricks. Stock sheds sufficient to house 10,000,000 bricks.

We carry a stock of standard moulded bricks and make to order any desired shape that can be produced in a brick factory.

Artbrick and Tile.

Yingling-Martin Brick Company, Johnsonburg, Pa., produces the Johnsonburg Artbrick, Art Tile, and Promenade Brick in rough texture and smooth.

The Johnsonburg Artbrick have a distinctive character and individuality that is peculiar to the raw material obtained in the immediate neighborhood of this factory. The bricks are uniformly reliable in texture and color, and are carefully shaded to give the best possible blending of colors. We believe the best results are obtained by using full range of colors, but we can furnish this brick in solid colors, or blended to suit the architect's requirements.

The Art Tiles are manufactured in smooth repressed and rough texture, having the same unusual blending of colors that are found in the Artbrick.

The Promenade Tiles are made repressed, either with beveled edge or square, and are used very largely for terraces, porch floors, and garden walks. They also have the same blending of shade and richness of color tone found in the Artbrick and Art Tile.

Annual capacity, 20,000,000 bricks.

FACTORY OF KITTANNING BRICK & FIRE CLAY COMPANY, KITTANNING, PA.

STANDARD BRICK COMPANY

W. E. DUNWODY, President

MACON, GA.

Products.

Manufacturers of Facing Brick in all shades and finishes; Common Clay Brick; Fire Brick; Sidewalk Brick in standard sizes; also Hollow Brick for foundations, partitions, etc.; Johnson Hollow Building Tile; Impermeable Wall Coping; Flue Lining.

Facilities.

We are the "South's Greatest Clay Products Company"; the capacity of the plant is 100,000,000 bricks annually.

We have two miles of railroad loading tracks in our plants, which plants are equipped with every modern facility for manufacturing the best grade of brick, and are electrically operated throughout.

Shipments.

Brick can be shipped the day the order is received. A new method of loading makes it possible to deliver brick in the best condition and practically free of bats; and in such a way as to enable one to verify the count of the car as soon as the seals are broken, thus saving the trouble and expense incident to counting the brick as when loaded in the old method.

Composition.

Our products are made from *pure clay.*

Facing Brick.

"Cravenette" Impervious Brick is made in a great variety of shades—black, gun-metal, tones of mahogany, brown and cherry—and handled by men who have been trained in color effect. It is adaptable to the various bonds and colors of mortars.

The play of light and shadow gives such an attractive effect to the masonry as is equaled by no other product. The dark red with fire-flashed "kiln marks," ranging in tone from gun-metal to brown, running "hit or miss" across the face, has a pleasing appearance of age. To be recommended for the heavy joint, any color of mortar or kind of bond.

"Ratine," Rough Faced, in any of the foregoing shades, is carried in stock.

Common Brick.

Our manufacturing facilities enable us to supply common brick in any quantity, and of best quality.

Fire Brick.

A high standard is maintained in supplying the needs for superior grades of fire brick and refractory material for such purposes as blast furnaces, copper smelting furnaces, lime kilns, open hearth steel furnaces, boiler settings, chimneys, and general uses where high temperatures are employed.

Their uniform quality makes them especially valuable for exacting uses.

Sidewalk Brick.

Sidewalk brick will withstand the roughest traffic, and is also suitable for such uses as the construction of private drives and walks. It is made in standard sizes.

Hollow Partition Tile.

The Hollow Tile is strong, substantial and economical. It resists heat and cold, and wears well.

Co-operative Service.

We solicit a trial of our products; and will fill orders with the proper material promptly, intelligently, and at the right price.

If you are troubled with burned-clay-products problems, bring them to us.

Information.

Interesting and helpful literature relative to the advantages of brick construction will be furnished gladly on request.

SAYRE & FISHER COMPANY

All Kinds of Brick

261 Broadway (Cor. Warren Street)
NEW YORK, N. Y.

BRICK WORKS OF THE SAYRE & FISHER CO., SAYREVILLE (ON RARITAN RIVER), N. J.

Products.

Fine Pressed Front Brick, Special Brick, Brick for Arches or Ornamental Work, Superior Enameled Brick, Porcelain Face Brick.

Also Fire Brick and Hollow Brick (for fire-proofing purposes), for which see opposite page.

Front Brick in Various Colors.

These we manufacture in a great variety of colors: White, Light and Dark Buff, Red, Gray, Old Gold, Rough Face Persian, and Mottled; other shades to order; enabling architects to select a material that, while fire-resisting and easily handled, shall permit them to lighten and beautify and add strength and variety to a street façade.

Special Brick.

We manufacture these to meet architects' designs in any particular color or size.

Brick for Arches or Ornamental Work.

These we produce in any desired shape, plain or moulded.

Superior Enameled Brick.

We manufacture Superior Enameled Brick in large quantities. They are coming into more general use for a great variety of purposes, and are especially adapted for lining of waiting-rooms of railroad stations, tunnels, markets, hospitals, engine and boiler rooms, kitchens, etc.

Porcelain Face Brick.

Porcelain Face Brick for front brick purposes. Used in the following buildings:

City Investing Building, New York, N. Y., 900,000, Francis H. Kimball, Architect.

Eighty Maiden Lane, New York, N. Y., 800,000, D. H. Burnham, Architect.

German-American Insurance Co., Maiden Lane and Liberty Street, New York, N. Y., 250,000, Hill & Stout, Architects.

Office Building, Broadway and Astor Place, New York, N. Y., 200,000, Francis H. Kimball, Architect.

Seneca Building, Buffalo, N. Y., 250,000, McKenzie, Voorhees & Gmelin, Architects.

Adams Express Co. Building, New York, N. Y., 1,000,000, Francis H. Kimball, Architect.

Western Union Telegraph Building, New York, N. Y., 750,000, Wm. Wells Bosworth, Architect.

Shipping Facilities.

The favorable location of our works at deep water on the Raritan River, N. J., enables us to load vessels of large draught.

Shipments can also be made direct to all points, connecting with any line of railroad.

Export Trade.

We make a specialty of loading large vessels for export trade.

SAYRE & FISHER COMPANY

Red Brick Department

261 Broadway (Cor. Warren Street)

NEW YORK, N. Y.

Products.

Hard Building Brick, Selected Common Brick, "S. & F." Clinker, "Hill Specials," "Rain-Washed," "Old English Red," Repressed Down-Draft Red and Repressed Up-Draft Red Stretchers, and Black Headers for Facing; Hollow Brick and Fire Brick.

Hard Building Brick.

Hard-burned, dark red color. Shipments, in cargo lots, via our fleet of barges or schooners or via rail to all points. A very economical building brick for heavy construction work.

Millions used in the Hudson Terminal (Clinton & Russell, Architects); Pennsylvania Terminal (McKim, Mead & White, Architects), etc., New York City.

Selected Common Brick.

For facing. Of general dark red color and sufficiently varied in color and shape for "Harvard" work. These are very desirable for Colonial work.

Millions used in the University of Pennsylvania buildings, Philadelphia, Pa.

"S. & F." Clinker Stretchers.

These are also for facing. Sometimes called "Clinker Brick," because they are nearest the fire in the kilns and are burned black and twisted.

Very popular with some architects for residences, etc., such as the Heinsheimer residence (R. L. Daus, Architect), Breezy Point, Far Rockaway, Long Island, N. Y.

"Hill Specials."

Also for facing. A brick with a pinkish tone, made popular by Mr. Hill, of Hill & Stout, Architects, and used by him on many buildings and residences, notably the Tichenor Stables on 60th Street, near Broadway, New York, N. Y.

"Rain-Washed" Red Stretchers.

These are laid either with or without Black Headers. A "chance" product caused by rain on the brick when in a green state on open yards.

The Orpheum Theater, Brooklyn, N. Y.; Rogers, Peet & Co. Building, 13th Street, 4th Avenue and Broadway, New York, N. Y., are built of this brick.

"Old English" Red Stretchers.

This product is something new and is about the size of the Old English Brick, made in dark red tone and measuring about 8⅞ x 2⅞ x 4 inches.

Over six hundred thousand in the new Curtis Publishing Company's Building in Philadelphia, being selected by the architects after searching the Old World for ideas that were unique and artistic. Very popular.

Repressed Down-Draft Red Stretchers.

These are of a uniform dark red color and a great seller.

They were used in the new Astor Hotel, Broadway and 44th Street, also in the new Royal Insurance Building, William Street and Maiden Lane, New York, N. Y., and in the Royal Insurance Building, San Francisco, Cal.

Repressed Up-Draft Red Stretchers.

Same as the Down Draft, except that these show light and dark kiln marks on the stretcher side, which gives a diversified effect.

St. Veronica School, Washington and Barrow Streets, New York, N. Y., and St. James Rectory, Jay Street, Brooklyn, N. Y., are built of them.

Black Headers.

Made to be used with the Selected Common Brick or Repressed Stretchers for the "Harvard" effect if desired.

Hollow Brick.

Both Stretchers and Headers of a very superior quality. They can be furnished in cargo lots.

Fire Brick.

Two grades: No. 1 "Sayre & Fisher" and No. 1 "Phenix." Very desirable for boiler settings, furnace linings, etc., in all standard sizes.

Export Trade.

We have such adequate and satisfactory facilities for shipment as well as such large and complete stock always on hand that our export trade has grown to great proportions and is still increasing.

WESTERN BRICK COMPANY

Manufacturers of All Kinds of Brick, Building and Partition Tile

GENERAL SALES OFFICE AND FACTORIES
DANVILLE, ILL.

BRANCH SALES OFFICES
PEORIA, ILL., 823-24 Jefferson Building
INDIANAPOLIS, IND., 804 Hume-Mansur Building
REPRESENTATIVES IN ALL PRINCIPAL CITIES OF THE MIDDLE WEST AND THE NORTHWEST

Products.

FACING BRICK: "CLOISTER," SIDE-CUT, IMPERVIOUS; "RUGS," VERTICAL SCORED ROUGH TEXTURE; "EMPIRE," MATTE OR ROUGH TEXTURE; "DORIC" and "GOTHIC," STIPPLED TEXTURE.

Various Grades of VITRIFIED, IMPERVIOUS and SEMIPOROUS COMMON and HOLLOW BRICK.

BUILDING and PARTITION TILE.

All products are manufactured strictly from shale and fire clay.

Facilities.

One hundred million brick and tile are manufactured at our three plants annually. The shale and clay supply for these factories is practically inexhaustible; fuel supply is owned by the company in sufficient quantities to last at least twenty-five years. Shipping facilities are unequaled, as the product can be distributed from Danville over seven railroads. Plants have side-track room for about seventy-five cars, and ordinary daily shipments, during the building season, exceed a half million. Over a billion of brick have been manufactured and marketed.

"Cloister," or 400 Series.

A medium-priced, impervious, side-cut facing brick, manufactured from shale. Colors range from bright red through the intermediates to dark brown. Treated in the early stages of manufacture, in order to eliminate all harsh glaze. This face brick is absolutely the best value for the money that can be produced, and we are able to sell it at prevailing prices only on account of our exceptionally large production.

About two hundred millions have been marketed in the Middle West. The absorption is well below four per cent, and the crushing strength exceeds 10,000 pounds to the square inch. None of the "Cloister," or 400 Series, are of rough texture on face.

A brief description of various shades follows:

"Cloister" No. 420.

Soft, velvety, grayish-brown, with headers somewhat darker than the faces. Kiln-marks are not prominent, and are of about the same shade as the headers. A distinctive Western product, burned as hard as shale can be burned.

"Cloister" No. 430.

Brownish edge, with deep red center are the prevailing characteristics of this brick. Headers are darker than the stretchers, and the wall is full of life and character.

"Cloister" No. 440.

This shade is dark, wine red to brown; kiln-marks show brownish black. Not sorted to uniform color but to shades that will give a well-blended effect in the wall.

"Cloister" No. 450.

A brilliant red brick, quite uniform, one of the most attractive of the "Cloister" shades.

"Cloister" No. 460.

A light red facing brick, sold at very low price, suitable for unimportant buildings, inside facing, etc.

"Western Rugs," or Vertical Scored Rough Texture.

Thoroughly burned, and ranging in color through the reds and purples. These "Rugs" are manufactured in very large quantities, and price will be found very moderate.

Following are brief descriptions of various shades:

"Western Rugs" No. 531—A beautiful, rich, oriental red, shading toward wine color and purple; texture rough enough to show plenty of life, giving rich, warm, red effect.

"Western Rugs" No. 551—A bright red, almost carmine in color.

"Western Rug Mixture."—A beautiful mingling of all shades which can be produced in burned shale. Effect can be varied to suit the purchaser.

Continued on next page

"Doric" and "Gothic" Stippled Brick.

This is of a new refined texture, developed by this Company and just placed on market. The principal feature is the elimination of all grain or lines by use of stippling process, making a myriad of small indentations. Colors in this texture are refined, deep and soft.

"Empire"

"Empire," of horizontal matte texture, in shades described below:

"Doric" No. 871.

Very dark purplish brown, and black, quite uniform in color. (Same shade in matte texture is "Empire No. 810.")

"Doric" No. 872.

Deep brown, with slight purplish cast; not absolutely uniform. (Same shade in matte texture is "Empire" No. 820.)

"Doric" No. 875.

A variant from No. 872 in that its prevailing color is lighter, the tans are more prominent, and shading not quite so uniform. (Same shade in matte texture is "Empire" No. 825.)

"Doric" No. 876.

A golden-tan brick, distinctly different in shading from anything else produced; not absolutely uniform, but with sufficient life to make the wall interesting. (Same shade in matte texture is "Empire" No. 830.)

"Doric" No. 878.

Lively golden-buff, comparatively even in color. (Same shade in matte texture is "Empire" No. 833.)

"Gothic" No. 972.

A dark rich brown, fairly uniform in color. (Same shade in matte texture is "Empire" No. 920.)

"Gothic" No. 974.

A brownish-red mixture, having considerable variation in color, but of perfect blend. (Same shade in matte texture is "Empire" No. 940.)

"Gothic" No. 973.

This shade shows considerable variation, ranging through lighter reddish colors. (Same shade in matte texture is "Empire" No. 943.)

"Gothic" No. 975.

A red, with wonderful old-rose shades. (Same shade in matte texture is "Empire" No. 950.)

Shapes.

Octagons, or 45-degree Angles and Round Corners (2-inch radius), or Bullnoses, are kept in stock at all times to match any of the foregoing shades.

Arches or Specials, other than the above, can be made to order, cut green and burned; as all our facing brick are burned too hard to be successfully ground. This work requires from three to five weeks, dating from the time we receive full-sized details.

Western Commons.

These brick are all manufactured from shale, and in the hard-burned varieties are impervious and vitrified.

We do not ship any Common Brick "kiln-run," as all are carefully sorted for *hardness* (not for color) into three grades described below:

Vitrified Hard Commons.

Very low absorption, and thoroughly vitrified. Not selected for color.

Medium Hard Commons.

Very durable, and can be used for all classes of work, either foundation or superstructure. Not selected for color.

Light Commons.

Suitable only for inside work, and are not recommended or suggested for use in work exposed directly to the weather.

Chimney Brick No. 160.

A light red, cheap, facing brick, selected for color and packed in straw, suitable for chimney-tops and facing of unimportant buildings.

Western Hollow Brick.

These are manufactured from shale and are very high in crushing strength, exceeding 3500 pounds to the square inch. Furnished in two grades, Vitrified or Semiporous.

Western Partition and Building Tile.

The following sizes, with returns and halves are kept in stock; other sizes can be made to order:

4" x 5" x 12"; 5" x 8" x 12"; 4" x 12" x 12"; 3" x 12" x 12"; 6" x 12" x 12", and 8" x 12" x 12".

These are manufactured from shale, with dovetailed scorings, and are graded for hardness into Vitrified and Semiporous.

ALPHONS CUSTODIS CHIMNEY CONSTRUCTION CO.

Designers and Builders of Radial Brick Chimneys

Bennett Building
NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., Marquette Building
BOSTON, MASS., Oliver Building
DETROIT, MICH., Moffat Building
PITTSBURGH, PA., Empire Building
PHILADELPHIA, PA., Pennsylvania Building
ATLANTA, GA., Healy Building
KANSAS CITY, MO., Reliance Building
MONTREAL, P. Q., CAN., New Birks Building
TORONTO, ONT., CAN., Confederation Life Building

Products.

Designers and Builders of PERFORATED RADIAL BRICK CHIMNEYS, with FOUNDATIONS and FLUES, of all sizes, for Boilers, Furnaces, Crematories and Ovens. Also CHIMNEYS for Smelters, Hotels and Office Buildings; ACID-PROOF CHIMNEYS for Paint Works and Chemical Plants; HIGH TEMPERATURE CHIMNEYS for Garbage Destructors and Incinerators.

Also, KILNS, BOILER SETTINGS, etc.

Services.

The ALPHONS CUSTODIS CHIMNEY CONSTRUCTION COMPANY, through its forty years of experience, is equipped to give expert advice as to the size and shape of any kind of a chimney, for any purpose, as well as make recommendations through their engineers regarding boiler layouts, size, shape and design of flues.

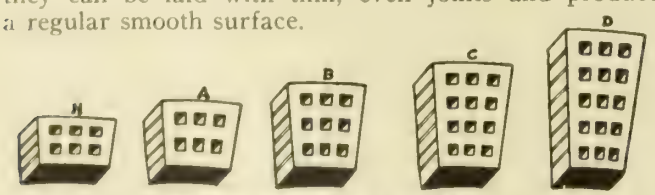
The boilers, the coal used, temperatures, gases generated, geographical location and many other conditions affect the determination of the most economical and efficient size of a chimney. Tell us your conditions and the results you wish to accomplish. The engineers of this company will promptly give the correct, efficient and economical size of chimney, and will make recommendations, not from theoretical tables, but from forty years' experience and unpublished data collected from actual working conditions of our chimneys all over the world.

The fact that over 6,000 Custodis Radial Brick Chimneys are now in successful operation is conclusive proof of their efficiency, permanency and economy.

Description.

The Perforated Radial Blocks are made only from the purest clays, selected for high refractory powers and high crushing strength. Special attention is given in our brickyards to making the proper mix of clays in the right proportion to produce a radial brick chimney which will resist heat strains, as well as strains from weight and wind.

All the radial blocks are formed to suit the circular and radial lines of each part of the chimney, so that they can be laid with thin, even joints and produce a regular smooth surface.



PERFORATED RADIAL BLOCKS
Manufactured in sizes and shapes suitable for all chimney diameters

The Blocks are larger than common bricks, making the number of mortar joints in a Radial Brick Chimney one third of those in a common brick chimney of the same size.

Moulded with vertical perforations, as shown in the illustration, the Radial Blocks are most thoroughly and uniformly burned, increasing, to a marked degree, their density and strength. The perforations form a dead air space around the chimney, insulating the hot column of rising gases on the inside from sudden changes of temperature of the outer air, resulting in a maximum draft under all conditions.

Flues and Kilns.

This company designs and constructs flues and furnaces. It makes a specialty of building kilns of all kinds. We line steel stacks, etc.

Remodeling and Repairing.

Old chimneys can be heightened without any interruption to the plant.

Send the height, inside diameter, width at base and wall thickness, or a plan of the old chimney. The engineering department will furnish design, and figure on heightening it.

Old brick chimneys can be removed without danger. We repair, straighten and point them while in operation, if necessary. We inspect old chimneys and make reports and recommendations on their condition.

TALLEST AND LARGEST CHIMNEY IN THE WORLD. CONSTRUCTED FOR BOSTON & MONTANA C. C. & S. M. CO., GREAT FALLS, MONT.

506 feet by 50 feet. Weight, 17,000 tons. Built in 1908

Information Required.

When requesting estimates, please give the following information:

Name of place where chimney is to be erected.
On what railroad siding is same located.
Distance from siding delivery to chimney site.
Is chimney to be used for boiler drafts or other purposes.
Give probable temperatures of the flue gases.
If for boiler draft, what is total horse-power.
Kind of fuel or coal to be used.
Amount consumed per horse-power or total per hour.
Dimensions of chimney required—Diameter. Height.
Is arrangement for overhead or underground flue.
Give dimensions and shape of flue opening desired in chimney.
Give height of same above or below foundation top.
What is nature of soil where chimney will stand.
What is estimated safe load per square foot.
What depth of excavation is necessary to reach good soil.
What is latest date allowed for erection of chimney.
Sketch showing arrangement of building, boiler and chimney.
Local prices, red brick, lime, cement and sand.

H. R. HEINICKE, INC.

Designers and Builders of Factory Chimneys

TELEPHONE, Stuyvesant 2686

147 Fourth Avenue
NEW YORK, N. Y.

FACTORY
NEWCOMERSTOWN, OHIO

BRANCH OFFICES
BOSTON, MASS., Oliver Building CHICAGO, ILL., Webster Building PHILADELPHIA, PA., Drexel Building
INDIANAPOLIS, IND., 821 Hume-Mansur Building CLEVELAND, OHIO, American Trust Building
CONNECTIONS THROUGHOUT THE UNITED STATES

Services and Products.

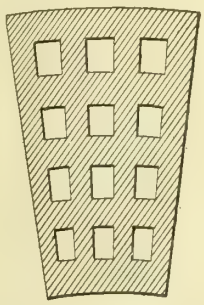
We build Perforated Radial Brick Chimneys of an improved type for Factories, Smelting Plants, Crematories, Garbage Incinerators, and Heating Plants for Schools, Churches, Hospitals, Loft Buildings, Apartment Houses, and Institutions of various kinds.

We manufacture our own Radial Bricks.

We line steel stacks, remove old stacks; also heighten old stacks without interfering with operation of boiler plant.

Description.

The Radial Brick System of Building Chimneys is one in which only specially made perforated bricks, shaped to the circular and radial lines of the chimney, are used. The perforations by forming dead air space make for good insulation and reduce the radiation. The mortar penetrates to the depth of about one half inch into the perforations, locking the two bricks together. In connection we use the "Heinicke Header Bond," breaking joints every layer by bricks varying in length from four to ten inches.



SECTIONAL VIEW OF RADIAL BRICK

Perforations 22 per cent of total sectional area
Manufactured in lengths of 4, 7, 8 and 10 ins.
Height uniformly 4½ ins.
Width of face 6½ ins.

The use of the "Heinicke Bond" allows building the strained parts of smaller wall thickness, yet with greater strength; and as an additional factor of strength, we insert steel bands into the brick work at critical points, to take the stresses due to expansion caused by heat.

Relative Advantages of Perforated Radial Brick Chimneys.

(1) Fewer joints, due to special form and increased size of our brick, compared with standard sized or common brick.

(2) Less deterioration than in chimneys built of any other material. Radial Brick withstands the influence of heat and acids better than any other materials.

(3) Great saving in fuel, as there is much less radiation than in stacks built with thin walls (unlined steel).

(4) Increased resistance to wind strains, owing to high crushing strength of Radial Brick and to the use of our special Header Bond described above.

Estimates.

In writing for information to cover a particular case, please advise us on the following:

(1) Intended use of the chimney (boilers, furnaces, smelters).

(2) Height and diameter, or boiler horse-power, or number and dimensions of boilers.

(3) Character of soil for foundation.

(4) Distance from nearest railroad siding or team track.

(5) Approximate price of cement, lime, sand, gravel, crushed stone, and common hard bricks, delivered at the chimney site.

HEINICKE CHIMNEY SERVING A SMELTER
460 feet high, 8 feet clear diameter at top
Built 1889

Specifications.

Specifications covering the construction of our Radial Brick Chimney will be furnished on request.

ATLANTIC TERRA COTTA CO.

1170 Broadway

NEW YORK, N. Y.

SOUTHERN BRANCH

ATLANTA, GA., Atlanta Terra Cotta Co., Third National Bank Building

DISTRICT OFFICES

BOSTON, MASS. ATLANTA, GA. DALLAS, TEX. PHILADELPHIA, PA. PITTSBURGH, PA.

AGENCIES IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

PLANTS

PLANT 1: TOTTENVILLE, S. I., N. Y.
PLANT 2: PERTH AMBOY, N. J.
PLANT 3: ROCKY HILL, N. J.
PLANT 4: PERTH AMBOY, N. J.
SOUTHERN PLANT: EAST POINT, GA. Seven miles from Atlanta

Products.

Architectural Terra Cotta: Lustrous Glazed, Matt Glazed, Unglazed, Smooth, Tooled, Bush-hammered, Rough and Ordinary Surface in any one or many colors.

Faience: Polychromatic combinations in a great variety of soft and brilliant colors.

Glazed Garden Pottery of exceptionally high grade in many colors.

Scope.

The Atlantic Company is the largest Terra Cotta Company in the world, and ships to all parts of the United States and Canada.

Use.

Atlantic Terra Cotta is more than a building material; it is an architectural decorative material as well. It may be used either independently for an entire façade, or in connection with any other building material, brick, stone or concrete. Atlantic Terra Cotta is always an outward, visible part of the building, interior or exterior.

It is easily attached to any form of frame construction, and the Atlantic Company invariably makes construction drawings for the builder's use, showing the attachment of every piece in complete detail. With these drawings any mason builder can easily erect Atlantic Terra Cotta, though the builder may and frequently does engage an experienced Terra Cotta fitter from the Atlantic Company's staff to expedite the work of construction.

ATLANTIC TERRA COTTA KILN

Qualities.

Physically, Atlantic Terra Cotta is a mixture of clays, pressed in a plaster mould to the desired shape and size, and fired in a kiln to a temperature of 2250 degrees Fahrenheit. Its color depends on a covering slip or glaze, applied before burning, and thoroughly incorporated with the body during burning. The colors that may be specified are practically unlimited, and they may be used alone or in combination.

NEW YORK CITY'S TERRA COTTA SKYLINE

More than half the visible building material is Atlantic Architectural Terra Cotta. The largest unit, the Woolworth Building, is entirely of Atlantic Terra Cotta on all elevations from third story to tower roof. The basic color is a varying matt ivory; but ten other Atlantic colors, including lustrous gold, are used in the background of modeled ornament

Continued on next page

In addition to the possibility for the use of many colors, the decorative properties of Atlantic Terra Cotta are further emphasized by the fact that the most intricate modeling, from delicate bas-relief to figure work in heroic size, is easily possible. These two properties make Atlantic Terra Cotta an excellent material for high-class interior work, in addition to its usefulness for exterior façades.

Structurally, Atlantic Terra Cotta is practically weatherproof, durable, and very easy to clean down; the tremendous temperature it undergoes during manufacture makes it not only fireproof, but it will be unaffected by adjacent fires.

Properly constructed, Atlantic Terra Cotta will bear any necessary compression, and as it protects the frame of the building completely, a building of Atlantic Terra Cotta will outlast any other type of construction.

Cost.

To arrive at the cost of Atlantic Terra Cotta, it is necessary to figure the architect's drawings and specifications. In general, the cost will be from twenty to fifty per cent less than the cost of stone; and in case of a design calling for intricate or extensive modeling, the cost of stone might be several times the cost of Terra Cotta.

Monthly Magazine.

The fact that Atlantic Architectural Terra Cotta is not a stock material, but is made especially for the building on which it is to be used, makes the publication of a catalogue impossible.

The Atlantic Company, however, publishes a monthly magazine which has proved to be of considerable interest to architects, and this magazine will be gladly sent to any architect on request.

Service.

Atlantic service is particularly efficient in showing how Terra Cotta might be applied to definite requirements. When desired, our service includes making up colored sketches and perspectives in accordance with the architect's ideas, or showing an appropriate use for Atlantic Terra Cotta.

Glazed Garden Pottery.

In addition to its major product, the Atlantic Company manufactures an exceptionally fine quality of garden pottery. Made in many different colors and following the antique in design, they are thoroughly refined, exceedingly decorative, and at the same time excellent for growing plants and small trees.

The colors ordinarily employed are Marble White, Antique Green, Limestone Gray, Pompeian Red and Colonial Yellow.

When the designs are decorative, the modeling is graceful and low in relief. The chief beauty of Atlantic pottery is the strength and grace of outline.

Catalogue sent on request.

DESIGN Z103 IN MARBLE WHITE,
Pan-American Union Garden, Washington, D. C.

Z104
Height, 22 ins.; top diameter, 37 ins.; bottom diameter, 19 ins.; weight, 200 lbs.

Z100
Height, 26 ins.; top diameter, 12½ ins.; bottom diameter, 13 ins.; weight, 125 lbs.

Z111
Height, 30 ins.; top diameter, 16 ins.; bottom diameter, 11½ ins.; weight, 170 lbs.

GARDEN VASES OF GLAZED POTTERY

THE CAMPFIELD RAGGLE BLOCK CO.

GENERAL OFFICES

Colonial Building

RICHMOND, IND.

Products.

We manufacture, under Campfield patents dated August 30, 1910; September 19, 1911; September 26, 1911; January 2, 1914, and January 21, 1914:

Campfield Clay and Terra Cotta Raggle Block

Campfield Clay and Terra Cotta Wall Coping

Campfield Glazed Brick

Campfield Prepared Oakum

Campfield Raggle Cement

Campfield Terra Cotta Water Table

Campfield Air-Cell Flue Lining

Campfield Air-Cell Underground Conduit for Steam Pipes

Campfield Segmental Sewer Block

General Information.

Our catalogue covers details fully, explaining uses and giving much valuable information.

Cost.

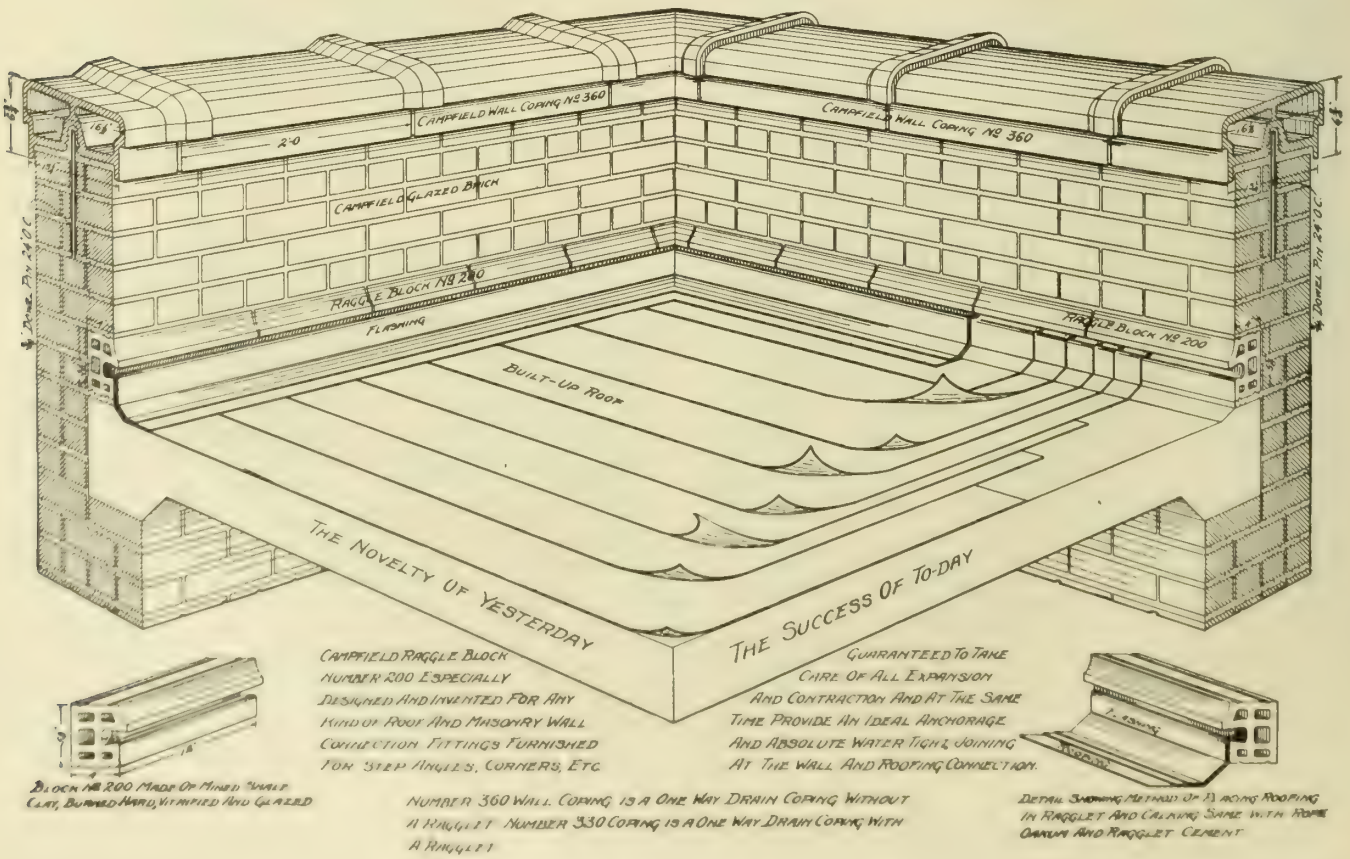
Campfield Raggle Company's products are sold in all parts of the country at standard prices.

Fastening Flashings.

Without doubt the Raggle Block provides an ideal manner for fastening the flashings to the wall, no matter whether the flashing is of felt or metal, and this is especially true if the wall is of brick or concrete. It will not only be easy on new work, but will lower the cost if flashings have to be renewed.

Specifications.

Write us for specifications and plans, which will be sent to you promptly. If you desire a special drawing, one will be furnished free of cost.



APPLICATIONS OF CAMPFIELD PRODUCTS

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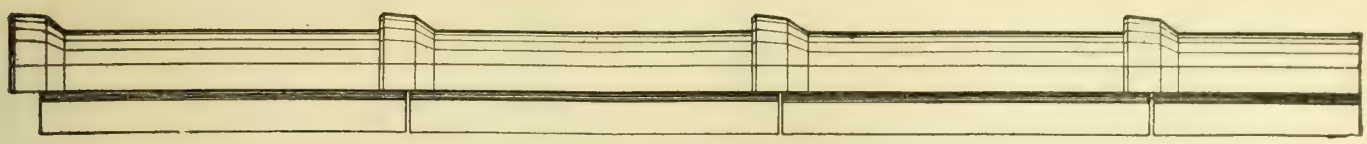
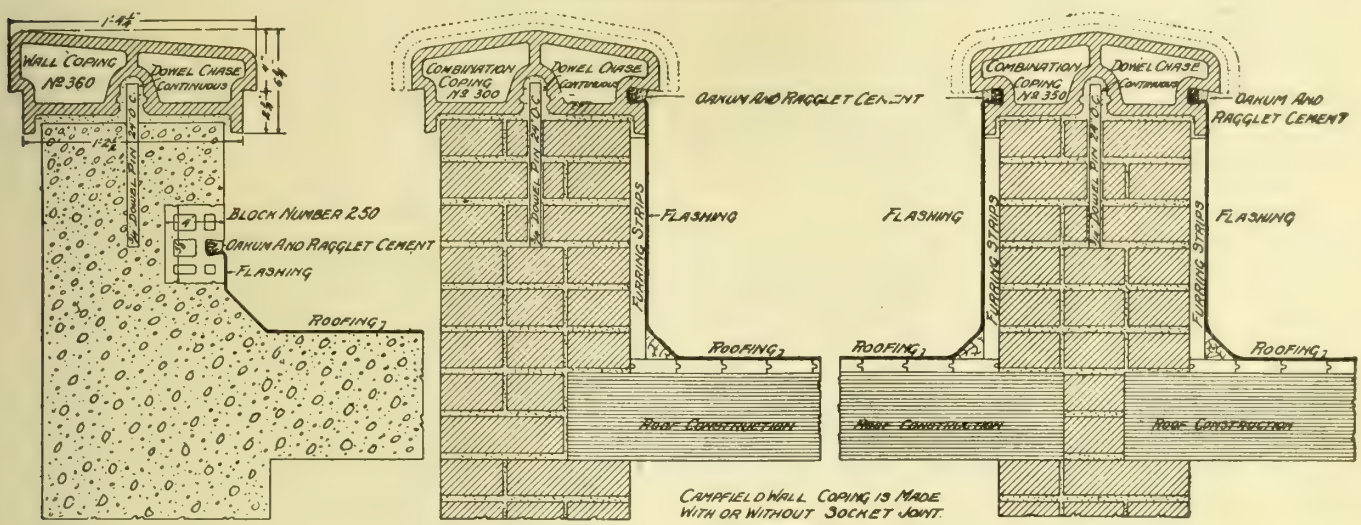
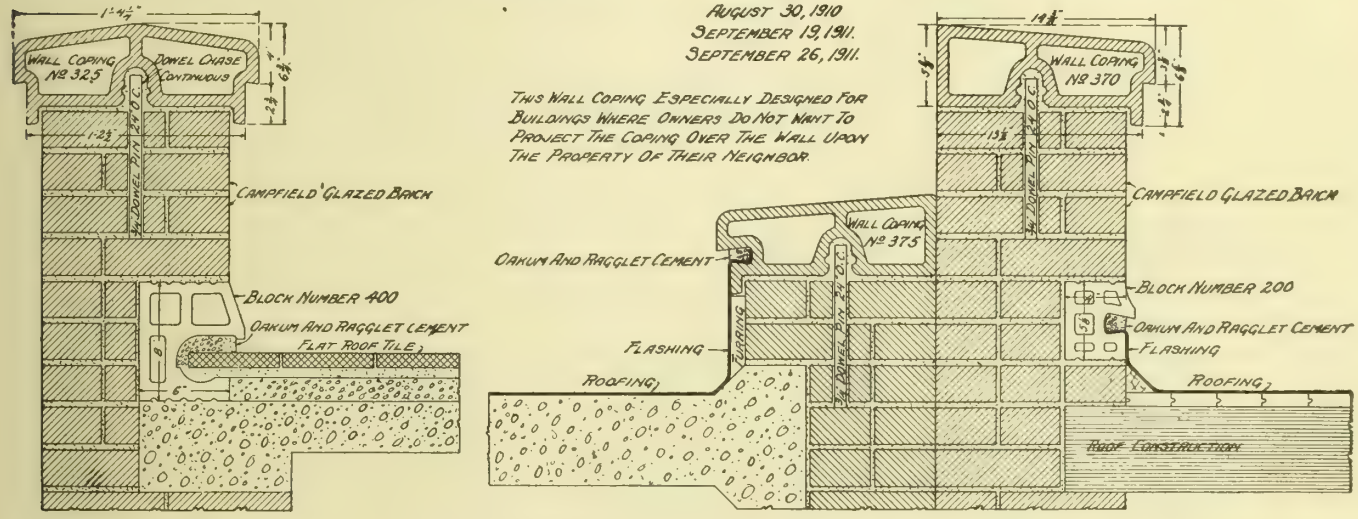


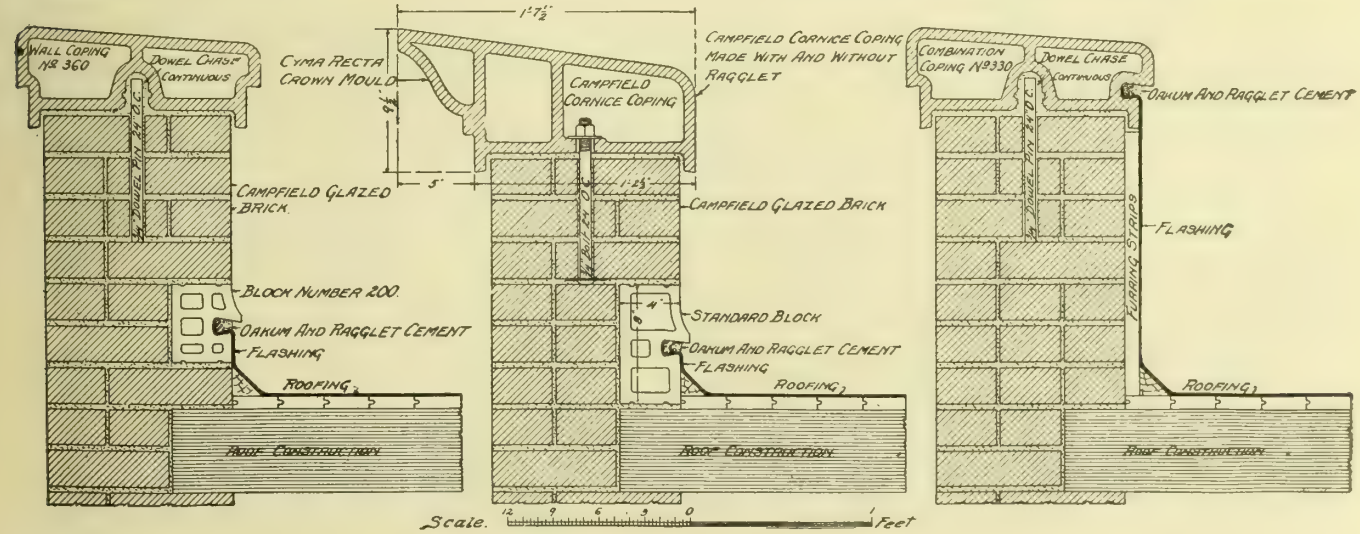
ELEVATION OF COMBINATION WALL COPING Nº 300



CAMPFIELD WALL COPING IS MADE WITH OR WITHOUT SOCKET JOINT.
PATENTED
AUGUST 30, 1910
SEPTEMBER 19, 1911.
SEPTEMBER 26, 1911.

THIS WALL COPING ESPECIALLY DESIGNED FOR BUILDINGS WHERE OWNERS DO NOT WANT TO PROJECT THE COPING OVER THE WALL UPON THE PROPERTY OF THEIR NEIGHBOR.





CAMPFIELD RAGGLE BLOCK AND WALL COPING

FEDERAL TERRA COTTA CO.

MANUFACTURERS OF

A Superior Grade of Architectural Terra Cotta

Trinity Building, 111 Broadway

NEW YORK, N. Y.

Jno. Baumiller, Western Manager, Kresge Building, Detroit, Mich.

FACTORY: WOODBRIDGE, N. J. (Penna. R.R.)

OFFICERS

DeForest Grant, President and General Manager
Edwin Thorne, 1st Vice-President
Lewis R. Morris, 2d Vice-President
William B. Dinsmore, Treasurer
Dwight W. Taylor, Secretary and Assistant Treasurer
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DeForest Grant
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Edwin Thorne

Products.

Architectural Terra Cotta for Exterior and Interior Use, in complete range of Limestone, Buff and Red shades, with Standard Vitreous Finish; White, Cream and Polychrome colors, with Matt and Full Glaze finishes.

Specialties.

This Company is now offering architects and builders an unrivalled line of Near-Marble and Near-Granite Terra Cotta. The Near-Marble material is dead white in color with a crystallized surface effect. Federal Near-Granite Terra Cotta exactly reproduces the color and texture of real granite, and is indistinguishable from it.

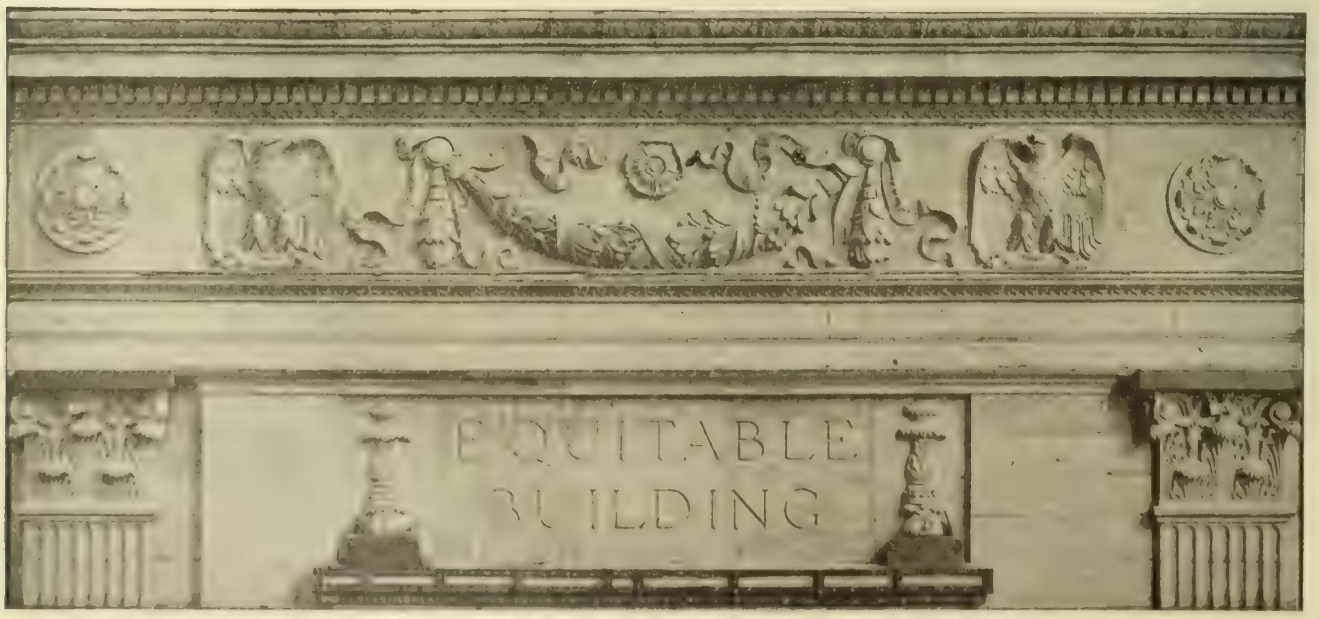
SPECIMENS OF WORK

Notable Examples of Buildings Erected with Federal Near-Granite Terra Cotta.

BUILDING	LOCATION	ARCHITECT	BUILDER
Equitable	New York, N. Y.	Graham, Burnham & Co.	Thompson-Starrett Co.
Aetna Life	Hartford, Conn.	Donn Barber	Marc Eidlitz & Son
Jefferson County Bank	Birmingham, Ala.	William C. Weston	F. W. Mark Construction Co.
Wayne Avenue Bridge	Cincinnati, Ohio	City Engineer	Theodore Schomaker
First Bridgeport National Bank	Bridgeport, Conn.	Egerton Swartwout	Hoggson Bros.
Printing Crafts Building	New York, N. Y.	Edward L. Larkin	Edward L. Larkin
Standard Arcade (Near-Marble)	New York, N. Y.	Severance & Van Alen	Cauldwell-Wingate Co.

Other Representative Work.

Biltmore Hotel	New York, N. Y.	Warren & Wetmore	George A. Fuller Co.
Paul Starrett Building	New York, N. Y.	Starrett & Van Vleck	George A. Fuller Co.
Gilchrist Store	Boston, Mass.	Bigelow & Wadsworth	George B. H. Macomber Co.
Emmet Building	New York, N. Y.	Barney & Colt	Cauldwell-Wingate Co.
Ritz-Carlton Hotel	Montreal, Can.	Warren & Wetmore	George A. Fuller Co.
Parkway Central Telephone	Philadelphia, Pa.	John T. Windrim	Cramp & Co.
St. Matthew's Church	Washington, D. C.	LaFarge & Morris	J. E. & A. L. Pennock



DETAIL OF NEAR GRANITE TERRA COTTA AND GRANITE

Near-Granite Terra Cotta has been used in the Equitable Building, from the third story lintel course to the eighth story. It reproduces exactly the color, texture and finish of the granite

Continued on next page

BUILDING	LOCATION	ARCHITECT	CONTRACTOR
Otis Building	Chicago, Ill.	Holabird & Roche	George A. Fuller Co.
Kress Store	New Orleans, La.	Emile Weil	George J. Glover
Chronicle Building	Augusta, Ga.	W. L. Stoddart	King Lumber Co.
Masonic Temple	Watertown, N. Y.	Charles E. Dewey	F. A. Caswell
Court House	Virginia, Minn.	Bray & Nystrom	Bailey Marsh Co.
Ford Motor Co.	Minneapolis, Minn.	Kees & Colburn	Splady, Albee & Smith
Pantlind Hotel	Grand Rapids, Mich.	Warren & Wetmore	George A. Fuller Co.
Hotel Chicsa	Memphis, Tenn.	Hanker & Cairns	C. B. Barker Construction Co
Royal Bank	Toronto, Can.	Ross & MacDonald	George A. Fuller Co.
Traymore Hotel	Atlantic City, N. J.	Price & McLanahan	Cramp & Co.
Public Service Corporation Terminal	Newark, N. J.	George B. Post & Sons	Hedden Construction Co.
St. Gregory's Church	Brooklyn, N. Y.	F. J. Helmle	Peter Cleary
Logan-Gregg	Pittsburgh, Pa.	Charles Bickel	James Wherry & Co.
Rice Building	Boston, Mass.	Parker, Thomas & Rice	James Black Masonry & Contracting Co.

EQUITABLE BUILDING, NEW YORK, N. Y.

ERNEST R. GRAHAM, Architect — THOMPSON-STARRETT CO., Builders

Entire façade of this structure, the largest office building in the world, is in Architectural Terra Cotta, except the granite in lower stories and brick piers. The Terra Cotta is indistinguishable from the granite, to which it is adjacent. All Terra Cotta was delivered and set, complete in the building, within a period of five months. Another notable example of the efficient management and service given by FEDERAL TERRA COTTA COMPANY

AMERICAN TERRA COTTA & CERAMIC CO.

(Gates Potteries)

MAIN OFFICE
2008 People's Gas Building
CHICAGO, ILL.

WORKS
TERRA COTTA, ILL.

BRANCH OFFICES

MILWAUKEE, WIS., Ricketson & Schwarz, University Building
MINNEAPOLIS, MINN., S. J. Hewson, 211 South Fourth Street
SIOUX CITY, IOWA, George Walter Oakley, 200 United Bank Building
TOPEKA, KAN., Hargreaves & Co., Central National Bank Building
ST. PAUL, MINN., Corning Brick Co., Ryan Building
WINNIPEG, CAN., Edelen & Kilvert Co., 304 Tribune Building
WICHITA, KAN., C. A. Noll, 521 Beacon Building
BIRMINGHAM, ALA., Solon Jacobs & Co., Woodward Building
CLEVELAND, OHIO, Hydraulic-Press Brick Co., Schofield Building
COLUMBUS, OHIO, Columbus Brick & Terra Cotta Co., New First National Bank Building
KANSAS CITY, MO., Reliance Brick Co., Reliance Building
LINCOLN, NEB., Nebraska Material Co., 1126 P Street
DES MOINES, IOWA, Contractors' Material Co., Hubbell Building

Products.

Architectural Terra Cotta; Teco Art and Garden Pottery; Teco Wall, Floor and Art Tile; Polychrome Work, and Faience.

Decoration.

When ornament is desired on the facade of a building, there is no more attractive or economical way of obtaining it than by the use of architectural terra cotta. "American" terra cotta can be used for any style of decoration and combines agreeably with other building materials. Modeled, it has a particular charm of its own, as in the examples shown below. If a unit of decoration is adopted, which can be repeated for different portions of the facade, the cost of giving a building distinction through its ornament is not prohibitive.

Quality.

Quality in design, color, materials and manufacture has been our motto for a quarter of a century, and our artists are of the highest skill.

Capacity.

We have most satisfactorily handled many of the largest contracts, and maintain a large staff of competent workmen for erecting and installing any of our products in any part of the country.

Co-operative Service and Estimates.

Our design department is prepared to co-operate with architects and others in the study and preparation of decorative schemes. Requests for suggestions or estimates will receive our prompt attention.

LYON & HEALY BUILDING
Marshall & Fox, Architects
Erected 1915

CABLE BUILDING
Holabird & Roche, Architects
Erected 1899

KIMBALL BUILDING
Graham, Burnham & Co., Architects. Erected 1915

The Terra Cotta for above three buildings, located at Wabash Avenue and Jackson Boulevard, Chicago, furnished by American Terra Cotta & Ceramic Co.

O. W. KETCHAM

Manufacturers of and Dealers in a Complete Line of Burnt Clay Products

24 South 7th Street
PHILADELPHIA, PA.

BRANCH OFFICES

BALTIMORE, MD., American Building
WASHINGTON, D. C., Home Life Building
NEW YORK, N. Y., 1170 Broadway—Telephone, Madison Square 4893

Products.

Manufacturers of Architectural Terra Cotta, and Hand-Made "Ageart Terra Tile" for Roofing.

Dealers in Hollow Tile Fireproofing, Clay Roofing Tile, Mosaic Tile, Floor and Wall Ceramic Tile, Promenade Tile.

Porcelain Brick, Faience and Ornamental Brick, Rough and Smooth Texture Brick, Bonding Brick, Paving Brick, Repressed Brick.

Chimney and Flue Lining, Brick or Terra Cotta Chimney Caps and Tops, Fireplace Brick and Tile, Mantel Brick and Tile, Floor Brick; Wall Plugs and Ties.

Designers of Brick Work and Interior Brick Finish.

Contractors for the Erection of Hollow Tile Fireproofing.

Terra Cotta.

We manufacture all kinds of plain, ornamental, glazed and polychrome Terra Cotta. Our finishes are standard, and our variety of colors is extensive.

We can furnish any quantity desired from our own plant, and can make deliveries as rapidly as required.

Fireproofing.

Hollow tile of burned fire clay is one of our principal lines of products. This line consists of all forms known to the trade, such as floor arches, partitions, column coverings, book tile, girder coverings, and the heavy scored building blocks of various sizes; also, hollow building bricks for damp-proofing.

Facilities.

Our line in Burnt Clay Products is complete. We deal in nothing else except Metal Wall Ties, used in conjunction with Brick, Terra Cotta and Fireproofing. We have our own plant where we manufacture all kinds of Architectural Terra Cotta, and also a strictly Hand-Made Roofing Tile, known as the "Ageart Terra Tile."

We represent the Huntington Roofing Tile Co., the Mueller Mosaic Tile Co., and sixteen of the best and oldest brick and clay companies. With these plants to draw from, we can promptly supply any demand, no matter how large.

Co-operative Service.

We furnish estimates for these products either delivered to the operation, or erected in the building, estimates being made from plans and specifications. Where special construction is necessary, the assistance of competent men can be had for the asking. Out of town parties please send plans and specifications to home office for estimates.

When possible, we prefer architects to make their own full-sized details; but we have a large force of competent men to work these out when necessary.

We will make estimates, on request; and drawings and specifications sent us from out of town will have immediate attention, and will be promptly returned with estimates.

Samples, etc.

We will send samples by express, on request of those interested in future work.

We extend a cordial invitation to those visiting our city to look over our works and become acquainted with our facilities.

POLYCHROME CARTOUCHE PANEL, THEIS THEATER, WILKESBARRE, PA.
Henry Maier, Wilkesbarre, Pa., Architect

KARL MATHIASEN, President ECKARDT V. ESKESEN, V. Pres., Secretary and Treasurer

THE NEW JERSEY TERRA COTTA COMPANY

ESTABLISHED 1888

Manufacturers of Architectural Terra Cotta

TELEPHONES, Cortland { 3903 3904

Singer Building, 149 Broadway
NEW YORK, N. Y.

WORKS
PERTH AMBOY, N. J.

AGENCIES

BOSTON, MASS., Fiske & Co., Inc., 25 Arch Street
PITTSBURGH, PA., J. E. Finnessey, Benedum-Trees Building
DETROIT, MICH., F. B. Holmes & Co., Penobscot Building
BUFFALO, N. Y., Buffalo Builders' Supply Co., Ellicott Sq.
CINCINNATI, OHIO, Allan Ross Raff, Greenwood Building
CLEVELAND, OHIO, Cleveland Material Company
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NEW ORLEANS, LA., Erskine W. Fisher, Liverpool & London & Globe Building
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LANSING, MICH., The Briggs Co.
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CHATTANOOGA, TENN., T. L. Henderson, 101 Chestnut Street
MONTREAL, CAN., Webster & Sons, Ltd., 31 Wellington Street

Products.

Architectural Terra Cotta in Standard, Glazed, Polychrome and Fire-Gilded or Gold Surfaces.

Experience and Facilities.

The New Jersey Terra Cotta Company has been engaged in the manufacture of Architectural Terra Cotta for twenty-seven years, during which period it has supplied terra cotta for many important buildings throughout the United States and Canada. Its staff and its workmen are skilled in all the best practices of the trade and understand the manufacture of high-grade architectural terra cotta from the ground up.

Its plant at Perth Amboy, New Jersey, recently rebuilt on lines of most modern construction, has a capacity equal to any individual factory in the east. The equipment is up to date; the service efficient; and the facilities for getting out work in the shortest possible time, consistent with good workmanship, are of the best. Plant is located directly on lines of Lehigh Valley R. R. and Central R. R. of New Jersey and has connection facilities with all leading railroads of the country.

Quality.

Quality is as important in architectural terra cotta as in other things. New Jersey Architectural Terra Cotta has the merit of giving entire satisfaction to owner, to architect, and to contractor, because it is backed up with *experience, facilities* and *service.*

The illustrations on this and the opposite page, showing terra cotta in the Miami Hotel, Dayton, Ohio, convey a fair idea of New Jersey Quality in Standard material. For a better idea of what is meant by New Jersey Quality, look at the building *itself,* at your convenience. This color and finish is known as New Jersey No. 19 Limestone

THE MIAMI HOTEL, SECOND AND LUDLOW STREETS, DAYTON, OHIO
H. L. Stevens & Co., Architects

Examples of Work.

The Architectural Terra Cotta for the building illustrated above and on the opposite page was made by The New Jersey Terra Cotta Company, Singer Building, New York City. The terra cotta is executed in a light gray limestone material, and may be duplicated in color, texture and finish by just specifying "New Jersey No. 19."

The most prominent characteristics of this terra cotta are: Finely modeled ornamentation in the Adam

Sweet's Catalogue

Continued on next page

EXTERIOR DETAILS, FIRST STORY, AT DINING ROOM, MIAMI HOTEL

style; uniform color; close and even rubbed joints; true alignment of long stretches; and freedom from imperfections.

Colors and Finishes.

Standard and glazed Terra Cotta made in many shades and with a variety of finishes—plain, speckled, granite and special. Polychrome Terra Cotta made in Standard or Glazed. Fire-Gilded or Gold, in bright or matt finish.

Territory.

This Company is prepared to make prompt deliveries to all parts in North and South America. Resident agents are located in the cities named above.

Estimates.

A large and efficient estimating force is maintained at all times. Price quotations, with samples, times for delivery of work and all other desired information, cheerfully furnished on request. Send plans and specifications; same will be promptly returned with a *reliable* estimate.

Co-operative Service.

The service of the Engineering Department of THE NEW JERSEY TERRA COTTA COMPANY is freely offered to architects and builders; there is no obligation

DETAILS OF MODELING, LOWER STORIES, MIAMI HOTEL

of any kind. This department will lay out terra cotta construction so as to give the greatest economy consistent with good and safe practice, and submit for architect's approval.

All requests for information connected with the use of architectural terra cotta, whether relating to construction, design, color, finish or otherwise, will be handled fairly and promptly and to your entire satisfaction.

Setting and pointing of terra cotta supervised by the Company's expert at any time, anywhere, by special arrangement.

Some of Our Recent Contracts.

BUILDING, LOCATION, ARCHITECT AND CONTRACTOR

Victoria Building, Twenty-seventh Street, Broadway to Fifth Avenue, New York, N. Y., Schwartz & Gross, 230 Fifth Ave., Corp.

Montefiore Home, Gun Hill Road, Bronx, N. Y., Buchman & Fox, A. W. Brunner, Asso., Hedden Construction Co.

Central Branch Y. M. C. A., Brooklyn, N. Y., Trowbridge & Ackerman, The Whitney Company

Mount Sinai Hospital, 99th-100th Streets and Fifth Ave., New York, N. Y., Arnold W. Brunner, Thompson-Starrett Company

Bank and Office Building, Syracuse, N. Y., Mowbray & Uffinger, The Whitney Company

Hanselmann Lodge, Cincinnati, Ohio, Harry Hake, David Hummel Building Co.

St. Michael's Church, Montreal, Que., Can., A. Beauregard Champagne, The Atlas Construction Co.

Fordyce Bath House, Hot Springs, Ark., George R. Mann and Eugene J. Stern, Col. S. W. Fordyce

Ft. Stanwix Hotel, Johnstown, Pa., Janssen & Abbott, Johnstown Hotel Co.

Old State National Bank, Evansville, Ind., Adolph Scherrer, Scarborough-Davies Company

Temple for Children of Israel, Memphis, Tenn., Jones & Furbringer, James Alexander Constr. Co.

Masonic Temple, Charleston, W. Va., H. Rus Warne, Building Committee for the Masonic Fraternity of Charleston

THE NORTHWESTERN TERRA COTTA CO.

WORKS AND MAIN OFFICE
2525 Clybourn Avenue
CHICAGO, ILL.
BRANCH OFFICE: CHICAGO, ILL., Insurance Exchange
Address all Correspondence to 2525 Clybourn Avenue

Product.

All varieties of ARCHITECTURAL TERRA COTTA: ENAMEL, STANDARD, FAIENCE; in any color, granite effect, or polychrome.

TRADE-MARK

"Northwestern" Experience and Service.

Ours was the first Architectural Terra Cotta concern in America, and we now own the largest plant of its kind in the world.

While throughout our thirty years' experience we have kept in touch with all European advances, ceramic and mechanical, the perfection of our product is due in great measure to our own persistent laboratory work. The fruits of this work may be found all over the United States and Canada, exteriors and interiors alike unaffected by age or climatic conditions.

Our Terra Cotta possesses all the good qualities listed in the next column, but one "Northwestern" specialty is not there scheduled, namely, the intelligent and helpful service which is recognized to be the keynote of our success.

Leading architects and engineers have welcomed our collaboration in the working out of their problems, and have adopted without question our systems of Terra Cotta construction in connection with steel and concrete.

At all times we are ready to give our clients the benefit of our experience.

Another "Northwestern" point to be remembered is that our enormous facilities and central location enable us to make prompt deliveries, regardless of the size of the contract.

Technical Characteristics of Architectural Terra Cotta.

Permanence—Terra Cotta suffers no change from the action of the elements, and is virtually indestructible.

Strength—Terra Cotta withstands all reasonable pulling and crushing tests, and plays an important part in the protection of adjoining material.

Lightness—This feature, peculiar to Terra Cotta, is invaluable in large buildings and the designing of heavy projections; also an important factor in freight and handling.

Texture—While Terra Cotta comes in an endless variety of natural surface treatments, it lends itself successfully to the imitation of other materials, such as marble, granite, bronze, etc.

Form—The natural sequence of Terra Cotta manufacture—from a plastic beginning to a fixed completion—renders it capable of taking on any conceivable form.

Color—The architect finds in Terra Cotta a medium offering the widest choice of colors and tints, several of which may be obtained on one piece, if desired. All these colors are unfading, and the enameled surfaces are easily cleaned with soap and water.

Ornament—For bold or delicate modeling in all styles, classic or modern, Terra Cotta is the ideal material. Thanks to its infinity of form and color, the designer of ornament may realize his finest conceptions.

Economy—Although possessing all the good points listed above, Terra Cotta is not expensive. This feature of economy has a great deal to do with its ever-increasing use.

SKY LINE OF CHICAGO, AS SEEN FROM LAKE MICHIGAN, A. D. 1912

THE NORTHWESTERN TERRA COTTA CO.
Furnished Architectural Terra Cotta for all Buildings named

Continued on next page

DOMINION BANK, TORONTO

DIME SAVINGS BANK, DETROIT

AMERICAN TRUST AND SAVINGS BANK, BIRMINGHAM

BOYLSTON CHAMBERS, BOSTON

Examples of "Northwestern" Architectural Terra Cotta Work.

On nearly all of these buildings the terra cotta was set by our own men.

We are prepared to erect any work manufactured by us and recommend this method.

BURLINGTON BUILDING, CHICAGO

MARSHALL APARTMENTS, CHICAGO

CONTINENTAL AND COMMERCIAL BANK, CHICAGO

WINNIPEG ELECTRIC CHAMBERS, WINNIPEG, CAN.

NEW YORK ARCHITECTURAL TERRA-COTTA CO.

Manufacturers of High-Grade Architectural Terra-Cotta

TELEPHONE, Astoria 700

OFFICE AND WORKS
401 Vernon Avenue
LONG ISLAND CITY, BOROUGH OF QUEENS, NEW YORK, N. Y.

PITTSBURGH SALES OFFICE: 1408 Keenan Building, PITTSBURGH, PA.

Product.

Architectural Terra-Cotta, in Granite, Limestone, Polychrome and other colors, and in Standard, Matt or Full Glaze Finish, as desired.

Facilities.

The New York Architectural Terra-Cotta Co. manufactures its product in a factory the equipment of which is always kept well abreast of the times. The company has for many years been noted for the high quality of its product and the prompt delivery of its work.

Among the buildings for which it has manufactured the material are many of the finest examples of the use of Architectural Terra-Cotta in exterior and interior decoration. This result is largely due to the personal interest given to all orders placed with the company.

All work in the city of New York and vicinity is delivered by truck at the building, immediately upon receipt of shipping instructions. Equally prompt shipment on other orders is insured by our facilities for loading and shipping the work in freight cars loaded at our dock.

Quality and Service.

It has always been the aim of the company to furnish every possible opportunity to owners and architects for the inspection of work in the course of manufacture. Such personal inspection is made possible by the convenient location of our plant, which is practically in the heart of the city of New York.

Many of the most intricate and elaborate examples of modeling have been worked out entirely by the company's artists under such personal supervision of architect or owner.

The company is always glad of the opportunity to render any assistance in its power in the way of suggestions as to the construction and the use of Architectural Terra-Cotta.

An experience of over thirty years under one management in the manufacture of Architectural Terra-Cotta, enables the company to offer you a quality and a service which cannot be surpassed.

Samples.

Samples will be furnished on request.

HARDIN COUNTY COURT HOUSE, KENTON, OHIO
Richards, McCarthy & Bulford, Architects

DETAIL OF STAIRCASE AND DOUBLE-FACED GRILL IN HARDIN COUNTY COURT HOUSE

DETAIL OF LOBBY IN HARDIN COUNTY COURT HOUSE

ALPHA PORTLAND CEMENT COMPANY

GENERAL OFFICES
EASTON, PA.

BRANCH OFFICES

NEW YORK, Hudson Terminal Building
PHILADELPHIA, Harrison Building
PITTSBURGH, Oliver Building
BALTIMORE, Builders' Exchange
BOSTON, Board of Trade Building
SAVANNAH, National Bank Building

WORKS

ALPHA, N. J.
MARTINS CREEK, PA.
CEMENTON, N. Y. (on Hudson River)
MANHEIM, W. VA.

Product.

ALPHA PORTLAND CEMENT.

STANDARD SACK OF ALPHA PORTLAND CEMENT

Experience.

Alpha Cement is a pioneer American brand representing to-day twenty-five years of experience in cement making. The manufacture of Portland cement is, as an authority recently expressed it, "an extremely scientific proposition, requiring the exercise of the greatest care and long experience. It is a scientific and chemical procedure representing the antithesis of guesswork, or slipshod methods."

Distinctive Features.

Alpha Portland cement is manufactured under strict chemical supervision at all of the six Alpha plants, samples from the rock borings being taken at regular intervals and hourly tests made to insure exact proportioning, thorough burning and fine grinding. The Alpha chemists and chemical engineers are men of real authority, and no zeal for large output or low operating cost can overrule their decisions. This enables the manufacturer not merely to assure the purchaser of uniform high quality but to *guarantee* that all Alpha cement will more than meet United States Government requirements and the standard specifications as adopted by the American Society for Testing Materials and approved by the American Society of Civil Engineers. *Every Alpha bag is now stamped "guaranteed."* Under the Alpha system of supervision, it is impossible for cement that lacks binding power to be shipped out. This hourly tested and guaranteed brand costs no more than any other good cement.

Low-Alumina Cement of Distinctive Color.

Portland cement of a low-alumina content is preferred by some engineers for constructions that are exposed to the action of sea water. The ALPHA PORTLAND CEMENT COMPANY produces at its Cementon, N. Y., plant (with private docks directly on the Hudson River) a cement with a percentage of alumina running as low as .0635. Most Portland cements have an alumina percentage of from .07 to .0825. The product of the Cementon Alpha plant, in addition to its low-alumina feature, has an unusual record of strength on long-time tests; and, instead of producing the usual concrete surface effect, yields a light bluish gray tone that is ideal for stucco, floors, walks, walls or other work where it is desired to secure a lasting artistic effect without the addition of coloring matter.

Facilities.

The Alpha mills have a combined capacity of 25,000 barrels daily; storage for 2,000,000 barrels. Our private sidings connect directly with five of the main trunk lines of the country—Lehigh Valley, Delaware, Lackawanna & Western, Pennsylvania, Baltimore & Ohio, and the New York Central Lines. Through the Lehigh & New England Railroad, connection is made with the Philadelphia & Reading, the Central Railroad of New Jersey, the Erie, and to New England points via Poughkeepsie Bridge route. These connections assure us of an ever-ready and liberal supply of cars, and we are, therefore, in a position to serve quickly any section of the country.

Distinctive Use.

Large quantities of Alpha cement have been used in such notable undertakings as Pennsylvania Railroad Terminal and Tunnels, New York; New York Aqueduct (2,000,000 barrels); Detroit River Tunnels; Bush Terminal; Hudson Terminal; Allegheny River Dams; Galveston Sea Wall; Vanderbilt Hotel; Union Station at Washington; Central Park Roads, etc.

Package.

Alpha cement is shipped in the United States in cotton sacks or paper bags, containing 94 pounds net. Export shipments are made in tongue-and-grooved barrels, made of staves a full ½-inch thick, strongly reinforced and lined with waterproof paper.

Free Publications.

"Alpha Cement—How to Use It," is a practical 80-page handbook on general use of Portland cement. "Alpha Art Envelope" contains views and descriptions of many concrete undertakings.

FOUR LARGE CONCRETE CONSTRUCTIONS USING ALPHA PORTLAND CEMENT

THE ATLAS PORTLAND CEMENT COMPANY

NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL. PHILADELPHIA, PA. BOSTON, MASS. MINNEAPOLIS, MINN.
DES MOINES, IOWA ST. LOUIS, MO. DAYTON, OHIO

WORKS

NORTHAMPTON, PA. HANNIBAL, MO. HUDSON, N. Y.

Products.

"Atlas" Portland Cement and "Atlas-White" Portland Cement.

Capacities.

Productive Capacity—Eighteen million barrels annually.

Storage Capacity—Four million barrels.

Manufacture.

The importance and magnitude of these capacities and storage facilities are particularly called to your attention, assuring as they do ample facilities for securing prompt shipments and the satisfactory handling of large contracts.

Quality.

The quality of "Atlas" Portland Cement is such as to have won the distinction of being "The Standard by which all other makes are measured," and is guaranteed to pass all Standard Specifications for this material, such as:

The United States Government;
The American Society of Civil Engineers;
The American Society for Testing Materials;
The American Institute of Architects;
The American Railway Engineering Association.

Packages.

"Atlas" Portland Cement is shipped in barrels of 400 pounds gross or 376 pounds net weight, and in duck and paper bags. In bags the weight is 94 pounds net per bag, four bags to the barrel.

Our Record.

During the twenty-one years of its history "Atlas" Portland Cement has gained and maintained a reputation far beyond the confines of the country in which it is manufactured.

The United States Government selected and used "Atlas" Portland Cement in the construction of the Panama Canal to the exclusion of every other brand, and to the extent of over six and one half million barrels.

Other great works scattered throughout the United States are indications of the character of this material.

Publications.

For the benefit of those architects who desire to have a complete and authoritative reference file of concrete construction in their library, we have published the following books, all of which we are glad to send you free:

"Early Stucco Houses," with Stucco Specifications.
"Concrete in Railroad Construction."
"Concrete in Highway Construction."
"Reinforced Concrete in Factory Construction."
"Concrete Construction for the Home and the Farm."

Technical and Research Department.

The Atlas Portland Cement Company maintains this Department for the purpose of assisting the users of its material in the solution of any problem that might confront them, whether in the form of construction matters or the preparation of specifications for work of various characters; the examination of aggregates or the proper method for handling its material in any work. This service is offered free of charge, and we invite correspondence and consultation.

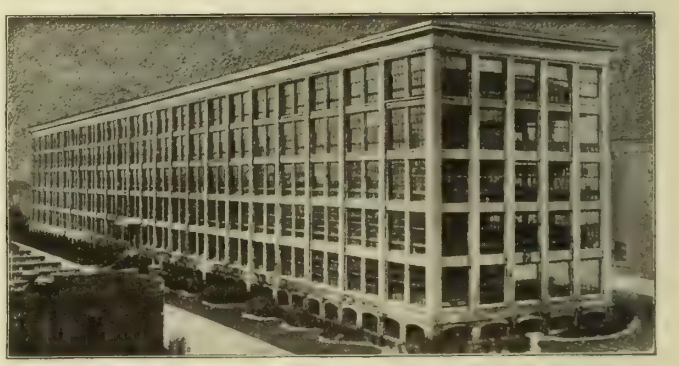
TRADE-MARK

Reinforced Concrete Service Department.

The use of reinforced concrete for industrial building is growing fast. It is more efficient than mill, and cheaper than steel construction. It is fireproof, durable, low in maintenance and insurance, and lowest in ultimate cost.

Many architects are giving keen attention to this most significant development. Our Service Department is equipped to assist architects with data and statistics, and if desired will co-operate with them in the preparation of designs.

Send for information on factories, lofts, warehouses, terminals, hospitals, schools, garages, stables, etc.



NATIONAL CASH REGISTER CO., DAYTON, OHIO
F. A. Waldron, Architect and Engineer
Noel Construction Co., Contractors

COMMONWEALTH ICE & COLD STORAGE BUILDING, BOSTON, MASS.
Sterrett & Bennett, Architects
Aberthaw Construction Co., Contractors

Continued on next page

Non-Staining "Atlas-White."

"Atlas-White" is a Portland Cement of highest quality. It possesses the strength and physical characteristics of Portland Cement and passes all standard specifications for this material; and, in addition, is *white* and *non-staining*.

TRADE-MARK

Architectural possibilities with the use of "Atlas-White" are unlimited, as it is used for exterior as well as interior decorative work, as follows: For stucco work; in preparation of mortars for setting marble, tile, brick and stone; for facing concrete blocks; for laying terrazzo floors; for manufacture of decorative concrete stone; for wainscoting for bathrooms, kitchens, etc., and in fact for any work requiring use of Portland Cement where a white color is desired. "Atlas-White" Portland Cement is absolutely non-staining, and, therefore, is a most excellent material for laying up limestone, marble, or any fine-textured stone.

As sand affects to a great extent the color of finished concrete work, we have prepared "Atlas-White" Mixtures, composed of "Atlas-White" Portland Cement mixed with pure white sand, ready for use with addition of water. The proportions of the mixtures are one to one, one to two, and one to three, and are intended not only for convenience of the trade, but for use in localities where a white sand is not obtainable.

"Atlas-White" Mixture No. 1.

This is composed of one part "Atlas-White" Portland Cement and one part pure white silica sand, thoroughly and intimately mixed. The sand in this mixture is of fine, even grain, and the mixture can be used as a mortar: For plastering on concrete walls, exterior or interior; for floor surfacing where a rich mixture is required; in making mortar for laying terrazzo and tile floors, it is more satisfactory than neat cement; and for setting ceramic mosaic tile, marble and wall tile of any description.

"Atlas-White" Mixture No. 2.

This is composed of one part "Atlas-White" Portland Cement and two parts pure white silica sand thoroughly and intimately mixed. The sand in this mixture is graded in such a manner as to make a dense mortar. This is the mixture recommended in the Standards of the American Concrete Institute for surfacing concrete sidewalks and floors; also, for facing concrete blocks. It is also the mixture recommended by the Associated Tile Manufacturers for tile setting, and for floating and buttering wall tile and in foundations for terrazzo floors. It is also recommended for cast-stone work of every description, such as window-sills and lintels, balustrades, vases, garden furniture and decorative work.

"Atlas-White" Mixture No. 3.

This is composed of one part "Atlas-White" Portland Cement and three parts pure white silica sand, thoroughly and intimately mixed. The sand in this mixture is graded similarly to that in Mixture No. 2, the mortar being weaker on account of additional sand. This mixture is recommended for ordinary work where an especially strong mortar is not necessary. It can be used for the manufacture of cement brick.

Stucco Specifications.

The purpose of the following form is to furnish the architect with a convenient guide for the preparation of stucco specifications.

The three types of construction are covered: Stucco on Masonry Walls, Stucco on Sheathed Frame Walls, and Stucco on Skeleton Frame Walls. Materials and methods are to be understood as common to all three forms of construction unless specially stated to be peculiar to one or two particular forms. Variable parts are in italics.

For convenience of reference, all notes

A BEAUTIFUL "ATLAS-WHITE" STUCCO HOME,
SOUTH ORANGE, N. J.
DAVIS, MCGRATH & KIESSLING, Architects

STUCCO ON METAL LATH FINISHED WITH "ATLAS-WHITE,"
ENGLEWOOD, N. J.
DAVIS, MCGRATH & KIESSLING, Architects

TRINITY LUTHERAN CHURCH, AKRON, OHIO
J. W. G. CORBUSIER, Architect

Continued on next page

have been placed immediately following the specification paragraph of which they are explanatory.

STUCCO WORK

BRICK, HOLLOW TILE and CONCRETE BLOCK WALLS; SHEATHED FRAME WALLS; SKELETON FRAME WALLS.

SCOPE—

(1) The work required under this *section of the* specification comprises the stuccoing of all exterior wall and chimney surfaces, as shown on the drawings and hereinafter described.

NOTE—When a separate specification is written for the stucco work, the words in italics will be omitted.

GENERAL CONDITIONS—

(2) Attention is called to the General Conditions, in the fore part of this specification, which apply equally to all trades.

NOTE—When a separate specification is written for the stucco work, the general conditions governing the work will be placed here instead of the reference in paragraph 2.

PROTECTION—

(3) All materials shall be properly protected while stored at the site, and shall not be placed on the ground. Fresh stucco shall be protected against the weather. No stucco in which cracks, pits, streaks, discolorations, or other defects may occur will be accepted.

CEMENT—

(4) Cement shall be Atlas Portland Cement *for undercoats and Atlas White Portland Cement for finish coat.*

NOTE—When a natural cement color is required for the stucco, instead of a white color, the words in italics will be omitted.

AGGREGATE—

(5) Aggregate *for undercoats* shall be thoroughly clean sand, graded from fine to coarse grains, with the coarse predominating; shall be free from loam, salt, vegetable and other deleterious matter.

NOTE—The binding qualities of the cement are adversely affected unless sand is as above described; and if the sand is not naturally clean, it should be washed after its removal from the bank.

By grading sand from fine to coarse, a more dense and more waterproof mortar is obtained.

Paragraph 5 presupposes the use of white sand, marble screenings or other special aggregate for the finish coat of stucco. If the ordinary sand is to be used for all three coats, the words in italics will be omitted and paragraph 6 will not be used.

(6) Aggregate for finish coat shall be thoroughly clean and coarse *white quartz or silica sand,* properly graded.

NOTE—Alternatives for the material in italics are: white marble screenings, gravel grit, pink granite screenings, etc. White beach sand is usually too fine for the best results.

LIME—

(7) Lime shall be (state brand) hydrated lime.

NOTE—The admixture of a small quantity of hydrated lime in stucco mortar does not materially decrease the strength, and it does, to a marked degree, increase its plasticity, making it work more freely under the trowel. As lime is an inert void filler, it renders the stucco substantially moisture-proof.

WATERPROOFING COMPOUND—

(8) Waterproofing compound shall be (state brand, etc.).

NOTE—Under extensive experiments, hydrated lime has proven so generally successful as a waterproofer of stucco, that we advocate its use in place of the so-called waterproofing compounds. In the coat or coats in which any of these compounds are used, the hydrated lime should be omitted.

COLOR PIGMENTS—

(9) Coloring matter shall be (state brand) dry color pigments.

NOTE—When color is to be produced other than by the use of colored aggregate, mineral colors only should be employed. They should be of the highest degree of purity, of substantially the same specific gravity as the cement, and unaffected by lime, cement or the action of the elements.

HAIR (*Sheathed Frame Walls*)—

(10a) Hair shall be first quality long cattle or goat hair.

HAIR (*Skeleton Frame Walls*)—

(10b) Hair shall be first quality long cattle or goat hair.

WATER—

(11) Water shall be clean and free from acids or strong alkalies.

FURRING (*Sheathed Frame Walls*)—

(12a) Galvanized half-inch crimped furring not lighter than 22-gauge, shall be fastened over the sheathing paper and directly along the line of the studs, using 1¼-inch 14-gauge galvanized staples, placed 12 inches apart.

FURRING (*Skeleton Frame Walls*)—

(12b) Galvanized half-inch crimped furring not lighter than 22-gauge, shall be fastened directly to the studding, using 1¼-inch 14-gauge galvanized staples, placed 12 inches apart.

LATH (*Sheathed Frame Walls*)—

(13a) (Expanded Metal) Lath shall be (give maker's name) expanded metal of 24-gauge, weighing not less than 4 pounds per square yard, galvanized after expansion.

(14a) (Wire Cloth) Lath shall be (give maker's name) 19-gauge wire, woven 2½ meshes to the inch, galvanized after being woven.

NOTE—Paragraphs 13a and 14a are alternatives.

An improved form of construction, taking the place of the furring (paragraph 12a) and the lath (paragraph 13a or 14a) is an expanded metal lath combining furring in the form of an integral stiffening rib, or a wire cloth with a V-stiffening.

(15a) Place lath horizontally over the furring, driving 1¼-inch 14-gauge galvanized staples 8 inches apart over the furring. The sheets of lath shall be locked or lapped at least 1 inch and tied at joints between studs, both vertically and horizontally, with 18-gauge wire. The lath shall be folded around the corners at least 3 inches.

LATH (*Skeleton Frame Walls*)—

(13b) (Expanded Metal) Lath shall be (give maker's name) expanded metal of 24-gauge, weighing not less than 4 pounds per square yard, galvanized after expansion.

(14b) (Wire Cloth) Lath shall be (give maker's name) 19-gauge wire, woven 2½ meshes to the inch, galvanized after being woven.

NOTE—Paragraphs 13b and 14b are alternatives.

An improved form of construction, taking the place of the furring (paragraph 12b) and the lath (paragraph 13b or 14b) is an expanded metal lath combining furring in the form of an integral stiffening rib, or a wire cloth with a V-stiffening.

(15b) Place lath horizontally over the furring, driving 1¼-inch 14-gauge galvanized staples 8 inches apart over the furring. The sheets of lath shall be locked or lapped at least 1 inch and tied at joints between studs, both vertically and horizontally, with 18-gauge wire. The lath shall be folded around the corners at least 3 inches.

MORTAR—

(16) Mortar for first and second coats shall be composed of one (1) part of Portland cement, three (3) parts of sand and one-tenth (1/10) part of hydrated lime, by volume.

(17) Hair may be added to the first coat mortar on metal lath, but in quantity only sufficient to bond the mortar.

NOTE—Hair is added to the first coat of mortar on metal lath to hold the mortar together on the lath, otherwise there would be considerable waste due to the mortar dropping behind the lath; but no greater quantity than is necessary to accomplish this purpose should be used, as an excessive amount of hair will prevent the mortar from going through the lath sufficiently to thoroughly imbed the metal and so preserve it from corrosion.

(18) Mortar for finishing coat shall be composed of one (1) part of *White* Portland Cement, two and one half (2½) parts of *White Sand* and one tenth (1/10) part of hydrated lime, by volume.

NOTE—The words in italics are variable for the reasons given in Notes 4 and 5.

If a waterproofing compound is to be used, the reference to lime in paragraph 18 should be stricken out and a description of the waterproofing compound inserted.

(19) The finishing coat shall be brought to a tone selected by the addition of dry color in quantity not exceeding 6 per cent of the weight of the cement.

NOTE—An excess of color reduces the binding quality of the cement. Stuco made with White Portland Cement responds more quickly to color tones.

(20) Proportions stated are by volume, and one bag (94 pounds) cement is to be considered as one cubic foot.

MIXING—

(21) Mixing shall be done on a water-tight platform, the different constituents thoroughly mixed dry to a uniform color, water then added to obtain the proper consistency, and the whole turned over until the mass is uniform in color and consistency.

(22) There shall not be mixed at one time more mortar than will be used within thirty (30) minutes. No retempered mortar shall be used under any circumstances.

NOTE—Cement is likely to take its initial set within thirty minutes after mixing, and in even less time during the hot summer months. The practice of retempering mortar after it has taken its initial set, cannot be too strongly condemned.

(23) The dry color in the finishing coat shall be very carefully weighed or measured and thoroughly mixed with the sand. The cement and lime shall then be added, and the entire mass thoroughly mixed by shoveling, from one side of the platform to the other, through a ¼-inch mesh screen; when the batch is of uniform color, the water shall be added.

Continued on next page

MORTAR APPLICATION (*Brick Hollow Tile and Concrete Block Walls*)—

(24) The stucco shall be applied in three coats, each coat not less than ¼ inch or more than ⅜ inch in thickness, the whole finishing ⅞ inch thick beyond the normal masonry line. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied where the temperature is below freezing. Masonry surfaces shall be cleaned and thoroughly saturated with water just before the first coat of mortar is applied.

See Note following "28."

(25) The first coat shall be applied under pressure to secure a good bond.

MORTAR APPLICATION (*Sheathed Frame Walls*)—

(24a) The stucco shall be applied in three coats, each coat not less than ¼ inch or more than ⅜ inch in thickness, the whole finishing 1 inch thick over the furring strips. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry at the edge. Where this is impossible the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied when the temperature is below freezing.

(25a) The first coat shall be applied under pressure so that the mortar shall be forced through the lath and completely imbed the metal on both sides. Special care shall be taken to fill all voids around furring strips and where lath laps.

MORTAR APPLICATION (*Skeleton Frame Walls*)—

(24b) The stucco shall be applied in three coats and back-plastered one coat, the whole finishing 1½ inches thick, with the outside face 1 inch beyond the face of studs. The finishing coat shall be not less than ¼ inch in thickness. The plastering shall be carried on continuously in one general direction, without allowing the mortar to dry out at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface. Stucco shall not be applied when the temperature is below freezing.

(25b) The first coat shall be applied under pressure to secure good key, and after it has set shall be back-plastered on the inside or back surface on the lath to a thickness of ½ inch.

MORTAR APPLICATION (*All Types of Construction*)—

(26) After the first coat has set, but before it has dried, the second coat shall be applied and floated to a true plane with wood screeds placed at five-foot intervals and about openings.

(27) After the second coat has set, but before it has dried, the finishing coat shall be applied and finished as hereinafter specified.

(28) The undercoats shall be cross-scratched before the initial set has taken place, and shall be thoroughly wetted before the succeeding coats are applied. The finishing coat shall be kept moist for at least two days, either by gently spraying with water after the mortar has hardened sufficiently to permit it or by hanging wet burlap or other fabric over the surface.

NOTE—To fully develop its binding properties, cement requires moisture continuously during the period of crystallization. For this reason masonry surfaces and undercoats are saturated so that they will not absorb the water from succeeding coats, and the finish coat is kept moist either by gently spraying the stucco itself or by soaking burlap curtains hung about 6 inches away from the stucco. The latter provision is particularly necessary during the hot summer months in order to prevent the evaporation of the water in the finished surface, which is the cause of crazing or hair cracks.

SURFACE FINISH—

(29) *Smooth Troweled.* Finishing coat shall be smoothed with a metal trowel, with as little rubbing as possible.

(30) *Stippled.* Finishing coat shall be smoothed with a metal trowel, with as little rubbing as possible, and then shall be lightly patted with a brush of broom straw to give an even stippled surface.

(31) *Floated.* Finishing coat, after being brought to a smooth, even surface, shall be rubbed in a circular motion with a wood float. This floating shall be done when mortar is partially set, and a little sand shall be used to slightly roughen the surface.

(32) *Sand Sprayed.* After the finishing coat has been brought to an even surface, it shall be coated with a creamy mixture of equal parts of white cement and white sand, mixed fresh in a bucket every thirty (30) minutes and kept well stirred. This mixture shall be forcibly thrown from a whisk broom against the finishing coat while it is still moist and before it has attained its final set.

(33) *Rough Cast.* After the finishing coat has been brought to an even surface and before attaining its final set, it shall be uniformly coated with a mixture of one (1) part white cement to two (2) parts white sand, thrown forcibly against the wall in such a manner as will produce a rough surface of uniform texture.

(34) *Pebble Dash.* After the finishing coat has been brought to an even surface and before attaining its initial set, clean pebbles shall be forcibly thrown against the mortar and imbedded therein. Pebbles shall vary in size from ¼ inch to ½ inch, shall be well wetted before being cast, and shall be uniformly distributed over the surface. They may be pressed into the mortar with a clean wooden trowel, but the surface shall not be otherwise disturbed.

(35) *Exposed Aggregate.* The finishing coat within twenty-four (24) hours after it has been troweled to an even surface, shall be scrubbed with a stiff brush and until the aggregate has been uniformly exposed. Should the cement be too hard to be readily removed by water, a solution of one (1) part hydrochloric acid to four (4) parts of water may be used; but as soon as the aggregate has been exposed, particular care shall be taken to remove all trace of acid by spraying thoroughly with clean water from a hose.

NOTE—The above surface finishes are alternatives.

SAMPLES—

(36) Samples of the surface finish shall be laid up well in advance of the work, and the approved sample shall be carefully preserved during the prosecution of the work and used as a standard.

NOTE (*Sheathed Frame Walls and Skeleton Frame Walls*)—

The success of stucco on wood frame construction is as dependent upon the character of the framework as it is of the stucco itself. A well braced and rigid framework is absolutely essential. The following provisions are presented as a standard of good practice in this regard:

FRAMING (*Sheathed Frame Walls and Skeleton Frame Walls*)—

The studs should be spaced 12 inches on centers and be continuous from main sill to rafter plate, with 1- x 6-inch ribbons housed into studs to support the floor joists and tie the studs together. No girts or other horizontal grained members should intervene. The floor joists should be securely spiked to the studs.

BRIDGING (*Sheathed Frame Walls*)—

No bridging is required.

BRIDGING (*Skeleton Frame Walls*)—

Once in the height of each story, the stud walls should have a row of 2- x 3-inch bridging cut in diagonally between the studs and securely spiked to them.

SHEATHING (*Sheathed Frame Walls*)—

Matched or ship-lap sheathing, dressed one side to a thickness of ⅞ inch, not less than 6 or more than 8 inches wide, should be laid diagonally over the studs and fastened with two nails at every bearing.

SHEATHING (*Skeleton Frame Walls*)—

No sheathing is required.

WATERPROOFING (*Sheathed Frame Walls*)—

Sheathing boards should be covered with a felt—not a sheathing paper—thoroughly waterproofed by impregnation with tar or asphalt, well lapped and tacked at joints and well flashed and tacked about openings.

WATERPROOFING (*Skeleton Frame Walls*)—

The outer face of studs, and the sides for a distance of 2 inches back from the face, should be thoroughly coated with a pitch or asphalt compound, to interpose waterproofing between the stucco and the framework.

INSULATION (*Sheathed Frame Walls*)—

When greater insulation than the waterproof felt affords is desired, such as quilting or corrugated paper, this insulation should be placed between the waterproof paper and the sheathing.

INSULATION (*Skeleton Frame Walls*)—

After the stucco lath has been back-plastered, the air space between the studs may be divided by applying, between the bridging and the inside plastering, quilting or other insulating material, fastening it in place by nailing wood strips, over the fold in the paper, on the side of the studs.

FURRING (*Sheathed Frame Walls*)—

Unless metal furring is used, or a lath of which furring forms an integral part, the wall should be furred over the waterproof paper with 1- x 2-inch strips placed vertically 12 inches on centers and about openings.

FURRING (*Skeleton Frame Walls*)—

Unless metal furring is used, or a lath of which metal furring forms an integral part, the wall should be furred with 1- x 2-inch strips placed vertically on the studs and about openings.

SILLS (*Sheathed and Skeleton Frame Walls*)—

Sills of openings should have ample slope and projection and undercut drips.

ALSEN'S PORTLAND CEMENT WORKS

Manufacturers of German and American Portland Cement

TELEPHONES: RECTOR { 510 / 511 / 512

45 Broadway
NEW YORK, N. Y.

W. P. CORBETT, GENERAL MANAGER SALES

Products.

Manufacturers of "ALSEN'S" GERMAN PORTLAND CEMENT, "ALSEN'S" AMERICAN PORTLAND CEMENT, "ALSEN'S" INSTANTANEOUS SET PORTLAND CEMENT.

Capacity.

Annual capacity is about 3,000,000 barrels.

Description.

German "Alsen's" is light colored—not white. Its great strength and high quality have made it known to leading Architects and Engineers in every country where cement is used. American "Alsen's" closely approximates the German in analysis and strength.

American "Alsen's" has a fine uniform bluish tint. In sidewalk, artificial stonework and cement blocks it produces a most pleasing effect. The color is also an indication of the high quality of the cement. It is often called the "Waterproof Cement," because it makes such dense and impervious concrete.

Medium slow set is always the safest in the long run. Forced strength in cement (like forced growth in living things) is dangerous, and means less strength at maturity. We supply quick set only when required for special work.

"Alsen's" is made by the oldest manufacturers of high-grade cements in the world.

Tests of old date, or from special samples, which some companies publish, are obviously unreliable, and not a criterion of regular quality. "Alsen's" almost invariably shows superior *long-time* tests when properly conducted under equal conditions, as proved in various countries:

ANALYSIS OF "ALSEN'S" AMERICAN PORTLAND CEMENT

Silica	22.20	Magnesia	1.95
Alumina	6.74	Sulphuric Acid	1.10
Iron Oxide	3.44	Loss	1.17
Lime	63.40		

Specific Gravity 3.17

Quality.

What is a good Portland Cement? Most important is *durability* and *safety;* it should gain with time, not lose in strength. Laboratory tests, while most necessary and useful, can be misleading; they alone *can not prove durability under actual working conditions.* Time can. Executed work under all sorts of climates, temperature changes, etc. In this kind of long-time record of *actual work done* "Alsen's" stands ahead.

This is due not alone to the general excellence of its manufacture, but to the chemically superior raw material from which it is made, a material low in magnesia and sulphuric anhydride, those deleterious components which can be so injurious. Leading authorities agree on this from many years' exhaustive tests. Err on the safe side, if at all, viz.: The *less* of magnesia and sulphur the better. They are

GERMAN LABEL

AMERICAN LABEL

treacherous elements and not yet fully understood. Not one barrel of "Alsen's" leaves the mill until it passes all accelerated and other tests.

Advantages.

"Alsen's" German and American Portlands are scientifically prepared to stand the maximum of abuse; they are most durable; they are *uniform.* Unlimited capital and close supervision throughout the process of manufacture by trained German and American experts insures careful and intelligent attention in *every* detail.

The American Plant.

When the American works were planned the "Alsen" engineers spent three years searching all sections for a *better raw deposit* than had yet been discovered.

This deposit was finally located at a special point on the Hudson River and its superior quality was attested by the highest chemical experts obtainable, and a property they had also bought in Lehigh Valley (second to none in that district) was then sold to a competitor not so extremely critical.

This "Alsen" mill is under the supervision of the German Alsen Fabriken, the product of which is the standard of high quality throughout the world.

BRIDGE NEAR ASHOKAN RESERVOIR
Shows class of work possible with "Alsen's" Cement

THE LEHIGH PORTLAND CEMENT COMPANY

ALLENTOWN, PA. CHICAGO, ILL. SPOKANE, WASH.

BRANCH OFFICES

NEW YORK, N. Y. PHILADELPHIA, PA. BOSTON, MASS. BUFFALO, N. Y.
JACKSONVILLE, FLA. MINNEAPOLIS, MINN. MASON CITY, IOWA NEW CASTLE, PA.

MILLS

FOGELSVILLE, PA. WEST COPLAY, PA. ORMROD, PA. NEW CASTLE, PA.
MASON CITY, IOWA MITCHELL, IND. METALINE FALLS, WASH.

Product and Services.

LEHIGH CEMENT—Guaranteed to conform in every respect to present Standard Specifications for Portland Cement as adopted by the American Society for Testing Materials when tested by methods of testing recommended by the American Society of Civil Engineers.

TRADE-MARK

For those customers desiring to test their own cement, we will reserve and seal bins for any amount desired.

Marketing and Shipping Facilities.

Lehigh Mills are located at strategic points from the Atlantic to the Pacific. In all the principal marketing centers, branch offices have been established for the convenience of our customers.

Lehigh Cement is marketed in cloth or paper bags for domestic trade, and in barrels for export trade. The bags contain 94 pounds net (four bags to the barrel), and the export barrel contains 376 pounds net. These barrels are made in our own cooperage plant, and are tongued and grooved to withstand the rough handling necessary in export trade.

CITY HALL, TAMPA, FLA.
Lehigh Portland Cement Used

Use.

In practically every type of modern construction the use of cement is required. In great engineering works, concrete is the essential material.

The careful selection of the ingredients for concrete is a big factor in the success of the finished work. The selection of Lehigh Cement is a warranty for the most important material used in concrete.

Perhaps the best guarantee on future promise is past performance. The great New York Connecting Railroad; the Municipal Building, New York; the Girard Point Elevators, the League Island Dry Docks, Philadelphia; the Boston Braves' Ball Park; the Chicago and Northwestern Railway Terminal; the Quay and Sea Walls, Charlestown; the Galveston Causeway —these are a few of the structures where Lehigh is on the job.

Special Features of Concrete Construction.

The most noteworthy conflagrations, quakes and storms of various sorts have proved the strength and permanence of concrete. Another feature of this material that recommends its consideration to architects is its adaptability to every form and class of architecture.

For Architects' Convenience.

To any architect writing us on the stationery of his firm and mentioning SWEET'S CATALOGUE, we will send our celluloid computing scale, giving the amounts of cement, sand and stone required per cubic yard of rammed concrete of different proportions.

We will also be glad to send a small technical book summarizing the many advantages of concrete construction. Further discussion of items of particular interest to any architect may be entered into by communication with any of our offices.

MARQUETTE CEMENT MANUFACTURING CO.

SALES OFFICES
Marquette Building
CHICAGO, ILL.

WORKS
LA SALLE, ILL.

Products.

MARQUETTE PORTLAND CEMENT, *The Certified Cement.*

Manufacture.

Marquette Portland Cement is a mined product; 600,000 tons of rock are mined yearly, from which 2,000,000 barrels of Marquette Portland Cement are manufactured. After the rock has been blasted from the mine, it is conveyed to the surface of the earth, where it goes through the various processes of crushing, burning, pulverizing and curing, until it is ready for sacking. Hourly tests are made of the finished product to insure uniform as well as the best quality. Every bag of Marquette Portland Cement is guaranteed to conform to Standard and Government specifications; there is a green guarantee tag attached to every bag; it certifies Marquette superiority.

Packages.

Marquette Portland Cement is shipped in strong duck bags or strong paper bags. Prices are quoted by the barrel; four bags to a barrel; 95 pounds per bag.

Territory.

Illinois, Wisconsin, Minnesota, Iowa, Indiana and parts of Michigan.

Literature.

Sent free to any architect, builder, engineer, or contractor interested in the Middle West:

TRADE-MARK

"Building for the Future." Every architect and builder should have a copy; this book is photographic proof of Marquette superiority.

"Stucco Houses." A book explaining the various types of construction and finishes, and the approximate cost per square yard of applying to old or new buildings.

"Making of Portland Cement." A brief description of how Marquette Portland Cement is made.

References.

Rand, McNally Building, Chicago, 30,000 barrels. Architect: Holabird & Roche, Chicago; Contractor: Wells Bros. Co., Chicago.

Grand Avenue Viaduct, Milwaukee, Wis., 55,000 barrels. Architect: Concrete-Steel Engineering Co., New York; Contractor: National Engineering & Construction Co., Milwaukee.

Crane Company (Corwith Plant), 45,000 barrels. Architect: Graham, Burnham & Co., Chicago; Contractor: Lanquist & Illsley Co., Chicago.

Ford Motor Company Building, Minneapolis, Minn., 30,000 barrels. Architects: Kees & Colburn, Minneapolis, and John Graham, Detroit; Contractor: Splady, Albee & Smith, Minneapolis.

Sixteenth Avenue Bridge over Cedar Rapids River, Cedar Rapids, Iowa, 11,000 barrels. Architect and Engineer: Hedrick & Ash, Kansas City, Mo.; Contractor: Union Engineering & Construction Co., Chicago.

LA SALLE HOTEL, CHICAGO, ILL.
25,000 bbls. Marquette Portland Cement
HOLABIRD & ROCHE, Architects

ST. PAUL HOTEL, ST. PAUL, MINN.
11,000 bbls. Marquette Portland Cement
W. J. HOYT & CO., Architects

CONWAY BUILDING, CHICAGO, ILL.
20,000 bbls. Marquette Portland Cement
GRAHAM, BURNHAM & CO., Architects

THE SANDUSKY PORTLAND CEMENT CO.

CLEVELAND, OHIO

FACTORIES

BAY BRIDGE, OHIO SYRACUSE, IND. DIXON, ILL. YORK, PA.

Products.

MEDUSA GRAY PORTLAND CEMENT, MEDUSA WHITE PORTLAND CEMENT, MEDUSA GRAY and WHITE WATERPROOFED PORTLAND CEMENTS.

Output.

Annual production 2,500,000 barrels.

Quality.

Medusa Portland Cements are guaranteed to be at least equal to any other Portland Cement in the world, and will pass and surpass standard specifications. Every carload is tested before being shipped, and a record of our laboratory test will be furnished on request.

Description.

Medusa Portland Cements are slow-setting and quick-hardening, absolutely uniform and unsurpassed in fineness and strength.

Medusa White Portland Cement is a true Portland, perfectly white in color and stainless; a beautiful product adapted to ornamental artificial stone work of the highest grade.

TRADE-MARK

Medusa Waterproofed Cements are our regular gray and white brands waterproofed with our celebrated Medusa Waterproofing (see our page in Waterproofing Section), and ready for use.

Catalogues and Samples.

Send for samples and catalogues illustrating and describing work in which Medusa has been used and containing tests, testimonials and specifications.

Uses.

Medusa White Portland Cement can be used for exterior as well as interior work and will be found suitable for building ornamentation, stucco, concrete building blocks, interior decoration, statuary, cemetery work, parks and grounds, tile, mosaic, colored concrete, stainless mortar, setting marble, and many other uses.

Medusa Waterproofed Portland Cement is especially adapted for use in storage tanks, cellar walls and floors, cisterns, reservoirs, swimming-pools, concrete conduits, sewer pipe, elevator pits, dams and a multitude of other uses in which resistance to percolation of water is required.

U. S. GOVERNMENT ADMINISTRATION BUILDING, BALBOA, CANAL ZONE

Medusa White Portland Cement was used for stucco in the rotunda, wainscot of the halls, and for a wash over the outside stucco of ordinary Portland cement and sand

REFERENCES

Selig Zoo, Los Angeles, Cal., Ornamental entrance
Monterey Hotel, Asbury Park, N. J., Exterior stucco, Watson & Huckel, Architects
Universal Film Co. Plant, Universal City, Cal., Exterior stucco finish of buildings
"Bauernhof" on Estate of August A. Busch, St. Louis, Mo., Exterior stucco, Klipstein & Rathmann, Architects
Charleston, S. C., Library, Exterior finish, McGoodwin & Hawley, Architects
Perry Memorial, Put-in-Bay, Ohio, Stainless mortar for laying granite, J. H. Freedlander and A. D. Seymour, Jr., Architects
Government Buildings, Kingston, Jamaica
Residence of R. A. Herold, Architect, Sacramento, Cal.
New Parliament Building, Winnipeg, Man., Non-staining mortar, Victor Horwood, Provincial Architect
U. S. Custom House, Boston, Mass., Setting marble, Peabody & Stearns, Architects
Buckingham Palace, London, Eng.
National Museum, and Senate and House Office Buildings, Washington, D. C.
U. S. Post Offices in New York, Canandaigua and North Tonawanda, N. Y.; Bristol and Wallingford, Conn.; Frankfort, Ky.; Wooster, Marion, Delaware, Athens and Ironton, Ohio; Connersville, Peru, Wabash and Jeffersonville, Ind.; Watertown, Wis.; Pontiac and Mt. Clemens, Mich.; Asbury Park, N. J.; Washington, D. C.; Ottumwa, Iowa; Temple, Tex.; Lake Charles, La.; Athol, Mass.; Fairmont, W. Va.; Carlisle, Pa.; and many others

ESTABLISHED 1901

SOUTHERN CEMENT COMPANY

Manufacturers of Slag Cement

BIRMINGHAM, ALA.

Products.

NON-STAINING SLAG CEMENT: Brands, ALABAMA and MAGNOLIA.

Description.

Fineness—The slag cement manufactured by the SOUTHERN CEMENT COMPANY is ground exceedingly fine, ninety per cent passing through a 200-mesh sieve. This insures a tougher and more nearly waterproof concrete than can be made when a coarser ground cement is used.

Strength—Slag cement concrete is very tough, and for this reason eminently fitted for heavy concrete foundation work. See in Professional Papers No. 28, Corps of Engineers, U. S. A., the statement: "Puzzolan mortars and concretes are tougher or less brittle than Portland."

Stainlessness—This product is entirely satisfactory as a stainless cement, as tests made by the Pittsburgh Testing Laboratory, a recognized authority on cement testing, show. Extracts from the report of the laboratory follow:

"From your samples of cement submitted, beg to report that we find this cement to be entirely satisfactory as a stainless one."

"Slag cement contains such a low percentage of iron that the effect of the atmosphere will not cause stains to be produced."

Advantages.

Slag cement is essentially slow setting. This quality is a great advantage in many classes of work. Masses of concrete poured on different days in the same work will show a less evident line of separation, and the bond be necessarily closer when a slow-setting cement is used.

In cement masonry work large quantities of mortar may be mixed at one time, and the mortar will remain plastic until used.

Slag cement, on account of its fineness, is very plastic and works smoother under the trowel; and more brick can be laid per barrel.

Uses.

This cement is suitable for concrete foundation work; brick and stone masonry; and for laying tile, terra cotta, stone or marble where a non-staining cement is required.

RESERVOIR OF REPUBLIC IRON & STEEL CO., EAST THOMAS, ALA.
Constructed with Magnolia Cement

AMERICAN TRUST BUILDING, BIRMINGHAM, ALA.

JEFFERSON COUNTY SAVINGS BANK, BIRMINGHAM, ALA.

EMPIRE BUILDING, BIRMINGHAM, ALA.

Fifteen thousand barrels of Magnolia were used in retaining walls, brickwork, hollow tile, concrete under floors, and as a stainless cement in setting white terra cotta and marble

TENNESSEE COAL, IRON & RAILROAD CO., ISHKOODA, ALA.
Seven thousand barrels of Alabama were used in foundations, retaining walls and the massive concrete work forming coal bins and supporting railroad tracks

STOCK-HOUSE OF REPUBLIC IRON & STEEL CO., EAST THOMAS, ALA.
Note piers supporting enormous weight of iron ore bins. Three thousand barrels of Magnolia were used

THE AMERICAN GYPSUM COMPANY

MANUFACTURERS OF

Wall Plasters and Other Gypsum Products

PORT CLINTON, OHIO

Products.

"Anchor," "Monarch," "20th Century" and "White Rock" (Neat) Cement Hair-Fibered Plasters.

"Anchor," "Monarch," "20th Century" and "White Rock" Wood Fiber Plasters.

"20th Century" Genuine Pulp Plasters.

"Anchor," "Monarch" and "20th Century" Asbestos (Neat) Plasters.

Bond Plasters for Concrete Walls.

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sanded Wall Plasters (Machine-mixed).

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sanded Wood Fiber Plasters (Machine-mixed).

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sanded Asbestos Plasters (Machine-mixed).

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sand Finish Plasters.

"Anchor," "Monarch," "20th Century" and "White Rock" Regular-Grade Plaster Paris for White Coat.

"Anchor," "Monarch," "20th Century" and "White Rock" Superfine-Grade Plaster Paris for White Coat.

"Anchor" Molding and Casting Plaster.

"20th Century" Special Prepared White Finish.

Keene's Cement.

"Anchor" Gypsum Partition Blocks and Roof Tile.

Hydrated Lime.

"Monarch" Plaster Board.

Location and Facilities.

Centrally located in that part of the United States east of Chicago, Ill., on the main lines of the New York Central Railroad, which, with its numerous systems, lines and connection roads, enables us to ship in any direction.

Strictly up to date. Electrically operated machinery and modern reinforced concrete fireproof buildings.

Capacity, seven hundred tons per day, or thirty-five 20-ton cars.

Reputation.

Our products have been on the market for nine years and their merits are well known, having been used on many of the largest buildings in our territory.

Guarantee.

We guarantee all of our products to be of the best quality, and to give first-class results if used in accordance with our instructions.

Specifications for The American Gypsum Company's Cement Plasters.

Grounds—To be ¾ inch for Plaster Boards, Wood Lath, Wire and Metal Lath; ½ inch for Gypsum Blocks and ⅝ inch to ¾ inch for Clay Tile and Brick Walls.

Lathing—Wood Lath: They should be of a good grade, free from knots, sap and bark; to be spaced not less than ¼ inch apart and well nailed with not less than two 3-penny lathing nails for each stud to each lath, and driven well home. Half green lath are best, as dry lath will buckle and crack plaster unless thoroughly soaked with water eight to ten hours before plaster is applied. Lath must have ¼ inch space between ends, and must not project through partitions.

Mortar—To be any brand of The American Gypsum Company's Cement Plaster, and to be mixed and applied according to manufacturer's directions.

Directions for Mixing

Use a clean, tight box, 3½ feet by 7 feet by 12 inches deep. The box should be thoroughly cleaned after each mixing and kept free from dirt and lumps of old plaster. Raise one end of the box about four inches.

First put in a layer of sand, then one of plaster; hoe dry from one end of box to the other, then back again, working the sand and plaster until thoroughly mixed; now mix with water immediately. Draw the material to the high end of the box, put the water in the lower end of the box and hoe the plaster into the water. Mix water and plaster thoroughly. Mix thin at first, then add sufficient dry plaster and sand to bring to proper consistency for applying. Let the mortar stand ten minutes after mixing with the water.

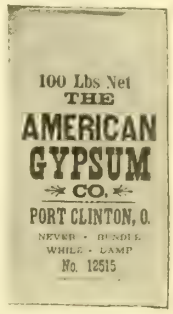
Always use clean water, free from alkali, salt and other impurities. Never wash tools in water to be used in mixing plaster; have a separate barrel of water for this purpose. Do not mix more material at one time than can be used in one hour. Never re-temper plaster after it has commenced to set. Do not mix one gauging with another.

Sand—Quality: Use only clean, sharp sand free from loam, dirt or frost. Use sand which passes through a 10- and remains on a 30-mesh sieve. Avoid quicksand.

Quantity—When using American Gypsum Company's Cement plasters on Plaster Board and Wood Lath, mix two parts by weight of clean, sharp, dry sand and one part of plaster. For Brick, Clay Tile, or Gypsum Blocks, mix three parts by weight of clean, sharp, dry sand with one part of plaster. For Metal Lath or Expanded Metal, use 1½ parts to two parts clean, sharp, dry sand by weight, to one part of plaster.

General Instructions for Applying

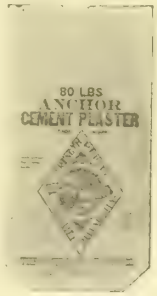
Plaster Board—First fill all joints between the boards. When this is set, apply the base or browning coat, filling out to grounds and darbying to a straight and even surface, ready to receive finish coat. Darby lightly and use water sparingly. Do not wet boards before applying plaster.



STANDARD 100 POUNDS SACK

"20TH CENTURY" PLASTER BAG

"MONARCH" BRAND BAG



"ANCHOR" CEMENT PLASTER BAG

Continued on next page

Wire and Expanded Metal Lath—Apply a scratch coat lightly, covering the lath and filling meshes. After the scratch coat has set hard, but before it is dry, apply the second coat, bringing it to a straight and even surface with rod and darby, ready to receive the finish coat. Darby lightly and use water sparingly.

On Wood Lath—If lath are dry, soak thoroughly; give them all the water they will take. This should be done eight to ten hours before applying plaster, so that lath will have a chance to swell and buckle. This will prevent their doing so after plaster is applied and insure a first-class hard wall, which is often lacking where plaster is applied to dry lath.

Lay plaster on, using sufficient pressure to force through lath and form a good key and fill up grounds as you go along. Darby lightly, so as not to force mortar through lath spaces, and use water sparingly. Never apply at one time more than can be darbied before material begins to set.

On Brick Tile or Gypsum Block Walls—First soak walls thoroughly, to reduce the suction; apply sufficient mortar to fill out the grounds, bring to a straight and even surface with rod and darby, ready to receive the finishing coat. Darby lightly and use water sparingly.

Specifications for The American Gypsum Company's Wood Fiber Plasters.

Grounds—Same as specified for Neat Cement Plasters.

Lathing—Same as specified for Neat Cement Plasters.

Mortar—To be any brand of The American Gypsum Company's Wood Fiber or Genuine Pulp Plasters, and to be mixed and applied according to manufacturer's directions. Only water is to be added to this plaster in sufficient quantity to temper to proper consistency for applying to walls, and under no circumstances will contractor be allowed to add sand or other solid material.

NOTE—We also manufacture Wood Fiber under a special formula, allowing the use or addition of sand on the job in proportions of equal parts sand by weight, which makes a good hard wall, but not as good as our Wood Fiber used without sand.

DIRECTIONS FOR MIXING AND APPLYING

First put water in box, then throw in such amounts of Wood Fiber Plaster as could be used in about one hour, spreading it out so the water can soak in. Allow the plaster to soak for ten or fifteen minutes without mixing. This is necessary, owing to the fact that this plaster requires lots of water, and if not allowed to soak it will mix hard and also work hard. After this period of soaking has elapsed hoe the material back and forth thoroughly, adding sufficient water to bring mortar to right consistency for application, and if before mortar is all used up it becomes too stiff in the box, re-temper with water.

By observing these instructions, plaster will work much easier and give the best results. General directions for applying are the same as given for Neat Cement Plasters.

Specifications for The American Gypsum Company's Prepared Wall Plasters.

Grounds—Same as specified for Cement Plasters.

Lathing—Same as specified for Cement Plasters.

Mortar—To be any brand of The American Gypsum Company's Prepared Wall Plasters, and to be applied according to the manufacturer's directions.

DIRECTIONS FOR MIXING AND APPLYING

Nothing but water to be added to this plaster, and under no circumstances will the contractor be allowed to mix in sand or other solid material.

Put plaster in raised end of box and water in low end. Hoe plaster into water, mixing thoroughly. Mix thin at first, as this permits free chemical action and prevents lumps forming. Add sufficient dry plaster to bring to proper consistency for application. The best results are obtained by allowing mortar to stand ten or fifteen minutes after mixing.

NOTE—We use Pelee Island, Lake Erie, sand in all brands of Prepared Plasters; conceded to be the best plastering sand in this territory. It is dried, then graded and blended to insure uniform grade, and accurately weighed, to insure proper quantities, and mechanically mixed to insure proper distribution with plaster.

Covering Capacity of The American Gypsum Company's Plasters.

The depth of grounds, uniform thickness of plaster, the skill of the mechanic, and the many different kinds of walls to which plaster is applied necessarily affect the amount of square yards of surface one ton of plaster will cover. But for estimating purposes and for general average results one ton of cement plaster with two parts sand added, when applied to wood or metal lath, will cover 200 yards; and with three parts sand added, on brick, tile or gypsum block, will cover 200 yards.

Wood Fiber and Genuine Pulp Plasters will average 220 yards per ton. Prepared, ready mixed, sanded plasters will average 60 to 70 yards per ton; and under favorable conditions either kind will cover 25 per cent more.

Specifications for The American Gypsum Company's Prepared Sand Float Finish.

Finish to be any brand of The American Gypsum Company's Prepared Sand Finishes, and to be mixed and applied according to the directions of the manufacturer. This finish is prepared so that nothing but water need be added, and under no circumstances will contractor be allowed to mix sand or other solid matter. Directions for mixing, the same as for Prepared Plaster.

GENERAL DIRECTIONS FOR APPLYING

The best results are obtained with float finish, by first allowing base coat to set firm and hard and while still green apply finish, which should be done in about twelve hours after base coat is put on.

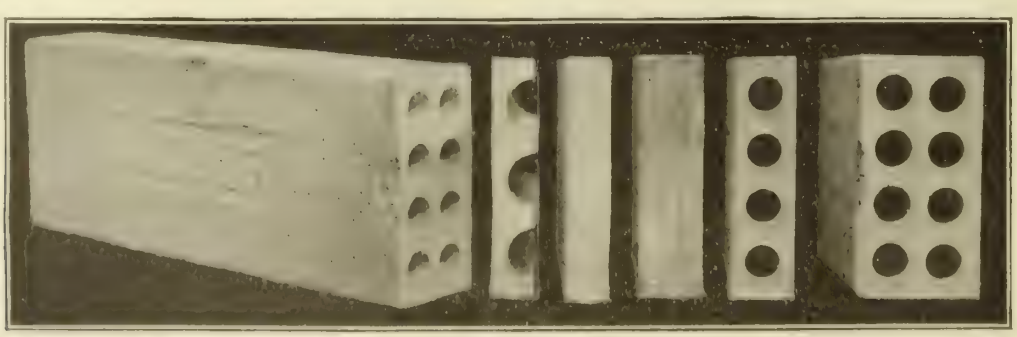
Lay on with a trowel, and then use cork-carpet or felt float, working material to a true and even surface, free from float marks and cat-faces. Use as little water as possible while floating, to avoid killing surface of finish. Best to use only a damp brush. Never attempt to float after finish commences to or has set.

Specifications for The American Gypsum Company's Prepared Troweled Finish.

Trowel finish to be The American Gypsum Company's "20th Century" Special White Finish, and to be mixed and applied according to the directions of the manufacturer. These finishes are prepared so that nothing but water need be added, and under no circumstances will contractor be permitted to add sand or any other solid materials.

DIRECTIONS FOR MIXING

Mixing-box and board to be perfectly clean, and clear water used in mixing. Place finish in high end of box and water in low end. Hoe into water and mix fairly thin, and



VARIOUS FORMS AND THICKNESSES OF ANCHOR GYPSUM BLOCKS

Continued on next page

allow to stand for four to six hours before using. If stiff when ready to use, thin by adding water, and mix same thoroughly to the proper consistency and carry in buckets.

General Directions for Applying

Base coat must be thoroughly dry before applying finish, so that any cracks will be filled with finish. If suction is too strong, sprinkle or brush with water. Apply surface in three coats. For first coat apply enough finish to cover surface filling, using it very thin, and press it firmly on base coat. Allow this to dry a few minutes to prevent blistering, then apply the second coat, bringing surface up level; then apply third coat, using material thin as can be handled on the hawk and fill in the cat-faces and imperfections. After finish has stiffened sufficiently for troweling, trowel to a smooth surface, using water sparingly.

Note—"20th Century" Finish, like Keene's Cement, cannot be killed by mixing or working after it commences to set. In fact, it can be broken down as often as desired, and each time done it improves its working qualities. It makes a very white, uniform color and is exceptionally hard. It can be blocked off to imitate tile if desired. When walls are dirty, can be washed with clean water. Pronounced by mechanics the best Prepared Finish on the market.

Specifications for The American Gypsum Company's Bond Plaster.

Undressed lumber should be used for concrete forms, so that walls will be left rough. Paraffin or oil should never be used on forms. Concrete walls must be thoroughly dry and never contain frost. All dust must be removed; also any oil, greases or paraffin before plaster is applied.

Grounds—To be on side walls ⅜ inch and on ceilings of sufficient thickness to bring on an even surface.

Mortar—To be The American Gypsum Company's Bond Plaster for concrete walls, to be mixed and applied in accordance with the instructions of the manufacturer's expert, who will be on the ground when the job is started, to personally inspect the work and consult with architect and contractor.

Anchor Hollow and Solid Gypsum Blocks.

Are made of pure calcined gypsum. They are very light, but are tough. Have been approved by the Underwriters. Are fireproof, vermin-proof and practically sound-proof. They are rapidly being recognized as the nearest to the ideal material for partitions and wall furring known, and are filling a long felt want of architects and engineers for a material that possesses such qualities; and, in addition, are so light that they make material reductions in building loads.

Anchor Solid Reinforced Gypsum Roof Tile.

Are made of the same material as the Hollow Gypsum Blocks, and are reinforced with special mesh reinforcing material. The lightest roofing material on the market, which very naturally reduces weights and cost of steel roof supports.

Size	Ceiling Heights, feet	Weight per square foot, lbs.	Mortar required per square foot, lbs.	Weight plastering one side, square foot, lbs.	Total weight plastered one side, square foot, lbs.	Weight plastering two sides, square foot, lbs.	Total weight plastered two sides, square foot, lbs.
2 inch Hollow 2 x 12 x 30	Furrin:	6.4	1	3	10.4	6	12.4
2 inch Solid 2 x 12 x 30	10	9.4	1	3	13.4	6	15.4
3 inch Hollow 3 x 12 x 30	13	9.9	1 2	3	14 1	6	15 9
3 inch Solid 3 x 12 x 30	15	12.4	1 2	3	16.6	6	18 4
4 inch Hollow 4 x 12 x 30	17	13	1.63	3	17.63	6	19
5 inch Hollow 5 x 12 x 30	24	15.6	2.04	3	20.64	6	21.6
6 inch Hollow 6 x 12 x 30	28	16.6	2.45	3	22.05	6	22.6
8 inch Hollow 8 x 12 x 30	40	22.4	3.26	3	28.66	6	28.4

Note — Anchor Gypsum Roof Tile made in the following sizes:
2 x 12 x 29½ inches—reinforced weight per square foot, 10 pounds.
3 x 12 x 29½ inches—reinforced weight per square foot, 13¼ pounds.

They are the most effective fire-resistant known. Will not disintegrate, and also prevent condensation or sweating, which is so objectionable in all factory buildings; neither will they transmit heat to interior of building. Such a combination makes them an ideal material for roof decks. Unskilled labor can be used in erection.

These tiles are made plain white or damp-proof black. Sizes are all Standard, 29½ inches long, and have T-iron supports placed 30 inches on center.

References.

The American Gypsum Company's products have been used on many of the largest buildings erected in the Central States territory in the last nine years, by the United States, State and Municipal governments, and other public, fraternal and private interests. A miscellaneous partial list is here given, and a complete classified list will be mailed to those receiving "Sweet's" 1916 Catalogue, as soon as certified list is received from publishers.

Dime Savings Bank, Detroit, Mich.
Miners' Bank, Wilkesbarre, Pa.
Union Trust Co., Cincinnati, Ohio
Court House, Danville, Ind.
Court House, Mercer, Pa.
Court House, Norwalk, Ohio
City Hall, Cleveland, Ohio
City Hall, Youngstown, Ohio
Wanamaker's Department Store, Philadelphia, Pa.
Halle Bros., Cleveland, Ohio
Jenkins' Arcade, Pittsburgh, Pa.
Woodward Arcade, Detroit, Mich.
New Michigan Central Depot, Detroit, Mich.
Whitney Building, Detroit, Mich.
Leader-News Building, Cleveland, Ohio
Daily News, Canton, Ohio
Sherman Hotel, Chicago, Ill.
Statler Hotel, Detroit, Mich.
Ponchatrain Hotel, Detroit, Mich.
Tuller Hotel, Detroit, Mich.
Gibson Hotel, Cincinnati, Ohio
Ohio State Normal School, Kent, Ohio
Ohio State University Museum, Columbus, Ohio
Ohio State Tuberculosis Hospital, Springfield Lake, Ohio
Dilworth High School, Pittsburgh, Pa.
Mason's High School, Akron, Ohio
Timpkins' $1,000,000 Residence, Canton, Ohio
U. S. Post Office, Ashtabula, Ohio
U. S. Post Office, Fairmount, W. Va.
U. S. Post Office, Mattoon, Ill.
U. S. Post Office, Greensburg, Pa.
Masonic Temple, Erie, Pa.
Elk's Temple, Terre Haute, Ind.
Elk's Temple, Marion, Ohio
U. S. Barracks, Sheridan, Ind.
U. S. Post Office, Winchester, Ohio
U. S. Post Office, Middlesboro, Ky.
U. S. Post Office, Mansfield, Ohio
Marion High School, Marion, Ohio
Gibbs Avenue High School, Canton, Ohio
Richmond High School, Richmond, Va.
West High School, Akron, Ohio
McKelvey High School, Pittsburgh, Pa.
Andrew Hospital, Muncie, Ind.
St. Elizabeth Hospital, Youngstown, Ohio
Ohio State Institution for Feeble Minded, Columbus, Ohio
School for Deaf, Flint, Mich.
University Chemical Laboratory, Cincinnati, Ohio
Ohio State Normal, Bowling Green, Ohio
Phoenix Hotel, Lexington, Ky.
Lawrence Hotel, Erie, Pa.
Miami Hotel, Dayton, Ohio
Casey Hotel, Scranton, Pa.
National Cash Register Co., Dayton, Ohio
Ford Building, Detroit, Mich.
City Hall, Alliance, Ohio
City Hall, Huntington, W. Va.
Second National Bank, Ashland, Ky.
Parkersburg National Bank, Parkersburg, W. Va.

ACME CEMENT PLASTER COMPANY

MANUFACTURERS OF

Acme Cement Plaster, Acme Keene's Cement and Gypsum Products

GENERAL OFFICES

SAINT LOUIS, MO.

SHIPPERS OF GYPSUM PRODUCTS FROM

ACME, TEX.	GRAND RAPIDS, MICH.	FORT DODGE, IOWA	WINSLOW, ARIZ.
LARAMIE, WYO.	ACME, NEW MEX.	GLADYS, OKLA.	LIME, ORE.
CEMENT, OKLA.	LOS ANGELES, CAL.	ACME, OKLA.	GYPSUM, ORE.

Products.

ACME CEMENT PLASTERS; ACME KEENE'S CEMENT; ACME WOOD FIBERED PLASTERS; ACME PREPARED FINISH; ACME GYPSUM BLOCKS.

Also, "APEX," "CLIMAX," "ROYAL," "LARAMIE STANDARD," "INDEPENDENT" and "MISSION" CEMENT PLASTERS; MOULDING and FINISHING PLASTER, and GYPSUM BUILDING PRODUCTS.

TRADE-MARK.

Reputation; Guarantee.

The Acme Products have a national reputation and are always sold under a guaranteed Trade-Mark, to meet every requirement of the most discriminating Standards for Testing Materials as to tensile strength, crushing strength, and fire-resisting, covering, spreading, working qualities and endurance.

Acme Cement Plaster.

The original natural cement plaster first introduced in the United States. It is guaranteed a perfect stock-keeper; it works very even and uniform; its working qualities make it a great favorite with architects and contractors.

Covering Capacity—2,000 pounds of Acme will cover 200 square yards on lath, and 250 square yards on Acme plaster blocks.

Acme Wood Fibered Plaster.

The addition of wood fiber to Acme transmits toughness and elasticity, making plastered walls that will bend without cracking and preventing lath cracks. An extra good material for finishing concrete ceilings.

Ideal for use where good sand is not available at reasonable cost; and can be made so that an equal measure of inferior quality of sand may be gauged with it, giving good results.

Covering Capacity—Without sand, 2,000 pounds will cover 80 to 120 square yards, depending upon thickness of grounds and spacing of lath. With sand, 2,000 pounds will cover 130 to 160 square yards.

Acme Keene's Cement.

A slow-setting, even and smooth-working cement for interior finish, gauged for plastering mortar by mixing with hydrated lime or lime putty and sand; the only plastering material which can always be troweled to an even and true surface, making perfect angles and joinings; the very best obtainable material for interior finish. It has a tensile strain, neat, 700 pounds per square inch. Crushing strain, ten times the tensile strength.

Metal will carbonize and rust when exposed to air. Thoroughly imbedded in plaster it will endure forever. Cheese cloth or burlap holds Acme walls in place just as well as metal.

Covering Capacity—Gauged with lime, 500 pounds will cover 100 square yards, two coats. Used neat, 300 pounds will finish 100 square yards. Gauged with lime, 100 to 150 pounds will finish 100 square yards.

Specifications for Acme Cement Plasters.

General Information—Acme Cement Plasters are cement and must be handled like cements to get results. They must be protected from dampness by being stored in a dry place, never on the ground, against a damp wall, or in any damp place when delivered to the building.

Acme Cement Plasters "set" and can not be re-tempered after the "set" begins. A very little "set" plaster in cement plaster mortar, whether from the mortar boxes, the water-barrel in which tools have been washed, or droppings from the floor, will cause all of the plaster mortar to "set" too quickly.

Acme Cement Plaster Mortar will "set" quick and work short if there is delay in tempering with water after sand has been mixed with it. It will spread a little easier if allowed to stand a few minutes after it has been tempered. To get the maximum tensile strength from Acme Cement Plasters they should be tempered as stiff as the mortar can be conveniently worked.

If finished walls are soft and chalky, it is because the water in the mortar has been evaporated before the plaster has "set." Spraying the walls with clean water, or with brush and water having powdered alum dissolved in it, is the remedy.

After Acme Cement Plaster Mortars are well "set," open doors and windows and dry as quickly as possible.

GENERAL REQUIREMENTS

Grounds—To be ¾ of an inch for Wood or Metal Lath; for Plaster Block, Brick, Stone and Tile, ½ of an inch.

Plaster Board—According to the manufacturers' directions for using.

Lath—Should be good grade; free from knots, sap and bark; spaced not less than ⅜ of an inch; securely nailed with 3d galvanized nails. Joints broken every fifth lath, leaving space at end of lath.

Sand—Use only clean, sharp sand of good voidage, free from loam, dirt, or impurities. Avoid quicksand.

Wet the Lath—Thoroughly swell wood lath with hose and water, if necessary, at least two hours before applying mortar.

Suction—Wet all Gypsum Block, Brick, Stone, Tile and Concrete Walls with water, to reduce suction, before applying plaster.

Mixing—Thoroughly mix all Cement Plaster with sand before adding water. At once add sufficient clean water and temper to the consistency of good stiff plasterers' mortar and allow to "set" a few minutes.

Gauging for Wood or Metal Lath and Plaster Board—To Fibered Acme Cement Plaster add sand as per manufacturers' specifications.

On Gypsum Block, Brick, Stone and Tile Walls—One part Unfibered Cement Plaster and 2 parts sand.

On Concrete Walls, Beams, Ceilings and Columns—To 1 part Unfibered Cement Plaster add ½ part sand.

DIRECTIONS FOR APPLYING

On Wood Lath—First Coat: Mortar to be applied promptly with sufficient pressure to fill keys and spread a good coat over lath, leaving surface rough; scratch with broom or rice-root brush and allow plaster to "set" hard

Continued on next page

Second Coat: When first coat is two thirds dried, to be applied with strong pressure, even with grounds. Straighten with rod and darby ready for finish coat. Must not be floated.

On Metal Lath—First Coat: Mortar to be applied promptly with sufficient pressure to fill keys and cover the lath with a thin coat of plaster, leaving rough surface to receive the second coat of plaster, to be applied in the same way as the second coat is applied on wood lath.

On Brick and Tile—All crooked, uneven walls to be straightened by filling the low places. After this has "set" hard, apply one coat with strong pressure, even with grounds, and leave ready for finish coat. May be floated before mortar begins to "set."

On Plaster Board—According to the Plaster Board Manufacturers' directions for using.

On Acme Gypsum Blocks—One coat applied with strong pressure and sufficient to make walls even with grounds, straightened with rod and darby and left ready to receive finish coat.

On Concrete—Thoroughly brush all walls and ceilings with steel brush; hack all smooth surfaces; thoroughly wash with brush and water, or hose, all loose substances, efflorescence, dust, dirt and oil from all walls and ceilings. While walls are still damp, apply sufficient Cement Plaster to fill out grounds and bring to straight and even surface, ready to receive finish coat.

Specifications for Acme Wood Fibered Plasters.

Acme Wood Fibered Plasters, Neat—Grounds to be ⅝ of an inch for wood lath; laths spaced ¼ of an inch apart, leaving space at end of lath; joints broken every fifth lath; use no sand; temper with clean water to the consistency of thin plasterers' mortar; apply one coat with strong pressure sufficient to bring to straight and even surface, flush with grounds and leave ready for finish coat.

Acme Wood Fibered Plasters with Sand—Equal parts Wood Fibered Plaster and sand. Same directions for using as Acme Cement Plasters.

Specifications for Acme Keene's Cement.

Grounds—Lath and sand same as Acme Cement Plasters.

Gauging for Wood Lath—First Coat: Equal parts Acme Keene's Cement and finely strained, well-seasoned lime putty, making one part; to this mixture add 2 parts clean, sharp sand. Fiber well with cattle hair or other equally good fiber, and add sufficient water to temper to proper consistency. Scratch or broom and then let dry.

Second Coat: When scratch coat is bone dry, dampen with clean water before applying second coat. Equal parts Acme Keene's Cement and finely strained, well-seasoned lime putty, making 1 part; to this mixture add 3 parts clean, sharp sand for ceilings (add 5 parts sand for walls). Add sufficient water to temper to proper consistency. Droppings may be retempered and used if done promptly.

For Metal Lath—Apply first coat with sufficient pressure to fill all keys and cover all metal with a light coat of mortar. Gauge in same proportions and apply in same manner as on wood lath.

For Acme Gypsum Block, Tile or Brick—Equal parts of Acme Keene's Cement and finely strained, well-seasoned lime putty, making 1 part; to this mixture add 3 parts clean, sharp sand for ceilings (add 5 parts sand for walls). Add sufficient water to temper to proper consistency.

Acme Keene's Cement Finishes

For Smooth Finish—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. Equal parts Acme Keene's Cement and finely strained, well-seasoned white lime putty, making 1 part; to this mixture add ⅙ part clean, sharp sand, screened through a No. 12 sieve. Add sufficient water to temper to proper consistency.

For Float or Sand Finish—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. Equal parts Acme Keene's Cement and finely strained, well-seasoned white lime putty, making 1 part; to this mixture add 2 parts clean, sharp sand, screened through a No. 12 sieve. Add sufficient water to temper to proper consistency.

For Trowel Sand Finish—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. Equal parts Acme Keene's Cement and finely strained, well-seasoned white lime putty, making 1 part; to this mixture add ½ part clean, sharp sand, screened through a No. 12 sieve. Add sufficient water to temper to proper consistency.

For Wainscoting—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. One part Acme Keene's Cement and ½ part finely strained, well-seasoned white lime putty; to this mixture add sufficient water to temper to proper consistency. In laying off wainscoting in imitation of tiling, brick or stone, the finish must be sufficiently hard for the tools to cut sharply defined lines without tearing the walls. Do not draw the lines deep; only deep enough to show distinctly.

General Directions for Mixing Finish Coat

First add some clean water to the Acme Keene's Cement, and quickly break up the initial set; then add other ingredients as required for the different finishes, as given above.

Acme Gypsum Blocks, and Lintels.

For all Fireproof Partitions, Corridors, Column Covering and Wall Furring. The most economical, lightest and fireproof material made from pure gypsum and fiber.

Specifications for Acme Gypsum Blocks, and Lintels.

All rough bucks for openings to be exact size of openings; set in place by the carpenter, securely braced and left plumb and true for the masonry contractor. All bucks to be exact size of abutting partitions and 2 inches thick, and have grounds 2½ inches wide by ½ inch thick nailed thereon to receive the ends of the Acme Gypsum Blocks.

Furring—Fur outside walls with 2-inch Hollow Back Acme Gypsum Blocks, laid up against the walls and securely spiked to the walls with 20d nails.

Interior Columns—All exposed Interior Columns to be covered with 2-inch solid or 3-inch Hollow Acme Gypsum Blocks, securely bonded with Gypsum mortar.

Mortar—Set all Acme Gypsum Blocks in a mortar composed of one measure Unfibered Acme Cement Plasters, 3 equal measures clean, sharp, coarse sand, and tempered with clean water to the consistency of bricklayers' mortar.

Ceiling Heights—Use sizes of Blocks for ceiling heights as provided by the National Board of Fire Underwriters, or as follows:

Non-bearing Corridor and Room Partitions, not exceeding 13, 17, and 22 feet in height, 3-, 4-, and 5-inch Hollow Blocks, respectively; 6-inch Hollow Block to ceilings over 22 feet and up to 30 feet; 8-inch Hollow Block when over 30 feet and up to 40 feet.

Acme Gypsum Lintels—Over all openings less than 5 feet in width, place an Acme Gypsum Lintel of the same thickness as the wall. This Lintel to be 12 inches longer than the width of the opening, and to have not less than 6 inches bearing on wall on either side, well bedded in Gypsum mortar and kept ½ inch above wood buck or jamb. Over all openings more than 5 feet, place the iron channels supplied for these openings by the general contractor.

Co-operative Service.

Our representatives will call on request, or we shall be pleased to furnish any information by mail concerning any Acme Products.

References.

BUILDING, LOCATION AND ARCHITECT

Acme Cement Plaster Used

New Ellis Island Immigrant Station, Long Island, N. Y.
U. S. Post Office Building, San Francisco, Cal., J. Knox Taylor, Supervising Architect
New York Life Building, New York, N. Y., McKim, Mead & White
New Union Station, Kansas City, Mo., Jarvis Hunt

Acme Wood Fibered Plaster Used

Washington Hotel, Colon, Panama

Acme Keene's Cement Used

U. S. Mint, San Francisco, Cal., J. Knox Taylor, Sup. Arch.
Sisters of Loretto Academy, Kansas City, Mo., Barnett, Haynes & Barnett

Apex Cement Plaster Used

U. S. Post Office Building, Detroit, Mich., J. Knox Taylor, Supervising Architect
La Salle Hotel, Chicago, Ill., Holabird & Roche

Acme Gypsum Blocks Used

Busch Office Building, Dallas, Tex., T. P. Barnett Architectural Co.
Boatmen's Bank Building, St. Louis, Mo., Eames & Young
Pantlind Hotel, Grand Rapids, Mich., Warren & Wetmore

THE AMERICAN CEMENT PLASTER COMPANY

Manufacturers of Gypsum Products

OFFICES

CHICAGO, ILL. TOLEDO, OHIO FORT DODGE, IOWA BUFFALO, N. Y. LAWRENCE, KANS.

MILLS

GRAND RAPIDS, MICH. AKRON, N. Y. FORT DODGE, IOWA BLUE RAPIDS, KANS. GYPSUM, OHIO ACME, TEX.

Products.

GYPSITE WALL PLASTERS: AGATITE, EAGLE, PEERLESS.

ROCK GYPSUM WALL PLASTERS: CRYSTAL ROCK, WHITE ROCK, FISHACK GYPSUM CEMENT, KRISOLITE, "AKRON."

WOOD FIBER PLASTERS: GREAT WESTERN, WHITE ROCK WOOD FIBER, WAYNE WOOD FIBER, KRISOLITE WOOD FIBER, "AKRON" WOOD FIBER.

SANDED PLASTERS: FISHACK SANDED WALL PLASTERS, CRYSTAL ROCK SANDED WALL PLASTERS, "AKRON" SANDED WALL PLASTERS.

WHITE FINISHING PLASTERS: SATIN SPAR, WHITE ROCK FINISH, XX FINISH, CRYSTAL ROCK FINISH.

PREPARED FINISHING PLASTERS: WHITE ROCK SPECIAL NO. 1, WHITE ROCK SMOOTH TROWEL FINISH, SAND FLOAT FINISH.

SUNFLOWER MOULDING and CASTING PLASTER.

DENTAL PLASTER and STUCCO.

AMERICAN PLASTER BOARDS—"The Modern Lathing."

AMERICAN GYPSUM BLOCKS, for Fireproof Partitions, etc.

For American Reinforced Gypsum Roofing Blocks, see our name in General Index.

TRADE-MARK

Quality and Facilities.

This Company owns and operates eight of the best and largest gypsum deposits in the United States. The mills are modern, and unexcelled in equipment, and the superior quality of our products has been demonstrated by a constant increase in demand for many years past.

Guarantee.

We fully guarantee all of our products to be of the best quality and that they will give the best of results when used in accordance with our specifications.

Specifications for Using Wall Plaster.

Studs and Joists—To be spaced not more than 16 inches between centers.

Grounds—To be ¾ in. for American Plaster Boards, wood lath and metal lath; ½ in. for American Gypsum Blocks; ¾ in. for clay tile.

American Plaster Boards—To be spaced ¼ in. apart; with nailing edges bearing at least ¾ in. on studs or joists; with horizontal joints in walls and joints at right angles with ceiling joists, broken at each board; and with vertical joints on opposite sides of partitions, not on the same studs; to be well nailed to studs, joists or furring, with 1¼ in., 11½ gauge, 7/16 in. head wire nails, spaced not more than 6 ins. apart; all of the center of each board to be nailed before the edges are nailed.

Wood Lath—To be of good quality, straight grained, and free from knots, bark and sapwood. To be spaced ⅜ in. apart with not less than ⅛ in. space between ends; with joints broken every eighth lath. To be well nailed to each stud and joist with 3d barbed nails.

If lath are dry, they are to be thoroughly wet at least four hours before mortar is applied to them, so that they will not swell or warp after the plaster is on them.

Gypsum Sheathing Lath—To be well nailed to studs spaced not more than 16 ins. between centers, to be spaced at least ⅛ in. apart, and to be thoroughly wet at least four hours before plaster is applied to them, so that they will not swell or warp after plaster is on them.

Brick and Tile—To be dampened before plaster is applied to them.

Concrete—The surface to be cleaned free from all efflorescence, dust, dirt and oil, and where very smooth, to be well hacked before mortar is applied.

Sand—To be clean, sharp, and free from clay, soil, alkali, salt and quicksand.

Mortar; Hair-Fibered and Unfibered Plasters—On American Plaster Board; to be one part plaster to two parts sand.

On Wood Lath and Metal Lath: first coat to be one part plaster to one and one-half parts sand; second coat to be one part plaster to two parts sand.

On Brick and Tile: mortar to be one part plaster to not more than two and one half parts sand.

On Concrete: to be equal parts plaster and sand.

Mortar; Wood Fiber Plaster—For making extremely light tough plastering, we recommend that our Wood Fiber Plaster be used without sand, but it will make excellent plastering when the mortar is equal parts of Wood Fiber Plaster and clean sharp sand.

For plastering on concrete. Wood Fiber Plaster should be used without sand.

Mortar; American Bond Plaster—On concrete, to be American Bond Plaster mixed with water, with the addition of no other material.

Mixing Sanded Mortar—All mortar to be mixed in clean tight boxes; the plaster and sand to be first thoroughly mixed dry, then immediately tempered with sufficient water to make good stiff mortar. No part of one batch of mortar is to be mixed with another batch in the mortar box or on the mortar board, and no mortar is to be used or worked after it has partly set. Mortar box, tools, hods, mortar board and water to be kept clean and free from set and partly set plaster, unless quick setting mortar is desired.

Mixing Wood Fiber Mortar—Plaster to be put in one end of mortar box, water in other end; then plaster to be slowly hoed into water and thoroughly mixed until there are no lumps or dry plaster in the mortar. No part of one batch of mortar is to be mixed with another batch in the mortar box or on the mortar board, and no mortar is to be used or worked after it has partly set. Mortar box, tools, hods, mortar board and water to be kept clean and free from set or partly set mortar, unless quick setting mortar is desired.

Applying Mortar to American Plaster Boards—The boards not to be wet before mortar is applied. All spaces between boards to be well filled with mortar, either by pointing the joint with quick setting neat plaster, or by carefully pressing the mortar used for first coat into the spaces between the boards as the first coat is put on. The second coat to be straightened with rod and darby ready for the finish coat, and must not be floated.

Applying to Wood Lath—First coat to be applied with sufficient pressure to form good keys, leaving a light coat of mortar over the lath, with surface rough. The second coat to be applied with strong pressure, when the first coat has set hard, but before the first coat is dry, and is to be straightened with rod and darby, broomed ready for finish coat, and must not be floated.

Applying to Metal Lath—The first coat to be applied so as to fill the meshes and lightly cover the lath. The second coat to be applied when the first coat is set hard, but before the first coat is dry.

Applying to Brick and Clay Tile—Crooked, uneven walls to be first straightened by filling the low places with mortar. After mortar used to straighten walls has set, sufficient mortar to fill out to grounds to be applied with strong pressure, and straightened ready for the finish coat.

Applying to Concrete—Where work can be straightened with one light coat of mortar, sufficient mortar to fill out to grounds is to be applied in one coat with strong pressure, and straightened ready for the finish coat. Where work cannot be

Continued on next page

straightened with one light coat, two coats are to be applied; the first coat to be set hard before applying second coat.

FINISHING PLASTER

Mortar for Smooth White Finish—To be one measure of Plaster Paris Finishing Plaster to not more than three measures of perfectly slaked lime putty; the plaster and lime to be thoroughly and uniformly mixed.

Mortar for Cement Finish—To be three measures of Unfibered Cement Plaster to not more than one measure of perfectly slaked lime putty, thoroughly and uniformly mixed.

Mortar for Sand Float Finish—To be Unfibered Cement Plaster, perfectly slaked lime putty, and clean sharp sand, thoroughly mixed in the proportions of four measures of plaster, one measure of lime, and five measures of sand.

Mortar of Prepared Finishes—To be made of the prepared finish mixed with water only.

Applying Finish Coat—Trowelled finish coat to be applied after base coat has set and dried, the base coat to be slightly dampened to reduce suction, before finish coat is applied.

Applying Sand Float Finish Coat—The base coat to be set hard, but not dry, when finish is applied.

CARE OF PLASTER AFTER IT IS ON THE WALL

In hot, dry, or windy weather, plastering is to be protected from wind, and if necessary, sprinkled with water, to prevent the plastering drying out too much before it has set.

In freezing weather plastering to be protected from frost until it has set hard.

When plastering has set, doors and windows are to be kept open, so that the plastering will dry quickly.

American Gypsum Blocks.

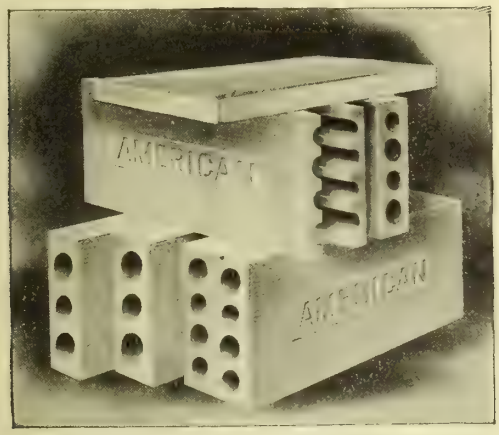
Fireproof, non-conductors of heat, and non-conductors of sound. They weigh less than terra cotta and clay tile; are strong and tough, and the expense of erecting them is less than the expense of erecting terra cotta and clay tile.

The standard dimensions of American Gypsum Blocks are 12 by 30 inches, 2, 3, 4, 6 and 8 inches thick.

Three-inch blocks to be used in partitions not exceeding 12 feet in height.

Four-inch blocks in partitions more than 12 feet high and not exceeding 17 feet in height.

Six-inch blocks in partitions more than 17 feet high and not exceeding 24 feet in height; and eight-inch blocks in partitions exceeding 24 feet in height.



AMERICAN REINFORCED GYPSUM ROOFING BLOCK

Prices—We shall be pleased to quote prices of American Gypsum Blocks, f.o.b. any railway station in the United States, or for the blocks erected in place ready for plastering.

SPECIFICATIONS

Partitions—Partitions to be set well bedded in mortar on fireproof floors that have been properly leveled to receive them; all blocks to be laid up plumb and true with joints broken and the top course to be tightly wedged to the floor arch above with mortar.

Furring—For furring outside walls, use 2-inch hollow American Gypsum Blocks laid against the walls and securely spiked to the walls.

Interior Columns—Cover exposed interior columns with 2-inch solid American Gypsum Blocks, securely bonded, and wrapped with No. 12 galvanized wire.

Mortar—To be gypsum plaster, mixed with not more than three measures of sand to one measure of plaster.

American Plaster Boards.

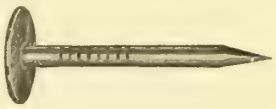
"The Modern Lathing"—One of the most efficient construction materials used for the purpose of insuring fire protection, perfect insulation, rapidity of erection, lightness, rigidity, sound-deadening, evenness of plastering surface, and protection against wood lath stains and wood lath buckling.

Our trade-mark shows prominently on every plaster board.

SPECIFICATIONS

Studs and Joists—To be set 12 or 16 inches centers.

Placing—Boards to be spaced ¼ inch apart with edges bearing not less than ¾ inch on studs or joists, with horizontal joints in walls and joints at right angles with ceiling joists, broken at each board.

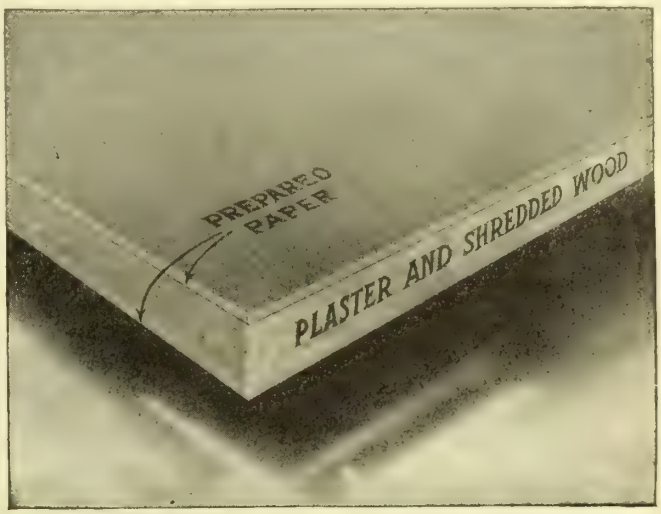


ACTUAL SIZE OF NAIL USED

Nailing—Nails to be 1¼-inch, 11½-gauge, 7/16-inch head wire nails, set not more than 6 inches apart, and driven home, the center of board to be nailed first.

Pointing—The spaces between boards to be well filled with mortar, either by pointing the joints with quick setting neat mortar before the first coat of plaster is applied, or by pressing mortar used for the first coat well into the joints when the first coat is applied.

Boards are not to be wet before applying mortar to them.



SECTION OF AMERICAN PLASTER BOARD

PILE OF AMERICAN PLASTER BOARDS

ESTABLISHED 1889

THE BEST BROS. KEENE'S CEMENT CO.

MEDICINE LODGE, KAN.

BRANCH OFFICES

NEW YORK CHICAGO

Products.

Manufacturers of Best Bros. Keene's Cement of the following grades:

Best Bros. Keene's "Regular," for general plastering purposes.

Best Bros. Keene's "Fine," for wainscots, columns and extra white finish. Also, for castings, running mouldings, and for Caen Stone finish.

Best Bros. Keene's "Coarse," for backing artificial marble.

Best Bros. Keene's "Superfine," for facing artificial marble.

Description.

The various grades of Best Bros. Keene's Cement are manufactured from the only pure gypsum so far found in the United States. The purity of this gypsum has been determined by analysis of the United States Geological Survey and Bureau of Standards. Best Bros. Keene's Cement has been manufactured in the United States since the year 1889.

Advantages.

Best Bros. Keene's Cement forms absolutely the hardest and whitest wall it is possible to obtain, and can be troweled to a marble-like finish. It is non-resonant, fireproof and sanitary. Best Bros. Keene's Cement is entirely free from acid, and will not affect the most delicate colors.

Specifications.

The following specifications are alternative. The first form may be employed when hydrated lime is used in the mixture, and the second form when lump lime is used.

No. 1. For Best Bros. Keene's Cement and Hydrated Lime

Three-Coat Work—On Wood or Metal Lath.

(*A*) *Scratch Coat*—Shall consist of equal parts of dry hydrated lime and Best Bros. Keene's "Regular" in proportions of one cubic foot of hydrated lime, one cubic foot of Best Bros. Keene's "Regular" and not to exceed five cubic feet of sand, in which shall be thoroughly and evenly incorporated plenty of good, well-beaten, water-soaked, long, winter-slaughtered cattle hair.

(*B*) *Brown Coat*—Shall consist of equal parts of dry, hydrated lime and Best Bros. Keene's "Regular" in proportions of one cubic foot of hydrated lime, one cubic foot of Best Bros. Keene's "Regular" and not to exceed seven cubic feet of sand.

(*C*) *Finish Coat*—Shall be mixed in the proportions of 400 lbs. Best Bros. Keene's "Regular" and 100 lbs. of dry, hydrated lime.

Two-Coat Work—On the Tile and Brick Work.

Brown Coat—Use brown coat (B), omitting scratch coat.

Finish Coat—Shall be mixed in proportions of 400 lbs. Best Bros. Keene's "Regular" and 100 lbs. of dry, hydrated lime.

One-Coat Work—On Concrete.

Finish Coat—Shall be mixed in proportions of 300 lbs. Best Bros. Keene's "Regular" and 100 lbs. of dry, hydrated lime.

No. 2. For Best Bros. Keene's Cement and Lump Lime

Three-Coat Work—On Wood or Metal Lath.

(*A*) *Scratch Coat*—Shall be mixed in the following proportions: To one barrel of lime paste add three barrels of sand and plenty of good, well-beaten, water-soaked, long, winter-slaughtered cattle hair. Gauge each cubic yard of this mixture with three (3) bags of Best Bros. Keene's "Regular" of one hundred (100) lbs. each. Keene's cement and sand to be mixed dry before adding lime paste.

(*B*) *Brown Coat*—To one barrel of lime paste add four barrels of sand, and gauge each cubic yard of this mixture with three (3) bags of Keene's cement, as above. Keene's cement and sand to be mixed dry before adding lime paste.

(*C*) *Finish Coat*—To each one hundred (100) lbs. of Best Bros. Keene's "Regular" add *one* pail of lime paste.

Two-Coat Work—On Tile and Brick Work.

Brown Coat—Use brown coat (B), omitting scratch coat.

Finish Coat—To each one hundred (100) lbs. of Best Bros. Keene's "Regular" add *one* pail of lime paste.

One-Coat Work—On Concrete.

To each one hundred (100) lbs. of Best Bros. Keene's "Regular" add *two* pails of lime paste.

Alternative Finishes:

Smooth, Hard Finish—For bathroom wainscots and similar work.

Use Best Bros. Keene's "Regular" neat. No lime to be added. If an extra fine white finish is desired, use Best Bros. Keene's "Fine."

NEW UNION STATION, KANSAS CITY, MO.

Jarvis Hunt, Architect George A. Fuller Co., General Contractors. W. H. Miller, Inc., Plastering Contractors

Best Bros. Keene's Cement used for plain and ornamental plastering.

Continued on next page

Sand Float Finish—To one barrel of lime paste add four barrels of sand, and gauge with three (3) bags of Best Bros. Keene's "Regular" of one hundred (100) lbs. each. Keene's cement and sand to be mixed dry before adding lime paste.

BRICK AND TILE SURFACES:

All brick and tile surfaces shall be thoroughly broomed off and washed before the mortar is applied, and shall be damp when it is applied.

CONCRETE SURFACES:

Concrete or cement surfaces shall be washed and scrubbed with a steel brush so as to remove all dust and loose particles. The surface shall then be thoroughly washed with a ten per cent solution of muriatic acid in water. The concrete must be thoroughly dampened while the plaster is applied. The one-coat finish plaster applied to this shall be a thin coat thoroughly troweled and worked into the surface of the concrete to make adhesion perfect.

LIME:

Hydrated lime shall be soaked in water-tight boxes for 24 hours before using.

Lump lime shall be prepared and run through a fine sieve, 1/16-inch mesh, and properly stored and protected for a sufficient time before using, to insure all particles being thoroughly slaked.

References.

The following is a partial list of important buildings in which Best Bros. Keene's Cement has been used:

BUILDING	LOCATION	ARCHITECT
United States Senate Office Building	Washington, D. C.	Elliott Woods, and Carrère & Hastings
New Union Depot	Kansas City, Mo.	Jarvis Hunt
New York State Educational Building	Albany, N. Y.	Palmer & Hornbostel
New Terminal Depot	Detroit, Mich.	Reed & Stem, and Warren & Wetmore
Continental-Commercial Bank Building	Chicago, Ill.	D. H. Burnham & Co.
Henry Ford Residence	Dearborn, Mich.	W. H. Van Tine
Massachusetts Institute of Technology	Boston, Mass.	W. W. Bosworth
Wanamaker Building	Philadelphia, Pa.	D. H. Burnham & Co.
National City Bank	New York, N. Y.	McKim, Mead & White
United States Penitentiary	Atlanta, Ga.	Eames & Young
United States Naval Station	North Chicago, Ill.	Jarvis Hunt
State Capitol	Jackson, Miss.	Theo. C. Link
State Capitol	Santa Fe, N. Mex.	I. H. & W. M. Rapp
State Asylum	Yankton, S. Dak.	L. C. Mead
State Asylum	Bangor, Me.	J. Calvin Stevens
Hartford State Library and Supreme Court Building	Hartford, Conn.	Donn Barber
National Museum	Washington, D. C.	Hornblower & Marshall
Art Institute	Chicago, Ill.	Shepley, Rutan & Coolidge
City Hall Building	Chicago, Ill.	Holabird & Roche
First National Bank	Cleveland, Ohio	J. Milton Dyer
First National Bank	Lynchburg, Va.	Lewis Burnham
Western National Bank	Pittsburg, Pa.	Geo. Orth & Bro.
H. W. Hellman Building	Los Angeles, Cal.	A. S. Rosenheim
Pope Building	Boston, Mass.	Peabody & Stearns
Fifth Avenue Office Building	New York, N. Y.	Maynicke & Franke
Pacific Building	San Francisco, Cal.	C. F. Whittelsey
People's Gas Co. Building	Chicago, Ill.	D. H. Burnham & Co.
Pioneer Building	Seattle, Wash.	A. Wethersham
Wells, Fargo & Co. Express Building	San Francisco, Cal.	Meyers & Ward
Denver Gas & Electric Building	Denver, Colo.	F. E. Edbrooke
Gloyd Building	Kansas City, Mo.	Jno. W. McKecknie
St. Luke's Hospital	Cleveland, Ohio	F. W. Striebinger
Lake Side Hospital	Cleveland, Ohio	G. H. Smith
Sacred Heart Hospital	Spokane, Wash.	Albert Held
St. Francis Hospital	Pittsburg, Pa.	S. F. Heckert
New German Hospital	San Francisco, Cal.	Herman Barth
Albright Art Gallery	Buffalo, N. Y.	Green & Wicks
Buffalo Historical Society Building	Buffalo, N. Y.	Geo. Cary
Convent of the Sacred Heart	St. Louis, Mo.	J. H. McNamarra
Chicago & North Western Depot	Chicago, Ill.	Frost & Granger
Wisconsin Central Depot	Chicago, Ill.	A. H. Lowden
Hudson Terminal Building	New York, N. Y.	Clinton & Russell
New York Central Terminal	New York, N. Y.	Reed & Stem, and Warren & Wetmore
Zoological Laboratories	W. Philadelphia, Pa.	Cope & Stewardson
Elliott Memorial Hospital	Minneapolis, Minn.	Wm. M. Kenyon
Hotel Kimball	Springfield, Mass.	Samuel Green, Inc.
New Onondaga Hotel	Syracuse, N. Y.	Esenwein & Johnson
Kansas City Star Building	Kansas City, Mo.	Jarvis Hunt
Santa Fe General Office Buildings	Topeka, Kan.	Root & Siemens
St. John's Hospital	St. Louis, Mo.	Barnett, Haynes & Barnett
City Hall Building	Portland, Me.	Carrère & Hastings
R. A. Long Residence	Kansas City, Mo.	Henry F. Hoit
Psychopathic Hospital	Boston, Mass.	Kendall-Taylor & Co.
Engineering Buildings, Minnesota University	Minneapolis, Minn.	C. H. Johnston
Jefferson Memorial Building	St. Louis, Mo.	Isaac Taylor
Provincial Mental Hospital	Mt. Coquitlam, B. C.	H. S. Griffiths
United States Post Office	Washington, D. C.	D. H. Burnham & Co.
New Terminal Station	Detroit, Mich.	Reed & Stem, and Warren & Wetmore
Cook County Hospital	Chicago, Ill.	Paul Gerhardt
Chas. C. Gates Residence	Minneapolis, Minn.	Marshall & Fox
Mount Zion Hospital	San Francisco, Cal.	J. E. Krafft & Sons
University Hospital	Augusta, Ga.	G. Lloyd Preacher
State Home for Feeble-Minded	Byberry Farms, Pa.	Philip H. Johnson
Louisville Public Hospital	Louisville, Ky.	D. X. Murphy & Bros.
Grover Cleveland High School	St. Louis, Mo.	W. B. Ittner
Mrs. Loeb Residence	Chicago, Ill.	Marshall & Fox
St. Mary's Hospital	Philadelphia, Pa.	Ballinger & Perrot

CLEVELAND BUILDERS SUPPLY CO.

Manufacturers and Distributors of Excelsior Caen Stone Cement

Leader-News Building

CLEVELAND, OHIO

Products.

EXCELSIOR CAEN STONE CEMENT, prepared ready for use, for Interior Walls and Ceilings, Cornices and Ornaments, Mantels, Fountains, Flower Boxes, Garden Furniture, and Exterior Plastering.

TRADE-MARK

Excelsior Caen Stone Cement.

Excelsior Caen Stone Cement is a successful equivalent for French Caen stone. After being applied and jointed off, it is in every important respect an exact reproduction of the quarried stone, absolutely fulfilling the essential requirements of durability, texture and color.

The color of Excelsior Caen Stone Cement is a light buff or cream, obtained solely by the use of a finely powdered stone as one of its principal ingredients. No artificial coloring is used. This ground stone is mixed in proper proportions with other materials necessary to secure a correct combination for imitating the texture and color of natural Caen stone.

The entire output of this ground stone is under the control of the CLEVELAND BUILDERS SUPPLY CO. The uniformity of color and composition of Excelsior Caen Stone Cement is absolutely guaranteed.

Tested and Used by the United States Government.

The Bureau of Standards, Department of Commerce, at Washington, D. C., after testing samples of Excelsior Caen Stone Cement, reports as follows:

"We are pleased to advise that we have made an examination of the samples of Caen Stone (Excelsior) submitted and find that they are of the same general quality and composition as those used by the Government."

Excelsior Caen Stone Cement has been approved by the Supervising Architect and used in a number of post office buildings throughout the United States.

Application.

Excelsior Caen Stone Cement is a free working, plastic material that can be applied readily by any competent plasterer. The directions given herewith have been worked out carefully. They are practical, simple and easy to follow. The finished surfaces are secured by floating, tooling, rubbing, etc.

Features and Advantages.

Excelsior Caen Stone Cement produces the same soft and pleasing effect as is obtained by the use of the natural Caen stone, and at only a fraction of the cost.

It is perfectly adapted for casting into moulds and for running cornices. Its strength increases with age; and its durability will practically equal that of the natural Caen stone. Requires no decoration nor tinting; saves cost of painting. Can be easily cleaned with soap and water.

Scope of Use.

Excelsior Caen Stone Cement is especially designed for a finish coat for walls and ceilings in churches, colleges, court houses, post offices, banking rooms, railway stations, club rooms, hotel and theater lobbies, schools and libraries; for corridors and vestibules of office buildings and residences; for wainscotings, columns, pilasters, caps, brackets, cornices and ornaments; for casting mantels, garden seats, flower boxes, fountains and other exterior decorative features, and for an exterior plaster, or "stucco" finish.

"Slow Set" and "Quick Set," and "Exterior."

For interior work, Excelsior Caen Stone Cement, "Slow Set," is made slow setting for plain surfaces, and "Quick Set," quick setting for running cornices and casting into moulds. For running cornices, the "Slow Set" is gauged with the "Quick Set" by the usual method. For casting into ornaments, use "Quick Set" only.

For exterior plaster finish, and for casting mantels, garden furniture, flower boxes, etc., where great strength and resistance to exposure from the elements is required, use "Exterior" Excelsior Caen Stone Cement.

Covering Capacity.

One hundred pounds of Excelsior Caen Stone Cement is required to cover approximately fifty square feet of surface, one quarter of an inch in thickness.

PALM ROOM, DETROIT ATHLETIC CLUB, DETROIT, MICH.
Designed by Albert Kahn, Architect
Walls finished in Excelsior Caen Stone Cement

Steel Construction

Continued on next page

Specifications for Interior Work.

Damp-proofing—When Excelsior Caen Stone Cement is to be used on the interior of outside brick or tile walls, first apply two heavy coats of Superior Bond, or any other approved brand of damp resisting paint. This is to keep dampness from coming through and staining the finished Caen Stone coat.

Scratch Coat on Metal Lath—Apply an approved brand of gypsum hard wall plaster, or lime mortar containing plenty of hair, gauged in proportions of two parts of mortar to one of Best Brothers Keene's Cement, or equal.

Brown Coat—To be used as a doubling up coat over scratch coat on metal lath, or as a first coat on brick or tile walls. Mortar shall consist of an approved brand of gypsum hard wall plaster, or lime mortar mixed as above specified, except that hair is not required. Scratch brown coat well. Let stand until thoroughly dry.

Caen Stone Coat—Shall be Excelsior Caen Stone Cement, manufactured by The Cleveland Builders Supply Company, Cleveland, Ohio.

Clean Box—Use a clean water-tight mixing box that has not been used for mixing any other kind of materials. Clean box thoroughly after each mixing.

Suction—Before applying Caen Stone Finish Coat, soak brown coat thoroughly with clean water to take out suction, using a hose. When suction is very uneven, apply a skim coat of a slow setting plaster or Keene's Cement and sand, covering same with Caen Stone Finish Coat before skim coat sets.

Applying Caen Stone Coat—Lay on Caen Stone Finish Coat not less than one quarter of an inch thick, and preferably three eighths of an inch thick. Straighten Caen Stone in with straight-edge, then tighten in with float. Let stand until fit to float with water. Float until chip-cracks stop appearing, and sufficiently to bring surface to desired texture. This usually requires about three floatings of about one hour apart. Use felt floats and plenty of clean water when floating.

Marking—Let Caen Stone Coat stand about two days, then cut joints with saw blades.

Filling Joints—Wet joints just before filling in, using a small camel's-hair painter's brush, being careful not to let water run out over surface of Caen Stone. Fill joints in flush with Best Brothers Keene's Cement, using small tool. Do not scrape off the Keene's cement that gets on edges of the joints, as this will come off with sandpapering.

Rubbing Down—Let Caen Stone stand about two days after joints are filled. Then, if it is thoroughly dry, rub down with sandpaper. Use No. 3 sandpaper for rubbing the plain surfaces, and No. 2 for rubbing the finished joints.

Tooled Finish—If a tooled finish is desired, run hack saw blades down or crisscross over the entire surface, instead of sandpapering.

Other Finishes—When surfaces other than those described above are desired, the manufacturers of Excelsior Caen Stone Cement will be pleased to give further information or suggestions.

MAIN LOBBY UNITED STATES POST OFFICE BUILDING, PIQUA, OHIO
Wall finished in Excelsior Caen Stone Cement. Designed by Supervising Architect of the United States

MANTEL OF EXCELSIOR CAEN STONE CEMENT, RESIDENCE OF P. A. MEYER, ASHLAND, OHIO
Vernon Redding, Architect

MANTEL OF EXCELSIOR CAEN STONE CEMENT, HAZELDELL SCHOOL, CLEVELAND, OHIO
W. R. McCornack, Architect

PARTIAL LIST OF REPRESENTATIVE BUILDINGS WHERE EXCELSIOR CAEN STONE CEMENT WAS USED

BUILDING AND LOCATION	ARCHITECT
Cleveland Athletic Club, Cleveland, Ohio	J. Milton Dyer
Detroit Athletic Club, Detroit, Mich.	Albert Kahn
Boys Protectory, Cincinnati, Ohio	J. F. Sheblessy
Ford Motor Co. Buildings, Detroit and Pittsburgh	John Graham
Museum, O. S. University, Columbus, Ohio	Jos. N. Bradford
Paschedag Chapel, St. Louis, Mo.	Clymer & Drischler
O. C. Barber, Residence, Akron, Ohio	Harpster & Bliss
Union National Bank, Columbia, S. C.	W. A. Edwards
U. S. Post Office, Piqua, Ohio	Supervising Architect
U. S. Post Office, Canton, Ill.	Supervising Architect
Olympic Theater, Detroit, Mich.	Smith-Hinchman & Grylls
G. A. R. Memorial Hall, Springfield, Ohio	Frank L. Packard
Jewish Hospital, Cleveland, Ohio	Geo. B. Post & Sons

FLOWER BOX OF EXCELSIOR CAEN STONE CEMENT

ESTABLISHED 1883

CARNEY'S CEMENT CO.

MANKATO, MINN.

Product.

CARNEY'S CEMENT MORTAR.

Description.

Since 1883 this Company has been furnishing Carney's cement for thousands of buildings in all sections of the United States from Virginia to the Pacific coast. This cement has been used in all classes of buildings calling for brick mortar, and there is not an instance of a single failure.

Carney's cement is the direct result of the demand for a cement that can be used for brick mortar without mixing lime with it. The rock from which Carney's cement is made is higher in lime than any other cement rock. When burned and ground it makes a slow setting and plastic bricklaying cement that requires no addition of lime to make it work smoothly under the trowel.

Advantages.

It cannot be oversanded, for any attempt to add more sand than specified, affects its plastic properties under the trowel, making the adulteration impracticable —having this advantage over the mixture of Portland cement and lime, which is so frequently abused by the use of too much lime and sand. Carney's cement makes a thoroughly uniform mortar, which ultimately becomes as hard as paving brick, the wall resulting in a homogeneous mass. Its slow setting qualities are invaluable, as the mortar, in the process of setting, bonds itself to the brick to a greater degree than any other mortar material. It costs less than a good mixture of Portland cement and lime in all sections from Virginia to the Pacific coast.

CARNEY'S CEMENT BAG
Showing style of label used

Specification for Brick Mortar.

One part Carney's cement to two parts sand—no lime.

Directions for Using.

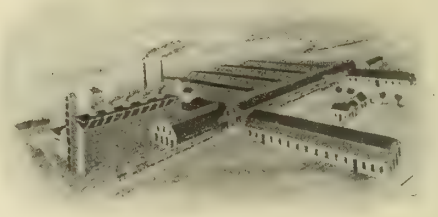
Carney's cement is put up in four sacks to the barrel, of approximately one cubic foot to the sack. It requires one and one half barrels to lay one thousand brick. Carney's cement is a great labor-saver to the contractor, for by using a mechanical mixer one man with a machine has kept twenty-five bricklayers busy.

To each sack of Carney's cement is attached a tag giving the following directions for mixing:

Mix one part Carney's cement to two parts sand, using considerable water, and run this through a mechanical mixer. The mortar will come from the mixer very thin, and should be run into a large box where it can be allowed to stand until the water is absorbed by the cement. This takes about one half hour, after which the mortar should be shoveled once over in the box before it is sent to the brick masons. The machine mixing makes a very uniform mortar.

Hand Mixing.

We recommend two boxes when Carney's cement is mixed by hand, so that the mortar can be soaking in



PLANT OF CARNEY'S CEMENT CO.

one while being used from the other. In some cases the cement itself is soaked before the sand is added to it. It does not take more than half an hour of soaking to produce the proper results; and to break the initial set of this mortar does not affect its quality in the slightest, but makes it work like lime under the trowel. It does not harm Carney's cement to stand in the box over night. Many contractors on small work arrange to mix sufficient mortar after shutting down at night to take care of the next day's requirements.

In Freezing Weather.

Freezing in the wall does not affect the quality of Carney's cement mortar. It has been successfully used in hundreds of buildings erected in winter. In cold weather, the sand and water must be heated, and the mortar must be used immediately after mixing.

Report of Test.

Test made by Robert W. Hunt & Co., Engineers, shows the mortar to become harder than the brick in ninety days; crushing strength per square inch being 2,567 pounds. A test on this cement mortar can be made by anyone interested, by laying up a few brick in a mixture of one part Carney's cement and two parts sand. The result will prove that this mortar always makes a bond harder than the brick it joins.

References.

Some of the recent work on which Carney's cement mortar has been used includes:

All Substations for the Chicago, Milwaukee & St. Paul Railway Co. in their electrified zone through Montana and Idaho

Hill Building (general offices of Great Northern and Northern Pacific Railways), St. Paul, 13 stories high, covering three fourths of a square block, costing $3,500,000.00. Charles S. Frost, Architect; Grant Smith Construction Company, Contractors

Butler Brothers Warehouse, Chicago, 384 by 154 feet, 25 acres of floors, costing $2,000,000.00. D. H. Burnham & Co., Architects; Wells Brothers, Contractors

Soo Railway Building, Minneapolis, 19 stories. R. W. Gibson, Architect; Thompson-Starrett Co., Contractors

Penobscot Building, Detroit, 25 stories. Donaldson & Meier, Architects; Geo. A. Fuller Co., Contractors

Morrison Hotel, Chicago, 22 stories. Marshall & Fox, Architects; John Griffiths & Son Co., Contractors

Stevens & Co. Building, Chicago, 21 stories. D. H. Burnham & Co., Architects; Geo. A. Fuller Co., Contractors

Borland Building, Chicago, 18 stories. Charles S. Frost, Architect; Geo. A. Fuller Co., Contractors

EMPIRE GYPSUM COMPANY

Manufacturers of Gypsum Wall Plasters

318-319 Cutler Building

ROCHESTER, N. Y.

MILLS AND MINES
GARBUTT, N. Y.

Products.

EMPIRE NEAT CEMENT PLASTER; RELIANCE WOOD FIBER PLASTER; EXCELSIOR SANDED WALL PLASTER; EMPIRE CONCRETE PLASTER; EMPIRE EXTERIOR PLASTER.

Gypsum Hard Wall Plasters.

Gypsum is the basis of all Hard Wall Plasters made by this company. Through the use of these plasters, *harder and firmer walls are obtained with lighter grounds,* thus removing enormous weight from the construction. The adhesive and formative properties permit of a solid wall in two or three hours after tempering. Plastering repairs are eliminated. Iron-clad formulae, based on established facts, are followed in the process of manufacture, and utmost care is exercised in the mixing, each batch being accurately timed. Delivered on the job *ready for use.* The brands of Empire Gypsum Plaster are:

Empire Neat Cement, or Hair Plaster.

Manufactured under a formula that demands sand under all conditions; with one part of Empire Neat Plaster (haired mortar), two parts of sand on lath, and three on brick or tile are required to be mixed.

Reliance Wood Fiber Plaster.

Contains *wood pulp* as a binder, giving it a light, stretchy, working action. Used in neat condition to a great extent, but will carry one part of sand on wood and metal lath work, and two parts on brick or tile. It sets in two hours and dries out rapidly.

Excelsior Sanded Plaster.

Used in localities not having sand in immediate vicinity. Sand is clean and sharp, screened to proper mesh for plaster work and thoroughly dried.

Empire Concrete Plaster.

To be applied direct to concrete interior walls and ceilings. Ready for use, water only is to be added. Grounds to be ½-inch.

See that concrete work is thoroughly dry before base coat is applied.

Concrete plaster should be allowed to soak in the water for about ten minutes before hoeing; after which it is to be mixed the same as any other hard plaster. Concrete plaster may be trowel or float finished as any other hard plaster. Before applying finish, be sure base coat is dry and hard.

It is very important that concrete surface be rough, and under no circumstances should oiled boards be used for casting forms.

Empire Exterior Plaster.

For stucco exteriors. Ready for use, water only to be added. Grounds to be ¾-inch.

Grounds.

The grounds required for all the above brands are as follows: ½-inch, for brick or tile; ¾-inch, for plaster boards, wood lath, wire or expanded metal lath.

General Specifications.

Lath—Wood space 3/16 to ¼ of an inch. Spray in warm weather if exceedingly dry. Nail lath firmly. Break joints. Wire or metal must be rigid to insure results. Too much give, means sagging.

Brick or Tile—Wet surface before application. Do not apply any brand of plaster to brick or tile which does not contain sand. The correct proportions are: Wood fiber one part, sand two parts; neat one part, sand three parts. Weight, not volume.

Sand—Clean, sharp sand free from gravel must be used.

Mixing—Sand and plaster must be thoroughly mixed before adding water. Use clean tools and clean water. Mix only that amount which will be applied in one hour. Do not re-temper. Work the material to a light consistency for best results.

Application—Hard Wall Plaster can be applied to any surface—wood or metal lath, brick, tile, plaster board. Use a firm but even pressure to secure clinch. Apply a light coat first on all surfaces. Scratch or darby same for doubling up or second coat. Fill out to grounds and run an even surface with darby. Permit walls to dry before finish coat is applied; then wet down lightly. Use water sparingly in applying finish coat.

BUILDINGS PLASTERED WITH EMPIRE PLASTER

BUILDING AND LOCATION	ARCHITECT	CONTRACTOR
Bonwit, Teller & Co.'s Building, New York, N. Y.	Howells & Stokes, New York, N. Y.	Davis Brown, Inc., New York, N. Y.
School Building, Edgewater, N. J.	Ernest Sibley, Grantwood, N. J.	C. T. Mitchell, New York, N. Y.
School Building, Glens Falls, N. Y.	Tooker & Marsh, New York, N. Y.	A. M. Barrows, New York, N. Y.
Maternity Hospital, Albany, N. Y.	M. L. & H. G. Emery, Albany, N. Y.	Davis Brown, Inc., New York, N. Y.
Elizabeth Steel Magee Hospital, Pittsburgh, Pa.	T. E. Billquist, Pittsburgh, Pa.	Beatty Bros., Pittsburgh, Pa.
First Bridgeport National Bank, Bridgeport, Conn.	Tracy & Swartwout, New York, N. Y.	Hoggson Bros., Inc., New York, N. Y.
Wilson Theater, Tyrone, Pa.	W. F. Wise, Tyrone, Pa.	George Wilson, Tyrone, Pa.
Washington School Building, Emaus, Pa.	Ephraim Pickin, Allentown, Pa.	M. G. Reinhard, Emaus, Pa.
St. Patrick's School and Convent, Glen Cove, L. I.	F. J. Helmle, Brooklyn, N. Y.	J. E. Brady Co., New York, N. Y.
Court House, Waterloo, N. Y.	W. J. Beardsley, Poughkeepsie, N. Y.	C. K. Benjamin, Geneva, N. Y.
Proctor Theater, Troy, N. Y.	A. J. Johnson, New York, N. Y.	Davis Brown, Inc., New York, N. Y.
School Building, Chatham, N. Y.	Pierce & Bickford, Elmira, N. Y.	John Lowry, Jr., New York, N. Y.
Albright Residence, Buffalo, N. Y.	Green & Wicks, Buffalo, N. Y.	Robert E. Williams, Buffalo, N. Y.
Leader Building, Corning, N. Y.	Thomas Hart, Corning, N. Y.	H. O. Dorman, Corning, N. Y.
First Methodist Episcopal Church, Waverly, N. Y.	Fulton & Butler, Uniontown, Pa.	Pulford & Dempsey, Elmira, N. Y.
Davis Theaters, Pittsburgh, Pa.	H. E. Kennedy Co., Pittsburgh, Pa.	Beatty Bros., Pittsburgh, Pa.

THE GARDEN CITY SAND CO.

Manufacturers of "Stonekote" Portland Cement Exteriors

708-711 Chamber of Commerce Building

TELEPHONES: Main 4827, Auto 33304 CHICAGO, ILL.

AGENCIES

ARLINGTON, MINN., Arlington Cement Stone Works
ASHLAND, KY., Kentucky Fire Brick Co.
ATLANTA, GA., V. H. Kriegshaber & Son
ATLANTIC CITY, IOWA, Green Bay Lumber Co.
CANTON, S. D., Bragstead Concrete Machinery Co.
CARROLL COUNTY, IOWA, Lake View Sand Co. (Lake View, Iowa)
CEDAR FALLS, IOWA, C. A. Wise & Sons Co.
CHILLICOTHE, OHIO, Kentucky Fire Brick Co.
CINCINNATI, OHIO, Moores Coney Co.
COLUMBUS, OHIO, Hamilton-Parker Fuel & Supply Co.
DAVENPORT, IOWA, John Benedict
DECATUR, ILL., V. H. Parke & Son Co.
DES MOINES, IOWA, Meredith & Perkins
DETROIT, MICH., A. J. Smith Construction Co.
FORT RECOVERY, OHIO, Emil Wagner
GRAND RAPIDS, MICH., S. A. Morman & Co.
HOUSTON, TEX., Vandaveer Clay Products Co.
HUNTINGTON, W. VA., Kentucky Fire Brick Co.
IRONTON, OHIO, Kentucky Fire Brick Co.
JACKSON, MICH., I. N. DeLamater
JACKSONVILLE, ILL., D. E. Sweeney
JEFFERSONVILLE, IND., R. Hansen (Louisville, Ky.)
KOUTS, IND., Rosenbaum & Kosanke
LIMA, OHIO, Fidelity Coal & Supply Co.
LINCOLN, NEB., Nebraska Material Co.
LOUISVILLE, KY., R. Hansen (Louisville, Ky.)
MANSFIELD, OHIO, Voegele Bros.
MEMPHIS, TENN., John A. Denie's Sons Co.
MITCHELL, S. D., Robert Burns Lumber Co.
MOLINE, ILL., John Benedict (Davenport, Iowa)
NEW ALBANY, IND., R. Hansen (Louisville, Ky.)
NEW ORLEANS, LA., Fritz Jahncke
OIL CITY, PA., C. J. Reody
OSHKOSH, WIS., Cook & Brown Lime Co.
PORTSMOUTH, OHIO, Kentucky Fire Brick Co.
ROCHESTER, IND., Marshall Hill
ROCK ISLAND, ILL., John Benedict (Davenport, Iowa)
ROCKFORD, ILL., Crumb-Colton Co.
ST. LOUIS, MO., Independent Lime & Cement Co.
ST. PAUL, MINN., S. P. Spates & Co.
SAX COUNTY, IOWA, Lake View Sand & Gravel Co. (Lake View, Iowa)
SIOUX CITY, IOWA, H. C. McNeil & Son
SIOUX FALLS, S. D., W. C. Buchanan Lumber Co.
SOUTH BEND, IND., Staples-Hildebrand Co.
SPRINGFIELD, ILL., Peter Vredenburgh Lumber Co.
STURGIS, MICH., R. L. Webb Lumber Co.
WINNIPEG, CAN., Dominion Fireproofing Co.

Products.

"Stonekotes," Plastic Portland Cement Products, prepared in any Color, waterproofed or not, and in special mixtures for the following applications, ready for use by addition of water:

For Scratch Coat. For Rough Cast.
For Second Coat. For Trowel Surfacing.
For Float Coat. For Polished Surfacing.
To apply as Mortar. To apply as Stucco.
For Casting in Ornamental Work.
For Surfacing for Concrete, Brick, Tile, Stone, or Steel Framework.

"Stonekote," for making Blocks in place of artificial stone.

"Stonekote," for colored Floor Finish, Terrazzo.

"Stonekote," as "Plastic Marble" Cement.

American Caen Stone Cement.

China Wall Finishes, in Colors.

Self-Decorating Wall Plaster.

Description of "Stonekote."

"Stonekote" is a ready to use Portland cement made plastic without the use of any lime or hydrated lime, waterproofed where desired; colored any shade of Gray, Brown, Red, Buff, Cream, Tan or White; containing quartz, marble or spar aggregates that will sparkle when acid washed. It is the most practical material ever placed on the market for all kinds of exterior cement surfacings.

"Stonekote" Under Coats.

"Stonekote" Scratch Coat and Second Coat are made with white silica sand as the aggregate, and accept the finish coat, forming a chemical clinch with it. Over wood lath, metal lath, brick or tile walls 100 pounds of Scratch Coat and 100 pounds of Second Coat are needed on each 2¼ yards of net surface. This gives a perfect surface over which to apply the colored waterproofed finish coat desired. The Scratch and Second Coats should be used for the very best of work, as they are combined in the right proportions to expand and contract to the same extent as the finish coat.

TRADE-MARK

Mechanics Can Work It.

As any good mechanic can secure perfect results with "Stonekote" by following "Stonekote" Book of Instructions, you can contract with your home mechanics.

Colors and Samples.

It is not possible to show shades and finishes from a flat colored print of ink or paint. Send in a little water-color, showing shade of color desired. Let us know the finish desired, rough cast, fine, medium, coarse, float, troweled, moulded, floor surface. We will submit sample and "Stonekote" Specifications.

Guarantee.

We guarantee "Stonekote" as follows:

Where all three coats are "Stonekote," manufactured ready to use by adding water only and the full quantity is used as directed in our "Stonekote" book of specifications and working directions, we will furnish, f.o.b. Chicago, new material to replace the following classes of breaks—

On metal lath that is imbedded in the "Stonekote," where the lath rusts out in ten years.

On wood lath with 3/8-inch clinch and 3/8 inch between ends of lath, 7/8-inch grounds above face of lath, where the "Stonekote" comes off the lath.

On properly built brick or deep-scored tile walls, where the "Stonekote" comes off without its bringing a layer of the brick or tile with it.

Specifications.

Caution—In writing specifications for "Stonekote" that will give you the lowest bids, there are several things to consider and decide on:

(1) Clay Tile construction requires three coats—scratch coat, second coat and finish coat.
(2) Brick construction requires three coats.
(3) Concrete Monolithic construction requires finish coat.
(4) Metal lath construction requires three coats.
(5) Wood lath construction requires three coats.
(6) Three coats of "Stonekote" secures our guarantee.
(7) Use of neat first and second coats reduces material cost.

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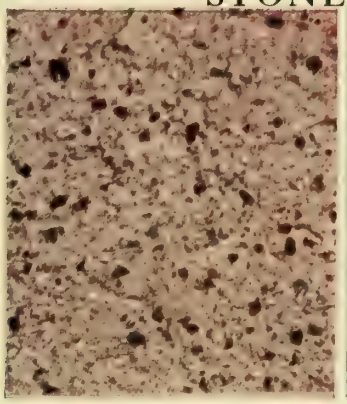
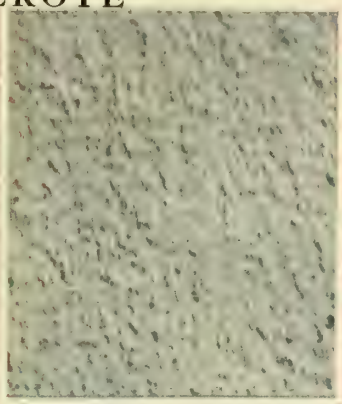
"STONEKOTE"

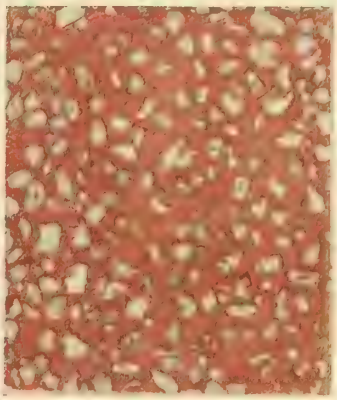
Caen Stone No. 689



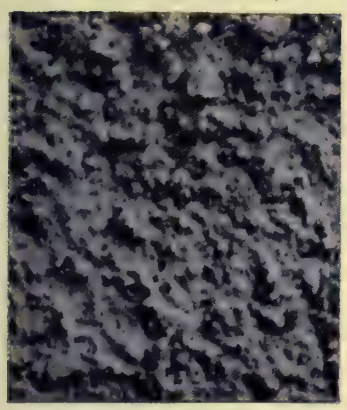
Granite Float Finish



Marble Float Finish



Terrazzo Floor Finish



Fine Wet Rough Cast

Medium Wet Rough Cast

Coarse Dry Rough Cast

Medium Dry Rough Cast

"Stonekote" Residence of E. L. King, Daytona, Florida. Geo. W. Maher, Architect, Chicago, Ill.

Continued on next page

(8) Use of home-made first and second coats reduces quality.

(9) There are ten styles of finish and 1000 shades of color. Different finishes take different quantities.

Different shades of color are different prices.

Important work is worthy of preliminary consideration; and the decision of the above items, and the embodying of the exact shade and finish number desired in the specifications before going to the contractor.

For Undercoats of Guaranteed Work—Over face brick, tile, metal lath, or wood lath allow ¾ inch for the "Stonekote" material. Apply 100 pounds "Stonekote" scratch on each 2½ yards of net surface. Roughen surface with broom. Apply 100 pounds "Stonekote" second coat on 2½ yards net surface, leaving surface under float without cat faces.

Price, 50c. per 100 pounds, including bag.

For Undercoats Bought Neat at $1.00 per 100 Pounds—Apply 1200 pounds neat scratch coat and 3000 pounds fine sand, and 1200 pounds neat second coat and 3000 pounds fine sand on 100 yards net surface. (Either of the above ways makes the wall ready for the finish coat.)

For Wet Rough Casting—Apply No. .... wet rough cast waterproofed on to a dry surface (in July and August dampen surface to cool it), leaving true even surface without scaffold joinings or markings. (This applies to all finish coats.)

Wet rough casting takes 1300 pounds fine grain, 1600 pounds medium grain, or 2000 pounds coarse grain on 100 net yards. Quantity needed according to roughness desired. Marble aggregate can be acid washed.

Price, according to color, 85c., 95c., $1.05 or $1.15 per 100 pounds.

For Dry Rough Casting—Apply No. ..... "Stonekote" Butter 1500 pounds on 100 yards net surface.

Prices, 85c., 95c., $1.05 and $1.15 per 100 pounds, according to color.

Dry rough cast this surface with marble or spar No. .....

No. 94 marble takes 500 pounds; No. 93, 750 pounds; No. 92, 1000 pounds;

No. 84 spar takes 500 pounds; No. 83, 750 pounds; No. 92, 1000 pounds, on 100 net yards of Butter surface.

Price, 75c. per 100 pounds, including bag, f.o.b. Chicago.

For Plain Float Finish—Apply 100 pounds of No. ..... waterproofed plain float finish on 5 square yards net surface.

Prices of Plain Floats run 60c., 70c., 80c. or 90c. per 100 pounds.

Prices of Granite Floats run 85c., 95c., $1.05 or $1.15 per 100 pounds.

For Plastic Marble Float—Apply 100 pounds of No. ..... waterproofed finish on 5 square yards. Acid wash the surface in 24 hours.

For Trowel Surface—Same as for float surface. Float to make color all even. While in the putty stage, trowel smooth without raising fat to surface.

For Block Facings—Face blocks, when making, with ¼-inch "Stonekote" No. ..... waterproofed.

Quantity needed, 3 pounds for one square foot of surface.

Prices same as float coats.

For Interior Work—Scratch coat and second coat must be either "Stonekote" or Portland cement mortar. Thickness of these coats can be reduced to 100 pounds on each 3⅓ yards of net surface. Finish with No. ..... "Stonekote" Plastic Marble, 100 pounds on five yards of net surface.

For Colored Cement Floors—Leave concrete floor with one inch for top dressing. Use bonding cement if surface has dried. Apply ¾ inch of one pound cement with two pounds torpedo sand, trowel well into place, float, and at once apply [illegible] "Stonekote" Floor Surfacing No. ..... waterproofed, troweling it in thin coats. Float surface, trowel well down without raising fat to the surface. Do not let surface dry out before under work has cured and dried. Polish terrazzo surface.

For American Caen Stone Cement—Hard wall plaster or Keene cement plaster to be used for the base coats; they to be floated out (to prevent coming through). Apply ¼ inch of American Caen Stone Cement and leave under the float. On water float in 24 hours. After this has dried out to be rubbed to a smooth surface with a fine carborundum brick, or sandpapered. 2 pound will cover one square foot ¼ inch thick.

For China Wall Finishes—Same treatment as American Caen Stone.

For Self-Decorating Hard Plaster Float Finish—A cheap colored Keene cement mortar of soft shades, used ¼ inch thick over lime mortar or hard wall plaster undercoat; stays soft, for cutting into stone. When plaster is on, room is decorated. Color must be settled on to complete specification.

Price of most shades, $10.00 per ton, including bag, f.o.b. Chicago.

Acid Washing.

Any "Stonekote" waterproofed surface can be acid washed at any time. (See "Stonekote" Book.)

Working Instructions, Catalogues and Distribution.

Catalogues on "Stonekote," "American Caen Stone," "Hard Wall Plaster" and Toch Bros.' Waterproofing will be sent to any inquirer. See that your working mechanic has a copy of the illustrated "Stonekote" Specification and Instruction Book.

Active agencies are listed on second page preceding. In towns where we have no agent, any contractor can be supplied by any material dealer, or can order direct.

Prices.

All prices are 100 pounds, f.o.b. Chicago, including bag (returnable). Scratch Coat, 50 cents; Second Coat, 50 cents; Finish Coats, 60 cents to $1.15, according to color and aggregates. Cement Floor Surfacing, 90 cents to $1.50. American Caen Stone, $2.00. Prices always the same to all consumers.

References.

One family has "Stonekote" on four buildings costing $600,000.00. Several architects each have "Stonekote" on buildings costing $1,000,000.00.

A partial list of the two hundred architects who are regular users of "Stonekote" goods on buildings in different cities:

G. W. Maher, 206 S. LaSalle St., Chicago, Ill. Buildings in Chicago and Kenilworth, Ill.; Winona, Minn.; and Daytona, Fla.

Otis & Clark, 105 S. Dearborn St., Chicago, Ill. 16 Buildings Municipal Tuberculosis Hospitals, Chicago, Ill.

F. W. Perkins, 21 E. Van Buren St., Chicago, Ill. Buildings in Decatur, Taylorville and Lake Forest, Ill.; and Duluth, Minn.

Spencer & Powers, 10 S. LaSalle St., Chicago, Ill. Buildings in Wheaton, Ill.; Indianapolis, Ind.; Knoxville, Tenn.; and Delevan, Wis.

A. T. Hawk, Rock Island Lines, LaSalle St. Depot, Chicago, Ill. Buildings in Joliet and River Forest, Ill.; Mason City, Iowa; and Searcy, Ark.

C. W. Bradley, Brown Building, Rockford, Ill. Buildings in Beloit, Wis.; Savanna, Freeport and Rockford, Ill.

Wm. G. Barfield, 58 W. Washington St., Chicago, Ill. Buildings in Hinsdale, Oak Park, LaGrange and Aurora, Ill.

J. S. Van Bergen, Caldwell Building, Oak Park, Ill. Residences of C. P. Skillen, Wilmette, and R. Cluever, Maywood, Ill.

H. K. Holsman, 332 S. Michigan Ave., Chicago, Ill. Buildings in Acley, Iowa; Oak Park and 9425 Pleasant Ave., Chicago, Ill.

H. H. Waterman, 10 S. LaSalle St., Chicago, Ill. Buildings in Wausau and Appleton, Wis.; Grand Rapids, Mich.; and Peru, Ind.

L. E. Stanhope, 108 S. LaSalle St., Chicago, Ill. Buildings in Chicago and four residences in Winnetka, Ill.

F. C. Jobson, 79 E. Adams St., Chicago, Ill. Buildings in St Louis, Mo., LaGrange, Highland Park and Chicago, Ill.

Perkins, Fellows & Hamilton, 6 N. Clark St., Chicago, Ill. Buildings in Winnetka, Evanston and Moline, Ill.; and Saugatuck, Mich.

Chatten & Hammond, 64 E. Van Buren St., Chicago, Ill. Buildings in Chicago, Lake Forest, Hinsdale and Evanston, Ill.

E. S. Hall, 19 S. LaSalle St., Chicago, Ill. Buildings in Berwyn and Glencoe, Ill.; Princeton, N. J.; and Lake Geneva, Wis.

J. R. Fugard and G. A. Knapp (Associated Architects), 111 W. Monroe St., Chicago, Ill. Buildings in Newton and Fremont, Iowa; Longwood, Ill.; Princeton, N. J.

Perry & Thomas, 140 S. Dearborn St., Chicago, Ill. Buildings in Chicago, Ill.; and apartment building sun parlors in Aurora, Neb.

W. W. Abell & Son, Elgin, Ill. Buildings in Elgin and Arlington Heights, Ill.; Dodgeville and Fond du Lac, Wis.

C. L. Inchlo, Brunson Building, Columbus, Ohio. A number of residences in Columbus, Ohio.

A. S. Pillsbury, Bloomington, Ill. Buildings in Bloomington and Normal, Ill.

J. W. Royer, Flat Iron Building, Urbana, Ill. Buildings in Urbana, Champaign, Centralia, Ill., and Attica, Ind.

THE FLEXOTILE FLOOR COMPANY

Flexotile Fireproof and Waterproof Stucco

ROCKFORD, ILL.

Products.

FLEXOTILE FIREPROOF and WATERPROOF STUCCO, for Siding and other Exterior and Interior uses.

Also, Flexotile Sanitary Plastic Flooring, for which see our name in General Index.

Description.

Flexotile Stucco is prepared by mixing an aggregate, ranging in size from 240-mesh to 4-mesh, with Flexotile silico binder, which is a chemical compound of a strength and adhesiveness sufficient to carry its own weight and that of the aggregate, without sagging during the process of crystallization or hardening. When crystallized, this material provides a stucco, or rather concrete, finish far superior to all ordinary stuccos in elasticity, impermeability, freedom from cracking, fire-resistiveness, insulating power and durability. (See tests, below.)

Flexotile has a natural white color and can be tinted to suit any color requirements. It can be finished in any style desired.

Advantages.

(1) Flexotile is fireproof.

(2) It is more than a stucco; it is a concrete and is as hard and durable as the best of that material.

(3) It has great flexibility and toughness, assuring freedom from cracks, due to expansion and contraction, and from chipping, due to direct blows or other violence of ordinary service.

(4) Its positive waterproofness assures healthier living conditions and is another factor in the prevention of cracks in the stucco, as in cold weather it will not absorb moisture, which, in freezing and expanding, always hurries cracking and disintegration.

(5) Its extreme thermal and electric non-conductivity assures, in the first place, conservation of the heat in the building in winter, and exclusion of outer heat in the summer; and, in the second place, freedom from disintegration near the ground, due to electrolysis.

(6) Flexotile may be applied in freezing weather, even as low as 20 degrees below zero, as successfully as in the heat of summer.

(7) It can be applied more speedily and economically than ordinary stuccos, as the material is not granular while plastic, but is of the consistency of putty.

Tests.

Strength—Tests made at Northwestern University have proved that Flexotile Stucco can bear a crushing pressure of 7340 pounds and a tensile strain of 1050 pounds.

Absorption—Tests at Northwestern University also proved that the absorption of this stucco, after an immersion of twenty-four hours, was only 1.17 per cent.

Flexibility—The city engineer of Rockford, Ill., stated in an affidavit that a 5½-foot span of Flexotile Stucco stood a 4-inch depression twenty-five times and showed no checks or cracks.

Fireproofness—The fire chief of Rockford, Ill., reported that actual fire tests of great severity with instantaneous cooling showed no cracks, checks or disintegration.

Freezing—A great number of installations have been made with perfect results in temperatures 10 to 17 degrees below zero.

Suggested Brief Specification Form (Including Guarantee).

All exterior surfaces of the building, including all chimneys, porch piers, interior walls of porches, etc., shall be plastered with natural color [or special color], stippled [or rough-cast, or other finish] "Flexotile" Stucco. This is to be guaranteed against all defects such as cracks, disintegration, peeling off, etc., for a period of five years. This stucco to be applied on Burketts-Sheathing Lath [or wood lath, metal lath, brick, hollow tile, cement blocks or old weather-boards].

NOTE—Apply Flexotile directly to the brick work in case of chimneys, and to metallic lath reinforcements at corners, angles, etc.

Cost.

Flexotile Stucco can be applied at from $1.00 to $1.25 per square yard in any part of the United States, allowing the contractor a reasonable margin of profit.

Samples.

This company will gladly co-operate with architects in the study of their stucco problems, and will gladly send samples, on receipt of particulars regarding color and finish desired.

Testimonials.

The following are extracts from testimonial letters received by this company:

"I have been able to produce effects and results with this stucco unobtainable with any other material I have ever used."—Frank B. Hunter, Architect, Indianapolis, Ind.

"It looks good to me, and the best is what I am looking for."—J. G. Cordner, Architect, Lincoln, Neb.

"I have been very glad to advise the use of your material, as I believe it to be a most excellent one."—A. S. Pardee, Architect, Pontiac, Mich.

From letter of F. H. Kneisley, Architect, Marshall, Mo. (See illustration below):

"Beg to advise that Chas. Petry's home was stuccoed with your Flexotile Stucco during severest weather last winter. Temperature dropped to 16 below zero the night after north side was applied, but material got hard as a rock. There is not the slightest apparent crack in the whole building, and the entire job is what I call a perfect one."

RESIDENCE OF CHAS. PETRY, MARSHALL, MO.
F. H. KNEISLEY, Architect
Flexotile Stucco applied with temperature 16 degrees below zero

GRAND RAPIDS PLASTER COMPANY

MANUFACTURERS OF

Wall Plasters and Other Gypsum Products

GRAND RAPIDS, MICH.

SALES AGENT FOR SACKETT PLASTER BOARD

Products.

WOOD-FIBER PLASTERS: "CLIMAX WOOD MORTAR," "SUPERIOR WOOD FIBER," "ELEPHANT WOOD FIBER," and "CRYSTAL WOOD FIBER."

HAIR-FIBERED WALL PLASTERS: "HERCULES," "GYPSUM," "ELEPHANT" and "CRYSTAL CEMENT."

CALCINED PLASTERS: "HOVEY'S EAGLE," "ACORN," "GREEN A" and "H. R. M."

FINISHES: "EAGLE WHITE" TROWEL FINISH, SAND FLOAT FINISH.

SACKETT PLASTER BOARD; PLASTER BLOCK.

ALSO, LAND PLASTER and CRUSHED GYPSUM ROCK.

Climax Wood Mortar.

This product is the result of our experiments during 50 years in improvements and developments of wall plasters and coverings. When applied, it contributes toughness, strength and lightness to any wall.

Climax Wood Mortar is all plaster, mixed with finely fibered, tough wood and such other ingredients as are necessary to make it plastic and easy spreading. Its density prevents vermin; it is absolutely fireproof and is not affected by water. Fiber adds one third to the bulk, thus covering greater area with less weight and maximum solidity and tensile strength.

Adaptability—Recommended for ceilings, arches and domes where plaster must be self-supporting; also, for Portland cement concrete ceilings and walls.

Covering Capacity.—One ton will cover 125 to 150 square yards of wall surface ⅝ inch grounds.

SPECIFICATIONS FOR USE

GROUNDS

Wood Lath—Grounds for wood lath ⅝ to ¾ of an inch, lath ⅛ to $^{3}/_{16}$ inch apart.

Tile or Brick—Grounds should be ½ of an inch.

Wire or Metal Lath—Grounds should be ⅜ of an inch over the face.

Sackett Plaster Board—Set grounds ⅝ to ¾ inch, drive nails home firm and tight. Do not wet boards. Apply plaster same as on wood lath.

Lathing—For wood lath, use a good grade free from knots, sap and bark; to be spaced not less than ⅛ to $^{3}/_{16}$ of an inch apart and securely nailed with 3d galvanized lathing nails. Break joints every 5th lath and leave space of ¼ of an inch between ends of lath. Half green laths are best. Dry lath must be thoroughly soaked from two to five hours before plaster is applied. This will avoid buckling. Do not extend lath through a partition wall.

Mixing—Place plaster in mixing box and add nothing but clean water. Mix water and plaster thoroughly, bringing it to proper consistency for applying. Let the mortar stand ten minutes after mixing with the water. Always use clean water, free from alkali, salt and other impurities. Never wash tools in water to be used in mixing plaster. Keep tools and mortar board clean. Have a separate barrel of water for washing tools. Do not mix more material at one time than can be used in one hour. Never re-temper plaster after it has commenced to set. Do not mix one gauging with another.

GENERAL SPECIFICATIONS

Plaster Board—First thoroughly fill joints between the boards. When this has set, apply the base or browning coat, filling out to grounds and darbying to a straight and even surface, ready to receive the finishing coat. Darby lightly and use water sparingly.

Plaster Block, Brick, Tile or Concrete Walls and Ceilings—First soak the walls thoroughly to reduce the suction. Apply sufficient mortar to fill out grounds. Bring to a straight and even surface with rod and darby, ready to receive the finishing coat.

Darby lightly and use water sparingly.

FOR TWO-COAT WORK

White Trowel Finish or Gray Finish—Apply base coat of "Climax Wood Mortar," using only enough to fill out to grounds; make walls plumb and straight; rod and darby to a rough surface, making all angles and corners true. When base coat is dry, apply Eagle Trowel Finish, or a finish composed of lime putty gauged with Calcined Plaster, and work to a smooth, hard finish, free from trowel or brush marks.

FOR THREE-COAT WORK

White, Gray or Sand Float Finish, on Wire or Metal Lath—Apply base coat of "Climax Wood Mortar," using enough to fill the meshes of the lath full. When set, apply second coat, using enough to fill out to the grounds and make walls straight and plumb; rod and darby to a rough surface, making angles and corners true. Apply finish coats as directed in two-coat work.

GRAY HARD FINISH

For bathrooms, hospitals, wainscoting or kitchens, where a very hard or durable finish is required. Use our Gray Hard Finish, but apply this when base coat is about half dry, and trowel well and smooth, using as little water as possible. This finish can be left smooth, or may be marked off in squares if so desired.

SAND FLOAT FINISH

First apply base coat of "Climax Wood Mortar," using enough to fill out grounds; make walls straight and plumb; rod and darby to a rough surface, making angles and corners true. For a Sand Float Finish, use equal parts Climax Sand Finish Plaster and Hydrate Lime and add two parts clean, sharp sand. Sand must be sharp, clean and dry, sifted through a fine sieve and mixed thoroughly with the Sand Finish Plaster and Hydrate Lime while dry. Then add water, using only enough to make the float coat work freely and easily. Apply before base coat is dry, but after it is well set, as otherwise suction will be too great to trowel smooth. Do all the sides, top and bottom, and avoid joining coats when possible. Add one part lime putty, if desired.

CARE OF PLASTER UNTIL SET

During the summer months protect the walls and ceilings from hot and dry winds, by closing up openings until plaster has fully set and become hard. This will prevent drying, causing the plaster to turn soft and chalky.

In winter, keep the plaster from freezing until it has fully set and become hard. In all cases, after the plaster has thoroughly set and become hard, allow free circulation of air to cause quick drying.

Continued on next page

"Hercules" Wall Plaster.

Gypsum Rock is the base of this product. It is a very high grade of Plaster Rock—almost a pure sulphate of lime. Our system of drying enables us to grind and calcine it to a perfect uniformity. Every particle of plaster is calcined to an absolute certainty, and not by guess, perfect fineness being necessary to secure the best results.

Our formula for mixing and retarding this plaster is the result of years of chemical experience and thorough testing.

"Hercules" Wall Plaster is strictly a modern wall plaster, and makes a wall that is durable, tough, hard; will last as long as the house; will not of itself crack, swell or shrink; will not fall off, even if wet by leaking roofs, or imperfect plumbing; and will admit the carpenters immediately after the plasterer has finished his work—weeks earlier than with ordinary lime plaster.

For decoration or papering, it makes the most durable and fine surface, is fireproof and regarded by Underwriters as a remarkable fire retarder.

Because of the density of this material, it makes a building warmer in winter and cooler in summer; and, being hard and tough, rats or vermin can not penetrate its surface and disease germs fail to live within it.

The use of this plaster permits a healthy occupation of the house *at once*.

It works smoothly, is very plastic, and its covering capacity is large.

Full plain directions for use accompany each bag of "Hercules" Wall Plaster, and, when strictly followed, perfect satisfaction is guaranteed.

Covering Capacity—One ton of "Hercules" Wall Plaster, when mixed with two parts clean, sharp sand, will cover from 225 to 250 yards; 800 to 900 pounds will cover 100 yards.

Amount of "Hercules" Wall Plaster required—For 100 yards on wood lath ¾-inch ground, on an average, eight one hundred pound bags, ten eighty pound sacks, mixed with proper amount and quality of sand, will brown one hundred yards; but, if your grounds are heavy and walls crooked, it will naturally require more.

For 100 yards on metal or wire lath, ½-inch ground, ten one hundred pound bags, or twelve to thirteen eighty pound sacks. Mix with two parts of sand to one of cement plaster.

DIRECTIONS FOR USE

In using "Hercules" Wall Plaster it is absolutely necessary, in order to attain first-class work, to have the lath spaced sufficiently far apart to permit the material to form a good clinch behind the lath.

It is also necessary to have the ground set sufficiently deep to insure a proper thickness of material being applied.

Grounds—Should be ¾-inch on wood lath; ½-inch on brick or tile; ⅜-inch over face of wire lath.

Lathing—Wood lath should be No. 1 White Pine, Spruce or Yellow Poplar, free from knots or bark. Space lath ¼ inch apart and drive nails home. If lath are dry they should be well sprinkled before mortar is applied, as this will prevent trouble from buckling. Half green lath are best. Apply as you would any mortar.

For Base Coat on Wood or Wire Lath—Mix two parts of clean, sharp sand to one of plaster.

For Brick or Tile Walls—Mix three parts of sand to one of plaster.

Use a clean and tight mortar box, about 3 x 7 x 1 feet, raised about three inches at one end. Put in first a layer of sand, and then a layer of plaster, and when ready hoe dry from one end of box to the other and back again, working together thoroughly in the operation. Leave material in raised end of box and pour water in lower end. Then hoe mortar gradually into water, allowing it to thoroughly absorb same, working to proper consistency.

GENERAL SPECIFICATIONS

Two-Coat Work on Wood Lath, White Finish—First apply "Hercules" Wall Plaster, mixed as we suggest, well rubbed in, using enough base coat to fill out to grounds, and make the walls straight and plumb.

White Finish—Apply "Eagle White" Trowel Finish as soon as base coat has become thoroughly dry and trowel to a smooth, hard finish, free from trowel or brush marks, or use a finish composed of lime putty gauged with Calcined Plaster.

Gray Finish—For bathrooms, wainscoting, kitchens, or for hospitals. Apply base coat, and when about one half dry, apply gray finish mixed with one third lime putty, with a little water.

Sand Float Finish—First apply base coat of "Hercules" Wall Paster, mixed with two parts of sand, using enough to fill out to ground, etc.

Sand Float Finish

Take four pails full of clear, sifted, sharp sand, and add to 100 pounds of unfibered "Hercules" Wall Plaster. Mix sand thoroughly with plaster, dry. Mix with water enough to make the float coat work free and easy. Apply before base coat gets dry. Add one part lime putty, if desired.

Three-Coat Work on Metal or Wire Lath, White Finish

First apply "Hercules" Wall Plaster, mixed with proper amount of sand, as we direct, sufficient to fill up meshes of the lath, and when well set (but not dry) apply second coat, using enough to fill out ground, etc.

White Finish—Apply "Eagle" Trowel Finish or a finish composed of lime putty gauged with Calcined Plaster as soon as base coats have become thoroughly dry and trowel to a smooth, hard finish, free from trowel or brush marks.

Gray Finish—When two base coats are about one half dry, apply gray finish with about one third lime putty, using as little water as possible.

Sand Float Finish—First apply "Hercules" Wall Plaster, mixed with the proper amount of sand (as we direct), sufficient to fill up the meshes of lath full, and when well set (but not dry) apply second coat.

For sand float finish, take four pailfuls of clean, sharp sand and add to 100 pounds of unfibered "Hercules" Wall Plaster, and mix thoroughly dry. Add sufficient water to make finish work free and easy from float. Apply before the base-coat gets dry. Add one part lime putty, if desired.

Two-Coat Work on Brick or Terra Cotta

First apply "Hercules" Wall Plaster, mix with three parts of good sharp sand, mixed into a mortar. Apply sufficient to fill out and make straight walls and true angles and corners. Apply white, gray or sand coat finishes as directed on lath work.

One-Coat Work on Wood or Metal Lath for Cellar Ceiling

Apply a good heavy coat of "Hercules" Wall Plaster, mixed with two parts of good sharp sand, made into mortar, which after bringing to true, even surface, trowel until smooth and hard, free from cat faces or other imperfections.

Sackett Plaster Board.

Used instead of wood and metal lath, Sackett Plaster Board is the foundation for the ideal modern wall. It is highly recommended by leading architects and builders for use in edifices of every type. It makes a warmer wall than wood lath, is cheaper than metal, and resists fire better than either.

Sackett Plaster Board consists of alternate layers of felt and stucco rolled into sheets which are nailed to studding. Plaster adheres perfectly. Boards are about ¼ inch thick and cut into sheets 32 inches x 36 inches. They can be sawed and nailed like wood.

Prices.

We will be pleased to quote prices on all our products f.o.b. any place east of the Mississippi River.

THE KELLEY ISLAND LIME & TRANSPORT CO.

MANUFACTURERS OF

Tiger Brand White Rock Finish

CLEVELAND, OHIO

Product.

TIGER BRAND WHITE ROCK FINISH (HYDRATED LIME) for white coat plastering, sometimes called the putty or finishing coat; and also for scratch and brown coat plastering and other uses.

HYDRATED LIME
TRADE-MARK

Manufacture.

Tiger Brand White Rock Finish is produced by scientifically slaking or "hydrating" a very high grade of burned quicklime. This hydrating is done at the manufacturer's plant, by adding the exact amount of water necessary to complete the chemical slaking.

When hydrated, the material is in the form of a fine white powder, and is put up in jute or paper sacks in shape to be easily and thoroughly wet up on the job.

Source.

This lime comes from the famous White Rock District in Ohio. It is the only district producing a lime which can be hydrated and used for white coat plastering. Lime manufactured in other localities, when hydrated, produces a putty which is yellow in color, and which works short and rolls up under the trowel in such a way as to make it unsatisfactory for white coat purposes.

Advantages for White Coating.

The lime is perfectly slaked at the manufacturer's plant and afterwards screened to remove impurities, so that it produces a wall which will never pit, pop nor blister. These troubles are common where lump lime is used and incompletely slaked on the job by careless laborers.

The work of screening and slaking the lime on the job is entirely saved where hydrated lime is used in place of lump lime. The material can be mixed in the room where it is used; thus it is not necessary to obtain street permits for mortar boxes, nor is it necessary to carry the mixed material to the rooms.

Tiger Brand, being perfectly hydrated, cannot become air-slaked or spoiled by long storage.

Tiger Brand White Rock Finish makes a mortar which spreads like butter and never works short under the trowel. It covers more surface and requires less material than ordinary lump lime putty. It can be applied rapidly, thus reducing the labor cost.

The cost of the material pound for pound is no greater than that of lump lime, and it requires about one third less calcined plaster for gauging.

Deliveries.

Tiger Brand White Rock Finish is sold by builders' supply dealers in all parts of the United States. The freight rate is not prohibitive. It is put up in 100-pound jute sacks or in 40-pound paper sacks, and always bears the trade-mark.

Preparation.

Tiger Brand is prepared by simply soaking over night in an ordinary mortar box in enough water to give it the proper consistency (15 to 16 gallons of water to 100 pounds of lime).

LINCOLN HIGH SCHOOL, LOS ANGELES, CAL.
EDGAR H. CLINE, Architect
Tiger Brand White Rock Finish was used exclusively in this building

Continued on next page

Covering Capacity of White Coating.

This depends on the thickness of the coat, the evenness of the base coat and the skill of the laborer. Where a first-class straight job is done, it will cover 700 square yards to the ton. On work that need not be perfectly straight and where a thin coat is put on, a ton will cover 800 to 1000 square yards.

White Coat Specifications for Use of Architect or Engineer.

Materials—Tiger Brand White Rock Finish, best grade of finely ground calcined plaster, best grade marble dust or washed sand.

Soak the lime over night before using. Add small proportions of sand or marble dust, either in the putty box or on the mortar board. To each 100 pounds of Tiger Brand White Rock Finish add 25 pounds of calcined plaster on the mortar board.

Finishing Coat—The finishing coat to be supplied when the brown coat is nearly dry. Sprinkle with clean water if bone-dry.

Finishing coat to be applied in a first-class workmanlike manner and troweled to a smooth, polished surface free from brush marks.

Other Uses of Tiger Brand White Rock Finish.

For Scratch, and Brown Coat Plastering—A mixture of Tiger Brand White Rock Finish and sand in proportion of one pound of Tiger Brand to from three and one half to four and one half pounds of sand is an ideal material for the base coats. It produces a sound-deadening wall, superior in every way to gypsum hard-wall plastered walls. On wood or metal lath, add three pounds of hair to the ton of sanded material.

It applies and straightens up easily, does not buckle wood or metal lath, and will not eat or discolor decorations. It gives the advantages of old-fashioned lump lime plaster and is as easy to apply as ready-mixed mortar.

The ingredients can be mixed on the job or at a mixing plant, and then delivered on the job all ready to wet up.

Complete specifications for plastering, in a handy little book, sent on request.

For Waterproofing Concrete—From ten to fifteen per cent Hydrated Lime added to Portland cement in the mixture fills the minute voids in the concrete and makes it denser and more nearly waterproof. It also makes the concrete more plastic and easily handled in chutes, etc.

The surface will also finish whiter and smoother. Complete information and specifications for using Hydrated Lime in concrete will be sent on request.

For Use with Cement in Bricklaying—Thirty-five per cent Hydrated Lime added to Portland cement in mortar for bricklaying will make the mortar spread more easily and will speed up the work.

Mortar so made will also carry more sand and hence be much cheaper.

With Cement for Exterior Stucco Plastering—One hundred and sixteen pounds Tiger Brand White Rock Finish, 580 pounds Portland cement, 1300 pounds sand makes an ideal exterior stucco. White Portland cement can be used, or white sand or marble dust may take the place of ordinary sand where a white stucco is desired.

For scratch coat add three pounds of hair to the ton of the sanded material.

Catalogues, Data, etc.

Complete data and specifications on scratch brown and white coat plastering will be sent on request.

CLEVELAND CITY HALL
J. Milton Dyer, Architect

Over 5000 tons of Tiger Brand White Rock Finish and Tiger Brand Prepared Plaster used on this building for base and white coat plastering

"THE BLACKHAWK" HOTEL, DAVENPORT, IOWA
Temple & Burrows, Architects

Tiger Brand White Rock Finish used exclusively for finishing

RESIDENCE OF H. L. SANFORD, CARLETON ROAD, CLEVELAND, OHIO
Walker & Weeks, Architects

Tiger Brand White Rock Finish used in scratch coat and white coat plastering

KEYSTONE PLASTER COMPANY

Nova Scotia Gypsum Products

GENERAL SALES AND EXECUTIVE OFFICES

CHESTER, PA.

MINES AND QUARRIES
ST. ANNS, C. B., NOVA SCOTIA

MILLS
CHESTER, PA.

PHILADELPHIA OFFICE, PERRY BUILDING

Products.

"KEYSTONE," "VICTOR" and "ADAMANT" WALL PLASTERS, Sanded or Neat (unsanded); "KEYSTONE" WOOD FIBRE PLASTER; "ADAMANT" ASBESTOS STUCCO; "KEYSTONE" CAEN STONE CEMENT; "KEYSTONE" "FINISHING," and "SUPERFINE" BRAND PLASTER-OF-PARIS; "KEYSTONE" WHITE TROWEL FINISH; "VICTOR" WHITE TROWEL FINISH; "KEYSTONE" SAND FLOAT FINISH, and "KEYSTONE" PLASTER BOARD.

Description.

General—The basis of our products is the purest Nova Scotia gypsum. Thirty years' experience in the manufacture of gypsum products, coupled with a supply of the purest raw material and unsurpassed manufacturing facilities, under a staff of practical and technical experts, as well as a central location, assure to the architect, contractor and owner a reliable and uniform material of the highest quality, and adequate service and co-operation.

"Keystone," "Victor" and "Adamant" Wall Plasters, Sanded or Neat (unsanded)—For interior plastering.

"Keystone" Wood Fibre Plaster—For interior plastering, where great strength and density, coupled with elasticity and light weight, are required, or where surfaces are subjected to abuse or neglect.

"Keystone" White Trowel Finish—For a hard, white and smooth surface.

"Victor" White Trowel Finish—As a base for finish decorations.

"Keystone" Sand Float Finish—As a sand finish.

"Adamant" Asbestos Stucco—Natural gray, white or buff, for exteriors.

"Keystone" Caen Stone Cement—For casting and surfacing.

Specifications.

"KEYSTONE" WALL PLASTER AND FINISHES.

Grounds—Should never be less than ¾ inch for gypsum plaster board, wood lath, wire or metal lath, and not less than ½ inch for brick, clay tile or gypsum block.

Lathing—Wood lath to be of good grade, preferably half green; free from bark, sap and knots; spaced not less than ¼ inch apart and well nailed with, at least, two 3d lathing nails through each lath at every stud. Joints to be broken at least every seventh lath. Gypsum plaster board applied in exact accordance with the manufacturers' instructions.

Mortar—To be the Keystone Plaster Company's ..... Brand of Wall or Wood Fibre Plaster, mixed and applied in accordance with manufacturers' directions.

Prepared Finish—To be the Keystone Plaster Company's ..... Brand of Trowel or Sand Float Finish, mixed and applied in accordance with manufacturers' directions.

DIRECTIONS FOR MIXING.

Use a clean, tight box, about three or four feet wide and seven feet long, with sloping ends. One end of box raised four or five inches.

Sanded Wall Plaster—Put sanded plaster in raised end and clean water in lower end of box. Hoe mixture into water, to a thin mass. Mix thoroughly and temper to proper consistency, for application, by sprinkling dry material over the mass, and working thoroughly.

Neat Wall Plaster (unsanded)—Spread a layer of sand in the box, then a layer of plaster on top; mix thoroughly. Hoe mixture to high end of box; put clean water in lower end, and hoe plaster and sand mixture into water to a thin mass, tempering to proper consistency, for application, by sprinkling a dry mixture of sand and plaster in proper proportions over the mass, and working thoroughly.

NOTE—Sand should be clean, of evenly graded texture, free from clay and loam. The shape of grain, whether sharp (i. e., angular) or round, however, is immaterial.

Wood Fibre Plaster—"Keystone" Wood Fibre Plaster should be mixed with water only. Water should be placed in the mixing box and the plaster spread out and allowed to soak for about fifteen minutes. Mix thoroughly and temper to the proper consistency, for application.

Prepared Trowel and Float Finishes—Put finish in raised end of box and clean water in lower end. Hoe finish into water and mix thoroughly, to remove lumps and air bubbles.

CAUTION—Gypsum plaster should always be kept in a dry place, and never on bare ground. Plaster should not be mixed with sand until ready to add water, for application. Mix only sufficient material at a time to be applied in one hour.

Use clean water, free from acids, alkalies and other impurities. Water in which plastering tools have been washed should not be used for mixing. Keep mortar box and tools clean.

Never mix one gauging with another, nor use re-tempered material which has begun to set.

A special time of set is required for all wall plasters, which are to be mixed in a mechanical mixer; and orders for wall plaster to be used in this manner should specify material for this purpose.

Application.

DIRECTIONS FOR APPLYING WALL PLASTERS AND WOOD FIBRE PLASTERS

On Gypsum Board—Do not wet board. Apply a scratch coat over entire surface of board. Press mortar into joints and cracks between boards to form strong keys. When scratch coat has set, and before it is dry, "brown out to grounds"; then with rod and darby straighten to a true and even surface, ready to receive finish coat. Darby lightly, and use little water.

On Wood Lath—Soak wood lath thoroughly a sufficient time before plastering to allow lath to swell.

Two-Coat Work—Apply plaster with sufficient pressure to obtain a good key; fill out to grounds and darby lightly to a true surface, ready for finishing coat. Use little water.

Three-Coat Work—Apply plaster for first or scratch coat with sufficient pressure to obtain a good key; scratch and allow to set hard. Follow up with second coat laid on to grounds; rod and darby to a true and even surface, ready to receive finishing coat. Use water sparingly in darbying.

On Wire or Expanded Metal Lath—Apply scratch coat to thoroughly fill the meshes of lath. Allow scratch coat to set firm and hard; fill out to grounds, and with rod and darby bring to a true and even surface, ready for finishing coat. Darby lightly and use water sparingly.

On Brick, Clay Tile and Gypsum Plaster Block—Wet down brick or clay tile walls; scratch on a light coat of plaster, mixed thin. Go back over surface and lay on sufficient material to fill out to grounds. Rod and darby to a true and even surface, ready to receive finishing coat.

DIRECTIONS FOR APPLYING FINISHES.

Trowel Finish—Apply in three coats over a dry base. Reduce suction by sprinkling lightly with clean water from a clean brush. Apply first coat of thin material, cover base completely and work in thoroughly. Allow first coat to draw a few minutes. Next lay on second coat perfectly level, and third coat as thin as can be handled on the hawk, to fill imperfections and cat faces. Trowel smoothly with aid of a damp brush and very little water. Work top and bottom together, wherever possible, to avoid joinings.

Sand Float Finish—Apply after base coat has set hard, but is still green. Lay on material, and float to a true, even surface of uniform texture, free from cat faces and float marks. Use a carpet, felt or cork float. A cork float is best.

J. B. KING & COMPANY

Nova Scotia Gypsum Products

GYPSUM MINES
WINDSOR, NOVA SCOTIA
AVONDALE, NOVA SCOTIA
HILLSBOROUGH, NEW BRUNSWICK

GENERAL OFFICES
17 State Street
NEW YORK, N. Y.

FACTORY
NEW BRIGHTON, NEW YORK

BRANCH OFFICES AND WAREHOUSES

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PROVIDENCE, R. I.
HARTFORD, CONN.
BUFFALO, N. Y.
PHILADELPHIA, PA.
NORFOLK, VA.
WILMINGTON, N. C.
CHARLESTON, S. C.

Products.

King's Windsor Asbestos Cement (neat and ready prepared); King's Superfine Windsor Cement; King's Special Windsor Cement (for concrete); King's Ready Finish; King's "Diamond" Brand Fibrous Plaster Board; King's "Diamond," "Hillsborough" and "Snowflake" Brands Plaster of Paris.

King's Windsor Gypsum Blocks; King's Windsor Pulp Plaster; King's Wood Fiber Plaster; King's Land Plaster; King's Marble Dust; King's Marble Flour; King's Terra Alba; King's Gypsum Plates; King's Perfected Cold-Water Paint; J. B. White & Bros.' "Keene Cement" and Portland Cement Dry Mortars.

King's Windsor Asbestos Cement.

King's Windsor Asbestos Cement is a perfected plastering material. It is composed of calcined plaster, manufactured from the finest quality of selected gypsum rock imported from the world-famed district of Windsor, Nova Scotia, incorporated with the correct proportion (determined by our thirty-six years' experience) of other high-grade plastic ingredients, asbestos fiber, hair, etc. It is made in two forms, namely, Neat (to be mixed with local sand) and Ready Prepared (requiring only water to be added).

King's Superfine Windsor Cement and Other Finishes.

King's Superfine Windsor Cement, a specially prepared Hard Finish, is designed to produce a very hard, smooth, white and elastic surface that will resist hard usage, and will present a perfect surface for painting, tinting or papering. Its slow setting properties enable the plasterer, by a little additional troweling, to produce a high polish. It is extensively used for imitating tile and brick work in bathrooms, etc. When used for hard finishing it is to be mixed with equal parts of lime putty.

King's "Diamond," "Hillsborough," and "Snowflake" Brands of Calcined Plaster are all standard finishing plasters, cool working, pure white, and very strong.

Reputation.

King's Nova Scotia Gypsum Products are examples of the highest art in plaster manufacture in America. That they are deemed the standard of excellence is shown by architects and contractors throughout the country in selecting them for use in the most expensive public and private buildings.

King's "Diamond" Brand Plaster Board.

King's "Diamond" Brand Fibrous Plaster Board is a practical fire-resisting substitute for wood and metal lath, for interior walls and ceilings; a non-conductor of sound, heat and cold. Other uses are: For protection against fire in mills, factories, warehouses, stables, etc., when the boards are to be nailed directly to the surface to be protected, placing them as close together as possible; for deadening sound, when they are to be used between the rough and finished floors; and for keeping out heat and cold when the boards may be used for exterior sheathing of frame houses.

Composition—King's "Diamond" Brand Fibrous Plaster Board is composed of Nova Scotia gypsum and fiber compressed into a solid fibrous sheet, reinforced on both sides with specially prepared felt.

Sizes—Size of boards, 32" by 36"; $\frac{5}{16}$", $\frac{3}{8}$" and $\frac{1}{2}$" in thickness; adapted for use on 8", 12", 16" and 18" centers.

$\frac{5}{16}$" A Board, Dark Felt.
$\frac{3}{8}$" A Board, Dark Felt.
$\frac{1}{2}$" A Board, Dark Felt.
$\frac{5}{16}$" C Board, Light Paper.

The dark felt boards are for use where plastering is required. The light paper board is adapted particularly for papering and burlaping.

Advantages—King's "Diamond" Brand Fibrous Plaster Boards make strong solid walls. They produce quick-drying plastering. They protect the wood frame from moisture. By their use there is no confined dampness in partition walls and no corrosion by rust (as when metal is used). They save time in construction. Their incombustible properties insure protection to human life and property.

KING'S "DIAMOND" BRAND FIBROUS PLASTER BOARD BEING APPLIED

NATIONAL KELLASTONE COMPANY

Kellastone Stucco, Plaster and Composition Flooring

BRANCH OFFICE
NEW YORK, 299 Broadway

19 South La Salle Street
CHICAGO, ILL.

PLANTS
ARGO, ILL.
JERSEY CITY, N. J.

AGENCIES THROUGHOUT THE UNITED STATES

Products.

KELLASTONE IMPERISHABLE STUCCO for Exterior and Interior Use on new and old buildings, and KELLASTONE PLASTER.

KELLASTONE COMPOSITION FLOORING and WAINSCOTING.

KELLASTONE IMPERISHABLE STUCCO
TRADE-MARK

To such, Kellastone will appeal, particularly since it can be applied over siding, brick or stone, just as readily as over new structures. It immediately enhances the appearance of property to such an extent that not only its selling value increases, but rentals can be justly increased as well.

Kellastone Imperishable Stucco.

Kellastone imperishable stucco contains no lime, Portland cement or gypsum. It is a product composed of magnesite and other materials of proved durability. It is mixed with a chemical compound instead of water. Can be applied and will cling tenaciously to wood lath narrowly spaced, metal lath, hollow building tile, brick surfaces, Portland cement plaster and concrete. Kellastone is made in but one grade and quality—mechanically mixed and chemically balanced.

Advantages—On account of its remarkable strength, and freedom from expansion and contraction caused by temperature changes, Kellastone is immune from the effects of changing weather conditions. Its resilient and elastic properties permit it to withstand settling strains to a far greater degree than any other material used for stuccoing or plastering purposes.

Being a non-conductor of heat, cold and dampness, Kellastone keeps the building cooler in summer and warmer in winter. It is fireproof and commands a very low insurance rate.

Kellastone imperishable stucco retains its new, attractive appearance indefinitely. Not being mixed with water, it defies the elements to mar its matchless beauty. It never needs to be covered with waterproofing solutions and is absolutely free from up-keep expense.

Kellastone stucco can be applied in summer or winter, *even in temperatures far below the freezing point.* This enables the work to be carried on during the winter season when help is plentiful and easy to get.

Finishes—Kellastone can be given a smooth, stipple, sponge or dash finish. It can also be colored the same as any other kind of stucco; but we do not recommend coloring Kellastone, because it is difficult to obtain a uniform, even color. When color effects are desired, far more artistic and satisfactory results can be obtained by dry-dashing with marble or granite chips of the natural color desired. This can be applied uniformly and the dash will cling permanently and never fade.

Remodeling Old Buildings with Stucco.

The ever-increasing tendency toward the use of stucco in modern building construction has created a desire in the mind of many owners of frame, brick and stone buildings to remodel their structures in accordance with the present exterior practice.

RESIDENCE FINISHED WITH
KELLASTONE IMPERISHABLE STUCCO

Kellastone Plaster.

Kellastone plaster, like Kellastone imperishable stucco, possesses those resilient, elastic qualities that permit it to withstand severe settling strains far better than any other plaster known. Except in cases where buildings settle to a very unusual degree, Kellastone plaster walls are crack-proof. It forms a much harder surface than ordinary plaster, and consequently is not marred when struck by furniture, etc.

Kellastone plaster is dustless, fireproof, and is not damaged by excessive heat, steam or other abusive usages.

Specifications and References.

The specifications for the application of Kellastone plaster or stucco to different building surfaces are so varied that it is impossible to give full information in a limited space. Consequently it is suggested that you write for our illustrated book of complete specifications, which will be gladly mailed on request.

Kellastone imperishable stucco has been specified by leading architects all over the country, for use on buildings of all classes, from office and public buildings down to the most humble bungalows. We cannot publish an entire list here, but will gladly give references on request.

Continued on next page

Kellastone Composition Flooring.

KELLASTONE COMPOSITION FLOORING TRADE-MARK

Kellastone composition flooring is a product composed of magnesite, asbestos and other ingredients of proved adaptability. It is manufactured from the formula of a practical investigator who has had more than fifteen years' actual experience in composition flooring in Germany, Austria, Belgium, France and the United States. It is mixed in a plastic form with a compound of which chloride of magnesium is the base, and is laid over iron, cement and wood, without joints or seams, including cove and base. It is machine mixed, insuring uniformity in texture, strength and color. It contains no Portland cement or lime.

Advantages—Because of the lightness, warmth, resilience and quietness of Kellastone composition flooring, and its adaptability to heavy trucking and machinery vibration (which terrazzo, tile and similar materials will not stand), and its sanitary and germ-proof qualities, it covers a wider range of practical adaptability than any other form of flooring. It is the ideal floor for schools, theaters, hospitals, asylums, office buildings, public buildings, machine shops and manufacturing plants. It is fast taking the place of concrete, marble, tile and similar materials in power plants, machine shops, etc.

Because of its remarkable resistance to abrasion, it does not produce dust and dirt or other gritty substances, which, in the case of most other flooring materials, is destructive to dynamo armatures and bearing parts of machinery. Firms whose work requires their employees to remain on their feet for hours at a time are using composition flooring in preference to all other materials, because it has been demonstrated that it causes less weariness to the feet than any other form of flooring except wood, to which it is superior in every other way. Another field of use is for stairway treads, where it has proved itself to be durable, safe and of attractive appearance.

Herewith is a table showing the result of tests by the highest authorities on the subject, as to the value of composition flooring compared with other materials used in interior work. In this comparison, maple has been taken as a standard for wood floors, because, except in the matter of beauty alone, it is superior to all other woods that are commonly used for floors.

	Durability	Appearance	Cleanliness	Quietness	Abrasion	Resiliency, freedom from cracks	Non-slippery	Waterproof	Warmth	Fireproof	Weight	Total
Composition Flooring...	95	80	100	75	100	90	100	90	98	100	53	981
Cork Tile.....	50	85	40	100	95	100	100	25	100	0	100	795
Wood.....	50	90	35	50	95	90	50	25	90	0	83	658
Marble.....	100	100	85	6	20	3	100	90	5	100	6	615
Rubber Tile....	0	80	0	98	30	95	100	90	90	0	32	615
Clay Tile.....	100	85	75	5	40	4	30	90	0	100	29	544
Terrazzo.....	95	80	90	0	40	3	0	100	5	100	30	543
Mosaic Tile....	100	85	75	5	40	4	0	90	0	100	30	531
Concrete.....	90	45	90	5	10	1	70	100	5	100	32	358

NOTE—The figures in the table are based upon 100 for the material having the best test under each heading.
The figures named in the table show by total points the order of merit of the various forms of flooring.

Note that composition flooring ranks well above all of its rivals. Cork tile approaches it the nearest; but it is far more expensive, its cost being about three times that of composition flooring. The cost of composition flooring is about one half that of clay and mosaic tile, and two thirds that of terrazzo.

Kellastone composition floors are hard enough for use in two or three days after they are laid, although they will stand careful walking in less than thirty-six hours. They require no care or treatment to insure durability and permanence, but like wooden floors respond to good care. Cleanliness, freshness and beauty will be maintained if they are gone over at intervals of every few months with an inexpensive dressing of oil and wax.

Colors—Kellastone composition flooring can be furnished in various shades of the following colors: Red, Black, Tan, Gray, Brown, Blue, White and Green.

Specifications and Co-operative Service—Kellastone composition flooring can be laid on bases of concrete, wood or steel, to which it has remarkable properties of adhesion. It can also be laid over old wooden floors when remodeling old buildings. There is no limit to the artistic combinations that may be obtained in borders, general designs and terrazzo effects.

Kellastone flooring is installed in two coats: An under, fibrous coat of great strength and pliability; and a top coat of exceeding fine-grained texture, highly immune to abrasive wear, under the severest conditions. The combination of the two coats produces a floor of quietness, strength and elasticity.

We will gladly furnish detailed specifications to architects and contractors for any job on which they may be figuring, if they will forward us description of foundation, and area and nature of space to be covered.

We will also furnish contractors the necessary materials and detailed instructions, in case they desire to lay their own Kellastone composition flooring.

References, Composition Flooring.

Kellastone composition flooring has been specified by leading Chicago architects for use in many prominent buildings. A list of users will be gladly furnished to architects and contractors, on application.

KELLASTONE COMPOSITION FLOORING BEING INSTALLED IN U. S. CUSTOM HOUSE, MILWAUKEE, WIS.
Installed in offices and storerooms and subjected to the handling of heavy merchandise

MONUMENT PLASTER CO.

Foot of Essex Street

TELEPHONE, 2381 HARRISON

HARRISON, N. J.

AGENCIES

CHICAGO, ILL., GEO. W. DE SMET
ST. PAUL, MINN., ST. PAUL BUILDERS MATERIAL CO.
MINNEAPOLIS, MINN., LANDERS-MORRISON-CHRISTENSON CO.
LOS ANGELES, CAL., HOWARD & BOHN
SAN FRANCISCO, CAL., HENRY COWELL LIME & CEMENT CO.
JACKSONVILLE, FLA., CAROLINA PORTLAND CEMENT CO.
NEW ORLEANS, LA., FRITZ JAHNCKE
CLEVELAND, OHIO, THE EUCLID BUILDERS SUPPLY CO.
COLUMBUS, OHIO, THE COLUMBUS BUILDERS SUPPLY CO.
CINCINNATI, OHIO, THE CINCINNATI CLAY PRODUCTS & SUPPLY CO.
ST. LOUIS, MO., MCEWING & THOMAS CLAY PRODUCTS CO.
NEW YORK, N. Y., Samples filed with the ARCHITECTS' SAMPLES COMPANY, Park Avenue and Fortieth Street

Products.

"ORIENTAL STUCCO," a ready prepared, colored, waterproofed Stucco in any color. For exterior use.

"ORIENTAL SAND FINISH," a ready prepared, colored, waterproofed plaster in any color. For exterior use.

"PREPARED CAEN STONE," a ready prepared plaster for casting or work laid off on the wall. For interior use.

"CAST CAEN STONE BLOCKS," a cast block made up in various sizes. For interior use.

"SPECIAL SCRATCH," a ready prepared base coat for wood or wire lath, for exterior stucco work.

"SPECIAL BROWN," a ready prepared base coat for brick, hollow tile, or concrete construction, or used as the second coat over the "Special Scratch." For exterior use.

Oriental Stucco."

This plastic material comes all prepared with the waterproofing and coloring incorporated in the material. In mixing, add nothing but clean water. The product is slow setting and will not show the "joinings" from one day's work to another. The colors are uniform and permanent.

"Oriental Stucco" is used as a Float, Rough Cast, or Stippled Finish over our Special Base Coats, or may be used over any proper Portland cement base coat.

"Oriental Sand Finish."

This finish comes all prepared and in the same color as our "Oriental Stucco." It is used for interior. In other words, it eliminates the white coat and painting of walls.

"Prepared Caen Stone."

Oriental Caen Stone, both in color and texture, is remarkably close to the real stone, and gives almost exactly the same soft, attractive appearance which has caused Caen Stone to be used for interior finish in fine edifices since 1350 A. D. For churches, theaters, schools, banks, court houses, hotel and office building lobbies, and all other public and semipublic buildings, this interior finish gives an effect of distinction obtainable in no other way.

Oriental Caen Stone is scarcely distinguishable from the actual stone itself; is far lower in cost, and this makes it possible to provide an attractive interior effect in a wide variety of buildings in which the genuine Caen stone could not be considered. Its color is uniform and permanent and its texture has the same remarkable softness which characterizes the real stone.

Oriental Caen Stone is slow-setting and free-working to an unusual degree, so that a greater surface can be covered in a given time than is possible with the faster-setting and slower-working preparations sometimes used for this purpose. It can be blocked off and tool-marked so as to make the resemblance complete. Where casting is to be done, a special material is furnished on request, as the regulation material is too slow-setting to lend itself suitably to this purpose.

One ton of Oriental Caen Stone will cover from 180 to 200 square yards of surface.

"Cast Caen Stone Blocks."

We are now preparing to give quotations on "Cast Caen Stone Blocks" in various sizes. These blocks can be set on the wall in the same manner that tile or marble is set up. Where an elaborate finish is required it is often better to set this up in blocks, rather than to attempt to have the work laid off on the wall, with the struck off joints. It also insures a more uniform job, as the blocks are uniform in color, while the plasterer is not always able to float the job uniformly.

SOUTH SHORE COUNTRY CLUB, CHICAGO, ILL.
Oriental Stucco No. 65 used
STERN-SMITH CO., Plastering Contractors

NIAGARA GYPSUM COMPANY

Manufacturers of Plasters and Gypsum Products

BUFFALO, N. Y.

MINES AND MILLS
OAKFIELD, N. Y.

Products.

NIAGARA PLASTERS and GYPSUM PRODUCTS as follows: NEAT CEMENT PLASTER (unsanded); WOOD FIBER PLASTER (wood pulp); SANDED MORTAR (haired); "KON-KREET" PLASTER (for plastering concrete); GRAY FINISH; READY FINISH; PLASTER BOARDS; GYPSUM BLOCKS.

Also, FINISHING LIMES, PLASTER OF PARIS, etc., in mixed car shipments.

TRADE-MARK

Facilities.

The mines and mills of this Company are located at Oakfield, N. Y., on the West Shore Railway (New York Central & Hudson River Railroad), convenient for the rapid filling of orders and shipment without delays. Mines and mills electrically operated, with a daily capacity of five hundred tons.

Gypsum Rock.

Report of state geologists, which is available on request, shows our rock to be of high analysis and uniform run. The deposits are extensive and insure us many years' supply.

Neat Cement Plaster.

Requires the addition of sand at the work. Economical on large operations. Used largely in localities where good sand is available. When mixed according to directions below, one ton should cover as much surface as three tons of sanded mortar.

How to Use—Grounds should be three quarters of an inch for two-coat work and seven eighths of an inch for three-coat work. Wood lath should be free from sap, bark and knots. Spaced about three eighths of an inch apart, joints broken every seventh lath. Thoroughly swell the lath, and do not let them shrink before application of plaster. Use two parts sand to one part plaster for wood lath, and three parts sand to one of plaster for brick, tile, or gypsum block surfaces, by measure, mixing materials well together before adding water.

Wood Fiber Plaster (Wood Pulp).

Characteristic ingredient is wood fiber, which gives the plaster toughness, flexibility and bulk. Spreads easily. Especially suitable for use in plastering over plaster board. Special mixtures prepared for particular cases.

How to Use—Ready to apply by adding water only; if desired, equal weight of sand may be added. On account of greater bulk should cover more surface per ton than other grades of wall plaster.

Sanded Mortar.

Splendid working qualities. Three grades manufactured for use on wood or metal lath, brick, tile or gypsum block. Ready for use. Add water only.

Prepared Finishes.

We make Gray Skim Coat; economical for giving a smooth, hard surface for papering. Also, a Ready Finish for hard, glossy body coat, and Sand Finish for walls to be tinted.

How to Use—Add water only. Mix as applied in small batches.

"Kon-Kreet" Plaster.

Increasing use of reinforced concrete construction calls for a specially manufactured plaster with strongest possible bonding features, to insure thorough adhesion when applied to these surfaces. Used by addition of water only. Light gray color. Can be finished by troweling.

Plaster Board.

A better material than lath. Plaster applied directly to the board, which is nailed direct on studding and on 2-inch furring strips set on 12-inch or 16-inch centers on joists.

A retarder of fire; sound deadener. Made in sheets 32 x 36 inches. Thicknesses, ¼, $\frac{5}{16}$, ⅜, and ½ inch. Use large flat-headed galvanized nails, 1¼ inches long, which are supplied for the purpose, spaced 6 inches apart around the board.

Gypsum Blocks.

For laying up partitions. Used in fireproofing. Light in weight. Surface sizes, 12 x 30 inches and 13½ x 32 inches. Thicknesses, 2, 3, 4 and 6 inches, and 2-inch furring.

BUILDINGS OF PROMINENCE PLASTERED WITH NIAGARA PLASTER

BUILDING	LOCATION	ARCHITECT	CONTRACTORS
Springfield Municipal Buildings	Springfield, Mass.	Pell & Corbett, New York, N. Y.	A. E. Stephens Co., New York, N. Y.
Manry High School Building	Norfolk, Va.	Neff & Thompson, Norfolk, Va.	East & Hobbs, Norfolk, Va.
Baltimore Medical College and Laboratory	Baltimore, Md.	Mottu & White, Baltimore, Md.	J. H. Warthen, Baltimore, Md.
Harlem Church	Baltimore, Md.	F. E. & H. R. Davis, Baltimore, Md.	D. S. Shaffer, Baltimore, Md.
Academic Building, Johns Hopkins University	Baltimore, Md.	Parker, Thomas & Rice, Baltimore, Md.	M. F. Boring, Baltimore, Md.
Western High School	Baltimore, Md.	O. G. Simonson, Baltimore, Md.	D. S. Shaffer, Baltimore, Md.
Hampton Court Apartment	Baltimore, Md.	Geo. R. Morris, Baltimore, Md.	J. H. Warthen, Baltimore, Md.
Grand Central Terminal	New York, N. Y.	Reid & Stein, New York, N. Y.	Klee, Thomson Co., New York, N. Y.
Oaklyn School Building	Camden, N. J.	Wm. T. Towner, New York, N. Y.	D. H. Sharpe, Camden, N. J.
Ritz-Carlton Hotel	Philadelphia, Pa.	H. Trumbauer, Philadelphia, Pa.	J. J. Roberts Co., New York, N. Y.
Otis Building	New York, N. Y.	Clinton & Russell, New York, N. Y.	P. J. Durcan, Inc., New York, N. Y
Addition to Hudson Terminals	New York, N. Y.	Clinton & Russell, New York, N. Y.	P. J. Durcan, Inc., New York, N. Y.
Edison Electric Building	New York, N. Y.	(Own Architects)	McNulty Bros., New York, N. Y.
State Normal School	Oswego, N. Y.	N. Y. State Architects	McNulty Bros., New York, N. Y.
Albany High School	Albany, N. Y.	Starrett & Van Vleck, New York, N. Y.	A. E. Stephens Co., New York, N. Y.
Hotel Bancroft	Worcester, Mass.	Esenwein & Johnson, Buffalo, N. Y.	Monahan Bros., Chicago, Ill.
National Biscuit Co. Building	New York, N. Y.	(Own Architects)	J. J. Roberts Co., New York, N. Y.
Weidner Memorial Library Building, Harvard College	Cambridge, Mass.	H. Trumbauer, Philadelphia, Pa.	Klee, Thomson Co., New York, N. Y.

M. A. REEB

Manufacturer of Wall Plasters and Products of Gypsum

GENERAL OFFICE

BUFFALO, N. Y.

MILLS AT

BUFFALO, N. Y. (N. Y. C. & H. R. R.) OAKFIELD, N. Y. (WEST SHORE R. R.)

Products.

PEERLESS PLASTERS and GYPSUM PRODUCTS as follows: NEAT CEMENT PLASTER (sand to be added), WOOD FIBER PLASTER, SANDED PLASTER (add water only), CONCRETE PLASTER, PLASTER BOARD, GYPSUM PARTITION BLOCKS, PORTLAND CEMENT MORTAR and ASBESTOS MORTAR.

Also, FINISHING LIMES and PLASTER OF PARIS for mixed car shipments.

TRADE-MARK

Facilities.

Our mills are situated at Oakfield, N. Y., on the West Shore Railway and at Buffalo, N. Y., on the N. Y. C. & H. R. R. R., with excellent manufacturing and shipping arrangements at each point, insuring prompt and efficient service to our customers. Extensive daily capacities to take care of large jobs.

Quality of Gypsum.

The gypsum, which is the base of all our materials, is of highest grade. It is mined and calcined at one of the most extensive deposits of gypsum rock in the country. Analysis is high and uniform, as New York State Geologist's records will show.

Neat Cement Plaster.

It is a material used on big work and in localities where a good clean, sharp sand can be readily obtained. Economical and makes strong job. Requires addition of sand at the work. When mixed according to directions below, one ton with sand added will cover three times as much surface as one ton ready sanded plaster.

Directions—Grounds should be ⅞-inch for three-coat work or ¾-inch for two-coat work. Thoroughly swell wood lath. Do not let them shrink before plaster is applied. Lath should be free from sap, bark and knots and should be spaced ⅜-inch apart, and joinings broken every seventh lath. Two parts sand to one part plaster for lath and three parts sand to one part plaster for brick, tile or gypsum block surfaces. Materials well mixed together before adding water.

Wood Fiber Plaster.

As the name implies, largely composed of wood fiber. Makes a light, tough and elastic plaster; easily applied.

Particularly desirable as a material for applying over plaster board. Ready to apply with the addition of water only. If desired, equal parts good clean sand may be added at the work. More bulky than other grades of wall plaster and covers more surface per ton.

Sanded Plaster.

This material is ready to use with the addition of water only. Our sand is clean and sharp, and our sanded plaster is noted for its easy and smooth working qualities. We manufacture three grades for use on wood, metal lath and brick.

Asbestos Mortar.

We manufacture an asbestos mortar required by architects and contractors for particular work. Further information upon request.

Concrete Plaster.

A material especially manufactured for application to interior concrete walls and ceilings. It has strong bonding features in connection with concrete.

Portland Cement Mortar.

A mortar made of standard Portland cement and clean sharp sand in exact proportions. Shipped in dry form, ready for water only at the job.

This material is also shipped in neat form, so that sand may be added at the job.

Special formulas prepared and waterproofed for exterior stucco work.

Plaster Board.

This is a substitute for wood and metal lath. Comes in sheets 32 x 36 inches and in thicknesses as follows: ¼, 5/16, ⅜ and ½ inches. Applied directly to studding on side walls and to 2-inch furring strips set on 12- or 16-inch centers or joists. A splendid sound deadener and fire retardative. Plaster is applied directly to the board with perfect bond between the two. Use large flat headed galvanized nails about 1¼-inch long, spaced about 6 inches apart around the board.

Gypsum Partition Blocks.

For partitions and furring of other walls. Made in 12 x 30-inch and 13½ x 32-inch surface measurements, and in following thicknesses: 2, 3, 4 and 6 inches and 2-inch furring.

PARTIAL LIST OF PROMINENT WORK DONE WITH "PEERLESS"

BUILDING	LOCATION	CONTRACTOR	ARCHITECT
New Vendig Hotel	Philadelphia, Pa.	P. J. Durcan, Inc., New York	Esenwein & Johnson, Buffalo
Chamber of Commerce	Buffalo, N. Y.	Metz Bros. Co., Buffalo, N. Y.	Green & Wicks, Buffalo, N. Y.
The Electric Building	Buffalo, N. Y.	John Gill & Sons, Cleveland, Ohio	Esenwein & Johnson, Buffalo
65th Regiment Armory	Buffalo, N. Y.	Mosier & Summers, Buffalo, N. Y.	George J. Metzger, Buffalo, N. Y.
Emergency Hospital	Washington, D. C.	A. Bussard & Co., Washington, D. C.	N. C. Wyeth, Washington, D. C.
Columbian Hospital	Washington, D. C.	R. F. Barber, Washington, D. C.	N. C. Wyeth, Washington, D. C.
Steam Building	Springfield, Mass.	D. W. Mellen	Samuel L. Green
Albany Theater	Albany, N. Y.	P. J. Durcan, Inc., New York	Francis H. Kimball
New York State Normal School	Buffalo, N. Y.	Eastern Concrete Steel Co., Buffalo, N. Y.	State Architect, Albany, N. Y.
Masten Park High School	Buffalo, N. Y.	Metz Bros. Co., Buffalo, N. Y.	Esenwein & Johnson, Buffalo
Technical High School	Buffalo, N. Y.	Mosier & Summers, Buffalo, N. Y.	M. C. Miller, Buffalo, N. Y.
New York Telephone Building	Buffalo, N. Y.	Geo. C. Rossell, Rochester, N. Y.	McKenzie, Voorhees & Gmelin, New York, N. Y.
John B. Cary School	Richmond, Va.	Wise Granite Co.	Charles M. Robinson
Stuart Circle Hospital	Richmond, Va.	A. M. Walkuf	C. M. Robinson, Inc.

ROCK PLASTER MANUFACTURING COMPANY

FACTORY
150th Street and East River
NEW YORK, N. Y.

GENERAL OFFICES
381 Fourth Avenue
NEW YORK, N. Y.

GYPSUM QUARRIES
AMHERST POINT, CHEVERIE AND
WALTON, NOVA SCOTIA

Products.

"Rock" Wall Plaster—Sanded.
"Riverside" Plaster of Paris.
Superfine Finish.
Gauging Plaster.
"Rock" Plaster Board.
"Blue Seal" Neat Cement Plaster.
"Walton" Flexible Wood Fiber Plaster.
Portland Cement Sanded Dry Mortar.
"Bell" Plaster Block.
Hydrated Lime.

FACTORY OF THE ROCK PLASTER MANUFACTURING COMPANY, 150TH STREET AND EAST RIVER, NEW YORK, N. Y

Quality.

Every step in the process of the manufacture of our plastering materials is conducted in the most scientific manner and with the utmost care, with the result of a product of the highest standard of quality.

We claim for uniformity, ease in applying, and economy, our plastering materials have no equal.

Shipping Facilities.

We have unexcelled shipping facilities; by rail connection with the New York, New Haven & Hartford Railroad siding on our premises; by water for direct loading of any size vessels at our wharves, and prompt delivery by our steam lighterage service.

Our factory is also conveniently situated for hauling from the warehouse by horse or motor vehicle.

Catalogues.

Catalogues and detailed information, descriptive of our products, will be furnished on request.

References.

Our plastering materials have been used in most of the prominent office buildings, hotels, apartment houses, and residences in Greater New York and vicinity, and extensively throughout the Eastern States. A detailed list will be sent if desired.

SOUTHERN GYPSUM COMPANY, INC.

MANUFACTURERS OF

Gypsum Wall Plasters, Plaster Finishes and Plaster Boards

GENERAL OFFICE AND PLANT

NORTH HOLSTON, VA.

CHICAGO OFFICE, 1642 WEST LAKE STREET

Products.

TRADE-MARK

CEMENT (neat) WALL PLASTERS: "CHEROKEE," "KING'S MOUNTAIN," "BOONE," "WHITE TOP," "WATAUGA."

WOOD FIBER GYPSUM PLASTERS: "CHEROKEE," "KING'S MOUNTAIN," "BOONE," "WHITE TOP," "WATAUGA."

PLASTER FINISHES: "CARARA" (clear white), "PEARL GRAY," "NATURAL," "WHITE QUARTZ SAND FINISH."

PLASTER BOARD: "ECONOMY."

"CONCRETE SPECIAL" for Concrete Interior Walls and Ceilings.

Quality.

Our plasters are made of the purest gypsum rock, treated with the greatest care in grinding, calcining and mixing. Maximum strength, toughness, uniformity and covering capacity guaranteed.

Specifications for the Use of Wall Plasters.

Grounds—To be ¾ inch for Economy Plaster Boards, Wood Lath, Wire and Metal Lath; ½ inch for Gypsum Block, Brick and Tile.

Lathing, Economy Plaster Boards—To be spaced ¼ inch apart with edges at ends bearing not less than ¾ inch on studs; to be well nailed to studs with 1¼-inch wire nails with flat ⅜-inch heads, set 4 inches apart. Joints to be broken.

Lathing, Wood Lath—To be of good quality, free from knots, sap and bark; to be well nailed with 3d lathing nails at each stud; to be spaced ⅜ inch apart with not less than ⅛ inch space between ends, and joints broken every fifth lath.

Plaster—To be ..... brand manufactured by SOUTHERN GYPSUM CO., INC. Mixed and applied according to the manufacturer's directions. Plaster must not be stored on the bare ground or where it will get damp.

Sand—To be of good quality, clean, sharp and free from clay, soil, salt and alkali.

MORTARS, WALL PLASTER HAIR FIBERED, AND NOT FIBERED

On Economy Plaster Boards—To be one measure of plaster to two measures of clean, sharp sand.

On Wood Lath, Wire and Metal Lath—First coat to be one measure of plaster to one and three quarters measures of clean, sharp sand; second coat to be one measure of plaster to two measures of clean, sharp sand.

On Gypsum Blocks, Brick and Tile—Mortar to be one measure of plaster to two and one half measures of clean, sharp sand.

NOTE—For making extremely light, tough ceilings and walls, we recommend our Wood Fiber Plaster used neat, or without sand.

Wood Fiber Plaster may be used with equal parts of sand; but if it is intended to be mixed with sand, notice should be given at the time the order is sent, as otherwise it is retarded only sufficiently for use without sand.

GENERAL INSTRUCTIONS FOR MIXING MORTARS

All mortar to be mixed in clean, tight boxes; the plaster and sand first to be thoroughly mixed dry, then immediately to be thoroughly tempered with water enough to make good stiff mortar.

One gauging of mortar is not to be mixed with part of another gauging, and no mortar is to be used or worked after it has partly set.

NOTE—Letting plaster mixed with sand stand long before adding water and tempering tends to make mortar set quickly and work short.

Letting mortar stand a few minutes after it is tempered before using it tends to make mortar spread easier.

Mortar mixed and worked stiff will be harder and stronger when set than it will be if too much water is used.

A very little set plaster mixed in plaster mortar greatly hastens the set of the mortar.

If the mortar box is not kept clean and free from set and partly set mortar, or if water dirtied with plaster by washing tools in it is used for mixing mortar, the set of the mortar will be greatly hastened.

We recommend the use of two mortar boxes, so that tenders can thoroughly clean the box after each batch of mortar is mixed before putting in the sand and plaster for the next batch, and thoroughly mix the sand and plaster and temper the mortar, without delaying the plasterers.

DIRECTIONS FOR APPLYING

On Economy Plaster Boards—The plaster boards are not to be wet before mortar is applied to them. All spaces between plaster boards are to be filled with neat plaster mortar. The browning coat to be straightened ready for the finish coat with rod and darby, using no more water than is necessary, and must not be floated.

On Wood Lath—If lath are dry, they are to be thoroughly wet at least four hours before mortar is applied, so that they will not swell, warp nor buckle after the mortar is on them.

Three-Coat Work on Wood Lath—The first coat is to be applied with sufficient pressure to form good keys, leaving a light coat of mortar over the lath, with surface rough. The second coat is to be applied after the first coat has set hard and has about two thirds dried. The second coat is to be applied with strong pressure, filling up to grounds, and straightened ready for the finishing coat with rod and darby, using no more water than is necessary, and must not be floated.

Two-Coat Work on Wood Lath—The first coat is to be applied with sufficient pressure to form good keys; after the first coat sets, but before first coat dries, the second coat is to be applied, straightened with rod and darby, using no more water than is necessary, and troweled smooth. Must not be floated.

On Wire and Metal Lath—The first coat to be applied so as to fill the meshes and lightly cover the lath; the second coat to be applied when the first coat is set hard, but before the first coat is dry. To be straightened with rod and darby, using no more water than is necessary, and must not be floated.

On Gypsum Blocks—The blocks to be wet before the mortar is applied, to reduce suction. First coat, sufficient mortar to fill out to grounds to be applied with strong pressure, and straightened ready for the finish coat. May be floated, but not after mortar is partly set.

On Brick and Tile—Brick and tile to be wet before mortar is applied, to reduce suction. Crooked, uneven walls to be first straightened by filling the low places with mortar. After mortar used to straighten walls has set, sufficient mortar to fill out to grounds to be applied with strong pressure and straightened ready for the finish coat. Walls may be floated, but not after the mortar has partly set.

Specifications for the Use of "Concrete Special" on Concrete.

Casting Forms—Rough boards to be used. No dressed lumber. Oiled boards must not be used under any circumstances.

Condition of Concrete—Must not be smooth, but dry and free from dust, oils and efflorescence before base coat is applied.

Grounds—To be ½ inch on side walls; ⅜ inch on ceilings or sufficient thickness to bring to a true and even surface.

Continued on next page

MIXING

Water only to be used in the mix. No sand or solid matter of any sort. Use water-tight box 3½ feet by 7 feet; raised about 4 inches at one end. Box must be free from dirt and every vestige of old cement or plaster.

After the load of water has been put in the lower end of the box, dump in the upper end one mix of Concrete Special Plaster. Hoe plaster into the water and allow it to soak for at least 10 to 15 minutes. Then work up in the usual way, adding water as needed to bring to the proper consistency.

DIRECTIONS FOR APPLYING

Remove any efflorescence or frost with a wire brush, and if necessary wash also with a solution (1 to 5) of muriatic acid.

Side Walls—After removing dust, use rod and darby to bring to a true and even surface ready for the finish coat.

Ceilings—After removing dust, apply a scratch coat and immediately broom slightly. When it has had time to draw a little, follow up with a second coat and bring out under the darby to a true and even surface, leaving rough to receive the finish coat. Under no circumstances darby after the material begins to set.

Trowel Finish—As soon as it has set so as to develop sufficient suction, apply the finish in the customary way. Base coat must not be dry when this is done.

Float Finish—Apply as soon as base coat is thoroughly set. Use damp brush only and do not drench with water. Where a finish coat is not desired, the work may be left under the trowel for papering.

CAUTIONS—Mix no more than will be used in an hour. Never re-temper mortar after it has begun to set. Do not mix one gauging with another. Do not wash tools in water to be used for gauging. Keep all tools, vessels, etc., clean. Be sure temperature is above freezing. See that it is not exposed to hot blasts, but give plaster after it has set free circulation of air. Dry out damp rooms, if necessary; and work that shows soft white spots wet up with a clean brush and water until these spots set up and harden.

Specifications for Finishing Plaster.

Plaster for Finish Coat—To be ..... brand, manufactured by SOUTHERN GYPSUM CO., INC., mixed and applied according to the manufacturer's directions.

For Smooth White Finish—Use Carara, which is a complete finish plaster made out of the highest grades Plaster of Paris and Hydrated Lime in proper proportions and requiring only the addition of water.

Pearl Gray Finish—A complete finish requiring only the addition of water.

DIRECTIONS FOR MIXING

Mortar box and tools must be kept scrupulously clean. Use only clean water, free from alkali and impurities. Put material in raised end and water in lower end of mixing box. Hoe material with water, mixing thoroughly.

Work the material until there are no bubbles or lumps left in it. Always mix the material very thin and carry in buckets instead of in the hod.

Care of Mortar after it is on the Wall—In hot, dry, windy weather, walls and ceilings to be protected from wind, and, if necessary, to be sprinkled to prevent the mortar drying too much before it has set.

In freezing weather, mortar to be protected from frost until it has set hard.

When mortar has set, doors and windows in building to be opened so as to dry the walls quickly.

Economy Plaster Board.

For fireproof lathing, sheathing, etc., Economy Plaster Board is fireproof, a non-conductor of heat, a non-conductor of sound, and is sanitary.

Standard size of boards, 32 by 36 inches and 24 by 32 inches; $\frac{5}{16}$ inch thick.

Specifications for Putting on Economy Plaster Board.

Studs—Studs to be set 12 or 16 inch centers.

Placing—Boards to be spaced ¼ inch apart with edges bearing not less than ¾ inch on studs, with horizontal joints broken.

Directions for Lathing—Space boards not less than ¼ inch apart on all sides and nail directly to studding or furring with 1¼-inch wire nails with flat ⅜-inch heads, using at least 18 nails to each board. Break joints every other board horizontally on walls and at right angles with furring on ceilings.

To cut boards, score with knife or hatchet and break, or use saw.

One pound of 1¼-inch nails will fasten nine boards. Nails will be shipped with boards if desired.

Pointing—The spaces between boards to be filled with mortar. Do not wet boards before applying mortar.

Co-operative Service.

It will be a pleasure to have our representatives call on you at any time and our office force stands ready to discuss any subject that may be presented.

PARTIAL LIST OF PROMINENT BUILDINGS PLASTERED WITH SOUTHERN GYPSUM COMPANY PRODUCTS

Y. M. C. A. Building, Roanoke, Va.
Thurman & Boone Building, Roanoke, Va.
City Hall Building, Roanoke, Va.
Virginian Hotel, Lynchburg, Va.
Southern Railway Station, Lynchburg, Va.
Day and Night Bank Building, Charleston, W. Va.
High School Building, Bluefield, W. Va.
Municipal Building, Martinsville, Va.
Dr. King's Sanitarium, Radford, Va.
Eagles' Home, Front Royal, Va.
U. S. Post Office, Wytheville, Va.
City Hall, Huntington, W. Va.
Rockbridge Bank Building, Lexington, Va.
First National Bank Building, Durham, N. C.
Geer Building, Durham, N. C.
Wake County Court House, Raleigh, N. C.
Commercial National Bank Building, Charlotte, N. C.
Masonic Temple, Charlotte, N. C.
Wauchovia National Bank Building, Winston-Salem, N. C.
Grubb's Office Building, Salisbury, N. C.
U. S. Post Office Building, Winston-Salem, N. C.
Wilmington Hotel, Wilmington, N. C.
Y. M. C. A. Building, Spartanburg, S. C.
Y. M. C. A. Building, Columbia, S. C.
Gresham Hotel, Columbia, S. C.
Chick Springs Hotel, Chick Springs, S. C.
Clark County Court House, Athens, Ga.
Chronicle Building, Augusta, Ga.
City Hospital Building, Augusta, Ga.
Plaza Hotel, Augusta, Ga.
U. S. Post Office, Augusta, Ga.
Savannah Hotel, Savannah, Ga.
Fulton County Court House, Atlanta, Ga.
Georgian Terrace, Atlanta, Ga.
Howell Apartment, Atlanta, Ga.
Conley Building, Atlanta, Ga.
Y. M. C. A. Building, Atlanta, Ga.
Ellisonia Apartment, Macon Ga.
Rhodes Building, Jacksonville, Fla.
Y. M. C. A. Building, Birmingham, Ala.
West End High School, Birmingham, Ala.
Lyons Hotel, Decatur, Ala.
City Hall, Decatur, Ala.
U. S. Post Office, Gadsden, Ala.
Mobile High School, Mobile, Ala.
U. S. Post Office, Opelike, Ala.
East Tennessee State Normal, Johnson City, Tenn.
Hillside Cotton Mills, LaGrange, Ga.
Commerce and Labor Building, Washington, D. C.
Murphy's Hotel, Richmond, Va.
Rueger's Hotel, Richmond, Va.
Martin Building, Norfolk, Va.
Y. M. C. A. Building, Petersburg, Va.
Hamilton County Court House, Chattanooga, Tenn.
Baylor School, Chattanooga, Tenn.
High School, North Chattanooga, Tenn.
School Building, St. Elmo, Tenn.
Chickamauga School, Chickamauga, Ga.
Chattanooga Golf and Country Club Building, Chattanooga, Tenn.

UNITED STATES GYPSUM COMPANY

GENERAL OFFICES

Williams Building, Fifth Avenue and Monroe Street
CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 1170 Broadway
CLEVELAND, OHIO, Schofield Building
KANSAS CITY, MO., R. A. Long Building
CHICAGO, ILL., 205 West Monroe Street
MINNEAPOLIS, MINN., Lumber Exchange
SAN FRANCISCO, CAL.

MILLS AT ALL PRINCIPAL GYPSUM PRODUCING CENTERS, AFFORDING A NATIONAL DISTRIBUTION OF UNIFORM QUALITY PRODUCTS

Products.

Manufacturers of GYPSUM CEMENT PLASTERS, WOOD-FIBRED PLASTERS and PREPARED PLASTERS (mixed with sand by machine), in various trade brands as listed under paragraph "Brands";

"ADAMANT" WALL PLASTERS (Interior and Exterior), prepared for particular uses, as described on following page;

PREPARED NO-LIME TROWEL FINISHES: "ADAMANT" (White, Gray and Slate Colored), "IMPERIAL," "IVORY," "ROCK" and "UNIVERSAL" BRANDS;

PREPARED NO-LIME SAND FLOAT FINISHES: "ADAMANT" (White and Gray), "IMPERIAL," "IVORY," "ROCK" and "SILICO" BRANDS;

"U. S. G." CALCINED PLASTER, for Lime Putty Finishes;

"U. S. G." CAEN STONE CEMENT, a perfect substitute for Genuine French Caen Stone;

"U. S. G." BOND PLASTER, for Concrete Interior Walls and Ceilings;

"U. S. G." MOULDING and CASTING PLASTERS;

SACKETT PLASTER BOARD, a Fire-resisting Lathing Material;

JESTER-SACKETT HOLLOW and SOLID PARTITIONS and SUSPENDED CEILINGS;

SACKETT SOFFIT CEILINGS;

PYROBAR GYPSUM TILE, a Fireproof Material for Partitions, Furring, Elevator Enclosures, Steel Protection, etc.;

PYROBAR REINFORCED GYPSUM ROOF TILE;

PYROBAR FLOOR TILE for Reinforced Concrete Construction;

SIMPLEX FLOOR SCREED;

"ADAMANT" SLATE PAINT, for Composition Blackboards.

Co-operative Service.

This company is represented in all parts of the country, and will be glad to confer, directly or through its representatives, with architects, engineers, contractors, etc., on any phases of the use and application of its products. It recognizes the tremendous value, to all concerned, of a general diffusion of thoroughly practical knowledge of the distinctive qualities of the Gypsum Plasters, Sackett Plaster Board, Pyrobar Gypsum Tile, etc.; and inquiries for general information or co-operation in the study of any related constructive problem will receive the promptest attention.

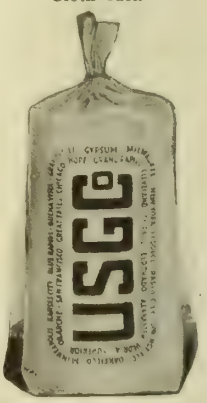
Quality.

United States Gypsum products are built on the sure foundation of pure raw materials, and perfected processes of manufacture. The company operates its own mines, conceded to be the finest gypsum properties existing. The "U. S. G." mills are the largest and most modernly equipped in the gypsum industry.

All products are rigidly inspected by experts at every stage of production, from the selection of the raw materials to the shipment of the finished goods. No guesswork, no carelessness, no weakness at any point. They must come up to the "U. S. G." measure of perfection, or they are promptly rejected at the mills.

TRADE-MARK

"U. S. G." STANDARD PLASTER PACKAGE
Cloth sack



"U. S. G." STANDARD PLASTER PACKAGE
Paper sack

"U. S. G." STANDARD "ADAMANT" PACKAGE
Cloth sack

U. S. Gypsum Hard Wall Plasters.

Briefly stated, the best hard wall plasters are made by calcining gypsum rock. This basic product, generally termed "plaster of paris," forms a plastic mass by the addition of water, and upon setting, or crystallizing, unites chemically with the same amount of water driven off during calcination; and, upon application to the wall, reverts to its original rock state.

U. S. Gypsum Plaster sets up uniformly hard and homogeneously within two to three hours after application; inside of thirty-six hours the walls are dry with no further possibility of dampness or sweating as with lime mortars. The building is immediately rendered habitable from a hygienic standpoint.

"U. S. G." Wall Plaster covers the interior walls of the building with a closely knit crystallized body—rock gypsum—that resists fire, and is many times greater in strength and durability than lime plaster.

Brands.

United States Gypsum Wall Plasters are furnished in three general types: U. S. Gypsum Cement Plaster (neat), U. S. Gypsum Wood Fibre Plaster, and U. S. Gypsum Prepared (sanded) Plaster.

Each type is marketed under different brands (as listed below), to meet trade demands. All brands of

Continued on next page

each particular type, except "Adamant," are of the same standard of quality.

One or more of these standard brands of "U. S. G." Plasters are sold in practically every city and town throughout the United States, insuring to the architect a national distribution of a uniform standard quality.

BRANDS

"Adamant"	"Eldorado"*	"Ivory"
"Alabaster"	"Flint"	"O. K."*
"Baker"	"Golden Seal"	"Pyramid"*
"Big Four"	"Granite"	"Rock"
"Buckhorn"	"Imperial"	"Zenith"

* Brands marked with a star (*) are Gypsite cement plasters—popularly known as "dark plasters."

"U. S. G." Cement Plaster (Neat).

Supplied in both hair fibred and unfibred; sand to be added at the job. Made for use where good sand is available at reasonable cost, and where purchaser prefers to sand his own mortar. See specifications on page 180.

"U. S. G." Wood Fibre Plaster.

Requires addition of water only to prepare for use. The sand is replaced by finely shredded wood fibre, uniformly distributed. Eliminates handling of sand and dangers of poor sand or oversanding.

Makes a dense, durable wall, almost one half the weight of a sanded mortar wall, and is superior in fire-resisting, insulating and sound-deadening qualities.

COVERING CAPACITIES PER 100 SQUARE YARDS
Material Mixed as per Specifications

Surface	Cement Plaster, Neat	Wood Fibre Plaster	Prepared Sanded Plaster
Wood Lath	9 to 12 (Sanded 2 to 1)	14 to 17 Unsanded	22 to 24
Metal Lath	15 to 18 (Sanded 2 to 1)	20 to 25 Unsanded	45 to 50
Sackett Plaster Board	8 to 9 (Sanded 2 to 1)	10 to 12 Unsanded	18 to 20
Brick and Clay Tile	14 to 17 (Sanded 3 to 1)	18 to 20 (Equal parts sand to be added)	30 to 34
Pyrobar Gypsum Tile	10 to 12 (Sanded 3 to 1)	14 to 16 (Equal parts sand to be added)	24 to 28

Its flexible nature renders it more capable of withstanding vibrations and other strains imposed upon the building. See specifications on page 181.

"U. S. G." Prepared Plaster.

Machine mixed—there is no guesswork about the proportioning of this ready-to-use plaster. Consists of gypsum cement, and clean, sharp silica sand, in proper proportions. Needing only water to fit it for application, it may be readily and quickly mixed inside the building, minimizing time and labor of application. No danger of poor sand, oversanding, streaks of sand or spots of unevenness in setting or in tensile strength on wall. See specifications on page 181.

"Adamant" Wall Plaster.

"Adamant" is the highest quality of wall plaster produced. Composed of gypsum and certain expensive ingredients, embodying in a prepared plaster unequalled fire-resisting, working and spreading qualities. Meets a demand in high-class building construction, where maximum wall strength, toughness, rigidity and wearing qualities are desired. For interior work, see specifications, "Prepared Plasters," on page 181.

TYPES OF INTERIOR "ADAMANT" WALL PLASTER

"Adamant No. 2 B," for base coat on brick or tile.

"Adamant No. 2," for base coat on wood lath or Sackett Plaster Board.

"Adamant No. 2 W," or "LF," for scratch coat on wire lath.

"Adamant No. 2 BW," for second coat on wire lath.

TYPES OF "ADAMANT" EXTERIOR WALL PLASTER (STUCCO)

"Adamant 2 C," is for first and second coat, for general purposes.

"Adamant 2 D," for special work.

These have been extensively used for over 20 years. Peculiarly fitted to withstand weather conditions.

Package: The above materials are sold by the barrel and shipped in cloth bags of 110 to 140 pounds each (2 bags to the barrel).

NOTE—To guard against imitations, specifications should always demand: "'Adamant' Wall Plaster, made by the UNITED STATES GYPSUM CO., to be mixed and applied strictly according to manufacturer's directions."

"U. S. G." Prepared No-Lime Gypsum Plaster Finishes.

These are made in three groups of finishes as tabulated. Group 1 of "Adamant" Finishes are of exceptional quality and hardness. They are preferable to Keene's cement, being easier to apply and more durable and economical. Group 2 Finishes, while not equal to the Group 1 standard of quality, are nevertheless very high-grade materials. Group 3 Finishes have been developed to supply the demand for a moderate cost, prepared finish, superior to and free from the imperfections of lime plaster finishes.

See specifications on page 181.

DATA "U. S. G." PREPARED NO-LIME GYPSUM PLASTER FINISHES

Finish	Description and Finish	Covering Capacity per Ton
	GROUP NO. 1	
IXXX	White, Trowel	350 to 400 yds.
No. 1	Gray, Trowel	350 to 400 yds.
No. 40	Slate, Trowel	350 to 400 yds.
IXX	White, Float	250 to 300 yds.
IX	Gray, Float	250 to 300 yds.
	GROUP NO. 2	
Imperial	White, Trowel	350 to 400 yds.
Ivory	White, Trowel	350 to 400 yds.
Rock	White, Trowel	350 to 400 yds.
Imperial	Light Gray, Sand Float	250 to 300 yds.
Ivory	Light Gray, Sand Float	250 to 300 yds.
Rock	Light Gray, Sand Float	250 to 300 yds.
	GROUP NO. 3	
Universal	Grayish White	350 to 400 yds
Silico	Grayish Float	250 to 300 yds

"U. S. G." Calcined Plasters for Lime Putty Finishes.

Made from carefully selected raw materials unusually well suited for this particular purpose. Uniformly ground to just the right fineness to insure easy mixing and working qualities. These finishes are to be gauged with lime putty in the usual manner.

Slow Set Brands—"Challenge," "N. Y. Finishing," "Golden Seal," "Star," "Quality Finish."

Quick Set Brands—"Michigan Perfection," "Champion," "Plaster of Paris," "Quality Calcined Plaster."

See specifications on page 182.

"U. S. G." Caen Stone Cement.

A perfect imitation of imported French Caen Stone. Ready for use by admixture of water only. Water- and acid-proof.

Shipped in full weight 100-lb. cloth sacks. Eight to ten sacks will cover 100 yards, average conditions.

"U. S. G." Bond Plaster.

The safest and best plaster made for direct application to interior concrete surfaces. Has superior adhesive and cohesive properties; is constant in volume during process of setting and hardening, and its bond with the concrete is not disturbed by the expulsion of surplus water during the process of crystallization. "U. S. G." Bond Plaster is dense, durable and fire-resisting; works well under tools, and needs water only to fit it for use.

Average covering capacity, 120 to 140 yards to the ton. Shipped in 100-lb. cloth sacks and 80-lb. paper bags. See specifications on page 182.

"U. S. G." Moulding and Casting Plasters.

Highest-grade moulding plaster made.

Very carefully manufactured from specially se-

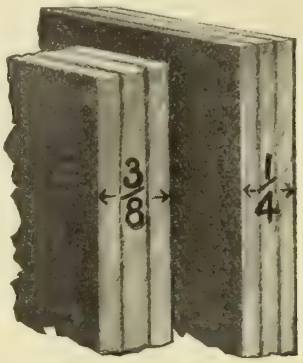
Continued on next page

lected gypsum rock, which accounts for the smooth working and uniform setting qualities which have made these plasters so popular.

Made in following brands: "U. S. G. Moulding" No. 1, "U. S. G. Moulding" No. 2, "Golden Seal Moulding," "New York City Mills," and "Terra Cotta Moulding."

"U. S. G. Moulding" No. 1 and No. 2 are exceptionally pure and fine grained.

Shipped in 100-lb. cloth sacks; 80-lb. paper bags and 250-lb. barrels.



CROSS-SECTION SHOWING FORMATION OF SACKETT PLASTER BOARD
Actual thickness

Sackett Plaster Board.

A fire-resisting lathing material, superior to wood or metal lath in the construction of plastered walls and ceilings. Composed of alternate layers of calcined gypsum and strong, fibrous felt, nailed direct to studs or joists and plastered over. See Specifications on page 182.

Sizes and Weights—Made in sheets 32 by 36 inches—8 square feet—in the following thicknesses:

¼ inch (named Standard Board)—Weighs 1½ pounds per square foot or 12 pounds per board or sheet.

⅜ inch (named Perfected Board)—Weighs 2 pounds per square foot or 16 pounds per board.

SACKETT NAIL
Actual Size

METHOD OF APPLYING SACKETT PLASTER BOARD
Plaster is applied to dry boards

WOOD LATH WALL
In case of fire this wood lath and the fire quickly destroys the building

SACKETT PROTECTED WALL
In case of fire Sackett will not burn—confines the fire and saves the building

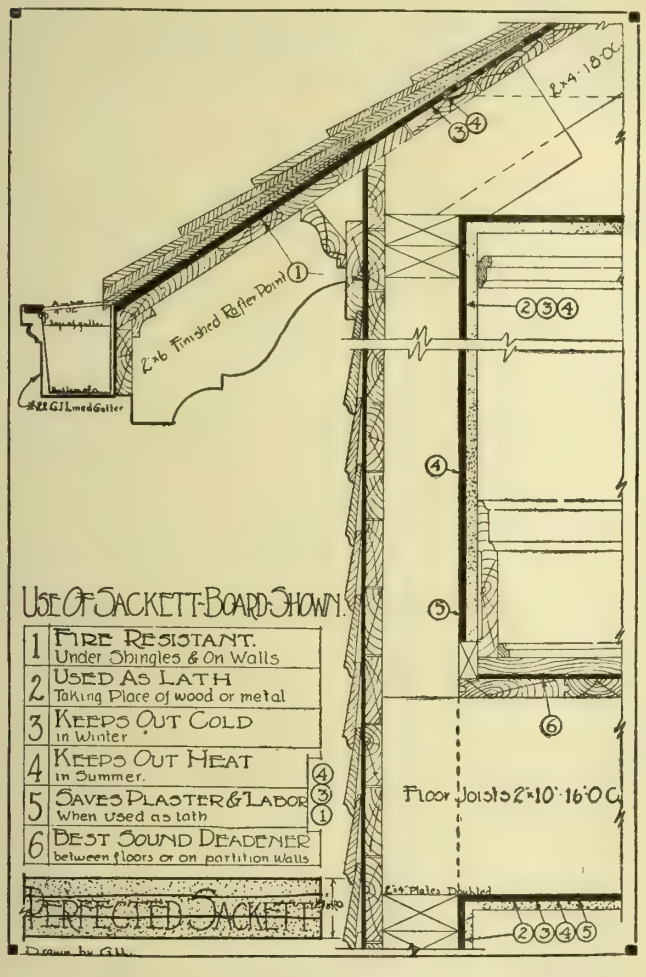
SECTIONAL VIEWS OF WOOD LATH AND SACKETT PROTECTED WALLS, SHOWING RELATIVE SAFETY AND EFFICIENCY

Note that instead of weak, flimsy, inflammable wood lathing that swells and cracks plaster, Sackett provides a solid continuous Gypsum sheet to which plaster adheres perfectly, and that positively does not swell, contract nor warp, thus eliminating the principal cause of plaster cracks. Sackett is also economical of plaster, defies decay, and exhaustive tests prove it over 3½ times more sound-proof than wood lath constructed walls

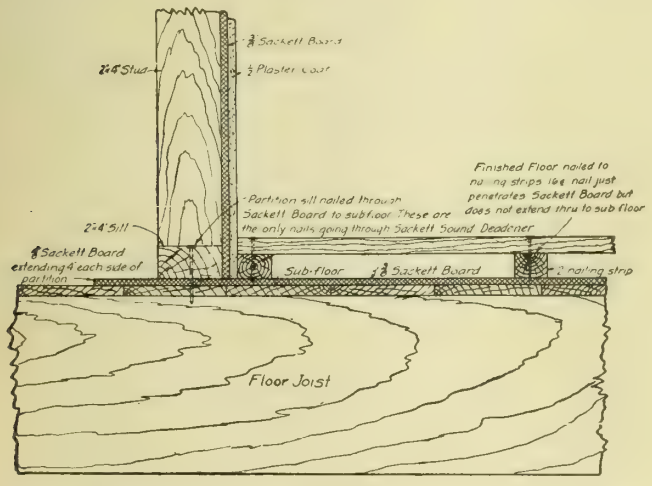
Continued on next page

½ inch—Weighs 2¼ pounds per square foot or 22 pounds per board. Made to meet requirements of certain building laws affecting some classes of construction.

Advantages—Combines lathing and fire-resisting construction in one inexpensive commodity. Non-conductor of heat and cold; sound-deadener. Easily and rapidly applied. Increases value of building, affording better rentals. Reduces fuel expense. No contraction nor expansion and no warping nor buckling under the plaster coat; avoids buckling lath, cracks, stains and other defects of wood lath construction.



DETAIL SHOWING APPLICATION OF SACKETT PLASTER BOARD TO WALL, CEILING, FLOOR AND ROOF CONSTRUCTION



DETAIL SHOWING METHOD OF SOUND-DEADENING FLOORS

Minimizes moisture in the building; keeps the moisture in plastering away from the woodwork; no warping of the framing or trim from the excessive water ordinarily used in plastering. Bond between the plaster and the dry board is perfect.

Can be easily cut, where necessary, to any desired size, by scoring with the point of a hatchet and breaking over a straight-edge; or may be quickly cut with an ordinary saw.

Other Uses of Sackett.

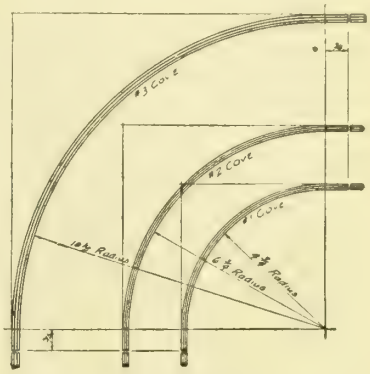
Instead of lumber for sheathing under weather boards to insulate against heat and cold, and as a fire-stop.

Over roof boards, in hot-air flues, dry-kilns, etc., as an insulator and fire-stop.

Between floors as a sound-deadener and fire-stop.

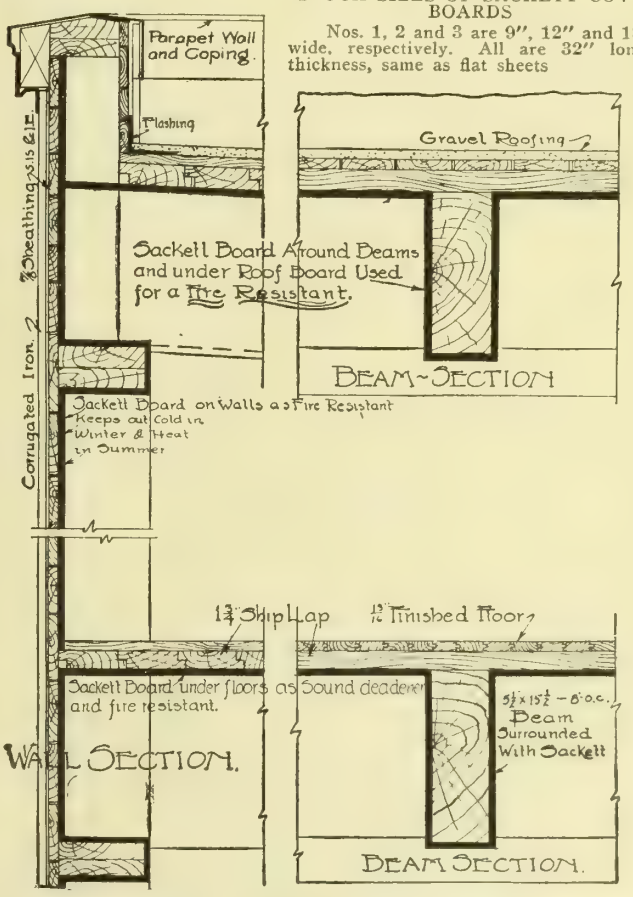
On exposed wooden surfaces in mill and warehouse construction as a fire-retardant.

Sackett is also ideal and is extensively used in connection with channel irons and steel studs for constructing incombustible partitions and suspended ceilings. See specifications on page 183; also description of Jester-Sackett Systems on following page.



STOCK SIZES OF SACKETT COVE BOARDS

Nos. 1, 2 and 3 are 9", 12" and 18" wide, respectively. All are 32" long; thickness, same as flat sheets



DETAIL SHOWING APPLICATION OF SACKETT PLASTER BOARD TO FRAME FACTORY BUILDING

Millions of square feet of Sackett Plaster Board are used for this purpose by railroads, cotton mills, warehouses, etc. Sackett does the work simply, quickly, effectively and economically

Continued on next page

Cost—Sackett-built walls cost less than metal lath and plaster walls, and in most markets little more than wood lath plastered walls. The cost is always in easy reach of every builder, large or small. Figures showing comparative cost will be promptly furnished on request to nearest office.

Supply and Distribution—Carried in stock by dealers in building materials. Mills have a capacity of over one million square feet per day, and being located at widely separated points, prompt and economical distribution is assured in all parts of the United States and Canada.

Jester-Sackett Systems.

The Jester-Sackett Systems are simple, economical and efficient methods for providing bases for plastering in three types of incombustible construction:

Solid partitions; hollow partitions; suspended ceilings. See specifications on page 183.

Each has many distinct advantages over the older systems of metal lath construction; cost less than ordinary channel iron and metal lath construction, because they use less channel iron; are more quickly erected; take less plaster, and the plaster is more quickly applied in fewer coats. They require no special tools, and can be erected speedily by any good mechanic.

There are other types of steel stud and Sackett Plaster Board Partition construction; for example, the Burson System of fabricated steel studs. These systems are adapted for the use of Sackett Plaster Board, and full information will be gladly furnished on request.

Solid Partitions.

The simplicity of this system enables the ordinary mechanic to erect partitions much more rapidly than metal lath partitions, by placing ordinary ¾-inch Sharon or hot-rolled channel iron 24¾ inches on centers and locking in between them solid sheets of Sackett Plaster Board 24 by 36 inches. Sackett is held securely to the channels by steel clips. Both sides of this solid surface are plastered with gypsum plaster to thickness required.

This partition, being built up almost entirely of gypsum, provides fire-resistance and protection equal to that of any form of 2-inch solid metal lath and plaster partition, and at less cost.

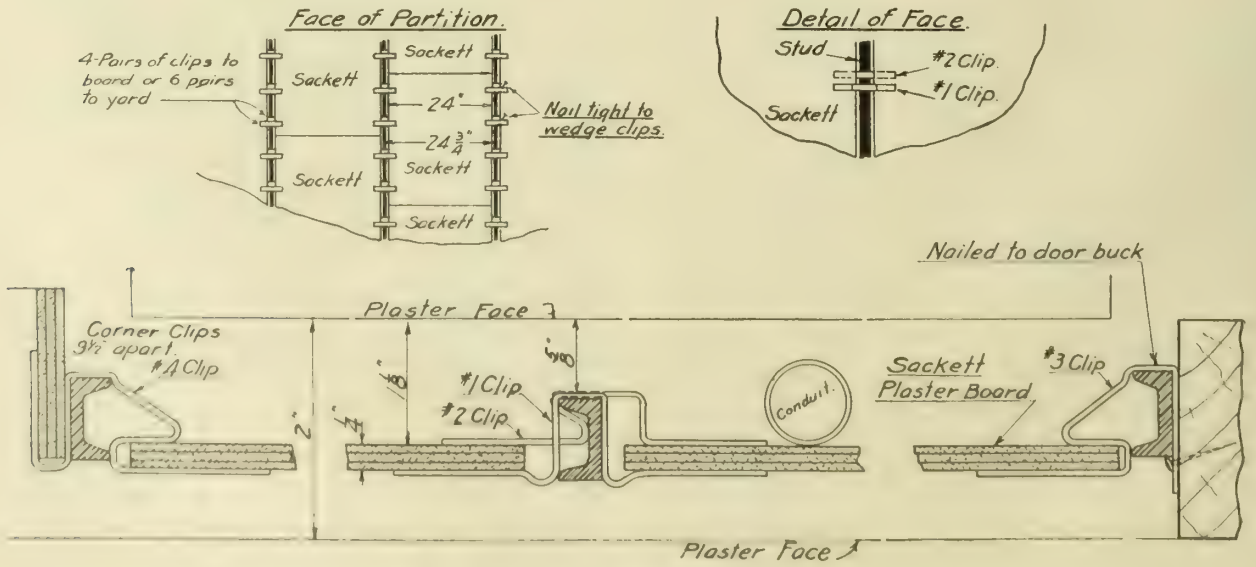
JESTER-SACKETT SOLID PARTITION IN COURSE OF CONSTRUCTION

Hollow Partitions.

When it is desired to construct a light weight partition with greater sound-deadening qualities than belong to a solid lath and plaster partition, or a hollow partition to enclose pipes, etc., the Jester-Sackett Hollow Partition has the same proven points of advantage over hollow metal lath partitions that the Jester-Sackett Solid Partition has over solid metal lath partitions.

When plastered on both sides with ½-inch coat of gypsum plaster, the thinnest type occupies only 2½ inches of floor space, and the hollow interior can be used for concealing electrical conduits, pipes, etc.

The plaster board covers the channel completely, and the only metal exposed to the plaster is the rust-proof clip. It also has the additional advantage over metal lath partitions in that the parts exposed to the air on the inside of the partition are not subject to rust, as is the case when metal lath is used as the plaster base. Only one style clip used throughout.



JESTER-SACKETT 2-INCH SOLID PARTITION
Sackett Board, Size 24 x 36 Inches
Studs as shown, 24¾ Inch Centers

Continued on next page

Speedily Erected—Standard or cold-rolled ¾-inch channels are spaced 16 inches on centers, and ⅜-inch Sackett Plaster Board 32 inches long and 18 inches high is held securely on each side by the Jester clips.

Comparative Cost—The cost of this double partition is less than the cost of a metal lath solid partition, and slightly more than that of the Jester-Sackett solid partitions.

Partition requires only a total thickness of 1 inch of plaster on the two sides against 1½ inches with the Jester-Sackett solid partition. Is considerably cheaper than a hollow partition erected of metal lath and plaster.

Sackett Plaster Board is attached to the door bucks by regular Jester metal clips set vertically in the double partition.

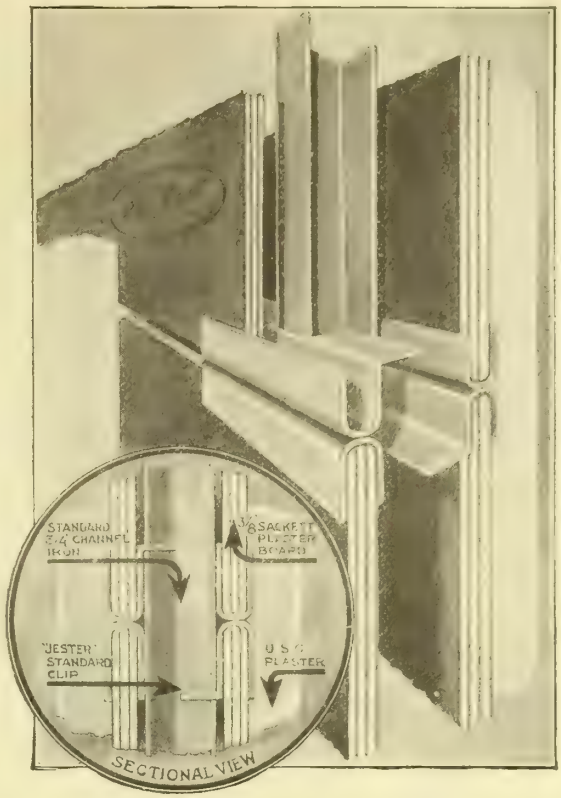
Attaching Grounds, Trim, Etc.—In both types of Jester-Sackett partitions, ½-inch grounds are necessary under all wood baseboards, chair rails and picture moulds, which are attached by wiring to the steel studs. Where grounds are required on opposite sides of partitions they may be attached at the same time by wiring them together. Care should be used in filling in between grounds and the Sackett Plaster Board when applying plaster. Wood door bucks are used, and should be of same width as finished thickness of partition.

These details are similar to those used with metal lath.

Jester-Sackett hollow partitions can also be constructed in the following thickness finished plaster dimensions—Plastering ½ inch thick each side.

Finished Thickness	Hollow Space between Boards	Size Channels used
2½ Inches	¾ Inches	¾ Inches
3 "	1 "	1 "
3½ "	1½ "	1½ "
4 "	2 "	2 "
5 "	3 "	2 ¾ "
6 "	4 "	2—¾ "

JESTER-SACKETT HOLLOW PARTITION READY FOR PLASTER



JESTER-SACKETT HOLLOW PARTITION

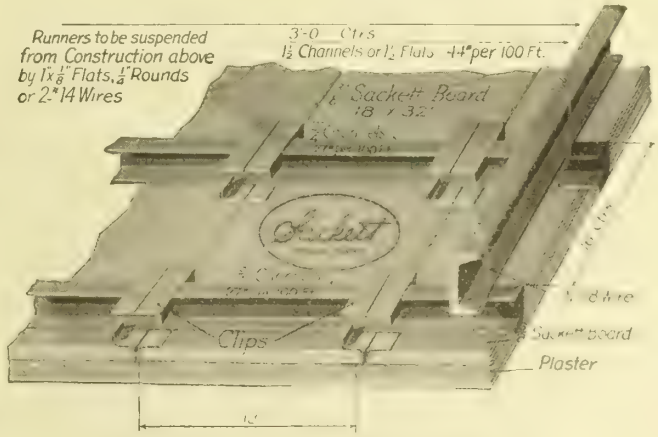
Suspended Ceilings.

The Jester-Sackett Suspended Ceiling is a great step in advance over the very expensive metal lath suspended ceiling as used when wired to channel irons.

This ceiling is similar to the Jester-Sackett partition set in a horizontal position: ¾-inch channel irons, suspended by suitable ties from the structure above, 16 inches on centers, on which ⅜-inch Sackett Plaster Board is clipped by means of rustproof Jester clips, forming a perfect, uniform plastering base, which is very economical in plaster and most satisfactory in every respect.

For intricate furred cornices or special parts where desired, metal lath may be used in connection with Sackett Plaster Board. Sackett, however, should be used for the flat area.

Architects are often handicapped by the high cost of suspended metal lath ceilings, and would many times prefer to furr down ceilings to disguise pipes and in corridors where girders extend below ceilings, but are prevented on account of excessive cost. This system reduces the cost approximately twenty per cent.



JESTER-SACKETT SUSPENDED CEILING

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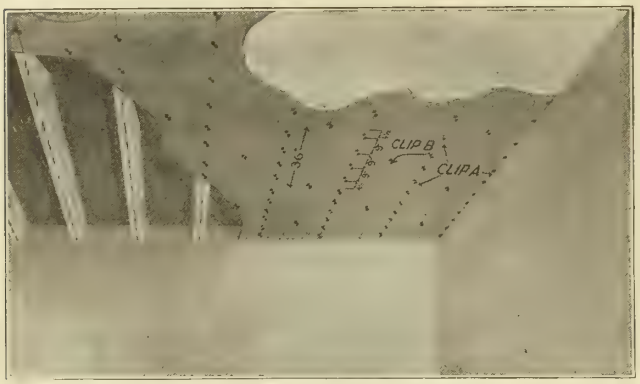

SHOWING APPLICATION OF SACKETT SOFFIT CEILING ON REINFORCED CONCRETE CONSTRUCTION

Note how flanges of steel clips, imbedded in concrete joists, are bent each way holding Sackett Board in place, and partial application of plaster

Sackett Soffit Ceilings.

Sackett Plaster Board possesses distinct advantages over metal lath for flat ceilings with reinforced concrete construction. Sackett Plaster Board can be used where wood or metal forms, permanent or removable, are employed in reinforced concrete T-beam or ribbed floor construction.

By means of an inexpensive, easily installed metal clip which becomes imbedded in the concrete, Sackett Plaster Board is quickly and securely placed in position on the concrete joists to form the ceiling. This clip also provides a chair or spacer for the reinforcing steel.

Lower Cost: Quickly Erected—While the cost of Sackett Plaster Board, including installation and clips, is approximately the same as the cost of metal lath with tie wires and pencil rods, there is an important saving of time and plaster amounting to at least ten to fifteen cents a square yard in plastering a rigid Sackett ceiling as compared with flexible metal lath ceilings.

A metal lath ceiling must first have a scratch coat of plaster applied to provide a sufficiently rigid base for plastering. This scratch coat must be given time to set hard before browning coat can be put on. The irregularities, convex and concave surfaces of metal lath, make it necessary to use more plaster to finish to the specified thickness of grounds, meaning more material and time.

Sackett Plaster Board presents a rigid and uniform plastering surface without any preliminary work, and the plaster is more easily spread, there being a perfect adhesion of plaster to the Sackett Board.

The difficulty and time required in applying metal lath on ceilings are two decided objections to its use. Sackett Board comes in convenient units, easily handled; and all that is necessary to attach them is to turn down the small clips. There are no small wires or pencil rods to be put in place.

Reduces Sound—Partitions are usually wedged under metal lath ceiling construction, and on account of the continuous metal ceiling, sound vibrations are conducted over the partitions from one room to another. Sackett Plaster Board, however, is a non-conductor of sound; and partitions wedged under a Sackett Board ceiling will form an effectual barrier to sound transmission. In addition, there is the sound-deadening feature which Sackett provides in reducing overhead noises from the floor above.

No Rust Stains—The only metal exposed in this system of ceiling construction is that of the flanges of the clip, which is itself protected by a rustproof coating. There are no pencil rods, small wires or metal lath to rust out and stain the plaster and impair the security of the job.

Fire-Resistive—Sackett Plaster Board is positively fire-resisting, being principally composed of gypsum, the most effective barrier against fire. The alternate layers of wool felt and gypsum are an exclusive patented feature of the construction of Sackett Board, and increase its effectiveness and strength.

Sizes—Sackett soffit sheets are 36 inches long and come in widths of 16, 24 and 30 inches, according to joist centers. Board, ⅜-inch thick, is used for the 16-inch joist centers and ½-inch thick board for the 30-inch joist centers.

Estimates—Our Fireproofing Department will be glad to submit estimates, including material and labor, clips and Sackett Board in place, ready for plaster.

See specifications on page 183.

Simplex Floor Screed.

Simplex Floor Screed is composed of wood nailing strips, wrapped with jute cloth imbedded in fibred gypsum.

Standard size, two by three inches by six feet long. Special lengths to order. Weight, two pounds per lineal foot.

Simplex Floor Screed are laid directly upon the concrete or tile floor on beds of mortar. They can be laid in this manner to line and level and will not warp or buckle after they are laid in place.

Simplex Floor Screed are fireproof and will not rot or decay.

When laid in conjunction with 1½-inch Pyrobar Gypsum Tile, bedded on sand and joints filled with gypsum mortar, they will form a sound-deadening medium. This system of floor fill will save three or four weeks time in construction, as the floors can be laid forty-eight hours after Simplex Screed and Pyrobar Gypsum Tile are in place; no waiting is necessary for fill to dry out.

Simplex Floor Screed can be used with cinder concrete fill or without fill. Simplex Floor Screed and Pyrobar Gypsum Tile fill will reduce dead load on all floors over wood nailing strips and cinder concrete fill.

Disadvantages of Wood Nailing Strips.

Wood sleepers or nailing strips are not fireproof. They are not bedded to the concrete or tile floors; are blocked up with wood shims and wedges, and the cinder concrete fill is necessary to hold them in place. Wood nailing strips buckle out of line and level after wet cinder concrete is in place, and it is necessary to dress them down to level before maple floor can be laid.

On account of the cinder concrete necessary to hold wood nailing strips in place, building operations are held up from three to four weeks before maple floor can be laid, waiting for cinder concrete fill to dry out, in order to avoid warping the floor.

Wood nailing strips will dry rot in four to five years, leaving all floors loose.

See specifications on page 183.

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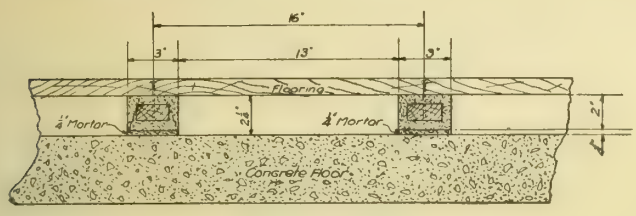
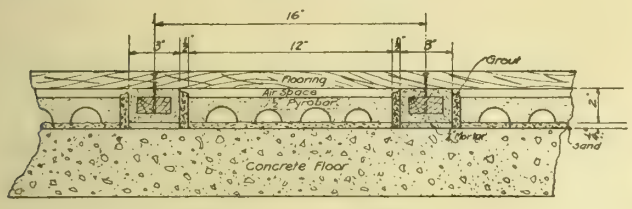


FLOOR SCREED



FLOOR SCREED WITH PYROBAR GYPSUM TILE

Pyrobar Gypsum Tile.

This very light, tough, Underwriter-approved, fireproofing tile is made of the highest-grade calcined gypsum, combined with a small percentage of wood fibre. Contains no sand, lime, cinders or other fillers which are cheaper but would reduce the fireproofing qualities of the tile.

Used most successfully for fireproof partitions, steel protection, wall furring, stair and elevator enclosures, warehouse partitions, pipe chases, heating and vent ducts, roof covering, etc.

When laid up in and plastered with "U. S. G." plaster, as specified, Pyrobar forms a solid, inseparable mass, light, strong, fireproof, vermin-proof and sound-deadening.

See specifications on page 183.

Features and Advantages.

Fire-Resistance—Pyrobar safely withstood, in the Underwriters' tests, a temperature of 2,200 degrees Fahr. for four hours. In contact with fire, less than five per cent of the heat is transmitted through the tile. No spalling, and no disintegration in any other way to a point where it ceases to be a fire-stop during progress of the fire. Owing to its remarkable features of calcination, the heat transmitted through the tile never exceeds 212 degrees Fahr. Because of this fact, established by laboratory tests and practice, Pyrobar gypsum tile means definite and dependable fireproofing.

Stainproof—The coloring matter in clay tile frequently works through the plaster and ruins expensive decorations. Pyrobar is made from pure white gypsum that cannot produce stains, or otherwise mar decorations.

Soundproof—Due to the nature of gypsum and the peculiar dead-air cellular structure of the tile, Pyrobar is the most effective non-conductor of sound available. Exhaustive tests prove that over sixty per cent less sound is transmitted through a plastered Pyrobar gypsum tile partition than through a plastered clay tile partition of same thickness.

Distinctive Economy—Pyrobar tile are large units —2½ times the usual size of clay tile—are light and easily and quickly handled. Every Pyrobar tile is straight and true, absolutely plumb; every tile is a casting of uniform thickness, presenting an even plastering surface. Requires thirty-three per cent less plaster to finish than clay tile. Partitions require not over one half inch of plaster on a side to finish.

Pyrobar partitions are easily removed and rearranged as desired. Can be sawed, pipe or conduit chases cut, and can be nailed into without cracking or splitting. Doors and windows cut with minimum annoyance and refuse.

Reduction in Dead Load—Pyrobar partitions are about forty per cent lighter than hollow clay tile, affording an opportunity for lighter steel members and consequent saving in cost.

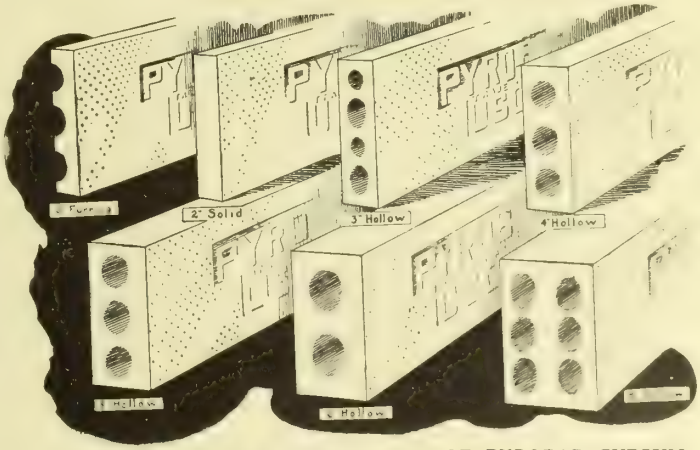
Sizes.

Pyrobar gypsum tile is regularly made in thicknesses from 1½ to 12 inches (hollow or solid), with face dimensions 12 by 30 inches. Sizes kept in stock are indicated in table below.

HOLLOW PYROBAR GYPSUM TILE

SIZES AND WEIGHTS OF PYROBAR GYPSUM TILE

Size	Ceiling Height	Weight Tile, per sq. ft., Lbs.	Weight Mortar, per sq. ft., Lbs.	Weight Plaster, One Side, per sq. ft., Lbs.	Total Weight Plastered One Side, per sq. ft., Lbs.	Weight Plaster, Two Sides, per sq. ft., Lbs.	Total Weight Plastered Two Sides per sq. ft., Lbs.
1½-in. Split 1½"x12"x30"	Furring	4.9	1	3	7.9	6	10.9
2-in. Split 2"x12"x30"	Furring	6.4	1	3	9.4	6	12.4
2-in. Solid 2"x12"x30"	10 feet	9.4	1	3	12.4	6	15.4
3-in. Hollow 3"x12"x30"	13 feet	9.9	1.2	3	12.09	6	15.9
3-in. Solid 3"x12"x30"	15 feet	12.4	1.2	3	15.4	6	18.4
4-in. Hollow 4"x12"x30"	17 feet	13.0	1.63	3	16.00	6	19.0
5-in. Hollow 5"x12"x30"	25 feet	15.6	2.04	3	18.60	6	21.6
6-in. Hollow 6"x12"x30"	28 feet	16.6	2.45	3	19.60	6	22.6
8-in. Hollow 8"x12"x30"	40 feet	22.4	3.26	3	25.40	6	28.4



VARIOUS THICKNESSES AND FORMS OF PYROBAR GYPSUM TILE

Continued on next page

Special Pyrobar gypsum tiles made to order in any size, thickness or shape required.

Cost.

Its extreme lightness and large true units secure economy in freight, and of labor in handling, erecting and plastering, and of material in laying up and plastering.

When cost of finished work (including plastering) is considered, Pyrobar Gypsum Tile will compete with clay tile or other materials used for fireproofing, and often show a lower cost in the finished wall.

Supply, Distribution and Service.

Supply is ample to take care of any trade conditions.

Mills are located at widely separated points, enabling us to make prompt and economical deliveries to all markets.

Prices f.o.b. cars at any distributing point given on request to our nearest office.

Special Note to Architects—Bids on Pyrobar Gypsum Tile, erected in place, ready for plastering, may be had by sending plans to Gypsum Fireproofing Co. in care of any of our sales offices.

Pyrobar Gypsum Tile Roofing System.

Pyrobar Reinforced Gypsum Tile Roofing System meets the essential requirements of modern roof deck construction:

Fire-resistive	Light weight
Non-condensing	Rapidly erected
Non-corroding	Low in cost

Pyrobar roof decks consist of Pyrobar reinforced roof tile laid on T-iron purlins. The spaces between the tile above the flange of the T-irons are filled with stucco grout, bonding the tile together and forming a homogeneous deck that has an even surface to which any style composition roofing, baked clay, slate or rolled tile can be cemented or directly nailed.

Pyrobar roof decks are equally adaptable for flat or steep roofs, and have been installed on all types of buildings—manufacturing plants, cold storage warehouses, residences, apartment, school, church and theater buildings. In each case their practicability has been demonstrated under all conditions. Comparison on an efficiency basis with clay book tile or concrete tile, concrete shingle or poured cement slab roofs, allows the informed architect or engineer no alternative.

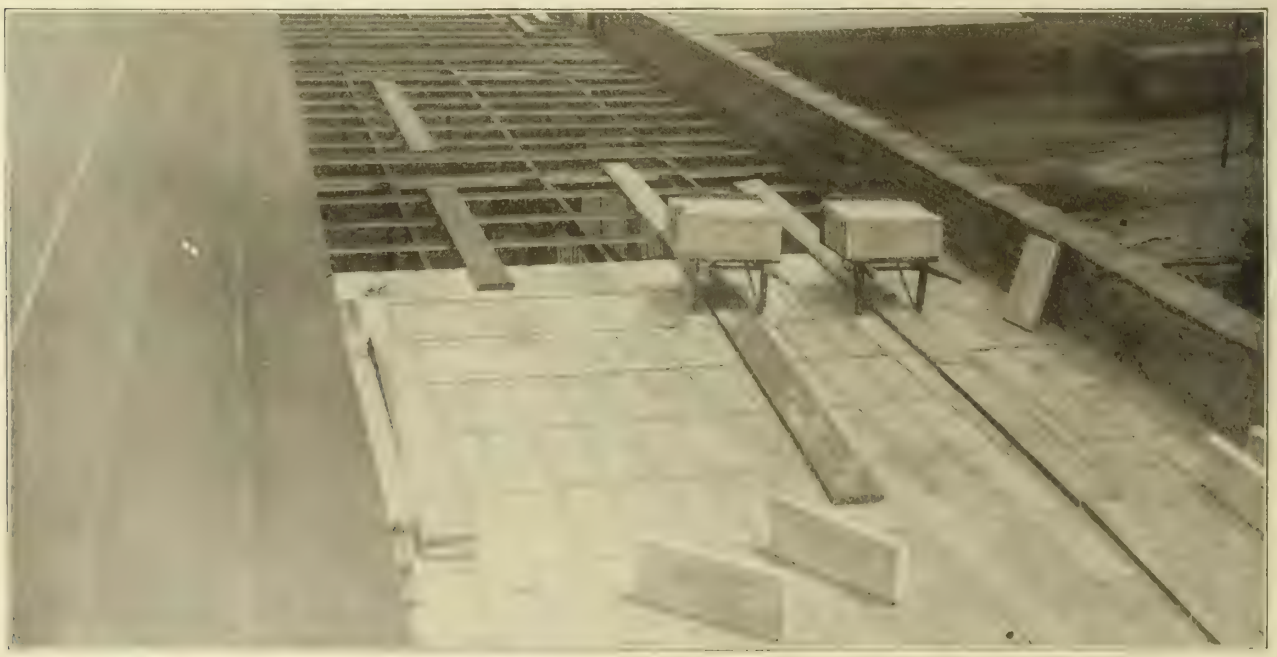
The low coefficient of conductivity of gypsum makes possible a non-condensing roof deck with Pyrobar gypsum roof tile. However cold the weather may be, the lower inside face of Pyrobar roof tile remains the same temperature as the interior of the building; therefore, no condensation of warm, moist air is possible.

The elimination of "sweating" and dripping is desirable on every type of structure, and an absolute necessity for many manufacturing plants, or where a constant humidity must be maintained, as, for example, in the cementing of rubber goods and in textile mills. Pyrobar roof decks solve this perplexing condensation problem.

Because of their low conductivity, Pyrobar roof decks simplify the heating problem on all buildings with large roof areas, and effect a decided saving in fuel, insuring a comfortable interior temperature in winter, and making a noticeably cooler building in summer. This has been found of value, particularly in foundry buildings and similar plants where excessive temperatures prevail.

So far as cost is concerned, Pyrobar gypsum tile roof decks have an important advantage over clay book tile or concrete roofs. They are light in weight, which means considerable saving in steel; erection is quick; no scaffolding or expensive forms are required, and tile can be laid under any weather conditions.

Our Engineering Department is prepared to furnish any information desired on roof deck construction. Estimates will be submitted taken from your plans for Pyrobar roof decks installed all in place, ready for roof covering. See specifications on page 184.

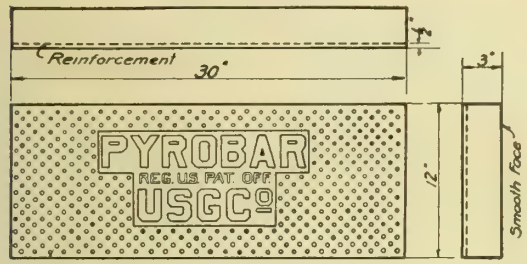


PYROBAR ROOF TILE DECK ON CEMENTING PLANT OF GOODYEAR TIRE AND RUBBER COMPANY, AKRON, OHIO
Note portion of Roof covered with Asphalt Composition Roofing

Continued on next page

DATA SHEET

PLATE No. 1



REINFORCED PYROBAR ROOF TILE.

DATA REQUIRED FOR DESIGNING REINFORCED PYROBAR GYPSUM TILE ROOFS

Size of tile 3"x12"x30" Weight of tile 13 lbs per sq ft (solid tile)
Forty tile will cover one square (100 sq ft) of roof
Standard spacing of tee iron purlins, 2'-6½" ctrs. Size 2½"x2½"x4.2# tee.
Maximum spacing of main purlins 5'-0" for std tee iron purlin
Safe load on tile, 100# per sq ft uniformly distributed
Special details furnished on application

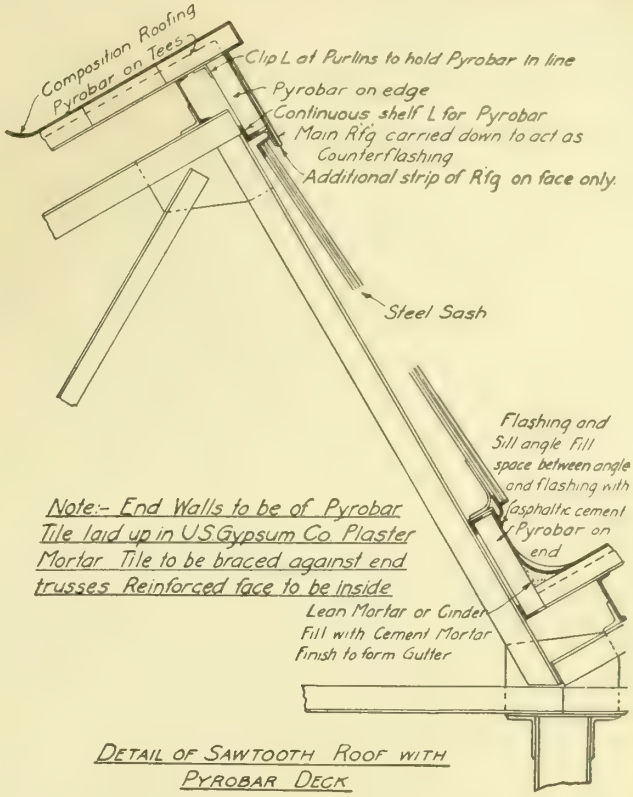
SIZES OF CHANNEL PURLINS FOR PYROBAR TILE ROOFS.

TOTAL LOAD 50 LBS. PER SQ. FT INCLUDING WEIGHT OF ROOF.

Purlins C to C in Feet	Distance Center to Center of Trusses in Feet							
	10	12	14	16	18	20	22	24
2'-6"	4"-5¼"	4"-5¼"	5"-6½"	6"-8"	6"-8"	7"-9¾"	7"-9¾"	8"-11¼"
3'-0"	4"-5¼"	5"-6½"	5"-6½"	6"-8"	7"-9¾"	7"-9¾"	8"-11¼"	9"-13¼"
3'-6"	4"-5¼"	5"-6½"	6"-8"	6"-8"	7"-9¾"	8"-11¼"	8"-11¼"	9"-13¼"
4'-0"	4"-5¼"	5"-6½"	6"-8"	7"-9¾"	7"-9¾"	8"-11¼"	9"-13¼"	10"-15"
4'-6"	5"-6½"	5"-6½"	6"-8"	7"-9¾"	8"-11¼"	9"-13¼"	9"-13¼"	10"-15"
5'-0"	5"-6½"	6"-8"	7"-9¾"	7"-9¾"	8-11¼"	9"-13¼"	10"-15"	12"-20½"
5'-6"	5"-6½"	6"-8"	7"-9¾"	8"-11¼"	9"-13¼"	10"-15"	12"-20½"	12"-20½"
6'-0"	5"-6½"	6"-8"	7"-9¾"	8"-11¼"	9"-13¼"	10"-15"	12"-20½"	12"-20½"
6'-6"	6"-8"	7"-9¾"	7"-9¾"	8"-11¼"	9"-13¼"	10"-15"	12"-20½"	12"-20½"
7'-0"	6"-8"	7"-9¾"	8"-11¼"	9"-13¼"	10"-15"	10"-15"	12"-20½"	12"-20½"
7'-6"	6"-8"	7"-9¾"	8"-11¼"	9"-13¼"	10"-15"	10"-20"	12"-20½"	12"-20½"
8'-0"	6"-8"	7"-9¾"	8"-11¼"	9"-13¼"	10"-15"	10"-20"	12"-20½"	12"-25"

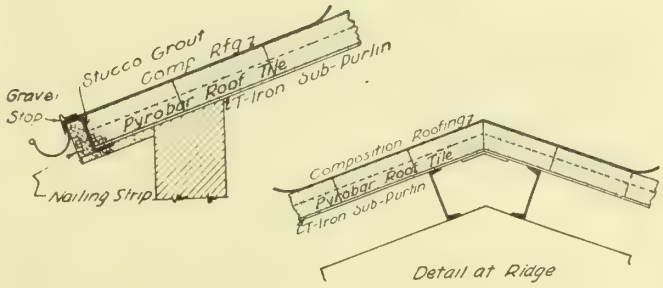
SPANS FOR WHICH VARIOUS T IRONS SPACED 30" INCH CENTERS WILL CARRY A TOTAL LOAD OF 50 LBS. PER SQUARE FOOT.

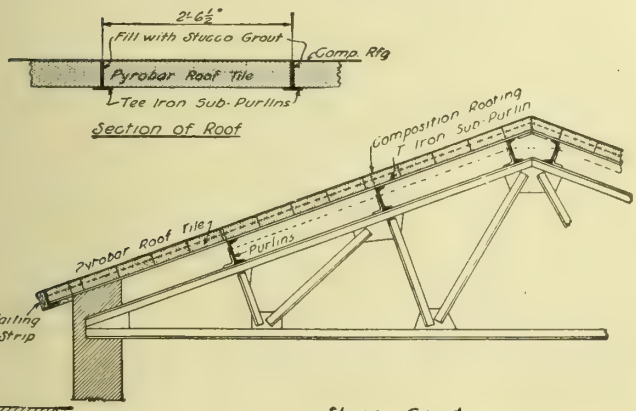
SPAN.	SIZE T IRON.
Up to 5'-3"	2¼" x 2¼" x 4.2#
5'-3" to 5'-10½"	2¼" x 2¼" x 5#
5'-10½" to 6'-5½"	2½" x 2½" x 5.6#
6'-5½" to 8'-0"	3" x 3" x 6.8#

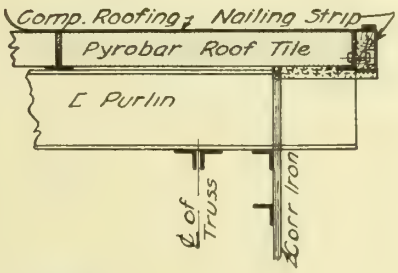


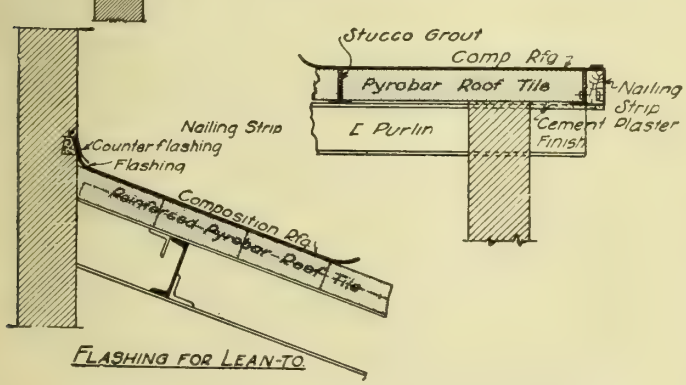
Note:- End Walls to be of Pyrobar Tile laid up in U.S.Gypsum Co. Plaster Mortar. Tile to be braced against end trusses. Reinforced face to be inside

DETAIL OF SAWTOOTH ROOF WITH PYROBAR DECK

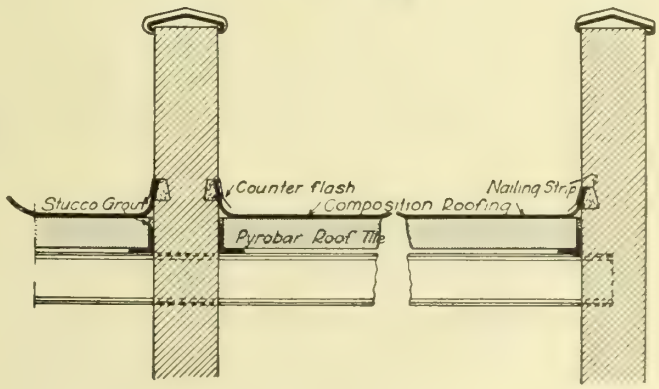








FLASHING FOR LEAN-TO



DETAILS SHOWING METHOD OF INSTALLING PYROBAR ROOF

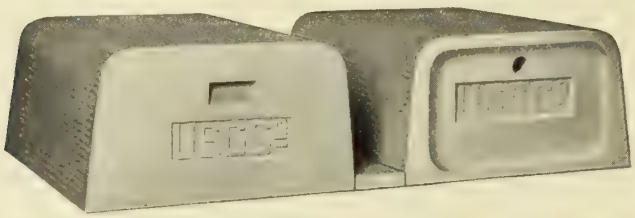
Continued on next page

Pyrobar Floor Tile.

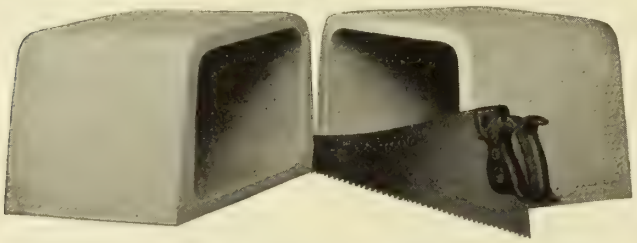
Pyrobar Floor Tile are used with reinforced concrete floor construction; made of gypsum and cast in moulds. The tile are, therefore, uniform in size and shape, and each fits snugly against the other, end to end, minimizing loss in concrete. The end pieces are cast integral with the tile. This not only strengthens them, but insures against the loss in concrete in the event of displacement of tile during construction. No concrete can run inside the tile. None is wasted.

Pyrobar floor tile with spacers between provide a smooth solid gypsum plastering base. As compared with metal dome construction with metal lath ceilings, Pyrobar floor tile afford a distinct saving in plastering cost, requiring one coat less of plaster.

The strength of these tile is such that they will withstand far rougher usage than either clay tile or metal domes. They are easily sawed to fit any requirement of construction.

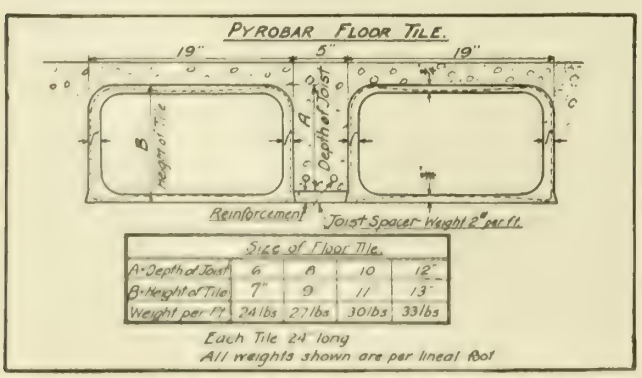


PYROBAR GYPSUM FLOOR TILE, WITH SPACER BETWEEN



SAWED SECTION OF PYROBAR GYPSUM FLOOR TILE

Concrete quantities required are the same as for metal domes 24 inches on centers, except that metal domes during construction bend down considerably, owing to walking and wheeling concrete over them, with the result that more concrete than the figured amount is required. Pyrobar tile are absolutely rigid, strong and stiff, and the amount of concrete used is exactly as required. Pyrobar floor tile per square foot are about one half the weight of clay tile per square foot, spaced 16 inches on centers, thus reducing dead load. Considering the loss of concrete which occurs in metal domes, dead load of Pyrobar tile construction is not in excess of metal dome construction; so that the tonnage of reinforcing steel is about the same.



Size of Floor Tile.				
A-Depth of Joist	6	8	10	12"
B-Height of Tile	7"	9	11	13"
Weight per ft.	24 lbs	27 lbs	30 lbs	33 lbs

Each Tile 24" long
All weights shown are per lineal foot

PYROBAR FLOOR TILE, WITH TABLE OF SIZES

"U. S. G." Plaster Specifications.

The following general directions apply to all brands of "U. S. G." Cement, Wood Fibre and Prepared Plasters:

Use a clean, tight mixing box, about 3½ by 7 feet, raised about four inches at one end. If an old mixing box is used be sure it is free from dirt and lumps of old cement or plaster.

Use only clean water, free from alkali and impurities; keep tools clean.

Do not mix more material than can be handily used in about one hour.

Do not mix one gauging with another, and never re-temper plaster after it has commenced to set. Clean the mixing box after each gauging.

Keep plaster in a dry place; never store it on the bare ground.

Specifications for "U. S. G" Cement Plasters.

Grounds—To be not less than ¾ inch for Standard Sackett Plaster Board (applied according to manufacturers' specifications); ¾ inch for wood lath; ¾ inch for wire or expanded metal lath; ½ inch for Pyrobar Gypsum Tile; ⅝ inch for brick or tile.

Lathing—Preferably to be Standard (¼ inch) Sackett Plaster Board. If wood lath is specified, it should be a good grade of wood lath, free from knots, sap and bark; to be spaced ¼ inch apart and well nailed, with not less than two 3d lathing nails for each stud to each lath, driven well home. Half green lath are best, as dry lath will buckle unless thoroughly wet before plastering. Lath must have ¼ inch space between ends.

Mortar—To be any brand of United States Gypsum Company's Cement Plaster, and to be mixed and applied according to directions of the manufacturer.

Directions for Mixing

Raise box four inches on one end. First put in a layer of sand, then one of plaster. Hoe dry from one end of the mixing box to the other, then back again, working sand and plaster thoroughly together. When thoroughly mixed, the dry material should be put in the one end of the box. Then put water in the other end of the box and hoe the plaster into the water, mixing thoroughly. Mix thin with water first, then add sufficient dry plaster and sand in proper proportions to bring it to the proper consistency for application.

Do not mix sand and plaster until ready to add the water, as the material will work short if the sand and plaster are allowed to stand awhile before adding the water.

Use only dry, clean, sharp sand, free from loam and dirt. Screen through a six-mesh screen. Avoid quicksand.

The proportions specified in all cases to be by weight.

The following is a convenient way to arrive at the correct proportion:

Two to One—Use six ten-quart buckets, struck measure, of sand, to a one-hundred pound bag of plaster, and five ten-quart buckets of sand, struck measure, to an eighty-pound bag of plaster.

Three to One—Use nine ten-quart buckets of sand, struck measure, to a one-hundred pound bag of plaster, and seven ten-quart buckets of sand, struck measure, to an eighty-pound bag of plaster.

For Sackett Plaster Board, Wood, Wire and Expanded Metal Lath—Mix two parts by weight of clean, sharp, dry sand with one part of plaster.

For Brick, Pyrobar Gypsum Tile, Clay Tile and Second or Browning Coat—Mix three parts by weight of clean, sharp, dry sand with one part of plaster.

General Directions for Applying

On Sackett Plaster Board—Same as for Wood Lath, but do not wet board. Three-coat work recommended.

On Wire or Expanded Metal Lath—Apply a scratch coat, lightly covering the lath and filling meshes. After the scratch coat has set firm and hard, but before it is dry, apply the second coat, bringing it to a straight and even surface with rod and darby, ready to receive the finishing coat. Darby lightly and use water sparingly.

On Wood Lath—If lath are dry, soak thoroughly the day before or several hours before applying the plaster, so that they

Continued on next page

will absorb all the water they can hold. This will prevent buckling of the lath and avoid their absorbing the water from the plaster, which would prevent it from setting properly.

Lay plaster on lightly, but with sufficient pressure to obtain a good key, and fill up grounds as you go along.

Darby lightly, so as not to force the mortar through the spaces between the lath, and use water sparingly.

Do not apply more at one time than can be darbied before material begins to set.

On Brick, Pyrobar Gypsum Tile, or Clay Tile Walls—First soak the walls thoroughly to reduce the suction. Apply sufficient material to fill out grounds. Bring to a straight and even surface with rod and darby, ready to receive the finishing coat. Darby lightly and use water sparingly.

Specifications for "U. S. G." Wood Fibre Plasters.

Grounds—Same as specified for Gypsum Cement Plasters.

Lathing—Same as specified for Gypsum Cement Plasters.

Mortar—To be any brand of the United States Gypsum Company's Wood Fibre Plaster, and to be mixed and applied according to directions of manufacturer.

Only water is to be added to this material to fit it for application, and under no circumstances will the contractor be allowed to mix in sand or other solid material.

NOTE—We also manufacture Wood Fibre Plaster under a formula allowing the use of equal amount of sand by weight, but recommend the use of the neat material, as the addition of sand destroys some of the distinctive properties of "U. S. G." Wood Fibre Plaster; namely, elasticity, toughness and light weight.

DIRECTIONS FOR MIXING

These are prepared dry mortars and require the addition of water only in mixing for use. Raise one end of the mixing box four inches. Place your plaster at one end and the water at the other end of your box. Mix thin with water first, then add sufficient dry material to bring it to the right consistency for application. In all cases keep your mortar box and tools clean and use clean water.

Mix two to four bags at a time—not more than can be put on and straightened in one and one-half hours.

Let the mortar soak ten minutes after being mixed—it makes the material work easier in mixing and applying. To get all the good results of wood fibre plaster it should be used neat as shipped from our mills.

APPLYING

Wood Lath—Apply first a thin coat of mortar, following up at once before it sets with sufficient material to fill out the grounds. When the wood fibre is to be troweled down smooth for a finish, the wood fibre should be used neat. When a float or troweled finish is desired, the surface of base coat must be broomed—left rough—to receive the finish. Broom before the plaster begins to set, otherwise you will kill the surface.

For Sackett Plaster Board—Apply the mortar the same as on wood lath.

For Wire and Metal Lath—Apply the mortar a little stiff, scratch a thin coat on the lath, just enough to cover the metal, and after this coat is set hard, apply a second coat mixed same as for brick, to straighten up the walls. Wood fibre is a most desirable material to use on metal lath. The second coat should be left rough or broomed to receive the finish.

For Pyrobar Gypsum Tile, Brick or Clay Tile—Mix equal parts plaster and clean, sharp sand and apply in usual manner. Material must be retarded for use with sand.

Specifications for "U. S. G." Prepared Wall Plasters.

Grounds—Same as specified for Cement Plasters.

Lathing—Same as specified for Cement Plasters.

Mortar—To be any brand of the United States Gypsum Company's Prepared Wall Plaster, and to be mixed and applied according to directions of the manufacturer.

DIRECTIONS FOR MIXING AND APPLYING

Nothing to be added to this material but water; and under no circumstances will the contractor be allowed to mix in sand or other solid material.

Put plaster in one end and water in the other end of box. Hoe plaster into water, mixing thoroughly. Mix thin at first, as this makes mixing easier and prevents the material from getting lumpy. Add a sufficient amount of dry material and work to proper consistency for application.

Apply same as specified for cement plaster.

Specifications for "U. S. G." Prepared Trowel Finishes.

Trowel Finish—To be "Adamant," "Imperial," "Ivory," "Rock," or "Universal" Trowel Finish, and to be mixed and applied according to directions of the manufacturer.

These finishes require nothing but water to be added to fit them for application, and under no circumstances will the contractor be allowed to mix in other material.

DIRECTIONS FOR MIXING

Use a small mixing box, size about 2 feet 6 inches by 4 feet 6 inches by 10 inches deep.

Mixing box, mortar board and tools must be kept perfectly clean.

Raise box four inches at one end.

Use only clean water free from alkali and impurities.

Put material in raised end of mixing box and water in lower end. Hoe the material into the water (using approximately one part of water to two parts of material measured by volume). Allow the material to soak and draw in the water, without hoeing for at least ten minutes. Then, after all the material has soaked and shows no further signs of air bubbles, mix thoroughly and with particular care break down the mix to a smooth, even, creamy consistency.

Bring the mix finally to a very thin consistency.

The mixture is too thin to carry in a hod; use a bucket.

GENERAL DIRECTIONS FOR APPLYING

Base coat must be about half dry before finish is applied. If suction is too great, sprinkle lightly with clean water with a clean brush.

Apply in three coats. The first time over put on enough material to cover the surface completely, using material as thin as possible, and grind it thoroughly into the base coat. Allow this to draw a few moments, to avoid blistering.

The second time overlay the material on perfectly level, and the third time make the material as thin as can be handled on the hawk and fill in cat-faces and imperfections. After it has drawn a few moments, trowel to smooth surface, applying water with a damp brush. Do not drench with water, as it will kill the face of the material.

Work top and bottom of the wall at the same time, to avoid joinings.

CAUTION—Never apply a finish coat on a base coat which contains frost, and keep from freezing for twenty-four hours after it is applied.

In hot, dry weather, close all openings while plastering to prevent drying out of the material before it has set. Should this happen, however, and the work show soft, white spots, it can be remedied by sprinkling with clean water with a clean brush until the material sets up and hardens.

After the plastering is set, open the windows and permit the wall to dry out as quickly as possible.

Specifications for "U. S. G." Prepared Sand Float Finishes.

Sand Float Finish—To be "Adamant," "Imperial," "Ivory," "Rock," or "Silico" Sand Float Finish, and to be mixed and applied according to directions of the manufacturer.

These finishes require nothing but water to be added to fit them for application, and under no circumstances will the contractor be allowed to mix in sand or other solid material.

Directions for Mixing—Same as indicated for Prepared Trowel Finishes, above.

GENERAL DIRECTIONS FOR APPLYING

To obtain best results Float Finish should be applied after base coat has set firm and hard, but while still green and within twelve (12) hours after base coat is applied.

Lay on with trowel and then use cork, carpet or felt float (cork float is best), working material to a true and even surface, free from float marks and cat-faces.

Use as little water as possible while floating, so as to avoid killing the surface. Use damp brush only.

Do not attempt to float after the material begins to or has set.

CAUTION—Same as for Trowel Finishes, above.

Continued on next page

Specifications for "U. S. G." Calcined Plaster.

Trowel Finish—Mix two parts of United States Gypsum Company's Calcined Plaster to three parts best grade hydrated lime. Lime putty must stand twenty-four (24) hours before mixing in the plaster. Mix thoroughly together and apply in customary manner.

Float Finish—Use one part United States Gypsum Company's Unfibred Gypsum Cement Plaster to one part clean, sharp sand. Screen sand through No. 12 screen. Mix thoroughly and apply in usual manner.

Specifications for "U. S. G." Bond Plaster.

Rough boards should be used for concrete casting forms. Use no dressed lumber. Oiled boards must not be used under any circumstances.

CAUTION—The concrete surface must be dry; must not be smooth, and must be free from dust, oils and efflorescence before base coat of plaster is applied.

If oil or grease is present on any of the concrete surfaces, it must be burnt off with a gasoline blow torch; the surface so treated should be washed with a diluted solution of muriatic acid.

Grounds—To be ½ inch on side walls; ⅜ inch on ceilings, or sufficient thickness to bring to a true and even surface.

Mortar—To be "U. S. G." Bond Plaster, manufactured by the UNITED STATES GYPSUM COMPANY, and to be mixed and applied according to the following directions:

INSTRUCTIONS FOR MIXING

Water only is needed to fit this material for application to the work. Under no circumstances will the contractor be allowed to add sand or other foreign material to the mix.

Mix in water-tight box, about 3½ x 7 feet, raised about four inches at one end. If an old box is used, it must be free from dirt and lumps of old cement or plaster.

First put water in lower end of box, then into upper end of box throw the amount of Bond Plaster that you have decided to use for one mixing. Now hoe plaster into the water and allow it to soak for at least ten or fifteen minutes.

This period of soaking is necessary owing to the peculiar composition of "U. S. G." Bond Plaster. If not allowed to soak at this stage, the resultant mixture will prove *"poor"* and will not work satisfactorily.

After this period of soaking has elapsed, work up the mixture in the usual manner, adding sufficient water as you go along, to bring it to the proper consistency.

DIRECTIONS FOR APPLYING

To secure the best results in applying "U. S. G." Bond Plaster to concrete surfaces it is important that the following directions be absolutely complied with:

If there is any sign of efflorescence on the concrete surface, thoroughly remove the frost with a wire brush, then wash the concrete surface with a diluted solution (1 to 5) of muriatic acid. Then wash off well with clean water to remove acid.

Side Walls—First brush to remove any dust from the surface. Apply "U. S. G." Bond as you would any hard plaster, using rod and darby, bringing to a true and even surface to receive the finish coat.

Ceilings—First wash the concrete with a solution of one part of commercial muriatic acid to four parts of water. Then wash off well with clean water to remove acid.

To remove any dust from the surface use a stiff brush. Then apply a scratch coat and immediately broom slightly. As soon as it has had enough time to draw a little, follow up with a second coat bringing out under the darby to a true and even surface, leaving rough to receive the finish coat. Do not attempt to darby after the material has commenced to set or you will kill the face of the surface.

SPECIAL NOTE—Do not mix more material than you expect to use in about one hour. Do not re-temper mortar after it has started to set.

Clean box after each gauging, and do not mix one gauging with another.

Use clean water only, and keep your tools clean. Do not wash tools in barrel containing gauging water.

Keep temperature above freezing in winter. Keep out hot blasts of wind in summer, but as soon as plaster has set allow free circulation of air. If plastering is done during damp or rainy season, use artificial or other means for drying out rooms after plaster has set. Should the work, however, show soft white spots after drying, wet up with a clean brush and water until these spots set up and harden.

Standard Specifications for Sackett Built Walls.

(Sackett Plaster Board with ½ inch United States Gypsum Company's Wall Plaster.)

NOTE—The general conditions which cover this part of the work are contained in articles 1 to .... inclusive, and must be adhered to in every particular by this contractor.

Article 1. Lath—Shall be ¼-inch Sackett Plaster Board made by UNITED STATES GYPSUM COMPANY, Chicago. Size of sheets 32 x 36 inches.

NOTE TO ARCHITECT—⅜-inch Sackett may be specified if preferred.

Article 2. Nails—Sackett Lathing shall be applied with Sackett nails, 1¼ inches long, 11½ gauge, $^{7}/_{16}$ inch flat head (see illustration on page 172), obtainable from UNITED STATES GYPSUM COMPANY or Supply Dealers handling Sackett Lathing.

Article 3. Lathing—Cover all walls, ceilings and partitions throughout the entire building, except as otherwise specified, with Sackett Plaster Board.

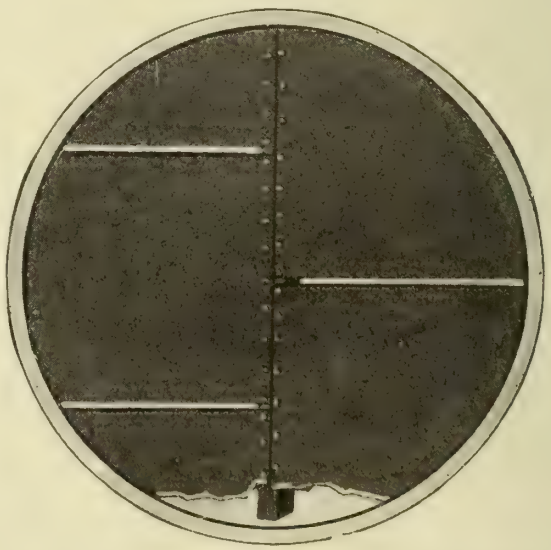
NOTE TO ARCHITECT—Best results on ceilings requiring leveling are obtained by furring with ⅞- by 2-inch furring strips set on 8- or 12-inch centers.

Article 4. Grounds—Shall be ¾ inch (¼ inch Sackett; ½ inch plaster).

NOTE TO ARCHITECT—If ⅜-inch Sackett Lathing is specified, grounds should be ⅞ inch.

Article 5. Application of Sackett Lathing—Lay all Sackett sheets in parallel courses *following the direction of studding, furring or joists.* Break joints at right angles to studding on walls (horizontally) and at right angles to joists or furring on ceilings.

NOTE—The continuous joint always runs with the studding or joist. Across the studding or joists the joints are broken. Start each alternate course with half sheet (32 x 18 inches). The last sheet of Sackett of each course shall be cut to exactly fit space.



SACKETT METHOD OF SPACING AND BREAKING JOINTS

Article 6. Breaking Joints—Break joints between walls and ceilings so that a vertical joint on the wall will not meet a ceiling joint. (See illustration on page 172.)

Article 7. Breaking Joints on Opposite Sides of Partitions—Perpendicular joints on opposite sides of partitions must not be on same stud, but instead the stud that comes at *center* of Sackett on one side of partitions must be at *edge* of Sackett on opposite side.

Article 8. Spacing—The Sackett sheets must be spaced ¼ inch apart at all horizontal or other joints which do not come on studs. At all vertical or other joints coming on studs or joists the sheets may be butted tight or come as will, but joints must not exceed ¼ inch.

(Article 9 continued)

Continued on next page

Specifications for Jester-Sackett Solid Partitions.

All partitions shown on plans, except as otherwise noted, to be Jester-Sackett 2-inch solid partition, constructed of ¼-inch Sackett Plaster Board clipped to ¾-inch Sharon or hot rolled channel iron studs. The flanges of the studs should not exceed ⅜ inch. Channel studs to be spaced 24¾ inches on centers and fastened in a suitable manner to floors and ceilings.

Sackett Plaster Board, 24 by 36 inches in size, to be placed between the channels and clipped to same with Jester clips, spaced 9 inches on centers, starting 4½ inches from floor or ceiling.

Carpenter contractor to place grounds for plastering, picture mould, base and chair rail where required, and set all bucks. Bucks to be made from 2- by 2-inch pine and properly braced and set.

Plastering—Sackett Plaster Board must not be wet before applying plaster. (On solid partitions first apply brown coat on channel side of partition, taking care to fill in behind grounds, then apply brown coat on other side to grounds or thickness to receive finish coat.) Plaster out to grounds, making all angles and corners flush and straight, ready to receive trim. Allow plaster on one side of partition to set before plastering other side.

Plaster—To be United States Gypsum Company's gypsum wood fibre, cement or prepared plaster, mixed and applied according to directions of the manufacturer.

Portland cement plaster can be used by first applying a scratch coat of gypsum plaster to the Sackett Board.

Finish—To be United States Gypsum Company's prepared trowel finish or sand float finish, mixed and applied according to directions of the manufacturer.

Specifications for Jester-Sackett Hollow Partitions.

Jester-Sackett 2½-inch partitions are to be constructed with ¾-inch channels spaced with 16 inches on centers, fastened to floors and ceilings, the same as in metal lath partitions. On each side of the channels place Sackett Plaster Board 18 by 32 inches in size and ⅜ inch thick, clipped to each channel with Jester ¾-inch clips, breaking all perpendicular joints between floor and ceilings; partition to finish 2½ inches in thickness, requiring ½ inch of gypsum plaster on a side.

Carpenter contractor to place grounds for plastering, picture mould, base and chair rail where required, and set all bucks. Bucks to be made from 2-inch pine, width of finished wall and properly braced and set.

Plastering—Same as for solid partitions.

Specifications for Jester-Sackett Suspended Ceilings.

All ceilings where indicated to be suspended, shall be formed of Sackett Plaster Board with the Jester ceiling clips. Boards to be ⅜-inch Sackett, 18 by 32 inches in size, attached by means of Jester clips to ¾-inch standard or Sharon channels, spaced 16 inches on centers. These ¾-inch channels to be attached by means of No. 16 tie wire to 1½-inch channels spaced 3 feet apart, which latter are to be suspended from the construction above by 1- by ⅛-inch flat iron straps or ¼-inch round rods or 2 No. 14 galvanized wires, not to exceed 4 feet on centers, bent around them and wired securely.

Hangers are to be provided by this contractor, but will be set in concrete by the mason contractor.

Plastering—Same as for solid partitions.

Specifications for Sackett Soffit Ceilings.

Reinforced Concrete Contractor—This contractor will install special combination reinforcing steel chairs and Sackett ceiling clips 9 inches on centers in all joists; same to be furnished by plastering contractor.

Plastering Contractor—This contractor will supply required special Sackett ceiling clips to be installed 9 inches on centers in concrete joists, and install Sackett Plaster Board on all ceilings unless otherwise specified, plastering same to a full ½ inch with "U. S. G." cement (or wood fibre) plaster.

Specifications for Simplex Floor Screed.

After all pipes and conduits are in place and building is ready for wood finish floor, place Simplex floor screed at 16-inch centers on beds of mortar, floor seats level, to be 2¼ inches above fireproof floor.

The mortar to be composed of one part "U. S. G." cement plaster and one and one-half parts of sharp, clean sand.

Fill all spaces between floor screed with 1½-inch split Pyrobar gypsum tile laid loose upon bed of sand ¼ inch thick.

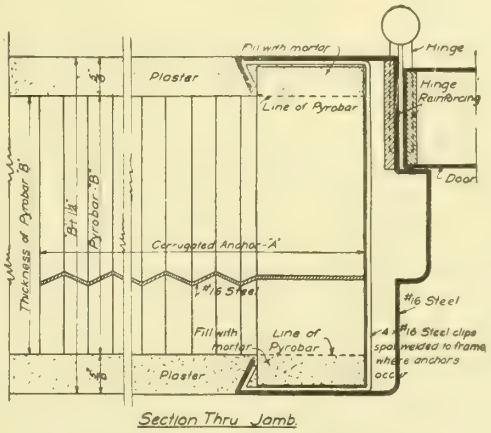
Fill all spaces between Pyrobar tile and Simplex floor screed with U. S. Gypsum mortar, composed of one part gypsum cement plaster and two parts clean, sharp sand. Have mortar thin so as to pour from spouted can.

When cinder concrete is used, lay planks upon floor screed and wheel in concrete, filling up within ¼ inch of floor seats.

Specifications for Pyrobar Gypsum Tile.

Partitions—Unless otherwise specified or shown, all partitions shall be built of United States Gypsum Company's Pyrobar Gypsum Tile, of thickness indicated on plans. All partitions shall be started on the fireproof floor, and the tile shall be set plumb, leaving both faces of partitions straight and true. All partitions shall be wedged at ceiling and slushed in with mortar.

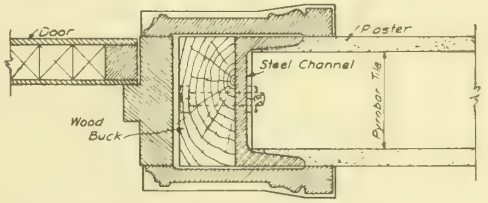
Furring—All outside walls, where shown on plans, shall be furred with Pyrobar Gypsum Tile, of thickness and type indicated on plans, laid up against the wall, and where 2-inch solid or hollow furring tile is used, the same shall be securely spiked to the wall every square yard with 10d steel cut nails.



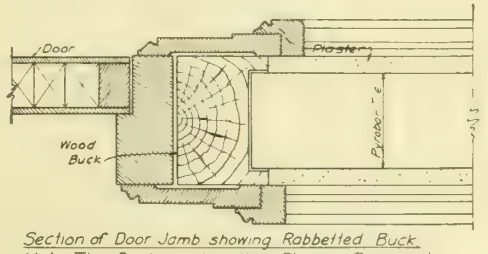
Section Thru Jamb

Table of Anchor Sizes for Various Size Walls

'B' Thicknesses of Pyrobar Tile—	2"	3"	4"	5"	6"
'A' Lengths of Corrugated Anchors—	9"	8"	7"	6"	5"



Section of Door Jamb showing Wood Buck Reinforced with Steel Channel



Section of Door Jamb showing Rabbetted Buck
Note - This Buck may be either Plain or Rabbetted

DETAILS OF JAMB CONSTRUCTIONS
PYROBAR GYPSUM TILE

Column Protection—All exposed interior columns shall be covered with Pyrobar Gypsum Tile, of thickness indicated on plans, and shall be securely bonded and wrapped as often as necessary with No. 12 galvanized wire.

Shafts, Openings and Ducts—Construct all pipe chases, dumb-waiter shafts, heating and vent ducts, etc., where shown on plans, with 2-inch solid Pyrobar Gypsum Tile.

Mortar and Laying—All Pyrobar Gypsum Tile shall be laid up in mortar composed of any brand of United States Gypsum Company's Cement Plaster—one part of plaster to three parts of clean, sharp, dry sand, thoroughly mixed. No mortar shall be re-tempered. All tile shall be laid with full flush joints to a line, with horizontal beds uniformly level on each course.

Continued on next page

Fill all joints, chinks and crevices between the tile and other work, which shall be well slushed in.

Lintels—Unless otherwise specified or shown, the Pyrobar Gypsum Tile over all openings shall be made self-supporting by laying in the form of jack arches. Skew backs shall be cut in all jamb tile, and the tile over the opening shall be cut in the form of voussoirs symmetrically over the opening, with a key in the center.

Frames—The carpenter contractor shall set the rough bucks for openings ahead of the contractor for this work, so as to cause no delay. These bucks shall be left plumb and true by the carpenter, and shall be made of 2-inch lumber of the same width as the thickness of the partition, and there shall be ⅝-inch by 2¾-inch grounds nailed to the bucks forming a rabbet to receive the Pyrobar Gypsum Tile. Anchor the partition at the wall by driving spikes into the walls in the joints at the top of each course.

Attaching Trim, Base Boards, Fixtures, Etc.—Chair rails, picture moulds, plastering grounds shall be nailed directly to Pyrobar Tile by reverse, staggered, diagonal nailing.

NOTE—Base boards may be securely and satisfactorily fastened by nailing a 1- by 12-inch wood nailing block the width of the tile to one end of each Pyrobar before laying up. Blackboards, heavy toilet fixtures, etc., may be securely fastened by attaching a wood nailing block to Pyrobar Tile laid in place. These methods are simple, inexpensive, quickly accomplished and in general are very satisfactory.

SPECIAL NOTE—Full details and specifications covering the use of Pyrobar Gypsum Tile for all types of column protection, fireproof enclosure system, furnished promptly on request.

Specifications for Pyrobar Roof Tile.

The roof deck shall be constructed of 3-inch solid, reinforced, Pyrobar gypsum roof tile, laid in T-irons, spaced 30½ inches on centers, of size indicated on drawings.

The joints between the tile at the T-irons shall be filled with plaster grout. All necessary nailing strips, flashing, composition roof covering, cinder concrete fills and T-irons shall be furnished by other contractors.

References.

The following are representative buildings in each section of the country, in which "U. S. G." Products were used:

¶ Woolworth Building, New York, N. Y.
* Municipal Building, Hartford, Conn.
‡ High School, Swampscott, Mass.
‡ Y. M. C. A., Ithaca, N. Y.
‡¶ Niagara County Almshouse Buildings (6), Lockport, N. Y.
¶ Marine National Bank, Buffalo, N. Y.
¶ Elmira Free Academy, Elmira, N. Y.
* Waverly Public School, Baltimore, Md.
* High School, Trenton, N. J.
¶ Scottish Rites Temple, Washington, D. C.
*¶ Capitol Park Hotel, Washington, D. C.
*¶ First National Bank Building, Portsmouth, Ohio
* General Electric Co., Schenectady, N. Y.
‡ Otesaga Hotel, Cooperstown, N. Y.
*¶ Passaic High School, Passaic, N. J.
¶ City Hall, Waterbury, Conn.
¶ Alms House, Bridgeport, Conn.
¶ Loomis Institute Buildings, Windsor, Conn.
¶ Greenwich Y. M. C. A., Greenwich, Conn.
‡¶ Mary Baldwin Seminary, Staunton, Va.
¶ Homestead Hotel, Hot Springs, Va.
¶ Court House, Wilmington, Del.
¶ High School, Binghamton, N. Y.
* Albany County Court House, Albany, N. Y.
* State Educational Building, Albany, N. Y.
‡¶ High School, Myerstown, Pa.
*¶ High School, Shamokin, Pa.
*¶ Y. W. C. A., Springfield, Mass.
¶ Y. W. C. A., Coatesville, Mass.
* Notre Dame Academy and Convent, Boston, Mass.
*¶ State Armory for Mounted Troops, Boston, Mass.
* Newport Office Building, Boston, Mass.
‡ Grossman Building, Lynn, Mass.
¶ Dawes Hotel for Unemployed, Boston, Mass.
‡¶ University Place High School, University Place, Nebr.
* Elks' Building, Minneapolis, Minn.
* Hastings Hotel, Minneapolis, Minn.
* Chemistry Building, Iowa Agricultural College, Ames, Iowa
‡ Jackson Hotel, Sioux City, Iowa
¶ Y. M. C. A. Building, Omaha, Nebr.
* Sherwood Apartments, Duluth, Minn.
¶ Minnesota Steel Company's Buildings (170), Duluth, Minn
‡ High School, Bismarck, N. D.
* Court House, Grand Forks, N. D.
*¶ Yankton College, Yankton, S. D.
*¶ Y. M. C. A. Building, Great Falls, Mont.
*¶ College Dormitory, Grinnell, Iowa
¶ Blackstone Hotel, Omaha, Nebr.
*¶ Minneapolis Athletic Club, Minneapolis, Minn.
*¶ Normal School, Superior, Wis.
¶ High School, Burlington, Iowa
*¶ Court House, Greeley, Colo.
¶ Federal Building and Post Office, Charleston, W. Va.
¶ Statler Hotel, Cleveland, Ohio
¶ Cleveland Athletic Club, Cleveland, Ohio
¶ The May Co.'s Building, Cleveland, Ohio
* Masonic Temple, Huntington, W. Va.
¶ University of Pittsburgh, Pittsburgh, Pa.
¶ Oliver Building, Pittsburgh, Pa.
‡ Uniontown Country Club, Uniontown, Pa.
¶ U. S. Post Office, Dayton, Ohio
¶ William Penn Hotel, Pittsburgh, Pa.
¶Union Central Life Insurance Building, Cincinnati, Ohio
*¶ Stevens Building, Chicago, Ill.
*¶ Y. M. C. A. Hotel, Chicago, Ill.
*¶ New Borland Building, Chicago, Ill.
*¶ Grunewald Hotel, New Orleans, La.
‡ R. E. Olds Residence, Lansing, Mich.
‡ Chas. Bunnell Residence, Detroit, Mich.
† W. J. Tully Residence, Locust Valley, L. I., N. Y.
† Administration, Vivarium and Ceramics Buildings, University of Illinois, Urbana, Ill.
† Illinois Oil Co., Rock Island, Ill.
† Campbell-Cannon-Wyant Co. Foundry, Muskegon, Mich.
† Bakery Building, State Hospital for Insane, Alton, Ill.
† Bloomingdale Asylum, White Plains, N. Y.
†§ Y. M. C. A. Building, Racine, Wis.
† Parish Mfg. Co.'s Building, Detroit, Mich.
† Detroit Copper & Brass Rolling Mill, Detroit, Mich.
† French Battery & Carbon Co.'s Building, Madison, Wis.
† Diamond Match Co., Barberton, Ohio
† Havana Metal Wheel Co., Havana, Ill.
† Milwaukee Coke & Gas Co.'s Building, Milwaukee, Wis.
† Thilmany Pulp and Paper Co., Kaukauna, Wis.
† West Steel Castings Co., Cleveland, Ohio
* Syria Temple Building, Pittsburgh, Pa.
*¶ Power & Light Building, Cleveland, Ohio (Cleveland Electrical Illuminating Co.)
§¶ Holden Hotel, Dayton, Ohio
† American Ship Building Co., Foundry Building, Cleveland, Ohio
† The Dunham Co., Factory Building, Berea, Ohio
‡¶ Mercy Hospital, Du Bois, Pa.
*¶ Northeast High School, Kansas City, Mo.
*¶ Snyderhoff Hotel, Kansas City, Mo.
*¶ Mercer Hotel, Kansas City, Mo.
*¶ Sherman Hotel, Kansas City, Mo.
*¶ VanHorn School, Kansas City, Mo.
*¶ Kling and Allen Building, Kansas City, Mo.
¶ Candler Building, Atlanta, Ga.
* Underwriters' Laboratories Building, Chicago, Ill.
* Cook County Detention Hospital, Chicago, Ill.
¶ Continental and Commercial National Bank, Chicago, Ill.
‡ High School, Ashland, Wis.
* Statler Hotel, Detroit, Mich.
‡ St. Francis Hospital, Galesburg, Ill.
¶ Great Southern Building, Louisville, Ky.
‡ Bristol Hotel, Bristol, Tenn.
† Goodyear Tire & Rubber Co., Factory, Akron, Ohio
† Crown Building, Cleveland, Ohio
† Chandler Motor Works, Cleveland, Ohio
† Biology Building, University of Minnesota, Minneapolis, Minn.
† International Acheson Graphite Co., Niagara Falls, N. Y.
§ Merry Building, Kansas City, Mo.
§ Wirthman Hotel, Kansas City, Mo.
§ High School Building, East Milwaukee, Wis.
§ Fleming Bank Building, Denver, Colo.
§ Y. M. C. A. Building, Tulsa, Okla.
§ Lutheran Hospital, Moline, Ill.
§ Y. M. C. A. Building, Streator, Ill.
¶ Helping Hand Institute, Kansas City, Mo.
‡ Shorter College, Rome, Ga.
* Holy Rosary School, Pittsburgh, Pa.

* Pyrobar Gypsum Tile. † Pyrobar Roof Tile. ‡ Pyrobar Plaster Board. § Tester Sackett Systems. ¶ "U. S. G." Plaster

Buyer's Guidance

D. J. KENNEDY COMPANY

Manufacturers and Distributors of Builders' Supplies

6366 Frankstown Avenue

PITTSBURGH, PA.

Products.

- Portland Cement
- Lump Lime
- Hydrated Lime for Building, Agricultural or Chemical Purposes
- Roman Asbestic Wall Plaster
- Ceresit Waterproofing
- Maumee Waterproofing
- Hydro Seal Damp-Proofing
- Bay State Brick and Cement Coating
- Reinforcing Fabric
- Keene's Cement
- White Cement
- Metal Lath
- Sewer Pipe
- Wall Coping
- Flue Lining
- Chimney Tops
- Corner Bead
- Mortar Colors
- Roofing
- Sand, Gravel
- Building Brick
- Fire Brick
- Upson Processed Board

Roman Asbestic Plaster.

Ready mixed; nothing to be added but water. Sand of best grade, thoroughly mixed with plaster by machinery, insuring uniform working and good, solid, strong job.

Lime.

Hydrated for masons' use by most approved system.

Bay State Brick and Cement Coating.

For the decoration and protection of concrete, cement, stucco and brick.

Ceresit Waterproofing Paste.

Ceresit is a perfect means of preventing the penetration of dampness and water through structures of all kinds, such as foundations, basements, sub-basement floors, fountains, tunnels, dams, reservoirs, swimming-pools, building walls, bridges, concrete roofs, cement, stucco for exterior finishes, etc.

Facilities.

Plaster Mill and Lime Grinding and Hydrating Plants in Pittsburgh; also, three large storage yards and depots for supply, insure prompt service; besides, our connections with plants manufacturing the other commodities enumerated above put us in the best possible position to give good service on practically everything used in the construction of buildings, sewers, bridges, pavements, etc.

THE WOODVILLE LIME & CEMENT CO.

MANUFACTURERS OF AND WHOLESALE DEALERS IN

Lime, Alca Plasters, Sewer Pipe and Builders' Supplies

1340-1350 Nicholas Building
TOLEDO, OHIO

PLANT AND KILNS
WOODVILLE, OHIO

Products.

"White Enamel Finish" and "White Lily Finish" Brands of Ohio Hydrated Finishing Lime.

Alca products, divided into three brands, namely, Polar Bear Alca Stucco for Exterior Stucco Work, Enamel Alca Plaster for Interior Plastering, and Alca Mortar for Masonry.

Finishing Lime.

"White Enamel Finish" and "White Lily Finish" brands have been on the market for fifteen years, and time has proved them unsurpassed. We are pioneers in the manufacture of this commodity, and guarantee these brands to be fully equal to any brand of Ohio hydrated lime. They are handled by builders' supply dealers in all parts of the United States and Canada. The freight rate is not prohibitive.

Specifications

"White Enamel Finish" or "White Lily Finish" brands hydrated lime; best grade of finely ground calcined plaster; best grade marble dust or washed sand.

Soak the hydrated lime over night before using. Gauge about 25 pounds of calcined plaster to each 100 pounds of dry finish. If sand or marble dust is to be used in white coat, mix in desired amount.

Finish coat is to be applied when second coat is nearly dry. Sprinkle with clean water, if the second coat be thoroughly dry. In applying trowel down with water, same as with lump lime putty, to a smooth, polished surface free from brush marks.

Alca Products.

These materials are mixtures of magnesium hydrated lime and calcium aluminate, the latter being the active element in Portland cement. Their nature is to take a slow set and then gradually revert into limestone. The color of all is a pure white. They are extremely plastic, and can be applied by any ordinary plasterer. All of our Alca products are hydraulic. These materials are presumed to be similar to the old Roman Pozzuolanic cements which were used hundreds of years ago.

Polar Bear Alca Stucco.

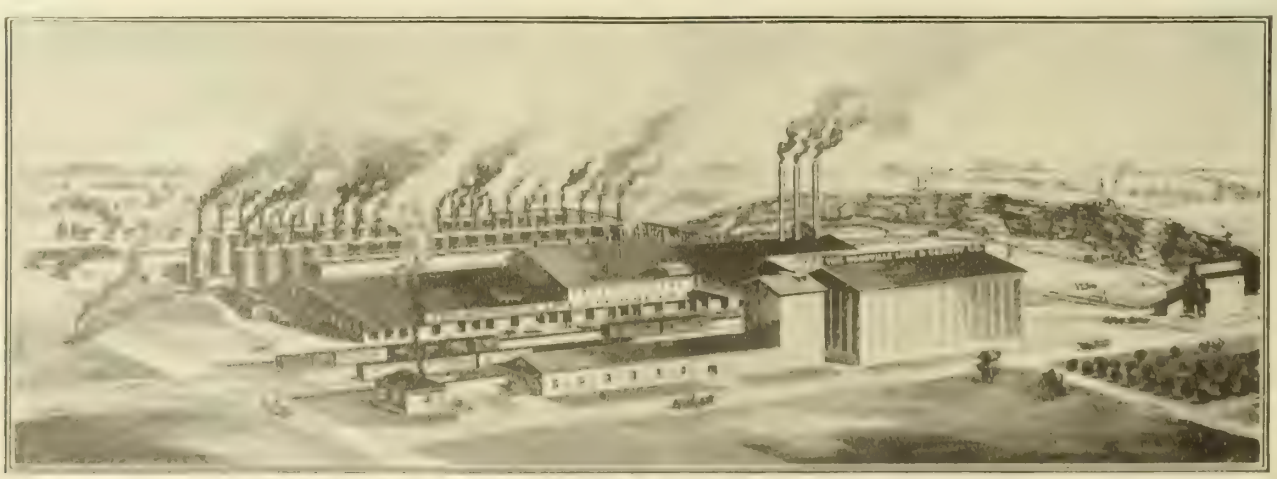
For exterior use only. It is made haired and unhaired—the haired material being specified for first coat on metal lath or wood lath; the unhaired material is specified for second coat, and also for first and second coat on brick or tile.

All stucco possesses the property of capillary attraction, a physical property of "sucking" water out of the ground. In order to prevent this we recommend a course of Soldier brick around the base of the building, at least eight or twelve inches high. This can be substituted by running a base eight or twelve inches high of Portland cement, thoroughly waterproofed. Either of these methods of construction will prevent dampness being drawn up the wall from the ground. Being ground so fine, Polar Bear Alca Stucco is very nearly waterproof, and shows a tendency to increase in waterproofing qualities with age after being on the wall.

Specifications

For the best and highest class results Polar Bear Alca Stucco shall be applied in three coats (although a great deal of the material has been used very successfully in two-coat work). When two-coat work is used, omit the second in the directions following. Where material is applied on wood lath, it shall be double-lathed in lattice style, the lath being put on diagonally and one inch apart. This will require a trifle more material than single lathing, but will afford opportunity for giving a greater clinch and a heavier key. The lath shall be thoroughly wet down at least one day before being plastered, and again just before applying. The first coat shall be in the proportion of 100 pounds of Polar Bear Alca Stucco, haired, to 350 pounds of clean, sharp sand, and shall be thoroughly pressed on the wall to make a good key. This same proportion applies when used on metal lath. When applied to brick or tile work, the proportion should be 450 pounds of sand to 100 pounds of unhaired Polar Bear Alca Stucco.

The second coat shall contain one part more sand than the first coat; the Alca containing no hair shall be



PLANT OF THE WOODVILLE LIME & CEMENT CO., WOODVILLE, OHIO

Continued on next page

applied before the first coat has become dry. Each coat shall be combed, scratched or brushed in order that the next coat may be better bonded.

The third coat shall be the finishing coat.

Finishes

A few finishes for the third coat are given, but many other attractive finishes can be used.

No. 1. Rough Dash—For a very rough effect, to each 100 pounds of Polar Bear Alca Stucco add 300 pounds of sand and 200 pounds of clean, crushed stone from one quarter- to one half-inch in size. This shall be thrown on evenly with a paddle, and all hollow spaces filled. Always strip the corners. Last coat shall be of thinner consistency than the first two coats.

No. 2. Pebble Dash—Applied the same as the rough dash. The mixture, however, shall contain pebbles from one quarter- to three eighth-inch, instead of crushed limestone.

No. 3. Dry Pebble Dash—The three coats shall be applied in same manner as the No. 6, followed up quickly before the last coat has taken the initial set, with clean pebbles, crushed granite, crystals, or other materials, according to the effect desired.

No. 4. Sponge Finish—First two coats applied as given above; the last coat being composed of 450 pounds of sand to 100 pounds of Polar Bear Alca Stucco, unhaired. A rough sponge shall be thrust against the last coat and quickly withdrawn. The material has a tendency to follow the sponge from the wall, leaving an attractive finish.

No. 5. Carpet Finish—First two coats applied as above. Third coat, 450 pounds of sand to 100 pounds of Polar Bear Alca. Finish is obtained by going over third coat with piece of Brussels carpet.

No. 6. Float Finish—First two coats applied as above. Third coat, 450 pounds of sand and 100 pounds of Polar Bear Alca. Bring up to smooth finish with float.

No. 7. Sand Finish—Apply three coats as in the float finish. Brush with stiff broom several hours after material has been applied.

Enamel Alca Plaster.

For interior plastering only. It is made haired and unhaired; the former being for first coat on wood or metal lath, and the latter for second coat, or for first coat on brick and tile.

Specifications

Always use clean, sharp sand and clean water with any plaster or mortar material. Note that proportions below are *by weight* and not by bulk.

For Plastering on Wood Lath—Nailed not greater than 16-inch centers and ⅜-inch key (spacing). Wet lath thoroughly sometime before plastering in order to get the twisting and buckling out of the lath.

First Coat: 100 pounds of haired Alca Plaster, and 350 pounds of sand.

Second Coat: 100 pounds of unhaired Alca Plaster, and 450 pounds of sand.

On Stone, Brick, Hollow Tile or Plaster Block—

First Coat: 100 pounds of unhaired Alca Plaster, and 550 pounds of sand.

Second Coat: 100 pounds of Enamel Alca Plaster, and 450 pounds of sand.

On Metal Lath—

First Coat: 100 pounds of haired Alca Plaster, and 350 pounds of sand.

Second Coat: 100 pounds of unhaired Alca Plaster, and 450 pounds of sand.

Second coat should be applied before first coat is dry. If first coat has become dry, sprinkle with brush.

Slight variations in these proportions may be made according to the character of the sand. Fine, clean sand takes less material than coarse, clean sand, and works easier. Sand containing loam will give more plasticity, but will not give so strong a job.

Alca Mortar.

Made for use in laying brick, tile or stone. It should be mixed 100 pounds of neat Alca to 600 pounds of sand. It will increase the plasticity to have it mixed at least one hour before using. This material takes the place of lump lime mortar gauged with Portland cement. It is hydraulic and can be used below the grade line.

REINFORCED FIREPROOFING COMPANY

"Delac" Reinforced Fireproof Plaster and Stucco Board

PHILADELPHIA, PA.

Products.

"Delac" Reinforced Fireproof Sheets for General Stucco and Plaster Work and for Fireproof Partition Construction.

"Delac" Wire Corner Bead.

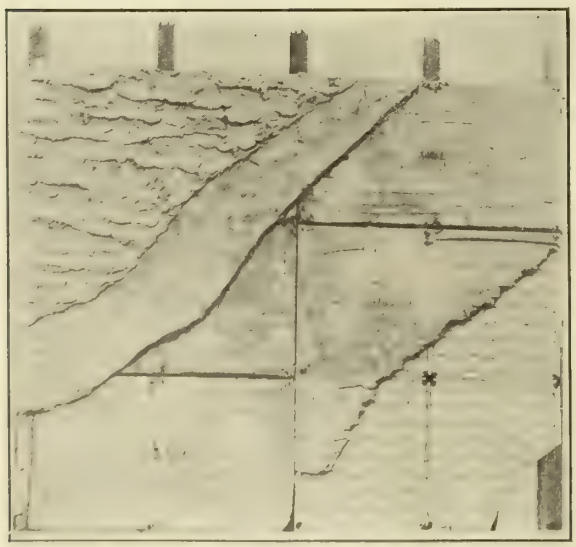
"Delac" Plaster Gauge Lock.

"Delac" Reinforced Fireproof Sheets.

Construction—"Delac" Sheets are made of a fire-resisting composition with gypsum base, containing 35 per cent of air cells, which make them effective insulation against heat, cold and sound. Each sheet is reinforced with mesh wire and galvanized iron frame, which when nailed to the studs give efficient structural strength. (See illustration.) All edges are beveled to reinforce plaster at joints.

Regular stock sheets are 32 by 36 inches, and ¾ or 1 inch thick.

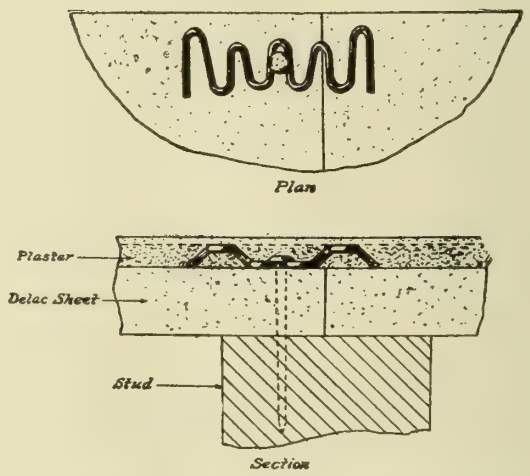
Uses—"Delac" Reinforced Fireproof Sheets are used in all classes of buildings for outside stucco work (applied directly over studding), for inside plastering, for plastering inner side of masonry walls, for thin fireproof partitions, for fireproofing exposed combustible surfaces in manufacturing plants, etc.



DETAIL OF CONSTRUCTION "DELAC" EXTERIOR STUCCO WORK

Advantages — "Delac" Reinforced Fireproof Sheets insure sound, durable fireproof construction. They make a perfect plaster bond; their beveled joints allow full penetration of plaster; and, when secured by the "Delac" Plaster Gauge Lock, they hold the plaster or stucco firmly, thus insuring a perfect plaster finish.

"Delac" is endorsed by building departments for its fireproof qualities. Applied on inner side of masonry walls, it provides a continuous air space between wall and plaster. It is economical, as it dispenses with sheathing boards, lath, and at least one coat of plaster. It reduces the cost of heating the building because of its insulating qualities and assured uniform thickness of at least 1¼ inches. It assures additional floor space, for "Delac" Fireproof Partitions are not over 3 inches thick, and yet they assure maximum strength, equal to that of any other material twice their thickness.



APPLICATION OF "DELAC" PLASTER GAUGE LOCK

"Delac" Plaster Gauge Lock.

This device, illustrated above, acts as a scientific washer for nails securing "Delac" sheets. Its projection furnishes a gauge for thickness of plaster, and also gives an additional key from outside of first coat.

"Delac" Corner Bead.

This device, illustrated herewith, affords a reinforcement for all exterior corners, and its use eliminates the cracking of plaster, so usual at these points.

"DELAC" EXTERIOR CORNER BEAD

Continued on next page

Application for Stucco.

Set "Delac" sheets so that horizontal joints are broken every 32 inches.

Use a No. 10 plumber's saw for cutting.

Nail securely, rough side out, directly on studs with 8d galvanized wire nails, placing on each nail, as per illustration, a "Delac" Plaster Gauge Lock before driving nail home.

Nail each sheet through nail holes provided. When sheets are cut, nail all edges at intervals of not over nine inches.

Protect all corners with "Delac" corner bead.

Before applying plaster or stucco finish, wet and fill beveled joints between sheets and any holes, using gypsum plaster with wood fiber or hair used neat.

Insist upon thorough wetting of "Delac" sheets before application of plaster or stucco.

Specifications.

For Exterior Stucco Finish—Set studs 16 inches on center. The center of first stud from corner to be 16 inches on one wall and 15¼ inches on other wall to allow lap.

Cover all studs with any approved brand of damp-proofing.

Cover all walls, soffits and ceilings to be stuccoed with 32-by 36-inch reinforced "Delac" sheets, securely nailed, rough side out, directly on studs.

Set Reinforced "Delac" Sheets to break horizontal joints. Nail each sheet through nail holes provided, one at center, one at each corner, and one in center of each side of sheet. Nails to be 8d galvanized wire, and not to be driven home until gauge lock is placed on each nail.

Also place one 8d galvanized wire nail on line of studs between holes provided, making fifteen nails in all.

When sheets are cut, use gauge locks on all nails, spaced not over 12 inches apart.

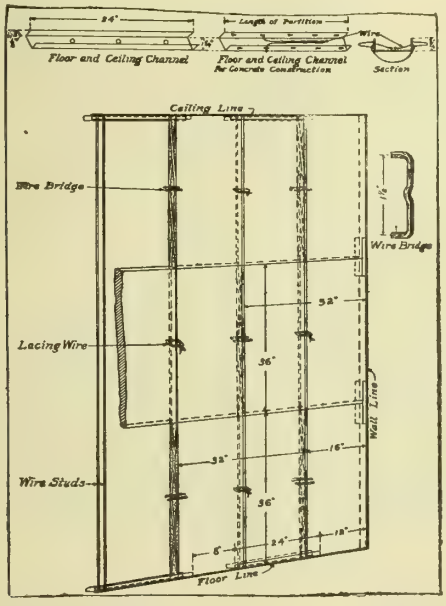
Protect all exterior corners with special "Delac" corner bead before applying stucco.

Before applying stucco finish, wet and fill beveled joints and holes between sheets, using gypsum plaster with wood fiber or hair used neat.

Mix stucco same as for any first class job, using Portland cement, with not less than 25 per cent of lime bulk. Apply two coats to stucco: first to cover gauge locks, second to give the desired finish or effect. Mix last coat of stucco with any approved brand of waterproofing.

Before applying stucco, thoroughly wet entire surface of "Delac" sheets, the same as would be necessary with a very dry brick wall.

For Fireproof Partitions, Wood Construction—Contractor for plastering is to provide all materials and labor for erecting and finishing "Delac" partitions, as follows:



METHOD OF ERECTING "DELAC" PARTITIONS

On floors and ceilings and on side walls where partitions abut, furnish and nail iron channels to receive "Delac" sheets. These channels to be stock, pressed or rolled 1¼ inch by ½ inch with holes punched in back for nailing to ceilings or floors or side walls. Side wall channels to be at least 10 inches long, with two holes punched in back for nailing.

All channels to be of kind and size noted on detail drawing.

When ceiling and floor channels are loosely nailed in place, install stud wires, spacing as below. After spacing wires drive nails home, thus keeping wires in proper position. These wires to be No. 12-gauge galvanized for partitions up to 10 feet in height and No. 10-gauge for partitions over 10 feet high. The wires are to be run under floor channel and over ceiling channels, moderately taut, one pair of wire for each 16 inches of length of partition.

Outside Walls—On outside walls nail furring strips 16 inches on centers, and on these nail ¾-inch "Delac" sheets, waterproofed on back side, as provided by manufacturers. Use 8d galvanized wire nails. Wet down and plaster two coats, as above.

Concrete Construction—For concrete floor construction, use channels as shown on plan, and set in position with stud wires inserted as shown, before the concrete is placed.

Set "Delac" sheets in courses between the stud wires, breaking vertical joints, being held by channels in floor and ceiling.

After "Delac" sheets are set up, truss the wires by means of wire bridges (provided by the manufacturers of "Delac").

In the center of each sheet lace these stud wires together by passing thin lacing wire through holes provided in the sheets.

Wet down the "Delac" before applying plaster.

Finish partitions, both sides, two coats: one coat of browning of any approved gypsum plaster and one coat of hard finish.

Ceilings and Soffits—Unless included in specifications for steel and iron work, the lathing contractor will provide and put up all the necessary iron hangers, with 2-inch by ¼-inch rods placed 16 inches on centers.

Cross fur on top with ⅜-inch rods 6 feet on centers.

To these rods wire ¾-inch "Delac" sheets. Where rods run parallel to and over joints, place wire bridges as specified for partition work, under and at right angles to rods. Use only galvanized wire.

Wet down and plaster two coats, as above.

For Side Walls—Note that "Delac" sheets for this purpose are specially waterproofed on the back side.

Where metal furring is required, fur with 1-inch channel and fasten "Delac" with special fastener furnished by manufacturers.

Place sheets so that the vertical joints are broken every 32 inches.

Wet all joints thoroughly, and fill with gypsum plaster.

After mortar in joints is dry, wet the entire surface.

Then immediately apply scratch coat of neat gypsum plaster, ½ inch thick.

Finishing coat to be troweled to a hard, smooth surface, not less than ¼ inch thick.

Erection.

Full directions for erection will be furnished on application.

Suggestions for Specifying.

It is suggested, for sake of brevity, that architects and engineers write in their specifications, after stating that "Delac" Reinforced Fireproof Sheets, manufactured by the Reinforced Fireproofing Company, of Philadelphia, Pa., shall be used; that same shall be erected and left complete in accordance with the descriptions, standards of construction and specifications given on their pages in Sweet's Architectural Catalogue, 1916 Edition.

TURNER CONSTRUCTION COMPANY

Contractors in Reinforced Concrete Construction

TELEPHONE, RECTOR 9292 — 11 Broadway — ESTABLISHED 1902

NEW YORK, N. Y.

BRANCH OFFICES: BUFFALO, N. Y., 312 Prudential Building; BOSTON, 45 Milk Street

Services.

We are Contractors in REINFORCED CONCRETE BUILDING CONSTRUCTION FOR INDUSTRIAL PURPOSES, working exclusively in Reinforced Concrete or in Structural Concrete combined with Brick, Tile, Terra Cotta or Stone.

FACTORY, DIEHL MANUFACTURING CO., ELIZABETH, N. J.
DAY & ZIMMERMAN, Architects TURNER CONSTRUCTION CO., Contractors
Structural concrete with brick curtain walls; 3 stories, 300 x 70 feet; erected complete in three months. Turner speed records won over lower bids

FACTORY, LOOSE-WILES BISCUIT CO., LONG ISLAND CITY, N. Y.
WILLIAM H. HUDDESON, Architect TURNER CONSTRUCTION CO., Contractors
The largest concrete industrial building east of the Mississippi; 10 stories, 430 x 200 feet; floor loads 150 to 3000 lbs.; glazed terra cotta exterior on three sides

Experience and Organization.

For more than fourteen years we have specialized exclusively in Industrial Reinforced Concrete Construction, and the number of separate contracts handled to date totals 553. Our organization is made up of experienced engineers and trained concrete specialists who have been with us for periods ranging from six to fourteen years. This organization is maintained—not permitted to disintegrate between contracts.

Speed.

We have executed 553 contracts in fourteen years *without a single penalty for failure to complete on time* —an average of a building every ten days and every one on time.

Record.

Seventy per cent of the reinforced concrete buildings in and about New York were erected by us. We invite any architect or owner to make a personal investigation of Turner work done.

Forms of Contract.

We work under any form of contract—lump sum, cost-plus-a-fixed-sum, or cost-plus-a-percentage. Forty per cent of our business to date has been on a cost-plus-percentage basis. The Turner policy is never to do cheap work, but to do the best work at the lowest consistent price. The fact that forty-six per cent of the Company's contracts have been "repeat orders"—most of them awarded without competition—is evidence of the high standard of Turner work and the satisfaction of clients.

Co-operative Service.

Our corps of trained engineers and concrete specialists is at the service of architects and engineers, with a view to rendering any reasonable assistance in the preparation of plans and the execution of work along most economical lines. Our system of unit costs—based on the successful performance of 553 contracts—enables us to give accurate estimates promptly, even from plans drawn for steel or mill construction.

TEXTILE PLANT, NAUMKEAG STEAM COTTON CO., SALEM, MASS.
[illegible] & Company, Architects and Engineers TURNER CONSTRUCTION CO., Contractors
Mill building of 4 stories and basement, 722 x 136 feet. Storehouse of 6 stories, 500 x 110 feet. This reinforced concrete textile plant is regarded as a model structure in the textile industry

Sweet's Catalogue

Continued on next page

Important Work.

The following lists give some of the architects and owners for whom we have built in reinforced concrete. A complete list will be sent to you on request.

ARCHITECTS FOR WHOM WE HAVE DONE WORK

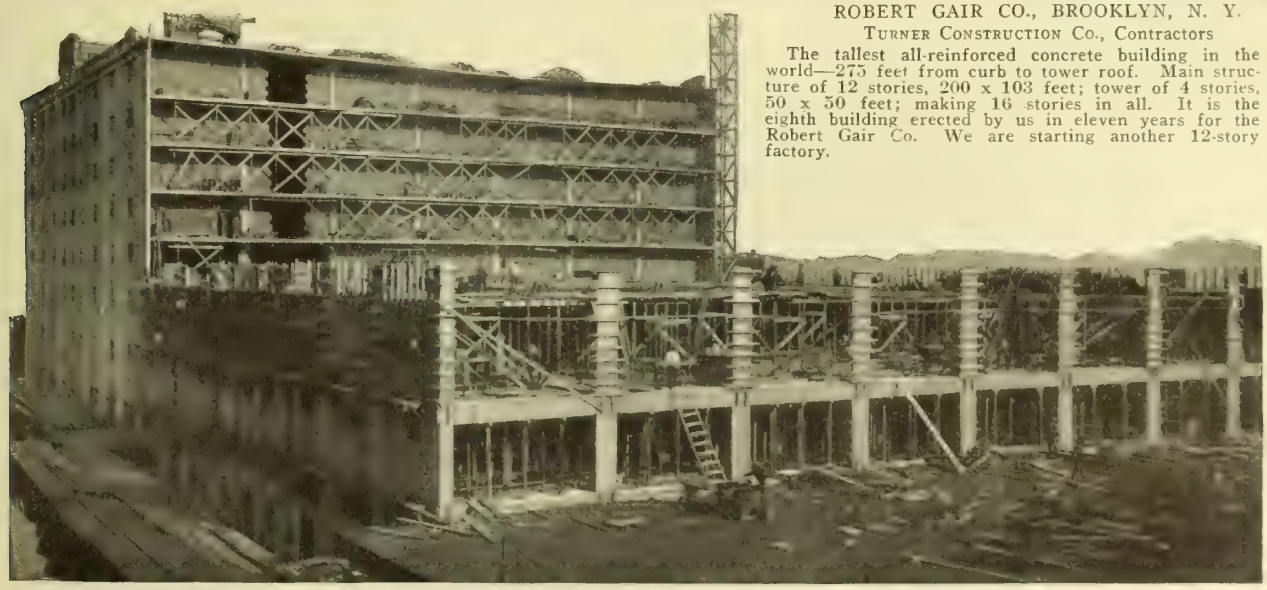
Ballinger & Perrot
A. E. Baxter
Bosworth & Holden
H. O. Chapman
Colson & Hudson
Day & Zimmerman
Eidlitz & McKenzie
Chas. Fall
Ernest Flagg
Francisco & Jacobus
Cass Gilbert
Heins & La Farge
Frank J. Helmle
William Higginson
Alfred Hopkins
Howells & Stokes
Hunt & Hunt
Albert Kahn
Linn Kinne
Lockwood, Greene & Co.
Lord, Hewlett & Tallant
McKim, Mead & White
C. R. Makepeace
Marshall & Fox
Maynicke & Franke
Monks & Johnson
Reed & Stem
R. J. Reidpath & Son
F. P. Sheldon & Sons
J. B. Snook Sons
W. L. Stoddart
Fletcher Thompson, Inc.
Timmis & Chapman
Warren & Wetmore

SOME BUILDINGS WE HAVE ERECTED

American Agricultural Chemical Co.
American Can Co.
American Lead Pencil Co.
Arbuckle Brothers
Baltimore & Ohio Railroad Co.
Sidney Blumenthal Co.
Borden's Condensed Milk Co.
John E. Bradley
Bullard Machine Tool Co.
Bush Terminal Co.
Chesebrough Mfg. Co.
Colgate & Co.
Cyphers Incubator Co.
R. U. Delapenha & Co.
Diehl Manufacturing Co.
Eastman Kodak Co.
Enterprise Oil Co.
Ford Motor Co.
Robert Gair Co.
Great Atlantic & Pacific Tea Co.
General Electric Co.
Havemeyer & Elder
Hoboken Land & Improvement Co.
C. Kenyon Co.
Keuffel & Esser Co.
J. B. King & Co.
Loose-Wiles Biscuit Co.
Merchants Refrigerating Co.
Murphy Varnish Co.
Nashua Manufacturing Co.
Naumkeag Steam Cotton Co.
New York Consolidated Card Co.
New York Dock Co.
Austin Nichols & Co.
Norton Company
Pierce-Arrow Automobile Co.
Republic Metalware Co.
Revere Rubber Co.
Royal Baking Powder Co.
Safety Car Heating & Lighting Co.
Scovill Mfg. Co.
Seth Thomas Clock Co.
E. R. Squibb & Sons
Standard Oil Co.
Standard Varnish Works
Jos. Stern & Sons
The Carborundum Co.
The Fleischmann Co.
The Texas Co.
Union Terminal Co.
U. S. Aluminum Co.
Vacuum Oil Co.
L. E. Waterman Co.
Western Electric Co.

WAREHOUSE, AUSTIN NICHOLS & CO., NEW YORK, N. Y.
Cass Gilbert, Architect Turner Construction Co., Contractors
Largest and most completely equipped wholesale grocery warehouse in U. S.; 440 x 180 feet, 6 stories and basement. Owners say it will stand as a concrete record for speed and low cost of construction

ROBERT GAIR CO., BROOKLYN, N. Y.
Turner Construction Co., Contractors
The tallest all-reinforced concrete building in the world—275 feet from curb to tower roof. Main structure of 12 stories, 200 x 103 feet; tower of 4 stories, 50 x 50 feet; making 16 stories in all. It is the eighth building erected by us in eleven years for the Robert Gair Co. We are starting another 12-story factory.



TEXTILE WAREHOUSE, NASHUA MANUFACTURING CO., NASHUA, N. H.
C. R. Makepeace, Architect and Engineer Turner Construction Co., Contractors
Reinforced concrete 9 stories, 320 x 160 feet. Entire building was completed, in two distinct sections, in seven and one half months, two days ahead of schedule

ESTABLISHED 1895

WHITE FIREPROOF CONSTRUCTION COMPANY

Standard Concrete Fireproofing

286 Fifth Avenue

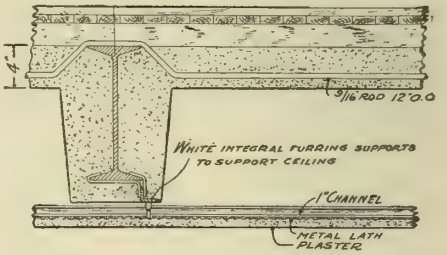
NEW YORK, N. Y.

Products and Services.

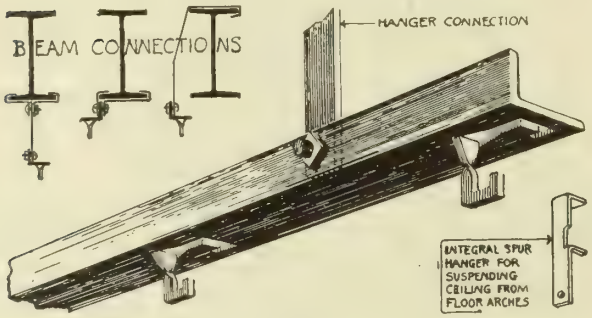
Engineers and Contractors for Reinforced Concrete Fireproofing: Floors and Partitions, Metal Furring and Lathing, and Reinforced Concrete Stairs.

Specialties: Manufacturers and Distributors of "White" Integral Main Furring Bars for Metal Lath Ceilings, White Wire Soffit Clips of different designs to support Concrete Soffits under steel beams, etc.

TRADE-MARK



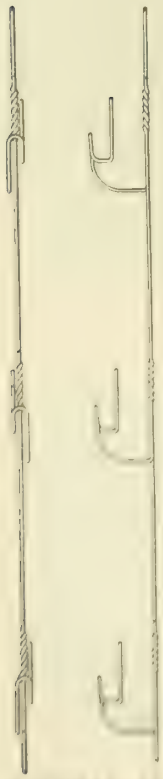
"WHITE" FIREPROOFING SYSTEM



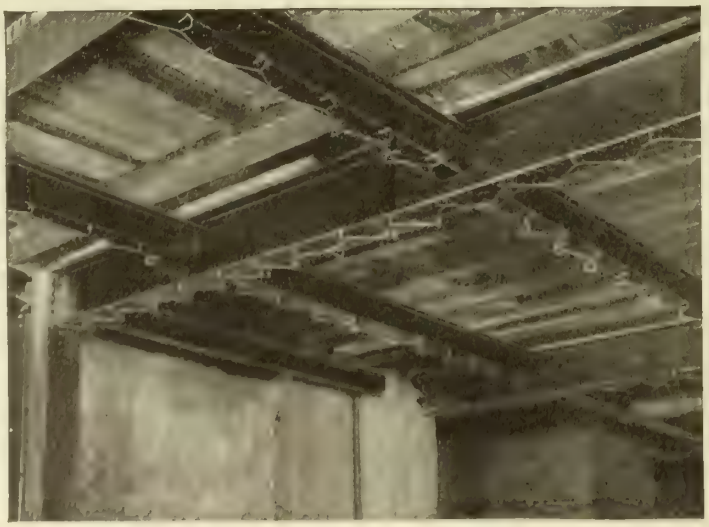
Detail View "White" Integral Main Furring Bar

"White" Integral Main Furring Bar Ceiling, Showing True Alignment, Spacing and Plane

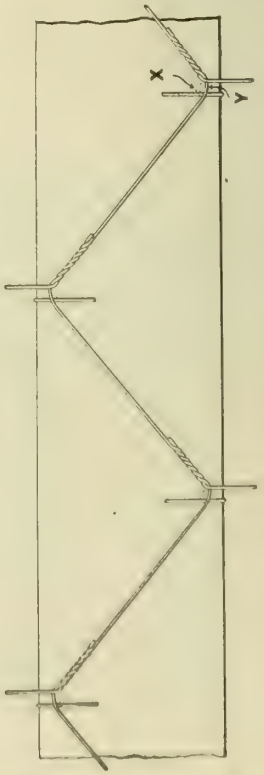
CROSS FURRED METAL LATH CEILING CONSTRUCTION



MATERIAL AS IT COMES TO THE JOB



CONTINUOUS BEAM SOFFIT REINFORCEMENT
Sprung into place and rigidly held there without play



MATERIAL IN PLACE AS SEEN FROM BELOW

CORRUGATED BAR COMPANY

Concrete Reinforcement, Fireproof Floor Systems and Corr-Mesh Construction

GENERAL HEADQUARTERS
Mutual Life Building
BUFFALO, N. Y.

FACTORIES

FABRICATION PLANT (BARS)
BLASDELL, N. Y., South Buffalo Railway

CORR-MESH
BLASDELL, N. Y., Erie Railway

GENERAL STOCK
BLASDELL, N. Y., South Buffalo Railway

DISTRICT OFFICES

NEW YORK, N. Y., Whitehall Building, 17 Battery Place
CHICAGO, ILL., 20 West Jackson Boulevard
ST. LOUIS, MO., Federal Reserve Bank Building
ATLANTA, GA., 1017 Grant Building
BOSTON, MASS., 201 Devonshire Street
ST. PAUL, MINN., Pioneer Building
PHILADELPHIA, PA., Drexel Building
SYRACUSE, N. Y., Union Building
DETROIT, MICH., David Whitney Building

Products.

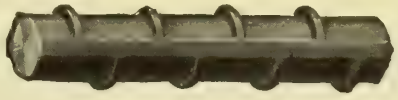
CORRUGATED BARS, for concrete reinforcement.
CORR-BAR UNITS, shop-fabricated reinforcement.
CORR-RIB FLOORS, long-span, one-way concrete rib and slab.
CORR-PLATE FLOORS, long-span, girderless.
CORR-MESH, a ribbed expanded metal and the base of
CORR-MESH PARTITIONS,
CORR-MESH FLOORS and ROOFS,
CORR-MESH CEILINGS, and
CORR-MESH WALLS.
CORR-MESH LATH, a ribbed lath.
CORR-LATH, an expanded metal.
CORR-BASE, an integral waterproofer.

Corrugated Bars and Corr-Bar Units.

The Bars—Corrugated Bars are made of both medium and hard grade steel, both square and round in cross-section, and have ridges or corrugations which effect a positive mechanical bond with the concrete.

The value of a positive mechanical bond is now recognized by modern reinforced concrete engineers in all countries. Even in France, where they have so far confined themselves almost exclusively to plain round rods, the foremost government engineers admit that such reinforcement has been far from successful in actual service.

A fact not generally understood is that all bond is mechanical. Adhesion is mechanical bond to the extent that it exists at all. It is the entering of the cement into the microscopical pores in the surface of the steel. Small sized bars, cooling rapidly, are somewhat cold rolled. In these the pores are very small indeed, and the bond consequently less. Furthermore, when the working stress of 16,000 pounds per square inch is developed in the steel, the diameter has been materially reduced. That is to say, the reduction is material when compared to the depth of the pores in the surface of the steel.



CORRUGATED ROUNDS (PATENTED)

	Standard Sizes, Corrugated Rounds								
	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"
Net area in sq. in.	.11	.19	.25	.30	.44	.60	.78	.99	1.22
Weight per ft., in lbs.	.38	.66	.86	1.05	1.52	2.06	2.69	3.41	4.21
Extras in cts., per 100 lbs.	.25	.10	.10	.05	Base				

Bond tests to show the real superiority of the Corrugated Bar should therefore be made on beams under stress. Some such tests have been made at different places, and they show, as all kinds of bond tests have invariably shown, the Corrugated Bar to be superior in a marked degree to all other types of reinforcement. (See following page.)

We maintain a large stock at all times available for immediate shipment.

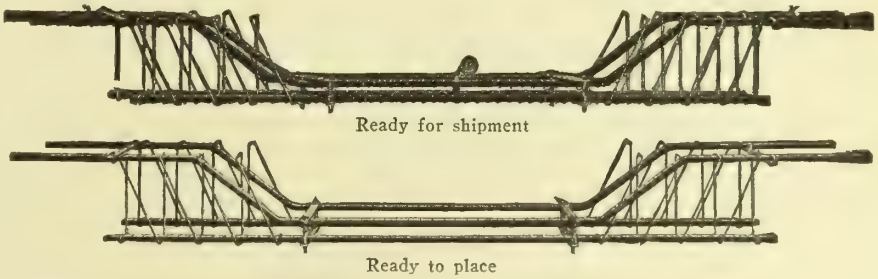
CORRUGATED SQUARES (PATENTED)

	Standard Sizes, Corrugated Squares								
	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"
Net area in sq. in.	.06	.14	.25	.39	.56	.76	1.00	1.26	1.55
Weight per ft., in lbs.	.22	.49	.86	1.35	1.94	2.64	3.43	4.34	5.35
Extras in cts., per 100 lbs.	.50	.25	.10	.05	Base				

Cutting to lengths from 2 to 5 feet $.05 Less than 2000 pounds of one size $.15
Cutting to lengths from 1 to 2 feet .10 Less than 1000 pounds of one size .35

Attention is called to the fact that where the character of the work requires small bars, a saving in cost is obtained by using Corrugated Rounds, owing to the difference in size extras between rounds and squares of equivalent area.

The Units—Corr-Bar Units are shop-fabricated and self-positioning reinforcement for concrete beams and girders. Each unit represents the entire reinforcement for the beam, anchored rigidly together, is made collapsible for shipment, and is opened on the job and set in the form wherein it positions itself.



Ready for shipment

Ready to place

CORR-BAR UNITS (PATENTED)

One form of unit is shown in the accompanying cut. This and all other forms of fabricated reinforcement, including column spirals and hoops, beam stirrups, truss bars and other bending, are done with absolute accuracy, affording greatly increased speed of construction combined with absolute safety and an actual saving in cost.

How to Specify—Reinforcement for slab and column construction shall be medium [hard-grade] Corrugated steel bars made in accordance with the Manufacturers' Standard Specifications, accurately spaced and rigidly held in position in the forms, and reinforcement for beams and girders shall be Corr-Bar Units as manufactured by the CORRUGATED BAR CO., ... City.

Continued on next page

Tests of Bond Value.

In Bulletin No. 71, of University of Illinois Engineering Experiment Station, are described in detail the results of tests of bond between concrete and steel. The two diagrams show that Corrugated Bars have double the bond, and twice the elastic limit, of plain or twisted bars. You can certainly use much less reinforcement where high elastic material is employed; but this is not permissible except with a bar having a high bonding value. Corrugated Bars furnish the highest bonding value, and permit highest working stresses; or, for a given working stress, highest safety factor.

Pull-Out Test.

The curves shown in Fig. 1 indicate clearly the value of mechanical bond of the *proper design*. All reinforcing bars shown on this diagram, except those marked *"a,"* are Corrugated Bars or bars covered by patents owned by the CORRUGATED BAR COMPANY.

a_1 is a screw thread, and not a reinforcing bar at all.

a_2 is the ordinary twisted bar.

a_3 shows the results on two different sizes of plain round bar.

The average bonding efficiency of our bars is, therefore, more than double that of plain or twisted bars.

Elastic Limit Test.

Fig. 2 shows that twisting a bar does not raise its elastic limit, as has heretofore been supposed.

As the safe allowable working stress in the reinforcement is the elastic limit divided by the selected factor of safety, it is evident that about 50 per cent more steel will be required with plain or twisted bars than will be needed where Corrugated Bars are used.

Conclusions.

In view of these two sets of tests at the University of Illinois Engineering Experiment Station, the following conclusions drawn in Bulletin No. 71 are certainly justified, namely:

"The results found with the twisted square bar do not justify its present widespread popularity as a reinforcing material."

"The use of deformed bars of proper design may be expected to guard against local deficiencies in bond resistance due to poor workmanship, and their presence may properly be considered as an additional safeguard against ultimate failure by bond."

Corrugated Bars are of proper design, and infringe no patents.

The integrity of reinforced concrete depends on the bond existing between the concrete and steel. If this bond is slight, as in the case of plain or twisted bars, shocks and vibrations are liable to severely injure the bond, and the integrity of the concrete is thereby endangered. Mechanical bond of the *right type* is essential if you would minimize the danger of failure by bond. There are many different types of mechanical bond reinforcement. Corrugated Bars are the result of years of scientific study of the basic principles of reinforced concrete construction. They are of *right type* because *the sides of the ribs or projections against which the concrete impinges in its effort to move along the bar are nearly at right angles to the axis of the bar, not varying therefrom an amount in excess of the angle of friction between the concrete and the steel.*

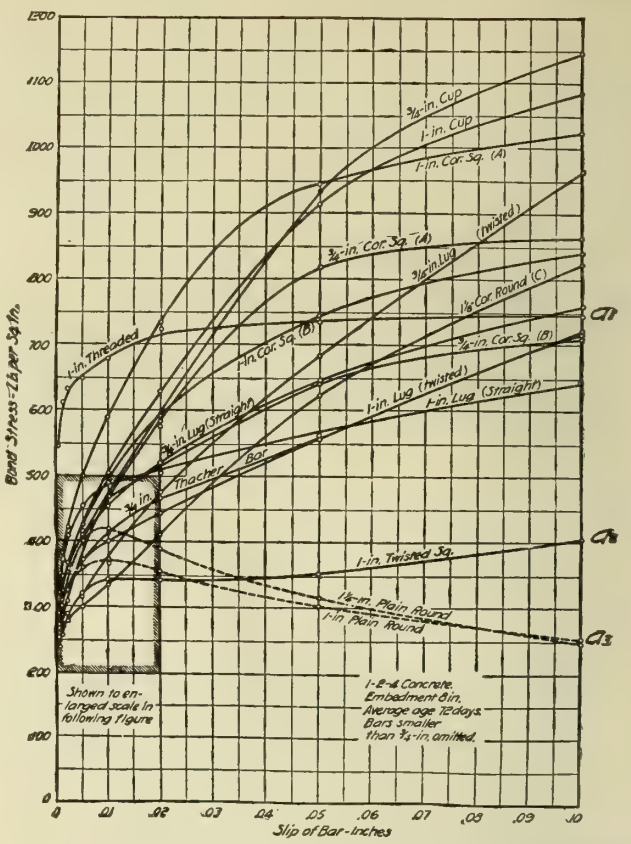


FIG. 1. DIAGRAM OF TESTS OF BOND BETWEEN CONCRETE AND STEEL

Load Slip Curves from Pull-Out Tests. Reproduced from Bulletin No. 71, University of Illinois. CORRUGATED BAR CO. patents cover all bars in above diagram, except those marked *a*

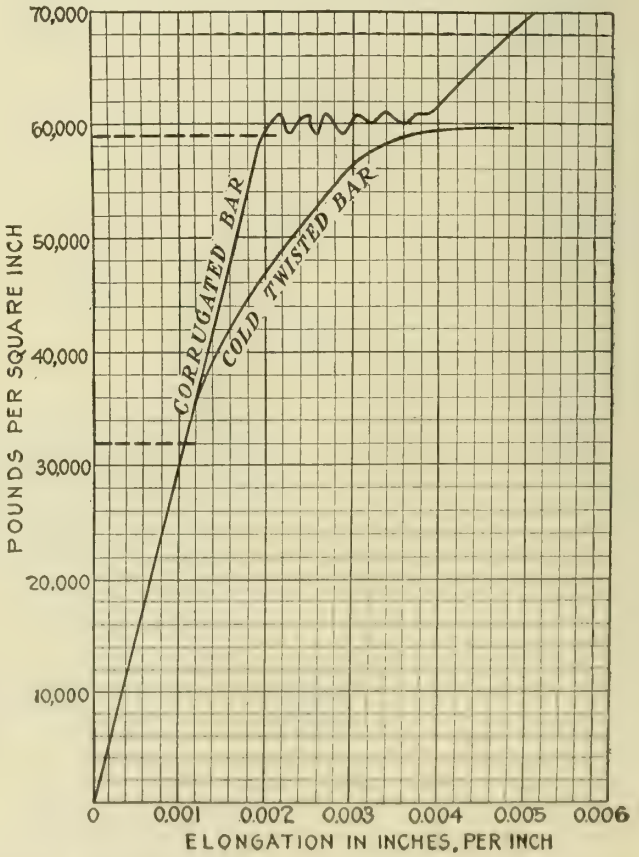


FIG. 2. DIAGRAM OF TESTS OF ELASTIC LIMIT OF TWISTED AND CORRUGATED BARS

Prepared from Unpublished Tests at the University of Illinois

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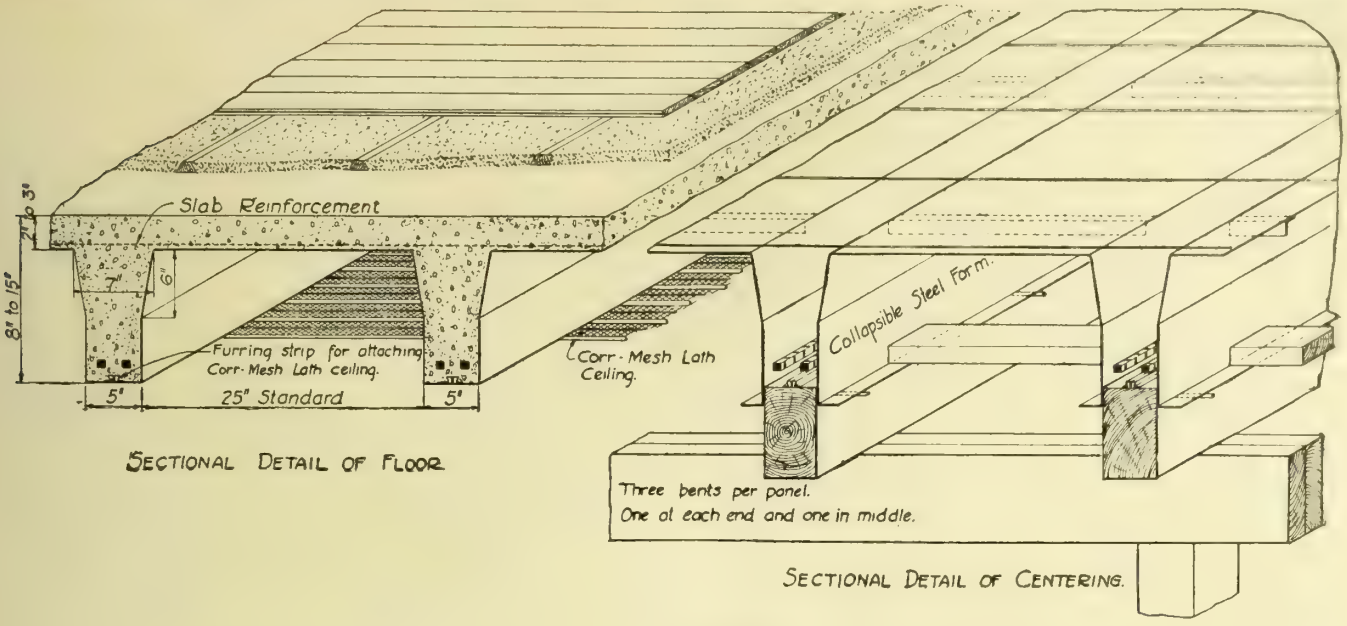
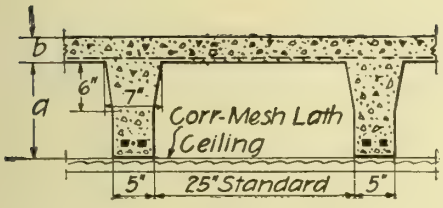


SECTIONAL DETAIL OF FLOOR

SECTIONAL DETAIL OF CENTERING.

CORR-RIB FLOORS



TYPICAL CROSS SECTION

Live Load	75 lbs. or less	100 lbs.	101 lbs. to 200 lbs.	201 lbs. to 400 lbs.
2" Slab	¼"ϕ 12" Cts.	¼"□ 12"Cts.	¼"□ 12" Cts.	⅜"○ 12" Cts.
3" Slab	¼"ϕ 24" Cts.		¼"□ 12" Cts.	¼"□ 10" Cts.

TRANSVERSE BARS IN SLAB

Corr-Rib Floors.

General—The Corr-Rib Floor represents a step in advance in the field of long span fireproof construction. It renders possible an absolutely fireproof floor with the minimum amount of dead load, a feature that makes it particularly adaptable to structural steel frame buildings, owing to the saving that may be made in the carrying beams, columns and footings. A glance at the accompanying tables will serve to emphasize the force of this statement.

Steel Cores—The feature of special interest in the construction lies in the removable steel cores used to form the concrete ribs and connecting slab. These cores may be removed in two to three days after concrete has been poured, and used over again in the upper floors. They are furnished in standard widths and lengths, and with the necessary adjustable sections to take up variation in length and width of floor panel. As shown in the cut, the standard design calls for ribs 5 inches wide and 30 inches on centers, to which are attached the sheets of Corr-Mesh Lath to receive the plaster ceiling.

SAFE SUPERIMPOSED LOADS IN POUNDS PER SQUARE FOOT FOR CORR-RIB FLOORS

TABLE NO. 1, BASED ON $\frac{WL}{12}$

fs = 18000 lbs. CORRUGATED BARS

ONE-WAY SYSTEM—CONTINUOUS SPANS

a+b	WGT.* PER SQ.FT.	BARS IN EACH RIB	SPAN OF RIBS IN FEET ¢ TO ¢ OF BEAMS																
			10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6+2	40	2-¾" ○		276	226	186	155	129	108	92	77	66	55	45	39	32	26		
6+3	53	1-¾ □ 1-¾ □			278	229	189	158	132	111	94	79	66	55	45	37	29		
8+2	44	1-¾ ○ 1-⅞ ○				304	256	216	185	158	137	118	103	88	76	66	57	49	41
8+3	57	2-⅞ ○						278	239	205	176	153	131	115	99	85	73	63	54
10+2	48	1-⅞ □ 1-⅞ □							310	269	235	205	181	160	142	124	110	98	87
10+3	61	1-⅞ ○ 1-1" ○								302	262	228	201	177	155	137	121	106	94
12+2	53	2-1" ○									345	303	269	240	213	189	171	152	136
12+3	65	1-⅞ □ 1-1" □										318	281	249	221	197	176	156	140

TABLE NO. 2, BASED ON $\frac{WL}{10}$

fs = 18000 lbs. CORRUGATED BARS

ONE-WAY SYSTEM—END SPANS

a+b	WGT.* PER SQ.FT.	BARS IN EACH RIB	SPAN OF RIBS IN FEET ¢ TO ¢ OF BEAMS																
			10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6+2	40	2-¾" ○	279	222	182	148	123	100	83	70	58	49	39	31	25				
6+3	53	1-¾ □ 1-⅞ □	343	274	222	181	149	123	101	84	69	57	47	36	29				
8+2	44	1-¾ ○ 1-⅞ ○	446	361	296	245	206	172	147	124	106	91	77	66	56	48	39	32	27
8+3	57	2-⅞ ○			380	316	265	222	188	161	136	118	100	85	72	61	52	43	35
10+2	48	1-¾ □ 1-⅞ □				404	341	289	249	215	186	162	143	125	109	95	84	73	63
10+3	61	1-⅞ ○ 1-1" ○					384	327	280	242	208	180	157	136	120	103	90	79	68
12+2	53	2-1" ○							366	318	279	244	215	190	169	149	133	117	105
12+3	65	1-⅞ □ 1-1" □							387	335	290	254	223	196	174	153	136	119	104

* Weight per sq. ft. given in table does not include Corr-Mesh lath ceiling. If ceiling is used, allow 10 lbs. per sq. ft.

NOTE—Shear reinforcement is required in ribs for all values to left of heavy stepped lines.

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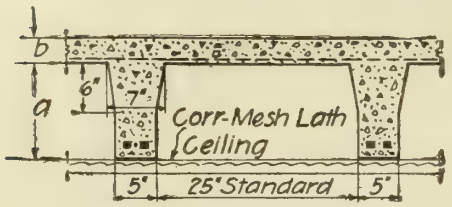


TYPICAL CROSS-SECTION

Application—This type of floor is especially designed for use in office and loft buildings, schools, hotels, apartments and other buildings of the Class "A" type.

Advantages—For a given span and depth of floor, Corr-Rib construction gives maximum carrying capacity with minimum dead load. It results in a distinct saving in all beams, columns and footings. It is fire- and sound-proof. It is applicable to spans from 10 to 26 feet, and in its design is capable of exact analysis in accordance with the Building Ordinances of the various cities. It is reinforced with shop fabricated Corr-Rib Units, having attached shear members and supporting chairs to position the unit correctly in the rib, insuring accuracy of placement of the reinforcing steel. Loose bar reinforcement can be used, if desired.

How to Specify—All floor and roof construction, unless otherwise shown or called for, shall be Corr-Rib Construction in accordance with plans and details to be furnished by the CORRUGATED BAR COMPANY, of ..... City.

Wooden falsework shall be erected and rigidly braced to support the steel cores forming the ribs of the floor.

The steel cores may be removed in two to three days after the concrete has been poured, depending upon weather conditions; but all falsework supporting the concrete ribs shall remain in place until the Architect, or his duly authorized representative, shall direct their removal.

Reinforcement shall be Corrugated Bars accurately placed and rigidly held in proper position while concrete is being poured.

Concrete shall be machine mixed in a "batch mixer," in the proportion of one part of ..... Portland cement, two parts of clean sharp sand, and four parts of clean, broken stone or washed gravel varying in size from ¼ inch to ¾ inch in longest dimension.

The placing of concrete must be a continuous operation, and the full depth of floor must be poured at one time. When necessary to stop concreting before the completion of a panel, the cut-off shall be made on the center line of the panel normal to the direction of the ribs.

Before placing concrete, the furring strip, for the attachment of the Corr-Mesh Lath ceiling, shall be tacked to the centering forming the soffit of the floor ribs.

After the removal of centering, No. ..... gauge Corr-Mesh Lath is to be wired to the furring strip by means of either galvanized or copper wire, of not less than No. 17 U. S. standard gauge, at every alternate rib of the Corr-Mesh Lath. The marginal ribs of the lath must be wired to the furring strip at all points where they overlap.

Live Load	75 lbs. or less	100 lbs.	101 lbs. to 200 lbs.	201 lbs. to 400 lbs.
2" Slab	¼"φ 12" Cts.	¼"□12"Cts.	¼" 12" Cts.	⅜"○ 12" Cts.
3" Slab	¼"φ 24" Cts.		¼"□ 12" Cts.	¼"□ 10" Cts.

TRANSVERSE BARS IN SLAB

SAFE SUPERIMPOSED LOADS IN POUNDS PER SQUARE FOOT FOR CORR-RIB FLOORS

TABLE NO. 3, BASED ON $\frac{WL}{8}$

fs = 18000 lbs.
CORRUGATED BARS

ONE-WAY SYSTEM—SIMPLE SPANS

a+b	WGT.* PER SQ.FT.	BARS IN EACH RIB	SPAN OF RIBS IN FEET ¢ TO ¢ OF BEAMS																
			10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6+2	40	1-⅜ ○ 1-½ ○	262	209	169	138	114	93	78	63	53	42	34	27					
6+3	53	2-⅜ ○	348	278	226	185	151	124	103	86	70	58	47	37	30				
8+2	44	1-¾ □ 1-⅜ □		366	301	250	209	177	150	126	110	97	79	67	58	49	41	35	29
8+3	57	1-⅜ ○ 1-1" ○		422	345	287	228	200	169	144	121	103	88	74	61	52	43	35	28
10+2	48	2-1" ○				380	320	273	233	202	175	152	132	115	100	88	76	66	58
10+3	61	1-⅜ □ 1-1" □					394	335	287	247	214	186	161	141	123	107	94	81	70
12+2	53	2-1⅜ ○							373	324	283	249	218	194	171	152	136	121	108
12+3	65	2-1" □							398	345	302	262	242	203	179	158	141	123	110

TABLE NO. 4, BASED ON $\frac{WL}{12}$

fs = 16000 lbs.
CORRUGATED BARS

ONE-WAY SYSTEM—CONTINUOUS SPAN

a+b	WGT.* PER SQ.FT.	BARS IN EACH RIB	SPAN OF RIBS IN FEET ¢ TO ¢ OF BEAMS																
			10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6+2	40	2-¾" ○	301	241	196	161	133	111	92	77	64	54	44	36	30				
6+3	53	1-⅝ □ 1-¾ □	370	297	241	197	162	134	112	93	77	64	53	42	34				
8+2	44	1-¾ ○ 1-⅞ ○		377	318	265	222	187	159	135	117	99	86	73	63	54	45	38	32
8+3	57	2-⅞ ○				341	286	241	206	176	150	129	111	95	82	69	59	50	41
10+2	48	1-¾ □ 1-⅞ □					367	313	270	234	203	177	155	137	120	104	93	82	71
10+3	61	1-⅞ ○ 1-1" ○						352	303	262	226	197	172	150	131	115	100	88	76
12+2	53	2-1" ○								343	301	264	233	206	183	163	146	129	116
12+3	65	1-⅞ □ 1-1" □								362	316	276	243	214	189	167	149	131	117

TABLE NO. 5, BASED ON $\frac{WL}{10}$

fs = 16000 lbs.
CORRUGATED BARS

ONE-WAY SYSTEM—END SPANS

a+b	WGT.* PER SQ.FT.	BARS IN EACH RIB	SPAN OF RIBS IN FEET ¢ TO ¢ OF BEAMS																
			10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6+2	40	2-¾" ○	244	193	157	127	104	85	69	58	47	38	30						
6+3	53	1-⅝ □ 1-¾ □	298	238	191	155	126	103	84	68	56	44	35	26					
8+2	44	1-¾ ○ 1-⅞ ○	390	315	258	213	178	148	125	105	90	75	64	54	44	37	30		
8+3	57	2-⅞ ○		406	332	275	228	191	161	136	115	98	83	69	58	48	39	32	
10+2	48	1-¾ □ 1-⅞ □			421	353	298	252	216	186	160	138	121	106	92	79	69	60	50
10+3	61	1-⅞ ○ 1-1" ○			478	399	335	283	242	208	178	153	132	115	99	85	73	63	54
12+2	53	2-1" ○					432	370	319	277	242	211	185	164	144	126	113	98	88
12+3	65	1-⅞ □ 1-1" □					459	391	336	290	251	219	191	167	146	128	112	98	86

TABLE NO. 6, BASED ON $\frac{WL}{8}$

fs = 16000 lbs.
CORRUGATED BARS

ONE-WAY SYSTEM—SIMPLE SPANS

a+b	WGT.* PER SQ.FT.	BARS IN EACH RIB	SPAN OF RIBS IN FEET ¢ TO ¢ OF BEAMS																
			10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6+2	40	1-⅜ ○ 1-½ ○	228	181	146	118	96	79	64	52	42	33							
6+3	53	2-⅜ ○	304	241	194	158	127	104	86	70	57	45	35	27					
8+2	44	1-¾ □ 1-⅝ □	398	320	262	217	181	152	128	108	92	78	65	55	47	39	32		
8+3	57	1-¾ ○ 1-1" ○	459	369	301	248	196	171	144	121	102	85	71	59	49	39	32		
10+2	48	2-1 ○		482	396	332	279	237	202	173	150	129	112	96	84	72	62	54	45
10+3	61	1-¾ □ 1-1" □				408	343	291	248	213	183	158	137	118	103	88	76	65	56
12+2	53	2-1⅛					440	376	326	282	246	215	188	166	147	129	115	101	90
12+3	65	2-1" □						403	346	300	260	226	198	174	153	133	118	103	90

* Weight per sq. ft given in table does not include Corr-Mesh lath ceiling. If ceiling is used, allow 10 lbs. per sq. ft.

NOTE—Shear reinforcement is required in ribs for all values to left of heavy stepped lines.

Continued on next page

Corr-Plate Floors.

Design—The flat-slab or beamless floor suggests a stress distribution at the columns corresponding to an umbrella action, requiring, in reinforced concrete, a system of radiating rods. It is not generally understood that in over ninety per cent of the area of the panel, the lines of principal stress in such floors are parallel to the sides of the panel, and that therefore a two-way system of reinforcing is bound to be more economical and more scientifically correct, provided the quantity of reinforcement per unit of width is made to vary in accordance with the gradual change in stress, as determined by extensive laboratory and field tests such as are conducted by the Research Department of the Corrugated Bar Company, and reported in various technical journals as well as in our own catalogue literature.

The Corr-Plate Floor satisfies both of these requirements, and is therefore a technically correct system of flat-slab construction.

Advantages—Our experiments demonstrated that a floor of uniform thickness was not economical, the stresses around the column being much heavier than in the middle of the panel. The Corr-Plate Floor therefore employs a cap, usually about two inches in thickness, the width of which is marked "C" in the cut, by means of which much saving in concrete is effected. This cap can be placed underneath the floor; or, if wood floor surface is used, it can be placed on top, thus giving a perfectly smooth ceiling.

The reinforcement in quantity and location was adjusted to meet the actual theoretical requirements; and as it runs, at practically all points, in exactly the right direction to coincide with the principal stresses, there can be no waste. The fact that the reinforcement is in but two layers gives an increased effective depth, as compared with those forms of flat-slab construction employing four layers of steel.

In addition to the advantages above recited that are particular to the Corr-Plate System, it has, of course, the generic advantages possessed by all types of flat-slab construction, i. e., the saving in total height of structure for given clear-story heights; simplicity of forms and ease of erection; better lighting; better ventilation; and less cost in sprinkling and overhead shafting installations.

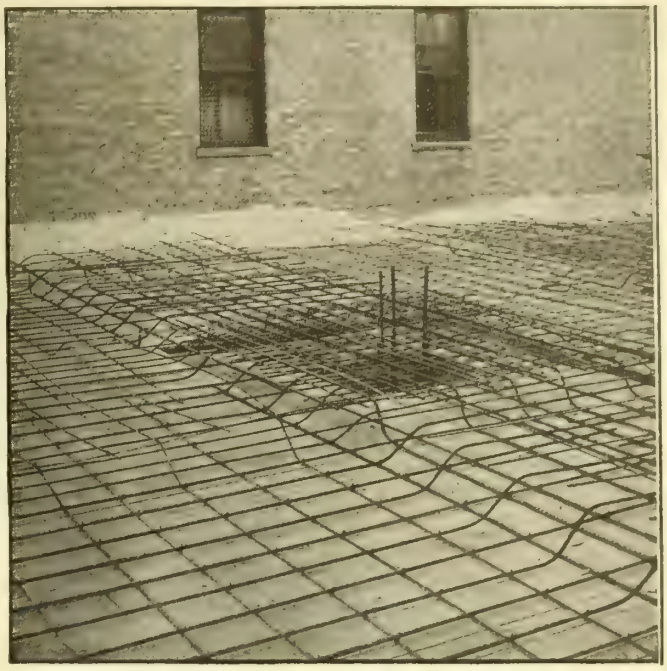
Patent Situation—In the recent case of Drum vs. Turner, the United States Circuit Court of Appeals declared the Turner Mushroom System to be an infringement of the Norcross patent, owned by the Flat Slab Patents Company, of Chicago, who claims that this decision applies not only to all types of Four-Way construction, but to Two-Way Systems as well.

After a careful consideration of the various aspects of this situation in connection with the service this company was furnishing to its clients, we decided to take out a license under the Norcross patent, which was done under date of November 24th, 1915.

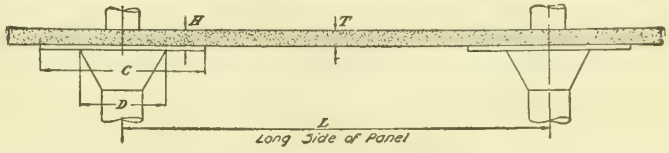
We are therefore at present able to convey on our Corr-Plate construction not merely the protection of Lindau patent No. 1,050,477, but of Norcross patent No. 698,542 as well.

Notwithstanding our obligation to pay a royalty on the Norcross patent, and the double protection that we can now supply to our clients, no increase has been made in our standard royalty charge.

How to Specify—The system used for floor and roof slabs shall be known as Corr-Plate Construction, from designs and details by the Corrugated Bar Company, ... City.



VIEW OF CORR-PLATE FLOOR, SHOWING TWO-WAY SYSTEM OF REINFORCEMENT (PATENTED)



DIMENSION DIAGRAM

DIMENSION TABLE OF CORR-PLATE FLOORS

L	C	40 Lbs.				150 Lbs.				200 Lbs.				300 Lbs.				400 Lbs.				500 Lbs.			
		T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.
15	6′–0″	5½	7½	36	73	6	8	36	79	6	8	36	79	7	9	39	92	7½	11½	42	102	8½	12½	42	114
16	6′–6″	5½	7½	36	73	6	8	36	79	6½	8½	42	86	7½	9½	42	98	8	12	45	108	9	13	45	121
17	6′–9″	5½	7½	39	73	6½	8½	42	86	7	9	45	92	8	11	45	106	8½	12½	48	114	9½	13½	48	127
18	7′–3″	6	8	39	79	6½	8½	45	86	7	9	48	92	8½	11½	48	112	9	13	51	121	10	14	51	133
19	7′–9″	6	8	42	79	7	9	48	92	7½	9½	51	98	8½	11½	51	112	9½	13½	51	127	10½	15½	51	142
20	8′–0″	6	8	42	79	7½	9½	48	98	8	10	54	104	9	13	54	120	10	14	54	133	11	16	57	148
21	8′–6″	6½	8½	45	86	8	10	51	104	8	10	54	104	9½	13½	54	127	10½	14½	57	139	11½	16½	60	154
22	8′–9″	6½	8½	48	86	8	10	54	104	8½	11½	57	112	10	14	57	133	11	16	60	147	12	18	60	162
23	9′–3″	7	9	51	92	8½	10½	57	111	9	12	60	119	10½	14½	60	140	11½	16½	60	154	12½	18½	63	168
24	9′–9″	7½	9½	54	98	9	11	60	117	9½	12½	60	125	10½	15½	63	142	12	18	63	162	13	19	66	175
25	10′–0″	8	10	57	104	9½	11½	63	123	10	13	63	131	11	16	66	148	12½	18½	66	165	14	20	69	187

Note—Dimensions T, H and D are given in inches. Weight given in pounds per square foot.

Designing Table—Table gives dimensions of Corr-Plate Floors when reinforced with Corrugated Bars for various sizes of panels and live loads. Data are based on a maximum theoretical concrete stress of 750 pounds per square inch. Slab thicknesses are such that the deflections under a superimposed test load equal to twice the safe live load plus dead load will not exceed 1/400 of span for a theoretical working stress in steel of 18,000 pounds per square inch.

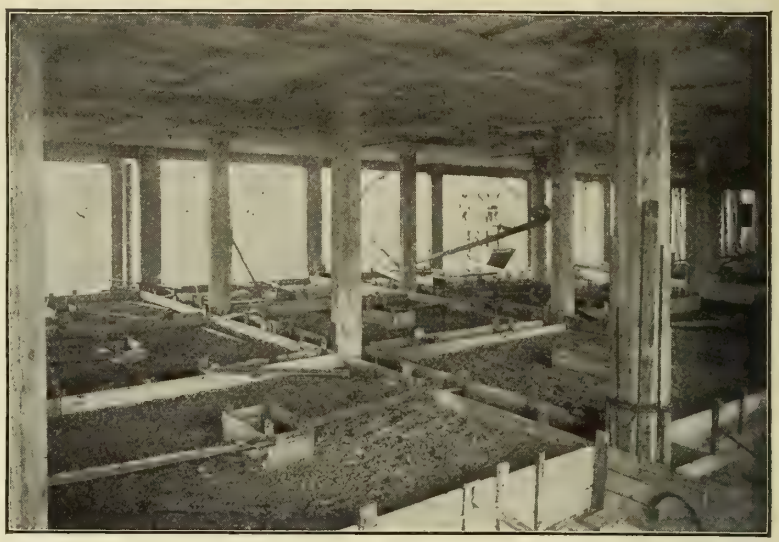
Flat-slab designs, showing smaller column head diameters, or thinner slabs over the supports, should be carefully checked for shear at the edge of the column heads.

Continued on next page

Multiple Panel Test of Corr-Plate Floor—The accompanying cut illustrates a nine-panel test conducted at the new factory building of the Shredded Wheat Company at Niagara Falls, N. Y. The panels are 20 feet 0 inches by 22 feet 0 inches, and the floor slab is 7 inches thick, designed for a safe live load of 125 pounds per square foot. The nine panels were loaded to 200 pounds per square foot; after which the load was removed from six of them, leaving three panels in a row loaded to the same intensity. Finally, the load was removed from two of the remaining panels, leaving the center panel only loaded; and the load on this was increased to 250 pounds per square foot.

The deflections observed at the middle of the central panel were as follows:

Load	Deflection in Inches	Deflection in Terms of Diagonal Span
120 pounds	0.129	1/2750
200 pounds	0.421	1/850
250 pounds	0.502	1/710

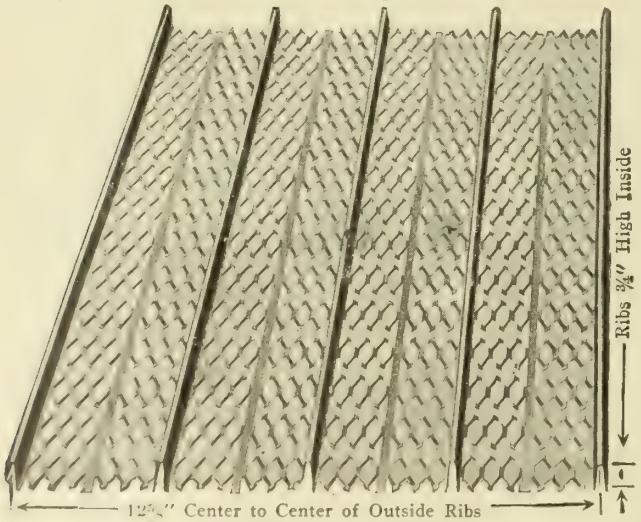


TEST OF NINE PANELS OF CORR-PLATE FLOOR AT NEW FACTORY BUILDING OF SHREDDED WHEAT CO., NIAGARA FALLS, N. Y.

In addition to the deflections, the actual stresses per square inch in the concrete and metal reinforcement were measured at all characteristic points of the various panels, this work being done in co-operation with the Engineering Experiment Station of the University of Illinois. A bulletin describing this test may be obtained on application to our Buffalo office.

Corr-Mesh (Ribs ¾ inch High).

The Material—Corr-Mesh is an expanded metal with integral stiffening ribs. It is given a protective coating of paint, applied after expansion.



CORR-MESH (PATENTED)

Advantages—The material is so expanded that it produces no internal stress in the metal, and hence it is not essential to handle it carefully in order to avoid splitting, a condition peculiar to the overexpanded products.

The ribs obviate the necessity of studs for the partitions, practically eliminate centering for the floor and roof construction, and materially reduce the amount of light steel framing required for suspended ceilings.

Other special advantages of Corr-Mesh are enumerated in the discussions of its field of application.

Dimensions—The sheets are 13 inches wide and have five ribs ¾ inch high. They are made in standard lengths of 8, 10, and 12 feet, but may also be had in intermediate lengths.

Gauges—The standard sheets are made in Nos. 24, 26, and 28 U. S. gauge. Other gauges can be furnished if required.

Corr-Mesh Partitions.

General—Corr-Mesh, when used for partitions, is steel studs and lath combined. The sheets are laid on the floor, outer ribs are interlocked and pinched together, and the whole is "up-ended" as a unit into a sheet metal top channel and a sheet metal bottom angle. When plastered, they form a solid reinforced slab of great strength and rigidity. Full details of the construction are illustrated in the accompanying plate, on page 203.

CORR-MESH PARTITIONS

Span	Gauge	Thickness of Wall
Up to 8 feet	28	1¾ inches
8 to 12 feet	28	2 inches
12 to 13 feet	26	2 inches
13 to 14 feet	26	2¼ inches
14 to 15 feet	26	2½ inches
15 to 16 feet	24	2½ inches
16 to 17 feet	24	2¾ inches
17 to 18 feet	24	3 inches

If over 18 feet in height, uprights of small angles, tees, or channels should be provided, and the Corr-Mesh Sheets placed horizontally.

Advantages—Corr-Mesh Partitions greatly reduce the amount of labor and time in the field, effect a considerable saving in floor space, are light in weight, and are fire- and vermin-proof. When used in fireproof buildings, the difference in the weight of Corr-Mesh and hollow tile partitions is enough to cause a considerable saving in the cost of the steel framing. They are much more stable than hollow tile partitions, are next to them in sound-proofing efficiency, and cost about 20 per cent less.

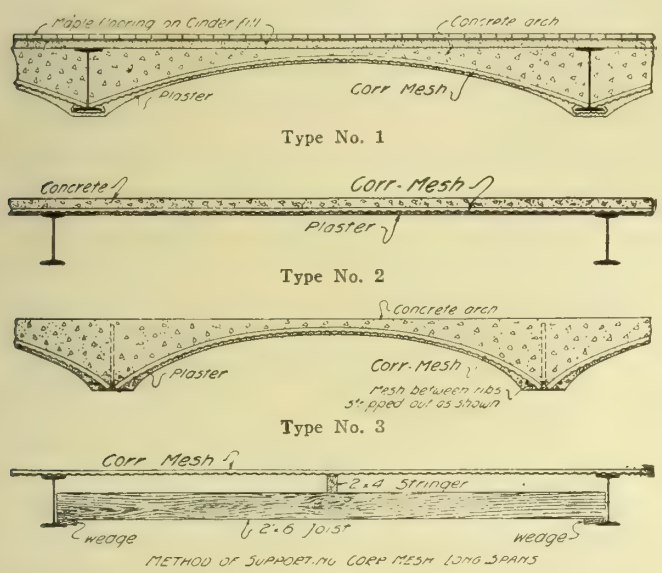
How to Specify—All partitions [3 inches or less in thickness] shall be constructed of [No. 28] gauge Corr-Mesh with ¾-inch ribs spaced not more than 3¼ inches center to center (Corrugated Bar Co., ... City), erected with ribs vertical, outer ribs interlocked and pinched together, set in sheet metal channel at ceiling and fastened by sheet metal angle at floor. Channel and angle shall be nailed to [wood plugs set in] floor and ceiling. At openings the Corr-Mesh shall be nailed to the wood bucks. Properly brace the Corr-Mesh until scratch coat on the lath side has set. [Partitions over 18 feet high shall have framing of tee, angle or channel uprights, and sheets shall be set with ribs horizontal and wired to uprights.]

Note—In connection with the above, the usual plaster specification will apply.

Continued on next page

Corr-Mesh Floors and Roofs.

General—Corr-Mesh forms a very efficient reinforcement for short-span floor and roof construction between either steel or concrete beams. The accompanying cuts illustrate three types of floor construction.



TYPES OF CORR-MESH FLOOR AND ROOF CONSTRUCTION

The Corr-Mesh for Types 1 and 3 is delivered bent to the required curvature. It is crated for shipment.

For warehouses and like buildings subject to heavy loads, Type 1 is recommended. For the lighter loads used in hotels, apartment houses, etc., Type 2 with a suspended ceiling is more desirable. Type 3 illustrates the arch panel between intermediate beams of reinforced concrete.

For carrying capacity of Type 2 slabs, see accompanying table. In view of the difficulty of formulating standard tables for arch construction, the carrying capacities of Types 1 and 3 are not given here. On

TABLE OF CARRYING CAPACITIES OF TYPE 2 SLABS

t See Sketch	Weight of Slab per Square Foot with Plaster	Gauge of Corr-Mesh U.S. Std.	SPAN IN FEET 2'-0" Total Load	2'-0" Live Load	3'-0" Total Load	3'-0" Live Load	4'-0" Total Load	4'-0" Live Load	5'-0" Total Load	5'-0" Live Load	6'-0" Total Load	6'-0" Live Load	7'-0" Total Load	7'-0" Live Load	8'-0" Total Load	8'-0" Live Load	9'-0" Total Load	9'-0" Live L'd	10'-0" Tot. L'd	10'-0" Live L'd
1"	19"	28	261	242	115	96	64	45												
		26	307	288	135	116	75	56												
		24	335	316	147	128	82	63	52	33										
1¼"	22"	28	371	349	162	140	90	68	56	34										
		26	436	414	191	169	105	83	66	44										
		24	539	517	236	214	131	109	83	61	60	38								
1½"	25"	28	482	457	210	185	117	92	74	49										
		26	565	540	247	222	136	111	87	62	61	36								
		24	744	719	325	300	181	156	115	90	79	54								
1¾"	28"	28	597	569	260	232	144	116	92	64	63	35								
		26	707	679	308	280	170	142	108	80	75	47								
		24	927	899	404	376	224	196	142	114	98	70	72	44						
2"	31"	28	712	681	311	280	172	141	110	79	76	45								
		26	850	819	370	339	205	174	130	99	90	59	66	35						
		24	1110	1079	483	452	267	236	170	139	117	86	86	55	65	34				
2¼"	34"	28	838	804	364	330	201	167	128	94	89	55								
		26	998	964	433	399	239	205	152	118	104	70	76	42						
		24	1305	1271	564	530	313	279	199	165	137	103	100	66	76	42				
2½"	37"	28	965	928	417	380	231	194	147	110	102	65	74	37						
		26	1146	1109	496	459	274	237	174	137	119	82	87	50						
		24	1500	1463	646	609	359	322	228	191	157	120	114	77	87	50	69	32		
2¾"	40"	28	1097	1057	470	430	260	220	165	125	114	74	83	43						
		26	1308	1268	559	519	310	270	196	156	135	95	98	58	76	36				
		24	1700	1660	727	687	402	362	255	215	176	136	128	88	98	58	77	37		
3"	43"	28	1230	1187	524	481	290	247	183	140	126	83	92	49						
		26	1470	1427	623	580	346	303	219	176	151	108	110	67	84	41				
		24	1900	1857	808	765	446	403	282	239	195	152	142	99	109	66	85	42		
3¼"	46"	28	1375	1329	586	540	324	278	204	158	140	94	102	56	78	32				
		26	1621	1575	690	644	381	335	241	195	166	120	121	75	92	46				
		24	2117	2071	903	857	497	451	315	269	217	171	158	112	120	74	95	49		
3½"	49"	28	1520	1471	648	599	358	309	226	177	155	106	113	64	86	37				
		26	1773	1724	758	709	416	367	264	215	181	132	132	83	100	61				
		24	2335	2286	999	950	549	500	349	300	240	191	174	126	132	83	105	56	84	35

The left-hand column marked "total load" gives for each span the total safe load capacity in pounds per square foot. This load is the sum of the dead and live loads.

The "dead load" is the weight in pounds per square foot of floor of the materials shown in the sketch.

The right-hand column marked "live load" gives for each span the safe load capacity in pounds per square foot in excess of the "dead load" as above defined.

MAXIMUM CLEAR SPANS ON WHICH CORR-MESH WILL CARRY VARYING THICKNESSES OF WET CONCRETE SLABS

Gauge of Corr-Mesh U.S. Standard	THICKNESS OF SLAB = t 1"	1¼"	1½"	1¾"	2"	2¼"	2½"	2¾"	3"	3¼"	3½"	3¾"	4"
24	5'-7"	5'-1"	4'-8"	4'-4"	4'-0"	3'-10"	3'-8"	3'-6"	3'-4"	3'-2"	3'-1"	3'-0"	2'-11"
26	4'-7"	4'-2"	3'-10"	3'-7"	3'-4"	3'-2"	3'-0"	2'-10"	2'-9"	2'-8"	2'-7"	2'-6"	2'-5"
28	4'-0"	3'-7"	3'-3"	3'-1"	2'-10"	2'-8"	2'-7"	2'-6"	2'-5"	2'-4"	2'-3"	2'-2"	2'-1"

For greater spans use temporary supports, as shown in detail at left.

receipt of full particulars, our nearest office will send you full calculations for each particular condition.

For sloping roofs of Corr-Mesh slabs, see plate on page 204.

Advantages—The ribs of Corr-Mesh act as beams and practically eliminate centering (see accompanying table), thereby effecting a considerable saving in cost and increasing the speed of erection. For the longer spans, only temporary supports are required.

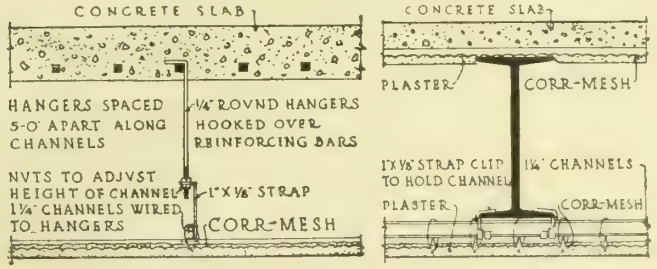
How to Specify—All floor and roof construction shall consist of concrete [slabs] [3"] thick, reinforced with [No. 24] gauge Corr-Mesh with ¾-inch ribs spaced not more than 3¼ inches center to center (Corrugated Bar Co., ... City), laid with the rib side upward. Outer ribs shall be interlocked and pinched together and ends shall be lapped two inches. Ends of sheets in all cases shall bear on supporting beams. Attach alternate sheets to each supporting beam at the outer or lapped rib with Corr-Clips. Provide ¼-inch round rods every two feet at right angles to ribs and wired thereto.

Concrete shall be composed of 1 part ..... Portland cement, 2 parts of clean, sharp sand and 4 parts of clean screened broken stone or washed gravel which will pass a half-inch ring. Retard the drying of concrete in hot weather by screening from sunlight and keeping well wet down for at least 48 hours.

After concrete has set, plaster the under side of slab ½ inch thick with mortar containing long cattle hair and composed of 5 parts ..... Portland cement, 12 parts of clean, sharp sand, and 1 part of ..... hydrated lime, all thoroughly mixed dry to a uniform color, and water then added to secure proper working consistency.

Corr-Mesh Ceilings.

Corr-Mesh makes an economical suspended ceiling. Being a combined unit of steel lath and furring, it eliminates 80 per cent of the light steel framing and time-consuming wiring. The mesh affords a positive plaster key. As shown in the cuts, the material is placed with the lath side down and cross-supports for the ribs are provided about every 4 or 5 feet. The hangers permit of adjustment to bring the ceiling to a true plane surface. Corr-Mesh, with ¾-inch ribs, of No. 28 gauge will span up to 3 feet, 11 inches; No. 26 to 4 feet, 11 inches; and No. 24 to 5 feet, 11 inches.



DESIGNING DETAILS OF CORR-MESH CEILINGS

How to Specify—Under all floor and roof slabs provide Corr-Mesh ceilings (Corrugated Bar Co., ... City), consisting of [No. 28] gauge Corr-Mesh with ¾-inch ribs spaced not more than 3¼ inches center to center, with rib side upward, ¼-inch round rod adjustable hangers every 5 feet, and 1¼-inch steel channel cross lines [3 feet 11 inches] apart, wired to the hangers and to the mesh at every rib. Outer ribs shall be interlocked and wired or pinched together at 24-inch intervals. End-laps shall be at least 2 inches, and shall occur only under lines of support.

Continued on next page

Corr-Mesh Walls.

General—The Corr-Mesh Wall may be used in connection with wood- or steel-framed stucco buildings.

In the former case, it gives a new type of stucco construction, calculated to eliminate the cracking to which stucco on wood is subject.

When applied to a skeleton steel frame, it gives a type of wall especially suited for factories and such other buildings of an industrial character as are not required to be heated to the same degree as stores and office buildings.

Corr-Mesh Walls are especially adapted for the construction of garages, and if constructed with a light steel framework or concrete columns (see plate page 203) make first-class fireproof construction.

Advantages—The Corr-Mesh Wall on a wood frame requires no sheathing, yet produces a better insulated wall. The cracking of stucco is caused by the opposite way in which the wood and cement are influenced by changes of temperature.

With a rise in temperature the stucco expands, whereas the supporting sheathing loses moisture and shrinks. Thus, for all changes of temperature, there is necessarily a slip between the sheathing, or supporting wood frame, and the stucco exterior, and the usual method of stucco construction makes such movement impossible without the cracking of the stucco.

A two-inch monolithic Corr-Mesh Wall, standing on edge on the foundations like a stone slab, the studs being housed into the slab, gives a thoroughly braced and substantial wall, and one free from the above objections.

The Corr-Mesh Wall on a steel frame costs about half as much as brick; is permanent, presentable and economical, and gives first-class fire protection.

Solid Stucco—Wood Frame.

Method of Construction—The plate on page 202 illustrates in full detail a typical example of Corr-Mesh Stucco Wall construction applied to a wood frame, and affords the information requisite to adapt it to varying conditions.

How to Specify—All exterior walls shall be of Corr-Mesh Construction (Corrugated Bar Co., ... City), applied to the timber frame in accordance with manufacturers' printed directions. Outside surface of wall shall be sheathed with 28 gauge Corr-Mesh with ¾-inch ribs spaced not more than 3¼ inches center to center, laid with the ribs outward and horizontal and stapled to every stud at both edges of every sheet. Outer ribs shall be interlocked and pinched together. Sheets shall be end-lapped 6 inches over bearings.

Over the above, stucco two coats on the outside surface and one coat (between the studs) on the inside surface, finishing the wall 2 inches thick.

Mortar shall be composed of 10 parts of ..... Portland cement and 1 part ..... hydrated lime, measured by volume, and be thoroughly mixed dry; 1 part of this cement-lime mixture and 2 parts sand, measured by volume, shall be thoroughly mixed dry, and sufficient water then added to make a stiff plaster.

The mortar for the first coat shall contain a thorough intermixture of long cow hair of good quality, in the proportions of 1 pound of hair for each sack of cement used.

The mortar for the ¾-inch finish coat on exterior wall shall contain Corr-Base, in the proportion of 1 gallon of base to each 18 gallons of water used to temper the mortar. The base shall be thoroughly mixed into the water. Mix mortar in quantities only sufficient for immediate use.

First coat shall be scratched. Finish coat shall be applied as soon as first coat has set and before it has dried. Finished surface shall be brought to a color and texture as directed. Lay up samples well in advance of work. Inside coat shall be troweled fairly smooth. In hot weather the stucco shall be screened and kept well wet down for at least 48 hours after initial set to retard the drying.

Note—In carpentry specification state: "No sheathing will be required for exterior walls, but framework of walls shall be wrapped with waterproof paper tacked in place or painted with oil paint in accordance with manufacturers' printed directions."

Solid Stucco—Steel Frame.

Method of Construction—The plate on page 204 illustrates a typical example of Corr-Mesh Factory Wall construction applied to a steel frame, Corr-Mesh roof being also used. This furnishes the complete information for adapting it to varying conditions.

How to Specify—All exterior walls shall be of Corr-Mesh Construction (Corrugated Bar Company ..... City), applied to the steel frame in accordance with manufacturers' printed directions, the ribs being placed outward and horizontally and attached to the steel work by means of special wall clips or bolts spaced not more than 6½ inches apart on each furring strip or steel member.

To guard against cracking of stucco from temperature stresses, where the length of wall is more than 25 feet, end-laps of sheets shall be not less than six inches, and pinched together by special punch, adjacent sheets breaking with respect to their end joints.

In cases where it is not practicable to run the Corr-Mesh sheets horizontally, then ¼-inch round temperature rods shall be laid in horizontal lines 24 inches apart.

Over the above, stucco two coats on the outside surface and one coat on the inside surface, finishing the wall two inches thick.

Mortar shall be composed of 10 parts of ..... Portland cement and 1 part ..... hydrated lime, measured by volume, and be thoroughly mixed dry; 1 part of this cement-lime mixture and 2 parts sand, measured by volume, shall be thoroughly mixed dry, and sufficient water then added to make a stiff plaster.

The mortar for the first coat shall contain a thorough intermixture of long cow hair of good quality, in the proportions of 1 pound of hair for each sack of cement used.

The mortar for the ¾-inch finish coat on exterior wall shall contain Corr-Base, in the proportion of 1 gallon of base to each 18 gallons of water used to temper the mortar. The base shall be thoroughly mixed into the water. Mix mortar in quantities only sufficient for immediate use.

First coat shall be scratched. Finish coat shall be applied as soon as first coat has set and before it has dried. Finished surface shall be brought to a color and texture as directed. Lay up samples well in advance of work. Inside coat shall be troweled fairly smooth. In hot weather the stucco shall be screened and kept well wet down for at least 48 hours after initial set to retard the drying.

Corr-Mesh Lath (Ribs $\frac{5}{16}$ inch High).

The Material—Corr-Mesh Lath is a ribbed expanded metal lath. It is a one-piece product in which the ribs, $\frac{5}{16}$ inch high and spaced 3 inches center to center, are connected by a diamond mesh. It is given a protective coating of paint after expansion.

Its Field—Corr-Mesh Lath is used for ceilings, solid and double partitions, and as a combined furring and lath for plastering both interior and exterior. For stucco work, it is preëminently the superior of any other material.

Advantages—As Corr-Mesh Lath requires no side-laps, there is a saving of eight per cent of the total material. For ceilings and partitions, Corr-Mesh Lath affords a surface which can be plastered with maximum speed and economy. The ribs stiffen the lath, permitting a greater distance between studs or beams than the usual 16-inch spacing. See table herewith.

DISTANCE BETWEEN SUPPORTS FOR CORR-MESH LATH WITH $\frac{5}{16}$-INCH RIBS

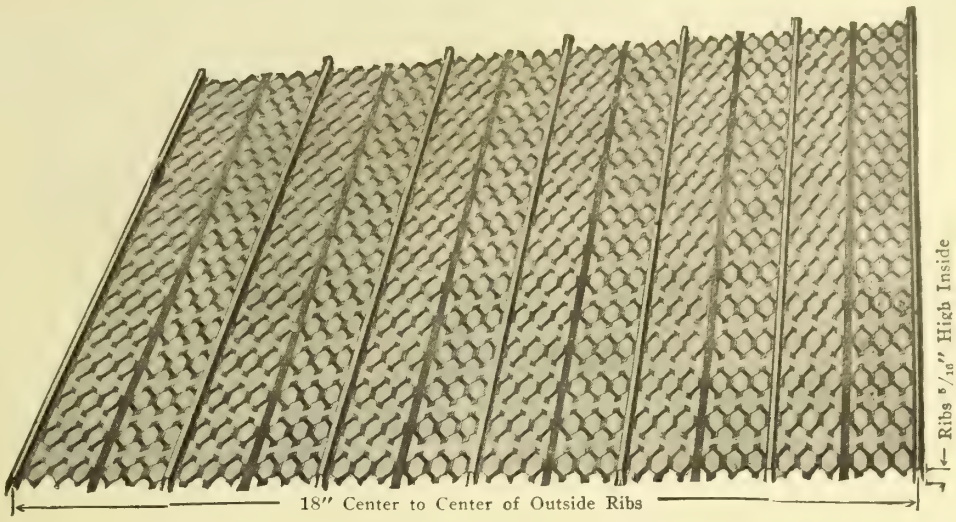
Gauge	For Ceilings	For Walls
24	36 inches	40 inches
26	32 inches	32 inches
28	26 inches	26 inches

Continued on next page

As Corr-Mesh Lath is a combined unit of steel lath and furring, it saves the cost of strips and the labor of placing them, making an economical furring. The ribs hold the lath at a sufficient distance from the wall to permit the plaster to key perfectly.

Dimensions—The sheets are 18 inches wide, and are made in standard lengths of 8 and 12 feet, painted, and 8 feet galvanized, but may also be had in intermediate lengths.

Gauges — The standard sheets are made in Nos. 24, 26 and 28 U. S. gauge, painted and galvanized. Other gauges can be furnished special, if required.



CORR-MESH LATH (PATENTED)

General Construction Details—The plate on page 205 illustrates the application of Corr-Mesh Lath. In erecting, there are no side-laps, as the sheets are fastened together by nesting the outside ribs of adjacent sheets and then wiring every 24 inches. Two-inch end-laps are sufficient, and they should always be made at supports. The sheets are placed with the lath side out and fastened by staples driven over the ribs.

How to Specify—All [walls, partitions, ceilings, stair soffits, etc.] shall be lathed with Corr-Mesh Lath with 5/10-inch ribs spaced not more than 3 inches center to center (Corrugated Bar Co., ... City), laid with 2-inch end-laps and fastened by a staple or by wiring over each rib at every bearing. Outside ribs of adjacent sheets shall be nested and wired together every 24 inches. End joints shall be broken, and made only at bearings.

Note—In connection with the above, the usual plaster specification will apply.

Stucco Veneer—Wood Frame.

To make successful stucco construction where wood sheathing is used, there is needed a lath with strong horizontal ribs that can both pull and push and force this movement, while at the same time preventing the cracking of the stucco; and for those who would like to retain the wood sheathing for one reason or another, we have a special material for this purpose, which we call Corr-Mesh Lath, details as to the use of which are shown in plate on page 205.

Method of Construction—The plate on page 205 illustrates in full detail a typical example of Corr-Mesh Lath Stucco Veneer Wall construction applied to a wood frame, and affords the information requisite to adapt it to varying conditions.

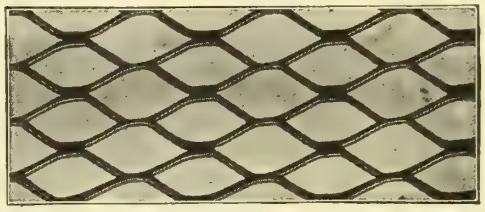
How to Specify—All exterior walls shall be of Corr-Mesh Lath Construction (Corrugated Bar Co., ... City), applied to the timber sheathing in accordance with manufacturers' printed directions. Outside surface of wall shall be covered with [No. 28] Gauge Corr-Mesh Lath with 5/16-inch ribs spaced not more than 3 inches center to center, laid with ribs inward and horizontal and fastened to the sheathing by staples in vertical rows 24 inches apart, each rib being fastened every 48 inches. Outer ribs shall be interlocked. Sheets shall be end-lapped 6 inches.

Note—In connection with the above, the usual plaster on stucco specification will apply.

Corr-Lath.

Corr-Lath is an expanded metal lath which affords a perfect key for any standard lime or patent plaster with no waste material. It is made in Nos. 24, 25, 26, and 27 U. S. gauge.

How to Specify—All [walls, partitions, ceilings, stair soffits, etc.] shall be lathed with Corr-Lath (Corrugated Bar Co., ... City), lapped 1 inch, stapled [or wired] to every bearing, jointed only at bearings and end joints broken.


CORR-LATH

Corr-Base.

General—Corr-Base is a white paste water-repellent which, when incorporated in mortar or concrete, makes the final mass waterproof. The base of the material is paraffine, a hydrocarbon that is unaffected by water and remains tough and waxy throughout a wide range of temperature, characteristics most necessary for an efficient waterproofer.

The Corr-Base is mixed with the water that is to moisten the dry mixture of cement and aggregate. By dissolving the Base thoroughly in the mixing water, a uniform distribution throughout the entire mass is assured. It has no effect on the mass or reinforcement other than to waterproof it. It is not affected by atmospheric changes, nor by oils, alkalies, gases, or acids likely to reach it.

Field of Use—It is used for waterproofing stucco, exterior concrete walls, concrete cisterns, cement blocks, etc. Combined with a rich mixture of cement and sand and applied to the outside surface of cellar walls, it will render them impervious to moisture.

Amount of Base to Use—For ordinary conditions, 1 gallon of Base to each 36 gallons of water used to temper the concrete waterproofs 1:2:4 mass concrete.

For 1:2 mortar coating of cement and sand use 1 gallon of Base to each 18 gallons of water used to temper the mortar.

For special conditions, consult our Engineering Department as to the best proportion to use.

How to Specify—Waterproof the [concrete] with Corr-Base (Corrugated Bar Co., ... City) in the proportion [....] of Base for each [....] gallons of water used to temper the concrete, mixed in accordance with manufacturers' printed directions.

Note—See also specification for "Corr-Mesh Walls."

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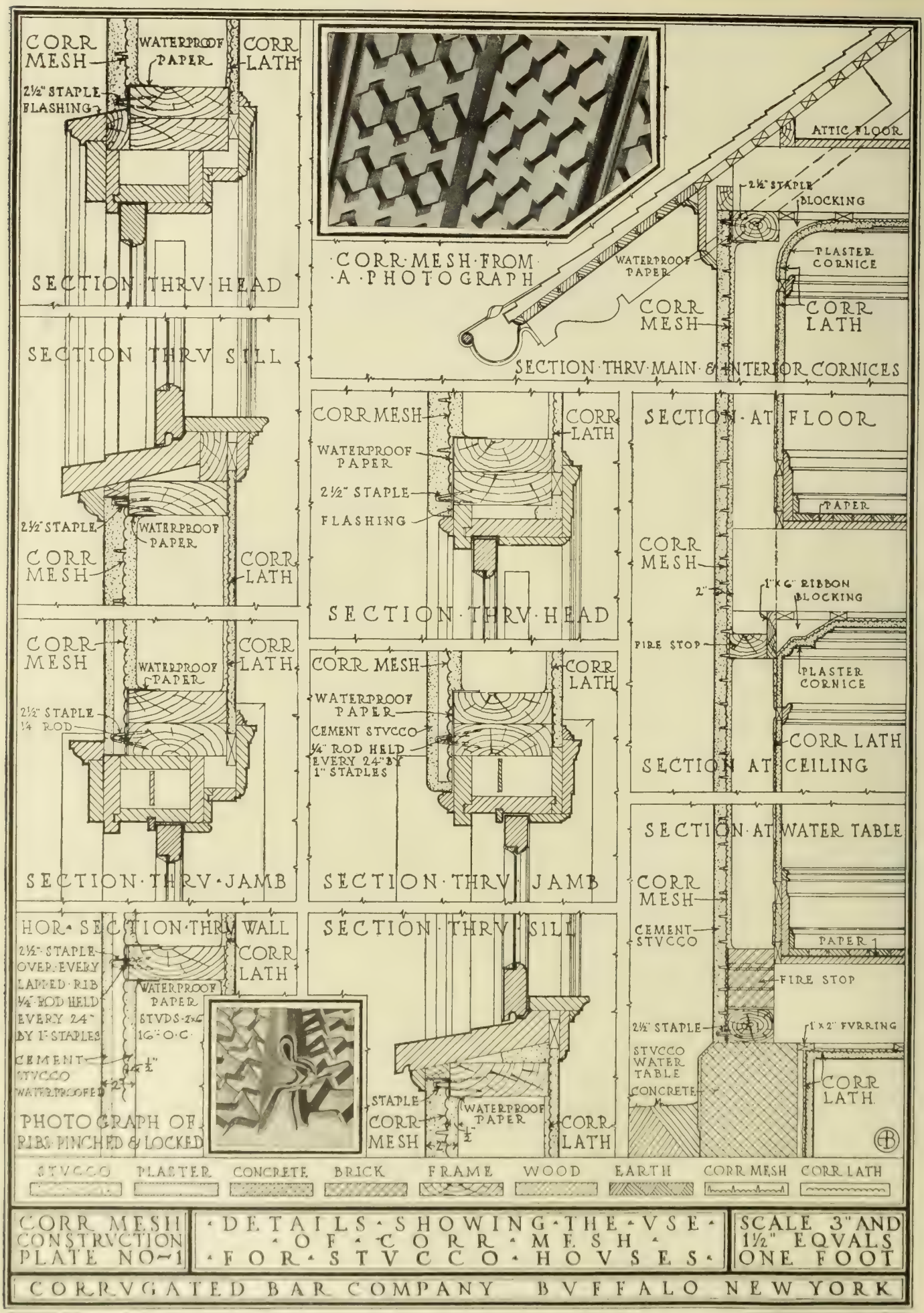

Continued on next page

BEAM
GROOVE FORMED BY BEVELED STRIP PLACED IN FORM
CORR MESH
CEMENT STVCCO WATERPROOFED
VERTICAL ANGLE
WALL CLIP
SECTION AT HEAD

COLVMN
GROOVE FORMED BY BEVELED STRIP PLACED IN FORM
CORR MESH
SECTION AT SIDES

CORR MESH
2"
VERTICAL ANGLE STVD
STVCCO
WALL CLIP
HORIZONTAL SECTION THRV WALL

CORR MESH
STVDS ANCHORED TO CONCRETE BY MEANS OF EXPANSION BOLTS, RECESS IN CONCRETE OR ANCHOR BOLTS IN CONCRETE
2" SOLID CEMENT WALL
RECESS
WATERTABLE
GRADE
SECTION AT FLOOR

¼" HANGER
1"X⅛" STRAP
CHANNELS
CORR MESH
1"X¾" CHANNEL WIRED TO CEILING
PICTVRE MOVLD
WOOD GROVNDS
DETAIL AT CEILING

CHAIR RAIL
WOOD GROVNDS NAILED THROVGH
DETAIL AT CHAIR RAIL

WOOD GROVND
MARBLE OR SLATE BASE
¾ PRONG ANGLE NAILED TO WOOD BLOCKS 3' APART
DETAILS AT FLOORS
CEMENT FLOOR

CORR MESH
2" SOLID PLASTER PARTITION
2"X4" STVDS
DETAIL OF DOORJAMB

CORR MESH
DETAIL OF GLAZED PARTITION

BACK OF POCKET
7"
JAMB FOR SLIDING DOOR

CORR MESH | CONCRETE | STVCCO | PLASTER | CINDERS | STEEL | FRAME | WOOD | MARBLE

CORR MESH CONSTRVCTION PLATE NO-2

DETAILS SHOWING THE VSE OF CORR MESH FOR GARAGE AND INTERIOR PARTITIONS

SCALE 1½ INCHES EQVAL ONE FOOT

CORRVGATED BAR COMPANY BVFFALO NEW YORK

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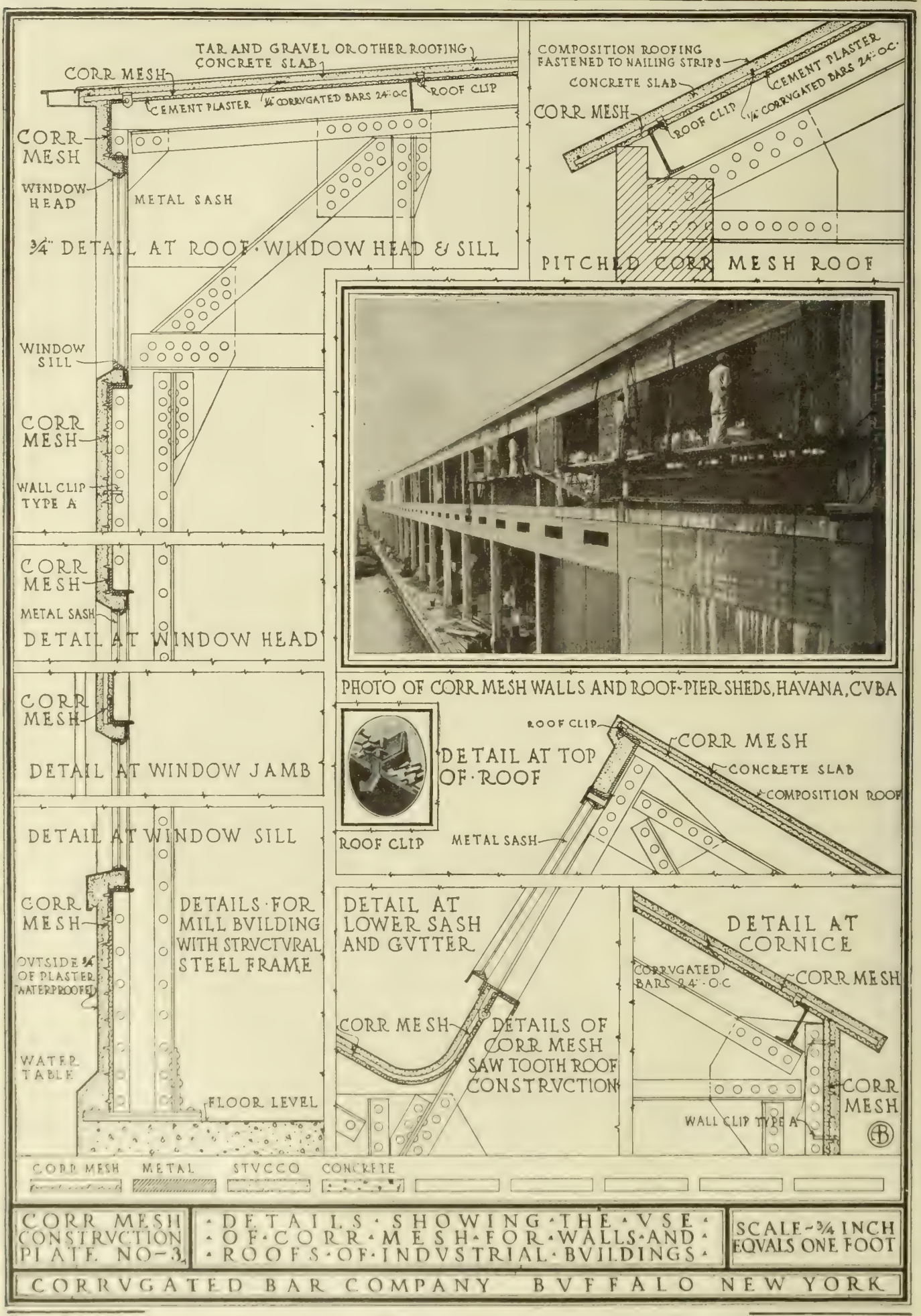

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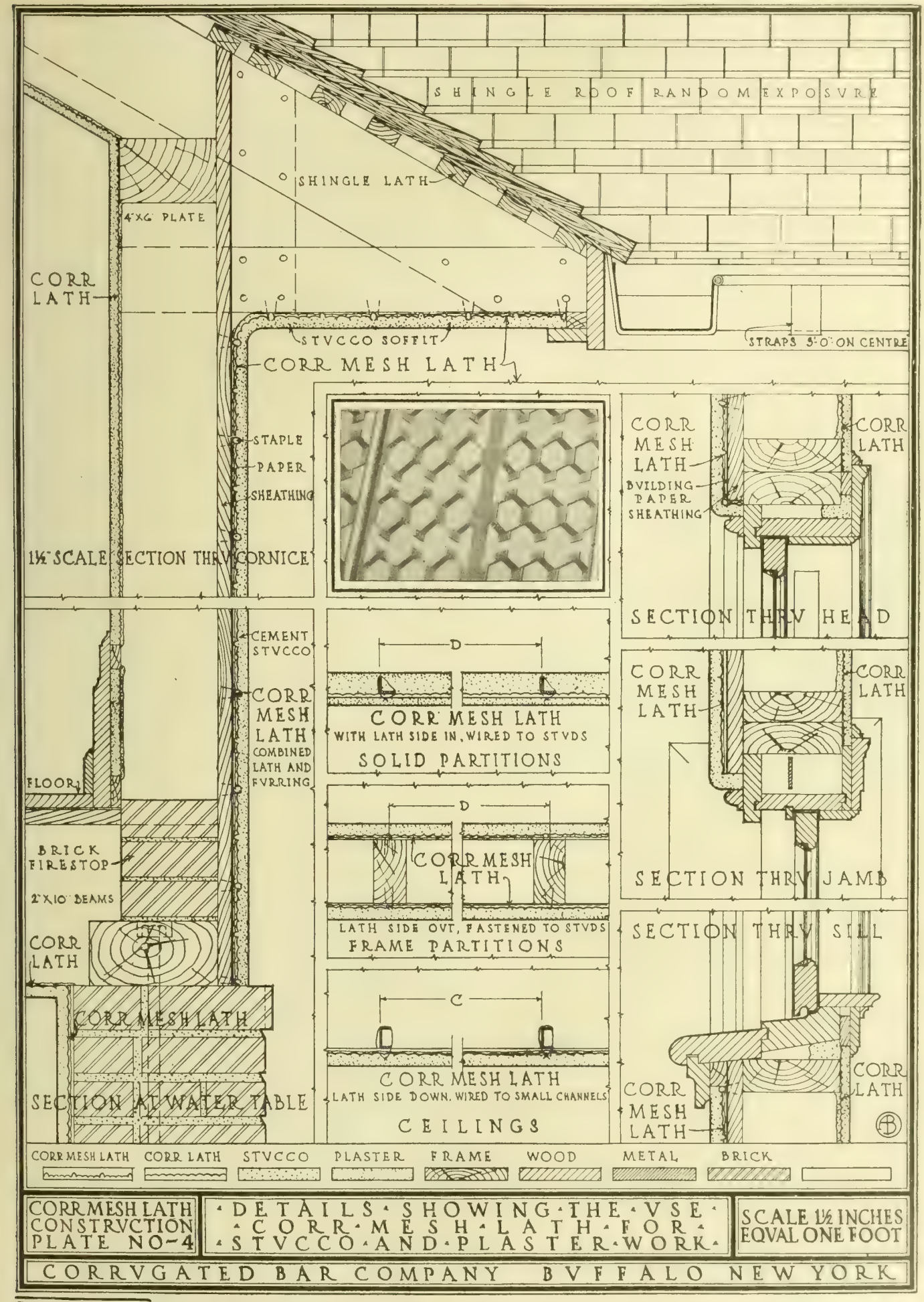
SHINGLE ROOF RANDOM EXPOSURE
SHINGLE LATH
4"X6" PLATE
CORR LATH
STUCCO SOFFIT
CORR MESH LATH
STRAPS 5'-0" ON CENTRE
STAPLE
PAPER
SHEATHING
1½" SCALE SECTION THRU CORNICE
CORR MESH LATH
BUILDING PAPER
SHEATHING
CORR LATH
SECTION THRU HEAD
CEMENT STUCCO
CORR MESH LATH
COMBINED LATH AND FURRING
FLOOR
BRICK FIRESTOP
2"X10" BEAMS
CORR LATH
CORR MESH LATH
SECTION AT WATER TABLE
D
CORR MESH LATH
WITH LATH SIDE IN, WIRED TO STUDS
SOLID PARTITIONS
D
CORR MESH LATH
LATH SIDE OUT, FASTENED TO STUDS
FRAME PARTITIONS
C
CORR MESH LATH
LATH SIDE DOWN, WIRED TO SMALL CHANNELS
CEILINGS
CORR MESH LATH
CORR LATH
SECTION THRU JAMB
SECTION THRU SILL
CORR MESH LATH
CORR LATH
CORR MESH LATH
CORR LATH
STUCCO
PLASTER
FRAME
WOOD
METAL
BRICK
CORR MESH LATH CONSTRUCTION PLATE NO-4
DETAILS SHOWING THE USE OF CORR MESH LATH FOR STUCCO AND PLASTER WORK
SCALE 1½ INCHES EQUAL ONE FOOT
CORRUGATED BAR COMPANY BUFFALO NEW YORK

THE BARTON SPIDER-WEB SYSTEM

Flat-Slab Reinforced Concrete Construction

TELEPHONES:
WABASH { 2188 / 2187
AUTO. 53—963

GENERAL OFFICES
822 Medinah Building
CHICAGO, ILL.

Products and Services.

Designers of BARTON SPIDER-WEB SYSTEM of FLAT-SLAB REINFORCED CONCRETE CONSTRUCTION. REINFORCING MATERIAL of all kinds, including BARS, UNIT FRAMES, SPIRALS and UNIT MATS. SPIRAL STEEL CONCRETE INSERTS, ADJUSTABLE INSERTS, COMPRESSION FERRULES, and "EVER-READY" SCUPPERS.

ENGINEERING SERVICES furnished for any structure of REINFORCED CONCRETE. Fees included in lump-sum price quoted to contractors on all reinforcing steel required.

Patent Protection.

Operating under the basic Norcross Flat Slab patent, recently upheld by United States Supreme Court decision, and the Barton patents, thus affording our customers complete protection against infringement suits.

Flat-Slab Construction.

For factories and warehouses especially; and, under some conditions, for offices, lodge halls, stores and hotels.

Advantages.

The requisite strength is obtained in the slab without the use of beams or girders extending below the level of the ceiling. Thereby lighting and heating are facilitated; story heights are reduced; fixtures and shafting are easily placed; the appearance is made pleasing. Greater economy is effected than with beam and girder construction, because of the simplicity of the form work and ease of laying steel.

Method of Reinforcing.

Belts of rods, as shown in illustrations, extend from column to column, both directly and diagonally, covering the entire panel area and resting in the bottom of the slab. These rods are straight and of short lengths, being very easy to handle. In this manner the positive tensile stresses in the slab are taken care of. The negative stresses around the column are taken care of by a mat of rods fabricated in shop and sent to the job ready to install. The rods in this mat run in two directions, and the ends are bent down. This method absolutely insures the proper position of this steel and forms stirrups, which take care of shear and act as spacers for the lower tension rods.

Authoritative Test.

The Building Department of the City of Chicago, which has very rigid flat-slab requirements, caused the commissioner of buildings to select a board of examiners, consisting of Prof. A. N. Talbot, of Illinois University, Prof. W. K. Hatt, of Purdue University, and Ernest McCullough, a consulting engineer of Chicago, to investigate the Barton Spider-Web System and to determine its design standards. The A. D. Curtis warehouse building, Chicago, was erected, and, after sixty days, a test was made for determining the actual stresses in the steel and in the concrete, at different points, under different loads. The design live-load was 200 pounds per square foot; a maximum of 500 pounds per square foot was applied to two panels. The maximum deflection recorded was $^{16}/_{100}$ of an inch, while the maximum stress under this load was only 12,000 pounds per square inch for the steel. The records show a very even distribution of stress approaching the ideal in this respect. Comparisons of the result of this test with the results of all other similar tests have proved to the building department and engineers generally the advisability of using the "Unit Mats" of the Barton Spider-Web System in order to secure the correct position of all reinforcement. The test was conducted by Prof. A. N. Talbot, with the assistance of W. A. Slater, C. E., of the Experiment Station of the Illinois University.

Specifications to Be Used.

"The structural parts of this building shall be constructed in the Barton Spider-Web System in strict accordance with the working drawings furnished by the BARTON SPIDER-WEB SYSTEM, Medinah Building, Chicago, Ill."

TYPE OF BUILDINGS WHERE BARTON SPIDER-WEB SYSTEM HAS BEEN USED THROUGHOUT

BUILDING	LOCATION	ARCHITECT
Edgewater Beach Hotel, 9 Floors	Chicago, Ill.	Marshall & Fox
Stewart Warner Speedometer Corp., 7 Floors	Chicago, Ill.	L. G. Hallberg & Co.
Henneberry Building, 5 Floors	Chicago, Ill.	S. N. Crowen
Illinois Cold Storage, 7 Floors	Chicago, Ill.	B. H. Jillson
Harder Improved Storage, 6 Floors	Chicago, Ill.	S. H. Dunford
J. P. Squires & Co., 8 Floors	E. Cambridge, Mass.	A. H. Eldredge
Swift & Co., 5 Floors	Havana, Cuba	B. H. Jillson
Harris Transfer, 5 Floors	Birmingham, Ala.	S. H. Dunford
Williams Hardware Co., 5 Floors	Streator, Ill.	F. G. Foster
Hanson and Hadley, 5 Floors	Waterloo, Iowa	Clinton P. Schockley
Des Moines Creamery, 5 Floors	Des Moines, Iowa	Frederick and Edwin Clarke
Saginaw Beef Co., 7 Floors	Saginaw, Mich.	Cowles & Mutscheller
Fairmont Creamery, 5 Floors	Louisville, Ky.	S. H. Dunford
Bank Savings Building, 7 Floors	Lima, Ohio	McLaughlin & Hulsken
F. E. Scobey, 5 Floors	San Antonio, Tex.	S. H. Dunford
Swift & Co., 4 Floors	Wichita, Kan.	B. H. Jillson
Crescent Macaroni & Cracker Co., 7 Floors	Davenport, Iowa	Clausen & Kruze
Theo. Leinenweber Store, 5 Floors	Sidney, Ohio	McLaughlin & Hulsken
Buick Building, 6 Floors	Cleveland, Ohio	W. S. Ferguson

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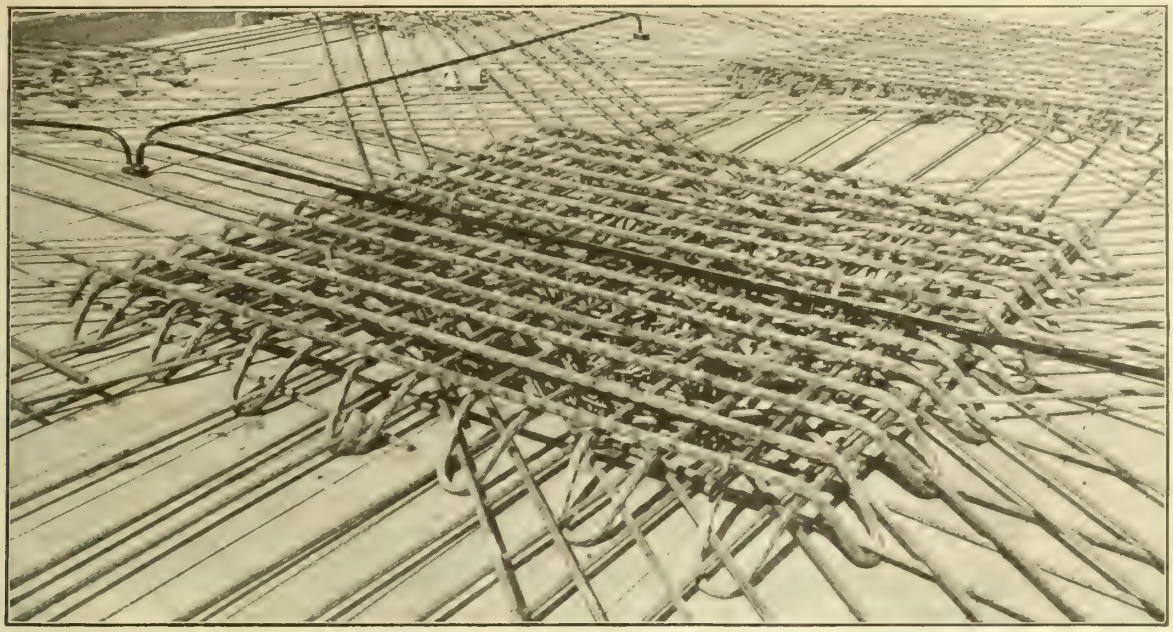
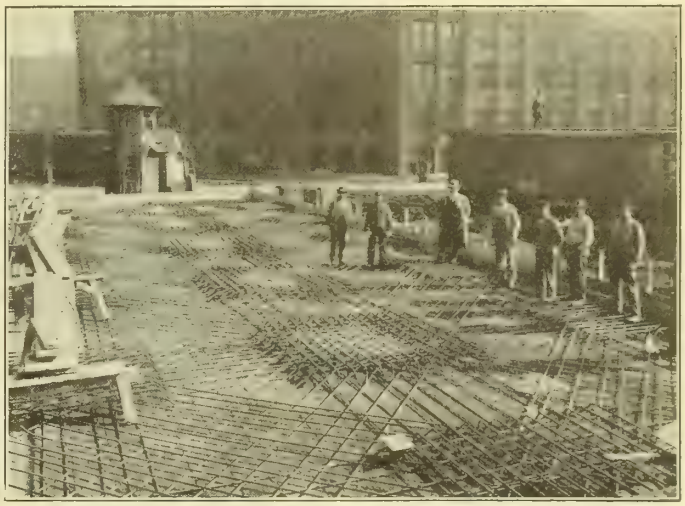


DETAIL SHOWING REINFORCEMENT CONSISTING OF UNIT MATS AT TOP OF COLUMN HEAD

McGUIRE'S BUILDING, CHICAGO, ILL., SHOWING A TYPICAL INTERIOR IN BARTON SPIDER-WEB SYSTEM



WAREHOUSE FOR THE MILLER BREWING COMPANY, CHICAGO, ILL., SHOWING THE REINFORCEMENT IN THE BARTON SPIDER-WEB SYSTEM

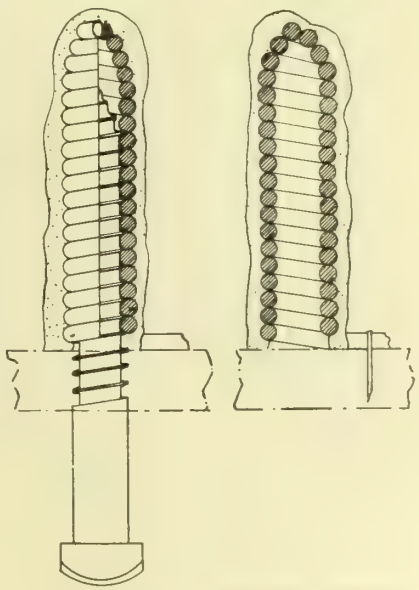
EXTENSOMETER TEST ON CURTIS BUILDING, CHICAGO, ILL., CONDUCTED BY PROF. A. N. TALBOT OF ILLINOIS UNIVERSITY FOR CITY OF CHICAGO

Load 500 pounds per square foot. Deflection $^{16}/_{100}$ of an inch

Spiral Steel Concrete Inserts.

Spiral Steel Sockets are used as a means of securing shafting, pipes, fixtures, etc., to concrete. Imbedded in the concrete, they eliminate the necessity of drilling. They are made of a special drawn wire so coiled that the threads of standard lag screws mesh with them. The most efficient and reasonable insert on the market.

Samples, prices, sizes, sent on request.



SPIRAL STEEL CONCRETE INSERT

CONCRETE ENGINEERING CO.

OMAHA, NEB.

DISTRICT OFFICES: CHICAGO, CLEVELAND, KANSAS CITY, SALT LAKE CITY, SAN FRANCISCO, LOS ANGELES

Products.

MEYER STEELFORM CONSTRUCTION, Reinforced Concrete System (Patented).

STEELFORMS; also REINFORCING STEEL; ROUND, SQUARE or DEFORMED BARS in mill shipments or fabricated units; COLUMN SPIRALS; CECO EXPANDED METAL LATH and CECO WIRE LATH; CECO CORNER BEADS; CECO WIRE FABRIC; CECO BAR CHAIRS; PLASTER BOARD; CECO PLASTER BOARD CLIPS.

Service.

We furnish complete details, drawings and specifications of reinforced concrete construction. These drawings show clearly the exact location of each reinforcing bar and the detailed size of all concrete work. The reinforcing bars are distinctly marked and tagged corresponding with the markings on our drawings. Reinforcing steel furnished and installed under competent supervision.

We maintain large stocks of Steelforms in numerous localities. Steelforms are installed under the supervision of a competent engineer, whose services are at the disposal of the architect or builder.

We furnish and erect Ceco steel lath, Ceco corner beads, etc.

Steelforms.

Steelforms are used in concrete construction as a mold for joists and intervening slab. The load is carried by these joists in one direction to the supports. In producing a continuous joist, Steelforms are lapped at the ends sufficiently to produce a tight joint. Endforms are placed at the ends to close up each row of Steelforms.

Steelforms are rectangular-shaped steel molds, open on the under side and at the ends. The depressed ribs in the top surface and the bottom flange give exceptional stiffness and rigidity. This is of especial importance in supporting the heavy weights and trucking loads which occur during construction. Steelforms are made of the best quality No. 16-gauge steel sheets, formed into exact shape by heavy presses. The lower flanges of Steelforms are provided with nail-holes so that they may be accurately and firmly placed in position. One-quarter inch round openings are placed along the sides of Steelforms at six-inch centers, and one in the top of each Steelform to provide for wires or hangers for ceilings.

Endforms are made both straight and tapered. Single tapered Endforms effect an increase in the concrete joists as they approach the supports. Double tapered Endforms make the compression flange or tee of the supporting girder.

Flat ceilings may be obtained by applying Ceco Expanded Metal or Wire Lath, or Plaster Board, directly to the concrete joists after the removal of Steelforms. When plastered, this forms the very desirable, hollow, soundproof floor. The air chambers between joists and ceiling make a perfect insulation. The erection of ceiling construction, after the removal of Steelforms, permits thorough and complete inspection of concrete and the easy installation of pipe or sprinkler systems. The metal lath being erected after the completion of the concrete work and just before plastering, effects the best possible workmanship.

Advantages.

Accuracy—The heavy steel molds effect absolute accuracy of concrete work. It is impossible to get them out of alignment. Ceco bar chairs in the joists hold the reinforcing steel in exactly the proper position.

Efficiency—Meyer Steelforms permit of the greatest possible speed of erection. Sufficient Steelforms are furnished to the job to completely cover one or more floors. They are removed and re-used in the successive floors of the building. This method affords the best possible results in the organization of labor.

Economy—Steelform construction is especially economical, as it requires a minimum amount of concrete and reinforcing steel. Concrete and steel are used only where they are effective in resisting stresses. It may be used with equal economy in connection with concrete frame or steel frame buildings.

APPLICATION OF STEELFORMS TO CONCRETE FLOOR CONSTRUCTION

Steelform Construction has many advantages over tile construction, being more fireproof, absolutely proof against leakage, light in weight, free from loss due to breakage, subject to minimum freight rates, and saving in field labor. Steelforms are shipped nested, so that a minimum freight rate prevails.

Steelforms, being *removable*, and permitting of repeated *re-use*, make possible an enormous saving over tile, which are permanent and remain in the construction. Steelforms, being extremely rigid, allow the use of open wood centering. Lines of centering are provided under the joists only, the intervening space being left open.

Steelforms are offered to the builder on a *rental* basis, thus giving maximum economy in concrete construction.

Sweet's Catalogue

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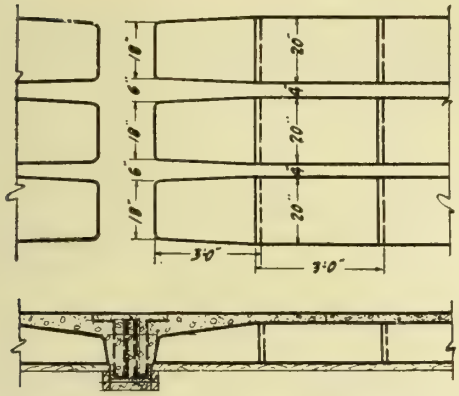
STANDARD SIZES OF MEYER STEELFORMS

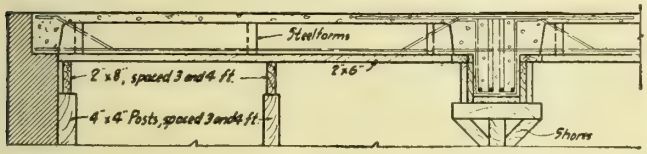


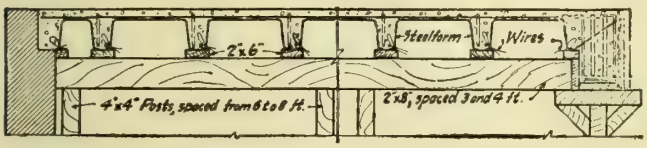
PLAN AND ELEVATION TO SHOW TAPERED ENDFORMS

SIZES

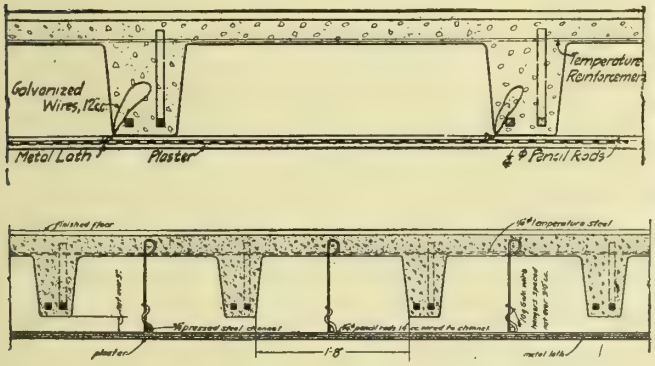
Standard Steelforms	Standard Endforms
Depths, 6″, 8″, 10″, 12″.	Depths, 6″, 8″, 10″, 12″.
Length, 3′ 0″.	Length, 3′ 0″.
Width, 20″.	Width, 20″ tapered to 18″.
Special, 1′ 0″ and 2′ 0″ lengths.	Special, 1′ 0″ length.
Special widths, 15″ and 10″.	Special widths, 15″ and 10″.
Steelforms are lapped from 1″ to 6″.	

Tapered Endforms in standard depths and lengths, 20″ wide at open end, tapering to 18″ at closed end. Double-tapered Endforms the same, with additional taper of 3″ in height from open to closed end.

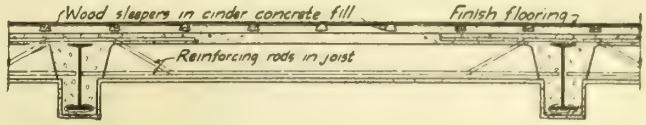


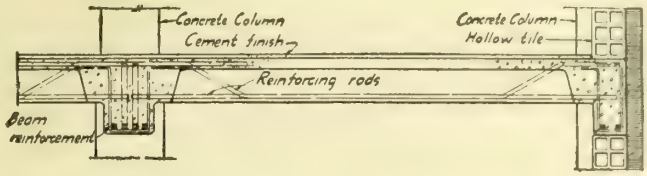


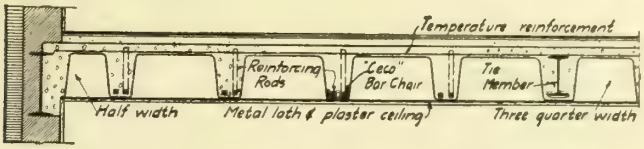
SECTIONS SHOWING ECONOMICAL CENTERING



SECTIONS SHOWING APPLICATION OF METAL LATH AND PLASTER CEILING







SECTIONS SHOWING COMPLETED CONSTRUCTION

STEELFORMS APPLIED IN WAREHOUSE CONSTRUCTION

STEELFORMS REMOVED AND WAREHOUSE CEILING COMPLETED

CONCRETE STEEL COMPANY

TELEPHONE: Broad 6128, 6129, 6130

42 Broadway
NEW YORK, N. Y.

WESTERN OFFICE: CHICAGO, ILL., Monadnock Block

DISTRICT SALES OFFICES

SYRACUSE, N. Y., Union Building PHILADELPHIA, PA., Pennsylvania Building BOSTON, MASS., 7 Water Street
BIRMINGHAM, ALA., Brown-Marx Building YOUNGSTOWN, OHIO, P. O. Box 24

WAREHOUSES AND FABRICATING WORKS

NEW YORK, N. Y. YOUNGSTOWN, OHIO PHILADELPHIA, PA. BOSTON, MASS. CHICAGO, ILL.

Products.

Havemeyer Deformed Bars (Patented), for Reinforcing Concrete; Fabricated Unit Frames; Spirals.

Bar-Tys, Chair Spacers, X-Tension Soffit-Clips, Ty-Chairs, Easel Chairs, Reliance Inserts, Anchorite Facing Bars for Corners and Expansion Joints, "Sanitread" Safety Treads.

Also, Wilson Stirrup-Bending Machines and Adjustable Beam Saddles.

Description of Havemeyer Bars.

Rolled deformed bars with the axes of the projections, forming the mechanical bond, parallel to the axis of the bar; designed to secure at all points constant uniform area of cross-section equal to area of cross-section of a plain bar of same size. Projections and depressions, being rolled longitudinally, allow all steel to be of value when bar is under tension. No sharp angles tending to start cracks when bar is bent. Full tensile strength of all metal is developed throughout length of bar, equalizing strength at all points. As Havemeyer Bars are rolled to same weight and area as plain bars, a strong mechanical bond is obtained with same weight of metal used in rolling a plain bar.

The deformations furnish a mechanical bond more than sufficient to develop strength of bar, as proved by many testing laboratories.

Advantages of Rounds and Squares.

Bending and handling costs are reduced to a minimum through the following important features: (1) Havemeyer Bars bend easily, because metal in longitudinal projections follows bend as readily as metal in body of bar. (2) Less spring than in twisted bar; therefore easier to get required permanent set in bending. (3) Both ends of a "double bend" lie in same plane without extra work. (4) No abrupt changes in cross-section to start cracks. (5) Bars easily wired at intersections, the projections and depressions preventing wire from slipping. (6) Bars easily selected on the work, because readily gauged.

Advantages of Flats.

In such construction as sewers, grain elevators, coal pockets and silos, Havemeyer Flats reduce the cost of the curved bends required. They can be run through a tire-machine at high speed, much quicker and cheaper than Rounds or Squares. The edges of the flats prevent the lugs from being damaged and allow the bar to run smoothly with the minimum expenditure of power. Flats can be bent with less power than their equivalent squares, as may be gauged by the following approximate moments of resistance at the elastic limit:

1¾ inch by $\frac{7}{16}$ inch.....1670 inch pounds
2½ inch square.....3360 inch pounds

A greater effective depth makes possible economies in either steel or concrete.

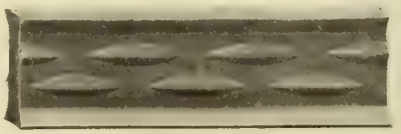
Because the bonding area per pound of steel is greater than for rounds or squares, lengths of laps may be reduced. A ⅞-inch square has a perimeter of 3.5 inches; and a 1¾-inch by $\frac{7}{16}$-inch flat, of equivalent sectional area, 4.375 inches, or a gain of 25 per cent. There is a similar advantage in 1½-inch by ⅜-inch and 1-inch by ¼-inch over the equivalent squares.

Sizes.

Round, square and flat Havemeyer Bars are regularly rolled at several mills in different parts of the country to sizes indicated in following table:

ROUND BAR

SQUARE BAR



FLAT BAR

TABLES OF WEIGHTS AND AREAS, HAVEMEYER SQUARE, ROUND AND FLAT DEFORMED BARS

Size, Ins.	SQUARE Area	SQUARE W'ght per ft.	ROUND Area	ROUND W'ght per ft.
¼	0.0625	0.212	0.0491	0.167
⅜	0.1406	0.478	0.1104	0.375
½	0.2500	0.850	0.1963	0.667
⅝	0.3906	1.328	0.3068	1.043
¾	0.5625	1.913	0.4418	1.502
⅞	0.7656	2.603	0.6013	2.044
1	1.0000	3.400	0.7854	2.670
1⅛	1.2656	4.303	0.9940	3.379
1¼	1.5625	5.312	1.2272	4.173

We can furnish 1⅜" and 1½" Square Havemeyer Bars from Pittsburgh Mills. Do not carry them in stock

Size, Ins.	FLAT Area	FLAT Weight per ft.
1 x ¼	0.2500	0.850
1 x ⅜	0.3750	1.280
1¼ x ⅜	0.4690	1.590
1½ x $\frac{5}{16}$	0.4688	1.590
1½ x ⅜	0.5625	1.913
1½ x ½	0.7500	2.550
1¾ x ⅜	0.6563	2.230
1¾ x $\frac{7}{16}$	0.7656	2.600
1¾ x ½	0.8750	2.980

Note—A size extra of 10 cents applies against 1 x ¼-inch and 1½ x $\frac{5}{16}$-inch flats; all other sizes tabulated take the base price

Deliveries.

Prompt shipments of bars cut to specified lengths can be made direct from nearest mill. Large stocks of round and square bars are always maintained at our yards in Youngstown, Philadelphia, and New York. Shipments can also be obtained from local stocks carried by agents in larger cities.

Specifications for Steel.

Havemeyer bars can be rolled to any standard specification. We recommend Manufacturers' Standard Specifications for concrete reinforcing bars, adopted 1910, because large tonnages are regularly going through mills on these specifications, and orders complying with them will be shipped in shortest possible time.

Fabricating.

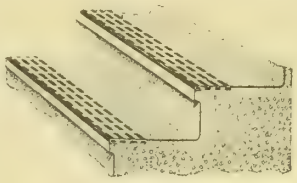
Our fabricating works at Youngstown and Philadelphia are equipped with the most modern machines for bending and fabricating. Very low prices can be made. Fabricated units for girders, beams, columns, etc., ready to drop into form boxes, can be shipped promptly.

Continued on next page

"Sanitread" Safety Treads.

A modern safety non-slipping device, imbedded in the face of tread or stairs, sidewalks, platforms and around machinery to prevent accidents due to slipping. The safety metal slugs are securely fastened to a metal base plate and the spaces around the safety metal are filled with cement, or other material, to produce a level finished surface.

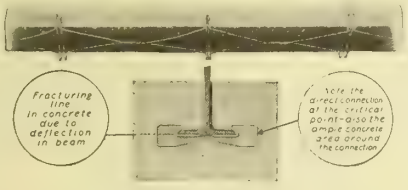
Actual service covering several years has demonstrated the durability and efficiency of "Sanitread."



"SANITREAD" SET IN CONCRETE STEPS

X-Tension Soffit-Clip for Fireproofing I-Beams and Columns.

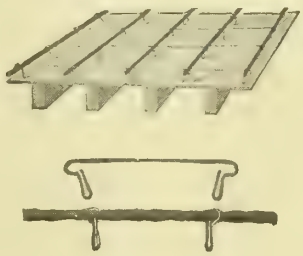
The X-Tension Clip is very quickly and easily put on, engaging flange of I-beam with a tension grip that prevents it being deranged or knocked off when placing concrete in beam or column box. Distinctive feature of X-Tension Clip is the wide range of adaptability of each size to various beam sizes; and another distinctive feature is extensive degree of mesh and reinforcement that can be obtained by variation of spacing of clips.



X-TENSION CLIP

Chair Spacers for Floor Slab Construction.

Chair Spacers provide a means for spacing the reinforcing members laterally, with the additional function of spacing the bar off the forms. The distance apart of the engaging loops is variable. Chair Spacers automatically and correctly space and prevent, by means of the spring lock, derangement of any part of the slab units. Chair Spacers are made of high-grade spring steel wire.

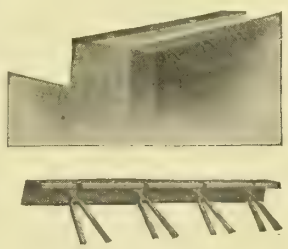


CHAIR SPACERS

Anchorite Facing Bar for Corners.

For the protection of the corners of concrete curbs, columns, stair steps, door jambs, thresholds and lintels.

The ingenious utilization of part of the material of the bar, as anchors, makes it an economical and effective appliance. Anchorite Facing Bars are manufactured from a special rolled angle 1¼-inch by 1¼-inch by $\frac{3}{16}$-inch. The top wearing surface made plain, or provided with suitable lugs that supply a non-slipping effect. Either galvanized or ungalvanized, and curved to various radii by special order. A special form Anchorite Facing Bar made for Expansion Joints.



ANCHORITE FACING BAR
Applied to Curbing

Ty-Chairs.

The Ty-Chair is applicable to any operation where reinforcing bars are used, and is equally adaptable to any of the various systems of reinforcement. Fits any make, size or combination of bars.

Made of high-grade spring steel wire. The Ty-Chair locks the bars securely at the intersections, and also provides a permanent support for the cross bar off the forms. No tools required; sprung into position as quickly as you would snap your knife shut.

TY-CHAIR IN POSITION

Easel Chair.

Made of high-grade spring wire in two types for single and double bars. Designed for supporting reinforcing bars in tile and joist construction.

EASEL CHAIR

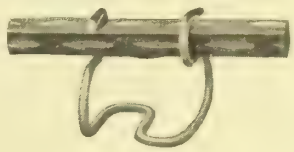
Reliance "Y" Socket Insert.

Made of malleable iron, comes in sizes of ⅜-, ½-, ⅝- and ¾-inch. Differs from the Reliance Adjustable Insert in so far as it affords no means of adjustment to the position of bolts.

RELIANCE "Y" SOCKET INSERT

Bar Chair.

Made of high-grade spring steel wire, in sizes to fit single reinforcing bars of any type. Bar Chairs can be made to keep the bars varying distances off the forms. The standard Bar Chair spaces one inch off the forms.



BAR CHAIR

Bar-Tys for Tying Concrete Reinforcement.

Bar-Tys provide a positive and quick means of tying reinforcing bars together. The special form of this spring steel device has been designed so that it may be quickly sprung into position. Positively no tools required. The security and economy of Bar-Tys have been demonstrated by the millions that have been used.

BAR-TYS AS APPLIED TO REINFORCED SIDEWALL CONCRETE CONSTRUCTION

Reliance Slotted Insert.

Made of pressed steel, in 18-inch lengths. Has a large range of adjustability. By placing several lengths together end to end any degree of adjustment is obtainable.

RELIANCE SLOTTED INSERT

Reliance Adjustable Insert.

Made of high-grade malleable iron to accommodate standard bolts of ½-, ⅝- and ¾-inch. The keyhole slot provides a means of inserting bolt head and also some adjustment.

RELIANCE ADJUSTABLE INSERT

THE BERGER MANUFACTURING CO.

MANUFACTURERS OF

Berger's Pressed Steel Cores for Long-Span Concrete Floor Construction

CANTON, OHIO

BRANCHES

NEW YORK, N. Y., S. E. Cor. 22nd Street and 11th Avenue
PHILADELPHIA, PA., Cor. 16th Street and Washington Avenue
SOUTH BOSTON, MASS., 160-166 Broadway Extension
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., 16 South Tenth Street
MINNEAPOLIS, MINN., 300-312 10th Avenue, South
SAN FRANCISCO, CAL., 1120 Mission Street

Products.

BERGER'S PRESSED STEEL CORES, for any type of Reinforced Concrete Construction.

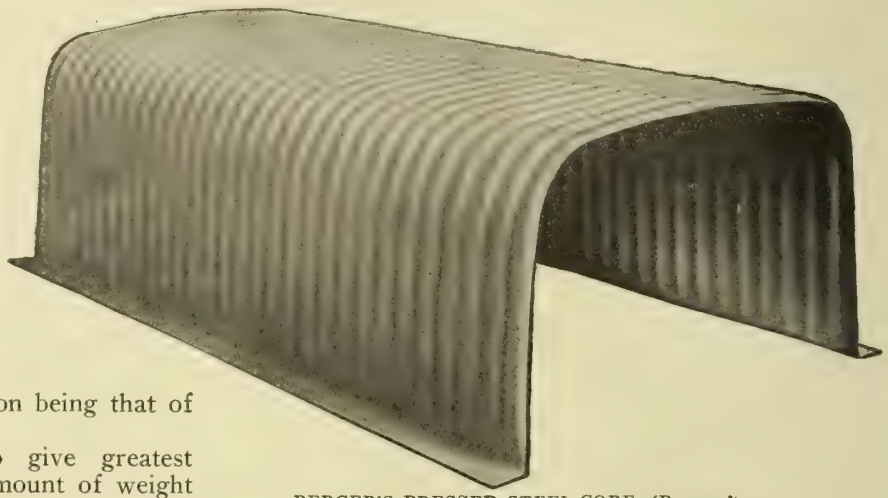
See our name in General Index for Steel Ceilings, Corner Beads, Sidewalk Lights, Metal Lumber, Concrete Reinforcement, Steel Building Materials, etc.

Description.

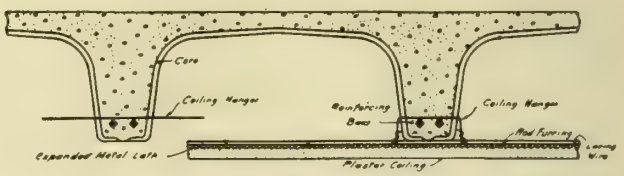
Berger's Pressed Steel "Left In" Cores are made from light-gauge sheet steel formed from one piece and corrugated, which makes them very rigid and stiff, the formation being that of a flat arch, as illustrated.

Berger's Cores are designed to give greatest strength and displacement for least amount of weight and cost, at same time making a great saving in concrete reinforcing steel, centering and labor, also dead floor load. When cores are made in the heavier gauges, they may be removed and used over again indefinitely.

Berger's Pressed Steel Cores can be used in any type of steel frame or reinforced concrete construction.



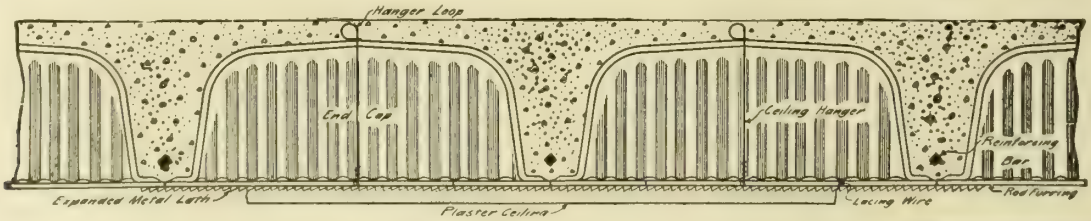
BERGER'S PRESSED STEEL CORE (Patented)



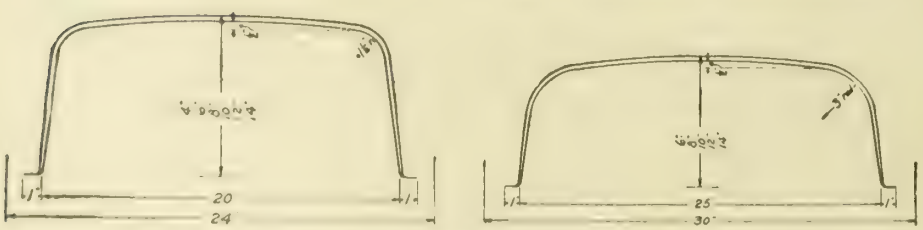
ANOTHER METHOD OF APPLYING CEILING
In conjunction with Berger's Cores

Installation.

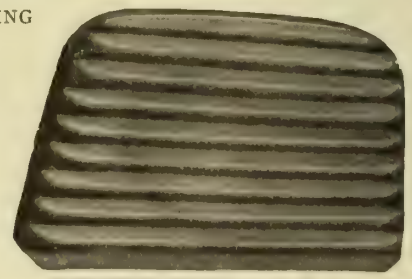
In considering the installation of these cores, the designer may span floor from column girder to column girder, thus providing an ideal beam layout.



SECTION THROUGH FINISHED FLOOR AND CEILING
Showing simple method of ceiling construction



ELEMENTS OF STANDARD PRESSED STEEL CORES.



BERGER'S SPECIAL END CAP
Corrugated end caps are supplied for closing the ends of the cores

Floor loads are carried to girders by the reinforced concrete joists formed by the use of the cores. Design of these reinforced concrete joists is worked out on same principles as design of the ordinary concrete "T" beam.

Then the cost of centering and form work is cut to a minimum, as skeleton centering only is required. No breakage can occur, and no concrete is wasted. Concrete floors built by use of Berger's Corrugated Steel Cores are soundproof to a remarkable degree, on account of dead air space incidental to this construction.

Further Information.

Designing data and complete information sent on application.

FLAT-SLAB PATENTS CO.

Floor and Roof Construction

332 South Michigan Avenue
CHICAGO, ILL.

LICENSES ISSUED UNDER BASIC NORCROSS PATENT

EASTERN REPRESENTATIVE:
CONCRETE STEEL CO.
New York, N. Y., 42 Broadway

PACIFIC REPRESENTATIVE:
C. F. WIELAND
San Francisco, Cal., Claus Spreckels Building

Products.

Design Licenses for Flat-Slab Reinforced Concrete Floor and Roof Construction.

Description.

Flat-slab construction, especially adaptable to all mercantile buildings, makes possible the safest and most economical distribution of reinforcing steel and concrete; minimum cost of form work; level ceilings resulting in maximum light distribution; reduction of story heights; minimum cost of sprinkler system, and a much lower total cost than any other system of fireproof construction. The heavier the load, the greater the saving.

In designing, a perfectly flat ceiling is provided or a depressed panel around the column capital is introduced, as desired. Either type of flat-slab construction, reinforced with bands of rods in two, three or four directions, is covered by the Basic Norcross Patent No. 698542, which has been sustained by the courts.

The important designers of flat-slab construction throughout the country, without exception, are now licensed under the Basic Norcross Patent. A very moderate royalty is charged, based on the area of flat-slab construction used in each year, representing only a small fraction of the saving resulting from the use of flat-slab construction.

THE LIGHT, CLEAN FLAT-SLAB INTERIOR

LIST OF LICENSEES, FEBRUARY 29, 1916

Alfred S. Alschuler
American Can Co.
American Concrete Steel Co.
American System of Reinforcing
B. & W. Concrete Company
Ballinger & Perrot
Barclay, White & Company
Ferdinand Barre
F. G. Barrows & Company
Francis M. Barton
W. C. Bennett
Bergendahl Knight Co.
H. D. Best Company
Leo I. Bruce
Robert Butke
Butler Brothers
Horace T. Campion
Carter Paving Co.
Chicago Concrete Bar Co.
W. A. Collings Co.
Concrete Construction Co.
Concrete Engineering Co.
Concrete Steel Co.
Concrete Steel Products Co.
Condron Company
Consolidated Engineering Co.
T. Edward Cornelius
Corrugated Bar Co.
James Cowin
Cramp & Company
John T. Craven
Dale Engineering Company
Royal D. Dwight
Ferro Concrete Construction Co.
Fidelity Construction Co.
Gabriel Reinforcement Co.
E. F. Gibbons
Giesecke & Geren
William H. Gravell
Samuel Hannaford & Sons
Hydro Construction Co.
Jackson & Maurice
Albert Kahn
King & Butcher
C. T. Kingsbury
W. J. Knight & Co.
Harry Lawrie
Leonard Construction Co.
Joseph D. McCord
Mathew B. Markland
Herman W. Maurer
Mills, Rhines, Bellman & Nordhoff
Monaghan & Loose
David W. Morrow
Charles K. Motl
H. A. Noble
Northern Construction Company
J. T. Nuchols
Prack & Perrine
Preston, Brown & Walker
Bertram W. Ranson
Harrison C. Rea Co.
Robt. J. Reidpath & Sons Co.
Reinforced Concrete Co.
Republic Structural Iron Works Co.
Schenck & Williams
J. Schulz
Sears & Piou
E. C. & R. M. Shankland
George M. Shaw & Co.
F. L. Shoemaker Co.
Frank Hill Smith
Sperry Engineering Co.
Stahl & Kinsey
Wm. Steele & Sons Co.
Stegner & Hughes
L. E. Stevens
Frank G. Steward
Trussed Concrete Steel Co.
Turner Concrete Steel Co.
Turner Construction Co.
Warren, Moore & Company
Wells Brothers Co.
Western Steel Products Co
A. J. Widmer
C. F. Wieland
Charles N. Williams
Tudor R. Williams
Willys Overland Co.
Witherow Steel Co.
Francis H. Wright

THE BERGER MANUFACTURING CO.

MANUFACTURERS OF

Concrete Reinforcing Plates and a General Line of Pressed Steel Building Specialties

CANTON, OHIO

BRANCHES

NEW YORK, N. Y., S. E. Cor 22nd Street and 11th Avenue
PHILADELPHIA, PA., Cor. 16th St. and Washington Avenue
SOUTH BOSTON, MASS., 160-166 Broadway Extension
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., 16 South Tenth Street
MINNEAPOLIS, MINN., 300-312 10th Avenue, South
SAN FRANCISCO, CAL., 1120 Mission Street

Products.

Berger's Rib-Trus Reinforcing and Furring Plates for Reinforcing Roofs, Floors, Side Walls, Partitions, Silos, Fences, Culverts, etc.

Berger's Ferro-Lithic Plates for Concrete Reinforcement for Roofs, Floors and Walls.

Berger's Multiplex Steel Plates for Heavy Concrete Floors and Bridges, Porch Floors, etc.

See our name in General Index for Steel Ceilings, Corner Beads, Pressed Steel Cores, Sidewalk Lights and Metal Lumber.

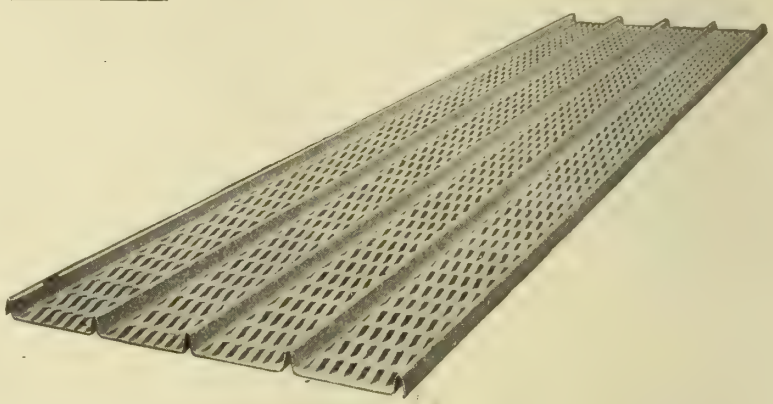


Fig. 1. IMPROVED RIB-TRUS PLATE READY TO LAY

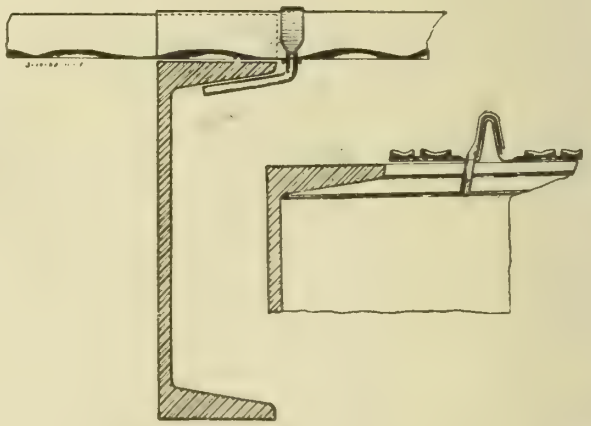


Fig. 2. ROOF CONSTRUCTION SHOWING METHOD OF FASTENING PLATES TO PURLINS

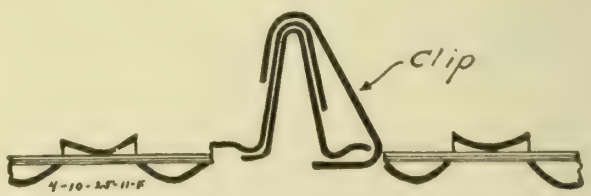


Fig. 3. POSITION OF CLEATS TO HOLD SIDES OF PLATES TOGETHER BETWEEN BEARINGS

Berger's Improved Rib-Trus Reinforcing Plates.

Rib-Trus is made in standard plates 18 or 24 inches wide by 4, 5, 6, 7, 8, 9, 10 and 12 feet long. If three weeks are given, plates any length up to 12 feet can be furnished without extra charge. In cutting to special sizes from stock the waste will be charged at current price of sheets. See table on following page for stock lengths.

Ribs—Each plate has five longitudinal ribs, 6 inches on centers, which vary in height as follows: ½, ¾ and 1 inch—the ¾ inch being the standard. (For weights, gauges and lengths, see table.)

Uses—Rib-Trus is especially adapted for reinforcing thin slabs of concrete, such as roofs, floors, side walls, partitions, suspended ceilings, stucco houses, etc.

Curved Rib-Trus—In curved form, Rib-Trus has a multitude of uses, such as in floors, roofs, silos, culverts, conduits, column covering, etc.

Method of Fastening to Purlins—The plates are fastened to the purlins or beams by our standard clips (see Fig. 2).

The edges of the plates between bearings are held together by a special clip or cleat (see Fig. 3). The clips are adjusted from top of plate in both cases.

Concreting—Rib-Trus Plates, after being laid, are concreted on top surface, thickness to be determined by length of span and load to be carried. After the concrete has hardened the under side should be plastered, using Portland cement and lime putty with sufficient hair, thereby preserving the plates from attack by gases, acid fumes, condensation, moisture and all elemental influences.

Waterproofing—The top surface of the concrete should be waterproofed by some approved system. Hot pitch may be used for fastening waterproofing.

Centering—No centering is required for short span work, the ribs of the plate furnishing the necessary rigidity while applying the concrete.

Continued on next page

Strength — The metal is slit only parallel to the strain, which *is parallel* with the ribs; it is *not* cut at right angles to the ribs, and thus no tensile strength is lost, all the metal in the sheet going into tension.

Partitions — We furnish either angles or channels for the top and bottom for holding plates in place. Edges should be clipped same as for roof work.

Suspended Ceilings —Ribs give sufficient stiffness to support plaster for ordinary spans. We furnish special clips for this purpose.

Stucco Work—The ½-inch Rib-Trus plates are especially adapted for furring houses for stucco finish. The ribs take the place of furring strips, and save time and expense. The plates should be painted for this class of work.

WEIGHTS, SIZES AND LENGTHS

Gauge	Covering Width, inches	Stock Lengths, feet	Weight per Square, pounds		
			½-inch Rib	¾-inch Rib	1-inch Rib
28	18 or 24	4, 5, 6, 7, 8, 9, 10 and 12	73	78	83
27	18 or 24	4, 5, 6, 7, 8, 9, 10 and 12	81	86	92
26	18 or 24	4, 5, 6, 7, 8, 9, 10 and 12	88	94	100
24	18 or 24	4, 5, 6, 7, 8, 9, 10 and 12	117	125	133

TABLE OF SAFE LOADS FOR RIB-TRUS

Thickness of Slab Above Plate	Gauge of Metal	Height of Rib	Span in Feet					
			3	4	5	6	7	8
1 in.	24	¾ in.	130	93	70			
Wt. 12 lbs. per sq. ft.	26	¾ in.	95	70	30			
1½ in.	24	1 in.	175	126	93	65		
Wt. 18 lbs. per sq. ft.	26	1 in.	125	98	68	50		
2 in.	24	1 in.	250	190	120	95	50	
Wt. 24 lbs. per sq. ft.	26	1 in.	195	160	100	65	35	
3 in.	24	1 in.	400	327	209	137	104	80
Wt. 36 lbs. per sq. ft.	26	1 in.	325	250	175	132	99	56
4 in.	24	1 in.	690	499	307	238	188	138
Wt. 48 lbs. per sq. ft.	26	1 in.	560	380	234	169	120	88

Total Load in pounds per square foot

NOTE —Weights given are for dead and live loads.

It must be understood that thin concrete slabs, such as are used for roof work, do not develop the full tensile strength of the Rib-Trus plates. However, a surplus of metal is a good thing and gives additional security.

PROPERTIES OF BERGER'S RIB-TRUS

Depth Rib, inches	Gauge U. S. Standard	Weight per 100 Square Feet	Cross-Sectional Area per foot width, not including Side Lap
½	28	73 pounds	.21875 square inches
	27	81 pounds	.240625 square inches
	26	88 pounds	.2625 square inches
	24	117 pounds	.35 square inches
¾	28	78 pounds	.234375 square inches
	27	86 pounds	.2578125 square inches
	26	94 pounds	.28125 square inches
	24	125 pounds	.375 square inches
1	28	83 pounds	.25 square inches
	27	92 pounds	.275 square inches
	26	100 pounds	.3 square inches
	24	133 pounds	.4 square inches

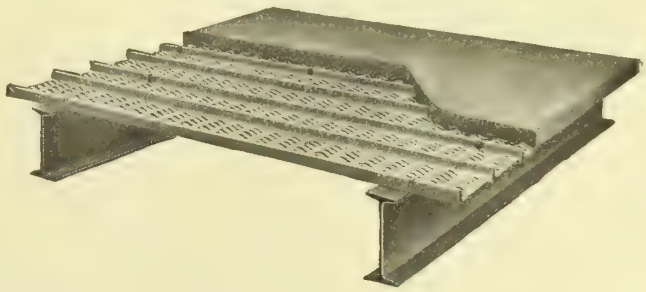


FIG. 4. IMPROVED RIB-TRUS PLATE CONCRETED

MAXIMUM SPAN FOR BERGER'S RIB-TRUS AS CENTERING

To Support Various Thicknesses of Wet Concrete. For Greater Spans Use Temporary Supports

Size of Rib	Gauge	Thickness of Slab 1 in.	1½ in.	2 in.	2½ in.	3 in.	3½ in.	4 in.	4½ in.	5 in.
1 in.	24		5 ft. 0 in.	4 ft. 6 in.	4 ft. 2 in.	4 ft. 0 in.	3 ft. 8 in.	3 ft. 6 in.	3 ft. 2 in.	3 ft. 0 in.
	26		5 ft. 0 in.	4 ft. 0 in.	3 ft. 6 in.	3 ft. 0 in.	2 ft. 9 in.	2 ft. 6 in.		
¾ in.	24	5 ft. 0 in.	4 ft. 6 in.	4 ft. 0 in.	3 ft. 6 in.	3 ft. 0 in.	2 ft. 9 in.	2 ft. 6 in.		
	26	4 ft. 6 in.	4 ft. 0 in.	3 ft. 6 in.	3 ft. 0 in.	2 ft. 6 in.				

Deflection not greater than ¼ inch.

Continued on next page

Berger's Ferro-Lithic Plates.

Ferro-Lithic
TRADE-MARK

Cross-Section—Ferro-Lithic Steel Plates are plates whose cross-section shows a continued series of alternate dovetails, as shown in Fig. 5. Because of this shape it is possible to concrete and plaster directly upon the steel plate in the manner shown in Fig. 6.

Uses—The Ferro-Lithic Interlocking system for reinforcing concrete slabs for roofs, floors, sides, etc., is especially suitable for buildings exposed to smoke, acid fumes, gases, condensation or moisture; such as found in various manufacturing plants, chemical works, collieries, rolling mills, galvanizing plants, plating works, foundries, power-houses, train sheds, breweries, roundhouses, etc.

Fig. 5. FERRO-LITHIC PLATE READY TO LAY
Depth, ½ inch
No. 24-Gauge Standard

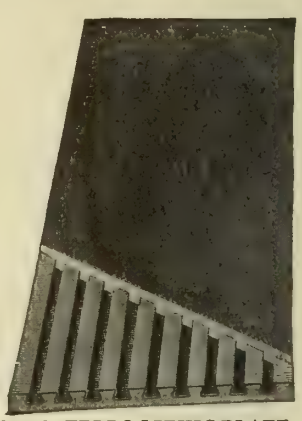


Fig. 6. FERRO-LITHIC PLATE CONCRETED ON TOP, PLASTERED UNDERNEATH
Weight, 16 lbs. per sq. ft.

Gauges—Ferro-Lithic Steel Plates are made of gauges Nos. 22, 24 and 26, and depths of ½, ⅝ and ¾ inches.

Depths—The standard plate is the No. 24-gauge plain, unpainted, with dovetails ½ inch deep.

Widths—The effective covering width of the ½-inch depth plate is 20 inches; of the ⅝-inch depth, 18 inches; and of the ¾-inch depth, 16½ inches.

Lengths—All depths and gauges can be furnished in any length up to and including 12 feet, and can be furnished cut to size or formed into special shape, such as may be required for cornice work.

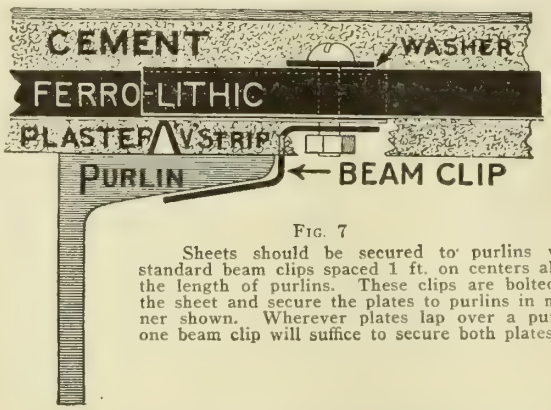


Fig. 7
Sheets should be secured to purlins with standard beam clips spaced 1 ft. on centers along the length of purlins. These clips are bolted to the sheet and secure the plates to purlins in manner shown. Wherever plates lap over a purlin, one beam clip will suffice to secure both plates

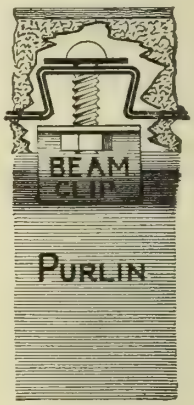


Fig. 8
METHOD OF FASTENING FERRO-LITHIC TO PURLIN
Showing Beam Clip applied

Curving—They can be curved for segmental arch construction in No. 24-gauge and depths of ½ and ⅝ inches, and no other size or gauge can be curved.

Record of Tests of Ferro-Lithic Arch Construction.*

Made under the supervision of C. R. Jamison, C. E.

Test No. 1—Plates, ½ inch deep, No. 24-gauge plain steel. Span, 5 feet 8 inches. Width, 3 feet 3 inches. Area, 18.42 square feet. Concrete, 1:2:4. Depth over plate at crown, 2 inches. Rise of arch at crown, 12 inches. Tie rods, 2¾ inches round. Loaded at center on a plank 8 inches wide. Total equivalent breaking load per square foot uniformly distributed, 2060 pounds.

Test No. 2—Plates ½ inch deep, No. 24-gauge plain steel. Span, 7 feet 7 inches. Width, 3 feet 2½ inches. Area, 24.30 square feet. Concrete, 1:2:4. Depth over plate at crown, 2½ inches. Rise of arch at crown, 15 inches. Tie rods, 2¾ inches round. Loaded at center on a plank 8 inches wide. Total equivalent breaking load per square foot uniformly distributed, 1640 pounds.

TABLE OF SAFE LIVE LOADS. FACTOR OF FOUR FOR FLAT FERRO-LITHIC REINFORCED SLABS

Depth of Concrete over Top of Plates	Clear Span																
	2′ 0″	2′ 6″	3′ 0″	3′ 6″	4′ 0″	4′ 6″	5′ 0″	5′ 6″	6′ 0″	6′ 6″	7′ 0″	7′ 6″	8′ 0″	8′ 6″	9′ 0″	9′ 6″	10′ 0″
0 in.	159	100	70	53	40	31	25	21	18	15	13	11	10	9	8	7	6
½ in.	415	265	184	138	105	84	68	54	45	38	33	29	25				
1 in.	718	460	319	238	181	144	116	95	80	69	59	51	45	40			
1½ in.	1025	655	455	335	256	208	168	138	115	99	85	74	65	59	52		
2 in.	1325	848	588	438	335	269	218	179	150	129	111	95	84	76	68	60	
2½ in.	1665	1065	738	539	413	330	268	221	186	159	136	119	104	93	83	75	68
3 in.	1955	1250	869	638	489	394	319	253	221	189	163	141	124	111	99	88	79
3½ in.	2270	1455	1010	741	568	458	370	305	256	219	189	164	144	124	113	101	91
4 in.	2620	1680	1165	855	655	519	420	346	291	248	214	185	163	144	129	115	104

Note—Loads for 2-inch depth and No. 24 Gauge only. Loads per square foot uniformly distributed. To determine safe loads for ¾ inch plates, add twenty-five per cent to the figures given in table for ½ inch plates. Loads below heavy lines show excessive deflection. Data of safe loads for other depths and gauges furnished on application.

* Over fifty concrete slabs of different length and depth were loaded to destruction, to obtain data from which above table was compiled.

Continued on next page

Test No. 3—Plates ½ inch deep, No. 24-gauge plain steel. Span, 9 feet 9 inches. Width, 3 feet 2½ inches. Area, 31.30 square feet. Concrete, 1:2:4. Depth over plate at crown, 1½ inches. Rise of arch at crown, 18 inches. Tie rods, 2¾ inches round. Loaded at center on a plank 12 inches wide. Total equivalent breaking load per square foot uniformly distributed, 905 pounds.

Berger's Multiplex Steel Plates.

Multiplex Steel Plates consist of steel plates formed into a series of compound corrugations. (See illustrations.) The depth of corrugations and gauge of material are varied according to the span and the load to be carried.

Laying and Concreting—In installing the plates the upper channels formed by the corrugations are filled with concrete, which can be put on immediately and should be lightly tamped. While filling the plate the concrete is incidentally moulded into a series of concrete beams which reduce the dead load of concrete about thirty per cent.

In filling the plates with concrete, it is a good rule to have the concrete as thick over the tops of the plates as the plates are deep. In other words, if a 2½-inch plate is used, then 2½ inches of concrete should be used over the plate, making total depth 5 inches.

Plate Details—Multiplex Steel Plates are made of Nos. 16- to 24-gauge sheet steel, either plain, painted or galvanized, and formed into corrugations with depths as listed below. Only the light gauges to be used as centering. (See end section, Fig. 9.)

Bridge and Warehouse Floors—Fig. 10 shows Multiplex Steel Plate used in its simplest form, being that ordinarily found in bridge floor construction, warehouses, factory buildings and all kinds of heavy service floors, and similar work.

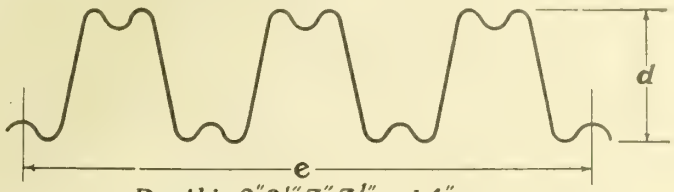


Fig. 9. END SECTION OF MULTIPLEX STEEL PLATE
Depths, 2 in., 2½ in., 3 in., 3½ in. and 4 in.

d = depth
When d = 2 in., e = 13½ in.
" d = 2½ in., e = 14 in.
e = effective covering width
When d = 3 in., e = 14½ in.
" d = 3½ in., e = 15 in.
When d = 4 in., e = 15 in.

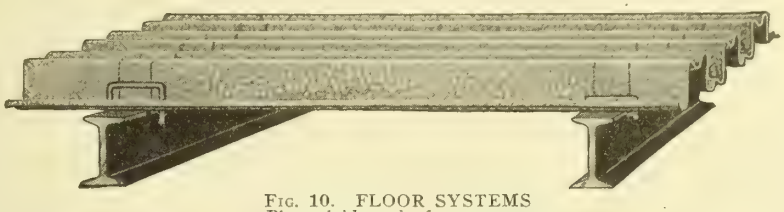


Fig. 10. FLOOR SYSTEMS
Plates laid ready for concrete

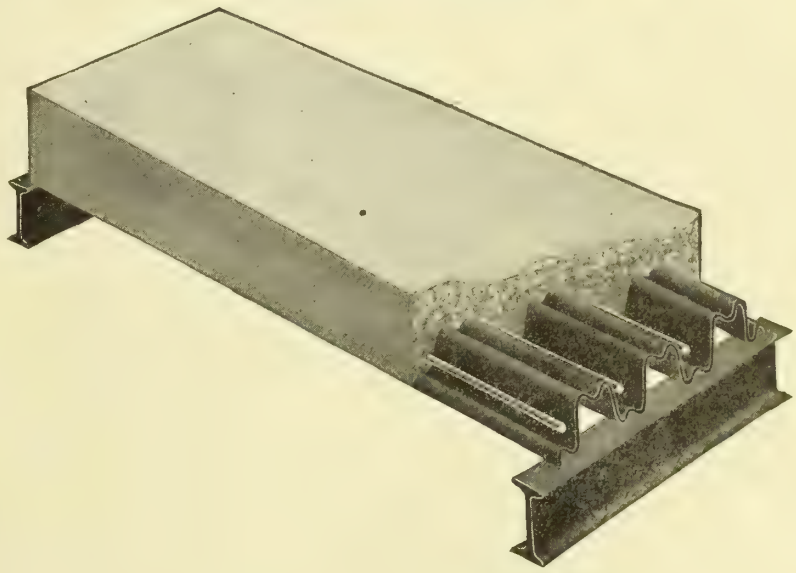


Fig. 11. METHOD OF ROD REINFORCEMENT

SAFE LOADS OF THE MULTIPLEX STEEL PLATE, [1]FILLED WITH CONCRETE ONE INCH ABOVE PLATE

By increasing depth of concrete over plate, carrying capacity will be increased

[2] Loads Per Square Foot in Pounds

Distance between Supports	Depth of Plate																								
	4-Inch					3½-Inch					3-Inch					2½-Inch					2-Inch				
	Metal Gauge No.					Metal Gauge No.					Metal Gauge No.					Metal Gauge No.					Metal Gauge No.				
	16	18	20	22	24	16	18	20	22	24	16	18	20	22	24	16	18	20	22	24	16	18	20	22	24
3 ft.	4,230	3,180	2,260	1,810	1,408	3,755	2,815	1,990	1,500	1,280	2,820	2,165	1,730	1,230	978	2,260	1,700	1,210	970	770	1,330	1,005	810	640	454
4 ft.	2,370	1,780	1,265	1,010	792	2,100	1,575	1,115	840	720	1,610	1,210	970	685	550	1,265	950	675	540	433	745	560	450	350	255
5 ft.	1,510	1,130	800	640	507	1,340	1,000	705	530	461	1,025	760	615	435	352	905	605	430	340	277	475	355	285	230	165
6 ft.	1,040	780	550	435	352	915	790	485	360	320	705	530	420	295	244	555	415	295	235	192	325	245	200	155	117
7 ft.	760	570	400	320	258	672	510	350	265	235	515	385	305	215	169	405	305	215	175	143	235	180	145	115	87
8 ft.	575	430	300	240	198	510	380	265	201	180	390	290	230	160	137	305	230	160	130	108	180	135	110	85	65
9 ft.	450	335	235	185	156	400	295	205	150	142	305	235	180	125	109	240	180	125	100	86	140	120	85	65	55
10 ft.	360	270	185	145	127	320	235	165	120	115	240	180	145	100	88	190	140	100	80	69	110	85	65	50	41

[1] Concrete filling consists of 1 part best cement, 3 parts clean, sharp, angular sand mixed with 5 parts of pure crushed furnace slag.
[2] Load is total safe load less weight of concrete filling and weight of plate itself.
Estimated weight of cinder concrete per cubic foot, 90 pounds.
These tables represent safe loads with factor of safety of four and show the strengths of new work. For absolute permanence and as additional factor of safety it is recommended that rods be added according to specific requirements. Expanded metal may also be used.
Best results may be obtained by filling concrete over the plates equal to depth of plate itself.
Table prepared from *actual tests* under the direction of Hallstead & McNaugher, successors to G. W. G. Ferris & Co., Civil Engineers.

FOUNDED 1880

THE BROWN HOISTING MACHINERY COMPANY

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street
PITTSBURGH, PA., Oliver Building
CHICAGO, ILL., 208 South La Salle Street
SAN FRANCISCO, CAL., Monadnock Building
PORTLAND, ORE., The Colby Engineering Co.
MONTREAL, CANADA, 145 St. James Street

Products.

Manufacturers of "Ferroinclave," a Patent Sheet-Steel Reinforcement for Concrete.

Also, all kinds of Hoisting Machinery.

Ferroinclave
TRADE-MARK

Description.

"Ferroinclave" is a box-annealed steel sheet with dovetail corrugations, ½ inch in depth or height, which are inversely tapered, permitting the large ends of corrugations of one sheet to fit or "shingle" over and into the small ends of corrugations of another sheet. This forms a tight joint and practically makes one continuous sheet. Sheets for ridges or valleys of roofs are made with non-tapering corrugations.

Advantages.

(1) Lightest reinforced concrete construction. (2) Strongest for a given thickness and span. (3) Erected without forms. (4) Sheets are waterproof and building can be used before concrete is applied. (5) Sheets are laid entirely from upper side. (6) Sheets easily handled. (7) Under side is smooth and white and serves as a ceiling.

Details for Roofing.

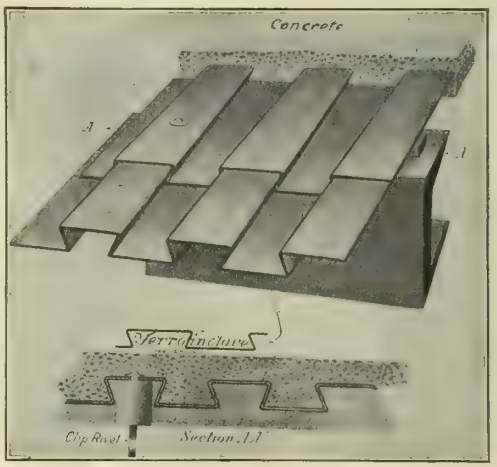
"Ferroinclave" is laid in the same manner as ordinary corrugated iron roofing. The purlins, I-beams, channels or Z-bars, may be spaced any distance up to 9 feet 9 inches. The standard size "Ferroinclave" sheets are 10 feet long, and purlins must be so spaced that the lap (usually 3 inches or more) of the sheets comes on one of them. A spacing of 4 feet 10½ inches is most economical, as it allows the use of sheets 10 feet long and requires a minimum of concrete and erecting labor.

"Ferroinclave" sheets should be laid on hardwood strips, ⅜ inch square, placed along the tops of the purlins, thereby preventing corrosion. As the sheets are laid they should be secured to the purlin at intervals of 10 inches with clips furnished with the sheets. The side laps are fastened with our special cross-ties, spaced about 2 feet apart.

Mortar Mixture.

When the "Ferroinclave" is secured in place the upper side should be coated with a mixture of one part Portland cement to two or three parts of sand, or one part Portland cement, two parts sand and four parts of stone or gravel. The coating should be ½ inch in thickness above tops of corrugations when purlin spacing does not exceed 5 feet. Tables of Safe Loads will be furnished on application.

After cement on upper side has set, under side should be coated with mortar composed of one part Portland cement



"FERROINCLAVE" ROOF, FLAT FLOOR OR SIDING, ETC.

to two or three parts sand, with small amount of hair. Mortar to be ⅜ inch thick, applied in three consecutive coats—second and third applied before preceding one dries or sets. Waterproof covering should be used on top of roof.

Weight and Cost.

Weight of complete roof (without waterproof covering), 1⅜ inches thick, is about 16 pounds per square foot. This kind of roof (with purlins not more than 5 feet apart) will support a uniform load of 300 pounds per square foot after ten days, and costs $15 to $17 per 100 square feet, including freight, labor and material.

Sidings and Partitions.

Construction is practically same as that for roofs.

Stairways.

Sheets are bent so that tread and riser are formed by one sheet. Mounted on structural steel or reinforced concrete stringers. No forms necessary.

Details for Flooring and Highway Bridges.

Same construction as roofing, or sheets may be curved between floor beams, making a segmental arch floor. Mortar of one part Portland cement to two or three parts sand should be spread over sheets to about ½ inch above corrugations. Then Portland cement concrete should be tamped on top to about 3 inches

Continued on next page

above the crown of the "Ferroinclave," thickness depending on span and load. The under side, when coated as in roofing, presents a smooth white appearance and serves as a ceiling.

Water Tanks, Silos, Bins, Culverts.

Sheets are bent according to curvature required, and applied as roofing.

Details of all Sizes.

Sheets are made in any lengths up to 10 feet, and length is determined by spacing of the purlins. Width, 20½ inches. Center to center of side laps, 20 inches. We keep in stock, for immediate shipments, No. 26-gauge sheets in 10-foot lengths, and No. 24 U. S. gauge sheets in even and ½-foot lengths, from 5 to 10 feet. Other sizes and weights are formed to order and shipped promptly.

Service.

On request and for large contracts we will execute the work complete and guarantee same. Catalogue H shows more fully how and where "Ferroinclave" is used.

WEIGHT OF "FERROINCLAVE" (NOT INCLUDING LAPS) AND CROSS SECTIONAL AREAS

28-gauge,	.94 lb. per sq. ft.,	.274 sq. in. per ft. of width
26-gauge,	1.13 lbs. per sq. ft.,	.329 sq. in. per ft. of width
24-gauge,	1.5 lbs. per sq. ft.,	.439 sq. in. per ft. of width
22-gauge,	1.88 lbs. per sq. ft.,	.548 sq. in. per ft. of width

TABLE OF DEFLECTIONS

SHEETS WITH CONCENTRATED LOADS AT MIDDLE AND WITHOUT CEMENT OR PLASTER COVERING—4-FT SPAN

No. 26-Gauge		No. 24-Gauge		No. 22-Gauge	
Total Load	Total Deflection	Total Load	Total Deflection	Total Load	Total Deflection
30 lbs.	⅛ inch	125 lbs.	¼ inch	170 lbs.	$\frac{1}{32}$ inch
80 lbs.	⅜ inch	150 lbs.	¼ inch	270 lbs.	$\frac{9}{32}$ inch
130 lbs.	½ inch	175 lbs.	$\frac{7}{16}$ inch	370 lbs.	$\frac{13}{32}$ inch
180 lbs.	⅝ inch	200 lbs.	½ inch	518 lbs.	$\frac{21}{32}$ inch

"FERROINCLAVE" SAWTOOTH ROOF ON FACTORY OF JOSEPH AND FEISS CO., CLEVELAND, OHIO

"Ferroinclave" is especially adapted for sawtooth roofs. Sheets can be bent to form gutter and siding, making a continuous monolithic slab

"FERROINCLAVE" FLAT FLOOR AT PLANT OF SUPERIOR FOUNDRY CO., CLEVELAND, OHIO

"Ferroinclave" Flat Floor combines great strength with light weight. Can be erected easily and quickly, is attractive in appearance, fire-resistive and inexpensive. The concrete is applied without the use of any forms and without interfering with any work on the floor below

SUPERIOR FOUNDRY CO., CLEVELAND, OHIO, AFTER FIRE, SEPTEMBER, 1909

Warehouse and paint shop near foundry were destroyed. Wooden window frames and sashes on exposed side of foundry were burned, but "Ferroinclave" roof and siding were uninjured and prevented spread of flames

UNDER SIDE OF "FERROINCLAVE" ROOF ON CAR BARNS OF THE CONNECTICUT CO., NEW HAVEN, CONN.

As "Ferroinclave" is applied to under side of "Ferroinclave" roof, it is given a smooth finish which makes a white ceiling, increasing the light of the building

THE BERGER MANUFACTURING CO.

MANUFACTURERS OF

Metal Lumber and a General Line of Pressed Steel Building Materials

CANTON, OHIO

BRANCHES

NEW YORK, N. Y., S. E. Corner 22nd Street and 11th Avenue
PHILADELPHIA, PA., Corner 16th Street and Washington Avenue
SOUTH BOSTON, MASS., 160-166 Broadway Extension
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., 16 South Tenth Street
MINNEAPOLIS, MINN., 300-312 Tenth Avenue, South
SAN FRANCISCO, CAL., 1120 Mission Street

AGENTS IN ALL PRINCIPAL CITIES

Products.

BERGER'S METAL LUMBER, including JOISTS, STUDS, RAFTERS, CHANNELS, ANGLES and other PRESSED STEEL STRUCTURAL MEMBERS; all being of Pressed Steel Construction (officially tested fireproof).

Metal Lumber
TRADE-MARK

See our name in General Index for Vault and Sidewalk Lights, Corner Beads, Steel Cores, Steel Ceilings, Concrete Reinforcement, etc.

Description.

Metal Lumber consists of scientifically designed pressed steel structural members, so proportioned and arranged as to make strong fireproof floors, partitions, roofs, and walls of buildings. These members are made from special analysis, cross-grained and heat-treated steel, manufactured especially for the purpose in our own furnaces.

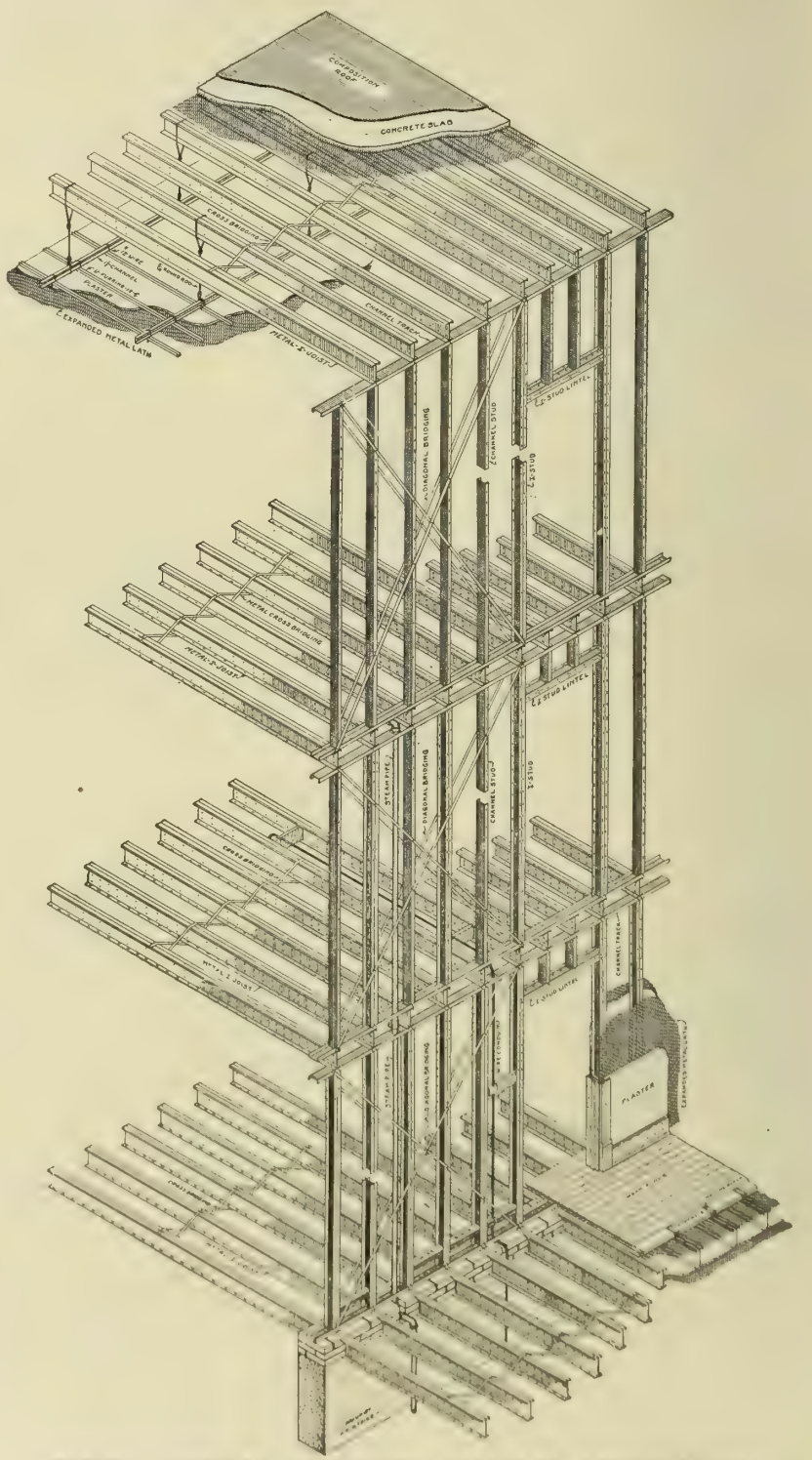
Erection Diagrams — Erection diagrams are furnished in connection with the material, each member being marked and cut to size, thus making the matter of erection very simple.

Prongs—Prongs are punched from the flanges of the members to secure the expanded metal lath. The prongs are readily bent over, holding the lath in a secure position.

Speed and Economy—Speed and economy of erection are greater than that with any other system of fireproof construction on the market.

Metal Lumber Members—The respective members used in various parts of a building constructed with Berger's Metal Lumber are:

I-Joists, I-Studs, Channel Joists, Channel Studs, Angle Studs, Metal Bridging, Crowning Member, Channel Track, Wall Ribbon and Expanded Metal Lath.



TYPICAL CORRIDOR SUPPORTING PARTITION CONSTRUCTION

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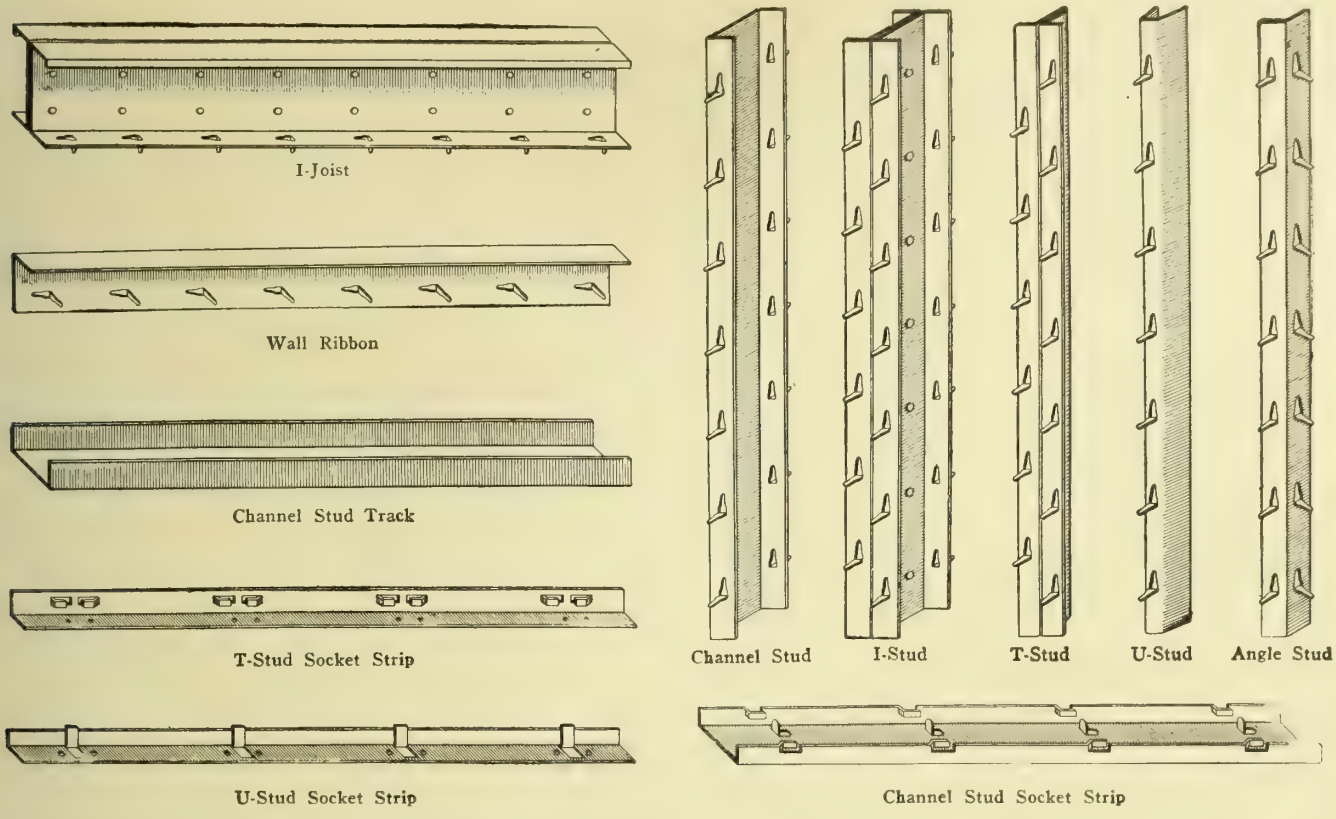
Metal Lumber Members.

The sections shown herewith represent the principal members of this construction, and are made of sizes, weights and lengths as shown in the tables on succeeding pages.



PRINCIPAL MEMBERS USED IN METAL LUMBER STEEL CONSTRUCTION

Berger's Standard Metal Lumber Pressed Steel Construction (Patented).

Total dead load per square foot, less than 40 pounds. I-Joists spaced 16 inches center to center with No. 25 gauge Expanded Metal Lath on top and bottom flanges. Joists are diagonally bridged with 1-inch No. 20 galvanized steel bridging.

On top of joists 2 by 2-inch nailing blocks are placed and securely nailed into web. Space between nailing blocks filled with 1:3:6 concrete on top of lath without forms.

This is standard construction, and may be finished with wood, as shown below, or concrete, tile or any finish wearing surface desired. See succeeding pages and "General Information."

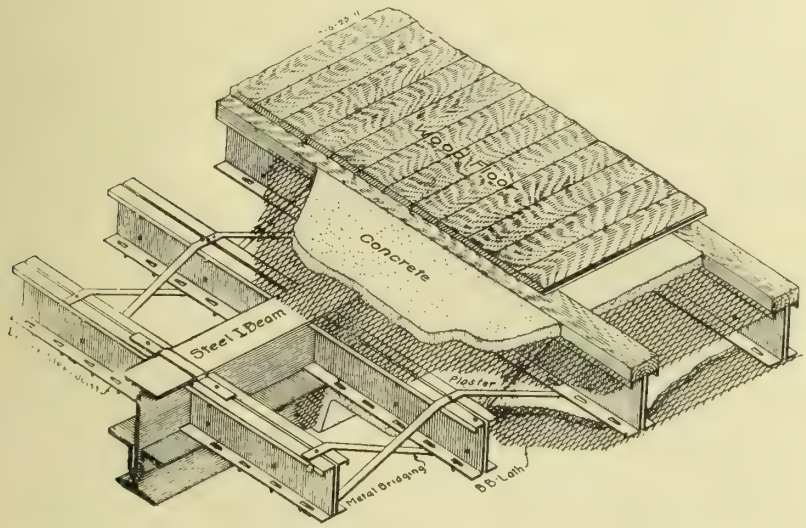


Fig. S—102—15
STANDARD SYSTEM OF FLOOR CONSTRUCTION
Note space for conduits, vents, etc.

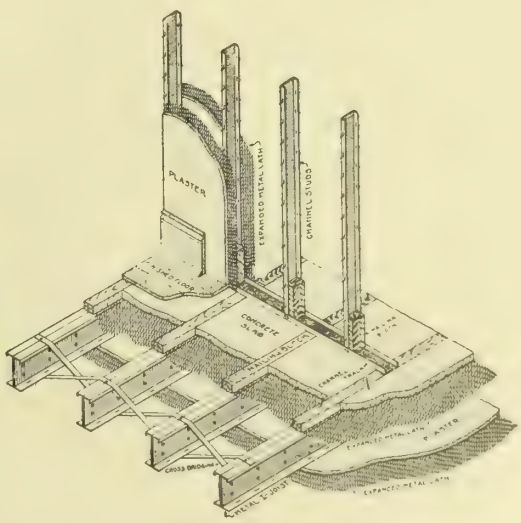


Fig. S—533—21
NON-SUPPORTING CHANNEL STUD PARTITION
RESTING ON CONCRETE SLAB

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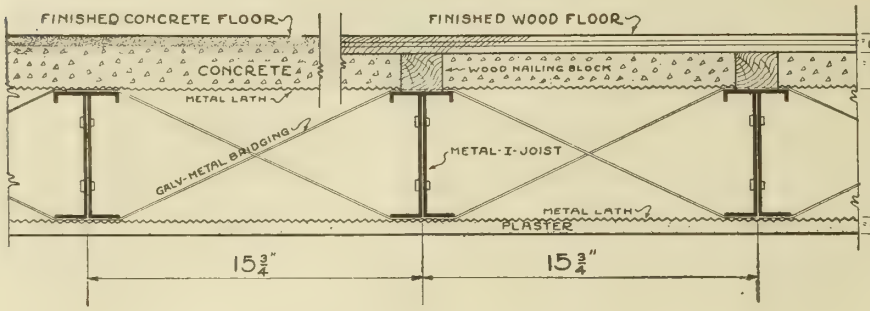
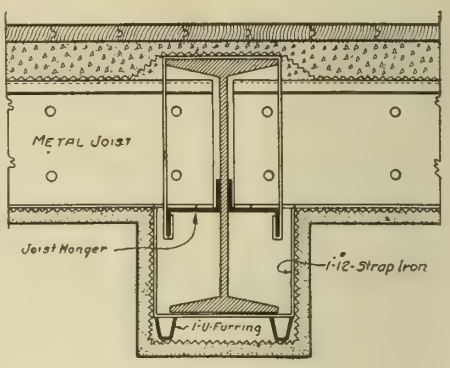
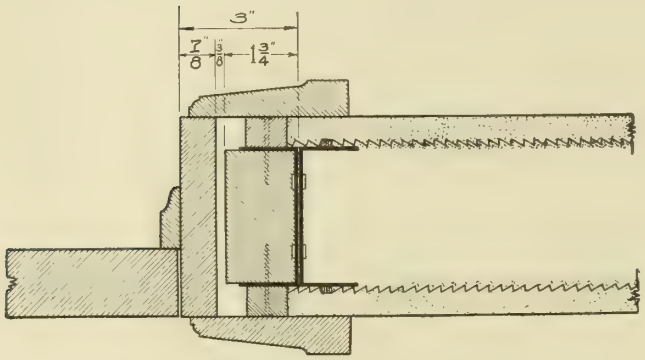


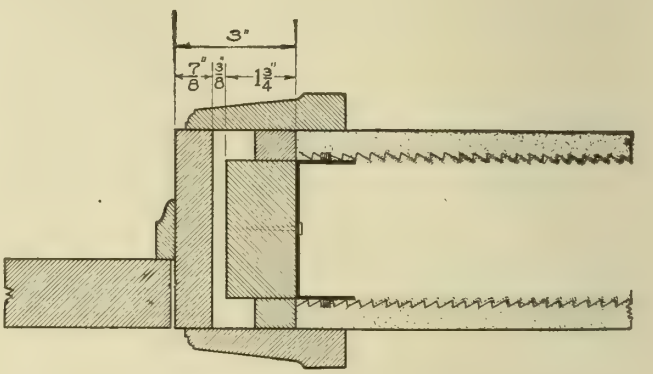
Section showing Standard Floor Construction



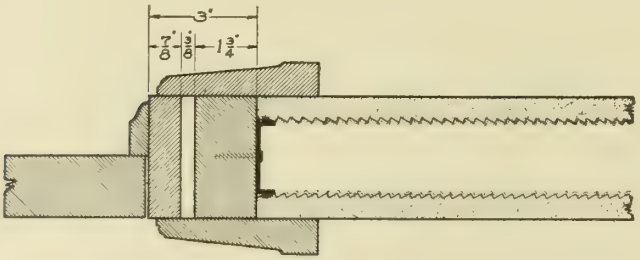
Section through Beam



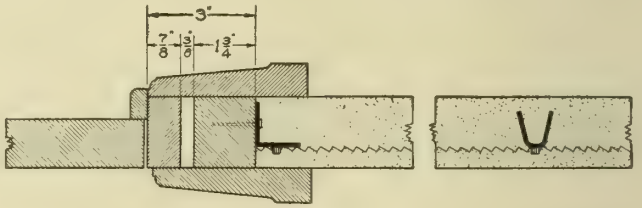
Detail showing construction of door jamb for Berger's Supporting Partitions where I-Studs are used at jamb



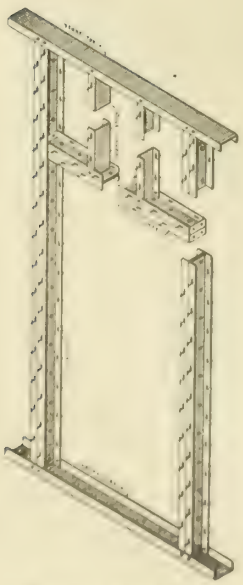
Detail showing construction of door jamb for Berger's Supporting Partitions where Channel Studs are used at jamb



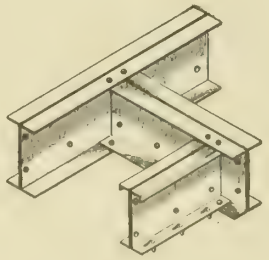
Detail showing construction of door jamb for Berger's Non-supporting Channel Stud Partitions



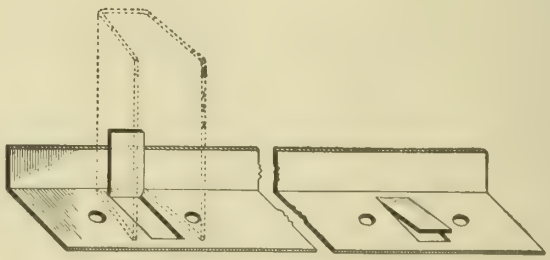
Detail showing construction of door jamb for Berger's Non-supporting U-Stud partitions with Angle Stud used at jamb



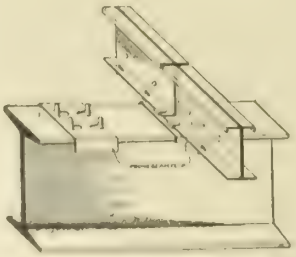
Detail of Door Frame



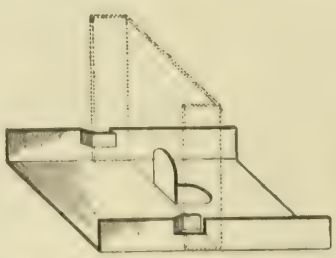
Detail of Header Framing



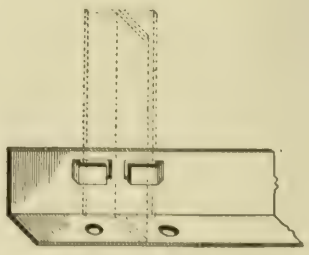
Detail of Socket Strip and U-Stud Connection



Detail of Beam and Joist Connection



Detail of Socket Strip and Channel Stud Connection



Detail of Socket Strip and T-Stud Connection

DETAILS OF CONSTRUCTION

Continued on next page

SIZE, WEIGHT AND LENGTH WITHOUT SPLICING OF STANDARD METAL LUMBER, PRESSED STEEL SECTION

I-Joists

Lengths over 16 feet 8 inches require splices

Size, Ins.	Gauge	Weight per Ft.
4	16	3.11
5	"	3.54
6	"	3.96
7	"	4.39
8	"	4.81
9	"	5.24
10	"	5.66
12	"	6.51
4	**15**	**3.48**
5	**"**	**3.97**
6	**"**	**4.45**
7	**"**	**4.92**
8	**"**	**5.40**
9	**"**	**5.88**
10	**"**	**6.36**
12	**"**	**7.32**
4	14	3.86
5	"	4.40
6	"	4.93
7	"	5.46
8	"	5.99
9	"	6.52
10	"	7.05
12	"	8.12
4	**12**	**5.34**
5	**"**	**6.08**
6	**"**	**6.83**
7	**"**	**7.57**
8	**"**	**8.32**
9	**"**	**9.06**
10	**"**	**9.80**
12	**"**	**11.29**

I-Studs

Lengths over 16 feet 8 inches require splices

Size, Ins.	Gauge	Weight per Ft.
2	**15**	**2.33**
2½	**"**	**2.56**
3	**"**	**2.80**
3½	**"**	**3.04**
4	**"**	**3.28**
4½	**"**	**3.52**
5	**"**	**3.76**
5½	**"**	**4.00**
6	**"**	**4.24**
2	14	2.57
2½	"	2.84
3	"	3.11
3½	"	3.37
4	"	3.64
4½	"	3.90
5	"	4.17
5½	"	4.44
6	"	4.70
2	**12**	**3.58**
2½	**"**	**3.93**
3	**"**	**4.30**
3½	**"**	**4.68**
4	**"**	**5.05**
4½	**"**	**5.42**
5	**"**	**5.80**
5½	**"**	**6.16**
6	**"**	**6.54**

Channel Studs "A"

Lengths over 16 feet 8 inches require splices

Size, Ins.	Gauge	Weight per Ft.
2	**15**	**1.17**
2½	**"**	**1.28**
3	**"**	**1.40**
3½	**"**	**1.52**
4	**"**	**1.64**
4½	**"**	**1.76**
5	**"**	**1.88**
5½	**"**	**2.00**
6	**"**	**2.12**
2	14	1.29
2½	"	1.42
3	"	1.56
3½	"	1.69
4	"	1.82
4½	"	1.95
5	"	2.09
5½	"	2.22
6	"	2.35
2	**12**	**1.79**
2½	**"**	**1.97**
3	**"**	**2.15**
3½	**"**	**2.34**
4	**"**	**2.53**
4½	**"**	**2.71**
5	**"**	**2.90**
5½	**"**	**3.08**
6	**"**	**3.27**

Channel Track and Crowning Members

Same weight as applies on corresponding sizes and gauges of channel studs

Track and crowning members furnished in 10-foot lengths unless otherwise specified

Wall Ribbon

Furnished in 10-foot lengths unless otherwise specified

Size, Ins.	Gauge	Weight per Ft., Lbs.
3½ x 2½	**15**	**1.42**
3½ x 2½	14	1.57
3½ x 2½	**12**	**2.20**

Bridging

Furnished in 10-foot lengths unless otherwise specified

Size, Ins.	Gauge	Weight per Ft., Lbs.
1	20	.14

NOTE—Gauges of I-Joists, I-Studs, Channel Studs "A" and Wall Ribbon shown in heavy face type are standard. Furnished from stock.

Socket Strips With Channel Studs for Hollow Partitions

Furnished in 10-foot lengths unless otherwise specified

Size, Ins.	Gauge	Weight per Ft.	
		Black	Galv.
2	20	.50	.55
2½	"	.56	.62
3	"	.62	.69
3½	"	.69	.76
4	"	.75	.83
2	18	.67	.72
2½	"	.75	.81
3	"	.84	.90
3½	"	.92	.99
4	"	1.00	1.08

NOTE—For ¾-inch, 1-inch, 1¼-inch and 1½-inch channel studs for solid partitions use U-stud socket strips.

Angle Studs for Outside Corners

Lengths over 12 feet require splices

Size, Ins.	Guage	Weight per Ft.	
		Black	Galv.
1¼ x 1¼	20	.31	.34
1½ x 1½	"	.38	.41
1¼ x 1¼	18	.42	.45
1½ x 1½	"	.50	.54

Channel Studs "B" for Solid and Hollow Partitions

Lengths over 12 feet, require splices

Size, Ins.	Gauge	Weight per Ft.	
		Black	Galv.
¾	20	.28	.31
1	"	.31	.34
1¼	"	.34	.38
1½	"	.37	.41
2	"	.44	.48
2½	"	.50	.55
3	"	.56	.62
3½	"	.62	.69
4	"	.69	.76
¾	18	.38	.40
1	"	.42	.45
1¼	"	.46	.50
1½	"	.50	.54
2	"	.58	.63
2½	"	.67	.72
3	"	.75	.81
3½	"	.83	.90
4	"	.92	.99
¾	16	.47	.49
1	"	.52	.55

T-Studs Socket Strips

Furnished in 10-foot lengths unless otherwise specified

Size, Ins.	Gauge	Weight per Ft.	
		Black	Galv.
¾ x 1¼	20	.25	.28
¾ x 1¼	18	.33	.36

T-Studs for Solid Partitions

Lengths over 12 feet require splices

Size, Ins.	Gauge	Weight per Ft.	
		Black	Galv.
¾	20	.31	.35
⅞	"	.34	.38
1	"	.38	.42
1⅛	"	.41	.45
1¼	"	.44	.48
¾	18	.42	.45
⅞	"	.46	.50
1	"	.50	.54
1⅛	"	.54	.58
1¼	"	.59	.63

Socket Strips for U-Studs

Furnished in 10-foot lengths unless otherwise specified

Size, Ins.	Gauge	Weight per Ft.	
		Black	Galv.
¾ x 1¾	20	.31	.35
¾ x 1¾	18	.42	.45
¾ x 1¾	16	.52	.55

U-Studs

Also Ceiling and Wall Furring U-furring furnished in 10-foot lengths unless otherwise specified U-studs over 12 feet, require splices

Size, Ins.	Gauge	Weight per Ft.	
		Black	Galv.
½	20	.19	.21
⅝	"	.22	.24
¾	"	.25	.28
1	"	.31	.35
1¼	"	.38	.41
1½	"	.44	.48
1¾	"	.50	.55
2	"	.56	.62
½	18	.24	.27
⅝	"	.29	.32
¾	"	.33	.36
1	"	.42	.45
1¼	"	.50	.54
1½	"	.59	.63
1¾	"	.67	.72
2	"	75	.81
½	16	.31	.33
⅝	"	.37	.39
¾	"	.42	.44
1	"	.52	.55
1¼	"	.63	.66
1½	"	.73	.77
1¾	"	.83	.88
2	"	.94	1.00

NOTE—All materials shown below heavy rule in center of page can be furnished from stock.

Continued on next page

TOTAL SAFE LOAD IN POUNDS UNIFORMLY DISTRIBUTED—BERGER'S METAL LUMBER I-JOISTS

Safe Loads below are figured for Fiber Stress of 16,000 pounds per square inch and include Weight of Joist

Depth Ins.	4" Joist				5" Joist				6" Joist				7" Joist			
Gauge	16	15	14	12	16	15	14	12	16	15	14	12	16	15	14	12
Wgt. Per Ft.	3.110	3.485	3.862	5.339	3.536	3.966	4.396	6.084	3.961	4.445	4.927	6.826	4.386	4.924	5.458	7.571
Clear Span in Feet 4	2806	3133	3462	4719	3820	4273	4721	6460	4948	5538	6123	8400	6191	6931	7666	10537
5	2245	2506	2769	3775	3056	3414	3777	5168	3959	4430	4891	6720	4953	5545	6133	8430
6	1871	2088	2308	3146	2547	2846	3147	4307	3299	3692	4082	5600	4127	4621	5111	7025
7	1603	1790	1978	2697	2183	2439	2698	3691	2828	3165	3499	4800	3538	3961	4381	6021
8	1403	1566	1731	2360	1910	2134	2360	3230	2474	2769	3062	4200	3095	3466	3833	5269
9	1247	1392	1538	2098	1698	1897	2098	2871	2199	2461	2721	3733	2751	3081	3407	4683
10	1122	1253	1385	1888	1528	1707	1888	2584	1979	2215	2445	3360	2476	2773	3067	4215
11	1020	1139	1259	1716	1389	1552	1717	2349	1799	2014	2227	3055	2251	2520	2788	3832
12	935	1044	1154	1573	1274	1423	1574	2153	1649	1846	2041	2800	2064	2310	2555	3512
13	863	964	1065	1452	1176	1313	1453	1988	1523	1704	1884	2585	1905	2133	2359	3242
14	802	895	989	1348	1092	1220	1349	1846	1414	1582	1750	2400	1769	1980	2190	3011
15	748	835	923	1259	1019	1138	1259	1723	1320	1477	1630	2240	1651	1848	2044	2810
16	702	783	865	1180	955	1067	1180	1615	1237	1385	1531	2100	1548	1733	1917	2634
17	660	737	814	1110	900	1004	1111	1520	1164	1303	1441	1977	1457	1631	1804	2479
18	624	696	769	1049	849	949	1049	1436	1100	1231	1361	1867	1376	1540	1704	2342
19	591	660	729	994	804	898	994	1360	1042	1166	1289	1768	1303	1459	1614	2218
20	561	627	692	944	764	854	944	1292	990	1108	1223	1680	1238	1386	1533	2107

Depth Ins.	8" Joist				9" Joist				10" Joist				12" Joist			
Gauge	16	15	14	12	16	15	14	12	16	15	14	12	16	15	14	12
Wgt. Per Ft.	4.812	5.402	5.989	8.316	5.237	5.880	6.522	9.060	5.662	6.359	7.053	9.804	6.513	7.316	8.116	11.293
Clear Span in Feet 4	7543	8451	9350	12871	9010	10097	11175	15403	10588	11868	13139	18129	14080	15789	17487	24174
5	6035	6761	7480	10297	7208	8077	8940	12322	8471	9494	10512	14503	11264	12631	13990	19339
6	5029	5634	6234	8581	6007	6731	7450	10269	7059	7912	8760	12086	9387	10526	11658	16116
7	4311	4829	5243	7355	5149	5769	6385	8802	6050	6782	7508	10359	8046	9022	9993	13814
8	3772	4225	4675	6436	4505	5048	5587	7701	5294	5934	6570	9064	7040	7894	8743	12087
9	3353	3756	4156	5721	4004	4487	4966	6846	4706	5275	5840	8057	6258	7017	7772	10744
10	3017	3380	3740	5149	3604	4039	4470	6161	4235	4747	5256	7251	5632	6315	6995	9669
11	2743	3073	3400	4681	3276	3671	4064	5601	3850	4316	4778	6592	5120	5741	6359	8790
12	2514	2817	3117	4290	3003	3366	3725	5134	3529	3956	4380	6043	4693	5263	5829	8058
13	2321	2600	2877	3960	2772	3107	3438	4739	3258	3652	4043	5578	4332	4858	5381	7438
14	2155	2415	2672	3678	2574	2885	3193	4401	3025	3391	3754	5180	4023	4511	4996	6907
15	2012	2254	2493	3433	2403	2692	2980	4107	2824	3165	3504	4834	3755	4210	4663	6446
16	1886	2113	2338	3218	2252	2524	2794	3851	2647	2967	3285	4532	3520	3947	4372	6043
17	1775	1988	2200	3029	2120	2376	2629	3624	2491	2792	3092	4266	3313	3715	4145	5688
18	1676	1878	2078	2860	2002	2244	2483	3423	2353	2637	2920	4029	3129	3509	3886	5372
19	1588	1779	1969	2710	1897	2126	2353	3243	2229	2499	2766	3817	2964	3324	3682	5089
20	1509	1690	1870	2575	1802	2019	2235	3081	2118	2374	2628	3626	2816	3158	3497	4835

15 Gauge and 12 Gauge Joists Are Standard.

NOTE—For loads below heavy horizontal line deflection will be greater than the allowable limit for plastered ceiling (i. e., 1/360 span)

SAFE LOAD IN POUNDS—BERGER'S METAL LUMBER I-STUDS

Gordon's Formula $P = \dfrac{50000}{1+\dfrac{(12L)^2}{36000r^2}}$ Safety Factor 4

Depth Ins.	Gauge	Weight Per Foot, in Lbs.	Area of Section Sq. In.	Length in Feet 3	4	5	6	7	8	9	10	11	12	13	14
2	16	2.073	.6094	7239	6966	6658	6303	5933	5557	5184	4823	4478	4153	3849	3567
	15	2.325	.6833	8115	7817	7454	7058	6642	6219	5800	5394	5006	4641	4300	3974
	14	2.575	.7568	8985	8647	8248	7807	7344	6873	6407	5957	5527	5122	4744	4394
	12	3.559	1.0459	12397	11918	11353	10731	10080	9419	8768	8140	7541	6980	6457	5974
2½	16	2.286	.6719	8117	7910	7660	7374	7063	6735	6399	6060	5726	5399	5083	4782
	15	2.570	.7536	9103	8870	8587	8266	7915	7546	7167	6787	6410	6043	5689	5350
	14	2.841	.8350	10082	9823	9509	9150	8761	8350	7929	7506	7088	6680	6300	5912
	12	3.931	1.1552	13939	13572	13127	12622	12073	11496	10906	10314	9730	9161	8612	8093
3	16	2.498	.7344	8954	8787	8581	8343	8078	7794	7491	7181	6868	6554	6244	5941
	15	2.837	.8240	10047	9859	9627	9356	9059	8737	8398	8050	7697	7344	6996	6654
	14	3.107	.9131	11132	10922	10689	10365	10032	9674	9298	8910	8518	8126	7739	7361
	12	4.303	1.2646	15410	15114	14750	14324	13860	13356	12828	12285	11735	11187	10647	10119
3½	16	2.711	.7969	9774	9634	9460	9256	9026	8751	8505	8222	7932	7636	7339	7043
	15	3.043	.8913	10969	10811	10615	10385	10125	9841	9538	9221	8894	8561	8227	7894
	14	3.373	.9912	12157	11982	11763	11507	11218	10902	10565	10212	9848	9479	9107	8737
	12	4.676	1.3740	16845	16596	16289	15927	15520	15075	14601	14105	13595	13076	12556	12039
4	16	2.924	.8594	10828	10461	10310	10131	9928	9704	9461	9204	8933	8659	8377	8093
	15	3.282	.9646	11878	11743	11573	11371	11142	10890	10616	10327	10025	9713	9401	9076
	14	3.639	1.0693	13167	13016	12827	12603	12348	12067	11764	11441	11106	10760	10407	10052
	12	5.048	1.4834	18261	18049	17782	17467	17109	16713	16286	15834	15363	14878	14385	13887

Continued on next page

SAFE LOAD IN POUNDS—BERGER'S METAL LUMBER CHANNEL STUDS

Gordon's Formula $P = \frac{50000}{1+\frac{(12L)^2}{36000r^2}}$ Safety Factor 4

Depth, Ins.	Gauge	Weight Per Foot in Lbs.	Area of Section Sq. In.	Length in Feet											
				3	4	5	6	7	8	9	10	11	12	13	14
2	16	1.037	.3047	3620	3493	3329	3151	2966	2778	2592	2411	2239	2076	1925	1783
	15	1.163	.3416	4057	3908	3727	3529	3321	3110	2900	2697	2503	2320	2150	1987
	14	1.288	.3784	4492	4324	4124	3903	3672	3437	3203	2978	2763	2561	2372	2197
	12	1.779	.5229	6198	5959	5677	5365	5040	4710	4384	4070	3770	3490	3228	2987
2½	16	1.143	.3359	4058	3955	3830	3687	3531	3368	3200	3030	2863	2700	2541	2391
	15	1.285	.3768	4551	4435	4293	4133	3957	3773	3583	3393	3205	3021	2845	2675
	14	1.420	.4175	5041	4911	4754	4575	4380	4175	3964	3753	3544	3340	3150	2956
	12	1.966	.5776	6969	6786	6563	6311	6036	5748	5453	5157	4865	4580	4306	4046
3	16	1.249	.3672	4477	4393	4290	4171	4039	3897	3745	3590	3434	3277	3122	2970
	15	1.419	.4120	5024	4930	4814	4678	4530	4368	4199	4025	3848	3672	3498	3327
	14	1.554	.4565	5566	5461	5344	5182	5016	4837	4649	4455	4259	4063	3869	3680
	12	2.152	.6323	7705	7557	7375	7162	6930	6678	6414	6142	5867	5593	5324	5060
3½	16	1.356	.3984	4887	4817	4730	4628	4513	4375	4252	4111	3966	3818	3669	3521
	15	1.522	.4471	5484	5406	5308	5192	5062	4920	4769	4611	4447	4280	4114	3947
	14	1.686	.4956	6078	5991	5881	5753	5609	5451	5282	5106	4924	4740	4553	4368
	12	2.338	.6870	8422	8298	8144	7863	7760	7537	7300	7052	6797	6538	6278	6020
4	16	1.462	.4297	5414	5230	5155	5066	4964	4852	4730	4602	4466	4330	4188	4046
	15	1.641	.4823	5939	5871	5786	5685	5571	5445	5308	5163	5012	4856	4700	4538
	14	1.819	.5347	6583	6508	6414	6301	6174	6033	5882	5720	5553	5380	5203	5026
	12	2.524	.7417	9130	9025	8891	8733	8554	8356	8143	7917	7681	7439	7192	6944

General Information Relating to Berger's Metal Lumber Pressed Steel Construction.

Berger's Metal Lumber Pressed Steel Construction *is protected by Letters Patent No. 682316, for building construction.* It is a material brought to its present state of high efficiency through extensive use and our many years of experience in manufacturing.

Facilities—We control the manufacture of the steel entering into our Metal Lumber Pressed Steel Shapes, having our own blast furnaces, open-hearth furnaces, rolling mills and factories. The facilities contrive to produce the quality of steel which is so highly essential in a material of this character.

Fireproof Feature—The fireproof qualities of Berger's Metal Lumber Pressed Steel Construction have been established by extensive official fire, load and water tests, reports of which can be secured from us upon request.

Quality of Steel—The steel is a special analysis open-hearth product, cross-grained, double rolled and annealed, giving it an ultimate tensile strength of 64,000 to 70,000 pounds per square inch of section, and so chemically proportioned as to give it full working values under high temperature.

Design—Twenty-nine years of experience in the manufacture and use of pressed steel, in all classes of building construction, has produced in our I-joists a section which is properly proportioned—a section which is not patterned after rolled steel shapes without regard to our knowledge of basic scientific principles. The proper relation of flanges to web, in order to realize the full working value of the steel within allowable and practicable limits, has been carefully worked out. Extensive physical, chemical and fire tests have been made to prove the accuracy of the design of section established as standard.

Uses—The extensive use to which Berger's Metal Lumber Pressed Steel construction has been put, with unqualified success in every instance, has proven conclusively the merit which this construction possesses.

It has been used successfully and extensively in the construction of over fifty-five different classes of buildings, located in forty different states and eight foreign countries. It has been used by some of the largest industrial corporations of the country, as well as the Federal Government, in extensive building operations.

Co-operative Service—It is always our desire to co-operate with architects, engineers, and contractors, and we, therefore, give below a standard form of specification in order to facilitate the use of the material, and for protection from infringers and those who wish to commercialize the product without regard for quality or service.

Metal Lumber Specifications.

General—Where Pressed Steel construction is called for on plans and specifications, it means material equal to that manufactured by The Berger Manufacturing Co. of Canton, Ohio.

Any system of Pressed Steel construction desired to be used as an equal to that specified above must be accompanied with official, authentic report of fire, load and water test—same having been made by competent, distinterested authorities—showing the construction capable of sustaining a live load of 150 pounds per square foot, under a temperature of 1700° Fahr. for four hours, after which water is applied at a pressure of 60 pounds per square inch at the nozzle, and the structure then loaded to 600 pounds per square foot, with a deflection of not more than 2½ inches on 12-foot spans.

The steel used in the manufacture of the Joists and Studs must not contain more than .4 of 1 per cent of phosphorus and sulphur, and must show on chemical analysis .14 to .17 of 1 per cent carbon. The steel must be rolled with a double grain, and annealed at not less than 1400° Fahr. before forming.

The gauges of steel used in joists and studs in supporting partitions shall in no case be less than No. 15 U. S. standard and the Lath not less than No. 25 U. S. standard. All steel entering into the manufacture of joists must show an ultimate tensile strength of not less than 64,000 pounds per square inch of section; a percentage of elongation equal to 1,400,000 divided by the ultimate strength and an elastic limit of not less than one half the ultimate strength. In no case will the flanges of the Pressed Steel Joist sections be permitted to contribute more than sixty per cent of the resisting inches of the total section.

Full facilities must be provided for inspector to make, or have made, physical or chemical tests as in his judgment are necessary to determine the quality of material used as specified above.

Continued on next page

All Pressed Steel construction for floors and supporting partitions must be provided in connection with erection drawings showing the location, size and character of the members to be used, and submitted to the architect for approval before the material is installed.

All Metal Lumber Pressed Steel sections to be given two coats of hand-dipped paint in graphite and linseed oil, consisting of from 5 to 8 pounds of graphite to a gallon of linseed oil. All Expanded Metal Lath to be given one coat of hand-dipped paint.

Floors—Floors to be constructed of size and gauge of Pressed Steel I-Joists, as shown on drawings, spaced 16 inches center to center, and bridged laterally every one third length of span with 1-inch No. 20 gauge Galvanized Bridging. This bridging to be secured by 10d nails driven into the webs of the joists.

On top of the joists, after bridging has been applied, attach No. 25 gauge Painted Expanded Metal Lath, securing same by large head nails driven directly into the web of the joists. The Ceiling Lath to be applied to the bottom flange by means of prongs provided for the purpose. Directly on top of the joists and parallel thereto apply 2 by 2-inch wood nailing strips, same being secured to joists by nailing directly thereto.

The top layer of Lath to be covered with 2 inches of concrete, consisting of 1 part cement, 2½ parts sand and 5 parts broken stone or clean gravel—the maximum size of which will pass through a ¾-inch ring. This concrete to be applied comparatively dry and directly on top of the lath without forms, same being floated to an even surface.

Where floors are used, requiring other than wood finished surface, eliminate the 2 by 2-inch nailing strips, and apply 2 inches of concrete slab directly on top of the lath, consisting of 1 part cement, 2 parts sand and 4 parts gravel or broken stone. This slab to serve as a base for any finish floor which may be called for under other specifications.

Roof Construction—The roof construction is the same as specified for the floors, using the 2-inch concrete slab on top of joists without nailing blocks. This slab to be left comparatively rough in order to thoroughly bond the waterproofing surface, which will be applied under another contract.

Suspended Ceiling—Suspended Ceilings are to be constructed of 1-inch No. 20 gauge Prong Lock U-Furring strips spaced 12 inches, center to center, and secured to 1½-inch Pressed Steel Channel runners spaced 3 feet 6 inches, center to center, which in turn are suspended from the roof construction by means of $\frac{3}{16}$-inch round rods, galvanized, and securely fastened thereto and spaced 3 feet 6 inches, center to center, along channel runners. The Furring is to be secured to Channel runners by means of No. 12 gauge wire clips provided for this purpose. Apply No. 25 gauge painted expanded metal lath to the U-Furring by means of prongs punched therefrom—these prongs being bent over in a manner that will hold the lath securely.

This Ceiling construction is designed to support a safe live load of 25 pounds per square foot.

Beam and Column Furring—The beam and column covering to consist of 1-inch No. 20 gauge U-Furring strip, secured to the column by 1-inch No. 12 gauge strap iron, spaced 3 feet 6 inches, center to center, and covered with No. 25 painted expanded metal lath, secured to furring by means of prongs provided for the purpose. Care to be exercised in forming the column so that size and shape, when plastered, will conform to that shown in drawings.

Supporting Partitions—Where partitions are required to support floor loads, same are to consist of Channel or I-Stud sections of sufficient strength to carry, with a safety factor of 4, the load of the floor supported thereby. The Studs are to be spaced not over 16 inches, center to center, and secured to channel track and crowning members at floor and ceiling line with ¼-inch diameter rivets. In no case will other devices be permitted to serve as connections for the Pressed Steel construction.

The Lath will be applied to the flanges of channels by the prongs punched therefrom.

Where openings occur, such as doors and windows, same will be provided with special I-Lintels of the proper size to carry superimposed loads which may come over these openings.

Partitions are to be erected in strict accordance with detailed erection drawings provided by the manufacturer and approved by the architect.

Non-Supporting, Hollow Channel Stud Partitions—Where partitions are shown hollow, with metal lath both sides of studs, the depth of studs being 2 inches or more, same are to consist of size of channels shown in plan, spaced 13½ inches, center to center, secured to both floor and ceiling by channel socket strips punched with sockets to receive them. No. 25 gauge painted expanded metal lath is secured to the studs by means of prongs punched out for that purpose, the prongs being clinched over the metal lath.

Non-Supporting Partitions—For 2-inch Solid Metal Lath and Plaster. The 2-inch partitions, where noted on drawings, are composed of 1-inch No. 18 gauge U-Studs, spaced 13½ inches, center to center, secured to both floor and ceiling by means of angle socket strips punched with sockets to set studs in. No. 25 gauge painted expanded metal lath is secured to the studs on one side only by means of prongs punched out for that purpose, the prongs being clinched over the metal lath.

PART OF A GROUP OF 11 RESIDENCES, COMPRISING OFFICERS' QUARTERS OF THE WAR DEPARTMENT, U. S. GOVERNMENT. SCHOFIELD BARRACKS, AT HONOLULU, H. I

The floors, roof, partitions, stairs, porches and exterior walls throughout were constructed with Berger's Metal Lumber

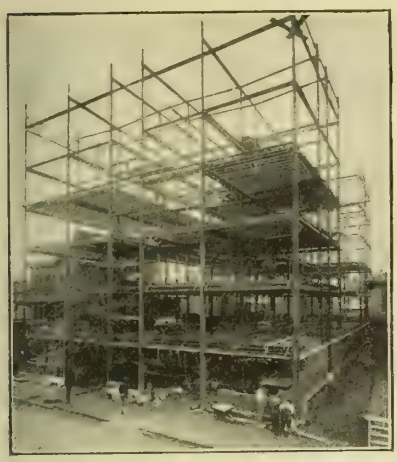
Catalog

Continued on next page

References.

A few of the thousands of Berger's Metal Lumber installations scattered throughout the United States and foreign countries are shown here.

PURITAN APARTMENTS, LOUISVILLE, KY.
Berger's Metal Lumber used in Floors, Partitions and Roof Construction
H. J. Scheirich, Architect

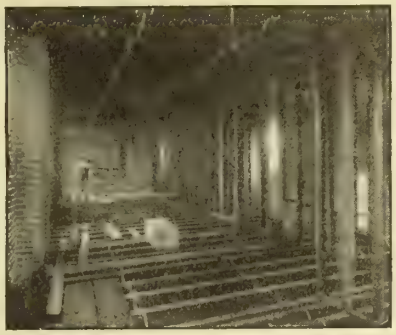


WAY'S SANATORIUM, FT. WAYNE, IND.
L. S. Tuttle, Architect

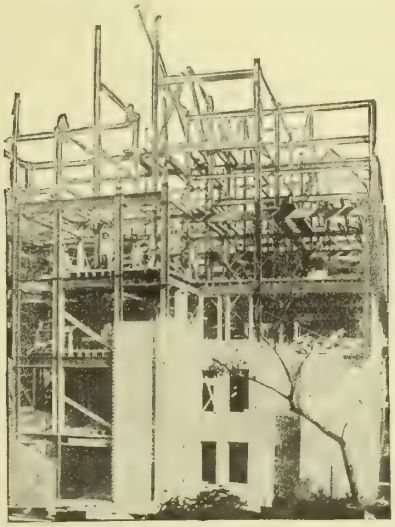
CLAY COUNTY HOME, TIPTON, MO.
F. E. Parker & Sons, Architects

SACRED HEART ACADEMY, GRAND FORKS, N. DAK.
Metal Lumber throughout
Geo. P. Stauduhar, Architect

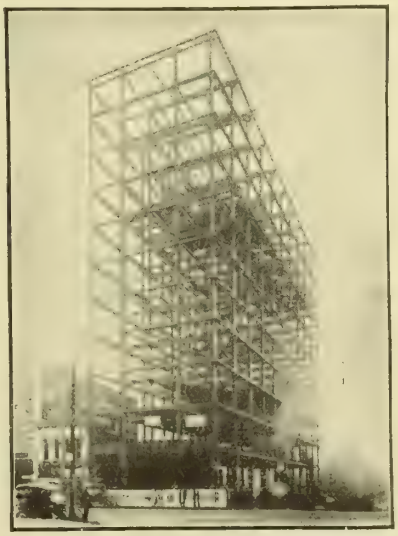
WARDER PARK SCHOOL, SPRINGFIELD, OHIO
Pretzinger Musselman, Architect



RESIDENCE OF MRS. MORRIS BELKNAP, LOUISVILLE, KY.
Metal Lumber Joists and Partitions
J. B. Hutchings & Sons, Architects

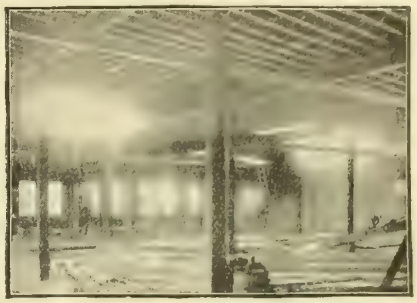


LEAVENWORTH APARTMENT BUILDING, SYRACUSE, N. Y.
Metal Lumber Interior Construction
C. E. Colton, Architect



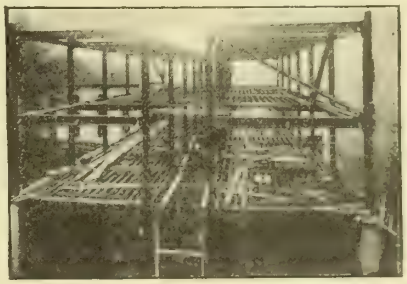
RENKERT BUILDING, CANTON, OHIO
Metal Lumber Floor, Roof and Ceilings
Walker & Weeks, Architects

BUSINESS BUILDING, KANSAS CITY, MO.
Metal Lumber throughout
Kling & Allen, Owners

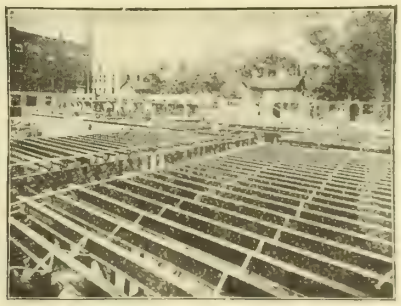


LATTSTETTER BUILDING, CLARKSBURG, W. VA.
Interior View, Showing Metal Lumber Floor, Partition and Roof
S. W. Ford, Architect

HOTEL BUILDING, ST. LOUIS, MO.
Metal Lumber throughout
Chas. Cunliff, Architect



ROBINSON BUILDING, CLARKSBURG, W. VA.
Metal Lumber throughout
Holmboe & Lafferty, Architects



BAILEY APARTMENT BUILDING, KANSAS CITY, MO.
Metal Lumber Floor, Partitions and Roof
Otis Goddard, Architect

TRUSSED CONCRETE STEEL CO.

Manufacturers of Reinforcing Steel, Metal Lath, Steel Sash, and Specialties

YOUNGSTOWN, OHIO

REPRESENTATIVES IN THE FOLLOWING CITIES

ATLANTA, GA.	CLEVELAND, OHIO	EL PASO, TEX.	MINNEAPOLIS, MINN.	PORTLAND, ORE.
BALTIMORE, MD.	COLUMBUS, OHIO	INDIANAPOLIS, IND.	NEW ORLEANS, LA.	ROSWELL, N. M.
BOSTON, MASS.	DALLAS, TEX.	KANSAS CITY, MO.	NEW YORK, N. Y.	ST. LOUIS, MO.
BUFFALO, N. Y.	DENVER, COLO.	LANCASTER, PA.	NORFOLK, VA.	ST. PAUL, MINN.
CHICAGO, ILL.	DES MOINES, IOWA	LOS ANGELES, CAL.	PHILADELPHIA, PA.	SALT LAKE CITY, UTAH
CINCINNATI, OHIO	DETROIT, MICH.	MILWAUKEE, WIS.	PITTSBURGH, PA.	SAN ANTONIO, TEX.
SEATTLE, WASH.	SPOKANE, WASH.	SYRACUSE, N. Y.		WASHINGTON, D. C.

Products.

REINFORCING STEEL; KAHN TRUSSED BARS; RIB BARS; RIB METAL; COLUMN HOOPING; STEEL FLORETYLES and FLOREDOMES; HY-RIB; METAL LATH; PRESSED STEEL JOISTS and STUDS; CORNER BEADS; INSERTS; CURB BARS; KAHN MESH; ARMOR PLATES; JOIST HANGERS; HOLLOW TILE; STAIR TREADS; etc.

KAHN Building Products
TRUSSED CONCRETE STEEL CO

TRADE-MARK

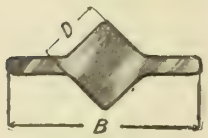
PROPERTIES OF RIB BARS

Size, ins.	Area, sq. ins.	Weight per lin. ft.
3/8	.1406	.48 lbs.
1/2	.2500	.86 lbs.
5/8	.3906	1.35 lbs.
3/4	.5625	1.95 lbs.
7/8	.7656	2.65 lbs.
1	1.0000	3.46 lbs.
1 1/8	1.2656	4.38 lbs.

Kahn Trussed Bars.

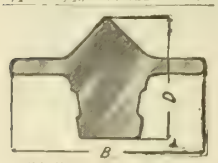
Kahn trussed bars are specially adapted for concrete beams, girders, floors and arches. Diagonals are formed from the flanges of the main bar, producing a unit bar. The rigid connection of shear members makes beams twelve to thirty per cent stronger than where loose stirrups are used. Kahn bars save steel in designing and labor in installation, and insure accuracy, safety, strength, and fireproofness.

KAHN TRUSSED BAR



SECTION KAHN TRUSSED BAR

D & B Ins.	Weight, per lin.ft.	Area, sq.ins.
1/2 x 1 1/2	1.4 lbs.	0.41
3/4 x 2 3/16	2.7 lbs.	0.79



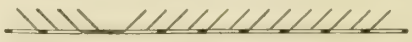
SECTION KAHN TRUSSED BAR

D & B Ins.	Weight, per lin.ft.	Area, sq.ins.
1 1/2 x 2 1/4	4.8 lbs.	1.41
1 3/4 x 2 3/4	6.8 lbs.	2.00
2 x 3 1/16	10.2 lbs.	3.00

STANDARD SHEAR
Middle portion left unsheared

CENTER SHEAR
Entire bar sheared to center

ONE-WAY SHEAR
All diagonals sheared, inclining in one direction



SPECIAL SHEARING
As directed by purchaser

LENGTH OF DIAGONALS

Size, ins.	Standard lengths, ins.	Special lengths, ins.
1/2 x 1 1/2	12	6, 8, 18
3/4 x 2 3/16	12, 24, 36	8, 18, 30
1 1/2 x 2 1/4	12, 24, 36	8, 18, 30
1 3/4 x 2 3/4	36	24, 30, 48
2 x 3 1/2	36	24, 30, 48

Rib Bars.

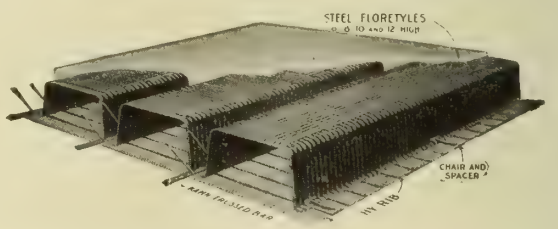
Designed to give maximum grip on concrete. Used principally in connection with Kahn trussed bars, Rib Metal, and Hy Rib; also extensively in all classes of construction requiring reinforcement.

RIB BARS

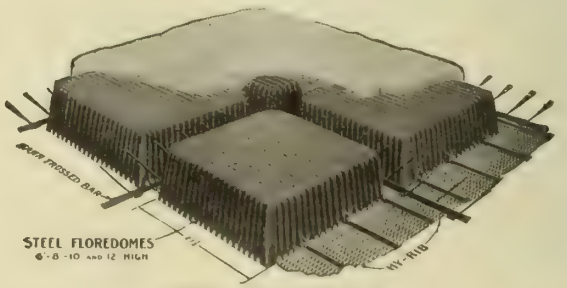
Floretyles and Floredomes.

Floretyles—Rectangular corrugated steel tiles, used extensively in constructing fireproof floors. Reinforcement between Floretyles carries load to supports. Effect great saving in concrete, steel, centering and weight. Produce flat ceilings of long span.

Floredomes—Similar to Floretyles, except closed on four sides. Reinforcement extends on all four sides carrying load in two directions to support.



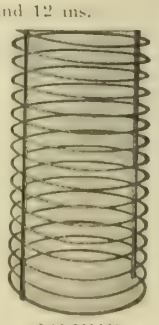
STEEL FLORETYLES
Approximate width at base, 20½ ins.; standard lengths, 3 and 4 ft.; standard heights, 6, 8, 10 and 12 ins.



STEEL FLOREDOMES
Size at base, 21 x 21 ins.; heights, 6, 8, 10 and 12 ins.

Collapsible Column Hooping.

Collapsible column hooping specially designed for reinforcing concrete columns. Vertically reinforced with rib bars. Shipped assembled ready for erection in field, in flat circular coils of exact diameter, which spring automatically into hooped columns. Accurately constructed, easily handled, and saves labor and time in construction.

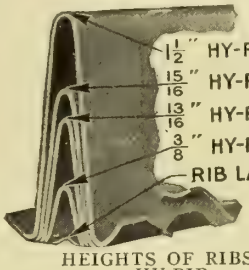


COLUMN HOOPING
Diameters from 9 to 30 ins.; pitch from 1½ to 12 ins.

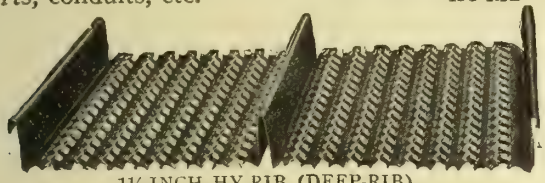
Continued on next page

Hy-Rib.

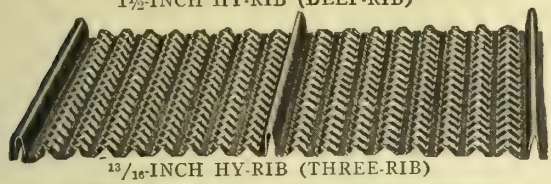
Hy-Rib is a reinforcement obtained by shearing and pressing sheet steel, making a unit of lath and stud. Ribs thus formed take place of centering and studs in concrete construction, reducing cost and simplifying construction, saving labor, time and expense. Used in construction of floors, roofs, walls, sidings, partitions, ceilings, furring, tanks, sewers, culverts, conduits, etc.



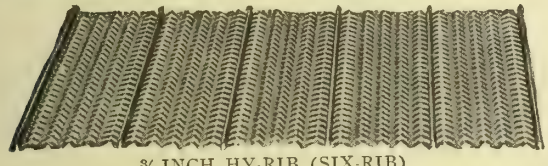
HEIGHTS OF RIBS IN HY-RIB



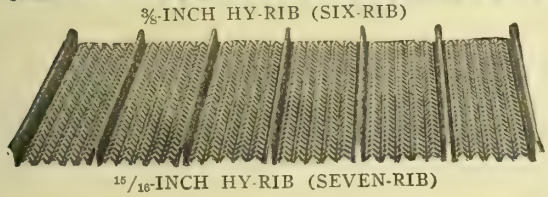
1½-INCH HY-RIB (DEEP-RIB)



13/16-INCH HY-RIB (THREE-RIB)



⅜-INCH HY-RIB (SIX-RIB)



15/16-INCH HY-RIB (SEVEN-RIB)

DIMENSIONS OF HY-RIB

Type of Hy-Rib	Formerly Called	Height of Ribs, Ins.	Spacing of Ribs, Ins.	Width of Sheets, Ins.	Gauge Nos. U.S. Standard
1½"	Deep-Rib	1½	7	14	22, 24, 26
15/16"	7-Rib	15/16	4	24	22, 24, 26, 28
13/16"	3-Rib	13/16	8	16	24, 26, 28
⅜"	6-Rib	⅜	4	20	24, 26, 28

Standard lengths, 6, 8, 10 and 12 feet. Other lengths cut without charge except for waste.

Rib Lath.

Rib Lath for plastering and stucco is a stiffened steel lath permitting wide spacing of studs. Furnished in three types and various gauges.

STANDARD RIB LATH

Size of Sheets—21 x 96 inches

Grade	Wt. per sq. yd. in lbs.	Max. stud spac. for walls c. to c.	Max. joist spac. for ceilings c. to c.
No. 1	2.72	14"	12"
No. 2	3.40	16"	14"
No. 4	4.08	18"	16"

BEADED PLATE OR "A" RIB LATH

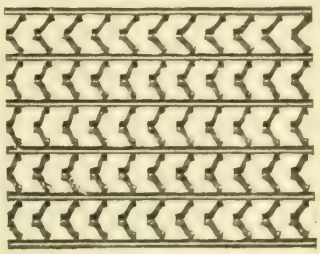
Size of Sheets—15⅝ x 96 inches

Grade	Wt. per sq. yd. in lbs.	Max. stud spac. for walls c. to c.	Max. joist spac. for ceilings c. to c.
No. 1A	3.66	18"	16"
No. 2A	4.57	20"	18"
No. 4A	5.48	24"	22"

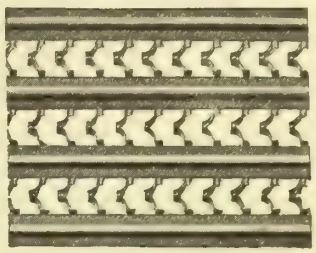
"B" RIB LATH

Size of Sheets—25 x 96 inches

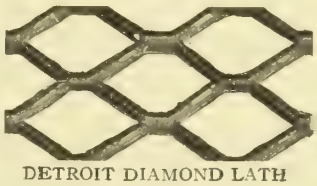
Grade	Wt. per sq. yd. in lbs.	Max. stud spac. for walls c. to c.
No. 1B	2.28	12"
No. 2B	2.85	14"
No. 4B	3.43	16"



STANDARD RIB LATH



BEADED PLATE RIB LATH



DETROIT DIAMOND LATH

Detroit Diamond Lath.

Furnished in various gauges, either plain, painted or galvanized.

MAXIMUM SPANS FOR 15/16" HY-RIB AS CENTERING

Gauge No.	Thickness of Slab 1½"	2"	2½"	3"	3½"	4"
28	3' 5"	3' 0"	2' 8"	2' 5"	2' 3"	2' 1"
26	3' 9"	3' 3"	2' 11"	2' 8"	2' 6"	2' 4"
24	4' 4"	3' 9"	3' 4"	3' 1"	2' 10"	2' 8"
22	4' 11"	4' 3"	3' 9"	3' 5"	3' 2"	3' 0"

MAXIMUM SPANS FOR 1½" HY-RIB AS CENTERING

Gauge No.	Thickness of Slab 2"	2½"	3"	3½"	4"	4½"	5"	5½"	6"
22	5' 7"	5' 0"	4' 6"	4' 2"	3' 11"	3' 8"	3' 6"	3' 4"	3' 2"
24	5' 0"	4' 5"	4' 1"	3' 9"	3' 6"	3' 4"	3' 2"	3' 0"	2' 10"
26	4' 4"	3' 10"	3' 6"	3' 3"	3' 0"	2' 10"	2' 8"	2' 7"	2' 6"

SIDE WALLS REINFORCED WITH HY-RIB

Span	Thickness, Ins.	No. Reinforcement
2'	1¾	28, ⅜" Hy-Rib.
2'–8"	1¾	26, ⅜" Hy-Rib.
	1¾	28, 13/16" Hy-Rib. or 24, ⅜" Hy-Rib.
6'	1¾	26, 13/16" Hy-Rib. or 28, 15/16" Hy-Rib.
8'	2	24, 13/16" Hy-Rib. or 26, 15/16" Hy-Rib.
10'	2	26, 15/16" Hy-Rib.
12'	2½	24, 15/16" Hy-Rib.

Temporary bracing should be used horizontally every 5 feet for 13/16" Hy-Rib and 6 feet for 15/16" Hy-Rib.

SAFE LOADS IN POUNDS PER SQUARE FOOT FOR SLABS REINFORCED WITH 1½" HY-RIB

Thickness of slabs above base of sheathing	Gauge No.	M. R. per ft. of width	Span in Feet 3	4	5	6	7	8	9	10	11	12	13
2½" slab	26	4870	451	254	162	113	83	63					
Wt. 30 lbs.	24	6500	601	338	216	150	110	85					
per sq. ft.													
3" slab	26	6090	563	317	203	141	104	79	63				
Wt. 36 lbs.	24	8120	751	423	270	188	138	106	84				
per sq. ft.	22	10150	940	529	338	234	172	132	104				
3½" slab	26	7310	676	380	243	169	124	95	75				
Wt. 42 lbs.	24	9740	901	508	324	225	165	127	100	81			
per sq. ft.	22	12180	1126	663	406	282	207	158	125	102			
4" slab	26	8530	789	443	284	197	145	111	88	71			
Wt. 48 lbs.	24	11370	1052	592	379	263	194	148	117	95	78		
per sq. ft.	22	14210	1318	740	473	329	242	185	146	118	98		
4½" slab	26	9740	901	508	324	225	165	126	100	81			
Wt. 54 lbs.	24	12990	1202	678	433	301	221	170	134	108	89	75	
per sq. ft.	22	16240	1505	847	541	376	276	211	167	135	112	94	
5" slab	26	10960	1013	570	365	254	186	142	113	91			
Wt. 60 lbs.	24	14620	1352	761	487	338	248	190	152	122	100	84	
per sq. ft.	22	18270	1688	950	609	422	310	237	187	152	126	106	90
5½" slab	26	12180	1123	632	406	281	207	158	125	102			
Wt. 66 lbs.	24	16240	1500	845	541	376	276	211	167	135	112	94	
per sq. ft.	22	20300	1880	1058	676	470	345	264	209	169	140	118	100

B. M. = 1/10 w l².

SAFE LOADS IN POUNDS PER SQUARE FOOT FOR SLABS REINFORCED WITH 15/16" HY-RIB

Thickness of slabs above base of sheathing	Gauge No.	M. R. per ft. of width	Span in Feet 3	4	5	6	7	8	9	10	11
2" slab	28	3140	291	164	104	73					
Wt. 24 lbs.	26	3770	348	196	125	87					
per sq. ft.	24	5020	464	261	167	117					
2½" slab	28	4080	377	212	136	94	69	53			
Wt. 30 lbs.	26	4900	453	255	163	113	83	63			
per sq. ft.	24	6530	605	340	217	152	111	85			
	22	8160	755	425	272	189	139	106			
3" slab	28	5020	464	261	167	116	85	65			
Wt. 36 lbs.	26	6020	558	314	200	140	102	78	62		
per sq. ft.	24	8020	742	417	267	186	136	104	82		
	22	10030	927	520	334	232	170	130	103		
3½" slab	28	5960	551	310	198	138	101	77			
Wt. 42 lbs.	26	7150	660	371	238	165	122	93	73		
per sq. ft.	24	9530	882	496	317	221	162	124	98	79	
	22	11910	1101	620	397	276	202	155	122	99	
4" slab	28	6900	638	358	230	160	117	90	71		
Wt. 48 lbs.	26	8270	768	431	276	192	140	108	86	69	
per sq. ft.	24	11030	1020	572	367	256	188	144	114	92	76
	22	13790	1275	716	459	319	234	179	142	114	95

For B. M. = 1/12 w l², add 20% to above loads. For B. M. = 1/8 w l², deduct 20% from above loads.

PARTITIONS REINFORCED WITH HY-RIB

Hgt.	Thickness, Ins.	No. Reinforcement
up to 10'	1¾	28, 13/16" Hy-Rib.
12'	2	26, 13/16" Hy-Rib. or 28, 15/16" Hy-Rib.
14'	2¼	24, 13/16" Hy-Rib. or 26, 15/16" Hy-Rib.
16'	2½	26, 15/16" Hy-Rib.
18'	2¾	24, 15/16" Hy-Rib.
20'	3	22, 15/16" Hy-Rib.

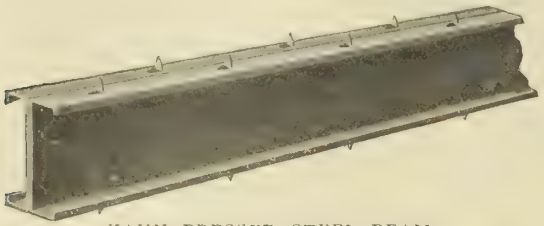
CEILINGS REINFORCED WITH HY-RIB

Spacing of Supports	No. Reinforcement
1'–10"	28, ⅜" Hy-Rib.
2'– 6"	26, ⅜" Hy-Rib.
2'– 9"	24, ⅜" Hy-Rib.
2'–11"	28, 13/16" Hy-Rib.
3'–11"	26, 13/16" Hy-Rib. or 28, 15/16" Hy-Rib.
4'–11"	24, 13/16" Hy-Rib. or 26, 15/16" Hy-Rib.
5'–11"	24, 15/16" Hy-Rib.

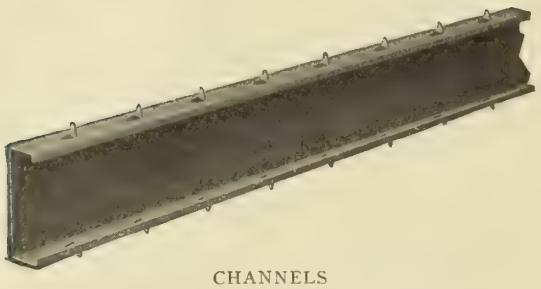
Continued on next page

Kahn Pressed Steel.

The line of pressed steel products used in building construction include I-beams, channel beams, studs and channels, cap and sill plates, etc. These products assure strength and rigidness with lightness of construction, economy in use of steel, and labor saving in erection; eliminate wood joists and studs.

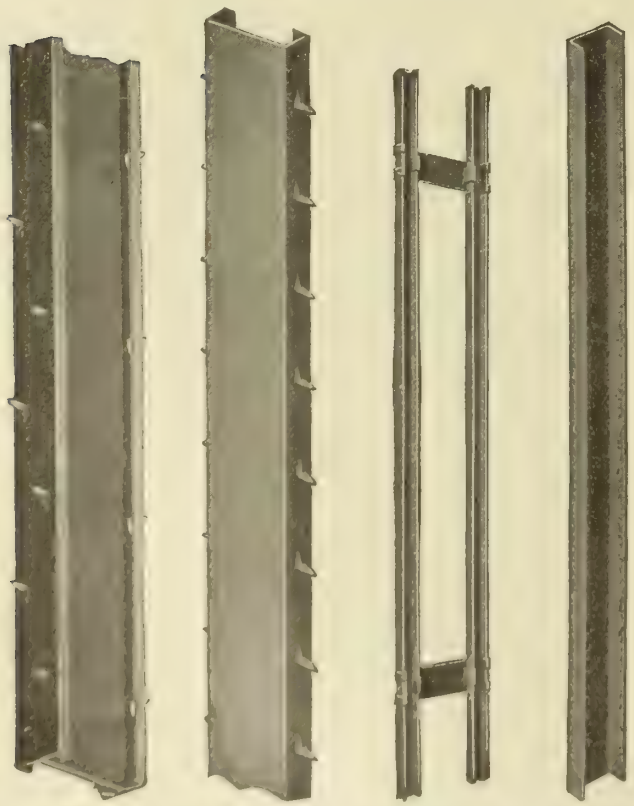


KAHN PRESSED STEEL BEAM



CHANNELS
3", 4", 5", 6", 7", 8", 9", 10" and 12"

CAPS AND SILL PLATES
For 2", 3", 4", 5" and 6" Studs



H STUD
3", 4", 5", 6"

CHANNEL STUD
2½", 4", 5", 6"
2" without turned flange

KAHN HOLLOW STUD
2", 3", 4"

CHANNELS WITHOUT PRONGS
¾", 1", 1½", 2"

Steel Corner Beads.

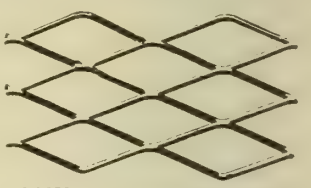
Furnished in various types, galvanized after forming. Length from six to twelve feet.

Metal Base Screeds.

Used extensively in place of wood screeds between cement bases and plastered walls. Furnished in three types: straight point, curved point, and slant point.

Kahn Mesh.

Kahn mesh is an expanded steel reinforcement. Furnished in sheets and provides absolute grip for concrete. Used in all classes of reinforced concrete construction, pavements, floors, roofs, walls, sewers, conduits, tanks, culverts, bridges, retaining walls, abutments, etc. Easily handled and placed, saves labor and time.



CONSTRUCTION OF KAHN MESH

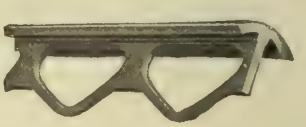
Kahn Armor Plates.

Protect expansion joints in concrete pavements. These plates have sheared lugs for anchoring in concrete. The beveled edge prevents concrete from chipping at the plates. Supplied curved to fit crown of pavement. Improved installing device assures accuracy of placing.

CROSS-SECTION OF JOINT MADE BY KAHN ARMOR PLATE

Kahn Curb Bars.

Protect corners of concrete construction, as curbs, bridges, sidewalks, columns, platforms, etc. Unit of substantial protecting plate and rigid positive anchorage. Furnished in two sizes, either straight or curved.



KAHN CURB BAR

Rib Metal.

A unit reinforcement for pavements, floors, roofs, walls, vaults, arches, conduits, sewers, reservoirs, tanks, etc., equivalent to a large number of separate bars. Provides perfect cross reinforcement against temperature and shrinkage strains.

RIB METAL

Inserts.

Used in concrete slabs, beams or columns for attaching shaft hangers, fixtures, sprinkler systems, etc. Obviate expensive drilling into concrete in finished building. Built into concrete during process of construction by merely fastening them to wood centering. The concrete thoroughly imbeds insert and holds it rigidly in place. Only narrow slot flush with concrete is seen in completed work.

SLOTTED INSERT
Standard lengths, 18, 24, 36 and 60 ins.

ADJUSTABLE INSERT
½, ¾ and ⅞ ins.

GYP STEEL PRODUCTS COMPANY

Manufacturers of Gyp Steel I Stud

Rialto Building

KANSAS CITY, MO.

Products.

The Gyp Steel I Stud, for Fireproof Partition Construction. (Patented September 15, 1914.)

Application Gyp Steel I Studs.

Applying Board—Each plaster board spans two steel I Studs, 18-inch centers. The single clips of the intermediate studs perforate the plaster board and the double clips are turned down on each end of the board, tying the partition together horizontally.

Advantages of Gyp Steel System.

Perfect Alignment—Steel runners at top and bottom give perfect alignment to partitions.

Sound Proof—The plaster board, gypsum plaster and dead-air space are non-conductors of sound; a combination that makes the Gyp Fireproof Partition sound-proof.

Fireproof—Constructed from recognized fireproof materials, its fireproof qualities are provided for.

Sanitary—Insures perfect sanitation; is air-tight and vermin-proof.

Strength—The I Beam shape makes it the stiffest construction on the market.

Staggered Joints—Arrangements of prongs provides for staggered joints throughout.

Lightness—The Gyp Steel I Stud Partition plastered, weighs about 40 per cent less than plaster block and about 70 per cent less than clay tile.

Different Sizes—Gyp Steel I Studs can be made in any size. Our construction provides for solid or hollow partitions, suspended ceilings, furring and bearing partitions.

Low Cost—Gyp Studs cost less, plastering on plaster board costs less, Gyp Finished Partitions cost 10 per cent to 20 per cent less, than any other partitions.

Specifications for Gyp Steel I Stud and Plaster Board Partitions.

All partitions to be made of Gyp Steel I Stud, of sizes shown on drawings, spaced 18-inch centers and ¼-inch plaster board 32 inches by 36 inches to cover the same. Nail Gyp channel plates to floor and ceiling and place Gyp Stud in same. Hammer double metal clips down tight over edges of board, and the single metal clip perforating middle of board. In floor heights of more than 12 feet to 16 feet the partitions are to be made of 3-inch Gyp Steel Stud; 16 feet or higher, of 4-inch Stud. Where plaster board meets concrete, brick or stone walls, a strip of metal lath must be used at all joinings, and also around the tops and extending down 6 inches on each side of door bucks. (See drawings for details of construction.) Use the above specification for 1-inch Gyp Steel I Stud up to 9 feet 6 inch ceilings.

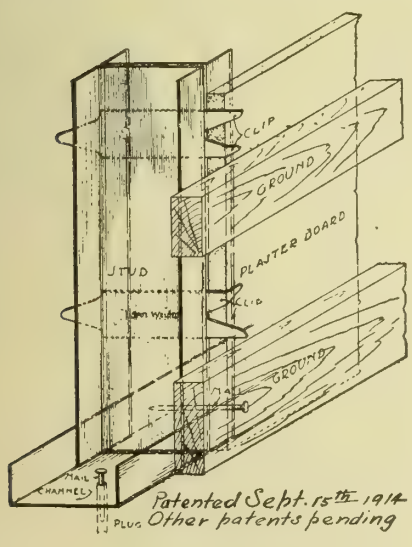
Bathrooms—For bathroom construction, use metal lath on inside for cement; stucco and plaster board on outside, as above specified.

Furring Outside Walls—Use 1-inch Gyp Steel I Stud, 18-inch centers, and apply plaster board on one side only, as specified for partitions fastened securely to walls.

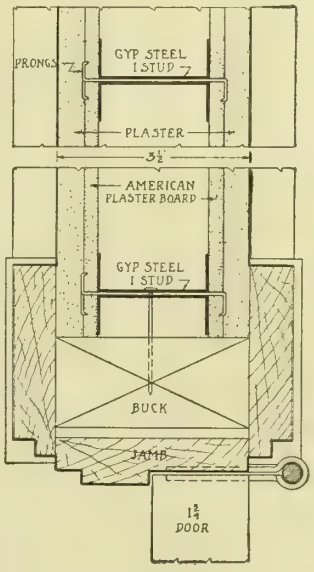
Suspended Ceiling Construction—Place in roof slab, ¼-inch rod hangers, 4-foot centers both ways, to which fasten securely 1½-inch x $\frac{3}{16}$-inch steel running bars. Wire 1-inch Gyp Steel I Stud spaced 16-inch centers to running bars, and attach plaster board as specified under partitions. Use No. 16 gauge galvanized annealed wire for tying.

Information.

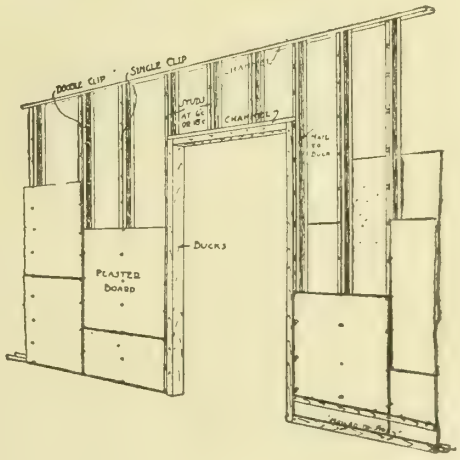
Write for table of safe loads for Gyp Steel Bearing Stud.



Gyp Steel Standard 2", 3", 4" and 5" Stud



Gyp Steel 3½" Partition, using 2" Studs



Framing Plan Gyp Steel System of Fireproof Partition

SECTIONAL PARTITION DETAILS

THE ASSOCIATED METAL LATH MANUFACTURERS

PUBLICITY BUREAU

332 South Michigan Avenue

CHICAGO, ILL.

MEMBER COMPANIES

For whose Products, see their respective pages mentioned below

THE BERGER MFG. CO. (pages 214-217; 260), Canton, Ohio
THE BOSTWICK STEEL LATH CO. (pages 238-239), Niles, Ohio
CONSOLIDATED EXPANDED METAL COS. (pages 241-243), Braddock, Pa.
CORRUGATED BAR CO. (pages 193-205), Buffalo, N. Y.
THE GENERAL FIREPROOFING CO. (pages 244-247), Youngstown, Ohio
NORTH WESTERN EXPANDED METAL CO. (pages 248-249), Chicago, Ill.
PENN METAL CO. (page 257), Boston, Mass.
THE SYKES METAL LATH & ROOFING CO. (pages 250-251), Warren, Ohio
TRUSSED CONCRETE STEEL CO. (pages 228-230), Youngstown, Ohio

Services.

(a) *The exploitation of Metal Lath* as a fire-resistant building material of high efficiency.

(b) *Research work,* to develop Metal Lath for every desirable purpose and to determine the type best suited for different classes of construction, at the same time developing the material to perform in the best possible manner the functions required of it.

(c) *Research work,* to determine the most perfect methods of application, and the formulation of these methods into practical specifications for the use of architects and the building trade generally.

(d) *The publication* of a Metal Lath hand book to contain full information as to the use of Metal Lath. The 1915 edition will be sent to any interested inquirer without charge, upon application.

General Fireproof Features of Metal Lath and Plaster.

The functions of Metal Lath are to provide a base or reinforcement of noncombustible material for plaster work, whether applied to exterior or interior construction, this construction to give a large measure of fire resistance, at an economical cost.

America's annual fire loss is approximately $235,000,000. Any and all efforts looking to the reduction of this tremendous waste are worth the consideration of every one responsible, either as owner, designer or builder, for the buildings of the country. That Metal Lath and plaster construction is efficiently fire-resistant has been abundantly proven both by scientific tests and in actual service.

In 1912 exhaustive tests were made in Cleveland, Ohio, under the direction of Mr. Virgil D. Allen, City Inspector of Buildings.

The illustration (Fig. 1) shows a panel of Metal Lath and plaster construction after exposure to a furnace fire for two hours, the maximum temperature being 1912 degrees Fahr.

In 1914 a test was made in New York by Prof. Jas. S. McGregor, to determine the fire-resisting value of the light, solid Metal Lath wall. Illustration (Fig. 2) shows the construction after exposure to fire for two and one half hours at an average temperature of 1746 degrees Fahr. and to the application of water at

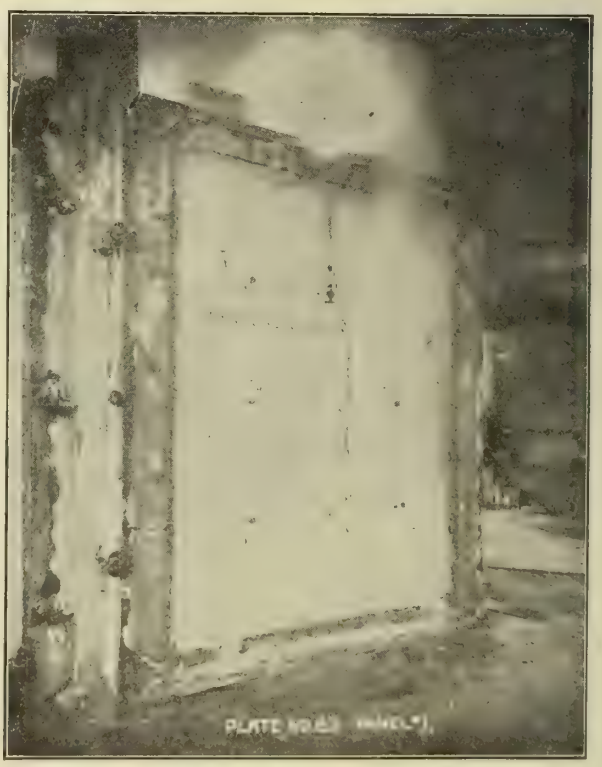


FIG. 1. METAL LATH ON WOOD STUDDING
Fire test at 7500 Aetna Road, Cleveland, Ohio
Photo taken before door was opened

twenty-five pounds pressure from 1⅛-inch nozzle at a distance of from two to six feet. No fire, smoke or water penetrated through the partition; and, after drying, it was firm and solid, and rang true when struck with a hammer.

The illustration (Fig. 3) of the solid Metal Lath and plaster elevator shaft left standing after the fire at the Bacon Department Store, Boston, Mass., is a striking demonstration of the accuracy of these tests proven by actual service (see succeeding page).

Chicago underwriters have announced that commencing Sept. 23, 1915, buildings of stucco (or plaster) exteriors are entitled to a ten per cent lower insurance rate than frame buildings.

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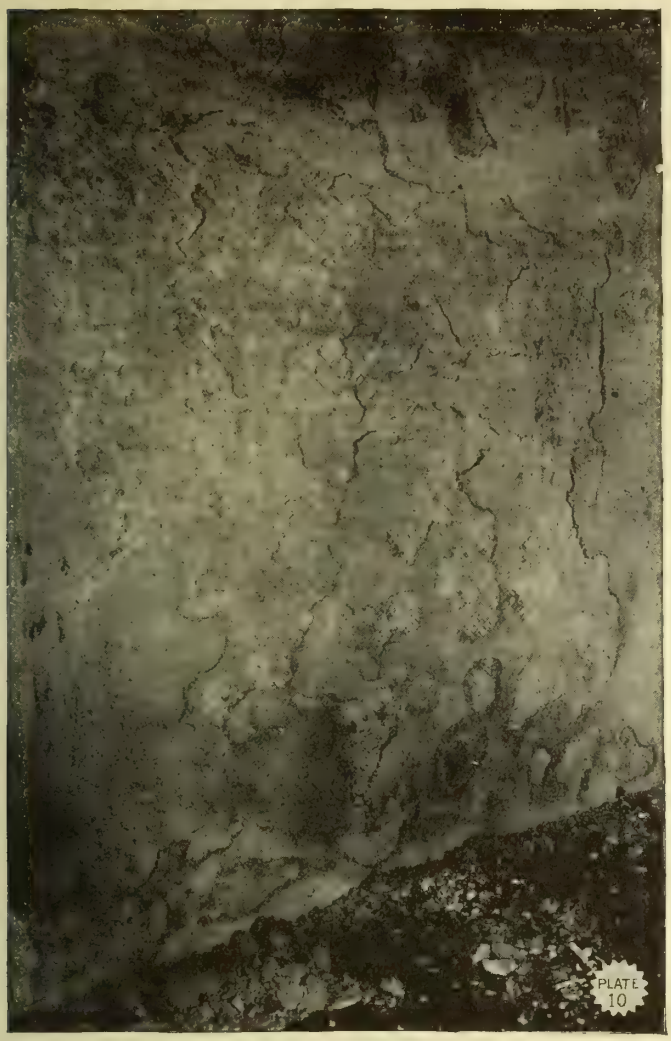

FIG. 2. LIGHT, SOLID METAL LATH WALL
After subjection to a fire and water test by Prof. J. S. McGregor in 1914

Partitions.

Whether solid of Channel Iron, Metal Lath and Plaster, hollow walls of the same construction, or Metal Lath on wood studding, all these have a distinct place in construction economy; apart from the saving of available space, they give fire-resistive subdivisions, satisfactory alike from the viewpoint of first cost, low upkeep or remodeling expense, permanency and rigidity. For the convenience of owners, architects, superintendents and builders, reduced details are shown of various methods used for Metal Lath and Plaster and the manner of application that has been proven most efficient as well as eminently satisfactory in actual service.

Complete specifications of the construction now shown are written in the Metal Lath Hand-Book, published by the Association, and will be forwarded upon request.

For buildings where the maximum amount of usable space is desirable, or where space has an intrinsic value for rental purposes, the solid Metal Lath and Plaster partition has an added value for increasing the available area as is graphically shown by the following diagrams (Fig. 4).

The diagrams that follow on this and succeeding pages describe these partitions, using various methods.

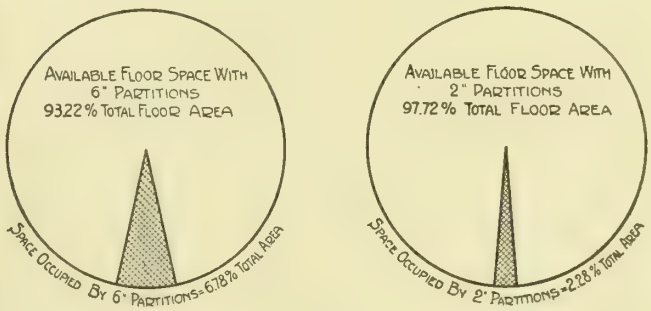

FIG. 4. DIAGRAMS SHOWING COMPARISON OF AVAILABLE FLOOR SPACE, IN TWO BUILDINGS, ONE WITH 2-INCH PARTITIONS, THE OTHER WITH 6-INCH PARTITIONS
Total floor area, 33,000 sq. ft.

FIG. 3. SOLID METAL LATH AND PLASTER ELEVATOR SHAFT
As it appeared after a fire

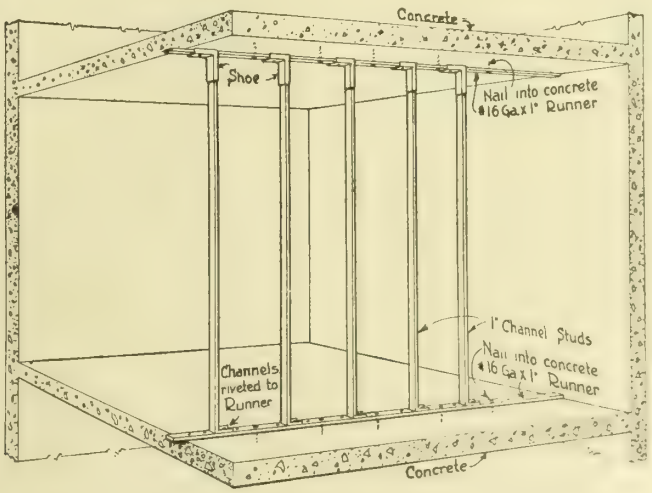

FIG. 5. SOLID PARTITIONS APPLIED TO CONCRETE

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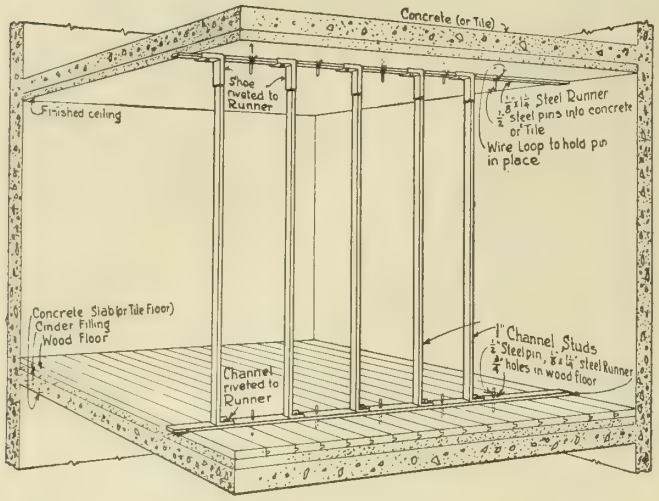

FIG. 6. SOLID PARTITIONS APPLIED TO CONCRETE

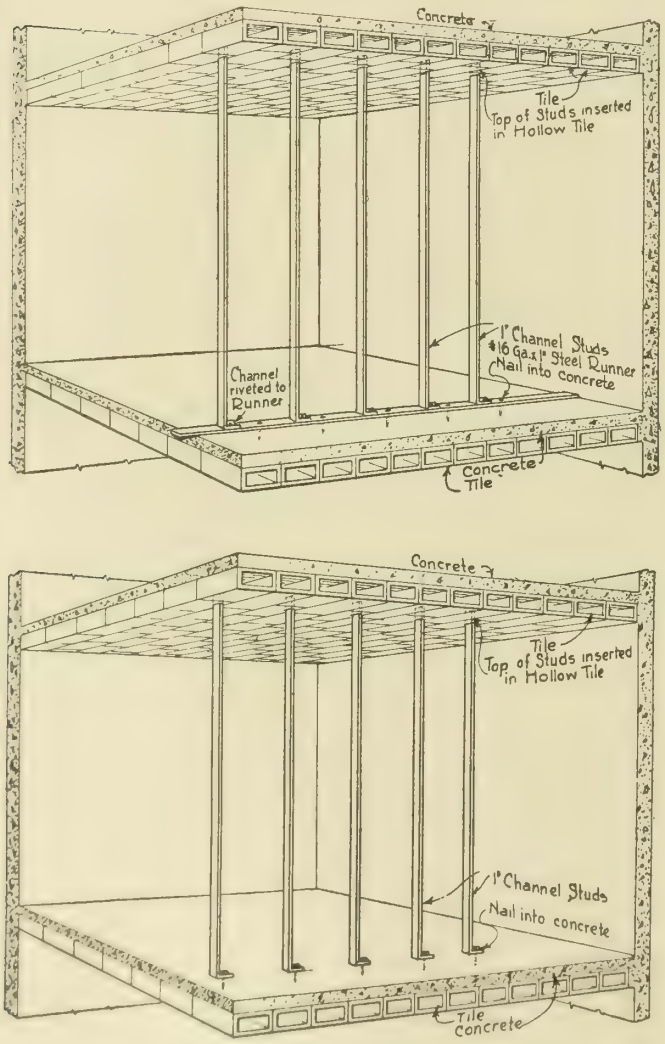

FIG. 7. TWO DIAGRAMS OF SOLID PARTITIONS APPLIED TO TILE

Metal Lath Hand-Book.

Any of the member companies will be pleased to forward the Metal Lath Hand-Book, giving more detailed information, or such book may be secured from the Bureau of Publicity (see introductory page).

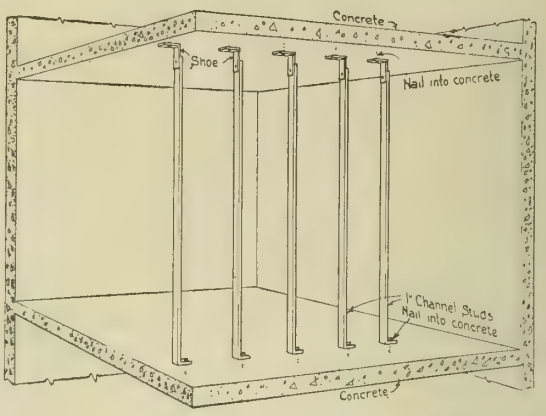

FIG. 8. SOLID PARTITIONS APPLIED TO CONCRETE, BOTH ABOVE AND BELOW
Shoe nailed to concrete

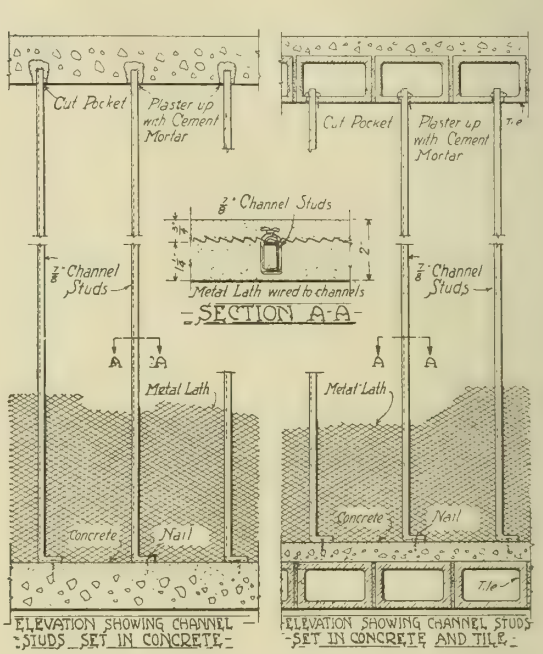

FIG. 9. 2-INCH SOLID METAL LATH PARTITION
Showing anchorage at top and base

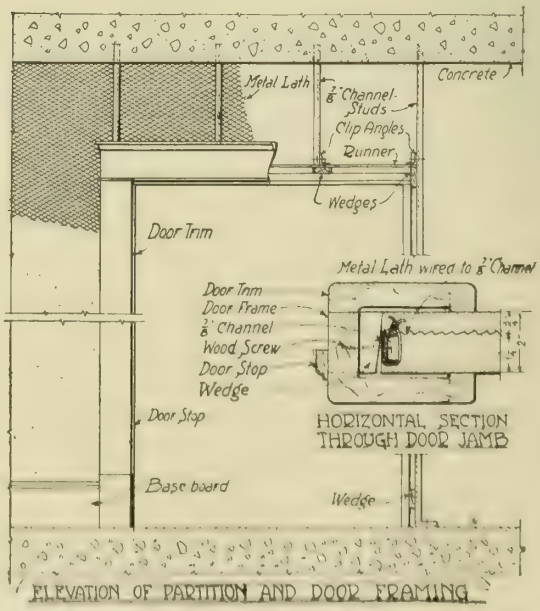

FIG. 10. DETAIL SHOWING RELATION BETWEEN 2 INCH SOLID METAL LATH PARTITION AND WOOD DOOR FRAME

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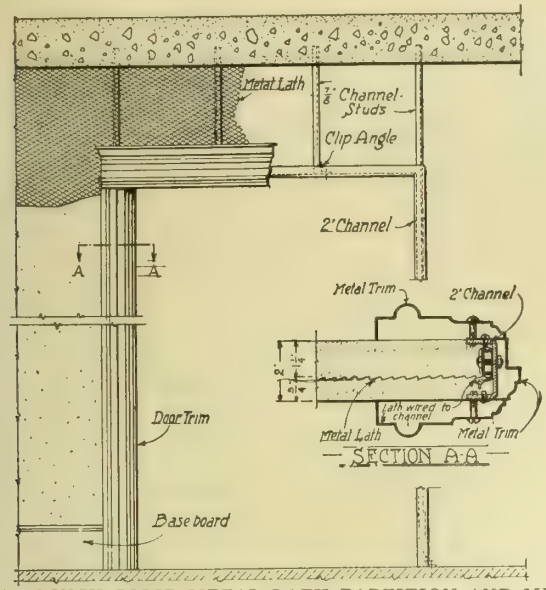


FIG. 11. 2-INCH SOLID METAL LATH PARTITION AND METAL DOOR FRAME

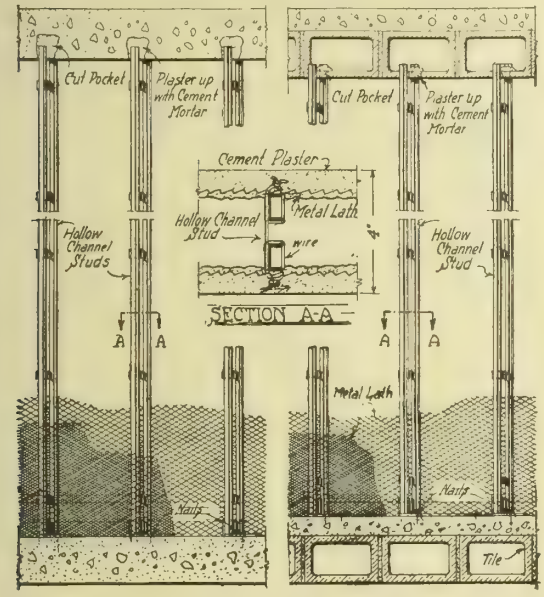


FIG. 12. 4-INCH HOLLOW METAL LATH PARTITION
Showing anchorage at top and base

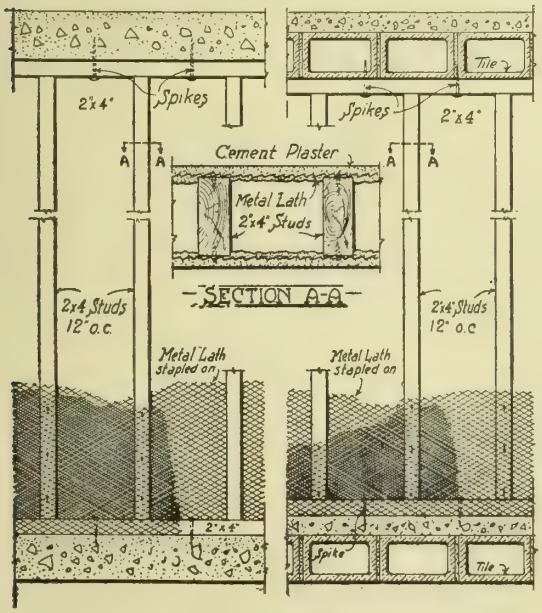


FIG. 13. DETAIL OF HOLLOW WALL METAL LATH ON WOOD STUDDINGS

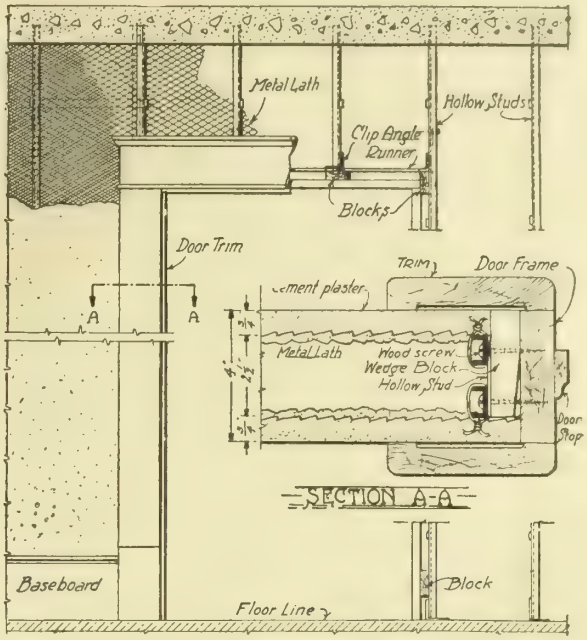


FIG. 14. DETAIL SHOWING RELATION BETWEEN 4-INCH HOLLOW PARTITION AND WOOD DOOR FRAME

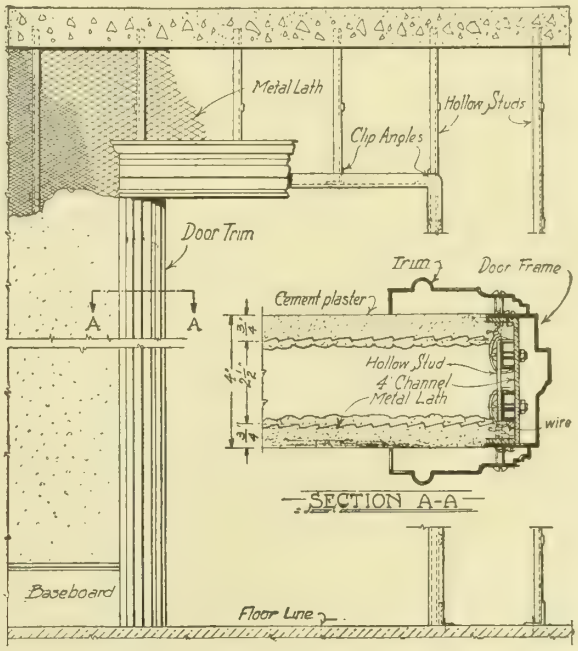


FIG. 15. DETAIL SHOWING RELATION BETWEEN 4-INCH HOLLOW METAL LATH PARTITION AND METAL DOOR FRAME

Beltways.

The Associated Factory Mutual Insurance Companies of Boston, Mass., realizing the importance of properly enclosing beltways and similar openings, have made them the subject of close investigation. Their Engineering Department issue as their recommendation the construction shown in the details on succeeding page.

The Inspection Department of the Factory Mutuals recommend the same construction for non-bearing enclosures of stairs and elevators, and as suitable for setting off special hazards, such as waste and oil supplies, from the rest of the building.

Continued on next page

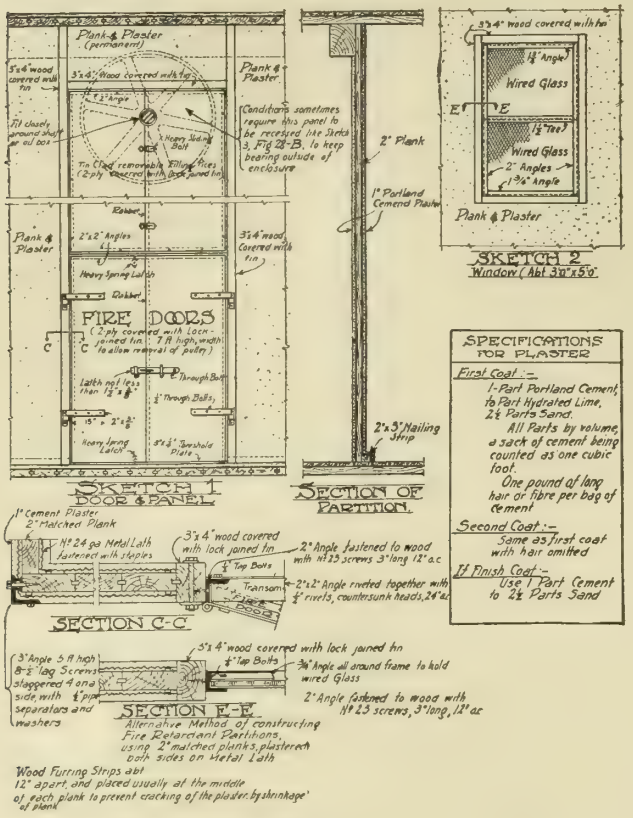


FIG. 16. STANDARD DETAILS FOR FIRE-RETARDANT BELT ENCLOSURES

Plaster and Metal Lath on Plank Partition

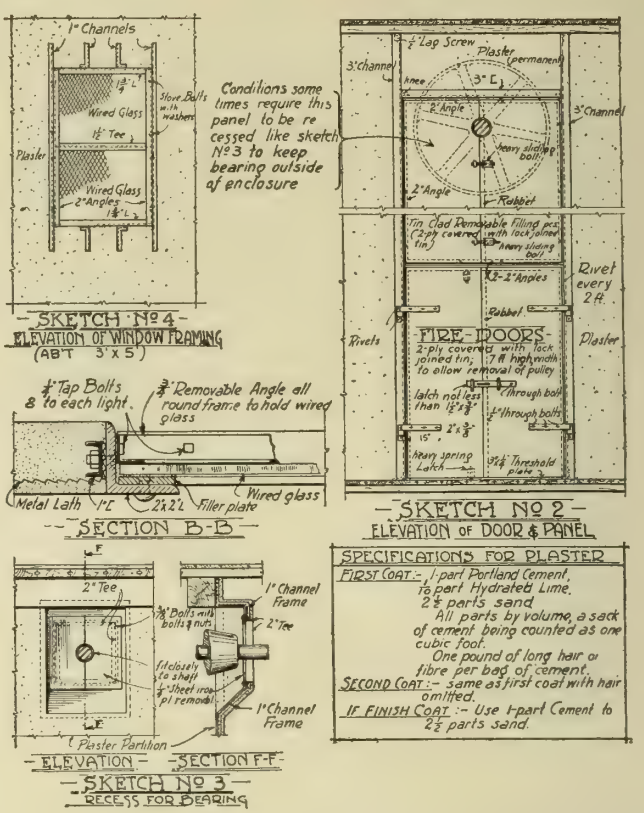


FIG. 18. STANDARD DETAILS FOR FIRE-RETARDANT BELT ENCLOSURES

Plaster and Metal Lath on Steel Frame Partition

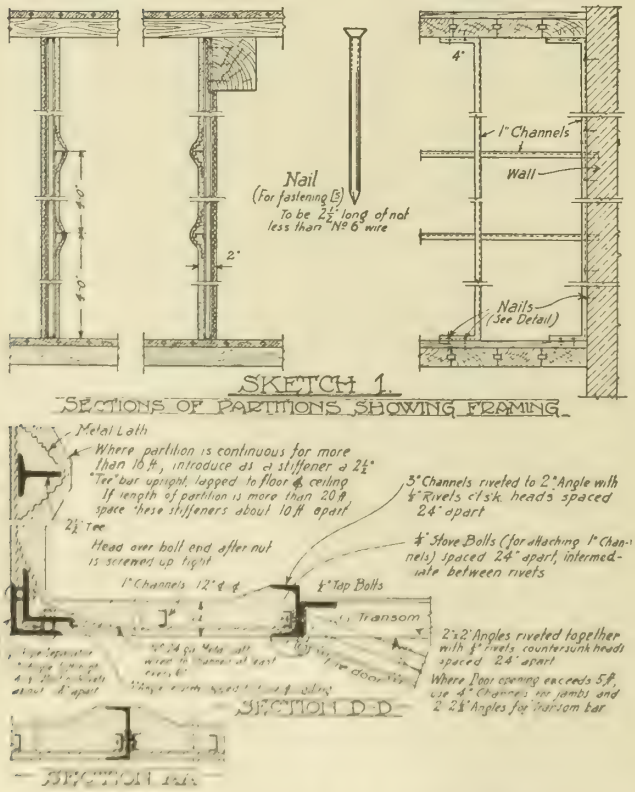


FIG. 17. STANDARD DETAILS FOR FIRE-RETARDANT BELT ENCLOSURES

Plaster and Metal Lath on Steel Frame Partition

Elevator Enclosures.

The New York Building Authorities class Metal Lath and Plaster Elevator Enclosures as "Fireproof." See following details of construction (Figs 19 and 20).

The same methods are applicable for giving fire protection to Vents and Ducts and Dumb-waiter Shafts.

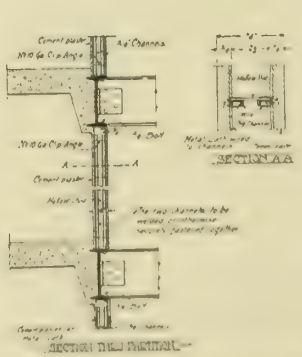


FIG. 19. DETAIL OF 4-INCH HOLLOW METAL LATH PARTITION

Showing anchorage for Elevator Shafts, Stair Wells, etc.

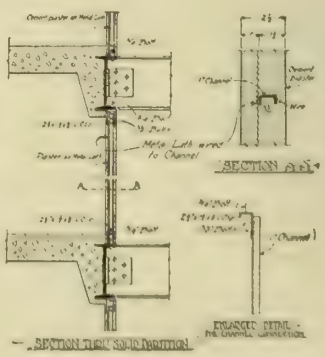


FIG. 20. DETAIL OF 2½-INCH SOLID METAL LATH PARTITION

Showing anchorage for Enclosure for Elevator Shafts, Stair Wells, etc.

Continued on next page

Suspended Ceilings.

The report of the Committee of Members of the American Society of Civil Engineers upon the San Francisco Fire reads: "It may be stated that one of the most obvious lessons taught by this fire is the protection to concrete floors and floor beams by the suspended ceiling of Lath and Plaster. In all cases where used it afforded complete protection. Where not used, concrete was destroyed and beams distorted." (Fig. 21.)

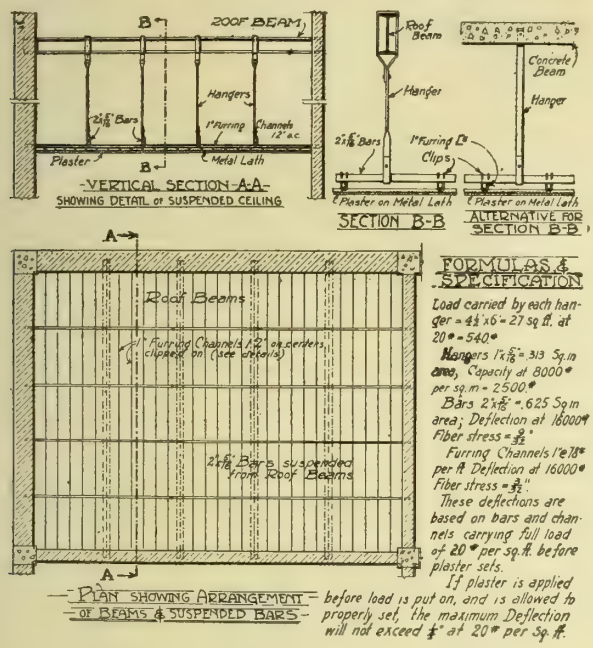


FIG. 21. SUSPENDED CEILING CONSTRUCTION

Column Protection.

Columns are the most important load-bearing members in modern buildings; they stand isolated, exposed on all sides. Steel Columns commence to give at temperatures of 1000 to 1200 degrees Fahr.; to protect them properly against fire is of the utmost importance. Just as it was proven by the San Francisco Fire that concrete floors and floor beams were efficiently protected by suspended ceilings of Metal Lath and Plaster, so will efficient protection be given to columns by using the construction illustrated in Figs. 22 and 23.

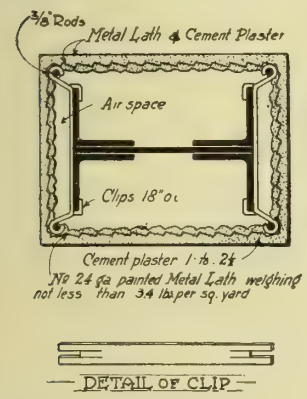


FIG. 22. COLUMN PROTECTION

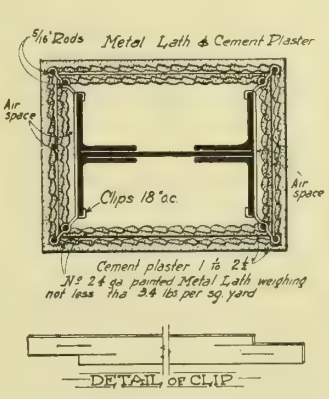


FIG. 23. DOUBLE WALL-COLUMN PROTECTION

Fire-Stops.

Fire-stops have a distinctive place in fire-resistive building construction; they are equally as necessary where masonry walls and hollow floors are used as where there is wood construction; and, by means of fire-resisting stops, all continuous spaces which would otherwise act as chases or draught flues for the spread of fire vertically or laterally are cut off. They also serve the useful purpose of obstructing the passage of rats and mice. The diagram (Fig. 24) shows an efficient fire-stop.

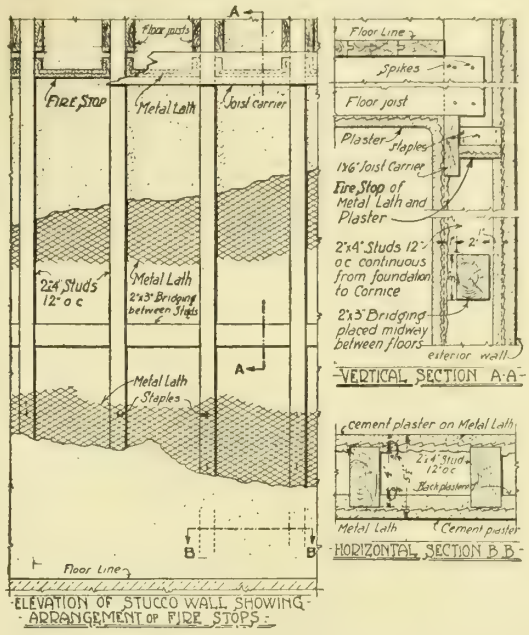


FIG. 24. DETAIL SHOWING ARRANGEMENT OF FIRE-STOPS IN STUCCO WALLS

Fire Protection for Mill Construction.

In places where lumber is plentiful it has been adapted to apartment houses and similar buildings. Such construction can be made fire-resistive at a low cost by protecting with Metal Lath and Plaster as shown in Fig. 25.

The salient features of Metal Lath and Plaster applied to various methods and places of construction are shown on these pages; detailed specifications including the plaster mix have been prepared and will gladly be forwarded to anyone interested in building. Ask for the Metal Lath Hand-Book. There are many types of Metal Lath; they may be classified as follows: Expanded Metal (either Diamond or Rectangular Mesh); Ribbed Lath; Corrugated Lath; Integral Lath, reenforced or stiffened, combining the functions of Lath and studding, and made both in the expanded and sheet types; Sheet Lath, with various types of perforation and keying; Wire Lath, woven or welded, plain and stiffened.

Each may the better serve the purpose for which it is required. The services of the experts in our association are offered to any who desire advice on the subject.

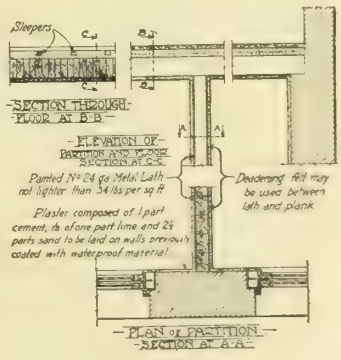


FIG. 25. TYPICAL DETAIL FOR MILL-CONSTRUCTED BUILDINGS, IN WHICH WOOD IS PROTECTED BY METAL LATH AND PLASTER

ESTABLISHED 1890

THE BOSTWICK STEEL LATH COMPANY

TELEPHONE, BELL 36

NILES, OHIO

BRANCH OFFICE: PHILADELPHIA, PA., 135 North 22nd Street—Telephones: Bell, Locust 956; Keystone, R4279

SPECIAL REPRESENTATIVES

CLEVELAND, OHIO PITTSBURGH, PA. CINCINNATI, OHIO DENVER, COLO.
LOUISVILLE, KY. OMAHA, NEBR. KANSAS CITY, MO.

DISTRIBUTORS IN ALL CENTERS

Products.

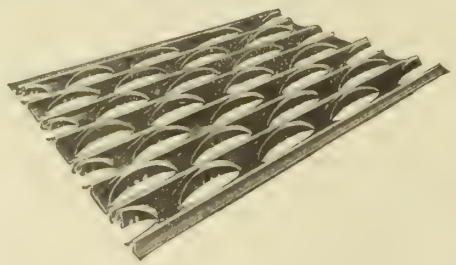
Manufacturers of BOSTWICK "TRUSS-LOOP" METAL LATH; BOSTWICK "TRUSS-LOOP" SPECIAL for Stucco; BOSTWICK "TRUSS-V-RIB" LIGHT REINFORCEMENT; BOSTWICK METAL CORNER BEAD; BOSTWICK METAL GROUND BEAD; BOSTWICK METAL WALL PLUG, and CORRUGATED METAL WALL TIE; also, BOSTWICK "Y" 3-STRESS, 3-WAY METAL WALL TIES.

For Methods of Construction with Metal Lath and Plaster, see pages 232 to 237 of the Associated Metal Lath Manufacturers.

Bostwick "Truss-Loop" Metal Lath.

Distinctive and exclusive features are: parallel corrugated ribs each side of and between a series of trussed arches (recognized as strongest form of support); metal expanded and contracted to forms of scientific structure and arrangement; each outside rib makes a nest for lapping, and gives double strength at every joint; openings spaced to give largest and most perfect plaster key. Weight, five pounds per square yard.

Advantages—Greatest strength and rigidity; safely used on 16-inch and 20-inch centers; saves eleven per cent in lath; no waste overlapping; nails to studding or joist without buckling; no time lost in stretching; will not give under trowel, nor sag with weight of mortar; allows rapid troweling; scratch and brown coats can be applied from same scaffold without change or removal; requires no furring; is economical in the cost of finished plaster surface.



BOSTWICK "TRUSS-LOOP" METAL LATH

DATA, "TRUSS-LOOP" LATH

Sizes			Sheets per Bundle	Yards per Bundle	Wt. per Sq. Yd.
Width	Length	For Centers			
13½ ins.	96 ins.	16 ins. and 24 ins.	10	10	5 lbs.
16¼ ins.	80 ins.	20 ins. and 16 ins.	10	10	5 lbs.
24 ins.	96 ins.	16 ins. and 12 ins.	10	17⅞	5 ins.

Bostwick "Truss-Loop" for Stucco.

The lath of proven efficiency for stucco work:

(1) Lath has inherent strength sufficient to sustain weight of wet mortar without sagging or buckling, preventing the possibility of mortar coat disintegrating, and any predisposition to crack, due to changes in position of lath, as the weight reduces when surface dries; (2) the rigidity of lath adds to structural strength of building and facilitates application; (3) this lath is showing perfect condition after twenty years' service. Weight, eight pounds per square yard.

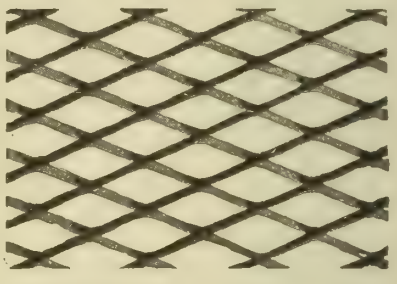
DATA, "TRUSS-LOOP" FOR STUCCO

Sizes			Sheets per Bundle	Yards per Bundle	Wt. per Sq. Yd.
Width	Length	For Centers			
16¼ ins.	80 ins.	20 ins. and 16 ins.	10	10	8 lbs.
24 ins.	96 ins.	24 ins. and 16 ins.	10	17⅞	8 ins.

Bostwick "Diamond-A" Expanded Metal Lath.

Note the real diamond mesh. Diagonal strands forming diamond shaped mesh provide ideal stress distribution.

Note angles of strands, a distinguishing feature, which also makes for increased strength; the result is a rigid plaster clinching fabric of greater weight and strength, the superiority of which has been fully demonstrated.



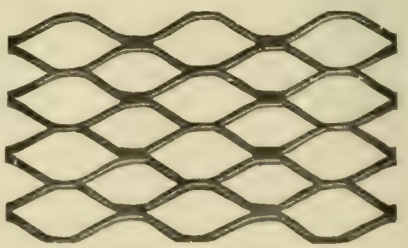
"DIAMOND-A" EXPANDED METAL LATH

DATA, "DIAMOND-A" EXPANDED METAL LATH

Gauge	Sizes		Sheets per Bundle	Yards per Bundle	Weight per Sq. Yd.
	Width	Length			
No. 20	14 ins.	96 ins.	20	20	6½ lbs.
No. 22	14 ins.	96 ins.	20	20	5¼ lbs.
No. 24	14 ins.	96 ins.	20	20	4 lbs.
No. 25	14 ins.	96 ins.	20	20	3⅔ lbs.
No. 26	14 ins.	96 ins.	20	20	3 lbs.
No. 27	14 ins.	96 ins.	20	20	2¾ lbs.

Bostwick "Niles" Lath.

Standard lath of the day, conforming to weights shown in Metal Lath handbook. Of good plaster-holding capacity, made in wide sheets favored by contractors. An eminently satisfactory material.



BOSTWICK "NILES" LATH

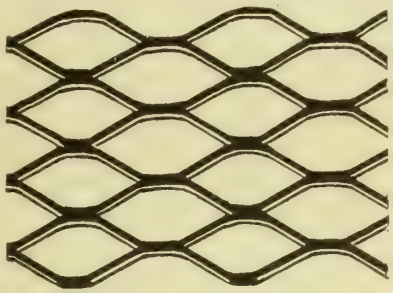
DATA, "NILES" LATH

Gauge	Sizes		Sheets per Bundle	Yards per Bundle	Weight per Sq. Yd.
	Width	Length			
No. 22	24 ins.	96 ins.	15	26⅔	4.00 lbs.
No. 24	24 ins.	96 ins.	15	26⅔	3.40 lbs.
No. 25	24 ins.	96 ins.	15	26⅔	3.05 lbs.
No. 26	24 ins.	96 ins.	15	26⅔	2.50 lbs.
No. 27	24 ins.	96 ins.	15	26⅔	2.33 lbs.

Continued on next page

Bostwick "Lock" Lath.

In places where a lighter weight material is desirable, Bostwick "Lock" lath will meet your requirements. Made from equally as good material as our other types, having a good plaster key, and with it satisfactory results have been secured.



BOSTWICK "LOCK" LATH

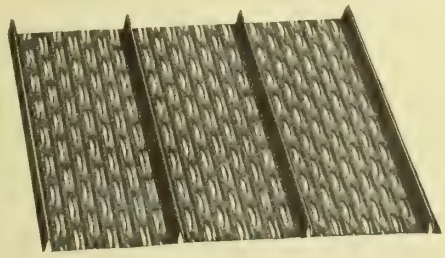
DATA, "LOCK" LATH

Gauge	Sizes — Width	Sizes — Length	Sheets per Bundle	Yards per Bundle	Weight per Sq. Yd.
No. 24.....	24 ins.	96 ins.	15	26⅔	2.80 lbs.
No. 26.....	24 ins.	96 ins.	15	26⅔	2.20 lbs.

Bostwick "Truss-V-riB" Metal Lath.

Ideal material for light concrete work without forms or stiffening channels. Made from best open-hearth sheet; a solid ribbed sheet with every ounce of metal retained, shaped into "Truss" formation for weight-carrying capacity, making openings for strongest and most efficient plaster bond; no narrow strands of metal to break from rib and weaken the fabric.

Uses—Especially recommended for light concrete roofs, walls, side walls, ceilings, partitions, column and beam protection. Equally adapted to hospitals, houses, factories, warehouses, office buildings, stucco houses, bungalows, cottages, boat houses, garages, barns and silos. Exceptionally efficient for overcoating frame buildings.

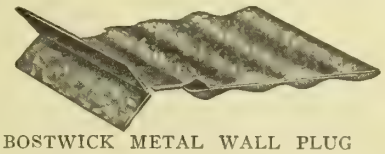


BOSTWICK "TRUSS-V-RIB" METAL LATH

Specification Data—Size of stock sheets, 21 inches wide by 4-, 5-, 6-, 7-, 8-, 9-, 10- and 12-foot lengths. Area of sheet, 21 by 96 inches: 14 square feet. Weight of sheet, 21 by 96 inches: No. 24, 15 pounds; No. 26, 12 pounds; No. 28, 9.85 pounds. Packed 5 sheets to the bundle.

Bostwick Metal Wall Plug.

For fastening interior trim instead of nailing into mortar joints (which gives only a temporary and unsatisfactory hold), or wooden blocks which shrink and loosen from the wall.

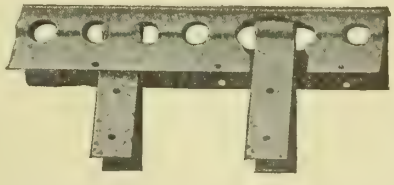


BOSTWICK METAL WALL PLUG

Specification Data—Made from heavy galvanized stock. Length, 2⅞ inches. Width, 2¼ inches. Packed 1,000 per barrel. Shipping weight, 125 pounds.

Bostwick Metal Corner Bead.

Supporting leaves are adjustable and of extra length, and the bead can consequently be satisfactorily applied to any depth of ground; they fit every angle of the bead, a feature found only in Bostwick bead, reinforcing to double strength every twelve inches they are used, and distribute the shock over largest possible area, preventing chipped and bruised corners. The plaster so covers and keys into bead that it becomes an integral part of wall or partition.

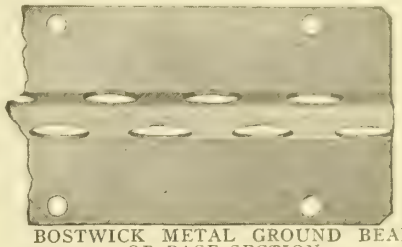


BOSTWICK METAL CORNER BEAD

Specification Data—Standard lengths, 5 feet, 6 feet, 7 feet, 8 feet, 8 feet 6 inches, 9 feet, 9 feet 6 inches, 10 feet. Length of clip, 3 inches. Standard package, 1,000 linear feet. Shipping weight, 350 pounds.

Bostwick Metal Ground Bead or Base Section.

Where composition floors are used, Bostwick metal ground bead prevents plaster running to a thin edge easily chipped and broken, insures a uniform thickness both of plaster and flooring compound to dividing line and protects from damage at vulnerable point. Openings for plaster and compound bond alternate on upper and under sides of bead, preventing the mixing of composition flooring with plaster and consequent discoloration, thus insuring a rigid clinch for both. Made from heavy galvanized stock.



BOSTWICK METAL GROUND BEAD OR BASE SECTION

Specification Data—Standard lengths, 5, 6, 7, 8, 9 and 10 feet. Shipping weight, 350 pounds per 1,000 feet. Inside and outside corners supplied according to requirements.

TABLE OF LIVE LOAD PER SQUARE FOOT OF FLOOR AND ROOF SLABS WITH "TRUSS-V-RIB" REINFORCEMENT

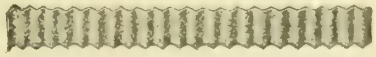
TABLE OF LIVE LOADS, FLOOR & ROOF SLABS

SECTION OF SLAB	DEPTH OF SLAB	WT. OF SLAB PER SQ. FT.	GAUGE METAL	SPAN IN FEET— SAFETY FACTOR 4									SPAN IN FEET— SAFETY FACTOR 2								
				2	3	4	5	6	7	8	9	10	2	3	4	5	6	7	8	9	10
	1½"	19	28	124	68	40							245	136	80	42					
			26	190	95	65	36						380	190	130	72	38				
			24	260	124	90	65						520	248	180	130	85				
	2"	25	28	270	142	98	72	38					540	282	196	144	76	40			
			26	296	160	110	67	48	22				580	320	220	134	96	44			
			24	398	190	135	90	64	37				790	380	270	180	125	70			
	2½"	31	28	291	235	178	102	72	45				580	470	355	200	140	90			
			26	350	272	205	134	91	61	30			700	540	410	265	180	120	60		
			24	462	310	261	167	122	82	51			920	620	520	330	240	160	100		
	3"	37	28	511	372	214	136	108	68	38			520	740	425	270	215	135	75		
			26		448	292	185	126	94	70	56			895	580	370	252	185	140	112	
			24		602	394	245	168	124	95	75			1200	785	490	335	245	190	150	
	3½"	43	28		426	260	166	115	84	63	48	26		850	520	332	230	165	125	95	50
			26		548	308	198	140	100	76	58	32		1095	635	395	280	200	150	115	60
			24			404	265	184	134	100	77	38			805	530	365	265	200	144	76

GAUGE	D=1"	D=1½"	D=2"	D=2½"	D=3"	D=3½"	D=4"	D=4½"	D=5"
28	3'-6"	3'-0"	2'-8"	2'-4"	2'-1"	1'-10"			
26	4'-1"	3'-6"	3'-1"	2'-9"	2'-5"	2'-2"	1'-11"	1'-8"	
24	4'-8"	4'-1"	3'-7"	3'-3"	2'-11"	2'-7"	2'-0"	1'-10"	1'-8"

Bostwick Metal Corrugated Wall Tie.

Made from heavy galvanized sheet with deep corrugations, giving maximum bonding power. Regular size, 7 inches; Veneer, 6 inches. Any reasonable size made to order. Packed 1000 to box; weight 50 pounds.

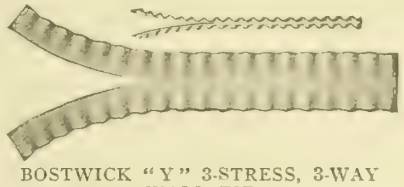


BOSTWICK CORRUGATED WALL TIE

Bostwick "Y" 3-Stress, 3-Way Wall Tie.

A new departure. Stress and strain of wall led three ways. Change of position in wet mortar will not affect holding power. Ties every brick with usual number of ties, or usual number of brick with half the number of ties.

Heavy galvanized stock with deep corrugations at various angles.



BOSTWICK "Y" 3-STRESS, 3-WAY WALL TIE

DATA, "Y" 3-STRESS, 3-WAY WALL TIE

For	Length	Width	Spread	Shipping Weight
Regular wall..	7 ins.	1 in.	2¾ ins.	65 lbs.
Veneer wall...	6 ins.	1 in.	2¾ ins.	60 lbs.
Concrete wall..	10 ins.	1 in.	2¾ ins.	105 lbs.

THE BRIER HILL STEEL COMPANY

Manufacturers of Expanded Metal Lath and Roofing

Stambaugh Building

EASTERN OFFICE AND WAREROOMS
521-525 West 23rd Street
NEW YORK, N. Y.
Telephone, Chelsea 8020

YOUNGSTOWN, OHIO

DISTRICT OFFICE AND WAREHOUSES
311-315 Rockefeller Building
CLEVELAND, OHIO

WESTERN OFFICE
3604 South Morgan Street
CHICAGO, ILL.

Products.

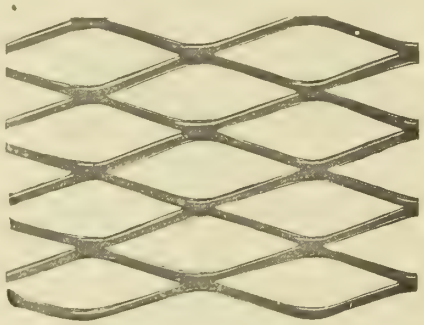
"Garry" Expanded Metal Lath and "Cleveland" Expanded Metal Lath.

Also, "Garry" Brands of Charcoal Iron Tinplate, "Garry" Brands of Steel Terne-Plate; Eaves-Trough and Conductor Pipe; "Garry" Brands of Mortar Colors.

"Garry" Expanded Diamond Mesh Metal Lath.

We have perfected an expanded metal lath adaptable to all kinds of work. Sold at a minimum price and used with minimum expense. It is a perfect diamond mesh lath, so constructed that all of the plaster applied keys at once, thus completely enveloping the lath, preventing undue waste and making a covered surface with a minimum amount of plaster.

This new lath is strong and offers a firm, flat surface to the plaster. At the same time, it is pliable and therefore easily worked about irregular surfaces. The large sheets, for instance, are 24 x 97 inches, although we charge for 96 inches only, allowing the extra inch for lapping, so that the furring strips may be evenly placed. Fewer number of laps are necessary, and this saves labor as well as material.



"Garry" Expanded Diamond Mesh Metal Lath

For all inside work, partitions, elevator shafts, etc., this lath positively satisfies the varied requirements of architect, contractor and owner. Samples gladly sent for examination.

"Garry" Diamond Mesh Lath is made in sheets 24 x 97 inches; packed in bundles of 9 sheets, containing 16 square yards, or in bundles of 18 sheets, containing 32 square yards, as desired. Furnished in gauges weighing as follows:

27-gauge, painted, 2⅓ pounds per square yard
26-gauge, painted, 2½ pounds per square yard.
25-gauge, painted, 3 pounds per square yard.
24-gauge, painted, 3 4/10 pounds per square yard.

Galvanized lath weighs one-eighth of a pound heavier in each gauge than painted. You can order the lath in painted or galvanized, as desired. Plain is furnished at same price as painted. Samples, prices and further information submitted on request.

"Cleveland" Expanded Metal Lath.

It is the heaviest expanded metal lath of this form made. The "A" grade, 24 gauge, galvanized, weighs 4½ pounds per square yard.

Being corrugated, both sides are reversible and it is always right side out, therefore cannot be wrongly applied. It is rigid and easily adapted to ornamental surfaces. By lapping a single corrugation continuous bond is assured.

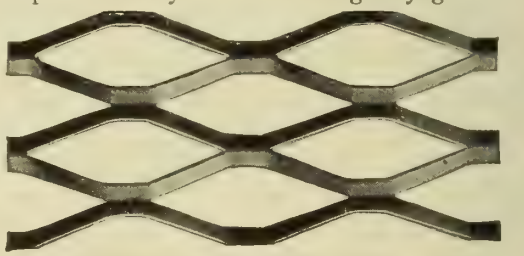
Exterior stucco on "Cleveland" neither cracks nor checks because of the even contraction and expansion, both lengthwise and sidewise. It bonds perfectly with both stucco and interior plaster, thus enveloping the lath completely. Many use it without furring strips.

Furnished painted or galvanized, weights per square yard being:

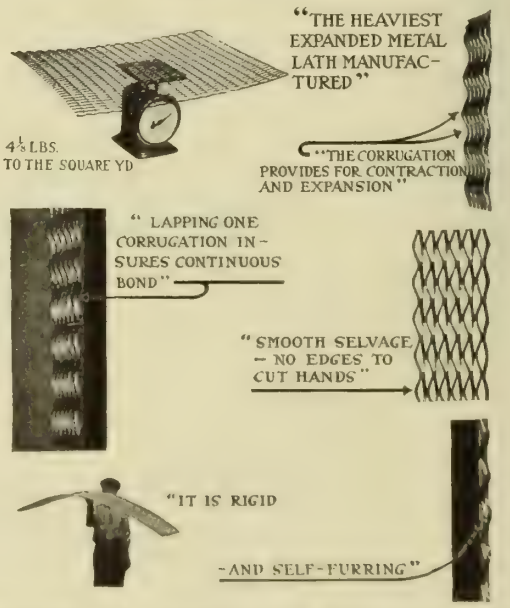
"A" grade—27-gauge, painted, 3⅛ pounds.
"A" grade—24-gauge, painted, 4 pounds.
"B" grade—27-gauge, painted, 2⅝ pounds.
"B" grade—24-gauge, painted, 3⅜ pounds.

"A" grade is the more suitable for stucco. Galvanized lath weighs one-eighth of a pound more to the square yard. "A" grade is in sheets 16½ x 96 inches, 18 sheets or 22 square yards to the bundle; "B" lath is in sheets 18 x 96 inches, 15 sheets or 20 square yards to the bundle.

Samples and any desired data gladly given.



"Cleveland" Expanded Metal Lath



Qualities of "Cleveland" Expanded Metal Lath Illustrated

Jobbing Agencies.

Agencies in all important distributing centers carry stocks of our lath; immediate shipment assured.

CONSOLIDATED EXPANDED METAL COMPANIES

Park Avenue and 40th Street
NEW YORK, N. Y.

TELEPHONE, Murray Hill 4097

FACTORY OFFICE
BRADDOCK, PA.

ASSOCIATES

NEW YORK, N. Y., The Expanded Metal Engineering Co.
PHILADELPHIA, PA., The Expanded Metal Co. of Philadelphia
BOSTON, MASS., Penn Metal Co.
BUFFALO, N. Y., The Buffalo Expanded Metal Co.
CHICAGO, ILL., Steelcrete Expanded Metal Co. of Illinois
SAN FRANCISCO, CAL., Holloway Expanded Metal Co.

Products.

The "Steelcrete" System of Reinforced Concrete Slabs, including:

"Steelcrete" Expanded Metal Reinforcement.

"Steelcrete" Expanded Metal Plastering Lath.

"Steelcrete" Metal Corner Bead.

Also, "Steelcrete" Expanded Metal "Special Mesh" for Fences, Lockers, Guards, etc.; and

"Steelcrete" Expanded Metal Beam Wrapping.

Steelcrete" Expanded Metal Reinforcement.

Unlike many so-called expanded metals, "Steelcrete," the oldest and most widely used concrete reinforcement, is not a steel plate which has been slit in one operation and by a second operation pulled and enlarged into a sheet of diamond-shaped meshes; instead, it is formed by cold-drawing the metal under an enormous speed, the plate having been previously covered with oil. Thus is made the only mesh that possesses great unit strength and a high elastic limit. Its uniformity in quality and stiffness makes a taut reinforcement and requires no stretching to take from it the "waves." In the finished product the ultimate strength has been raised 20 to 50 per cent and its elastic limit increased by 100 per cent.

Caution.

Only by specifying "Steelcrete" Mesh can you be sure of what you are getting. Simply saying "Expanded Metal" is likely to result in a cheap substitute.

Endorsement.

Not only has the "Steelcrete" type of reinforcement won the unanimous approval of the best engineers of the civilized world, but their endorsement as well. They regard its underlying principles as fundamentally correct.

Distinctive Features.

Three distinctive features make for its superiority. They are entirely unique with the material and are not encountered by any other fabrics: (1) The cold working of the steel in the process of manufacture. (2) The diamonds, or quadrilaterals, of the sheet under severe loading tend to close, giving the fabric an unusual ductility. (3) The closing of the diamonds, in addition to giving the fabric ductility, introduces a compression into the concrete which at this point is in tension. This is highly beneficial to the slab and greatly adds to its strength.

To these are added many other features which are readily recognized by experienced users.

Tests.

Innumerable tests made have invariably resulted better than the calculations.

DECIMAL STANDARDS FOR "STEELCRETE" EXPANDED METAL

Designation of Mesh	Size of Mesh: Width of Diamond	Size of Mesh: Length of Diamond	Section in sq. in. per ft. of width	Weight per sq. ft. in lbs.	Number of Sheets in a bundle	Size of Standard Sheets	Number of sq. ft. in a bundle	Weight per bundle in lbs.
3–13–075	3″	8″	.075	.27	10	6′0″x 8′0″	480	129.6
						6′0″x12′0″	720	194.4
3–13–10	3″	8″	.10	.37	7	6′9″x 8′0″	378	139.9
						6′9″x12′0″	567	209.8
3–13–125	3″	8″	.125	.46	7	5′3″x 8′0″	294	135.2
						5′3″x12′0″	441	202.9
3–9–15	3″	8″	.15	.55	5	7′0″x 8′0″	280	154.0
						7′0″x12′0″	420	231.0
3–9–20	3″	8″	.20	.73	5	5′3″x 8′0″	210	153.3
						5′3″x12′0″	315	230.0
3–9–25	3″	8″	.25	.92	5	4′0″x 8′0″	160	147.2
						4′0″x12′0″	240	220.8
3–9–30	3″	8″	.30	1.10	2	7′0″x 8′0″	112	123.2
						7′0″x12′0″	168	184.8
3–9–35	3″	8″	.35	1.28	2	6′0″x 8′0″	96	122.9
						6′0″x12′0″	144	184.3
3–6–40	3″	8″	.40	1.46	2	7′0″x 8′0″	112	163.5
						7′0″x12′0″	168	245.3
3–6–45	3″	8″	.45	1.65	2	6′3″x 8′0″	100	165.0
						6′3″x12′0″	150	247.5
3–6–50	3″	8″	.50	1.83	2	5′9″x 8′0″	92	168.4
						5′9″x12′0″	138	252.5
3–6–55	3″	8″	.55	2.01	2	5′3″x 8′0″	84	168.8
						5′3″x12′0″	126	253.3
3–6–60	3″	8″	.60	2.19	2	4′9″x 8′0″	76	166.4
						4′9″x12′0″	114	249.7

"STEELCRETE" SPECIAL MESHES

½″ No. 18	.43″	1.2″	...	.74	5	3′0″x 8′0″	120	88.8
¾–13–25	.95″	2″	...	.80	5	6′0″x 8′0″	240	192.0
1½–13–20	1.36″	3″	...	.60	5	4′0″x 8′0″	160	96.0
2–13–15	1.82″	4″	...	.50	5	5′0″x 8′0″	200	100.0
¾″ No. 9	.95″	2″	...	1.80	3	4′0″x 8′0″	96	172.8
1½″ No. 9	1.36″	3″	...	1.28	3	6′0″x 8′0″	144	184.3
2″ No. 9	1.82″	4″	...	.90	3	4′0″x 8′0″	96	86.4

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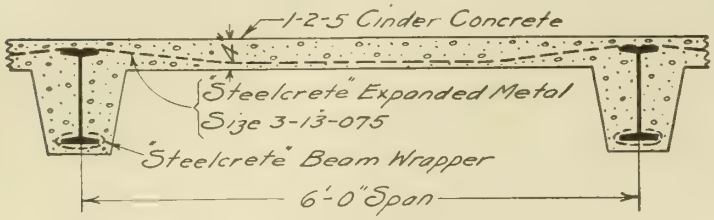
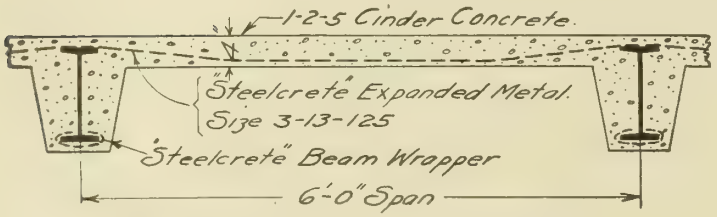
Approved Designs.

The following Designs of Floor Construction for buildings have been tested and approved (Nov. 6, 1911) by the Bureau of Buildings, Borough of Manhattan, New York, N. Y.:



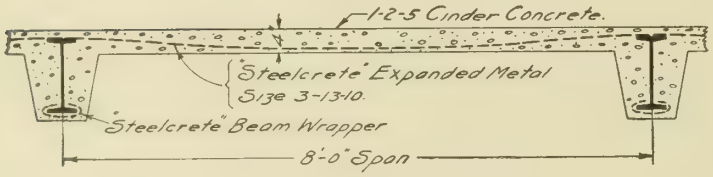
Approved live load, 175 pounds per square foot

SYSTEM 101



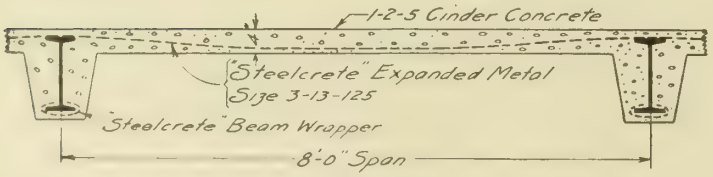
Approved live load, 328 pounds per square foot

SYSTEM 102



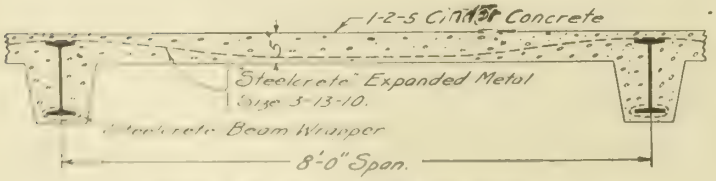
Approved live load, 94 pounds per square foot

SYSTEM 103



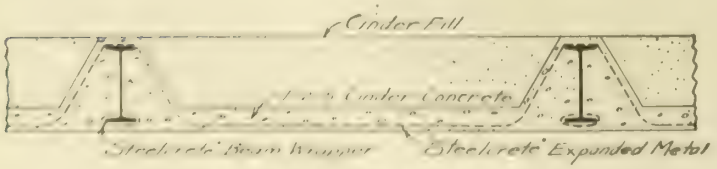
Approved live load, 120 pounds per square foot

SYSTEM 106



Approved live load, 200 pounds per square foot

SYSTEM 105

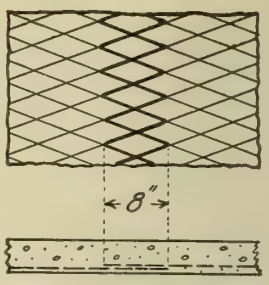


Approved for same load and span as shown above

INVERTED SYSTEM

Test Note.

The above tests having been made with an eight-inch lap at the center of the span, it will be sufficient to allow the lap to be made wherever it may occur in the construction.



DETAIL SHOWING 8-INCH LAP OR ONE DIAMOND AS ACCEPTED

Detailed Information.

Complete catalogue, giving full information and details, on request.

Specification.

The following should be embodied in your specifications:

The slabs shall be reinforced with "Steelcrete" Expanded Metal System, size ..... (or—The slabs shall be reinforced with "Steelcrete" Expanded Metal, of such a thickness of slab and size of metal as shall carry a superimposed load of ..... lbs. per sq. ft. with a factor of safety of 4).

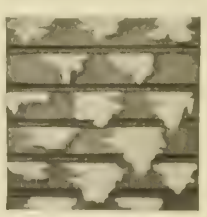
The Expanded Metal shall be laid on the forms with long way of diamond meshes extending transversely to supporting beams. Adjoining sheets shall be lapped eight inches on the end and one and a half inches on the side. They shall be wired together every three feet on the ends and every four feet on the sides.

Expanded Metal Plastering Lath.

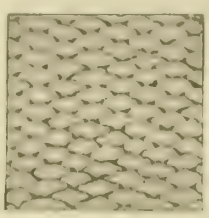
The excellence of this lath consists in its performing the function of a lath, i. e., of *holding and clinching mortar,* better than any other kind made. The reverse side is fully covered with clinch mortar, embedding the lath entirely and thereby preserving it and adding materially to the fire-resisting qualities of the construction.

Our lath is now made in different styles and grades to meet all possible conditions. For exterior stucco work and for much interior work when it is desirable to push the mortar well through, a stiff lath having large openings but the strands not too far apart is the best, and for such work the "A" and "B" "Steelcrete" Lath meet the requirements to perfection. "A" "Steelcrete," 22 gauge, is acceptable to the United States Government for Post Office work.

For certain interior work when it is desirable to use as little mortar as possible the lath openings should be small and the lath itself thin. In such cases there is nothing better than our Diamond Lath, shown herewith.



CLINCH OF SHEET LATH



CLINCH OF "STEELCRETE" METAL LATH

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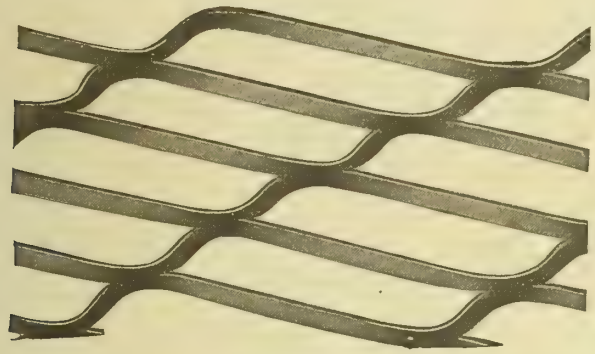
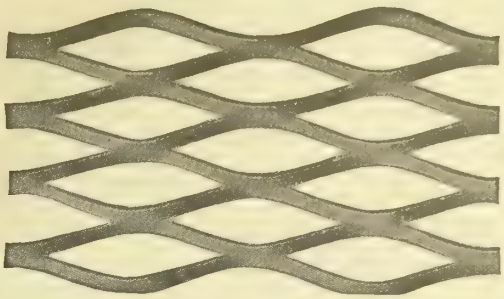


"A" AND "B" LATH



"DIAMOND" LATH

Orders and Specifications.

When ordering or specifying lath always give the full designation by name, gauge, weight per square yard, and whether painted or galvanized.

Specify, for example, as follows: "The metal lath shall be 'Steelcrete Diamond' 'F' No. 24-Gauge (painted, galvanized), weighing ..... pounds per square yard."

The accompanying table gives all necessary particulars. Lath should be wired to metal furring with No. 18 annealed steel wire. For fastening to wood studs or sheathing use staples long enough to enter at least three fourths of an inch.

DATA OF "STEELCRETE" EXPANDED METAL LATH (PAINTED)

DESIGNATION	Gauge U. S. Standard	Size of Sheets	Sheets in Bundle	Square Yards in Bundle	Weight Per Square Yard	Weight Per Bundle
PAINTED						
"Steelcrete A" 22.....	22	18" x 96"	15	20.00	4.3	86.00
"Steelcrete A" 24.....	24	18" x 96"	15	20.00	3.5	70.00
"Steelcrete B" 27.....	27	18" x 96"	15	20.00	2.4	48.00
"Steelcrete Diamond" 24 H..	24	28" x 96"	14	29.00	3.0	87.00
"Steelcrete Diamond" 24 F..	24	24" x 96"	15	26.66	3.5	94.00
"Steelcrete Diamond" 27 F..	27	24" x 96"	15	26.66	2.4	64.00
GALVANIZED						
"Steelcrete A" 22.....	22	18" x 96"	15	20.00	4.3	86.00
"Steelcrete A" 24.....	24	18" x 96"	15	20.00	4.0	80.00
"Steelcrete B" 27.....	27	18" x 96"	15	20.00	2.9	58.00
"Steelcrete Diamond" 24 H..	24	28" x 96"	14	29.00	3.4	98.60
"Steelcrete Diamond" 24 F..	24	24" x 96"	15	26.66	4.0	106.60
"Steelcrete Diamond" 27 F..	27	24" x 96"	15	26.66	2.9	177.30

"Steelcrete" Rail Corner Bead.

Made from 22-Gauge U. S. Standard Sheets, then *double hot-galvanized* in lead and zinc.

Special attention is called to the rigid manner in which clip is attached to bead. This insures absolute rigidity and prevents cracking of the plaster after erection.

Note holes for keying the plaster.

One clip furnished with every foot of bead. Clip can be placed where desired.

"STEELCRETE" RAIL CORNER BEAD
(Full size)

"STEELCRETE" CORNER BEAD
(Reduced)

"Steelcrete" Corner Bead.

Made from 24-Gauge U. S. Standard Sheets, then *double hot-galvanized* in lead and zinc.

This corner bead is very strong and straight, and absolutely rust-proof.

Particular attention is called to the double coating of lead and zinc.

The lead protects against corrosion and the zinc against rusting.

This type of bead is best adapted for use with wood or metal lath or wood studding, but can also be used to advantage on brick or hollow tile.

Stock lengths, 6, 7, 8, 9 and 10 feet.

Packed ten pieces to the bundle.

THE GENERAL FIREPROOFING COMPANY

Expanded Metal Lath, Expanded Metal Reinforcement and Steel-Tile for Floor Construction

YOUNGSTOWN, OHIO

BRANCH OFFICES
CHICAGO, ILL., 325 West Madison Street ATLANTA, GA., Third National Bank Building
EXPORT DEPARTMENT: NEW YORK, 395 Broadway

Products.

"HERRINGBONE" RIGID METAL LATH, Painted, Galvanized or made from "Armco" Iron; "DIAMOND-RIB" LATH, "GENFIRE" SHEET STEEL LATH; in fact, METAL LATH for every purpose.

TRADE-MARK
Reg. U. S. Pat. Office

COLD-ROLLED CHANNELS, used as Studding for Metal Lath Partitions and as Furring for Suspended Ceilings, Cornices, False Beams and Ornamental Plaster Work; CORNER BEAD, carrying a heavy plaster coat for exposed corners; WALL TIES, for both solid wall and veneer work.

"SELF-SENTERING," an Expanded Metal Reinforcement for Concrete, acting as both form and reinforcement or as lath and stud; "TRUSSIT," a patented Reinforcement for Curtain Walls and Partitions without studding; EXPANDED METAL, the general purpose Reinforcement for Concrete Work.

STEEL-TILE and END-TILE—Steel Forms for T-Beam Concrete Floors.

Also, Waterproofings, Dampproofings and Technical Paints, for which see our name in General Index.

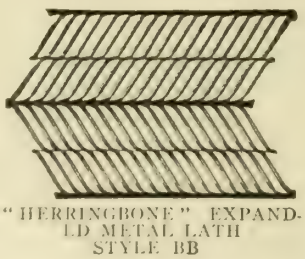
For Cabinets, Card Index and Filing, see our name in General Index.

"Herringbone" Expanded Metal Lath.

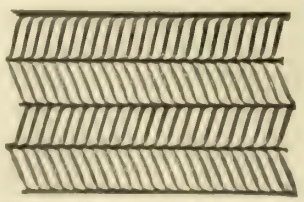
"Herringbone," universally used because of its stiffness, is, on account of its heavy, longitudinal ribs, the stiffest metal lath made. It permits wider stud spacing. The "Herringbone" standard is 16 inches on centers.

"Herringbone" offers a firm, flat surface, over which it is easy to lay a level coating of plaster. It will not buckle or sag between supports, which means a saving on plaster and labor. Selvage edges interlock, eliminating waste from lapping and reducing materially the cost of lacing the sheets together.

The flat cross-strands spread the mortar, which completely envelops them and curls around the ribs, forming a perfect key. A coat of protective paint is as much a part of "Herringbone" as the metal it is made of. When not ordered galvanized, it is furnished painted. No more uncoated lath! Suitable for all interior plastering, as well as for exterior stucco work.

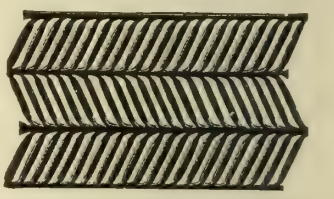


"HERRINGBONE" EXPANDED METAL LATH
STYLE BB



"HERRINGBONE" EXPANDED METAL LATH
STYLE A

As a special precaution against corrosion, where salt air or industrial gases are present, "Herringbone" can be furnished galvanized or made from "Armco" (American Ingot) Iron.



"HERRINGBONE" EXPANDED METAL LATH
STYLE AAA

STYLE BB, STANDARD LATH FOR CEMENT SIDING CONSTRUCTION AND FIREPROOF PARTITIONS

Sheets 20¼ x 96 inches.....1½ square yards
Size of mesh.....$^{7}/_{32}$ x 1¼ inches
Packed 15 sheets (22½ square yards) to the bundle.
Approximate weight per square yard:

Gauge.	Painted.	Galvanized.
No. 27 U. S. Standard	2.25 lbs.	2.82 lbs.
No. 26 U. S. Standard	2.50 lbs.	Not made
No. 24 U. S. Standard	3.37 lbs.	3.91 lbs.
No. 22 U. S. Standard	4.21 lbs.	Not made

Furnished painted, galvanized, or made from rust-resisting "Armco" Iron.

STYLE A, STANDARD LATH FOR CEILING WORK

Sheets 13½ x 96 inches.....1 square yard
Size of mesh.....$^{3}/_{16}$ x 1 inch
Packed 20 sheets (20 square yards) to the bundle.
Approximate weight per square yard:

Gauge.	Painted.	Galvanized.
No. 28 U. S. Standard	3.00 lbs.	3.75 lbs.
No. 27 U. S. Standard	3.33 lbs.	"Armco" Iron only

Furnished painted or galvanized.

STYLE AAA, THE "GENERAL PURPOSE" LATH

Sheets 18 x 96 inches.....1⅓ square yards
Size of mesh.....$^{7}/_{32}$ x 1¼ inches
Packed 15 sheets (20 square yards) to the bundle.
Approximate weight per square yard:

Gauge.	Painted.	Galvanized.
No. 27 U. S. Standard	2.53 lbs.	3.17 lbs.
No. 26 U. S. Standard	2.81 lbs.	Not made
No. 24 U. S. Standard	3.79 lbs.	4.39 lbs.
No. 22 U. S. Standard	4.74 lbs.	Not made

Furnished painted, galvanized, or made from rust-resisting "Armco" Iron.

"Herringbone" Catalogue, containing standard lathing and plastering specifications, mailed on request. Refer also to the Standard Specifications in the "Metal Lath Handbook" of the Associated Metal Lath Manufacturers. (See their name in General Index.)

GF Cold-Rolled Channel Studding and Furring.

Rolled from 16-gauge steel, with square, sharp corners and true right-angle sides. GF Channels are light, stiff and straight; therefore, easily erected. Lath goes on quickly, because the channels do not twist and turn, but stand up squarely in place.

Used for studding in solid or hollow partitions, for furring on flat or suspended ceilings, false beams, columns, cornice work and on masonry.

Continued on next page

Plain channels furnished in ¾-inch, 1-inch, 1½-inch and 2-inch widths, and lengths of 14, 16, 18 and 20 feet.

Perforated channels (punched for easy erection of metal lath) furnished in 1½-inch and 2-inch widths, same lengths as plain channels. Both styles stocked in large quantities.

GF Corner Bead.

A heavy galvanized bead with enough backbone to make erection easy and so designed that the plaster coat is carried tight up to the nose and held firmly in place. GF Corner Bead with "Herringbone" Lath insures a job that will not crack.

Made with or without clip. 26- and 24-gauge. Stock lengths, 6, 7, 8, 9 and 10 feet.

Specifications for Studding and Furring.

Hollow Partitions—Partitions shown on plans as hollow partitions to be made as follows:

Studding to be of 1½- or 2-inch GF cold-rolled steel channels spaced not exceeding 16 inches on centers. To be rigidly attached by means of "shoes" bent over and spiked or bolted to structural portion of the building, or, where concrete floors are used, to be secured by anchor bolts imbedded in the concrete. This may be varied by fastening steel runner plates to structural members or to concrete slabs, and bolting studs to these by the use of sheet iron "knees." Partitions to be lathed on both sides with 27-gauge BB "Herringbone" Expanded Metal Lath, securely wired to the studding with No. 18-gauge annealed wire.

Solid Partitions—Partitions shown on plans as 2-inch solid partitions to be made as follows:

Studding to be ¾-inch GF cold-rolled steel channels where height is 10 feet or less and 1-inch GF cold-rolled steel channels where height is more than 10 feet, spaced not to exceed 16 inches on centers. Studding to be rigidly anchored to structural frame of the building at ceiling and floor (in same manner as for hollow partitions). No. 27-gauge BB "Herringbone" Expanded Metal Lath to be securely tied to one side of the studding with No. 18-gauge annealed wire.

Flat Ceilings—Ceilings shown on the plans as flat ceilings to be constructed as follows:

Furring strips, consisting of 1-inch GF cold-rolled channels, spaced not more than 16 inches on centers, shall be clamped directly to the soffits of the steel beams or securely anchored to the bottom of concrete beams. To these furring strips, "Herringbone" Style AAA-27 gauge, 2.53-pound ceiling lath shall be rigidly attached with No. 16-gauge annealed wire.

Suspended Ceilings—Ceilings shown on plans as suspended ceilings to be hung from roof beams or slabs with hangers not less than ⅜-inch round spaced on 4-foot centers. The lower end of these hangers to be bent in the form of a hook to receive runner bars which shall be 2 x ½-inch flats. To these runner bars shall be wired ¾-inch GF cold-rolled channels spaced not more than 16 inches on centers. "Herringbone" Style AAA-27 gauge, 3-pound ceiling lath, to be securely tied to these channels with No. 16-gauge annealed wire.

(Detail drawings of Standard Partition Construction are given by the Associated Metal Lath Manufacturers. See their name in General Index.)

Specifications for Stucco (Cement Siding).

Framing—Studs spaced at 16-inch centers, wherever possible, shall be run from foundation to rafters without any intervening grain in the wood.

Bracing—The frame of the building shall be so rigidly braced as to avoid cracking the stucco—(a) at least one point between each two floors, using 2- x 3-inch bridging; (b) when sheathing is used, bracing may be omitted, as the sheathing boards act as bracing.

Sheathing—(a) The lath to be fastened direct to studding and back-plastered, and no sheathing boards are to be used; (b) sheathing boards shall be not less than 6 inches nor more than 8 inches wide and ⅞ inch thick, and shall be laid diagonally across the wall studs.

Furring—(a) When the lath is erected directly on the studs no furring is necessary; (b) when sheathing is used, fasten ½-inch galvanized crimped furring not lighter than 22-gauge (or other shape giving equal results) over the sheathing paper, directly along the line of the studs.

Lath—The lath shall be BB 24-gauge "Herringbone" Expanded Metal Lath, weighing 3.4 pounds to the square yard.

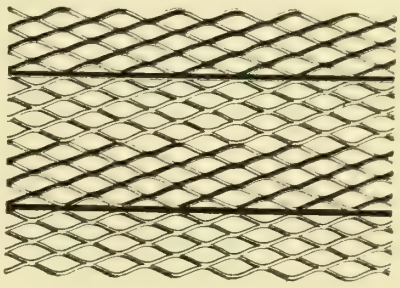
Application of Lath—Place "Herringbone" Lath horizontally (a) over the studs, (b) over the furring strips, and staple every 8 inches with 1¼-inch by 14-gauge galvanized staples. Lap the sheets one inch directly over the stud. Interlock selvage edges top and bottom.

Corners—(1) There shall be a 6-inch strip of metal lath bent round all angles or stapled or wired to the lath, or (2) the sheets shall be folded around the corners for at least 3 inches and stapled or wired.

"Diamond-Rib" Expanded Metal Lath.

"Diamond-Rib" Expanded Metal Lath is adapted for all kinds of work; but is especially suitable for curved surfaces because of its uniform pliability.

The flat ribs make "Diamond-Rib" Lath easy to handle and erect. A small mesh insures its complete envelopment in plaster, with the use of a minimum amount of material. The large sheets reduce the number of laps and save both labor and material.



"DIAMOND-RIB" EXPANDED METAL LATH

"DIAMOND-RIB" EXPANDED METAL LATH

Sheets 24 x 96 inches, packed 15 sheets to a bundle, 26⅔ square yards.

Approximate weight per square yard:

Gauge.		Galvanized.
No. 27 U. S. Standard	2.30 lbs.	2.73 lbs.
No. 26 U. S. Standard	2.50 lbs.	2.94 lbs.
No. 25 U. S. Standard	3.05 lbs.	3.32 lbs.
No. 24 U. S. Standard	3.40 lbs.	3.74 lbs.
No. 22 U. S. Standard	4.00 lbs.	Not made

Can also be made of rust-resisting "Armco" Iron.

For lathing and plastering specifications see the Standard Specifications in the "Metal Lath Handbook" of the Associated Metal Lath Manufacturers.

"Self-Sentering."

"Self-Sentering" is a combined reinforcement and form used extensively for floor and roof construction. It is adaptable also for solid and hollow walls, light partitions, etc., making possible a light weight, thin slab, built without expensive form work, and equal in fire protection to heavy reinforced concrete.

Roofs of any design and pitch can be built with "Self-Sentering," requiring little more than the permanent purlins and trusses for centering, and no solid forms at all.

"Self-Sentering" is a series of long expanded metal sheets of the only effective form—the diamond mesh—connected every 3⅝ inches by heavy cold-rolled ribs $\frac{11}{16}$ inch high, which act as stiffeners. The ribs carry the weight of the concrete till set; the diamond mesh forms a perfect bond for the concrete and carries the tension in the slab.

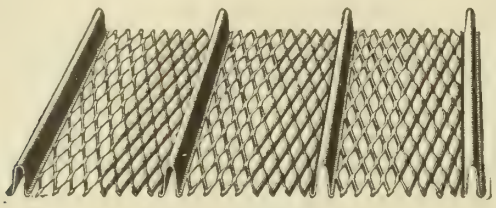
"Self-Sentering" is always furnished with a coating of baked-on enamel to protect it from corrosion until it is placed on the job. The mechanical bond of

Continued on next page

"Self-Sentering" is so great that this coating need cause no apprehension.

"Self-Sentering" Punch—This punch is used to eliminate a large proportion of wiring at the laps of "Self-Sentering" sheets. By its use the interlocking ribs are securely clinched, making further tying unnecessary. Such work is very rapid and leaves absolutely no play in the joints and no opportunity for sheets to sag or bulge.

Sizes—Sheets are 29 inches wide and can be furnished in lengths from four to twelve feet, in variation of one foot. Long sheets make for rapid erection and minimum laps. The side ribs nest snugly.



"SELF-SENTERING"
Patented March 3, 1914

"SELF-SENTERING" EXPANDED METAL SHEETS

Stock Gauges and Weights per Square Foot.

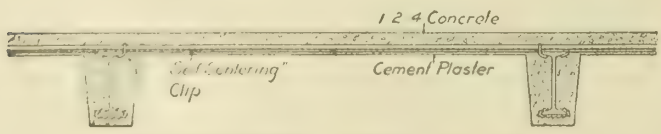
Gauge	Painted Weight	Galvanized Weight	Sec. Area per Foot of Width	Ship. Weight Crated (painted)
28	.55 lb.	.69 lb.	.163 sq. in.	.67 lb.
26	.66 lb.	.80 lb.	.196 sq. in.	.79 lb.
24	.89 lb.	Not made	.261 sq. in.	1.02 lb.

Other gauges furnished on special order.

"Self-Sentering" Floor Designs.

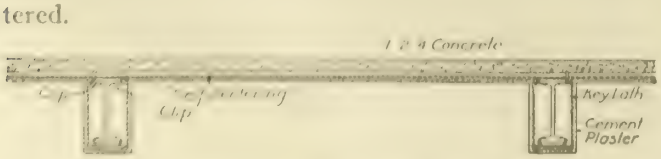
"Self-Sentering" makes a most economical type of fireproof floor, very similar to roof work, except that of course it must be heavier, to conform to the loads carried. The types of floors shown have each their individual merits, but are uniform in the economy of erection—due to the absence of form work.

"Self-Sentering" Floor, Type No. 1—"Self-Sentering" is attached direct to steel beams by clips; concrete applied to the desired thickness and the underside plastered with cement mortar. Sides of beam boxes are wired together, to save bracing across the span. To permit pouring the beam haunching at the same time, punch out the mesh between the "Self-Sentering" ribs where they come over the beam.



"SELF-SENTERING" FLOOR, TYPE NO. 1

"Self-Sentering" Floor, Type No. 2—This type of floor is the same as No. 1, except that beams are fireproofed with metal lath and plastered. This can be done at the same time the underside of the slab is plastered.



"SELF-SENTERING" FLOOR, TYPE NO. 2

SAFE UNIFORMLY DISTRIBUTED LIVE LOADS PER SQUARE FOOT ON "SELF-SENTERING" SLABS

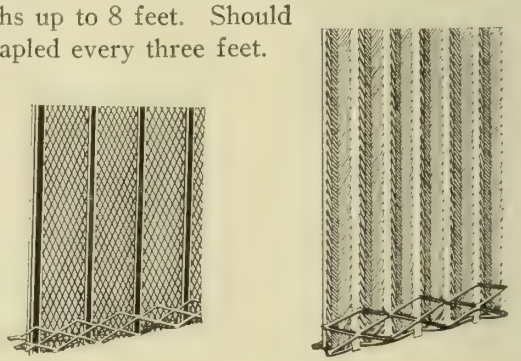
Assumptions:
Stress in steel, 16,000 pounds per square inch.
Ratio between the moduli of elasticity, 15.
Center of gravity, .19 of an inch above bottom slab.
R. M. = resisting moments per foot width in inch pounds; f c, = maximum extreme fiber stress in concrete.

Gauge "Self-Sentering"	Thickness of Slab Above Mesh	R. M.	f c	Span					
				3-foot	4-foot	5-foot	6-foot	7-foot	8-foot
28	2 ins.	4,360	660	310	164	98	61	...	...
26	2 ins.	5,190	760	359	192	128	92	49	...
24	2 ins.	6,210	800	476	258	166	110	64	30
28	2½ ins.	5,625	560	419	233	150	93	57	...
26	2½ ins.	6,710	650	484	279	186	118	76	50
24	2½ ins.	8,720	680	..	377	254	165	111	76
28	3 ins.	6,920	500	561	311	184	114	73	45
26	3 ins.	8,240	560	...	386	231	147	97	64
24	3 ins.	10,820	660	.	512	322	210	143	100
28	3½ ins.	8,250	460	...	368	218	135	80	50
26	3½ ins.	9,800	500	. .	455	274	174	115	76
24	3½ ins.	12,750	610	. .	...	375	245	166	116
28	4 ins.	9,500	425	...	439	261	164	105	68
26	4 ins.	11,300	460	...	533	320	206	136	91
24	4 ins.	14,800	560	...	...	436	286	196	137

Tables for other spans, also tables and complete data for all types of "Self-Sentering" floors and roofs, are given in the "Fireproofing Handbook." A copy of the latest edition available on request.

Expanded Metal Angles.

For attaching "Trussit" or "Self-Sentering" to floor and ceiling in studless partition and curtain wall construction. Made of 13-gauge steel; furnished in lengths up to 8 feet. Should be stapled every three feet.



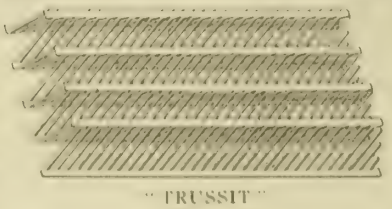
EXPANDED METAL ANGLES

"Trussit."

"Trussit" is an expanded steel reinforcement which is particularly adaptable to the construction of light fireproof walls and partitions from 1½ to 3 inches thick; also, of solid and hollow walls, curtain walls, elevator enclosures, small individual structures, or offices in a larger building—wherever a fireproof, sound-proof partition is required.

"Trussit" eliminates the usual studding, a few temporary braces being required only till the plaster coat on one side is set. Sheets are attached to floor and ceiling with expanded metal angles, rendering them free from vibration and the danger of cracking.

"Trussit" is uniformly expanded in both directions. This makes it possible to plaster upon each side exactly alike, and, when the wall is cured, steel and concrete are so uniformly distributed that expansion or contraction stresses in any direction are met by the "Trussit" reinforcement.



"TRUSSIT"
Patented

Continued on next page

Stocked in sheets up to twelve feet long; sheets uniformly 19 inches in width. Furnished painted, galvanized or made from "Armco" (American Ingot) Iron.

"TRUSSIT" STEEL REINFORCEMENT

Approximate Weight per Square Foot

Gauge.	Plain or Painted.	Galvanized.
No. 27 U. S. Standard	.57 lbs.	.68 lbs.
No. 26 U. S. Standard	.62 lbs.	Not made
No. 24 U. S. Standard	.83 lbs.	.88 lbs.

Construction details are given fully in the "Trussit Catalogue" and the "Fireproofing Handbook."

Expanded Metal Reinforcement.

Expanded Metal, made by expanding sheets of steel into elongated diamond-shape mesh, has greater reinforcing strength, pound for pound, than any other material. It can be cut and expanded to a greater variety of sizes adapted for particular classes or sizes of work.

The larger mesh is used for concrete reinforcement in construction of floors, roofs, sidewalks over basements, bridge decks, retaining walls, sewers, conduits, tanks, reservoirs, etc. Smaller mesh widely used in lighter cement work and for railings, window guards, machinery guards, elevator and tool room enclosures.

Style 3-10-176 (3-inch mesh, No. 10 gauge, .176 square inch sectional area, illustrated) is the type most commonly used for heavy work.

EXPANDED METAL

DATA ON EXPANDED METAL

Style	Size Mesh Short Way of Diamond	Nominal Gauge Metal	Net Section. Area per Foot Width — in sq. ins.	Approx. Weight per sq. foot	Standard Size Sheets: Lengths — Long Way of Diamond	Standard Size Sheets: Widths — Short Way of Diamond
3– 7–609	3″	7	.609	2.00	6′, 8′, 9′ and 10′8″	5′
3– 7–400	3″	7	.400	1.36	6′, 8′, 9′ and 10′8″	5′
3–10–353	3″	10	.353	1.20	6′, 8′, 9′ and 10′8″	3′, 4′, 6′
3–10–265	3″	10	.265	.90	6′, 8′, 9′ and 10′8″	4′, 5′, 4′
3–10–176	3″	10	.176	.60	6′, 8′, 9′ and 10′8″	3′, 4′, 5′, 6′
3–12–150	3″	12	.150	.51	6′, 8′, 9′ and 10′8″	3′, 4′, 6′
3–16–082	3″	16	.082	.278	6′, 8′, and 10′8″	3′, 4′, 5′, 6′
¾–12–246	¾″	12	.246	.84	6′, 8′	3′, 4′, 6′

A full line of smaller meshes also carried in stock at all times.

Steel-Tile and End-Tile.

GF Steel-Tile are simply light-weight steel forms for concrete floors, designed on the well-known T-beam principle—deep reinforced joists and thin connecting slabs of concrete.

One of the advantages of Steel-Tile construction lies in its substantial reduction in weight. Lazy concrete is reduced to the minimum, saving a good percentage of the load upon girders, columns, foundations and footings, and permitting a lighter construction throughout.

GF Steel-Tile make the old, expensive solid-form work unnecessary. Centering along the line of joists, which are 24 inches apart, is sufficient. This closes the only available opening and prevents leakage when concrete is poured.

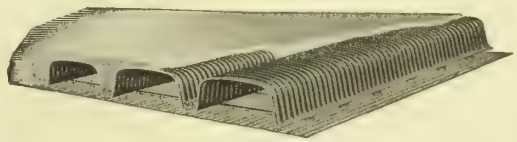
GF STEEL-TILE

Cost of transporting and handling Steel-Tile is much less than terra-cotta tile, which involves the same principle of construction, and there is no loss due to breakage. Steel-Tile are adaptable in such structures as schools, hotels, office buildings, department stores, apartments, warehouses, lofts, etc. Wherever long spans are required GF Steel-Tile construction will be found most economical.

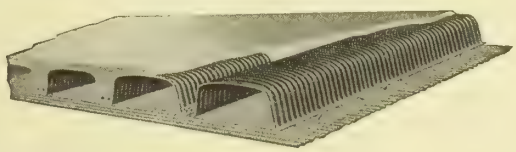
Flat ceilings are easily constructed under Steel-Tile floors. Two dependable methods are illustrated. One is to suspend wires from the reinforcing bars or through holes in the Steel-Tile and erect GF Cold-Rolled Channels and "Herringbone" Lath after pouring the floor. Another is to lay "Herringbone" Lath directly on forms before setting Steel-Tile and pouring concrete. Suspended ceilings are built upon hangers suspended through joists before pouring concrete.

GF END-TILE

GF Steel-Tile with End-Tile to match are made of corrugated steel in four sizes. Shipped nested; i. e., one inside the other, at a great saving of space.



TYPE No. 1. CEILING CONSTRUCTION UNDE GF STEEL-TILE, GF COLD-ROLLED CHANNELS AND "HERRINGBONE" LATH
Erected after pouring the floor



TYPE No. 2. CEILING CONSTRUCTION UNDER GF STEEL-TILE "HERRINGBONE" LATH LAID ON FORMS
Before pouring the concrete

PROPERTIES OF STEEL-TILE FLOORS

Width of Joists, in inches	Center to Center of Joists, in inches	2″ of Concrete Above Steel-Tile	6″	8″	10″	12″
		Size Steel-Tile				
4	24	Average weight per sq. ft., lbs	45.8	51.6	58.5	65.6
		Cu. ft. of Concrete per sq. ft. of floor	.310	.352	.398	.447
		Core Area, per cent of Section.	54.2	58.4	60.8	62.2
5	25	Average weight per sq. ft., lbs.	47.9	54.5	62.0	69.9
		Cu. ft. of Concrete per sq. ft. of floor	.325	.372	.423	.477
		Core Area, per cent of Section.	52.0	56.0	58.3	59.7

Send for GF Steel-Tile Handbook

Handbooks.

G. F. Publications cover construction data completely, and include standard specifications where they have been evolved. The "Herringbone" Catalogue contains full information on metal lath. The Fireproofing Handbook treats fully the uses of "Self-Sentering," "Trussit" and Expanded Metal. The Steel-Tile Handbook includes drawings, formulas, tables and computations for the concrete designer.

ESTABLISHED 1884

NORTH WESTERN EXPANDED METAL CO.

GENERAL OFFICES
407 South Dearborn Street
CHICAGO, ILL.

EXPORT OFFICE: NEW YORK, N. Y., 17 Battery Place
FACTORIES: CHICAGO, ILL., JEANNETTE, PA.

BRANCH OFFICES
BOSTON, MASS., 73 Tremont Street
LOS ANGELES, CAL., 412 West Sixth Street

Products.

EXPANDED METAL LATH, which includes "KNO-BURN," "EUREKA," "P. O. SPECIAL," "XX CENTURY," "PURE IRON," "DIAMOND MESH," "KNO-FUR," and "CHANELATH" EXPANDED METAL RIBBED LATH; "ECONO" EXPANDED METAL REINFORCING; "KNO-EQUAL" CORNER BEADS; METAL LATH ACCESSORIES; "DANDY" EXPANDED METAL WASTE BASKETS, and EXPANDED METAL SPECIALTIES.

"Kno-Burn" Expanded Metal Plastering Lath.

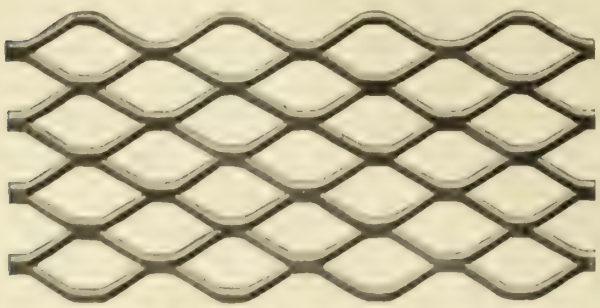
KNO-BURN
TRADE-MARK

"Kno-Burn" lath has a small mesh, as shown in the illustration. This insures the use of a minimum of plaster. The shape of the mesh provides a perfect "key," and every strand completely imbeds itself in the plaster. Suitable for either exterior or interior work or ornamental plastering work. Furnished either painted or galvanized.

STOCK SIZES AND WEIGHTS OF "KNO-BURN" LATH

Number	Sheets per Bundle	Yards per Bundle	Weight per Yard, Lbs.	Weight per Bundle, Lbs.
27-gauge	9	12	2⅓	28
26-gauge	9	12	2½	30
25-gauge	9	12	3.0	36
24-gauge	9	12	3 4	40.8

Regular size of sheets 18 x 96 ins.
Special size 24 x 96 ins., 16 yards per bundle, can be furnished.
All gauges furnished painted: 24 and 26 gauges can be furnished galvanized in 18-inch widths only.



ACTUAL SIZE OF MESH OF "KNO-BURN" LATH, ALSO OF "XX CENTURY" LATH

"Eureka" Expanded Metal Plastering ath.

EUREKA
TRADE-MARK

"Eureka" lath has a slightly larger mesh than "Kno-Burn," but with strands of the same width. It is specially adapted for use in the construction of solid plaster partitions, and in any other work where a light weight strong lath is required. Furnished painted or galvanized.

STOCK SIZES AND WEIGHTS OF "EUREKA" LATH

Number	Sheets per Bundle	Size of Sheets, Ins.	Yards per Bundle	Weight per Yard, Lbs.	Weight per Bundle, Lbs.
26-gauge	9	21 x 96	14	2.2	30.8
24-gauge	9	22 x 96	15	2.8	42.0
22-gauge	9	22 x 96	15	3.5	52.5

Furnished either painted or galvanized.

ACTUAL SIZE OF MESH OF "EUREKA" LATH

"XX Century" Expanded Metal Plastering Lath.

XX CENTURY
TRADE-MARK

"XX Century" lath is manufactured from a special acid- and corrosion-resisting metal. It is designed for use on both interior and exterior work. The size of the mesh is the same as that of "Kno-Burn."

STOCK SIZES AND WEIGHTS OF "XX CENTURY" LATH.

Number	Sheets per Bundle	Size of Sheets, Ins.	Yards per Bundle	Weight per Yard, Lbs.	Weight per Bundle, Lbs.
27-gauge	9	18 x 96	12	2.3	28.0
26-gauge	9	18 x 96	12	2.5	30
25-gauge	9	18 x 96	12	3.0	36.0
24-gauge	9	18 x 96	12	3 4	40.8

Continued on next page

"Pure Iron" Expanded Metal Plastering Lath.

We are in position to furnish an expanded metal lath, in the same sizes and weights as "XX Century," manufactured from "Pure Iron." This lath is furnished painted only.

"Kno-Fur" (Self-furring) Expanded Metal Plastering Lath.

KNO-FUR
TRADE-MARK

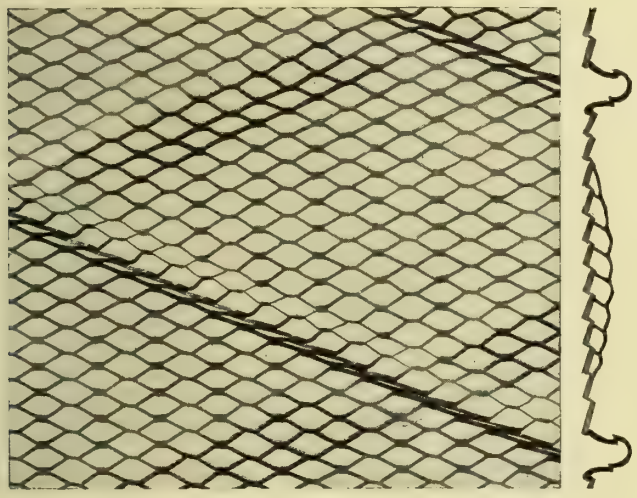
"Kno-Fur" lath is a material in which has been formed one half inch ribs running diagonally across the sheets. These ribs eliminate the use of furring strips and, being open mesh, permit the plaster to "key" to them and imbed them.

STOCK SIZES AND WEIGHTS OF "KNO-FUR" LATH

Number	Sheets per Bundle	Size of Sheets, Ins.	Yards per Bundle	Weight per Yard, Lbs.	Weight per Bundle, Lbs.
27-Ga. Reg.	9	22 x96	14¾	2.62	39.0
26-Ga. Spec.	9	19½x96	13	2.40	31.2
26-Ga. Spec.	9	20½x96	13⅔	3.08	42.0
24-Ga. Spec.	9	22½x96	14⅔	3.8	56.0

"Kno-Fur" regular has the "Kno-Burn" mesh, and is manufactured from acid-resisting metal.

"Kno-Fur" special has the "Eureka" mesh, and is manufactured from the same material as "Eureka."

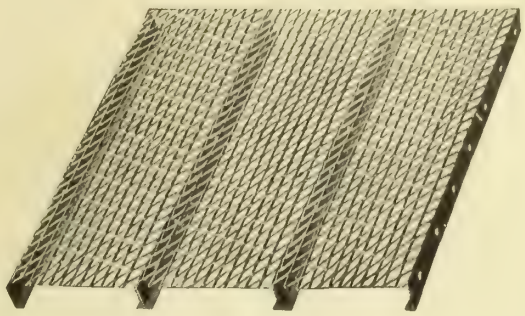


"KNO-FUR" SELF-FURRING METAL LATH

"Chanelath"

"Chanelath" is a new expanded metal product combining in one material a form and reinforcing for concrete slabs. It also provides in one material the lath and the necessary furring or studding for plastering work.

It is designed for reinforcing concrete roofs and floors, and as a base for plastering solid partitions, ceilings, curtain walls, etc.



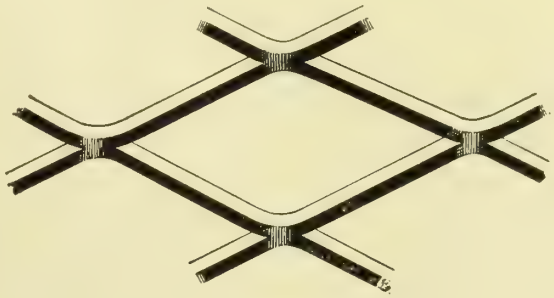
"CHANELATH"

STOCK SIZES AND WEIGHTS OF "CHANELATH"

Number	Weight per Sq. Ft., Lbs.	Area per 12 Inches of Width	Width of Sheets, Inches	Length of Sheets, Feet
28-gauge	56	.152 sq. ins.	4,8,12,16,20,	3, 4, 5, 6, 7,
26-gauge	67	.195 sq. ins.	24, 28, 32, 36,	8, 9, 10, 11
24-gauge	89	.244 sq. ins.	40, 44 and 48	and 12

"Econo" Expanded Metal Concrete Reinforcing.

"Econo" is an expanded metal fabric having meshes 3 inches by 8 inches and 2¼ inches by 6 inches. It is designed for use in all forms of reinforced concrete construction.



TYPICAL MESH OF "ECONO" FABRIC
Actual dimensions 3 x 8 in. and 2¼ x 6 in.

STOCK SIZES AND WEIGHTS OF "ECONO" FABRIC

Number	Area per 12 Inches of Width	Weight per Square Foot, Lbs.	Mesh and Gauge	Widths, Feet	Lengths, Feet
06–3	.06 sq. in.	.20	3″–16 ga.	3, 4, 6	8 and 12
10–3	.10 " "	.34	3″–12 "	3, 4, 6	8 and 12
15–3	.15 " "	.51	3″–10 "	3, 4, 6	8, 10½, 12
16–3	.16 " "	.55	3″–10 "	3, 4, 6	8, 10½, 12
20–3	.20 " "	.68	3″–10 "	3, 4, 6	8, 10½, 12
25–3	.25 " "	.85	3″–10 "	3, 4, 6	8, 10½, 12
30–3	.30 " "	1.02	3″–10 "	3, 4, 6	8, 10½, 12
35–3	.35 " "	1.19	3″–10 "	3, 4, 6	8, 10½, 12
40–3	.40 " "	1.36	3″– 7 "	3½, 7	8 and 12
10–2¼	.10 sq. in.	.34	2¼″–16 ga.	3, 4, 6	8 and 12
15–2¼	.15 " "	.51	2¼″–12 "	3, 4, 6	8 and 12
20–2¼	.20 " "	.68	2¼″–10 "	3, 4, 6	8 and 12
40–2¼	.40 " "	1.36	2¼″– 7 "	3½, 7	8 and 12

A full line of smaller meshes for screens, etc., is also carried.

THE SYKES METAL LATH AND ROOFING CO.

WARREN, OHIO

Products.

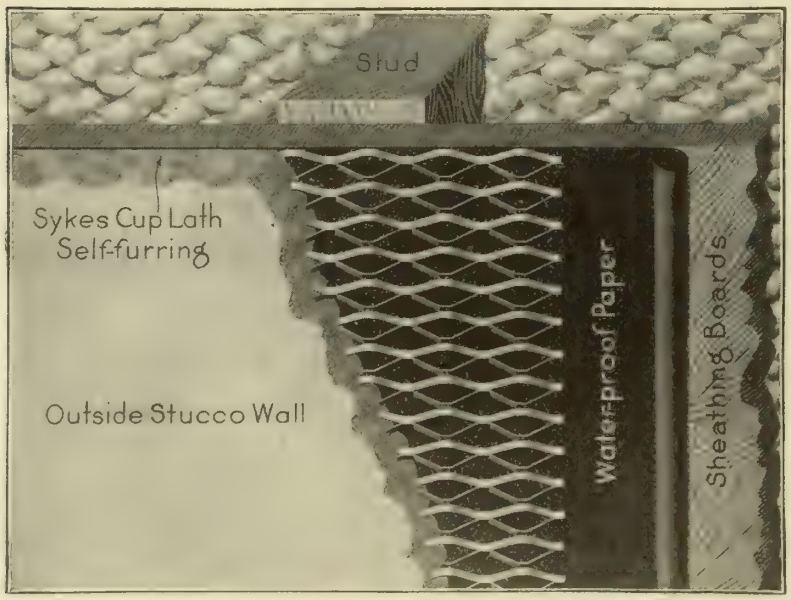
Manufacturers of Sykes Expanded Cup Lath, Sykes Trough Sheet Lath, Sykes Wall Ties and Sykes "Imperial" Galvanized Shingles.

Also, Metal Corner Bead and Metal Roofing.

Sykes Expanded Cup Lath.

Stucco Houses are becoming more popular each year, and their construction is now so understood that they can be successfully built in any climate. You can not find a better material or a more economical one for this purpose than Sykes Expanded Cup Lath "Self Furring."

Quality—Because we are determined that our products shall be of the best quality regardless of expense, we do not use deoxidized or pickled sheets, which would save the cutting edges on knives, but would make the lath more susceptible to rust. In the process of manufacture we do not stretch the metal, thus avoiding damage to the fiber. We give clear evidence of this statement by cutting galvanized sheets without even breaking the coating of spelter. Any operation that stretches the metal in the process of expanding it while cold destroys its durability to a certain extent.



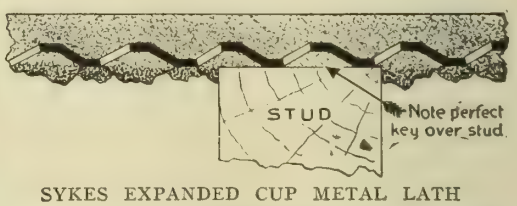
SYKES EXPANDED CUP LATH
Showing how it is used without Furring Strips

Advantages—This material is "self furring"; mortar gets a perfect clinch when lath is applied direct to sheathing boards or where passing over wood studs or other obstructions, without the use of furring strips.

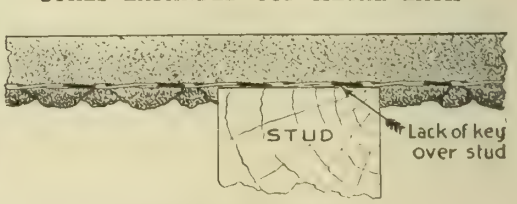
The key or bond of this lath is perfect. Mortar does not hang on a sharp cutting edge that would cut the clinch on either side walls or ceiling, but rests on a beveled edge in each case. The lath becomes thoroughly imbedded in the mortar, bracing it from all directions. It is not merely a background for the plaster, but makes a thorough reinforcement.

Superiority, being Best for Interior as well as for Exterior Work—Sykes Expanded Cup Metal Lath gives greater durability by giving more weight. By its peculiar formation it reinforces the wall to a greater extent than any other expanded metal lath. Note these illustrations:

Observe that one great superiority of Sykes Expanded Metal Lath over the common expanded metal lath is that Sykes Lath extends *into the wall* ¼ inch and is therefore imbedded in the mortar. Sykes Lath is a backbone to the wall; common lath is *on the back of the wall*—only a background for the plaster. The corrugation in the Sykes Lath makes a perfect reinforcement of the wall. Your wall will be much stronger, much more rigid, if Sykes Lath is used.



SYKES EXPANDED CUP METAL LATH



ORDINARY METAL LATH

More Weight; Less Mortar; More Durability—All grounds being measured from face to stud, not from face to lath, it is easily demonstrated that Sykes Lath requires *less mortar* than any other expanded lath:

First, because there will be less mortar back of the face of the stud, the key upon Sykes Lath being to a great extent *in the wall itself.*

Second, because the key on Sykes Lath is formed in a natural cup, therefore no mortar will be cut off and allowed to fall down back of the wall.

Sykes Expanded Cup Lath is heavier than others cut from the same gauge of metal, because of its wider

Continued on next page

strands. It is nearly one and one half times as heavy as some metal laths of the same gauge now on the market. *Judge by weight and gauge, not by gauge alone.*

Sykes Expanded Cup Metal Lath saves money and adds to the wall's life. It keys perfectly; can not be applied wrong.

SYKES LATH HEAVIER THAN OTHERS. CUT FROM SAME GAUGE OF METAL

How Applied — The illustration shows the manner of applying Sykes Expanded Cup Lath direct to sheathing boards for stucco work without the use of furring strips, although this lath is equally good for interior use.

Size and Weight—Sykes Cup Lath is manufactured in sheets measuring 18 by 96 inches; packed in bundles of 15 sheets each, containing 20 square yards.

Approximate weight per square yard in Painted: 27-gauge, $2^{7}/_{10}$ pounds; 26-gauge, $2^{9}/_{10}$ pounds; 24-gauge, $3^{6}/_{10}$ pounds.

Approximate weight per square yard in Galvanized: 27-gauge, 3 pounds; 26-gauge, $3^{1}/_{5}$ pounds; 24-gauge, 4 pounds.

Specifications—Specify Sykes Expanded Cup Lath 27- or 26-gauge for either interior or exterior work, where centering is 12 inches or less. Where centering is over 12 inches, specify Sykes Expanded Cup Lath 24-gauge or Sykes Trough Sheet Lath. Use 1-inch galvanized staples driven every four inches, lapping the sheets and arranging them to be bent around curves and angles, to prevent cracks in the plastering.

On iron frame work use No. 18-gauge wire for lacing.

No furring strips required with Sykes Expanded Cup Lath when used for exterior work.

Samples, etc.

Upon request we will cheerfully furnish architects with booklet entitled "Complete Specifications for Stucco on Metal Lath"; also any special data desired, together with samples. Write us.

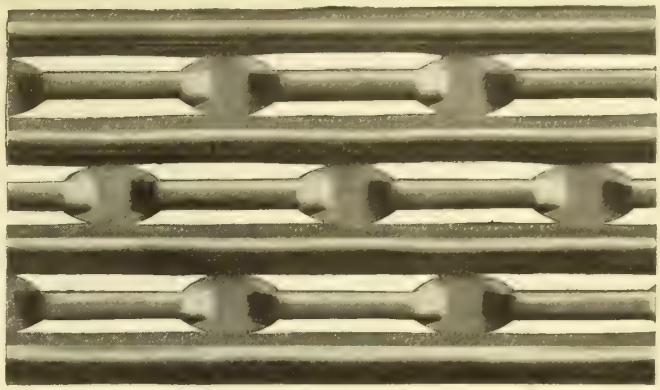
SPECIFICATION BOOKLET

Sykes Trough Sheet Lath.

Sykes Trough Lath is a sheet lath (not expanded), and by many is preferred because of its rigidity or stiffness. It can be applied on 16-inch centering with absolutely no uncertainty.

Sykes Trough Sheet Lath is especially desirable for either exterior or interior purposes, and when used for ceilings the trough forms a partial vacuum or suction, and thus prevents the mortar from falling off when wet.

Furnished with a good coat of durable black paint.



SYKES TROUGH SHEET LATH

Advantages—The novel design and shape of the trough in our Sheet Lath in connection with the corrugations that run the entire length of the sheet, make it beyond question the strongest and most rigid lath on the market.

It is economical in the amount of plaster used, and on account of its rigid character is an ideal lath for mantel and tile setting.

The merit of Sykes Trough Sheet Lath, when once used, is recognized by architects, builders and contractors.

Sizes—Manufactured in the following sizes:

13½" x 96"—10 sheets per bundle, containing 10 square yards.

18½" x 96"—9 sheets per bundle, containing $12^{1}/_{3}$ square yards.

23½" x 96"—9 sheets per bundle, containing $15^{2}/_{3}$ square yards.

Approximate weight, 5 pounds to the square yard.

Specification—For Interior Walls and Ceilings where Centering is 16 inches or less—Use Sykes Trough Sheet Lath, manufactured by The Sykes Metal Lath and Roofing Company, Warren, Ohio. Use 3d wire nails driven every four inches, lapping the sheets and arranging them to be bent around corners and angles to prevent cracks in the plastering.

On iron construction use No. 18-gauge wire for lacing.

For Exterior Concrete or Stucco—Apply Sykes Trough Sheet Lath, using 3d wire nails or staples. Use regular ⅜-inch furring set up to 16 inches on centers.

For panel work of medium size, ⅜-inch wood lath may be used for furring, set up to 16 inches on centers.

THE YOUNGSTOWN IRON & STEEL CO.

BELL TELEPHONE, 2200 YOUNGSTOWN, OHIO NEW TELEPHONE, 1277

AGENCIES

BALTIMORE, MD., Maryland Lime & Cement Co.
BOSTON AND HOLYOKE, MASS., J. Russell & Co., New England Agents
BUFFALO, N. Y., M. A. Reeb, 599 Michigan Street
CHICAGO, ILL., Chicago Builders Specialties Co., Old Colony Building
CLEVELAND, OHIO, J. F. Corlett & Co., Rockefeller Building
DETROIT, MICH., W. A. Munger, 302 St. Clair Avenue
KANSAS CITY, MO., James P. Sprague & Co., Rialto Building
LOS ANGELES, CAL., Union Lime Company
MINNEAPOLIS, MINN., Landers, Morrison, Christenson Co., 503 Lumber Exchange Building
NEW YORK, N. Y., Edward Caterson, 17 Battery Place
PHILADELPHIA, PA., W. H. Thomson & Co., Land Title Building
PITTSBURGH, PA., L. E. Aber, 1503 Machesney Building
PORTLAND, ORE., L. R. Kollock Co., 1100 Yeon Building
ROCHESTER, N. Y., American Clay and Cement Corporation
SALT LAKE CITY, UTAH, Utah Lumber Company
SAN FRANCISCO, CAL., Atlantic Fireproofing Co., Pacific Building
SCRANTON, PA., Paragon Plaster & Supply Co.
SYRACUSE, N. Y., Paragon Plaster Co.
SEATTLE, WASH., Fox Hunter Co.
VANCOUVER, B. C., Evans, Coleman & Evans

Products.

Manufacturers of Black and Galvanized Sheets, Flat and Corrugated; Corrugated Arches for Floors; Expanded Metal for Concrete Reinforcement, Metal Lockers, etc.; Expanded Metal Lath; Sheet Lath; Duplex Lath; "Buckeye" Trough Flooring for Fireproof Buildings and Highway Bridges; Steel Corner Bead; Metal Studding, and Furring Strips; "Mahoning" Pressed Channel.

Corrugated Arches.

We make, on order, Corrugated Arches (Fig. 1) of No. 16-gauge or lighter, curved to any arch or span.

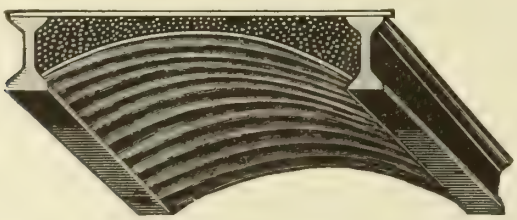


Fig. 1. SECTION OF CORRUGATED ARCH

Metal Lath.

Our "Youngstown" Corrugated Expanded Metal Lath (Fig. 2) is manufactured from the best grade of O. H. Steel sheets, pickled and thoroughly coated with linseed oil. The transverse corrugations, together with the wide strand, make this lath at least fifty per cent more rigid than any other lath of equal weight made.

Size of sheets, 21" x 97"; 14 sheets to each bundle. We charge only for 20¼" x 96".

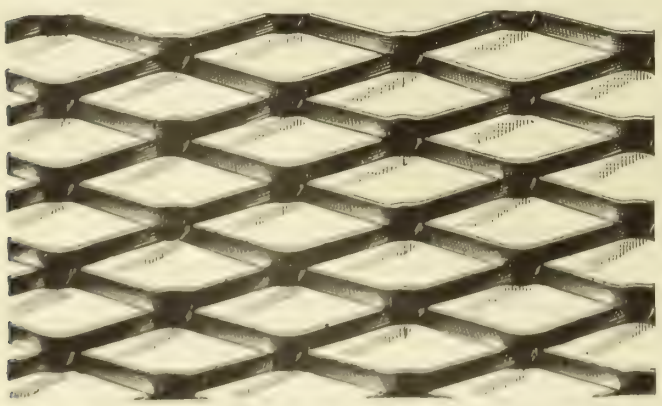


Fig. 2. "YOUNGSTOWN" CORRUGATED EXPANDED METAL LATH

"Mahoning" Corrugated Expanded Metal Lath.

Our "Mahoning" Corrugated Expanded Metal Lath (Fig. 3) is excelled only by our "Youngstown" Expanded Metal Lath (Fig. 2). Made in sheets 21" x 97".

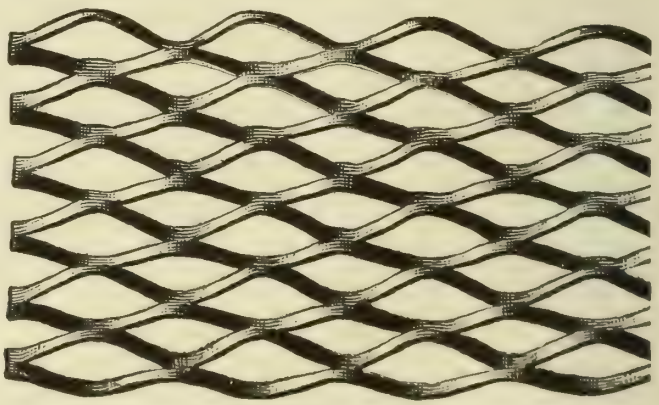


Fig. 3. "MAHONING" CORRUGATED EXPANDED METAL LATH

"Mahoning" Pressed Channel.

Is made in 10, 12, 14 and 16 foot lengths, from special analysis open hearth steel in No. 16-gauge. It is lighter and stronger than structural iron. The perfect uniformity in weight and strength is attained by the use of specially designed machinery.

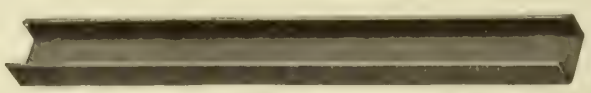


Fig. 4. "MAHONING" PRESSED CHANNEL

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"Youngstown" Stud.

Our "Youngstown" Stud (Fig. 5), in connection with our Metal Lath, meets a long-felt want in metal construction of fireproof buildings. Made from 18- and 20-gauge steel sheets, it is lighter and stronger than structural iron. The perfect uniformity in weight and strength is attained by use of well-designed shapes effected by special machinery. The prongs, stamped from the flanges, make the application of metal lath a quick and simple matter, besides fastening the lath more securely than by the old method of wiring. Cross bracing is avoided and perfect rigidity secured by using special brackets for top and bottom, as shown in the illustration.

"Mahoning" Steel Corner Bead.

Every architect, builder and plasterer in America has been wanting and suggesting a corner bead of this design to take the place of the old-fashioned beads now in use. The Sherardized "Mahoning" Corner Bead (Fig. 6) is rust-proof and is adapted to all classes of work and construction, interior and exterior, wood, tile, and concrete, and costs no more than old-style inferior grades. Made for ⅜" ground. There is no chance for mortar to peel off.

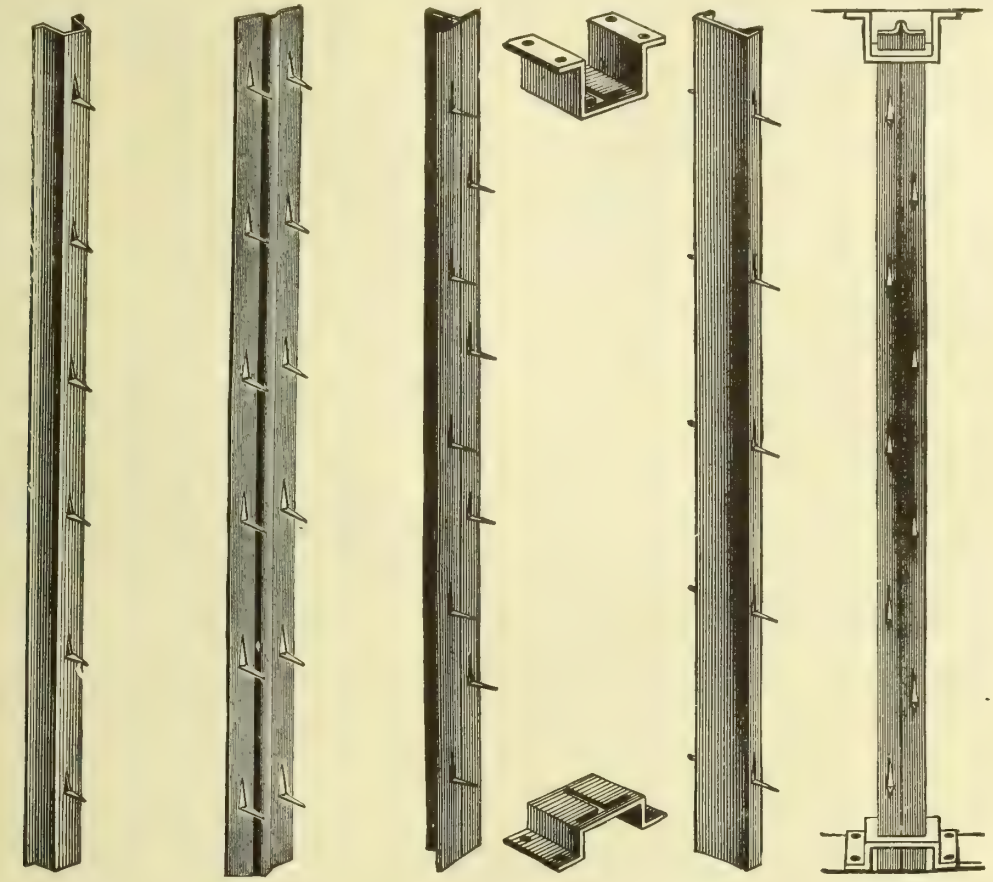

Fig. 5. "YOUNGSTOWN" STUD

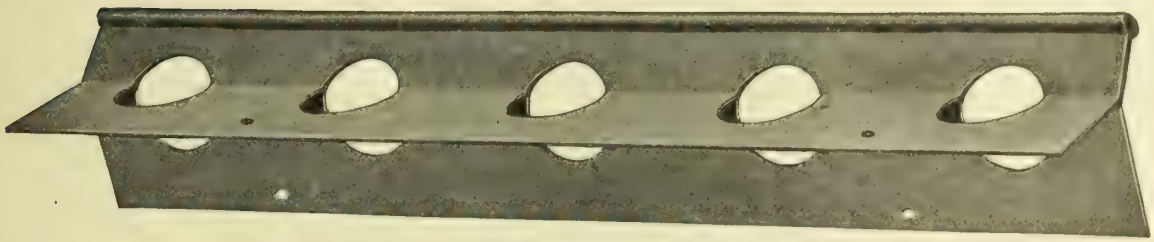

Fig. 6. SHERARDIZED "MAHONING" STEEL CORNER BEAD

"T. & C." Sheet Metal Lath.

Our improved "T. & C." Sheet Metal Lath has a firm, strong corrugated bridge or outward bulge, making a key or clinch for plaster that can not be equaled.

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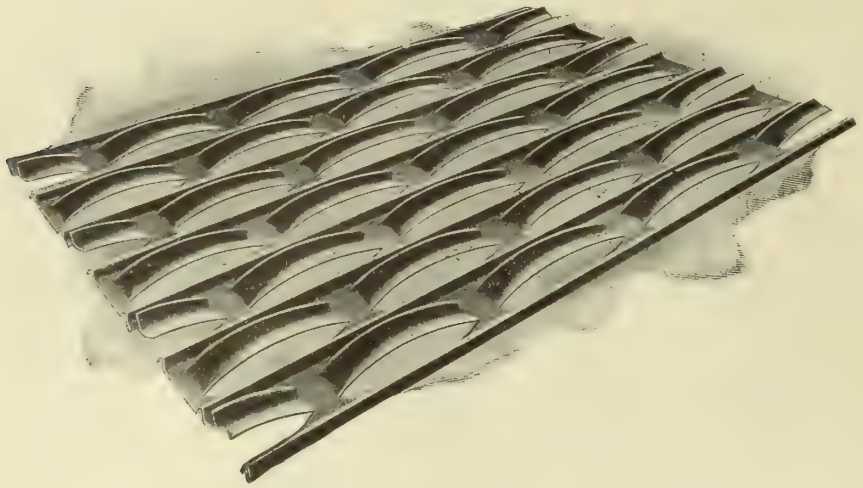

Fig. 7. "T. & C." SHEET METAL LATH

It is made in 96-inch lengths by 13½-inch widths, a sheet containing 1 square yard, and is put up in bundles of 16 sheets, each containing 16 square yards. It nests in shipping, and weighs about 5 pounds per square yard.

Lathers can work this size of sheet lath more economically and faster than other widths.

One coat of pure linseed oil is applied at factory and it needs no further coating, as oxidation ceases when lath is embedded in plaster.

"Buckeye" Trough Flooring.

"Buckeye" Flooring (Figs. 8 and 9) is properly shaped for strength, as it is of sufficient depth, and has the necessary support sideways. Each face has a heavy longitudinal corrugation, adding strength and stiffness to the floor, and acting as a key to the concrete. It is made from the best O. H. Galvanized Steel Sheet.

We give herewith a table of safe loads, with factor of safety 4 to 1.

SAFE LOADS FOR "BUCKEYE" FLOORS

Span	No. 16 Gauge	No. 18 Gauge
4 ft. 0 in.	1480 lbs.	1140 lbs.
4 ft. 6 in.	1160 lbs.	920 lbs.
5 ft. 0 in.	920 lbs.	730 lbs.
5 ft. 6 in.	750 lbs.	590 lbs.
6 ft. 0 in.	620 lbs.	480 lbs.
6 ft. 6 in.	500 lbs.	400 lbs.
7 ft. 0 in.	420 lbs.	340 lbs.
7 ft. 6 in.	360 lbs.	290 lbs.
8 ft. 0 in.	300 lbs.	250 lbs.
8 ft. 6 in.	260 lbs.	210 lbs.
9 ft. 0 in.	230 lbs.	180 lbs.
9 ft. 6 in.	200 lbs.	160 lbs.
10 ft. 0 in.	170 lbs.	130 lbs.

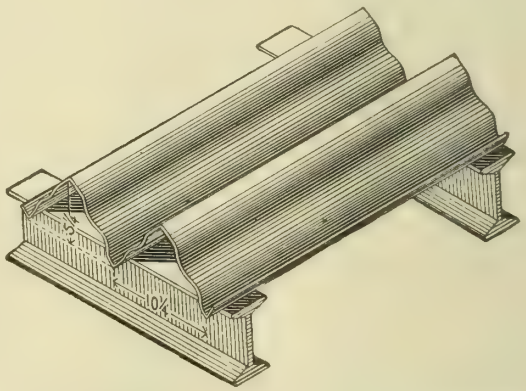

Fig. 8. "BUCKEYE" TROUGH LAID ON I-BEAMS

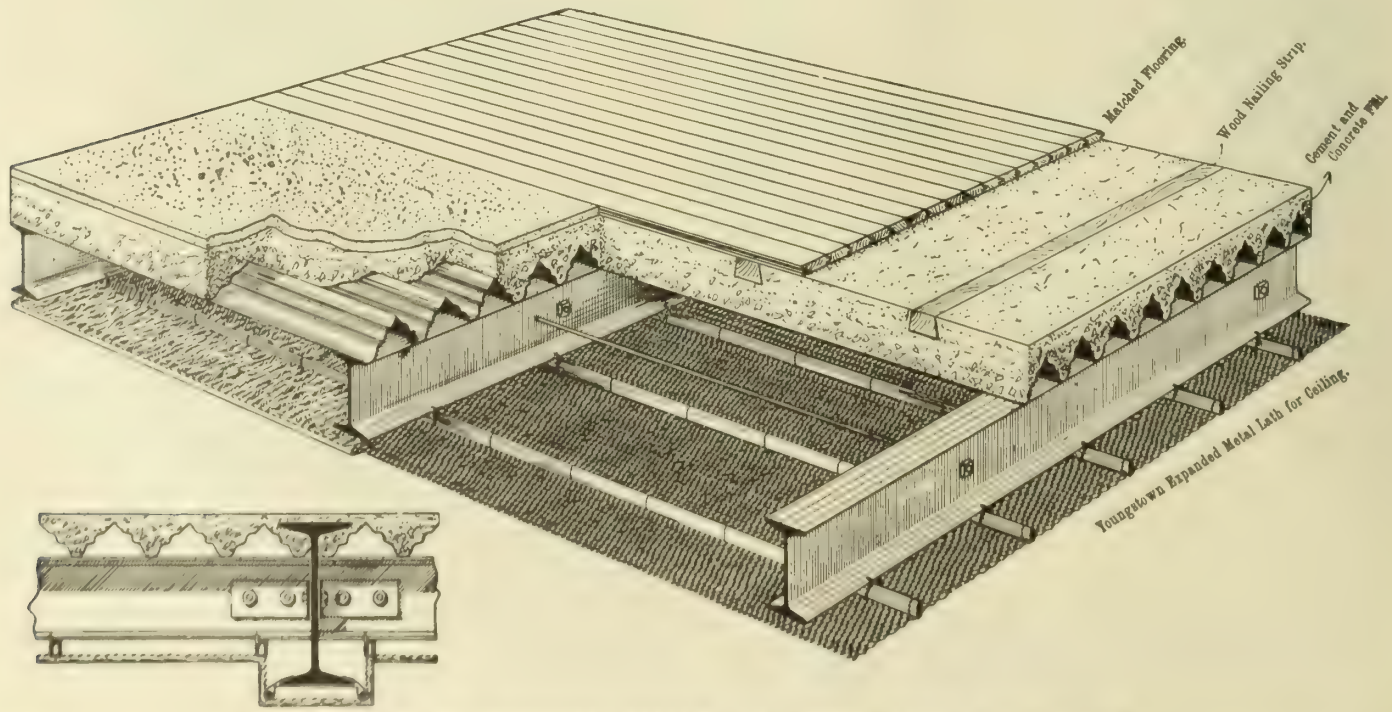

Fig. 9. DETAIL OF "BUCKEYE" SYSTEM OF FIREPROOF FLOOR CONSTRUCTION

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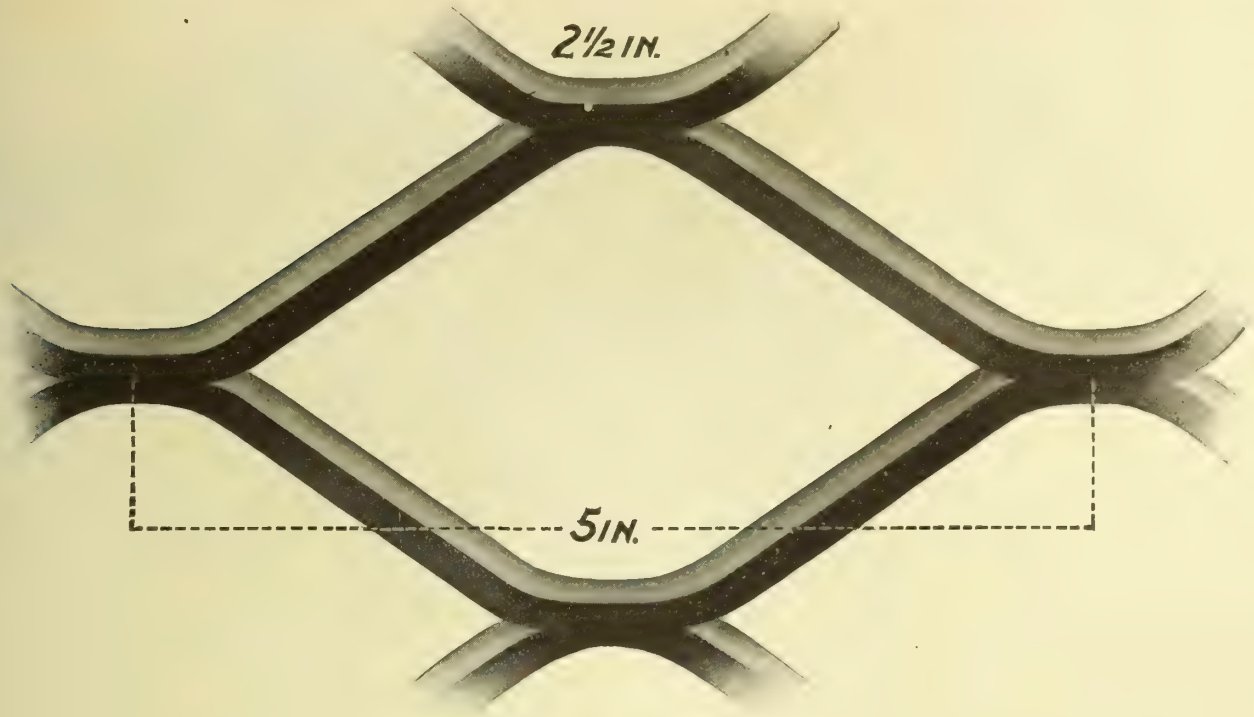


FIG. 10. "YOUNGSTOWN" EXPANDED METAL (FULL SIZE)

"Youngstown" Expanded Metal.

Our "Youngstown" Expanded Metal (Fig. 10) is used for reinforcing concrete, also in the manufacture of metal lockers, etc. It is made in different gauges and meshes, as shown in tables below.

Standard sizes, 6 feet wide, 10 feet long.

ULTIMATE TENSILE STRENGTH OF "YOUNGSTOWN" EXPANDED METAL

Gauge	
	3½-inch x 7-inch Mesh
7	1050 to 1250 pounds per sq. in.
10	750 to 925 pounds per sq. in.
12	620 to 750 pounds per sq. in.
	2½-inch x 5-inch Mesh
7	1300 to 1580 pounds per sq. in.
10	935 to 1140 pounds per sq. in.
12	760 to 930 pounds per sq. in.
16	430 to 530 pounds per sq. in.
	1½-inch x 3-inch Mesh
10	1000 to 1220 pounds per sq. in.
12	820 to 1000 pounds per sq. in.
16	465 to 565 pounds per sq. in.
18	370 to 450 pounds per sq. in.

WEIGHTS, MEASURES, ETC., OF "YOUNGSTOWN" EXPANDED METAL AND METAL LATH

Description. Mesh.	Gauge U. S. Standard.	Strand Standard or Extra.	Approximate Sectional Area in Square Inches per Foot of Width.	Approximate Weight per Square Foot in Pounds.	Size of Standard Sheets.	Number of Sheets in a Bundle.	Number of Square Feet in Bundle.
In.	No.				ft. ft.		
5/8	18	Mahoning	.146	.49	4 x 8	5	160
5/8	16	or Standard	.182	.61	4 x 8	5	160
1	20	"	.076	.25	6 x 10	5	300
1	18	"	.098	.33	6 x 10	5	300
2½	10	"	.166	.55	6 x 10	6	360
3	10	"	.180	.61	6 x 10	6	360
3	16	"	.084	.28	6 x 10	6	360
3½	10	"	.139	.46	6 x 10	6	360
1	20	Youngstown	.110	.37	6 x 10	5	300
1	18	or 50%	.132	.44	6 x 10	5	300
1	16	"	.158	.53	6 x 10	5	300
1	13	"	.234	.78	6 x 10	4	240
1½	16	"	.126	.42	6 x 10	6	360
1½	12	"	.216	.72	6 x 10	4	240
1½	10	"	.266	.89	6 x 10	4	240
2½	16	"	.124	.42	5 x 10	6	300
2½	12	"	.192	.64	6 x 10	4	240
2½	10	"	.240	.80	6 x 10	4	240
2½	7	"	.333	1.11	6 x 10	3	180
3½	12	"	.166	.55	6 x 10	4	240
3½	10	"	.206	.69	6 x 10	4	240
3½	7	"	.276	.92	6 x 10	3	180

Duplex Lath.

Duplex Lath is used for floors and roofs as a self-centering reinforcement.

It is used for partitions, side walls and ceilings as a plaster lath, and requires no studding.

The Arched Ribs add the stiffness necessary, and the cupped mesh between the ribs makes the ideal reinforcement for concrete or plaster. The metal is full section longitudinally (no cross cutting) and is therefore all (100 per cent) available for reinforcement.

Continued on next page

As a roofing reinforcement it is applied (by common labor) to the purlins in the same manner as corrugated sheet iron, and can be attached by wiring, or preferably, as shown in the illustration, by bending the cupped mesh around the upper flange of the purlins.

A roof that will compare favorably in price with slate is made of this metal on 4-foot 6-inch, or 5-foot centers, with 1½ inches of concrete on top, and plastered ½ inch on under side.

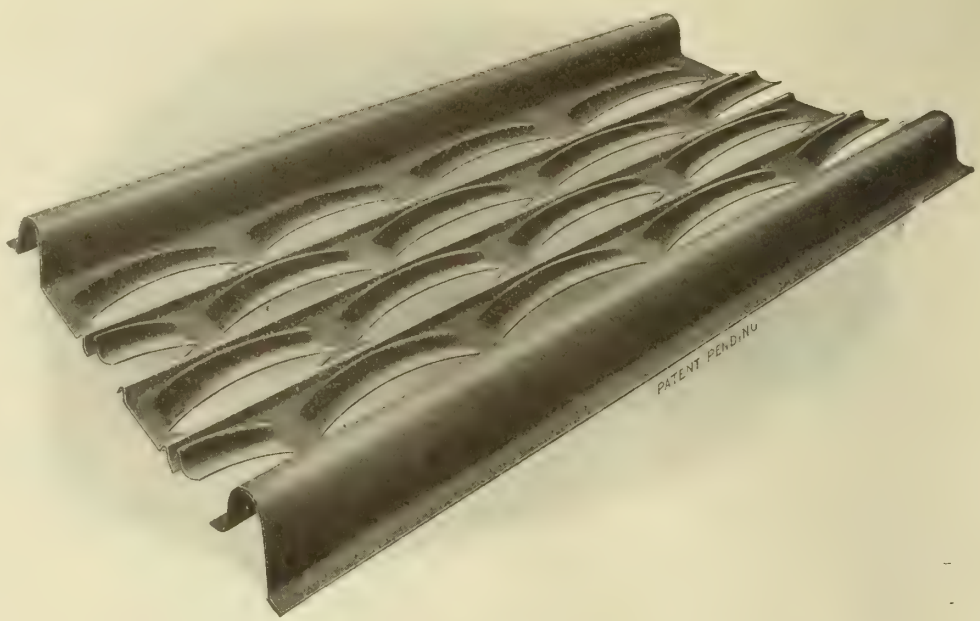


Fig. 11. DUPLEX LATH

Cupped Loops.

Note the large cupped loops, which are too large to entirely fill with concrete when applied to one side only, and consequently make an ideal key for the plaster when finishing under side of roof or floors.

As a lath for solid partitions or side walls it is unexcelled, there being sufficient metal properly formed to give a good key for the plaster on each side.

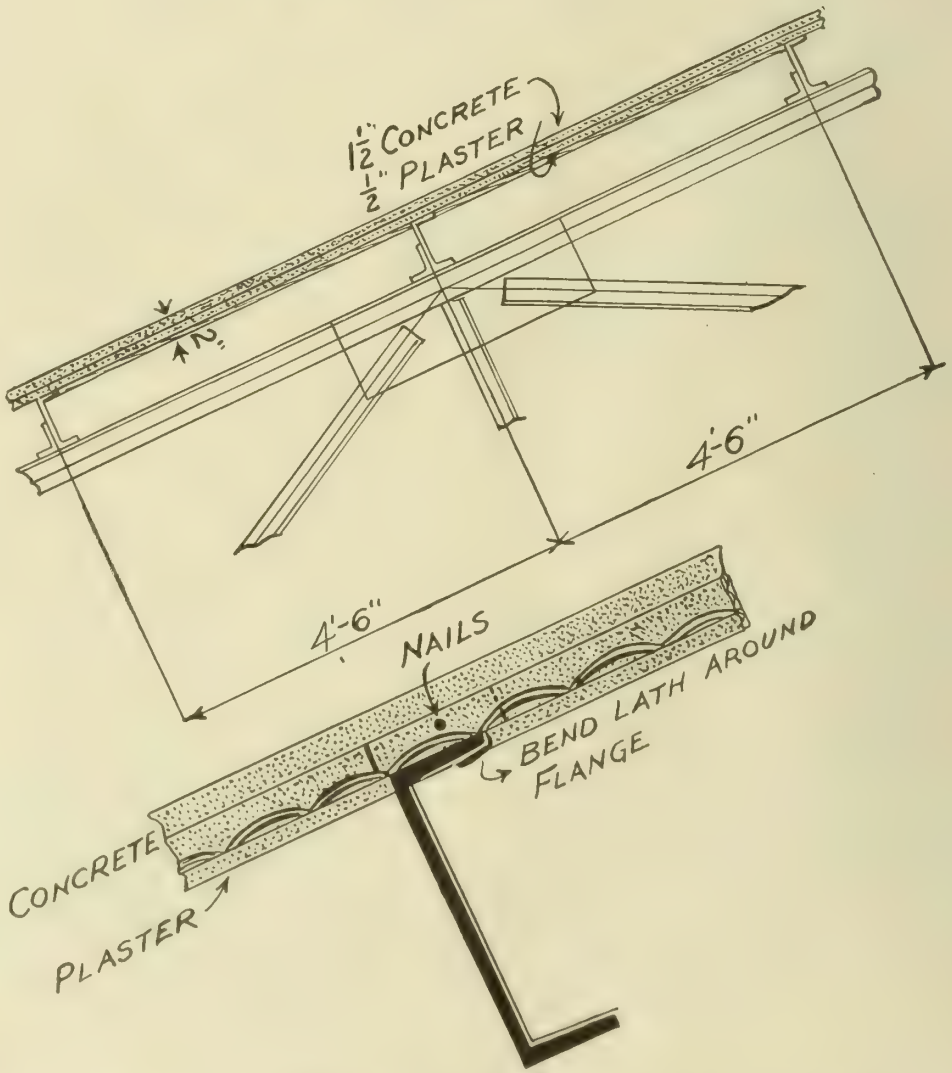
Weight and Area.

Duplex Lath is 23 inches wide, covering 22¼ inches when laid, in lengths of from 4 feet to 12 feet and of Nos. 24, 26 and 28 gauges.

It is made of a stiff Carbon Steel, rolled in our own mills.

Duplex Lath weighs: No. 24 gauge, 137 pounds per square; 26 gauge, 103 pounds per square; 28 gauge, 86 pounds per square.

The sectional area per foot of cross-section is for 24 gauge, .411; 26 gauge, .308; 28 gauge, .257.



Figs. 12 and 13. DUPLEX LATH APPLIED AS ROOFING REINFORCEMENT

PENN METAL COMPANY

Manufacturers of Fireproofing Specialties

201 Devonshire Street
BOSTON, MASS.

SALES OFFICES

NEW YORK, N. Y., 559 West 36th Street PHILADELPHIA, PA., 23rd and Hamilton Streets

Products.

Penco Expanded Metal Lath; Sheet Lath; Metal Studs; Metal Corner Bead; Metal Ground or Base Bead; and Penco Rail Bead.

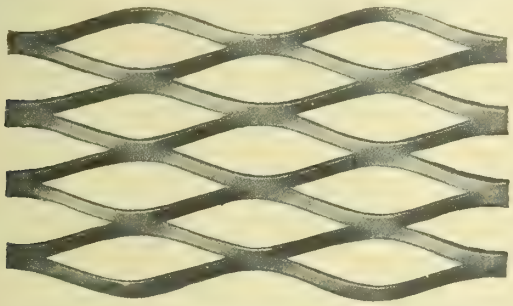
Also, Fire-Doors and Shutters; Metal Ceilings; Metal Siding; Metal Shingles and Roofing; Metal Culverts and Flumes.

TRADE MARK

Penco Expanded Metal Lath.

A perfect metal lath should (1) be rigid; (2) have gauge consistent with span of supports or condition of work required; (3) be sufficiently expanded to allow lath to become thoroughly imbedded in plaster; (4) have wide strand to hold plaster with a proper slant to avoid cutting key (see U. S. Government Specifications for Post Offices); (5) be of a width conveniently handled without extra labor, (6) and in sheets uniform and squared.

All of these essentials are embodied in Penco Expanded Metal Lath, backed by over twenty years' actual service in outside and inside construction.



FULL SIZE SECTION OF PENCO EXPANDED METAL LATH

Furnished Painted or Galvanized, Nos. 22, 24, 25, 26, 27 gauges. Also made from No. 24 gauge Hampton rust-resisting metal in sheets 24 x 96 inches. Packed in convenient bundles of nine sheets, or sixteen square yards. Wide slanting strand does not cut key of plaster; it allows plaster to be spread on strand and through meshes, making Penco lath a reinforcement, and not a background for plaster

Penco Metal Stud.

Low in first cost. Easily and quickly erected. Made for suspended ceilings, furring and solid and hollow partitions.

Penco U-Studs for furring, suspended ceiling and solid partitions. Made in ten- and twelve-foot lengths.

PENCO U-STUD OR WALL FURRING

PENCO CHANNEL OR HOLLOW PARTITION STUD

Fireproof Partition Construction.

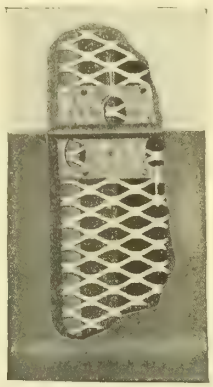
Penco metal lath and studding or channels plastered and back-plastered give a fire- and sound-proof partition at less cost than brick, tile, block or concrete.

Air "insulation" in hollow partitions does not retard sound, but transmits it; greater sound-resistance does not necessarily follow an increase in thickness of partition. See "Kidder's Handbook," "Fireproof Partitions," in which an account is given of a test in Chicago; in which a 2-inch solid plaster partition (metal lath and angles) was found to rank higher than double studding (hollow partitions), or a 4-inch porous partition of hollow block 5¼ inches thick over all.

In the great Baltimore fire metal lath and plaster partitions, though somewhat distorted and buckled, still remained to hold back the spread of the fire, while partitions of other types failed by crushing from their own expansion.

Penco Metal Beads.

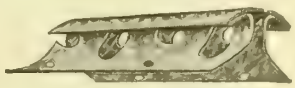
Penco Bead is formed over a micrometered die that makes a positive straight edge.



SHOWING APPLICATION OF PENCO NO. 3 METAL GROUND BEAD

PENCO PRONG STUD AND PENCO METAL LATH, SINGLE PARTITION

PENCO NO. 2 METAL CORNER BEAD



PENCO NO. 4 BULL-NOSE CORNER BEAD

PENCO NO. 6 RAIL BEAD

No. 2 Metal Corner Bead is made in lengths 6, 7, 8, 8½, 9, 10 and 12 feet, galvanized. Weight (bundled), 235 lbs. 1000 feet.

No. 3 Metal Ground or Base Bead gives a wall joint between plaster and cement or tile. Construction is non-shrinking and solid. Made in a number of sizes in 10-foot lengths, to suit all plaster thicknesses. Weight, 247 lbs. 1000 feet.

Penco No. 4 Bull Nose Corner Bead is for hospitals and public buildings; makes a large rounded corner at less cost than an all plaster corner. Weight, 368 lbs. 1000 feet.

Rail Bead No. 6 is adjustable for any depth of grounds; made in lengths of 6, 7, 8, 9, 10 and 12 feet. One clip furnished with each foot of rail. Clips may be firmly locked onto the rail and fastened into mortar between bricks or tile. Packed 25 pieces to a bundle. Weight, including clips, 225 lbs. 1000 feet. Clips in cartons of 100 and 500.

UNION METAL CORNER CO.

1301-1345 Columbus Avenue
BOSTON, MASS.

FACTORY
EAST DEDHAM, MASS.

Products.

Manufacturers of UNION, HANNON, HUB, HOSPITAL, and SPLAY METAL CORNER BEADS; HANNON "OUTERSITE" METAL PICTURE MOULDING; HANNON METAL BASE GROUNDS.

Union and Hannon Metal Corner Beads.

Because of their excellence, Union and Hannon Beads are specified everywhere for buildings of the highest class. Moreover, their reasonable cost permits their use for inexpensive buildings also; in fact, these beads are used today to protect the plastered corners in all kinds of fireproof and non-fireproof construction.

The fact that for one fifth of a century the UNION METAL CORNER CO. has manufactured metal beads exclusively, bespeaks the high standard that the Company maintains.

Monuments of architectural efficiency, like the Custom House, Boston, and the new Technology Buildings, Cambridge (of which Peabody & Stearns were the architects), prove conclusively the high opinion in which these beads are held by architects and experts in building construction.

Every plaster or cement corner, either inside or outside of buildings, should be protected and made damage-proof by using one of our metal corners. Broken, rough-looking corners are unsightly.

Advantages—Our metal corner beads are superior for the following reasons:

Perfectly true and straight, because a folded edge is naturally straight.

Straddle the corner, giving it a double continuous bearing. This makes the corner strong and rigid, and prevents cracking of plaster when struck a hard blow.

Unusually strong plaster key that locks the plaster firmly, making a solid corner of steel and plaster.

Sizes—The Hannon Bead is made in the following face widths:

No. 1 bead	½-inch face	No. 5 bead	1¼-inch face
No. 2 bead	½-inch face	No. 6 bead	1½-inch face
No. 3 bead	¾-inch face	No. 7 bead	1¾-inch face
No. 4 bead	1 -inch face	No. 8 bead	2 -inch face

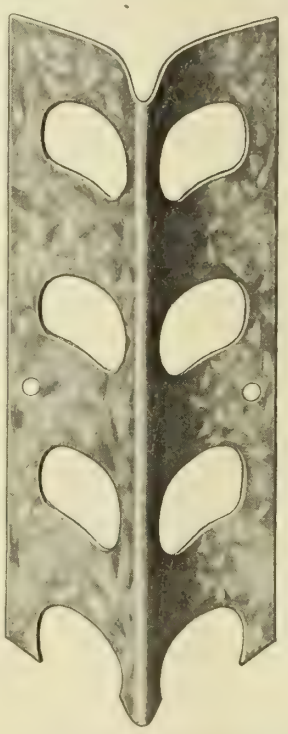
Please specify by name and number.

References—Some of the buildings in which Union or Hannon Beads were used, and architects by whom they were specified:

Muitomah County Court House, San Francisco, Cal., Whidden & Lewis
Board of Trade, San Francisco, Cal., D. C. Lewis
Alexandria Hotel, Los Angeles, Cal., Parkinson & Bergstrom
Van Nuys Building, Los Angeles, Cal., Morgan, Walls & Morgan
L. C. Smith Building (42 stories), Seattle, Wash., Gaggin & Gaggin, Syracuse, N. Y.
Residence, G. A. French, Duluth, Minn., F. W. Perkins
Lever Building (22 stories), Chicago, Ill., A. L. Alschuler
Woolworth Building, New York, N. Y., Cass Gilbert
Altman Building, New York, N. Y., Trowbridge & Livingston
Peoples' Bank Building, Chester, S. C., J. S. Starr
Cumberland Lodge, Nashville, Tenn., A. Norton
Macon Savings Bank, Macon, Ga., P. E. Dennis
New Haven County Court House, New Haven, Conn., Allen & Williams
Post Office Buildings in the following cities: Winchester, Tenn.; Pulaski, Tenn.; Granada, Miss.; Canton, Miss.; Bryan, Texas; Miami, Fla.; Gary, Ind.

Buildings in which Hannon Number 4 Metal Beads were used:

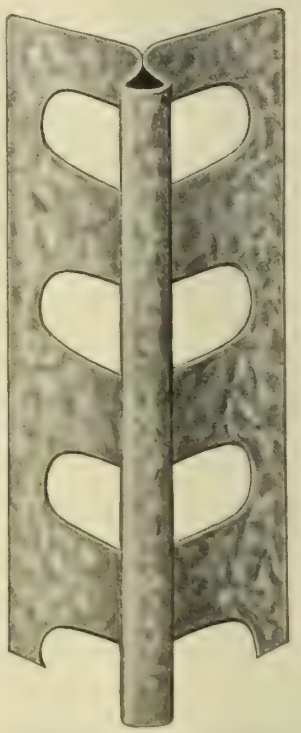
Epileptic Colony Buildings, Dixon, Ill., James B. Dibelka
Mission Hospital, Asheville, N. C., W. H. Lord
Psychopathic Hospital, Boston, Mass., Kendall, Taylor & Co.



UNION METAL CORNER BEAD

Made in lengths of 6, 7, 8, 8½, 9, 9½ and 10 feet

Use ¾-inch on Wood Stud; ⅜-inch over Wood Lath; ⅝-inch on Fireproof Construction, such as brick, wire, terra cotta, iron, expanded metal, etc. Ideal for arch work



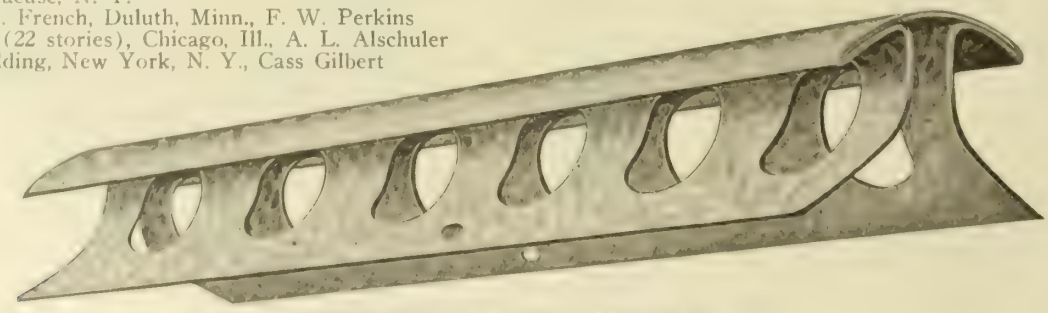
HANNON NUMBER 1 METAL CORNER BEAD

Made in lengths 6, 7, 8, 8½, 9, 9½ and 10 feet

Supplied in one size plaster ground only, ⅜ inch

Not intended for Wood Stud, but for use over Wood Lath, or where a ⅜-inch plaster ground is wanted

Clips for Beads—If desired, flat, annealed iron clips, 3¼ by 1¼ ins., will be supplied for use on beads. Useful for badly broken terra cotta construction; allow plaster grounds of any size. Suitable for any of our metal corners



HANNON NUMBER 4 METAL CORNER BEAD
One inch face width
In hospitals, where practicable to use a sharp corner, hospitals, nurseries, homes for aged, etc.—we recommend Hannon Number 4 Bead

Continued on next page

Hannon "Outersite" Metal Picture Moulding.

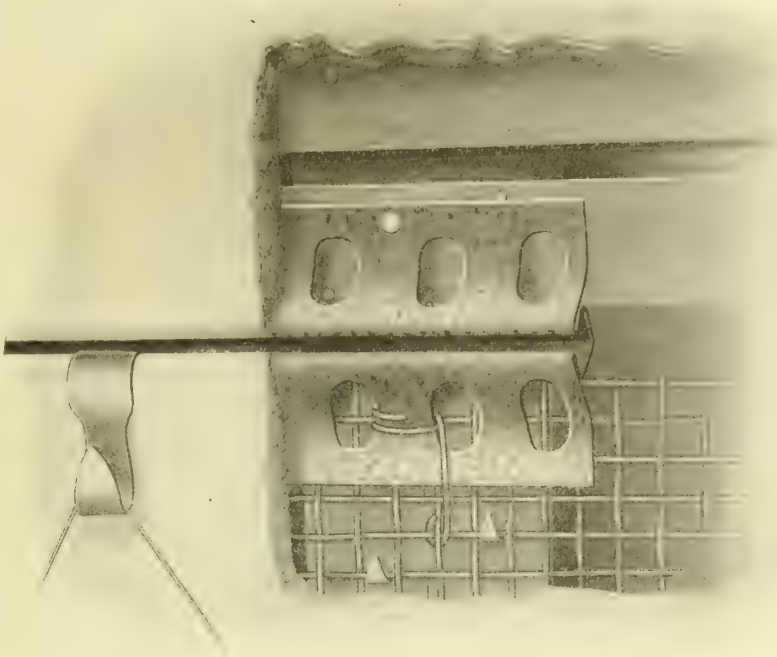
The Hannon "Outersite" Metal Picture Moulding is formed from one piece of heavy metal, so folded as to make two parallel edges one eighth inch apart; and perforated to form a perfect key for the plaster and to permit its being fastened to any form of construction.

When plastered to the edges, as shown in illustration, the moulding is out of sight ("outersite"), making a strong, lasting and thoroughly sanitary picture moulding. It also forms the top plaster ground, thereby serving two useful purposes.

"Outersite" should be specified for all schools, public buildings, private and public art galleries—in fact wherever large pictures are to be hung.

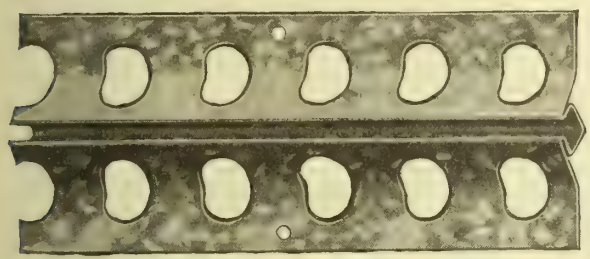
Will support a weight of 1000 pounds to the foot. Made in one length only, ten feet; width, two and one half inches.

Shipped in wooden crates, the capacity of each crate being fifty pieces (500 feet) of moulding.



"OUTERSITE" PLASTERED
Showing Hook Inserted
Hooks can be placed wherever desired

HANNON "OUTERSITE" METAL PICTURE MOULDING
An Invisible Moulding
Above section shows "Outersite" applied to wood-lath (upper half) and to wire (lower half). Can be used on any kind of fireproof construction



"OUTERSITE" METAL PICTURE MOULDING

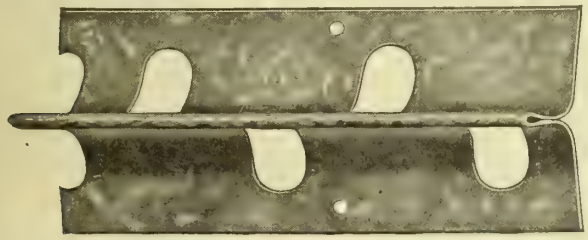
They maintain a uniform thickness on both sides of dividing point (note thickness of plaster and flooring compound in illustration). Furthermore, the alternating holes give to these grounds the resisting power of a solid piece of metal, and absolutely prevent the admixture of the base compound with the plaster.

References—"Outersite" was specified for the following buildings and used in their construction:

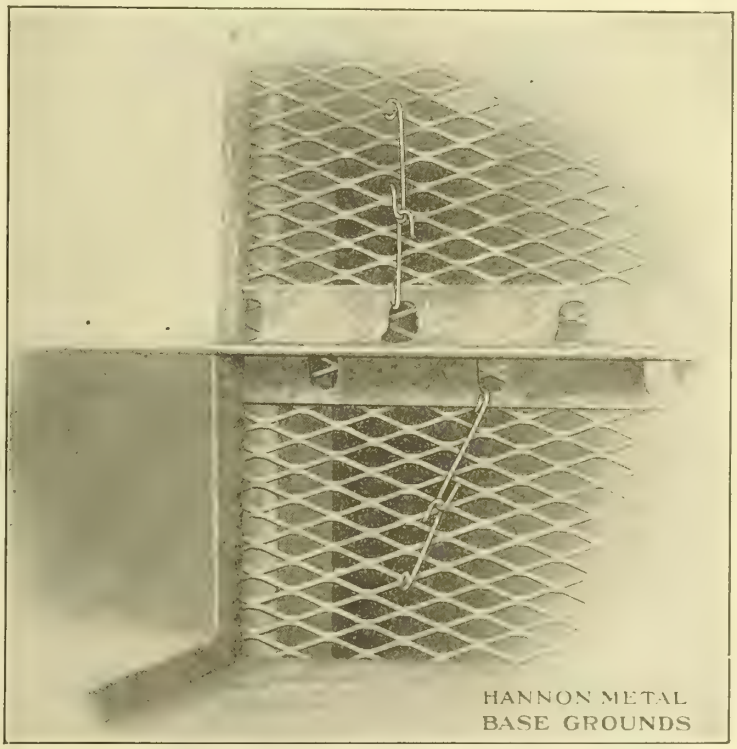
Jefferson School Building, Tampa, Fla., F. J. Kennard
Rock Springs High School, Rock Springs, Wyo., D. D. Spani
Kenyon College, Gambier, Ohio, C. F. Schweinfurth
Willoughby High School, Willoughby, Ohio, Franz Warner
Charles Vernon Gridley School, Erie, Pa., Wm. B. Ittner
High School, Girard, Kan., J. H. Felt & Co.
Bruce Dodson Building, Kansas City, Mo., J. H. Martling

Hannon Metal Base Grounds (or Separations).

Hannon Metal Base Grounds do not permit the plaster to run to a V point, so easily liable to crack or chip.



Length, 10 feet only; width, 2¼ inches. Sizes: ⅜ inch and ⅝ inch grounds. Shipped in crates, capacity 500 feet



Separates plastered wall from mastic base

HANNON METAL BASE GROUNDS (OR SEPARATIONS)

Sanitary, and necessary in modern fireproof construction. Otis & Clark specified Hannon Metal Base Grounds for the Municipal Tuberculosis Sanitarium, Chicago, Ill.

THE BERGER MANUFACTURING CO.

Manufacturers of Corner Beads, all Styles, and A General Line of Pressed Steel Building Specialties

CANTON, OHIO

BRANCHES

NEW YORK, N. Y., S. E. Cor. 22nd Street and 11th Avenue
PHILADELPHIA, PA., Corner 16th Street and Washington Avenue
SOUTH BOSTON, MASS., 160-166 Broadway Extension
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., 16 South Tenth Street
MINNEAPOLIS, MINN., 300-312 10th Avenue South
SAN FRANCISCO, CAL., 1120 Mission Street

Products.

CORNER BEADS.

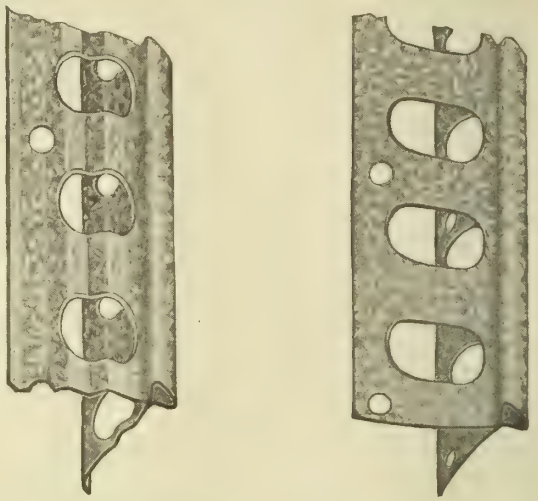
See our name in General Index for Steel Ceilings, Concrete Reinforcement, Steel Cores, Sidewalk Lights, Metal Lumber, Steel Building Materials.

Berger Corner Beads.

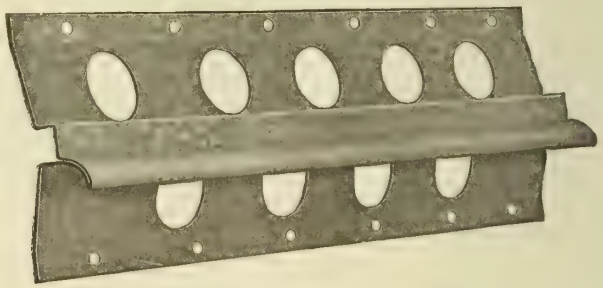
Berger Corner Beads more than offset the cost of their erection by the ease with which the plastered corner may be finished out. At the same time, they give protection against chipping or breaking of corner.

Types—Made in two types: Large or wing, and small or rail; the latter with clips, and the former with or without. For hollow blocks or bricks or any rough corners, use corner beads with clips.

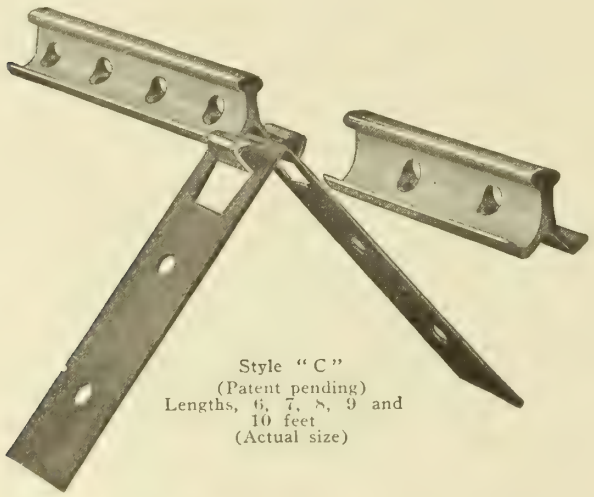
Material—Always galvanized; and either made from galvanized sheets, or galvanized after punched and formed.



Style "F" (Ribbed Point) Style "E"
BERGER'S CORNER BEADS
Both styles used either with or without clips



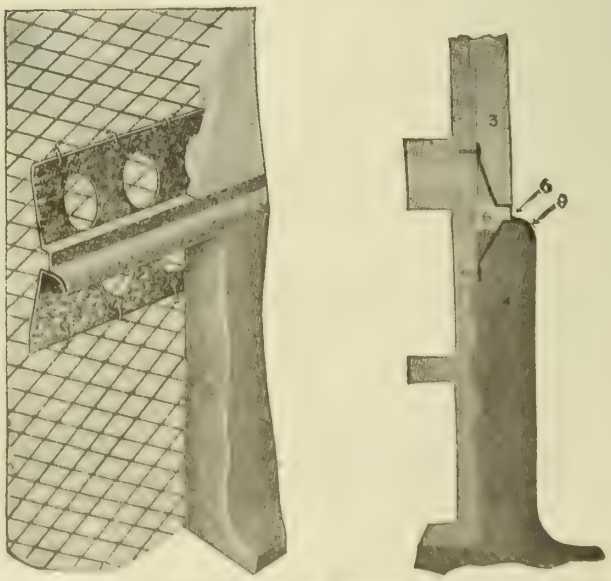
CURVED POINT METAL BASE SCREED



Style "C"
(Patent pending)
Lengths, 6, 7, 8, 9 and 10 feet
(Actual size)

Style "A"
(Patented)
Corner set and rigid
(Actual size)

BERGER'S CORNER BEADS



SECTIONAL VIEW SHOWING APPLICATION OF SCREED
Screed applied over metal lath. Plaster above and cement base below

PAGE WOVEN WIRE FENCE COMPANY

Manufacturers of Special Process Reinforcing Material

OFFICES AND MILLS
MONESSEN, PA.

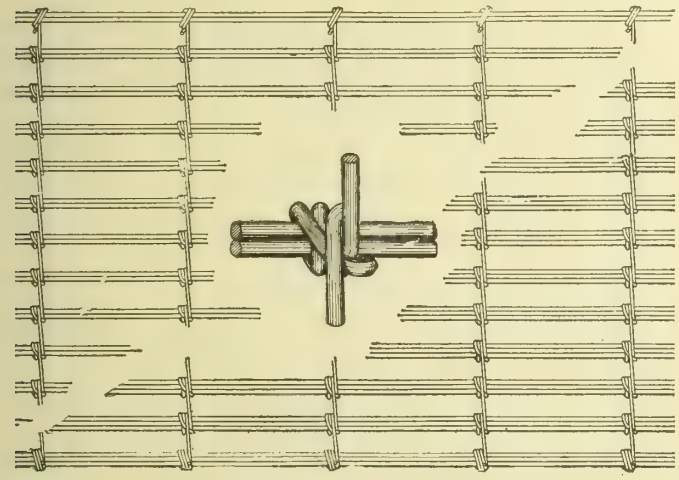
Products.

Special Process Reinforcing Fabric; Page Wall Ties; Wrought-Iron Work of all Kinds; Gates and Fencing, Ornamental Fencing, Animal Cages for Zoological Gardens.

Also, Fire Escapes, Arches, Awnings, Porches, Grille Work, Signs, Railings, Area Gratings, Hitching Posts, etc.; Farm Fencing.

Advantages.

Even distribution of metal. Absolute continuity. Distributed tension. Ease of installation. Highest elastic limits. Highest ultimate strength. Economy in first cost. And saves you money, while affording better construction.



PAGE WOVEN-WIRE REINFORCING FABRIC

Page Concrete Reinforcing Fabrics.

Page Fabrics are made in a large variety of designs and can be supplied in both Special Process and Mild Steel grades.

Special Process—This grade has a guaranteed ultimate strength of 150,000 pounds per square inch of steel, and it is also guaranteed to be uniform and free from brittleness.

Mild Steel Fabric—This fabric is made of a mild open-hearth steel, and by our special method of fabrication it has the advantage of furnishing the required amount of metal placed in such a manner as to secure the maximum bonding surface, eliminating the undesirable features of cabled wire.

The table at the bottom of this page gives interesting data relative to many of our designs, and special designs can be furnished on application.

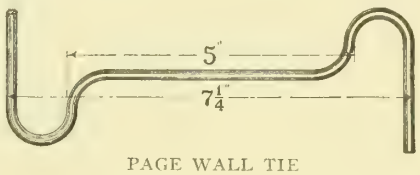
Samples, etc.

Samples of wire for testing purposes will be gladly forwarded to you on request.

Builders can save at least 33 1/3 per cent by the use of the Page Special Process Reinforcing Fabric, and at the same time secure greater reinforcing values

Page Wall Ties.

The Page Ties for bonds are scientifically correct and offer the greatest resistance of any bond now sold. They can not be started without breaking the bond at all points, and when imbedded in the mortar an initial movement is practically impossible without breaking the tie; as the tie is made of the best double strength wire, it will not break; hence, we claim a perfect bond.



PAGE WALL TIE

Tests.

Tests made for the New York Department of Buildings by Prof. James S. MacGregor of Columbia University, under W. N. Wight & Co.'s system of fireproofing, produced the following high results:

Concrete made of one part Portland Cement, two parts sand and five parts steam cinders. Stone concrete would have produced still better results. Loads were applied so as to prevent arching effect.

Style Fabric	Span	Thickness of Slab	Sectional Area of Fabric per Foot Width	Ultimate Load per Sq. Ft. of Slab
12–A	6 ft.	4 in.	0.0346 sq. in.	1330 lbs.
9–A	6 ft.	4 in.	0.0688 sq. in.	3270 lbs.
11–A	7 ft.	4 in.	0.0452 sq. in.	1500 lbs.
9–A	7 ft.	4 in.	0.0688 sq. in.	1795 lbs.
11–A	8 ft.	5 in.	0.0452 sq. in.	1440 lbs.

Note—On the basis of above official tests the New York Building Departments have allowed us a working load based on a safety factor of *ten*, thus giving greater safety for the same weights per square foot than is allowed other material.

Fabric No.	No. Wires Each Longitudinal	Size Wires Each Longitudinal	Sectional Area Each Longitudinal	Gauge Cross Wires	Area of Cross Section per Ft. Width of Fabric—Sq. In.	Weight per 100 Sq.Ft.	Fabric No.	No. Wires Each Longitudinal	Size Wires Each Longitudinal	Sectional Area Each Longitudinal	Gauge Cross Wires	Area of Cross Section per Ft. Width of Fabric—Sq. In.	Weight per 100 Sq.Ft.
14 A	1	14	.00503	14	.02012	11.04	29 A	2	9	.03456	14	.13824	55.58
13 A	1	13	.00658	14	.02632	12.91	29 B	2	9	.03456	12	.13824	59.60
12 A	1	12	.00875	14	.03500	15.85	7 1/2 A	1	7 1/2	.02261	14	.09044	37.50
12 B	1	12	.00875	12	.03500	18.44	7 1/2 B	1	7 1/2	.02261	12	.09044	40.42
11 A	1	11	.01141	14	.04564	17.47	27 1/2 A	2	7 1/2	.04522	14	.18088	70.88
11 B	1	11	.01141	12	.04564	20.34	27 1/2 B	2	7 1/2	.04522	12	.18088	76.04
9 1/2 A	1	9 1/2	.01561	14	.06244	27.72	7 A	1	7	.02461	14	.09844	39.48
9 1/2 B	1	9 1/2	.01561	12	.06244	30.75	7 B	1	7	.02461	12	.09844	42.84
9 A	1	9	.01728	14	.06912	28.60	27 A	2	7	.04922	14	.19688	77.54
9 B	1	9	.01728	12	.06912	31.78	27 B	2	7	.04922	12	.19688	82.32

Regular rolls 150, 300, 450 and 600 feet in length. Made in widths of any multiple of 3 inches from 18 inches to 54 inches. Special sizes on orders of 100,000 square feet or over.

AMERICAN STEEL & WIRE CO.

MANUFACTURERS OF

Triangle Mesh Concrete Reinforcement

CHICAGO NEW YORK PITTSBURGH CLEVELAND DENVER

EXPORT REPRESENTATIVES, U. S. Steel Products Co., 30 Church Street, New York

PACIFIC COAST REPRESENTATIVES, U. S. Steel Products Co., San Francisco, Los Angeles, Portland, Seattle

Product.

Triangle Mesh Concrete Reinforcement.

Uses.

Triangle Mesh Steel Wire Reinforcement is used for Floor and Roof Slabs, Sewer, Water and Culvert Pipe, Pavements and Roadways, River Revetment, Silos, Fireproofing, Steel Framing, Bridge Floors and Reservoirs.

Description.

Triangle Mesh Woven Wire Reinforcement for Concrete is made with either solid or stranded longitudinal members, properly spaced by means of diagonal cross wires, so arranged as to form a series of triangles between the longitudinal or tension members; the longitudinal members being spaced four inches, the cross wires either two or four inches as desired, providing either a two- or four-inch mesh. The sizes of both longitudinals and cross wires are varied in order to provide the cross-sectional areas of steel required to meet the conditions.

Advantages.

(1) Provides even distribution of steel.

(2) Reinforces in every direction.

(3) Tension or carrying members accurately spaced.

(4) Low cost of inspection.

(5) Properly distributes over a large area stresses due to concentrated load.

(6) Due to cold drawing, higher elastic limits and ultimate strengths with same quality of steel.

(7) Continuous action from one end of the structure to the other.

(8) Impossible to leave out or otherwise reduce the necessary steel, if specific style number of fabric or area of steel is specified.

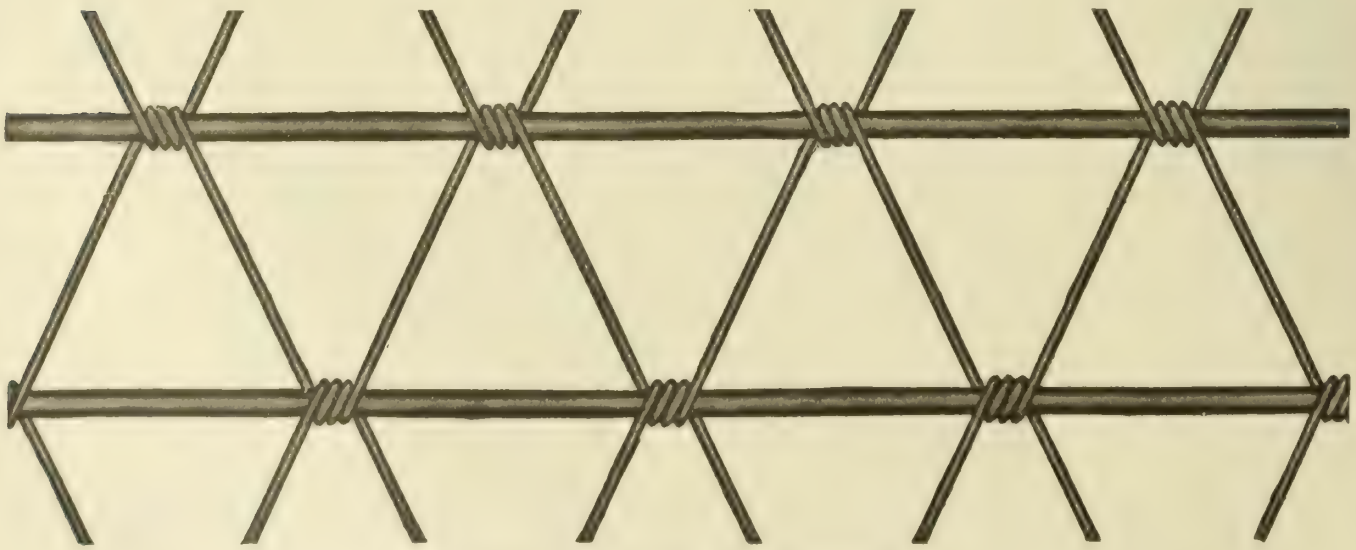
(9) Perfect mechanical bond.

(10) Easily handled and stored on the work.

(11) Minimum cost of installation.

(12) It is the only design of woven wire fabric in which the cross wires assist the longitudinal or tension members in carrying the load.

(13) By using stranded longitudinals in the heavy fabrics the necessary strength is furnished, and the finished material is more flexible and therefore more easily handled from the rolls.



TRIANGLE MESH CONCRETE REINFORCEMENT
Solid Longitudinals

Continued on next page

Grade of Steel.

High carbon, high tensile strength steel has its advantages over the low carbon low tensile strength steel mainly because of the higher allowable working stresses; therefore, a smaller sectional area of steel is required, or, with the same sectional area of steel an added factor of safety is secured.

The main disadvantage to a high carbon product is the stiff, brittle nature of the material.

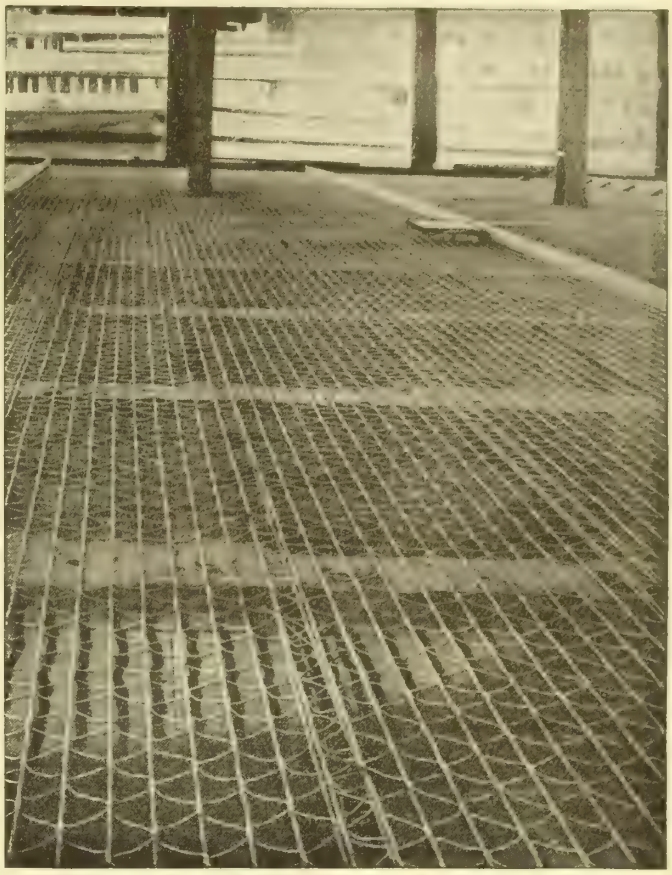
By cold drawing a mild steel, the advantages of the high carbon steel are secured with an elimination of the disadvantages.

Triangle Mesh Reinforcement is manufactured from a cold-drawn mild steel having an ultimate tensile strength of at least 85,000 pounds per square inch. Higher or lower strengths can be furnished if desired.

Galvanizing.

Triangle Mesh Reinforcement can be furnished either plain or galvanized. Except for special cases, such as when used in cinder or slag concrete, the plain material is preferable, as the adhesion of the concrete is then directly to the steel and not to a coating.

Galvanized material must of necessity cost more, and since nothing is added to the strength of the finished construction, this increased cost is not justified.



PIER 42, NORTH RIVER, 56,000 SQUARE FEET, STYLE 40, TRIANGLE MESH REINFORCEMENT USED

Note the large area of reinforcement with its heavy stranded longitudinals. Excellent results obtained with minimum installation cost

DATA, VARIOUS STYLES TRIANGLE MESH REINFORCEMENT

NUMBER AND GAUGE OF WIRES, AREAS PER FOOT WIDTH, AND WEIGHTS PER 100 SQUARE FEET.

Longitudinals Spaced 4-inches
Cross Wires Spaced 4-inches

Style Number	No. of Wires Each, Longitudinal	Gauge of Wire Each, Longitudinal	Gauge of Cross Wires	Sectional Area Longitudinal, Sq. In.	Sectional Area Cross Wires, per Ft. Width	Cross-Sectional Area, per Ft. Width	Approximate Weight, per 100 Sq. Ft.
* 4	1	6	14	.087	.025	.102	43
* 5	1	8	14	.062	.025	.077	34
* 6	1	10	14	.043	.025	.058	27
* 7	1	12	14	.026	.025	.041	21
*23	1	¼"	12½	.147	.038	.170	72
24	1	4	12½	.119	.038	.142	62
25	1	5	12½	.101	.038	.124	55
*26	1	6	12½	.087	.038	.110	50
*27	1	8	12½	.062	.038	.085	41
*28	1	10	12½	.043	.038	.066	34
*29	1	12	12½	.026	.038	.049	28
*31	2	4	12½	.238	.038	.261	106
*32	2	5	12½	.202	.038	.225	92
33	2	6	12½	.174	.038	.196	82
34	2	8	12½	.124	.038	.146	63
35	2	10	12½	.086	.038	.109	50
36	2	12	12½	.052	.038	.075	37
*38	3	4	12½	.358	.038	.380	151
39	3	5	12½	.303	.038	.325	130
*40	3	6	12½	.260	.038	.283	114
41	3	8	12½	.185	.038	.208	87
*42	3	10	12½	.129	.038	.151	66
43	3	12	12½	.078	.038	.101	47

Longitudinals Spaced 4-inches
Cross Wires Spaced 2-inches

Style Number	No. of Wires Each, Longitudinal	Gauge of Wire Each, Longitudinal	Gauge of Cross Wires	Sectional Area Longitudinal, Sq. In.	Sectional Area Cross Wires, per Ft. Width	Cross-Sectional Area, per Ft. Width	Approximate Weight, per 100 Sq. Ft.
4-A	1	6	14	.087	.050	.102	53
5-A	1	8	14	.062	.050	.077	44
6-A	1	10	14	.043	.050	.058	37
* 7-A	1	12	14	.026	.050	.041	31
23-A	1	¼"	12½	.147	.076	.170	86
24-A	1	4	12½	.119	.076	.142	76
25-A	1	5	12½	.101	.076	.124	70
26-A	1	6	12½	.087	.076	.110	64
27-A	1	8	12½	.062	.076	.085	55
28-A	1	10	12½	.043	.076	.066	48
29-A	1	12	12½	.026	.076	.049	42
31-A	2	4	12½	.238	.076	.261	120
32-A	2	5	12½	.202	.076	.225	107
33-A	2	6	12½	.174	.076	.196	97
34-A	2	8	12½	.124	.076	.146	78
35-A	2	10	12½	.086	.076	.109	64
36-A	2	12	12½	.052	.076	.075	52
38-A	3	4	12½	.358	.076	.380	165
39-A	3	5	12½	.303	.076	.325	145
40-A	3	6	12½	.260	.076	.283	129
41-A	3	8	12½	.185	.076	.208	101
42-A	3	10	12½	.129	.076	.151	81
43-A	3	12	12½	.078	.076	.101	62

Styles Marked * usually carried in stock.

Length of Rolls: 150 ft., 200 ft., and 300 ft. Widths: 18 in., 22 in., 26 in., 30 in., 34 in., 38 in., 42 in., 46 in., 50 in., 54 in. and 58 in.

NOTE.—Material may be furnished either plain or galvanized. Unless otherwise specified, shipments will be made of material not galvanized. Stock material usually carried in 150-foot rolls and 42-inch, 50-inch and 58-inch widths.

CLINTON WIRE CLOTH COMPANY

MANUFACTURERS OF

Electrically Welded Wire Fabrics

CLINTON, MASS.

BRANCH OFFICES

BOSTON, 508 Sears Building — NEW YORK, 55 Duane Street — CHICAGO, 342 River Street

DISTRIBUTORS OF CLINTON ELECTRICALLY WELDED WIRE

BOSTON, Dillaby Fireproofing Co.
NEW YORK, Albert Oliver & Son, Inc.
WASHINGTON, C. A. Hofferberth
MEMPHIS, Fisher Lime & Cement Co.
SAN ANTONIO, Moody & Hormann
SAN FRANCISCO, L. A. Norris Co.
LOS ANGELES, L. A. Norris Co.
PORTLAND, ORE., L. A. Norris Co.
SEATTLE, L. A. Norris Co.

AND BUILDING AND MASONRY SUPPLY CONCERNS IN PRINCIPAL CITIES

MONTREAL, OSHAWA, TORONTO, WINNIPEG, CAN., Pedlar People, Ltd.
VANCOUVER, B. C., L. A. Norris Co.

Products.

"Clinton" Electrically Welded Wire Fabrics for Reinforcing Concrete; "Clin-Truss" Welded Wire Wall Furring; "Clinton" Woven Wire Lath, and "Clinton" Welded Sheathing for Interior Plastering and Stucco Work; Wire Cloth, Netting, and Distributors for "Hunt" Metal Corner Bead.

For Perforated Metals of every description and Grilles, see our name in General Index.

Electrically Welded Wire Fabric.

Description—Clinton Electrically Welded Wire Fabric is a wire mesh made up of a series of parallel longitudinal wires, spaced certain distances apart and held at intervals by means of transverse wires arranged at right angles to the longitudinal ones, and cross-welded to them by means of a patented electrical process.

The Wire—The material is fabricated from a special grade of good quality steel wire possessing such strength, elasticity and ductility as to render it especially adapted for reinforcing concrete. The wire will develop an average ultimate strength of 70,000 to 80,000 pounds, with a maximum in some cases of 85,000 pounds per square inch; while innumerable tests and investigations have conclusively proved that the process of welding does not in any way lessen the tensile strength of the longitudinal wires.

The Electric Weld—The mesh is not formed by loops, twists or clips, but the intersecting wires are cross-welded, and actually fused together by electricity, producing thereby an immovable connection between the wires, which at all times assures a rigid mesh, regardless of the size and shape in which the fabric may be used.

THE CLINTON ELECTRIC WELD

In the wire the two wires have been cut through at their point of union, revealing a perfectly smooth surface. It is a perfect weld, the two wires are actually fused together

The Rectangular Mesh—The Mesh is rectangular, with no zigzag, crisscross woven members to ravel out when the fabric is being handled. The wires intersect at right angles with a clean cut intersection, without any knobs or lumps to obstruct the free passage of the concrete, which feature assures always a dense concrete free from voids covering all parts of the reinforcement. Clinton Electrically Welded Wire Fabric, affording as it does an efficient transverse as well as longitudinal reinforcement, prevents cracking due to changes in temperature, and provides a perfect network of steel which knits and binds the concrete together, reinforcing it securely in all directions. In floor slabs, designed and estimated on the basis of distributed loads, this is a most important factor in enabling a slab to receive a very heavy load upon a small area of floor.

The Perfect Bond—There is perfect adhesion of the concrete to Clinton Fabric. The transverse strands, which may be of much heavier gauge than can be used in any type of woven or twisted fabric, are securely welded at right angles to the longitudinal strands, and thus provide absolute anchorage against movement of the fabric in the concrete.

Unbroken Continuity—As used in floor and roof slabs, the fabric comes to the work in rolls of any desired length, and may be laid in continuous unbroken sheets over all spans from one side of the building to the other, obtaining thereby a perfect unbroken sheet of reinforcement extending through every span, with no laps, no splices, and no danger of misplaced steel.

Ease and Accuracy of Installation—Through the absolute welded union of transverse and longitudinal wires, the reinforcing strands of Clinton Electrically Welded Wire Fabric are spaced on exact centers. The spacing is established by machinery at the factory, and it is impossible for the relative position of the various members to become changed in the slightest degree. This renders the material fool-proof, and enables great quantities of it to be installed in a very short time by the most unskilled labor.

Galvanizing—Clinton Electrically Welded Wire Fabric is thoroughly galvanized before being welded, and is thereby thoroughly protected against rust or corrosion.

Continued on next page

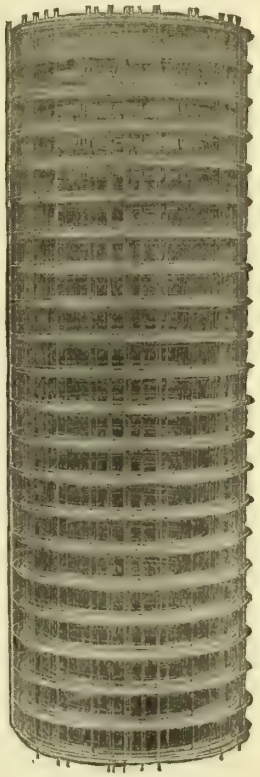
Uses—Combining as it does the distinctive properties of a low carbon steel wire of the best grade with the advantages of an accurate and rigidly fabricated mesh, Clinton Electrically Welded Wire Fabric is a reinforcement especially adapted for floors, roofs, walls, roads, sidewalks, sewers, reservoirs, levees, and in fact every kind of slab construction. The material is used to special advantage in work involving the fireproofing or protection of steel with concrete, as in buildings, bridges, subways and tunnels.

Size of Wire—The longitudinal or transverse strands may consist of Nos. 0 to 12, inclusive, Washburn & Moen gauge galvanized steel wire. When the same size of wire is not required in both members of the fabric, the heavier size can be placed longitudinally or transversely, as may be specified; but there should not be a difference exceeding six numbers in heavy grades, or five numbers in light grades, between the longitudinal and transverse strands.

Spacing of Wires—The longitudinal wires may be spaced on centers of two or more inches in steps of one-half inch. The distance between centers of outside longitudinal wires cannot exceed one hundred inches. The transverse wires can be spaced on centers of one to ten inches, inclusive, in steps of one inch; and on centers of ten to eighteen inches, inclusive, in steps of two inches. They must project at least one-half inch beyond the outside longitudinals, and may, if required, be extended to a maximum length of one hundred and two inches.

Rolls and Sheets—Special lengths of rolls or sheets, as may be required, can be made to order. Rolls may be of any desired length not exceeding four hundred feet in the light grades, depending upon the weight and convenience in handling. Sheets should not exceed 20 by 7½ feet, if shipped in box cars; or 32 by 8 feet, if shipped on flat cars.

How to Specify—In ordering or specifying Clinton Welded Wire Fabric, it is necessary to name merely the mesh and the wires. The longitudinal wires are considered as those running lengthwise of the sheet or roll, and their spacing and size are mentioned first. Thus, to indicate a fabric in which the longitudinal wires are No. 6 Washburn & Moen gauge spaced three inches on centers, with No. 10 Washburn & Moen gauge transverse wires spaced sixteen inches on centers and welded at right angles to the longitudinal wires, it is sufficient to state:



A ROLL OF CLINTON ELECTRICALLY WELDED WIRE

(Shipped also in sheets if desired)

3 x 16 inch mesh, No. 6 and No. 10 Clinton Welded Wire.

Information—For complete information concerning Clinton Electrically Welded Wire Fabric, write for special publications: "Concrete Floors," containing tables and other data relating to fireproof floor construction; and "Miscellaneous Construction," illustrating the varied uses of Clinton Fabric.

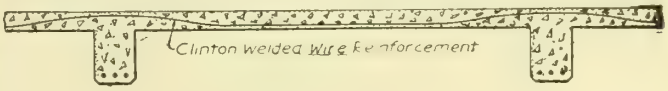
DESCRIPTION OF STOCK GRADES

Longitudinal Wires		Transverse Wires		Based on Longitudinal Wires Only in 1 Ft. of Fabric Width	Description of Rolls		
Spacing, Centers	Size	Spacing, Centers	Size	Sectional Area, Square Inches	Length, Feet	Width, Inches	Weight, Lbs.
2 inch	No. 3	16 inch	No. 8	.2798	150	62	777
3 "	" 3	16 "	" 8	.1865	150	86	746
3 "	" 4	16 "	" 9	.1594	150	86	636
4 "	" 3	16 "	" 8	.1399	150	86	579
3 "	" 5	16 "	" 9	.1346	150	86	545
3 "	" 6	16 "	" 10	.1158	200	86	623
4 "	" 5	16 "	" 9	.1009	150	86	425
3 "	" 7	16 "	" 10	.0984	200	86	537
4 "	" 6	16 "	" 10	.0868	200	86	486
3 "	" 8	12 "	" 10	.0824	200	86	473
3 "	" 8	8 "	" 10	.0824	200	86	509
4 "	" 7	16 "	" 10	.0737	200	86	420
3 "	" 9	12 "	" 11	.0690	200	86	395
4 "	" 8	12 "	" 10	.0618	200	86	378
4 "	" 8	8 "	" 10	.0618	200	86	411
4 "	" 9	12 "	" 11	.0518	200	86	318
5 "	" 12	9 "	" 12	.0209	400	102	385

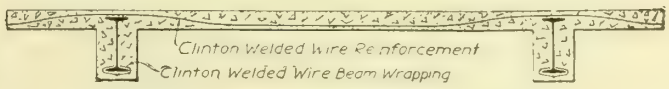
While fabrics listed as "Stock Grades" are those carried in stock, other sizes as desired may be obtained upon special order, as we can supply practically any combination of size and mesh.

Concrete Floor Slabs in New York City.

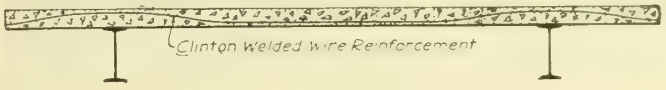
Because of the unaccountable strength of short span slabs, as shown by actual tests, the city of New York, after long consideration of the subject, has adopted a special empirical formula to be used in designing slabs of eight-foot span and less, when confined between steel beams. For these conditions, a minimum thickness of four inches is required; while the actual capacity is determined by the thickness of slab, the conditions of continuity, and the amount and kind of reinforcement used. The new law in New York City fixes this special formula as applicable only to spans of eight feet or less, and also prohibits the use of cinder concrete for spans exceeding eight feet.



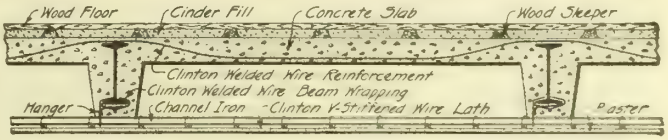
Slab Supported on Concrete Beams



Steel Beams with Complete Concrete Fireproofing



Slab Supported on Top of Steel Beams



Clinton Welded Wire and Clinton Wire Lath in Typical Fireproof Floor and Ceiling Construction

SHOWING USE OF CLINTON WELDED WIRE IN REINFORCING CONCRETE

Continued on next page

The following table has been computed by this special formula for the conditions of continuous wire mesh reinforcement, and the designs shown are, therefore, in accord with the new regulations now in force in New York City.

Write for special booklet "Concrete Floors," or see SWEET'S ENGINEERING CATALOGUE (1915 Edition) for other and more complete tables for designing floor slabs.

SLAB TABLES BASED ON NEW YORK CITY REQUIREMENTS

Span	Thickness of Slab, Ins.	Applied Load Lbs. per Sq. Ft.	Stone Concrete Slabs			Cinder Concrete Slabs		
			Total Load Lbs. per Sq. Ft.	Required Steel Sq. Ins. per Ft. Width	Required Clinton Fabric	Total Load Lbs. per Sq. Ft.	Required Steel Sq. Ins. per Ft. Width	Required Clinton Fabric
4 ft.	4	50	100	.0432	4 x 12 ins. Nos. 9–11	86	.0432	4 x 12 ins. Nos. 9–11
"	4	75	125	.0432	4 x 12 " " 9–11	111	.0432	4 x 12 " " 9–11
"	4	100	150	.0432	4 x 12 " " 9–11	136	.0432	4 x 12 " " 9–11
"	4	125	175	.0432	4 x 12 " " 9–11	161	.0432	4 x 12 " " 9–11
"	4	150	200	.0432	4 x 12 " " 9–11	186	.0432	4 x 12 " " 9–11
"	4	175	225	.0432	4 x 12 " " 9–11	211	.0433	4 x 12 " " 9–11
"	4	200	250	.0445	4 x 12 " " 9–11	236	.0484	4 x 12 " " 9–11
"	4	225	275	.0489	4 x 12 " " 9–11	261	.0535	4 x 12 " " 9–11
"	4	250	300	.0534	4 x 12 " " 8–10	286	.0587	4 x 12 " " 8–10
"	4	275	325	.0578	4 x 12 " " 8–10	311	.0638	4 x 12 " " 8–10
"	4	300	350	.0622	4 x 12 " " 8–10	336	.0689	4 x 16 " " 7–10
5 ft.	4	50	100	.0432	4 x 12 ins. Nos. 9–11	86	.0432	4 x 12 ins. Nos. 9–11
"	4	75	125	.0432	4 x 12 " " 9–11	111	.0432	4 x 12 " " 9–11
"	4	100	150	.0432	4 x 12 " " 9–11	136	.0436	4 x 12 " " 9–11
"	4	125	175	.0486	4 x 12 " " 9–11	161	.0516	4 x 12 " " 9–11
"	4	150	200	.0556	4 x 12 " " 8–10	186	.0597	4 x 12 " " 8–10
"	4	175	225	.0625	4 x 12 " " 8–10	211	.0677	4 x 16 " " 7–10
"	4	200	250	.0695	4 x 16 " " 7–10	236	.0757	3 x 12 " " 8–10
"	4	225	275	.0764	4 x 16 " " 7–10	261	.0837	3 x 12 " " 8–10
"	4	250	300	.0834	4 x 16 " " 6–10	286	.0917	3 x 16 " " 7–10
"	4	275	325	.0903	4 x 16 " " 6–10	311	.0998	3 x 16 " " 7–10
"	4	300	350	.0972	3 x 16 " " 7–10	336	.1078	3 x 16 " " 6–10
6 ft.	4	50	100	.0432	4 x 12 ins. Nos. 9–11	86	.0432	4 x 12 ins. Nos. 9–11
"	4	75	125	.0500	4 x 12 " " 9–11	111	.0513	4 x 12 " " 9–11
"	4	100	150	.0600	4 x 12 " " 8–10	136	.0628	4 x 12 " " 8–10
"	4	125	175	.0700	4 x 16 " " 7–10	161	.0744	4 x 16 " " 7–10
"	4	150	200	.0800	4 x 16 " " 6–10	186	.0859	4 x 16 " " 6–10
"	4	175	225	.0900	4 x 16 " " 6–10	211	.0974	4 x 16 " " 5–9
"	4	200	250	.1000	4 x 16 " " 5–9	236	.1089	3 x 16 " " 6–10
"	4	225	275	.1100	3 x 16 " " 6–10	261	.1205	4 x 16 " " 4–9
"	4	250	300	.1200	4 x 16 " " 4–9	286	.1320	3 x 16 " " 5–9
"	4	275	325	.1300	3 x 16 " " 5–9	311	.1436	2 x 16 " " 7–10
"	4	300	350	.1400	4 x 16 " " 3–8	336	.1551	3 x 16 " " 4–9
7 ft.	4	50	100	.0545	4 x 12 ins. Nos. 8–10	86	.0540	4 x 12 ins. Nos. 8–10
"	4	75	125	.0681	4 x 16 " " 7–10	111	.0697	4 x 16 " " 7–10
"	4	100	150	.0817	4 x 16 " " 6–10	136	.0855	4 x 16 " " 6–10
"	4	125	175	.0953	3 x 16 " " 7–10	161	.1011	4 x 16 " " 5–9
"	4	150	200	.1089	3 x 16 " " 6–10	186	.1168	3 x 16 " " 6–10
"	4	175	225	.1225	4 x 16 " " 4–9	211	.1325	3 x 16 " " 5–9
"	4	200	250	.1361	3 x 16 " " 5–9	236	.1481	2 x 16 " " 7–10
"	4	225	275	.1497	2 x 16 " " 7–10	261	.1639	2 x 16 " " 6–10
"	4	250	300	.1633	2 x 16 " " 6–10	286	.1796	3 x 16 " " 3–8
"	4	275	325	.1770	2 x 16 " " 6–10	311	.1953	2 x 16 " " 5–9
"	4	300	350	.1906	2 x 16 " " 5–9	336	.2110	2 x 16 " " 4–9
8 ft.	4	50	100	.0711	4 x 16 ins. Nos. 7–10	86	.0706	4 x 16 ins. Nos. 7–10
"	4	75	125	.0889	4 x 16 " " 6–10	111	.0911	3 x 16 " " 7–10
"	4	100	150	.1067	4 x 16 " " 5–9	136	.1116	3 x 16 " " 6–10
"	4	125	175	.1244	4 x 16 " " 4–9	161	.1321	3 x 16 " " 5–9
"	4	150	200	.1422	4 x 16 " " 3–8	186	.1526	3 x 16 " " 4–9
"	4	175	225	.1600	3 x 16 " " 4–9	211	.1732	2 x 16 " " 6–10
"	4	200	250	.1778	2 x 16 " " 6–10	236	.1936	2 x 16 " " 5–9
"	4	225	275	.1956	2 x 16 " " 5–9	261	.2142	2 x 16 " " 4–9
"	4	250	300	.2133	2 x 16 " " 4–9	286	.2346	2 x 16 " " 4–9
"	4	275	325	.2311	2 x 16 " " 4–9	311	.2553	2 x 16 " " 3–8
"	4	300	350	.2489	2 x 16 " " 3–8	336	.2758	2 x 16 " " 3–8

SWEET'S CATALOGUE

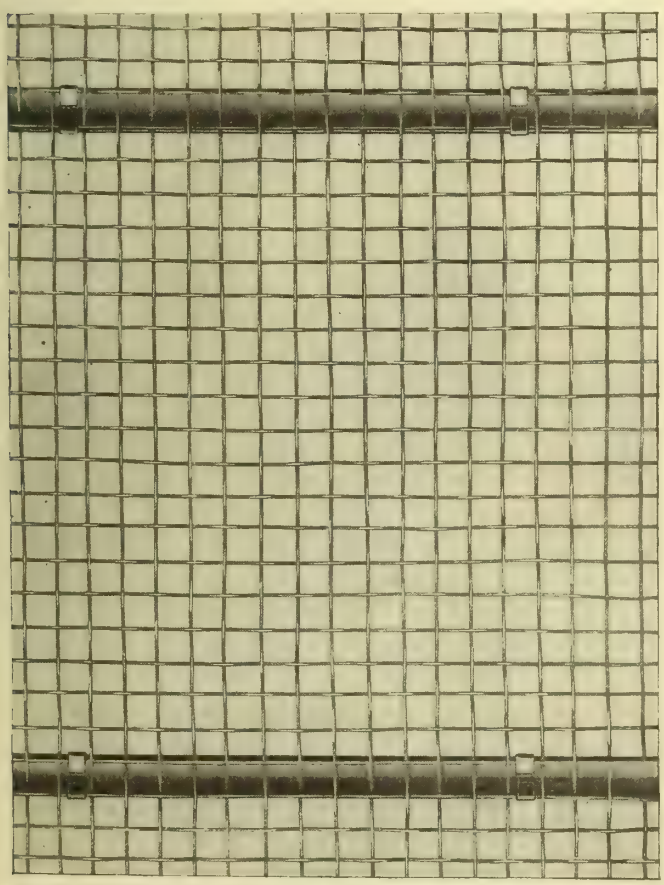
Continued on next page

Woven Wire Lath.

The Clinton Wire Cloth Company is the original inventor of wire lath. For over half a century no effort has been spared to maintain the very highest standard of quality, with the result that Clinton Wire Lath has long been the recognized standard wherever first-class construction is known.

Structural Advantages—A good quality wire lath is recognized as the ideal lathing material. A drawn-steel wire, in the matter of strength and quality of material, cannot be compared with sheet metal which has suffered cold cutting and expansion. In wire lath the woven wire mesh enables the plaster to form a key, which cannot be obtained with any kind of expanded or perforated metals. In any lath it is the key or the back-plaster which holds the plastered surface in place and which determines the degree of protection afforded the lath against deterioration. By the efficient back-plaster obtained with Clinton Wire Lath, the wires are completely covered, and the metal is thoroughly protected against corrosion and deterioration. This absolute imbedment of wire lath in the body of the plaster is also a most important element in the strength and durability of the plastered surface. Plaster on Clinton Wire Lath is thus practically reinforced, much as a concrete floor is reinforced, and for this reason will not check or crack.

Stock Grades—All standard stock grades of Clinton Wire Lath have two and one half meshes per lineal inch in warp and filling, and are made from No. 18 to No. 22 Washburn & Moen gauge steel wire.



CLINTON V-STIFFENED WIRE LATH

View showing photographic reduction of Clinton Wire Lath fitted with V-stiffeners. Note stiffeners are rigidly connected to lath by metal clips, which hold them securely in place and prevent stiffeners from turning or dropping out when lath is being handled.

This important feature is lacking in other brands of stiffened lath, wherein the stiffeners are merely laid in while the fabric is being woven

Special grades having two meshes per lineal inch in warp and filling, and made from Nos. 18 and 19 Washburn & Moen gauge steel wire, galvanized after woven, are also carried in stock.

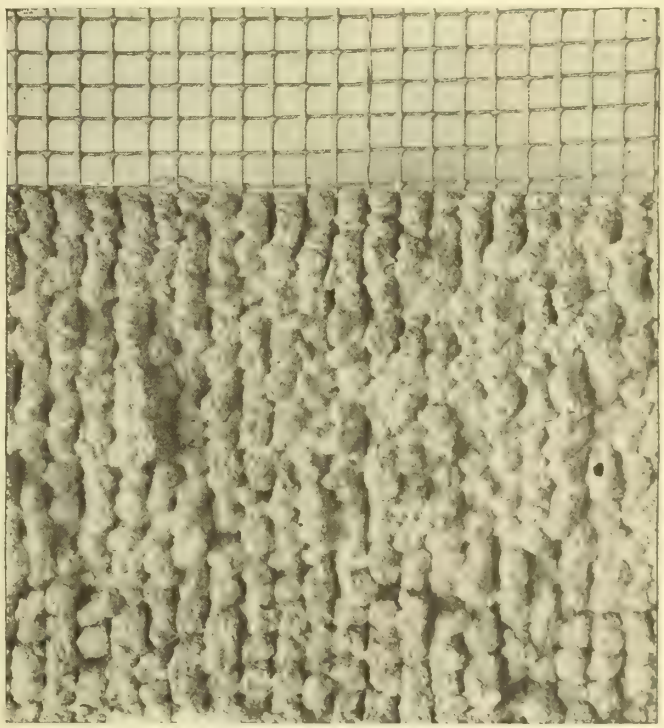
Clinton Wire Lath may be obtained either plain or V-stiffened; and either may be painted, galvanized after woven, or without any protective coating at all.

The painting, while cheaper than galvanizing, affords for most interior construction a very satisfactory and efficient protective covering. The galvanized *after-woven* process serves a double purpose. Through this process the mesh is made rigid by the soldering together of the wires where they cross each other. The galvanizing also forms the most efficient and lasting protection to the metal that can be obtained.

The stock grades of stiffened lath have V-shaped ribs of sheet metal attached transversely of the fabric and spaced eight inches apart. These stiffening ribs, in addition to increasing the rigidity of the lath, also afford an offset of about three eighths of an inch from the supporting frame, or surface of the building, and permit the plaster to be crowded through the meshes and establish a thorough key on the rear side of the lath.

Sizes of Rolls—All plain Clinton Lath is put up in rolls of about two hundred lineal feet, while stiffened lath is shipped in rolls of about one hundred lineal feet. The stock width of Clinton Wire Lath is 36⅝ inches, sold commercially as 36 inches.

Information—Write for "Lath and Plaster Handbook," describing Clinton Wire Lath and containing drawings, tables, and specifications covering the entire subjects of furring, lathing and plastering; also for "Successful Stucco Houses," a booklet dealing with the construction, economy and utility of stucco houses.



THE KEY OF CLINTON WIRE LATH

Photographic reduction of the rear side of section of wall plastered on Clinton Wire Lath, showing perfect key obtained and thorough manner in which lath is imbedded in body of plaster. Upper unplastered portion of view shows Clinton Wire Lath galvanized after woven. Note particles of galvanizing where wires cross, showing how process of galvanizing after weaving solders wires together where they cross. This maintains integrity of the meshes and adds greatly to rigidity of the lath

Continued on next page

"Clin-Truss" Wall Furring.

Description—"Clin-Truss" Wall Furring offers a method of furring wall surfaces which is superior to any other method in use. This furring consists of Clinton Electrically Welded Wire, the transverse wires of which are crimped so as to give the heavier longitudinal wires the required offset from the wall surface. These offset wires run vertically with the wall, and serve as the furring ribs to which wire or metal lath may be attached.

Advantages—The great advantage of this furring lies in the fact that it can be given practically any amount of offset with unobstructed air space, which is especially worthy of consideration in case it is desired to run pipes or wiring in the space between the plaster and the wall.

When walls are furred vertically or horizontally with channels or angles, the air space behind the plaster is usually broken up or divided by these furring members in such a way that pipes or wires cannot be conveniently run, except in definite vertical or horizontal lanes. With "Clin-Truss" Wall Furring, however, a free air space is obtained with no vertical or horizontal obstructions, thus permitting the free extension of pipes or wires in any direction throughout the air space. "Clin-Truss" Wall Furring is the ideal material for furring wall surfaces because:

(1) It is made from the highest grade of drawn steel wire thoroughly galvanized, and will not rust nor corrode.

(2) Its direct contact with the exterior wall is reduced to a minimum.

(3) It insures damp-proof walls.

(4) It prevents uneven temperature of interiors, due to direct conduct from without.

(5) Its weight after plastering is less than one half the weight of two-inch burnt clay wall furring and plastering.

(6) It provides an ideal pipe and conduit space, which permits the unobstructed extension of wires, ducts and pipes in any desired direction.

(7) It eliminates entirely the expense of cutting pipe chases.

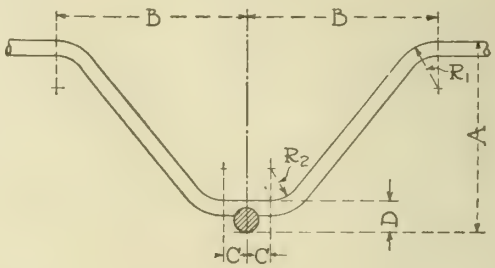
(8) It is the cheapest in initial cost and more easily erected than other types of wall furring.

(9) It provides a perfect key for the mortar, and insures against cracking and separation of the plastering from the background.

Construction Details—"Clin-Truss" Wall Furring is secured to the exterior brick or terra cotta walls by means of No. 12 galvanized wire ties, which are inserted in the mortar joints of the brick or terra cotta. Staples, anchor nails, or other approved methods may be used on work where the walls are already erected. For securing "Clin-Truss" to wood studding, the use of one-inch No. 12-gauge wire staples is recommended.

Picture, chair rail and base grounds are secured to the vertical members by means of clips or wiring, or may be erected over nailing blocks placed on the wall in the usual manner.

Stock Sizes—Stock sizes of "Clin-Truss" Wall Furring consist of a combination of No. 3 and No. 8 Washburn & Moen gauge wires. The No. 8 wires, which are crimped to give the heavier No. 3 wires the desired offset, are in all cases spaced at uniform intervals of twelve inches along the length of the sheet. All standard sheets have widths as indicated in the following table, but may be obtained in any desired length not exceeding a maximum of twelve feet. This table shows standard dimensions for sheets having 1-, 2-, 3-, 4- and 5-inch offsets.



TYPICAL CRIMP AND FULL-WIDTH SHEET

DATA, "CLIN-TRUSS" FURRING—STYLE A

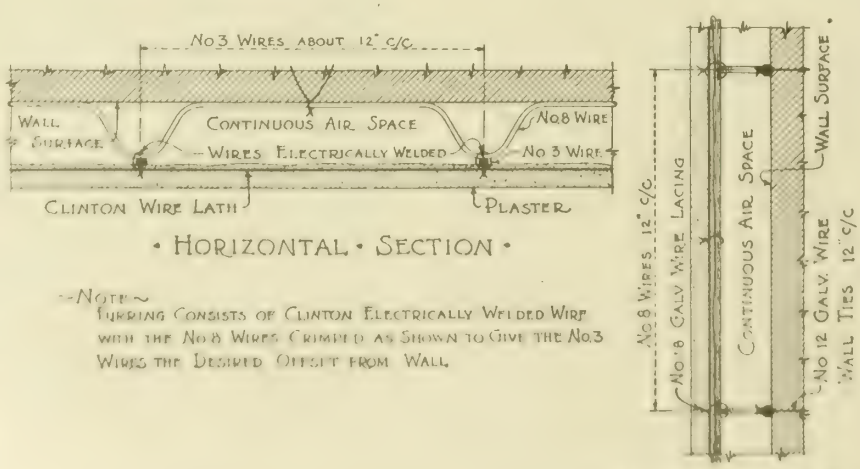
Style	Size of Crimped Wires	Size of Furring Wires	Dimensions in Inches								
			A	B	C	D	R	R	S	Y	W
1-A	No. 8	No. 3	1	1.25	0.25	0.35	0.50	0.33	12	3.75	55.5
2-A	"	"	2	2.00	"	"	"	"	"	4.25	56.5
3-A	"	"	3	2.50	"	"	"	"	"	4.75	57.5
4-A	"	"	4	2.75	"	"	"	"	"	5.00	58.0
5-A	"	"	5	3.00	"	"	"	"	"	5.25	58.5

Dimensions are for standard "Style A" furring made of Nos. 3 and 8-gauge wires. Other styles having combinations of heavier wires may be obtained upon special order.

SPECIFICATIONS

All exterior walls shall be furred with "Clin-Truss" Wall Furring, consisting of No. 3-gauge wires on 12-inch centers, cross-welded with No. 8-gauge wires on 12-inch centers. The No. 8 wires shall be crimped so as to offset from the plane of the No. 3 wires a sufficient distance to provide the required space between the wall and the plaster, as called for on the plans or as may be directed by the architect, but this offset shall in no case be less than one inch.

All furring shall be set straight and true to the proper lines and each No. 8-gauge wire shall be secured to the wall at intervals not exceeding twelve inches, by means of No. 12-gauge galvanized wire wall ties, staples, anchor nails or other approved means.



Note—Furring consists of Clinton Electrically Welded Wire with the No 8 Wires Crimped as Shown to Give the No 3 Wires the Desired Offset from Wall.

DETAIL SHOWING APPLICATION OF "CLIN-TRUSS" WALL FURRING

Continued on next page

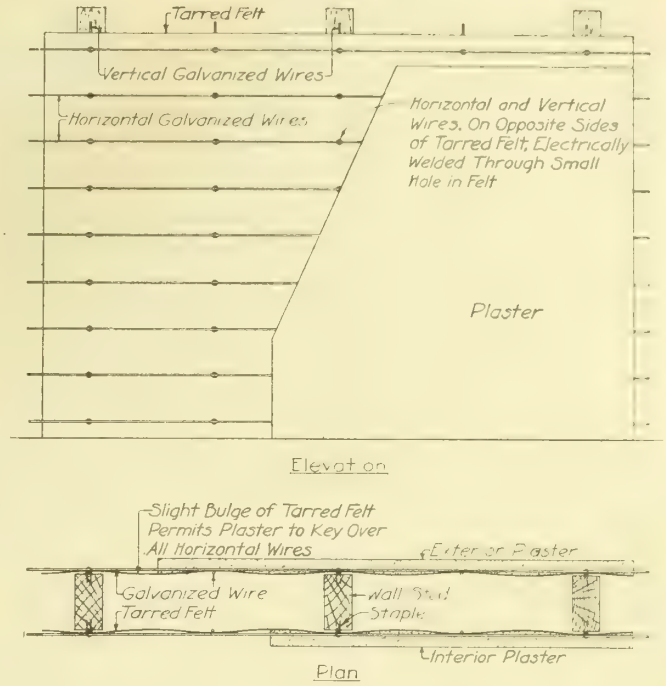
Welded Sheathing.

Description — Clinton Welded Sheathing, which consists of a light grade of Electrically Welded Wire Fabric provided with a tarred felt backing, is a most economical and efficient lathing for stucco or interior plastering. This material is manufactured by arranging longitudinal and transverse wires on opposite sides of a sheet of tarred felt, and electrically welding them together through very small holes previously punched in the felt at each point where a longitudinal crosses a transverse wire. In this way the tarred felt becomes an integral part of the wire mesh, being securely locked and held between the two groups of wires, but at the same time having no physical connection to any of the wires.

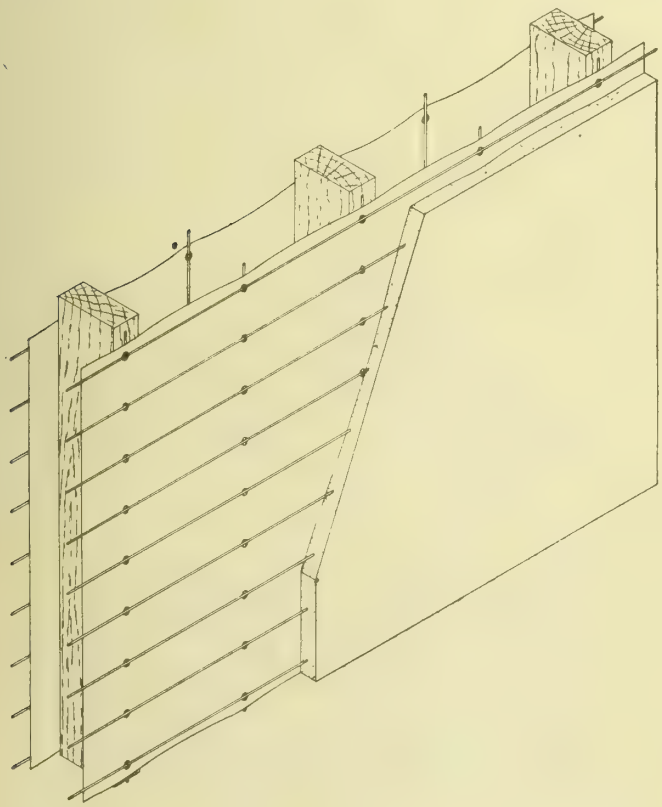
Thus the longitudinal or so-called "carrying" wires, all of which are arranged on the side of the felt to which the plaster or cement mortar is applied, are entirely unobstructed, and thereby become thoroughly imbedded in the body of the plaster, since the felt bulges slightly away from the wires under the pressure of the plasterer's trowel.

Uses—Welded Sheathing is especially adapted as an inexpensive lathing material for stucco and all kinds of interior plastering; also as a reinforcement for short span concrete slabs, as in roofs, or in floors carrying comparatively light loads.

Advantages—As applied to exterior wall construction, Welded Sheathing may be used without wood sheathing, as the wire fabric with its tarred felt backing may be stapled directly to the studs. The lath is placed so that the longitudinal or "carrying" wires, which are three inches apart, extend horizontally across the studs; the transverse or "stay" wires, which are eight inches apart, run vertically with the studs. As the cement mortar is applied it is pushed back, and keys thoroughly around all the carrying wires; while the tarred felt serves as a backing to prevent waste, and as a stop to retain the mortar while in its plastic state.



DETAILS OF WALL ON CLINTON WELDED SHEATHING



ISOMETRIC VIEW OF WALL ON CLINTON WELDED SHEATHING

Exterior walls constructed in this manner are continuous slabs of cement, spanning from stud to stud, reinforced with galvanized steel wire, and covered with an impervious moistureproof backing. The strength of this construction is apparent, as the reinforcing wires are of much heavier gauge than can be conveniently used in any type of woven or expanded metal lath; while its great economy is shown by the fact that the cost of any acceptable type of metal lath is more than double that of Welded Sheathing. Here is the ideal material for stucco work—*galvanized wire lathing and moistureproof felt,* combined in one material at about *half the cost* of ordinary metal lath.

Welded Sheathing, as applied to cement roof and floor construction, requires no forms, as the material may be stapled directly to the joists and merely screeded over with one to one and one-half inches of concrete or cement mortar. For light loads and short spans, Welded Sheathing provides both *forms* and *galvanized wire reinforcement* combined in one material, at about *half the cost* of wood forms in place.

Stock Sizes—Stock grades of Welded Sheathing consist of galvanized longitudinal wires of No. 13 Washburn & Moen gauge, spaced three inches apart and cross-welded to No. 13 galvanized transverse wires spaced eight inches apart. Inserted in the wire mesh is a well saturated grade of tarred felt. The material is cut into flat sheets thirty-two inches wide and eight feet long, packed in bundles of convenient size and crated for shipment. Heavier wires and sheets of special size may be obtained upon special order.

Information—Booklet describing uses and construction details will be sent on request.

"Hunt" Metal Corner Bead.

Types of Bead—The "Hunt" Corner Bead consists of wire edging, with flanges of U-shaped wire members alternating on opposite sides of the corner. The bead is made up in two general types: No. 2 bead, in which the flanges are made without continuous longitudinal pieces; and No. 1 bead, in which each flange is provided with a longitudinal strip of metal securely clipped along the outer edges of the wire flanges.

The No. 1 type is also adapted to a special bull-nose bead, known as "Hunt" No. 3 Bull-Nose Bead, in which the wire edging is replaced by sheet metal thoroughly clinched to a standard No. 1 flange, and shaped in such a way as to form a true bull-nose corner.

By bending the flanges into straight alignment, No. 1 bead may also be used for grounds, and in this form is known as "Hunt" No. 7 Ground Bead.

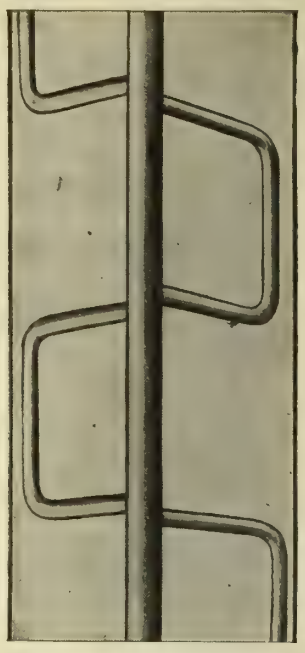
Advantages—The "Hunt" Bead absolutely protects the corners; is easily and accurately adapted under all conditions, and costs no more than a plain plastered corner. It straddles the corner with firm support on either side; can be quickly and accurately set to the proper lines; is stiff and rigid; and can be shaped to curves, arches and ovals without cutting or extra labor. The "Hunt" Bead is so constructed that the plaster will clinch through the flanges and around the edging without leaving any trace of a feather-edge. This bead unites with the plaster into one solid mass, and it is impossible for the plaster to shrink away from the bead.

Uses—The "Hunt" Bead may be easily and permanently connected to brick walls, channel iron, wood lathing, wire lathing, metal lathing, stone work, terra cotta and concrete. In walls, columns, ceiling and beam edges, where straight work is encountered, either No. 1 or No. 2 bead may be used with equal facility and economy.

The No. 2 bead, because of the absence of continuous longitudinal flange members, is readily adapted to all forms of curved work, as it may be bent and shaped to any desired curve without cutting or crimping. This bead is especially adapted as edging for concrete curbs, nosing on concrete steps, piazzas, etc.; while for arches, ovals, coves, and other intricate ornamental shapes, it is far superior to any other type of metal bead.

"HUNT" NO. 7 GROUND BEAD
It does the work on Wood, Wire or Metal Lathing, etc. Joins Plastic Material Perfectly

"HUNT" NO. 1 CORNER BEAD



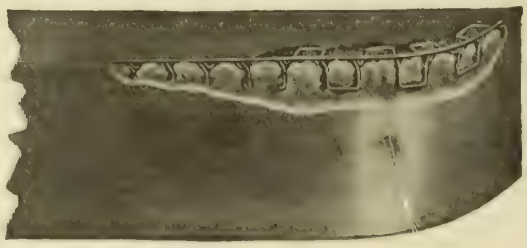
"HUNT" NO. 2 CORNER BEAD

"Hunt" No. 7 Ground Bead affords an ideal means of joining plastic materials. It establishes a perfect non-shrinking joint where tile, cement or any kind of sanitary base is turned up and joined with a plastered wall above. For this purpose it is extensively used in hotel and theater lobbies, hospitals, toilets and bathrooms.

Stock Sizes—"Hunt" Corner Beads are made in stock lengths of 6, 7, 8, 8½, 9, 9½, 10 and 12 feet. Special lengths less than six feet and more than twelve feet may be obtained upon special order. Stock sizes are made in ⅜-, ⅝- and ¾-inch grounds. The outer or finished face of "Hunt" No. 3 Bull-Nose Bead is bent to a segment of a circle one and one eighth inches in diameter, with a face width of seven eighths of an inch. Unless otherwise specified, all beads are made of best quality cold drawn steel thoroughly galvanized. All types may also be obtained either in bronze, copper or zinc.

Information—Samples and special catalogue may be obtained on request.

"HUNT" NO. 3 BULL-NOSE BEAD



"HUNT" NO. 2 CORNER BEAD
Adapted to all forms of curved work without any cutting or crimping

FLEXNER-TAYLOR CO., LTD.

Manufacturers of Fireproofing Materials

786 East Broadway
SOUTH BOSTON, MASS.

Products.

F. & T. Nail Course; F. & T. Cushion; F. & T. Nailing Blocks or Bricks; F. & T. Cushion Vault Lights; F. & T. "Hydro-Lytic" Waterproofing; F. & T. Composition Floor.

F. & T. Nail Course.

The F. & T. Nail Course is a plastic, resilient, enduring composition that solves the builders' problem in floors or roofings, and as a fire-stop in ceilings.

For nailing wood floors it takes the place of cinder concrete and screeds. The common danger of disintegration from sulphuric acid, where the cinders are not properly burned, is wholly obviated by the use of the F. & T. Nail Course.

Floors—In floor work, it offers a resiliency which is not obtainable in any other kind of floor construction; the top floor can be nailed directly to the nail course. We recommend one-ply dry sheathing paper under all wood floors over the nail course.

Roof—Slate may be nailed directly on the material, eliminating the necessity of wood for roofing. (See illustrations.)

Revamping Wood Floors—Can be used for revamping old wood floors.

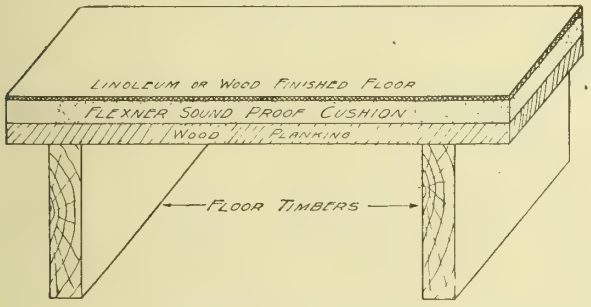
Fire-Stop—Can be made in slab form and nailed to ceilings as a fire-stop.

F. & T. Cushion.

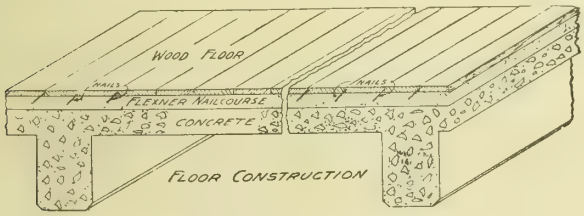
This plastic composition can be used as a foundation for setting any character of tile, eliminating noise; for cementing or nailing on linoleum, cork tile or carpet. Resiliency and toughness are among the main features of the materials composing it.

F. & T. Nailing Blocks or Bricks.

Used in place of wood nailing blocks in brick and terra-cotta walls, for nailing base, chair-rail, picture moulding, bathroom fixtures, etc. Used as a border for concrete floors, for nailing carpets, linoleum, etc.



SOUND-PROOF CUSHION CONSTRUCTION
Showing construction over wooden timbers; can be used also on the ceiling as fire-stop



FLEXNER NAIL COURSE
Floor Detail

F. & T. Composition Floor.

The material compounded to make this is of such a nature as to produce a resilient, wear resisting floor. Adapted for hospitals, schoolhouses, dormitories, halls, etc.

F. & T. Cushion Vault Lights.

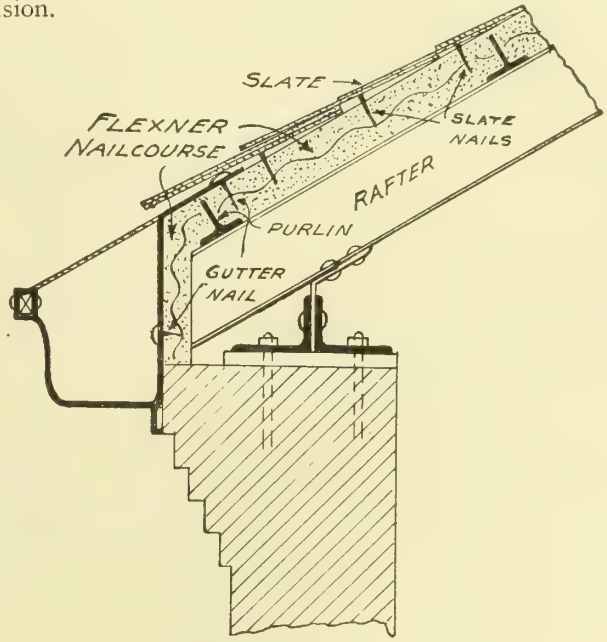
F. & T. Cushion Vault Lights are absolutely satisfactory, because of the fact that the breakage of glass, due to expansion or contraction, is practically eliminated.

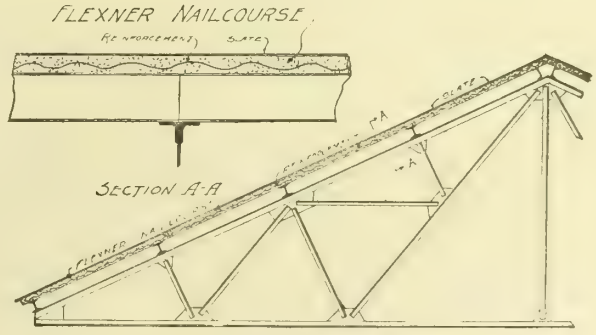
F. & T. "Hydro-Lytic" Waterproofing.

"Hydro-Lytic" is a cement mortar, containing an ingredient which renders any surface to which the mixture is applied, dry and impervious to dampness or to the penetration of water. It is applied to concrete, brick or stone surfaces, and has the same appearance as the concrete itself. Can be used on cellar walls, basement floors, concrete roofs, tanks, or any place where the presence of water is injurious.

Installation.

Our products are installed under our own supervision.





FLEXNER NAIL COURSE
Roof Detail

MITCHELL-TAPPEN CO.

50 Broad Street
NEW YORK, N. Y.

Products.

STANDARDIZED METAL CAGING; BEAM WRAPPING. Also, RIVETED PLATE and STRUCTURAL STEEL; ATMOSPHERIC COOLING TOWERS; STEEL SHEET PILING; STEEL STORAGE TANKS; STEEL PIPE; SMOKESTACKS; METAL COLUMNS, FLOOR PLATES; METAL FURRING; RAILINGS and FIXTURES; STEEL GRATINGS; STEEL DOOR FRAMES and JAMBS; COLUMN CLAMPS; CONCRETE REINFORCEMENT.

Standardized Metal Caging ("S. M. C.").

A steel wire basket or cage (Fig. 1) which firmly grips bottom flange of steel member, holding or locking concrete protection to steel, and providing a continuous strengthening skeleton *at a predetermined or fixed offset from the beam.* "S. M. C." can not "bunch"; it pulls out like a camera bellows, maintaining equal spacing of about eight inches. It clasps beam tightly at edge of flange, leaving a clear space for flow of concrete along face of flange. When used on deep beams, girders or columns, additional wires, of special shape, may be used to reinforce the side protection (Fig. 2).

Exclusive features shown in Fig. 1. "S. M. C." is ready to use, and can be readily applied by inexperienced men. Full printed directions furnished.

Shipment—Caging packed close together, in collapsed sections about four feet long. All sizes in stock.

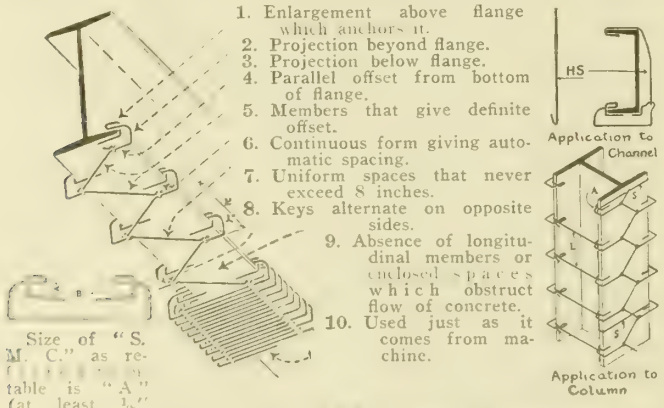


FIG. 1. APPLICATION OF STANDARDIZED METAL CAGING
End wire of section is caught over end of beam, and workman easily holds and pulls out section, which automatically locks it to the structural member. Caution: Stretch out *after* applying

Efficiency.

Fireproof soffit protection can not be jarred or knocked off, if locked on with "S. M. C."; hence, "S. M. C." is specified by the most eminent architects and engineers as well as by many railroads and the U. S. Government.

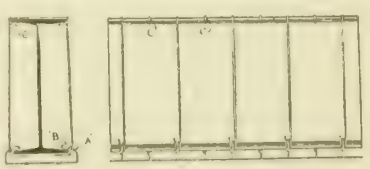


FIG. 2. STANDARD STIFFENER
For deep haunches, stiffener is hooked through "S. M. C." at "A," pulled tight and bent across top of beam and under top flange "C" on opposite side.

Prices and Sizes.

Full crates of 4,000 clamps, sizes Nos. 1 or 2, or 3 or 4, for standard beams up to 24 inches, $40.00, mill shipment. One size fits all channels, but in ordering, depth of channel must be given, so that proper length of back wire can be furnished.

TABLE OF SIZES, PRICES, Etc. ("S. M. C.")

S. M. C. Number	Size of S. M. C. in Inches	Special Depths	Depth of Beam	Weight per Pair	Weight Flange	Thickness Flange	Gage Wire	Price per 100 Clamps Stock	Price per 100 Clamps Mill
Channels	5⅝x 5¼	All Sizes	6 to 15 inc.	8 55	.92 3.81		36 30	$1.50	$1.25
No. 1	5⅝x 5½	Car.	4" H	13.6	4.0	0.29	30	1.25	1.00
"	"	"	4 in.	7.5 to 10.5	2.66 to 2.88	0.19	36 to 35	"	"
"	"	"	5 "	9.75 " 14.75	3.00 " 3.29	0.21	35 " 34	"	"
"	"	"	5 "	17.0	3.29	0.40	34	"	"
"	"	"	6 "	12.25 " 17.25	3.33 " 3.57	0.23	34 " 33	"	"
"	"	"	7 "	15.0 " 20.0	3.66 " 3.87	0.25	32 " 31	"	"
"	"	"	8 "	17.5	4.33	0.24	29	"	"
"	"	"	8 "	18.0 " 25.5	4.00 " 4.27	0.27	30 " 29	"	"
No. 2	5⅝x 6½	Car.	5" H	18.7	5.0	0.33	30	1.30	1.05
"	"	"	9 in.	21.0 to 35.0	4.33 to 4.77	0.29	33 to 31	"	"
"	"	"	10 "	22.0	4.67	0.27	32	"	"
"	"	"	10 "	25.0 " 40.0	4.66 " 5.09	0.31	32 " 30	"	"
"	"	"	12 "	27.5	5.0	0.32	30	"	"
"	"	"	12 "	31.5	5.0	0.46	30	"	"
No. 3	5⅝x 7½	Car.	6" H	23.8	6.0	0.36	29	1.35	1.10
"	"	"	12 in.	31.5 to 55.0	5.0 to 5.61	0.46	34	"	"
"	"	"	15 "	36.0	5.5	0.37	32	"	"
"	"	"	15 "	42.0 " 70.0	5.5 " 6.19	0.41	32 to 27	"	"
"	"	"	18 "	46.0	6.0	0.43	29	"	"
"	"	"	18 "	55.0 " 70.0	6.0 " 6.26	0.46	29 " 28	"	"
"	"	"	20 "	65.0	6.25	0.55	28	"	"
"	"	"	2-4s	7.5 " 10.5	5.87	0.19	30 " 28	"	"
"	"	Beth.	8 in.	17.5 " 19.5	5.25 " 5.33	0.21	33	"	"
"	"	"	9 "	20.0 " 24.0	5.44 " 5.56	0.25	32	"	"
"	"	"	10 "	23.5 " 28.5	5.85 " 5.99	0.27	30 " 29	"	"
"	"	"	12 "	28.5 " 36.0	6.12 " 6.30	0.44	30 " 28	"	"
No. 4	5⅝x 8½	Car.	15 in.	60.0 to 100.0	6.0 to 6.77	0.81	34 to 31	1.40	1.15
"	"	"	18 "	55.0 " 90.0	6.0 " 7.25	0.66	34 " 28	"	"
"	"	"	20 "	65.0 " 100.0	6.25 " 7.28	0.65	33 " 28	"	"
"	"	"	21 "	57.5	6.5	0.54	32	"	"
"	"	"	24 "	69.5	7.0	0.48	29	"	"
"	"	"	24 "	80.0 " 100.0	7.0 " 7.25	0.60	29 " 28	"	"
"	"	Beth.	15 "	54.0 " 64.0	7.0 " 7.20	0.59	29 " 28	"	"
"	"	"	15 "	54.0 " 71.0	7.0 " 7.5	0.79	29 to 27	"	"
No. 5	⅝x 9	Car.	8" H	34.0	8.0	0.36	28	1.45	1.20
"	"	"	2-5s	9.75 to 17.0	6.5 to 7.09	0.21	35 to 33	"	"
"	"	"	2-6s	12.25 " 17.25	7.32 " 7.81	0.23	31 " 29	"	"
"	"	"	2-7s	15.0 " 20.0	7.87	0.25	29	"	"
"	"	Beth.	15 in.	38.0 " 46.0	6.66 " 6.8	0.40	34 " 33	"	"
"	"	"	18 "	48.5 " 59.0	7.5 " 7.66	0.43	30	"	"
"	"	"	20 "	59.0 " 69.0	8.0 " 8.15	0.48	28 " 27	"	"
"	"	"	8"G	32.5	8.0	0.30	28	"	"
No. 6	11⅝x 9¼	Car.	24 in.	105.0 to 115.0	7.88 to 8.0	0.80	28	1.50	1.25
"	"	"	27 "	83.0	7.5	0.60	30	"	"
No. 7	5⅝x10½	Beth.	9"G	38.0	8.5	0.34	33	1.55	1.30
"	"	"	10"G	44.0	9.0	0.37	29	"	"
"	"	"	20 in.	72.0 to 82.0	8.75 to 8.89	0.58	30	"	"
"	"	"	24 "	73.0 " 83.0	9.0 " 9.13	0.51	29 to 28	"	"
"	"	"	24 "	84.0	9.25	0.59	28	"	"
"	"	Car.	2-8s	18.0 " 25.5	8.5 " 9.04	0.27	32 " 29	"	"
"	"	"	2-9s	21.0	9.31	0.29	28	"	"
No. 8	5⅝x11½	Beth.	12"G	55.0 to 70.0	9.75 to 10.0	0.58	31 to 29	1.60	1.35
"	"	"	15"G	73.0	10.5	0.77	27	"	"
"	"	"	24 in.	84.0	9.25	0.59	33	"	"
"	"	"	26 "	90.0	9.5	0.60	32	"	"
"	"	"	28 "	105.0	10.0	0.68	29	"	"
"	"	"	30 "	120.0	10.5	0.74	27	"	"
"	"	Car.	2-8s	21.0 " 35.0	9.31 " 10.19	0.29	33 " 28	"	"
"	"	"	2-10s	25.0 " 30.0	10.13 " 10.43	0.31	29 " 27	"	"
No. 9	5⅝x13½	Beth.	15"G	104.0	11.25	0.77	32	1.65	1.40
"	"	"	18"G	92.0	11.5	0.59	31	"	"
"	"	"	20"G	112.0	12.0	0.70	28	"	"
"	"	"	24"G	120.0	12.0	0.73	28	"	"
"	"	"	2-8s	17.5 to 19.5	10.88 to 11.04	0.21	33	"	"
"	"	"	2-9s	20.0 " 24.0	11.25 " 11.49	0.25	32 to 31	"	"
"	"	"	2-10s	23.5 " 28.5	12.13	0.27	27	"	"
"	"	Car.	2-12s	31.5 " 55.0	10.75 " 11.97	0.46	34 " 28	"	"
"	"	"	2-15s	42.0 " 55.0	11.75 " 12.25	0.41	29 " 27	"	"
No. 10	11⅝x14½	Beth.	15"G	140.0	11.75	1.09	33	1.70	1.45
"	"	"	20"G	112.0 to 140.0	12.0 to 12.5	0.93	32 to 29	"	"
"	"	"	24"G	112.0 " 140.0	12.0 to 13.0	0.80	32 to 27	"	"
"	"	"	26"G	150.0	12.0	0.95	32	"	"
"	"	"	28"G	165.0	12.5	1.00	30	"	"
"	"	"	30"G	180.0	13.0	1.04	27	"	"
"	"	"	2-12s	28.5 " 36.0	12.25 to 13.06	0.44	29 to 27	"	"
"	"	Car.	2-15s	42.0 " 70.0	11.75 " 13.11	0.59	32 " 26	"	"
"	"	"	2-18s	55.0 " 65.0	12.75 " 13.10	0.46	28 " 26	"	"
No. 11	11⅝x15½	Beth.	20"G	160.0	13.60	0.87	29	1.75	1.50
"	"	"	28"G	180.0	14.35	0.92	25	"	"
"	"	"	2-15s	38.0 to 46.0	14.0 to 14.30	0.40	27 to 25	"	"
"	"	Car.	2-15s	75.0 " 100.0	13.41 " 14.30	0.81	30 " 25	"	"
"	"	"	2-18s	70.0	13.27	0.46	31	"	"
"	"	"	2-20s	65.0 " 75.0	13.25 " 13.55	0.55	31 " 29	"	"
"	"	"	2-21s	57.5	13.75	0.84	28	"	"
No. 12	11⅝x16½	Beth.	30"G	200.0	15.0	0.95	28	1.80	1.55
"	"	"	2-18s	54.0 to 71.0	14.5 to 15.5	0.79	31 to 26	"	"
"	"	"	2-18s	48.8 " 59.1	15.5 " 15.82	0.43	26 " 24	"	"
"	"	Car.	2-18s	75.0 " 90.0	14.75 " 15.24	0.66	30 " 27	"	"
"	"	"	2-20s	80.0 " 100.0	14.75 " 15.32	0.63	30 " 27	"	"
"	"	"	2-24s	69.5	14.75	0.48	30	"	"
"	"	"	2-24s	80.0 " 100.0	14.75 " 15.26	0.60	30 " 27	"	"

Width of two beams is based on use of Standard Separators. All sizes are of galvanized wire, electrically welded

CEMENT-GUN CONSTRUCTION COMPANY

914 South Michigan Avenue
CHICAGO, ILL.
NEW YORK, N. Y., 40 Whitehall Street

Products and Services.

CEMENT-GUN WORK.

ENCASING STEEL STRUCTURES and LINING BINS to protect against corrosion and for fireproofing.

LINING TUNNELS and WATERPROOFING RESERVOIRS.

CONSTRUCTING FIREPROOF WALLS and ROOFS.

All work done by contract.

TRADE-MARK

Advantages of Gun-crete.

Why continue to use perishable wood or metal covering for factories or industrial plants? Both are short-lived. Both need constant attention. Neither is strictly fireproof or waterproof. At a moderate increase in cost, buildings can be encased by the Cement-Gun process with Gun-crete that is fireproof and waterproof, and that becomes more durable as the years go by. Architects may use the accompanying details, and write for correct specifications which apply to individual cases.

We do all work by contract, guaranteeing results.

A Few Sample Applications.

The steel frame building at a sulphuric acid plant, shown here, was originally covered with corrugated iron. At the end of two and one half years acid fumes had almost completely destroyed the entire covering. Without interrupting the service of the building, we covered the entire structure, roof and walls, with one and one half inches of Gun-crete. See other illustrations.

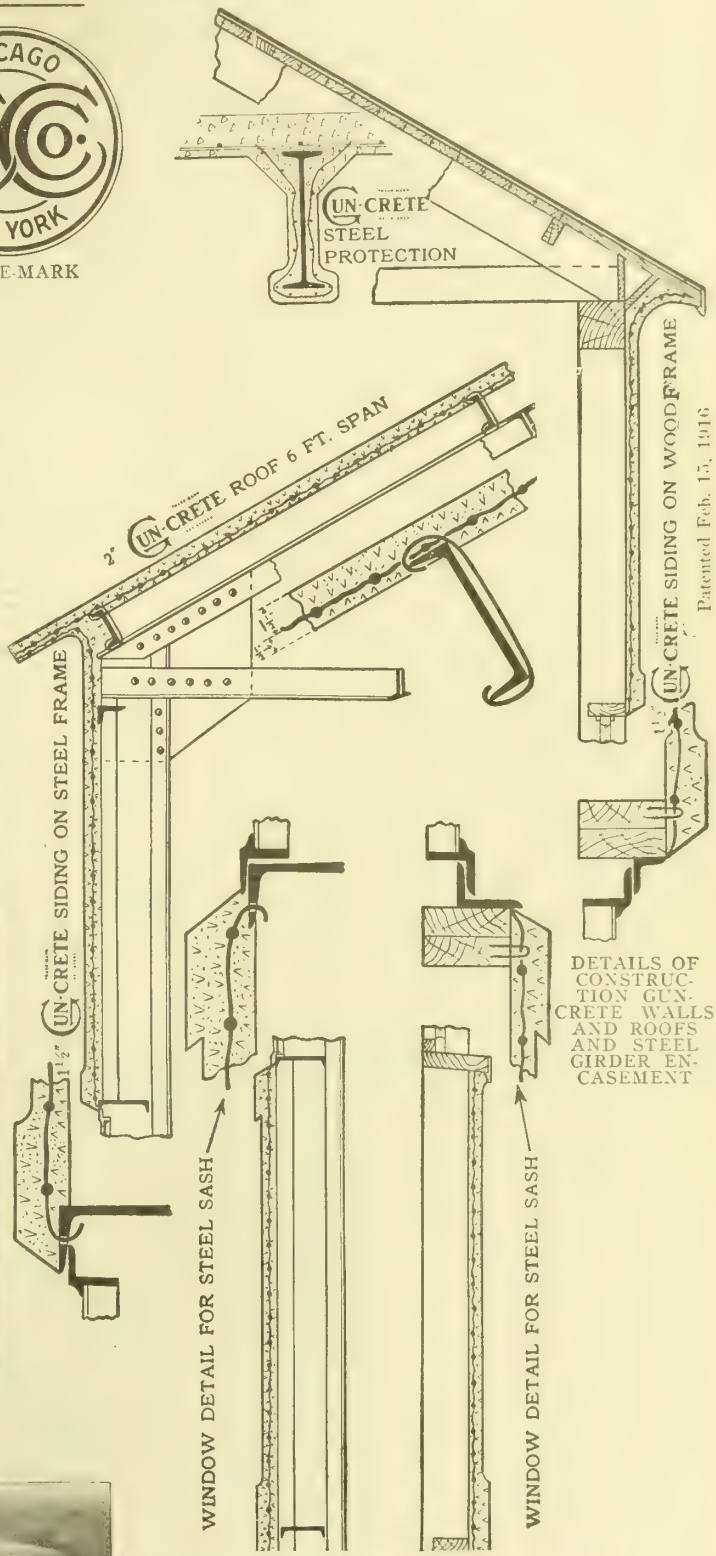
A STEEL FRAME BUILDING TREATED WITH GUN-CRETE

NEW MACHINE AND ERECTING SHOP OF SEABOARD AIR LINE RAILWAY AT PORTSMOUTH, VA.

This and four other wooden buildings covered with 1½-inch Gun-crete siding

LUMBER SHED AT DUBUQUE, IOWA

236′ x 100′ x 26′ high. Capacity of each, 3,000,000 board feet. Wooden frame buildings covered with 1½-inch Gun-crete siding



Co-operative Service.

Architects and Engineers may incorporate these details in their plans, and complete details and specifications will be furnished on request to meet special requirements.

ANKYRA MANUFACTURING CO.

Manufacturers of Ankyra Ankor Bolts

149 Berkley Street, Wayne Junction
PHILADELPHIA, PA.

Product.

ANKYRA ANKOR (Expansion) BOLTS.

TRADE-MARK
(Reg. U. S. Pat. Off.)

Purpose.

The purpose of the bolt is to provide a device which can be used in place of ordinary toggle or expansion bolts, and also in instances in which the latter are difficult to affix. Withal, the purpose includes ease and rapidity of installation, in any kind of wall or ceiling, and without reference to reinforcements of any kind, where the material is inherently weak. It is intended especially for use in glazed and hollow tile, stucco, concrete, lath-and-plaster —either wood or wire—expanded metal, compo-board and similar materials, and in hollow sheet metal, such as window frames and doors, interior trim, etc. *Ankyra Ankor Bolts are not recommended for heavy work in solid walls.*

Advantages.

The Ankyra Ankor Bolt (or sleeve) combines the principles of toggle and expansion bolts; differing from them, however, in that the nut is an integral part of the sleeve itself, and that it is, practically speaking, self-adjusting to any thickness of wall.

Ankyra consists of a longitudinally perforated metal sleeve (Fig. A), which is inserted into a hollow or solid wall as desired. In the former case, the expanding tool pulls up on the sleeve and forms the wing nut (Fig. C). Fig. B shows how Ankyra holds in solid walls.

Ankyra has eight prime advantages.

(1) It is a one-piece construction (integral nut).

(2) Is quickly and easily applied.

(3) Becomes a permanent part of wall.

(4) Can not loosen unless purposely done.

(5) Fixture held by it can be removed and replaced at any time, and repeatedly.

(6) Holds securely in any part of any wall, without grip in studdings or other reinforcement.

(7) Ordinary standard wood screws are used with Ankyra.

(8) Ankyra is always stronger per unit area than the wall itself.

Those familiar with other forms of anchor bolts, in which the nuts are separate from the sleeves, will appreciate the advantages of the integral nut, as combined in Ankyra. This feature permits repeated insertion and withdrawal of the screw, without possibility of derangement or loss of the sleeve.

The more extensive use of sheet metal for interior work has been hindered, to a large degree, by the necessity for predetermining the location of fixtures and hardware, so that suitable means of fastening may be provided. Ankyra eliminates this difficulty entirely,

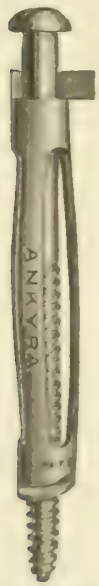


FIG. A. ANKYRA BOLT WITH WOOD SCREW BEFORE EXPANSION

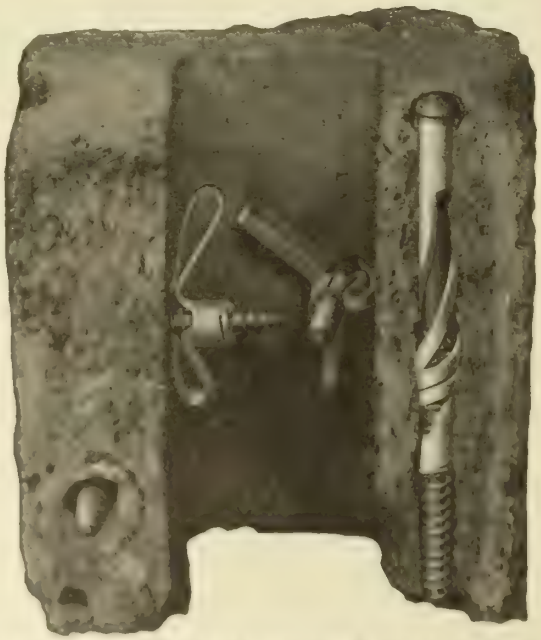


FIG. B. HOW ANKYRA HOLDS IN HOLLOW TILE OR SOLID WALLS

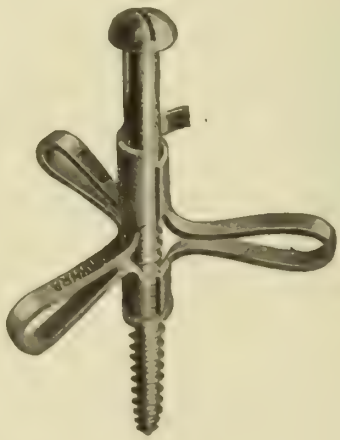


FIG. C. ANKYRA BOLT EXPANDED
Note Wood Screw

Continued on next page

(1) Ankyra expanded with this tool

(2) Insert the tool shank into the Ankyra sleeve

(3) Ankyra screwed onto shank till it meets the base plate. Push into wall through *previously drilled or punched hole*

(4) After insertion, hold base plate firmly against wall, and pull down evenly on handle

(5) Ankyra partially expanded by cam action of handle

(6) Ankyra now fully expanded. After removal of tool, fixtures may be applied by inserting an ordinary wood screw

(7) Expansion tool (special) for extra thick walls

(8) Expansion tool as used in connection with sheet metal work (Fig. I)

SHOWING EASY APPLICATION OF ANKYRA

since it permits fixtures to be placed anywhere, without previous reinforcement.

The fact that standard wood screws (the proper size number of which is stamped on each sleeve) are used with Ankyra Ankor Bolts indicates a practical and economical appliance.

To Architects, Builders, Plumbers and Others.

For affixing grounds to hollow tile, no other known method provides the flexibility of Ankyra, and there is no other way in which ground alignment can be controlled so accurately.

FIG. D. ANKYRA METHOD OF ALIGNING GROUNDS

The wedges naturally make it possible to take up between the wall and the ground any irregularities which may exist in the alignment of the wall (Fig. D).

FIG. E. HOW ANKYRAS HOLD GROUNDS

The larger illustration (Fig. E) shows exactly how Ankyra holds grounds to hollow tile. The speed with which grounds can be laid by one man is astonishing.

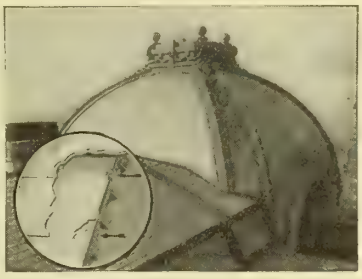


FIG. F. SLATES HELD TO TILE SUB-ROOF

In Fig. F is shown a part of the roof of the Bellevue-Stratford Hotel in Philadelphia, from which practically all the slates were blown in a severe wind storm about three years ago. Ankyra is now used to fasten the slates to the tile sub-roof, and holds them with absolute security.

FIG. G. WALL RADIATOR PLACED ON TILE WALL

Ankyra is used extensively in the largest and finest buildings for supporting wall radiators and other moderately heavy fixtures on hollow tile and other hollow walls (Fig. G).

The towel rack (Fig. H) illustrates the efficacy of Ankyra for holding bathroom and other fixtures to hollow and glazed tile. The difficulty of this is appreciated by every builder, architect and plumber.

The shade fixture (Fig. I) is typical of the way in which Ankyra is used in connection with sheet metal work.

FIG. H. ANKYRAS USE ON BATHROOM FIXTURES
Not injurious to walls and holds permanently

FIG. I. ANKYRAS IN HOLLOW METAL WORK
Easily removed and replaced

Installations.

Ankyra is used in many of the most prominent buildings in the country, among which some of the best known are the Woolworth, Metropolitan and Equitable Buildings in New York, and the big new Widener Building in Philadelphia. It is being specified in constantly increasing quantities, and for new uses, by the leading architects.

LIST PRICES, ANKYRA ANKOR BOLTS

Stock No.	Size, Ins.	Price per 100	Stock No.	Size, Ins.	Price per 100
6M	$\frac{1}{4}$ x $\frac{11}{16}$	$2.15	8	$\frac{5}{32}$ x $2\frac{1}{2}$	$3.50
8M	$\frac{1}{4}$ x $\frac{11}{16}$	2.15	10	$\frac{3}{16}$ x $2\frac{1}{2}$	3.75
10M	$\frac{3}{8}$ x $\frac{13}{16}$	2.45	12	$\frac{3}{16}$ x $2\frac{1}{2}$	3.75
12M	$\frac{3}{8}$ x $\frac{13}{16}$	2.45	14	$\frac{7}{16}$ x $2\frac{1}{2}$	4.15
8E	$\frac{5}{32}$ x $1\frac{1}{2}$	2.90	16	$\frac{7}{16}$ x $2\frac{1}{2}$	4.15
08	$\frac{5}{32}$ x $1\frac{1}{2}$	2.90	18	$\frac{7}{16}$ x $2\frac{1}{2}$	4.15

EXPANDING TOOLS

No. 6M to No. 12M	$0.45
No. 8 to No. 18	.45
No. 8 to No. 18 ("Extension")	.75

THE DAYTON MALLEABLE IRON COMPANY

Makers of High-Grade Malleable Iron Castings

DAYTON, OHIO

AGENCIES FOR THE SALE OF CONCRETE INSERTS

NEW YORK, N. Y., Olney J. Dean & Co.
PHILADELPHIA, PA., Janney, Steinmetz & Co.
CHICAGO, ILL., Olney J. Dean & Co.
BOSTON, MASS., Robert B. Campbell
ATLANTA, GA., Strafford R. Hewitt
BUFFALO, N. Y., Buffalo Builders Supply Co.
DAYTON, OHIO, Blanchard Structural Products Co.
DANVILLE, VA., Plumer Wiseman
DENVER, COLO., Colorado Builders Supply Co.
DETROIT, MICH., Wm. H. Cameron
DALLAS, TEX., S. A. Ellsberry
HOUSTON, TEX., Everett Bradt & Co.
INDIANAPOLIS, IND., The Fireproofing Co.
KANSAS CITY, MO., J. P. Sprague Co.
LOUISVILLE, KY., Thomas L. Barret
LOS ANGELES, CAL., Waterhouse & Price Co.
OMAHA, NEB., C. W. Hull Co.
PITTSBURGH, PA., Witherow Steel Co.
PORTLAND, ORE., F. T. Crowe & Co.
ST. LOUIS, MO., Randolph Sales Co.
SAN FRANCISCO, CAL., Pacific Building Materials Co.
SEATTLE, WASH., F. T. Crowe & Co.
SPOKANE, WASH., F. T. Crowe & Co.
MONTREAL, CAN., Wm. H. Wardwell
TORONTO, CAN., Railway Contractors Supply Co.
VANCOUVER, B. C., F. T. Crowe & Co.
CALGARY, CAN., Gorman, Clancey & Grindley, Ltd.
EDMONTON, CAN., Gorman, Clancey & Grindley, Ltd.

Products.

Dayton or Bigelow Patented Inserts (No. 803089), and Sleeper Supports (Patent pending).

Also, Octagonal Column Capital Forms, Octagonal and Square Column Clamps, Scuppers for Draining Concrete Floors, and other Malleable Iron Devices for Building Construction.

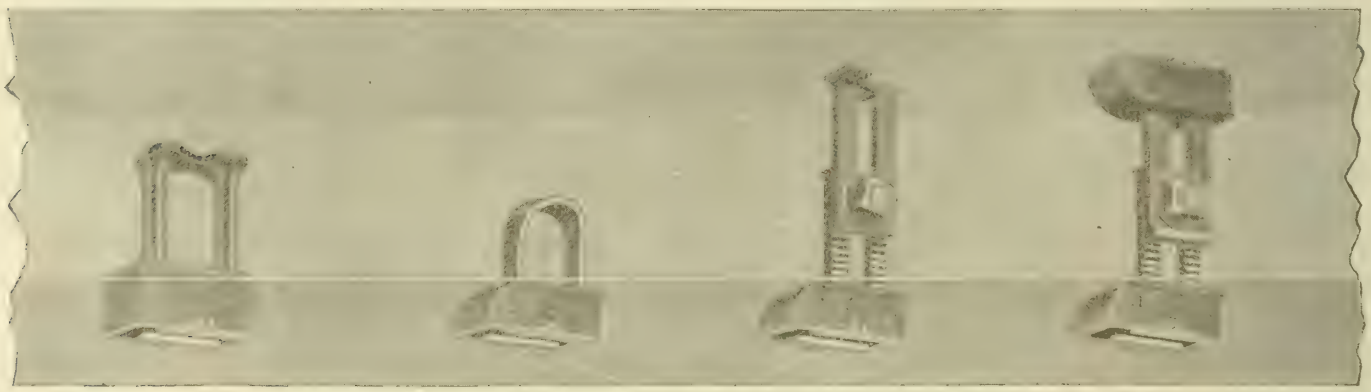
Design and Use of Dayton Inserts.

Designed with a rectangular socket, having a keyhole slot, and supported by two columns and flanged top or loop, they are fastened to the wooden floor, wall or ceiling forms by driving nails through the notched lugs, and are thus rigidly held in position when the concrete is poured.

When the forms are removed, the slotted face is exposed, flush with the concrete, providing for insertion of bolts and lateral adjustment, to secure perfect alignment of shafting, etc.

The bolts are readily inserted by entering the head at right angles to the sockets and turning the bolt as it enters, which prevents it from leaving the socket when being laterally adjusted. The various sizes have a wide margin of safety over safe working load of bolts used.

Our Inserts provide for the quick and easy installation or of later readjustment of shafting, machinery and all fixtures to be attached. The drilling of the hardened concrete slabs for lag screws or expansion bolts is eliminated, effecting a material saving.



APPLICATION OF DAYTON INSERTS

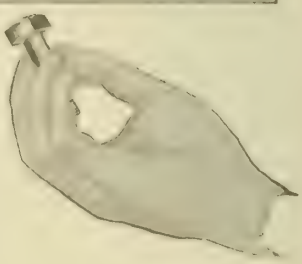
Bolt	NO. 3 INSERTS Height Over All	Length of Slot	Price per 100	NO. 5 INSERTS Height Over All	Length of Slot	Price per 100
[illegible]	[illegible]	1¾"	$3.00	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	2⅛"	1⅞"	$6.00
[illegible]	[illegible]	2¼"	7.50	2½"	2⅛"	7.50
⅝"	4"	2½"	9.00	2⅞"	2⅜"	8.50
[illegible]	[illegible]	[illegible]	12.00	3⅛"	2⅝"	10.00
[illegible]	[illegible]	[illegible]	14.00	3¼"	2¾"	12.50

Dayton Double-End Inserts.

No. 4A and No. 4B Inserts provide floor anchorage for machinery, motors, etc., directly over shaft hangers. They can be adjusted to the thickness of floor slabs.

	Height Over All	Length of Slot
No. 4A	4¼"	2⅞"
No. 4B	6¾"	2⅞"
	Minimum Height	Maximum Height
2 Inserts No. 4A	[illegible]	6⅞"
1 Insert No. 4A and 1 4B	7¾"	9"
2 Inserts No. 4B	[illegible]	11¼"

[illegible] and 4B designed for [illegible] floors. Other sizes furnished as required.



Dayton Sleeper Supports.

Made for buildings requiring wood, cork or other types of flooring to be laid over concrete. Nailed to sleeper and false work.

Sleeper Supports Nos. 6A and 6B may be combined with Inserts Nos. 4A and 4B, providing a ceiling insert and a sleeper support; or the combination may be inverted, providing a floor insert.

Co-operative Service.

Blue-prints, details and prices furnished on request.

ESTABLISHED 1895 INCORPORATED 1911

THE DONLEY BROTHERS CO.

Concrete Inserts and Multi-Adjustable Foot Anchors

East 74th Street and Aetna Road

CLEVELAND, OHIO

DISTRIBUTORS IN THE PRINCIPAL CITIES

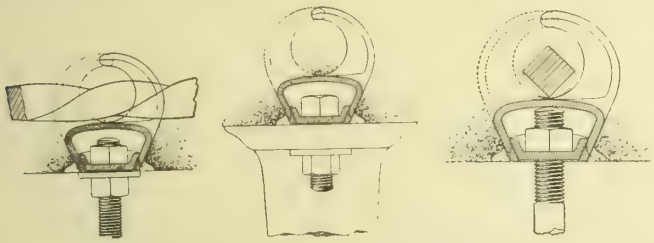
Products.

Manufacturers of D-B Heavy Duty Concrete Inserts and D-B Multi-Adjustable Foot Anchors for supporting Pipe and Transmission Machinery and for anchoring Building and Factory Equipment.

For D-B Garbage Receivers and Building Specialties, see our name in General Index.

D-B Heavy Duty Concrete Inserts.

For use wherever support to ceilings, walls or columns is required for shafting, trolley and conveyor tracks, heating and plumbing pipes, sprinkler systems, etc.



APPLICATION OF D-B HEAVY DUTY INSERTS

Features of Design—The size and bulge of the insert body and the widely extended claws engage such a broad mass of concrete as to provide exceptional supporting power.

Where desired, the insert can be placed with the claws encircling the reinforcement bar. This gives additional supporting power, and at the same time the inserts act as chairs for the bars.

Adjustable Features—The unique design gives unusual flexibility to meet the requirements of alterations in overhead attachment, frequently caused by changes in machinery or equipment. The same sockets are adapted to new equipment by interchangeable bearing plates for bolts varying in size from ¼ inch to ¾ inch.

Supporting Power—D-B Inserts will carry any load up to the allowable strength of the bolt used.

On the Wood Form

Imbedded in the Concrete

D-B HEAVY DUTY INSERTS

PRICES AND SIZES D-B HEAVY DUTY SOCKETS

No.	Size Bolts	Shipping Weight per 100	Price Each
1	¼, ⅜, ½, ⅝	110 lbs.	$.10
2	⅜, ½, ⅝, ¾	210 lbs.	.20

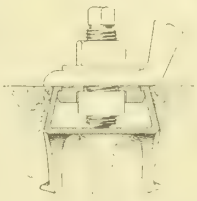
PRICES AND SIZES HEAVY DUTY BEARING PLATES

For Insert Socket	No.	Size Bolt	Shipping Weight per 100	Price, Each: Less than 5000	Price, Each: Over 5000
No. 1	12	¼	42 lbs.	$.01¾	$.01¾
	13	⅜	40 lbs.	.01¾	.01¾
	14	½	39½ lbs.	.01¾	.01¾
	15	⅝	38 lbs.	.01¾	.01¾
No. 2	23	⅜	40 lbs.	.01¾	.01¾
	24	½	39½ lbs.	.01¾	.01¾
	25	⅝	38 lbs.	.01¾	.01¾
	26	¾	37½ lbs.	.01¾	.01¾

Specifications for Installation—The D-B Heavy Duty Concrete Inserts, of size specified, shall be placed in rows spaced 5 ft. on centers not to exceed 5 ft. apart in the rows. Rows to start 1 ft. from wall or from beams which project below ceiling. They shall be placed on the concrete forms with the insert slot at right angles to the line of shafting or other equipment to be supported, then nailed securely in position.

D-B Multi-Adjustable Foot Anchors.

Specifications for Installation—The D-B Multi-Adjustable Foot Anchors shall be located by transit, template, or other method. Size specified shall then be securely nailed to the forms. Before concrete is poured each socket shall be filled with excelsior or waste paper. Final adjustment of bearing plates and bolts shall be made at time of installing equipment.



Foot of equipment securely held in position

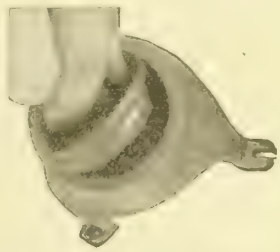


Plate and Bolt easily slipped into body of anchor

D-B MULTI-ADJUSTABLE FOOT ANCHOR

PRICES AND SIZES D-B FOOT ANCHOR SOCKETS

No.	Sockets Height, Ins.	Size Bolts	Shipping Weight per 100	Price, Each
30	1	¼, ⅜, ½, ⅝, ¾	44 lbs.	$.05
31	2	¼, ⅜, ½, ⅝, ¾	55 lbs.	.06
32	3	¼, ⅜, ½, ⅝, ¾	63 lbs.	.07
33	4	¼, ⅜, ½, ⅝, ¾	77 lbs.	.08
34	5	¼, ⅜, ½, ⅝, ¾	82 lbs.	.09

PRICES AND SIZES D-B MULTI-ADJUSTABLE FOOT ANCHOR BEARING PLATES

No.	Size Bolt	Shipping Weight per 100	Price, Each
302	¼	29 lbs.	$.01¾
303	⅜	25 lbs.	.01¾
304	½	25 lbs.	.01¾
305	⅝	22 lbs.	.01¾
306	¾	20 lbs.	.01¾

SECURITY INSERT COMPANY

Ceiling Sockets for Concrete Work

Thirty-Third and Arch Streets
PHILADELPHIA, PA.

Product.

SECURITY INSERTS, or CEILING SOCKETS, for Concrete Work.

Security Inserts.

The Security Insert solves the problem of the hanging of machinery or fixtures to be suspended from ceiling or wall in factories, warehouses and other buildings of concrete construction.

The Security Insert was designed by engineers who have made a careful study of this problem, and have produced a socket overcoming all objectionable features inherent in others. The ease of installation, the absence of any fixed thread, the strength and other commendable features of this socket, are shown in the illustrations.

Features.

The Security Insert embodies the following valuable features:

(1) The design, distribution of metal, and anchorage in the concrete enable it to carry a greater load than either bolt or concrete.

(2) It has no fixed thread to become rusty or damaged.

(3) In place of fixed thread a standard steel nut (the strongest thread possible) is placed in the Insert when ready to use.

(4) This nut is renewable at any time.

(5) A stud or a bolt may be used, whichever is more convenient for the work.

(6) The Security Insert permits play of stud or bolt while hanging machinery or other fixtures; but when washer is slipped into recess, the stud or bolt is held rigidly central.

(7) The Security Insert has a large flat base, insuring upright position in the form, to which it is securely nailed, thus avoiding waste of time and lumber.

(8) It is desirable to place Inserts in all parts of concrete buildings, such as offices, storerooms, etc., as well as in those portions where machinery is to be installed.

(9) The Security Insert is the only insert provided with a means for concealing the hole in wall or ceiling. This is accomplished by use of a cardboard disc, furnished free of charge, which fits the washer recess and can be painted to harmonize with surroundings.

STRENGTH OF BOLTS

ASSUMED TENSILE STRENGTH 60,000 POUNDS PER SQUARE INCH

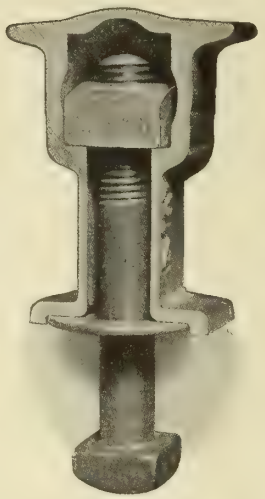
Size	Ultimate Strength	Safe Load Factor 5
3/8-inch Bolt	4,100 pounds	820 pounds
1/2-inch Bolt	7,600 pounds	1,520 pounds
5/8-inch Bolt	12,100 pounds	2,420 pounds
3/4-inch Bolt	18,100 pounds	3,620 pounds
7/8-inch Bolt	25,200 pounds	5,040 pounds

PRICE LIST

SECURITY INSERTS MADE FOR THE FOLLOWING SIZES OF BOLTS:

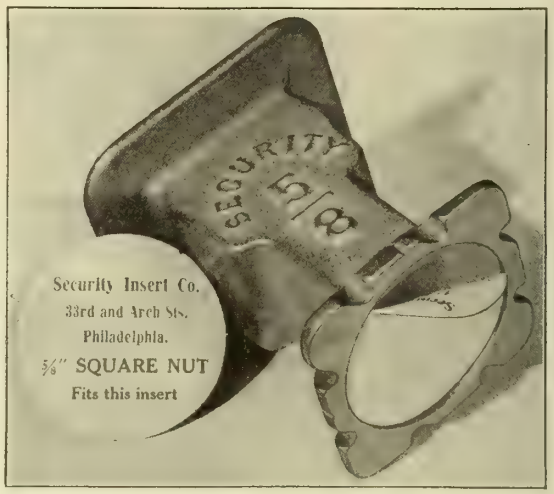
Diameter of Bolts	Each
[illegible] inch	11 cents
[illegible] inch	13 cents
5/8 inch	17 cents
[illegible] inches	21 cents
[illegible] inches	25 cents
7/8 inch	30 cents

We furnish the Insert only.

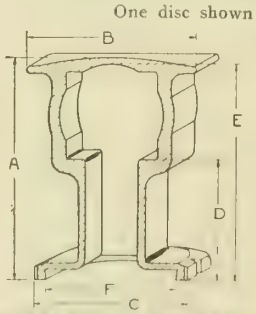


BOLT AND NUT IN POSITION

INTRODUCING OR REMOVING THE NUT
(Patented)



BOTTOM VIEW OF SECURITY INSERT, WITH CARDBOARD DISC FOR CONCEALING HOLE WHEN DESIRABLE
One disc shown in place, and partly turned back



DIMENSION DIAGRAM, WITH TABLE, IN INCHES

	A	B	C	D	E	F
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

THE INSERT NAILED TO FORM

SELF-CLINCHING NAIL CO.

SOLE MANUFACTURERS

44 North Fourth Street
PHILADELPHIA, PA.

Products.

Farrand's SELF-CLINCHING NAILS for Grounds and Furring Strips on Hollow Tile and Gypsum Blocks; for Carpentry, Electric Mouldings, etc., on Hollow Metal Lath.

Farrand's CLINCHER BOLTS for assembling industrial products.

Description.

Self-Clinching Nails and Clincher Bolts are basic forms of fastening, devoid of all nuts, threads, toggles, etc. They are driven with a hammer, and require attention from but one side of the work. They clinch on the opposite side, automatically, as a result of the blows given on the head.

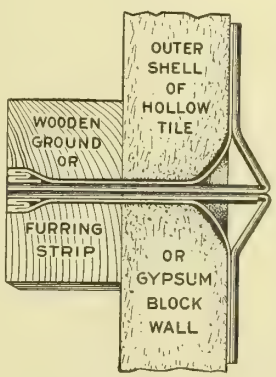
Advantages for Furring and Grounding.

Self-Clinching Nails furnish the logical method for attaching grounds and furring to hollow tile and gypsum block walls. They rivet directly to the structure itself, insuring a sound metal anchorage within the wall, and they eliminate every makeshift, such as wooden blocks, metal plugs or porous nailing tiles, which are liable to result in loose or insecure fastenings. Self-Clinching Nails replace slovenly and uncertain practices with dependable methods and a certainty of results.

IMPROVED SELF-CLINCHING NAIL

They cut out all cost of preparing the wall in advance of setting grounds and they give the architect full freedom to change the arrangement of the interior finish right up to the time plasterers begin their work. No workman's error in misplacing or omitting blocks can hinder the progress of building. They speed up the work of the mason fully 10 per cent; for it takes as long to lay a 1-inch wooden block as it does a foot of hollow tile.

Self-Clinching Nails preserve the full fire-resisting qualities of the structure by saving it from being riddled with wooden blocks, which offer a means for spreading fires from room to room and materially menace the stability of walls when so attacked.

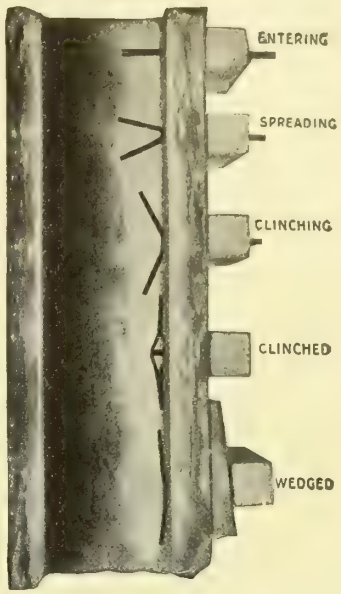


SECTIONAL VIEW, SHOWING NAIL CLINCHED

Comparative Cost.

Self-Clinching Nails do not compete in price with ordinary nails, but with the cost of preparing walls to receive nails. Considering labor, material, etc., their cost is less than that of wooden blocks or plugs in place. The labor involved in applying the ground is practically the same for Self-Clinching Nails as for ordinary nails. Self-Clinching Nails require a preliminary operation of punching holes in hollow tile, but their use so simplifies the later process of "lining out" the strip that it more than compensates for the slight loss incurred by the extra operation. They may be wedged out over ¾ inch without injuring their hold.

A special punch tool is supplied for making neat holes, $\frac{3}{16}$-inch diameter, in hollow tile.



CLINCHING ACTION OF NAILS WITHIN HOLLOW OF WALL

Samples.

Samples for test and illustrated "System for Attaching Grounds" sent to architects or builders on request. State thickness of wooden strip and type of fireproofing.

DATA FOR SPECIFYING

Thickness of Wooden Strip	Nominal Size Nail Required	Actual Length of Nail Over All
½"	1" nail	2¾"
⅝", ¾", ⅞"	1¼" nail	3"
1", 1⅛"	1½" nail	3¼"

One nail is required for every 1½ or 2 feet of wooden strip

Special nails made for Book and Furring Tile and other special forms of fireproofing

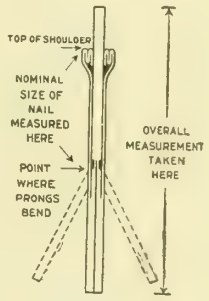


DIAGRAM OF NAIL DIMENSIONS

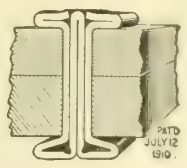
Clincher Bolts.

For the user of small bolts we can cut the cost of assembling to a fraction of what it now is, as from four to ten Clincher Bolts can be driven in the time it takes to set one ordinary bolt.

No nuts to take off or put on. Nothing to loosen or fall off. No threads to damage or clog. No helpers required. No screwdrivers, no wrenches, no clippers. No extra equipment.

For further information write, giving particulars as to class of work, material, dimensions and size of holes and bolts now used.

CLINCHER BOLT



CLINCHER BOLT, DRIVEN

THE STAR EXPANSION BOLT CO.

Expansion Bolts, Toggles and Concrete Inserts

147-149 Cedar Street
NEW YORK, N. Y.

STOCKS ARE CARRIED AND SHIPMENTS MADE FROM

CHICAGO, ILL., 120 West Lake St. SAN FRANCISCO, CAL., 579 Howard St.
MONTREAL, CAN., 131 St. Paul St., W. TORONTO, CAN., 82 East Richmond St. WINNIPEG, CAN., 425 Henry Ave.

HARDWARE AND SUPPLY DEALERS EVERYWHERE HANDLE OUR PRODUCTS

Products.

Manufacturers of Sebco Expansion Bolts, Screw Anchors, Concrete Inserts and Toggles; Brick and Stone Drills.

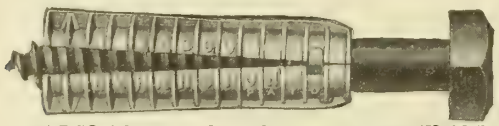
TRADE-MARK

SEBCO EXPANSION BOLT, SHOWING APPLICATION

Expansion Bolts.

An important point in specifying Sebco expansions is that the shields are made for use with standard lag screws and machine bolts. They are carried by every important jobber and dealer throughout the country, and can be obtained by the contractor without delay.

The various types shown below have all been used and specified to a large extent by United States Government engineers and for the most important public and private work.


SEBCO EXPANSION BOLT, LAG SCREW TYPE

Shield expands by turning in screw, and can be used for every purpose. Shield is the most practical for all ordinary requirements. Under test, a ½-inch Expansion Bolt sustained over four tons dead weight

Machine Bolt Type.

Bolt has a parallel expansion and is the strongest made. The harder the strain placed upon the bolt, the tighter the shield becomes wedged in the wall. Under test, the bolt breaks before the expanding parts are in any way weakened.

STAR DOUBLE EXPANSION BOLT

Sebco Screw Anchors.

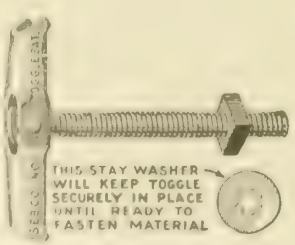
Bathroom fixtures in most of the large hotels erected during the past ten years have been fastened with Sebco screw anchors.

SEBCO SCREW ANCHOR

Their use insures against cup holders, towel holders and other attachments of the kind, becoming loose. The anchors are inserted in small holes drilled in the tile walls, and make a neatly finished job.

Toggle Bolts.

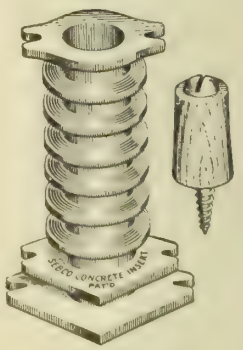
The universal adoption of hollow tile and metal construction in important buildings makes it incumbent upon the architect to specify a particular device for fastening mouldings and fixtures in a permanently secure manner. Almost any toggle will make a temporary fastening, but for permanence and strength, Sebco toggles can be absolutely relied upon.



SEBCO NO. 1 TOGGLE BOLT

Sebco Concrete Insert.

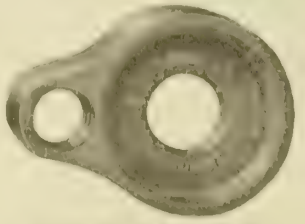
In designing a concrete factory, loft building, or other structure, architects and engineers are quite generally specifying the use of inserts which are fastened to the form before the mixture is poured. When the forms are removed, the insert then appears as a reinforced threaded hole, to which fastenings may be made by means of lag screws or machine bolts. This method of providing for necessary fastenings conserves the appearance of the wall or ceiling, and obviates the necessity of drilling for the insertion of expansion shields


SEBCO CONCRETE INSERT

The Sebco insert consists of a malleable iron anchor with corrugations formed to firmly engage the concrete, and threaded for either bolts or screws. Accuracy in fastening is provided for by the use of a wooden plug screwed to the wooden form and over which the insert is pressed. This plug comes away with the form, leaving only a neat aperture in the cement visible.

Adjusting Fixture for Use with Inserts.

While Sebco inserts can be placed with absolute accuracy, making adjustment ordinarily unnecessary, occasion may arise where through carelessness or change in plans it is necessary to make the fastening off from the opening. To meet this condition, the adjusting fixture has been designed and will be found easy to use and thoroughly efficient.


ADJUSTING FEATURE FOR USE WITH INSERTS

WAGNER-BEHM COMPANY

Manufacturers of "Furr-Easy" Furring Posts

20 East Jackson Boulevard

CHICAGO, ILL.

Products.

"Furr-Easy" Furring Posts for fastening Metal or Wire Lath to Walls, Beams, etc.

Description.

The "Furr-Easy" Furring Post is made from metal of various lengths, to suit the requirements of the user. Fig. 1 shows the side, and Fig. 2 the rear of the device, with the lip or flap turned up, in which state it is marketed. Fig. 3 shows the flap turned down, as it appears when in place. The post is open in the rear and on the sides, allowing plaster to enter and fill the interior for its protection.

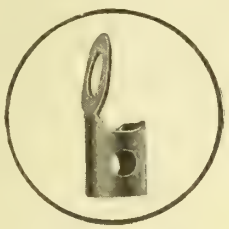


Fig. 1. Side view

Fig. 2. Rear view

Application and Uses.

In its application, the "Furr-Easy" post is inserted through the openings of the metal or wire lath; the lip is turned down over the strand, and the nail, of any length desired, is driven through the hole in the flap, thereby supplying a positive fastening, holding the lath rigidly in place, and producing a smooth and even surface.

Figs. 3 and 4 show a perspective view of a piece of metal lath fastened with "Furr-Easy" posts. The upper illustration shows the nail partially driven; the lower illustration shows the nail fully driven in place.

Fig. 3. Flap turned down and nail started

Fig. 4. Nail fully driven

"FURR-EASY" FURRING POSTS

The use of the "Furr-Easy" post results in the lath being rigidly fastened; and the entire lath is thoroughly covered with an equal thickness of plaster in an unbroken surface throughout, both, therefore, acting in unison during the process of expansion and contraction. The contact has thus been brought to a minimum, assuring preservation and uniformity.

A No. 26-gauge lath can be thoroughly fastened, stiff and rigid, for application of mortar, with twelve "Furr-Easy" posts per square yard.

The "Furr-Easy" post is an ideal device for semi-fireproof construction, where furring the lath on wooden beams or joists and on the inside of exterior walls is desired, to provide an unobstructed air circulation.

Within the past year much progress has been made in the coating of old wooden, stone and brick buildings, with stucco applied on expanded metal or wire lath. The "Furr-Easy" post is an ideal device for this purpose, and is superior to any other make.

Perplexing Problems Solved.

One of the most perplexing problems, since the advent of the use of stucco on exterior walls, has been the cracking of the surface, thereby admitting moisture and causing deterioration of the metal lath which is most generally employed in the construction of stucco work.

The architect and builder, in their effort to remedy this defect, at first resorted to the condemnation of the material from which the lath was manufactured. This practice resulted in the manufacture of various so-called rustless and rust-resisting metal lath, which, however, during tests, have not proven effectual in preventing this cracking. Later it was discovered that the method of construction had much to do with this defect. They then changed from the old method of wooden furring strips, which were spaced vertically, and in some cases horizontally, at regular intervals, to the use of the crimped V-shaped and other deformed metal furring strips.

It mattered little whether or not the furring strips were made of wood or metal, since the cracking usually appeared over the furring strips or support. The architect in many cases desired to employ at least some stucco work in many of his buildings; but owing to his seeming inability to obtain the stucco construction that would insure permanency, he was inclined to avoid such construction.

This led to a careful study of the problem, and in the hope of overcoming its difficulties many manufacturers of metal lath have resorted to deforming the lath by corrugation, "V," and other shaped depressions, to take the place of furring strips. This, however, did not add to the protection of that portion of the depression which was directly attached to the support, and it in many cases resulted in the more disastrous destruction of metal lath by the older method of furring strips. Some of the deformed metal lath has been so constructed that at intervals of three quarters to one inch it is exposed in the rear, causing its destruction by rust in a very short time. The fact has been known for some years that where metal lath is thoroughly imbedded in cement or lime mortar, the life of the lath is equal to the life of the building.

To overcome these defects the device known as the "Furr-Easy" post has been invented.

Sizes and Packages.

"Furr-Easy" posts are made in three sizes, ½-inch, ¾-inch, and 1-inch. Packed 1000 in a box.

Samples and Prices.

Samples, prices, and literature, or any information desired, may be had on request.

Services.

The Wagner-Behm Company is thoroughly familiar with the problems here mentioned, and upon application they will gladly give information, with a desire of promoting the best possible results for the advancement of stucco work.

THE ASSOCIATED TILE MANUFACTURERS

Clay Tile

BEAVER FALLS, PA.

MEMBERS OF THE ASSOCIATION COMPRISE

ALHAMBRA TILE COMPANY,
Newport, Ky.

AMERICAN ENCAUSTIC TILING COMPANY,
Factories: Zanesville, Ohio
Maurer, N. J.
New York Office, 16 East 40th Street

ATLANTIC TILE MANUFACTURING CO.,
Matawan, N. J.

BEAVER FALLS ART TILE COMPANY,
Beaver Falls, Pa.
New York Office, 155 West 24th Street
Chicago Office, 28 East Jackson Boulevard

BROOKLYN VITRIFIED TILE WORKS,
80-92 Third Street, Brooklyn, N. Y.

CAMBRIDGE TILE MANUFACTURING COMPANY,
Covington, Ky.
New York Office, 2 and 4 West 19th Street

GRUEBY FAIENCE AND TILE COMPANY,
Boston, Mass.

MOSAIC TILE COMPANY,
Zanesville, Ohio
New York Office, 30-32 West 24th Street
San Francisco Office, 230 Eighth Street

MATAWAN TILE CO.,
Matawan, N. J.

NATIONAL TILE CO.,
Anderson, Ind.
New York Office, 43 and 45 West 34th Street
Chicago Office, 59 East Adams Street
St. Louis Office, 411 Benoist Building
San Francisco Office, 1003 Crooker Building

OLD BRIDGE ENAMEL BRICK AND TILE CO.,
Old Bridge, N. J.
Chicago Office, 30 North Michigan Boulevard
San Francisco Office, 69 Lafayette Street

C. PARDEE WORKS,
Perth Amboy, N. J.

PERTH AMBOY TILE WORKS,
Perth Amboy, N. J.

ROBERTSON ART TILE CO.,
Trenton, N. J.
Factory, Morrisville, Pa.
Chicago Office, 508 Kesner Building

U. S. ENCAUSTIC TILE WORKS,
Indianapolis, Ind.
New York Office, 101 Park Avenue
Chicago Office, 19 West Jackson Boulevard

Products.

Members of THE ASSOCIATED TILE MANUFACTURERS make all kinds of CLAY TILE, including SEMI-VITREOUS or UNGLAZED ENCAUSTIC, VITREOUS, INLAID, CERAMIC MOSAIC and ART CERAMIC MOSAIC for FLOORS; ENAMELED, EMBOSSED or RELIEF, TERRA VITREA, DULL FINISH, FAIENCE, DECORATED, WALL and TRIM TILE for purposes stated in the following descriptive matter.

Object.

The object of the Association in these pages is to place before *architects* information that will assist them in securing the highest standard of installation and *the kinds of tile* that are best suited for their requirements.

Kinds of Tile, and Their Use.

To aid in selection a brief description is given of the different kinds of tile, together with sizes, shapes and colors in which they are made, and a list of purposes of each in use.

Semi-Vitreous or Unglazed Encaustic Floor Tiles.

Hard, Semi-Vitreous Tile—Nearly non-absorbent, made in all standard sizes and shapes; viz., 6" x 6" and divisions thereof, in Oblongs, Octagons, Hexagons, etc., ½" thick.

Standard Colors—Buff, Salmon, Light Gray, Dark Gray, Red, Chocolate, Black and Granite.

Used for—Porch Floors, Store Floors, Offices, Banks, Engine Rooms, Dairies, Bathrooms, Halls, Vestibules, Lavatories, Kitchens, Butcher Shops, Fish Stores, etc.

Continued on next page

Vitreous Tile.

Non-Absorbent Vitreous Tile—Made in all standard sizes up to 3″ x 3″, ½″ thick.

Standard Colors—White, Silver Gray, Celadon, Green, Blue Green, Light Blue, Dark Blue and Pink.

Special Sizes and Colors—Size 6″ x 6″, ¾″ thick, in White, Green and Silver Gray.

Used for—Floors of all kinds—Bathrooms, Halls, Vestibules, Porches, Offices, Banks, Dairies, Kitchens, Lavatories, Butcher Shops, etc.

NOTE—Vitreous and Semi-Vitreous Tile are frequently worked in combination with perfectly satisfactory results.

Inlaid Tiles.

Hard, Semi-Vitreous and Vitreous Tile—Nearly non-absorbent, inlaid in two or more colors showing geometrical designs, made in various sizes up to 6″ x 6″, ½″ thick.

Colors—Combination of Semi-Vitreous and Vitreous colors.

Used—In floors with Vitreous and Semi-Vitreous Tile.

Ceramic Mosaic Tile.

Vitreous and Semi-Vitreous—Made in following sizes, ¼″ thick:

Standard Sizes
- ¾ in. Square
- 13/16 in. Round
- 1 in. Hexagon
- 1¼ in. Hexagon

Special Sizes
- ½ in. Square
- ½ in. by 1 in. Oblong
- ⅝ in. by ⅞ in. Oblong
- ¾ in. Hexagon

Colors—Same as Semi-Vitreous and Vitreous Tile. Also, a number of special colors producing any color effect desired.

Used for—Floors of all kinds—Bathrooms, Halls, Vestibules, Lavatories, Kitchens, Porches, Offices, Banks, Swimming-pools, Butcher Shops, Exterior Walls, etc.

Art Ceramic Mosaic Tiles.

Hand-Cut Mosaic—In stock or special designs.

Used for—Floors in Vestibules, Doorways, Bathrooms, Hearths, Fireplace Facings, Store Fronts, etc.

Enamel Tile, Bright and Matt or Dull-Finish Glazes.

Made in all Standard Sizes, and in special shapes, ½″ thick.

Colors—Plain colors of various shades, and in Mottle, Onyx, and Marble effects.

Used for—Fireplaces, Hearths, Wainscoting, Vestibules, Halls, Bathrooms, etc.

Embossed or Relief Tile, Bright and Matt or Dull-Finish Glazes.

Made in Various Sizes, ½″ thick.

Colors—Same as Enamel Tiles, Bright and Matt or Dull-Finish glazes.

Used for—Fireplace Facings, Friezes, Wainscotings, Bathroom Borders, etc.

Note that Embossed or Relief Tile are not recommended for use in Hearths.

Terra Vitrea, Bright and Matt or Dull-Finish Glazes.

Rough and Smooth Surfaces—Made in following sizes: 6″ x 2″, 6″ x 3″, 7″ x 3½″, 8″ x 4″, 9″ x 4½″, 4″ x 4″, 6″ x 6″, 8″ x 8″, 9″ x 9″, ¾″ thick.

Special Sizes and Shapes are made for Mantel Facings.

Colors—Various shades of Greens, Browns, Blues, etc.

Used for—Fireplaces, Wainscotings in Vestibules, Halls, Bathrooms, Banks, Offices, etc.

Faience.

Made in standard sizes and in special shapes, ¾″ to 1″ thick.

Colors—Various shades for all kinds of Decoration.

Used for—Floors, Walls and general exterior work, in Office Buildings, Railroad Stations, Hospitals, Store-Fronts, Fireplaces, Bathrooms, etc.

Decorated Tiles.

Decorated on Embossed Tiles—In Gold and in Colors, over and under the glaze.

Used for—Borders in Bathrooms, Wainscotings, Fireplace Facings, etc.

Hand Decorated Tiles.

Painted—In regular stock designs or special designs after drawings or suggestions from architects.

Wall Tile, Bright and Matt or Dull-Finish Glazes.

Wall Tiles—Are made in the following regular sizes: 6″ x 6″, 6″ x 3″, 6″ x 2″, 4¼″ x 4¼″, 4¼″ x 2½″, ⅜″ thick, and 9″ x 3″ and 9″ x 4½″, ½″ thick.

Colors—White, Cream and Ivory.

Used for—Wainscotings and Walls in Bathroom Lavatories, Kitchens, Laundries, Hospitals, Passageways, and all places where a light and sanitary wall is required; also in Butcher Shops and Fish Stores.

Trim Tile, Bright and Matt or Dull-Finish Glazes.

For Shapes and Sizes—See illustrations on next page.

Colors—White, Cream, Ivory, and in Enamel and Matt or Dull-Finish Colors.

Used for—Base, Cap, Door and Window Trim, Sanitary Cove and Corners, Hospital Trim, etc.

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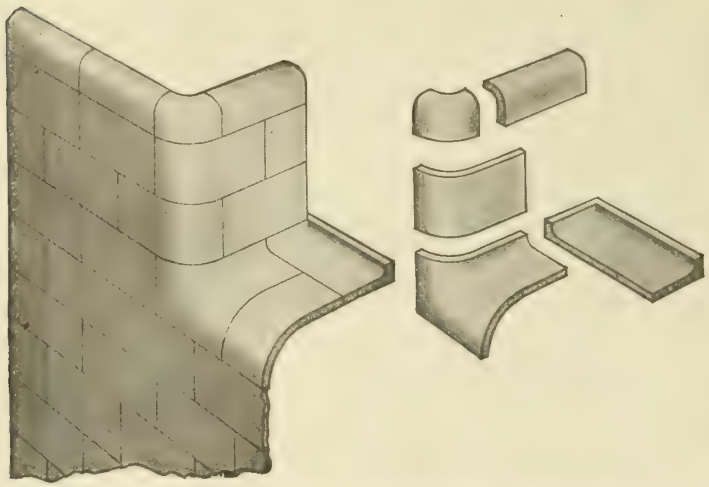
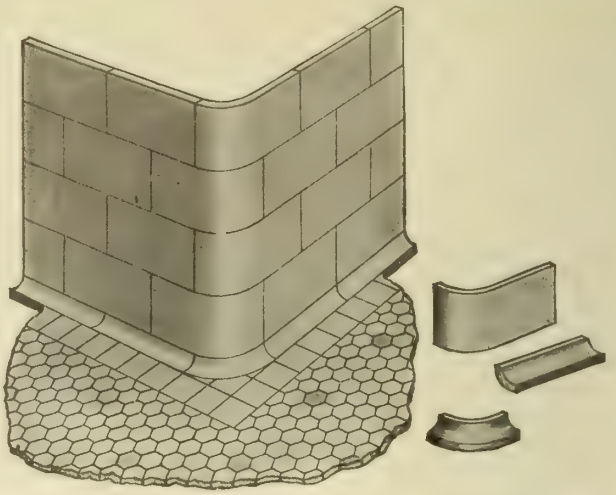
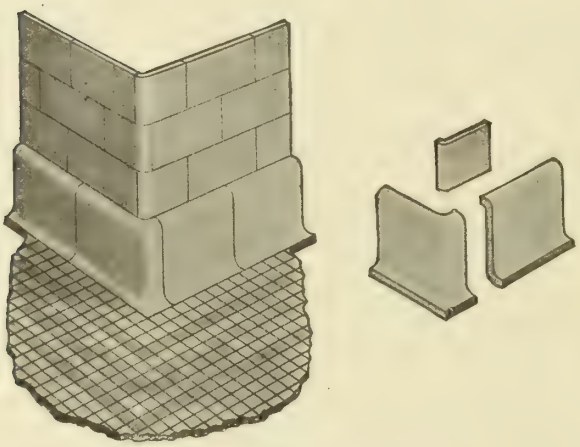


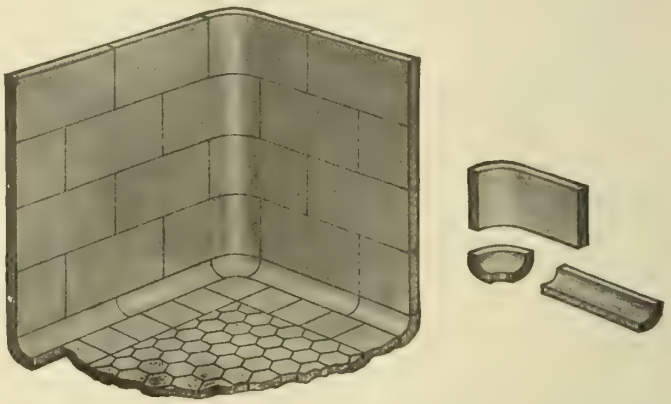
Sanitary shapes and their use to return wainscoting into window openings



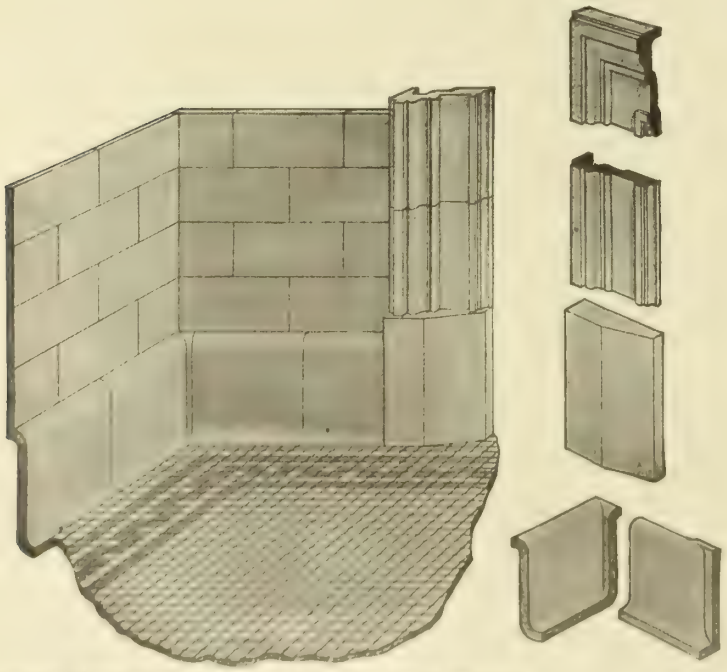
Convex corner of wainscoting with cove at floor intersection; convex angle on a large radius



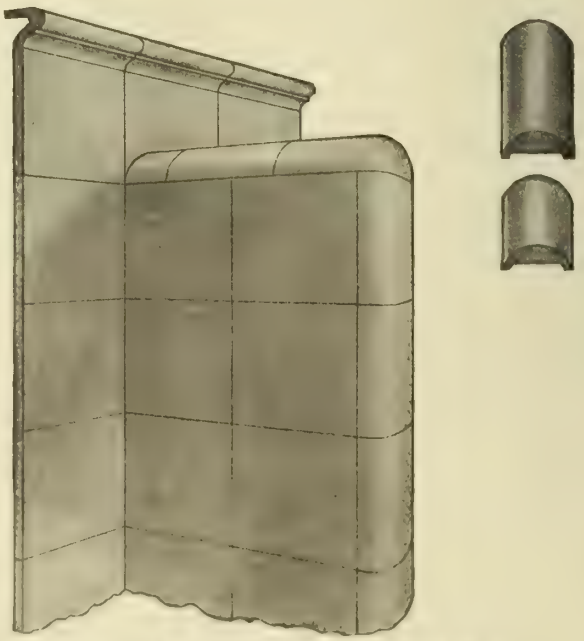
Convex corner of wainscoting, using a cove base at floor intersection; convex angle shown in a smaller radius



Concave corner, showing rounded angles on both the horizontal and vertical intersection



Sectional drawings of [illegible] with sanitary base and square corner



A treatment for a partition built of tile, showing use of cap on the wall

SECTIONAL DRAWINGS ILLUSTRATING THE METHOD OF USING SANITARY TRIM FOR BATHROOMS, KITCHENS, LAUNDRIES, HOSPITALS, ETC.

[illegible] CATALOGUE

Continued on next page

General Specifications and Instructions.

Important—If architects will specify that *work must be done* in accordance with the following specifications (copy having been placed in the hands of every dealer in the United States and Canada), and see that they are carried out in every particular, the results will be *most satisfactory to the architect as well as to his client.*

Foundation for Floors

A good foundation is always necessary, and should be solid and perfectly level, free from spring or vibration. Tile *must* always be laid upon a concrete foundation, prepared from the best quality Portland Cement and clean, sharp, washed sand and gravel.

Cinders should never be used, as they tend to destroy the life of cement; *but if used,* all ashes must be screened out and the *vitrified cinder or clinker* thoroughly washed. (The sulphur in cinders will destroy reinforcing in concrete.)

Concrete should be allowed to harden thoroughly before laying floor; thoroughly brushed to remove all dust; well soaked with water, dusting on concrete thin coat pure Portland Cement before applying cement mortar for laying tile.

Concrete should never be allowed to stand more than three or four days before laying the tile.

Lime Mortar

Lime mortar should never be mixed with concrete.

Concrete

Concrete should consist of one part Portland Cement, two parts clean, washed, sharp sand, four parts clean gravel.

Mix cement and sand thoroughly dry, add gravel and mix, adding sufficient water to form, when laid, a hard, solid mass when well beaten to a bed. Bed should be not less than three inches thick. Surface of concrete must be level and finished to within one inch of finished floor line (when tile ½ inch thick is used), which will leave space of ½ inch for cement mortar.

Cement Mortar

Cement mortar should consist of one part best quality Portland Cement, two parts clean, washed, sharp sand, thoroughly mixed as directed for concrete. All mortar should be used fresh, before it has its initial setting.

Reinforcing

Place on top of the concrete an open metal lath and spread the cement mortar over it. This will prevent the tendency to contraction of the cement mortar and *separation of the tile into floor cracks.*

Before laying Tile, sprinkle carefully with fine hand screen a little dry cement over floor on top of cement mortar.

Grouting

Joints to be grouted with pure Portland Cement, mixed with clear water, cleaned soon as grouting is done, leaving no cement scum on surface.

Floors in New Buildings

When tiles are laid on joists in new buildings, *if possible,* joists should be set five inches below intended finished floor line, spaced 12 inches on centers, thoroughly bridged, to make stiff floor, covered with one-inch rough boards not over six inches wide (three inches preferred), *thoroughly nailed,* and joints ⅛ inch apart to allow for swelling. (See Fig. 1.)

A layer of roofing paper on top of rough floor will protect boards from moisture of concrete, and prevent moisture from dripping through to ceiling below.

Floors in Old Buildings

Cleats are nailed to joists five inches below intended finished floor line, and short pieces of boards (not over six inches wide), ⅛ inch apart, fitted in between joists upon cleats and well nailed. Joists must be thoroughly bridged. Place roof paper as above directed. Corners on the upper edge of joists should be chamfered off to sharp point (see Fig. 2), as flat surface of joists will give uneven foundation. When strength of joists will permit, cut an inch or more off top. Where joists are too weak, strengthen by thoroughly nailing cleats six inches wide full length of joists.

When solid sub-foundation is thus prepared, concrete is placed upon it as above directed.

Iron Beams

Where iron beams and hollow tile arches are used, frequently very little space is left for preparing proper foundation for setting tile. The rough coat is usually put in by hollow tile contractor to protect his work. *This cover should always conform to requirements for a solid tile foundation.* Should this not be the case, the tile contractor *must remove sufficient* of covering to allow him to put down a foundation that will insure a satisfactory tile floor. Cinders, lime, mortar or inferior material *must never be used.*

The tops of iron beams should be three inches below the finished floor line to prevent floors showing lines on the beams. (See Fig. 3.)

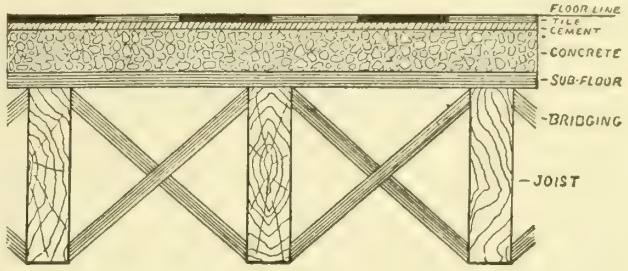


Fig. 1. CONSTRUCTION FOR TILE IN NEW BUILDING

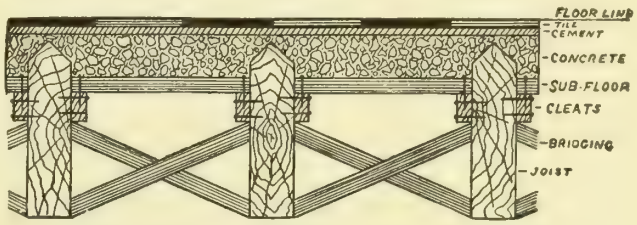


Fig. 2. CONSTRUCTION FOR TILE IN OLD BUILDING

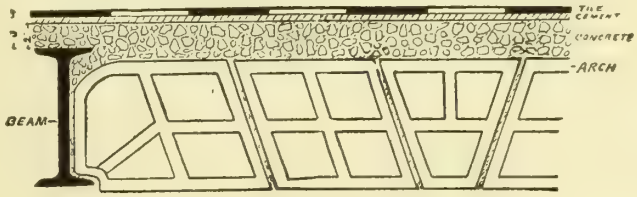


Fig. 3. TILE ON IRON BEAMS AND HOLLOW TILE

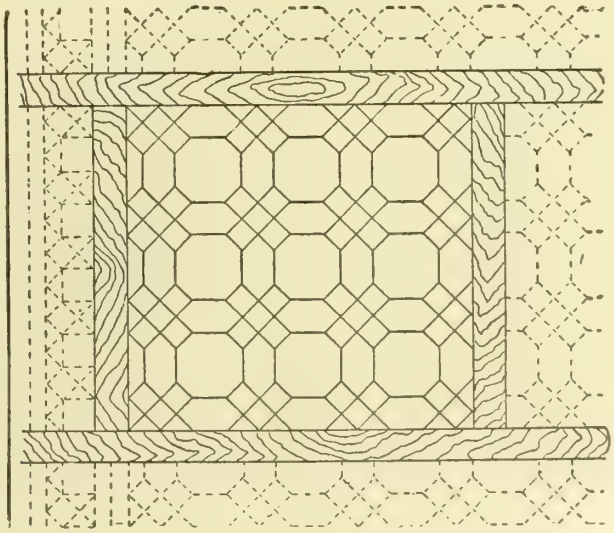


Fig. 4. GUIDE STRIPS FOR TILE LAYING

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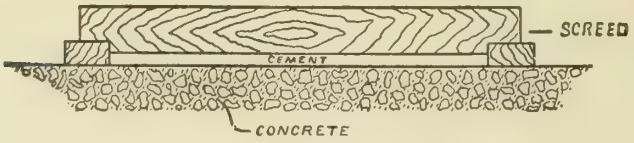


Fig. 5. SCREED FOR LEVELING MORTAR

Method of Laying Floor Tile

Semi-Vitreous or Vitreous Tiles for floors are first laid out to ascertain if they are all right, and compared with plan provided for laying floors. Strips are then set, beginning at one end of and in center of room, and level with intended finished floor line. Two sets of guide strips running parallel about 18 to 30 inches apart should be set first. (See Fig. 4.) Mortar is then spread between them for six to ten feet at a time, and leveled with screed notched at each end to allow for thickness of tiles. (See Fig. 5.)

Tiles are placed upon mortar, which must be stiff enough not to work up between the joints. Tiles are firmly pressed into mortar and tamped down with block and hammer until exactly level with strips. When space between strips is completed, strips on one side of tile are moved out 18 to 30 inches and placed in proper position for laying another section of tile, using tiles which have been laid for one end of screed, and laying of tile continued in same manner until floor is finished.

Figures 4 and 5 are given to show one approved method of installing floor tile. In some cities different methods have been worked up by mechanics, which are just as satisfactory as those shown.

When cement is sufficiently set, which should be in about two days, floor should be well scrubbed with clean water and broom, and joints thoroughly grouted with pure cement, mixed with water to consistency of cream. As soon as this begins to stiffen, it must be carefully rubbed off with sawdust or fine shavings, and floor left perfectly clean.

Method of Laying Ceramic Mosaic Tile

Ceramic Mosaic Tiles are first examined to ascertain if design is right, and laid as directed above. Cement mortar is spread evenly and leveled with screed. Sheets of papered Ceramic Mosaic are laid carefully on mortar, with paper side up. After space is covered, the tile setter should press tile into mortar, gently at first, firmly afterwards, using block and hammer, leveling tile as correctly as possible.

In large areas of floor work, every third or fourth row of sheets should be laid to a chalk line to avoid bad kinks in line of tiling after floor is finished.

Tile should be beaten down until mortar is visible in joints through paper, however without breaking it.

Paper is then moistened, and, after being well soaked, can be easily removed. It is pulled off backwards, starting from a corner. After removing paper, tile should be sprinkled with white sand before finishing the beating, so that tiles will not adhere to beater owing to paste which is used in mounting them. Corrections of surface are then made by leveling with block and hammer.

The filling of joints and cleaning of surface is a delicate operation, as the looks of this work depend largely upon it. Joints are to be filled with clean Portland Cement, mixed with water. This mixture is forced into joints with a flat trowel (not with a broom, which often scrapes out the joints). After joints are filled, surplus cement is removed from surface by drawing a wet piece of Canton flannel over it. This cloth must be washed frequently with clean water.

After the floor is cleaned, it should be allowed to stand for a day or two, when whole floor is to be rubbed with sharp sand and a board of soft lumber. This treatment removes the last traces of cement. In laying tile sheets on cement, care should be taken to have width of joints spaced same as tile on sheets, to prevent floor having a block appearance.

Cleaning Floor Tile

Remove with sawdust, and afterwards with flannel cloth and water, all traces of cement left on surface of tile, as it is hard to remove after it is set. After thoroughly cleaning floor, cover with sawdust and boards placed on floor for several days where there is walking upon it.

A white scum sometimes appears on surface of tile, caused by the cement. This can generally be removed by washing frequently with plenty of soap and water. If scum or dirt can not be removed by washing, then use a solution of muriatic acid and water (six ounces of acid to a bucket of water), applied with scrubbing brush. Allow acid to remain on floor for a few minutes only, then thoroughly wash off.

Foundation for Hearths

Foundations for Hearths should be placed upon brick arch, if possible, to insure perfect fire protection, then covered with concrete in same manner as directed for tile floors. (See Fig. 6.)

If placed upon sub-foundation of wood, concrete should be at least six inches thick. (See Fig. 7.)

Hearth and Facing Tile are set in the same manner as for floors and walls.

Foundation for Walls

A good foundation is absolutely necessary, and should be solid and perfectly plumb, free from any spring or vibration before applying scratch coat, to prevent tile coming loose.

Scratch Coat

The Scratch Coat should consist of one part best quality Portland Cement, two parts clean, washed, sharp sand. Mix the cement and sand thoroughly dry and add sufficient water to form a thick mortar.

The Scratch Coat should be allowed to harden for at least one day before commencing to set tile, thoroughly brushed to remove all dust, and well wet, brushing on thin coat of pure liquid Portland Cement before putting on cement mortar for setting tile.

Tiles Placed on Studding

When Tiles are placed on studding, the studding should be placed fifteen-inch centers, thoroughly braced to prevent vibration, and covered with expanded metal lath. (See Fig. 3.)

Scratch coat on metal lath should be ½ inch thick, or sufficient to make even and true surface to within ⅞ inch of intended finished surface of tile when tile ⅜ inch thick are used. Scratch coat should be roughly scratched.

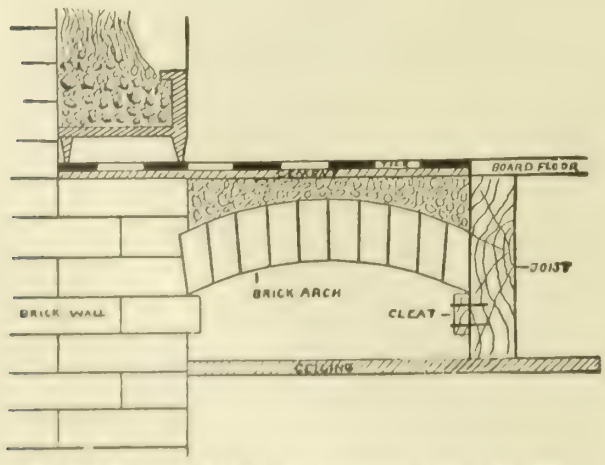


Fig. 6. BRICK ARCH FOUNDATION FOR HEARTH

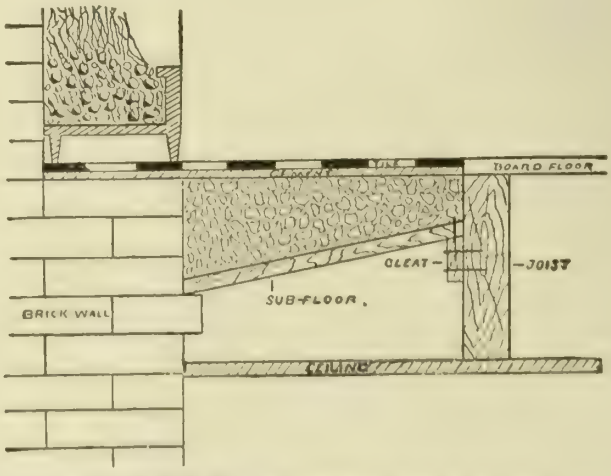


Fig. 7. WOOD SUB-FOUNDATION FOR HEARTH

Continued on next page

Tile Placed on Brick Walls

When Tiles are placed on brick walls, mortar must be raked out of joints of brickwork before using to form key for scratch coat.

Never Place on Wood or Plaster

Tile must never be placed on wood lath or on plaster—If placed on plaster blocks, they should be driven full of nails, or wire lath placed over them. Plaster block material does not form a good bond with cement, and in a short time tile tend to come loose and drop off.

Cement Mortar

Cement Mortar should consist of one part best quality Portland Cement, two parts clean, washed, sharp sand, thoroughly mixed as directed for floors.

If any lime is mixed with cement mortar to prevent it setting too quickly, *it should never exceed* 10 per cent, and great care must be used to have *lime well slacked* and made free from all lumps by passing through a fine sieve to guard against "heaving" or "swelling" and thus "loosening" or "lifting" tiles. White rock finish can be used as above in place of lime. Before setting tile, and after carefully placing last coat of cement mortar to receive tile, *place over it with a plasterer's trowel a very light coat of pure cement mixed to a consistency of thick cream.*

Grouting

Joints **should be grouted with Keene's** white cement or with pure light gray Portland Cement, if more character is desired to tile work.

Soaking Tile

All tiles should be thoroughly soaked in clean water before placing on the wall. *Dirty water or water off of cement* will stain tile, causing variation in shade and making an unsatisfactory job.

Method of Setting Tile for Wall or Wainscoting

Tiles are first laid out and compared with plan provided for setting them. Guide strips are then placed on wall, parallel, and about two feet apart, bottom one being arranged to allow base to be set after body is in place. (See Fig. 9.)

When a cove base is used, it may be necessary to set it first, but in all cases must be well supported on the concrete. (See Fig. 10.) The strips must be placed plumb and even with intended finished wall line.

The method of setting wall tile is governed to some extent by conditions of wall on which they are to be set, and mechanic must decide at time which process he will use, whether buttering or floating, as equally good work can be done by either by following instructions as stated below.

Floating Wall Tile

Mortar is spread between guide strips about five feet at a time, and leveled with screed notched at each end to allow for thickness of tile. (See Fig. 5.) Tiles are placed in position and tamped until firmly united to cement and level with strips. When space between strips is completed on one side of room, strips are removed and work continued in same manner until completed. When tiles are all set, joints must be carefully washed out and neatly filled with thinly mixed pure light gray Portland Cement or Keene's cement. All cement remaining on tile must be carefully wiped off.

Buttering Wall Tile

Cement mortar is spread on back of each tile, and tile placed on wall and tamped gently until firmly united and plumb with guide strips. When tiles are all set, joints must be carefully washed out and filled with cement, and tiles cleaned as directed above.

Fixtures

When Fixtures of any kind are to be placed on tile work, such as plumbing in bathroom, provision should be made for them by fastening wood strips on wall before rough or first coating of cement mortar is put on, strips to be same thickness as rough coating. Tiles can be placed over strips by covering them with cement mortar, and, when thoroughly set, holes can be bored in tiles for fastening fixtures without injuring tiling.

No Walking or Pounding

Caution should be used, not to allow any one to walk upon or carry anything *heavy over floor,* or have any pounding about wall work for several days, or until tiles are firmly set. Unless these precautions are taken, *it will be impossible to guarantee a first-class job.* Tile work is frequently condemned when the fault lies with the *rush of other contractors* to finish their work.

Do not allow tile to get wet and lay in sawdust, as it will stain the tile.

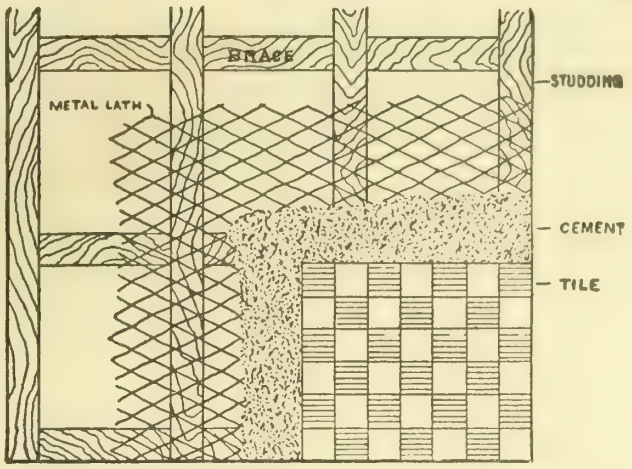


Fig. 8. EXPANDED METAL LATH ON STUDDING

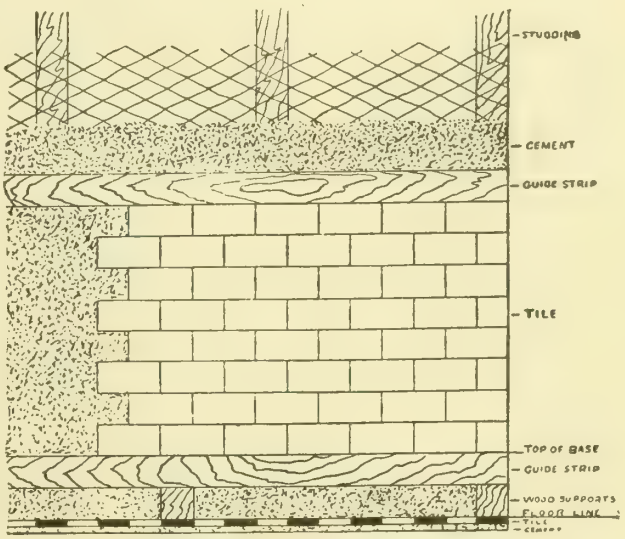


Fig. 9. METHOD OF SETTING WALL TILE

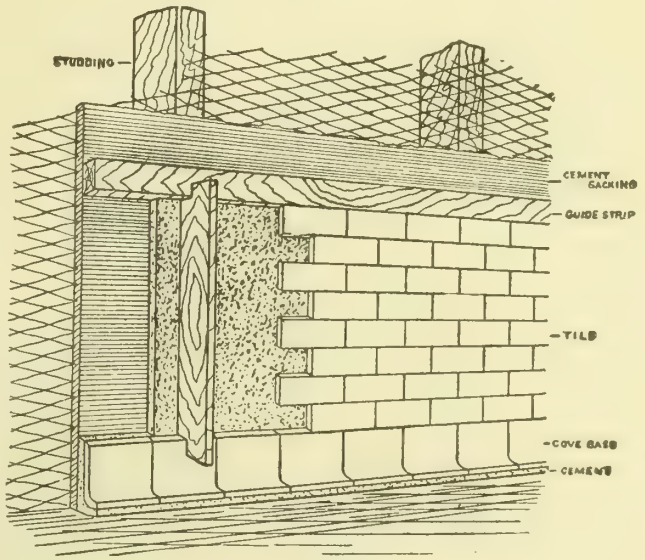


Fig. 10. COVE BASE SET FIRST

CHATTANOOGA SEWER PIPE & FIRE BRICK CO.

Manufacturers of Clay Products

CABLE ADDRESS, "CHATSEWER" CHATTANOOGA, TENN.

Products.

FIREPROOFING, HOLLOW BUILDING TILE, PARTITION TILE, WALL COPING, FLUE LINING, CHIMNEY TOPS, FIRE BRICK, GRATE BACKS, DRAIN TILE, CONDUITS, METER BOXES, SPLIT OR CHANNEL PIPE, CULVERT PIPE, SEWER PIPE, and other CLAY PRODUCTS.

Facilities.

The output of our three plants located in and adjacent to Chattanooga, and supplied with shales and fire clays from nearby deposits, is such as to enable us to make prompt shipments on all contracts. Annual capacity, 6000 cars.

Our factories are equipped with modern machinery and our process of manufacture is the result of many years' experience.

Quality.

For over thirty years our product has been recognized as the standard of the South.

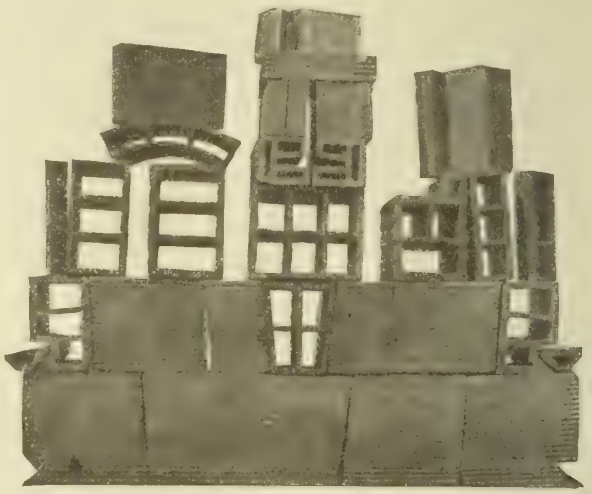
We are proud of our reputation and spare no trouble or expense in producing ware of such excellence as to fully merit the distinction.

Fireproofing and Hollow Tile.

Owing to the growing popularity of hollow building tile for residence construction, we are devoting more and more attention to the manufacture of Floor Arch, Partition Tile and Hollow Terra Cotta Building Blocks. Our outside wall tile is burnt to a white heat in course of manufacture and is absolutely fireproof and dampproof. Our semiporous tile is lighter, and will be scored for plastering unless otherwise desired.

Arch Construction.

We make several different types of arches in any required depth, details of which will be sent upon request. When necessary, we can make up special types to conform to architects' specifications.



FIREPROOFING AND HOLLOW TILE SHAPES FOR FLOORS AND PARTITIONS

Samples, etc.

We will be pleased to furnish samples and all necessary information when requested.

Cost.

Our prices are the lowest consistent with quality. Estimates will be submitted promptly without obligating you in any way.

HOLLOW TILE BUILDING IN COURSE OF CONSTRUCTION

Continued on next page

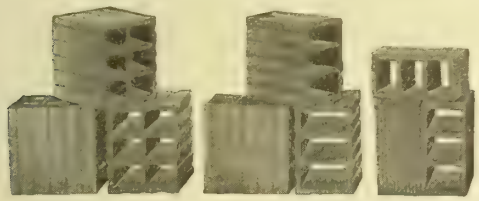
Vitrified Hollow Blocks.

Our Vitrified Hollow Blocks for walls and partitions are hard burnt and provide absolutely fireproof walls that resist moisture and keep out heat in summer and cold in winter. Made in a large variety of stock sizes. Any other sizes can be made to order without delay.

Plaster or stucco will not discolor when directly applied to this tile.

The following are approximate weights of larger sizes of vitrified hollow tile:

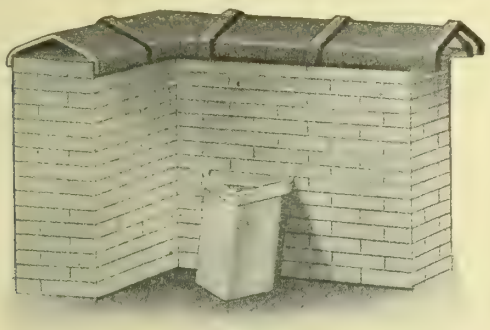
8″ x 12″ x 12″ blocks, 28 pounds per square foot
10″ x 12″ x 12″ blocks, 35 pounds per square foot
12″ x 12″ x 12″ blocks, 45 pounds per square foot



VITRIFIED HOLLOW BLOCKS

Wall Coping.

Our Vitrified Salt Glazed Wall Coping gives a finished appearance to building, prevents dampness, does not decay like stone or other material, protects and binds the top course of brick, consequently it is the cheapest and the best.



VITRIFIED SALT GLAZED WALL COPING

PRICE-LIST

Size	Price	Weight
9 in. Coping	22c. per foot	9 lbs. per foot
9 in. Corners and Angles	88c. each	20 lbs. each
13 in. Coping	32c. per foot	18 lbs. per foot
13 in. Corners and Angles	$1.28 each	35 lbs. each
18 in. Coping	52c. per foot	24 lbs. per foot
18 in. Corners and Angles	$2.08 each	45 lbs. each

List prices subject to liberal trade discount

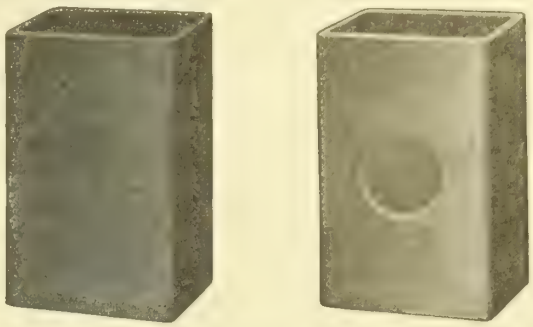
Flue Lining.

The object of Fire Clay Flue or Chimney Linings is to reduce the liability of fire from defective flues. This they do at a very slight cost, and they also materially reduce insurance rates.

PRICE-LIST

Square, in two-foot lengths Outside Measure	Price	Round, without sockets, in two-foot lengths Inside Measure	Price
		6 inches	$0.30 per ft.
8½ in. x 8½ in.	$0.45 per ft.	8 "	.45 "
8½ " x 13 "	.65 "	10 "	.65 "
8½ " x 18 "	.90 "	12 "	.85 "
13 " x 13 "	.85 "	15 "	1.25 "
13 " x 18 "	1.20 "	18 "	1.70 "
18 " x 18 "	2.00 "	20 "	2.25 "
		21 "	2.50 "
		24 "	3.25 "

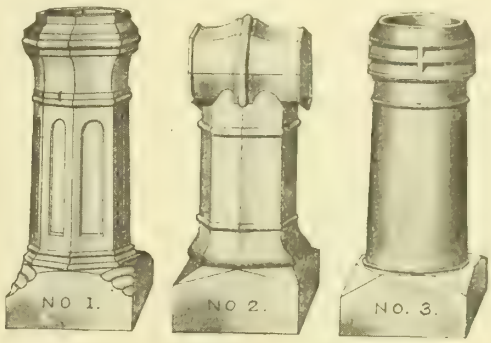
Openings, 50 per cent added
List prices subject to liberal trade discount



FIRE CLAY FLUE AND CHIMNEY LININGS

Chimney Tops and Wind Guards.

Chimney Tops and Wind Guards not only add an attractive finish to brick chimneys, but improve draught and prevent smoking of grates.



Octagon Top	Hooded Top	Wind Guard Round
2½ ft. high $3.00 each	2½ ft. high $4.00 each	2½ ft. high $4.00 each

CHIMNEY TOPS AND WIND GUARDS
Prices subject to discount

Split or Channel Pipe.

Split or Channel Pipe is especially useful as a conduit for water and steam pipe lines from central heating plants.

DENISON INTERLOCKING TILE MANUFACTURERS

(LICENSED UNDER THE DENISON PATENTS)

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Hippodrome Building

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NEW HAVEN, The Warner-Miller Co., Railroad Avenue

DISTRICT OF COLUMBIA

WASHINGTON, Hammett Fire Proofing Co.

FLORIDA

JACKSONVILLE, Gamble & Stockton Co., 108 West Bay Street

ILLINOIS

CHICAGO, The Clay Products Co., 175 W. Jackson Boulevard

INDIANA

INDIANAPOLIS, Clay Products Co., Lemcke Annex

BRAZIL, Lewis McNutt

EVANSVILLE, Indiana Builders' Supply Co., 703 Furniture Building

IOWA

DAVENPORT, John Benedict

KANSAS

BUFFVILLE, Kansas Buff Brick & Mfg. Co.

COFFEYVILLE, The Denison Clay Co., Kellogg Building

KENTUCKY

LOUISVILLE, Louisville Builders' Supply Co., 703 Realty Building

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SHREVEPORT, A. D. Morris

MARYLAND

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MASSACHUSETTS

BOSTON, Pennsylvania Tile & Construction Co.

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ISHPEMING, Consolidated Fuel & Lumber Co.

MARQUETTE, N. G. DeHass, Harlow Block

MINNESOTA

DULUTH, Standard Salt & Cement Co., 237 Lake Avenue, South

ST. PAUL, Twin City Brick Co., Capital Bank Building

MINNEAPOLIS, Twin City Brick Co., Lumber Exchange Building

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HELENA, Western Clay Manufacturing Co.

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OMAHA, Sunderland Brothers Co.

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BUFFALO, Buffalo Builders' Supply Co.

NEW YORK, American Clay Products Co., Inc., 175 Fifth Avenue

NIAGARA FALLS, Mitchell Builders' Supply Co.

OHIO

CLEVELAND, Interstate Clay Products Co., Hippodrome Building

CLEVELAND, Ohio Clay Co., 816 Hippodrome Building

COLUMBUS, Gaddis-Harrison Brick Co., 905 Brunson Building

DELAWARE, Delaware Clay Mfg. Co.

TOLEDO, Builders' Specialty Co.

YOUNGSTOWN, Youngstown Ice Co.

OREGON

PORTLAND, Denison Interlocking Tile Co., Fenton Building

PENNSYLVANIA

ERIE, Pennsylvania Fireproofing Co.

PITTSBURGH, Martin Brick Company, Empire Building

ST. MARY'S, Pennsylvania Fireproofing Co.

TEXAS

DALLAS, Fraser Brick Co., Sumpter Building

SEGUIN, Seguin Brick & Tile Co.

WASHINGTON

SEATTLE, Far West Clay Co., Railway Exchange Building

SPOKANE, American Fire Brick Co.

TACOMA, Far West Clay Co., 226 Tacoma Building

WISCONSIN

MILWAUKEE, Ricketson & Schwarz, University Building

ONTARIO

TORONTO, Sun Brick Co., Ltd., Traders Bank Building

BRITISH COLUMBIA

VANCOUVER, Canadian Denison Tile Co., Ltd.

Product.

Denison Interlocking Tile for Bearing Walls, Curtain Walls, Partitions, and Foundations. Particularly adapted for use with Face Brick and with Stucco Exterior; also made with Rough Texture Face for exposed work.

Design.

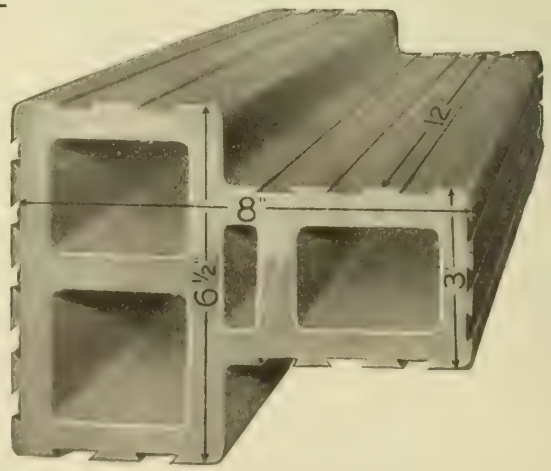
Owing to the special design of this tile, walls built with it have several distinct advantages found in no other type of wall construction.

Vertical Webs Always Align.

The design of the tile is such that when laid in the wall every vertical web must stand directly over a corresponding web in the tile below. This feature of positive alignment of webs is protected by letters patent and is peculiar to this form of tile. The 4-inch width of the mortar bed insures thorough bedding between webs; thus every square inch of vertical web section in the wall is available in computing bearing loads.

No Through Mortar Joints.

A common fault of other forms of masonry walls is the through mortar joint, which readily conducts moisture, heat and cold through the wall. In the wall



DENISON INTERLOCKING TILE

of Denison Interlocking Tile the mortar beds are on different levels. An air-pocket is thus provided in the mortar joint which prevents passage of moisture through the wall by capillary attraction, and insures ideal insulation.

Triangular Reinforcement.

The lateral strength of the wall is materially in-

Continued on next page

creased by the triangular reinforcement due to this offsetting of the mortar beds. In addition to this, all the mortar beds are dovetail-grooved, holding the tile together in the firmest possible manner.

Many Dead-Air Spaces.

The air-spaces are horizontal, and afford the perfect insulation which dead air gives. No convection currents can occur in such a wall. In this 8-inch wall there are three air-chambers, in the 12-inch wall five, and in the 16-inch wall there are seven, etc.

No Continuous Cross Webs.

None of the cross webs extend continously through the wall, each being insulated by an air-chamber.

Strong Walls.

The interlocking feature gives the wall greater strength for bearing the weight of walls and floors in the buildings, and makes the wall stronger against side thrusts, such as the roof and wall loads.

Non-Conductive Walls.

Walls of this tile are, for practical purposes, perfect non-conductors of heat and cold. Buildings are therefore warmer in winter and cooler in summer. This feature makes the tile especially advantageous for walls in cold storage buildings, lumber dry-kilns, warehouses and other places where non-conductive walls are necessary.

Dry Walls.

Moisture and dampness quickly penetrate the ordinary masonry wall at the joint. This liability to injury is entirely overcome in the Denison Tile wall, because no mortar joint extends entirely through the wall.

Bearing Strength.

The bearing strength of an interlocking tile wall is greatly enhanced by the fact that all bearing webs are continuous one above another from footing to sill. Thus every particle of strength of the individual tile is transferred to the wall. The web over web feature in this tile is not dependent on the skill or care of the mason; the tile can be laid no other way.

Strength Tests.

The following tests on Denison Interlocking Tile conducted by well known engineering authorities show the bearing strength of the individual tile and of the completed wall.

Authority	Location	Material	Result
United States Government Arsenal	Watertown, Mass.	Individual Tile	5042 pounds per square inch of vertical web section
Building Department	Tacoma, Wash.	12-inch wall	70.8 tons per square foot of gross wall area
United States Bureau of Standards	Pittsburgh, Pa.	12-inch brick-faced wall	64.8 tons per square foot of gross wall area

Fireproofing Qualities.

The design of Denison Interlocking Tile makes them even more valuable than ordinary tile for fireproofing. There are no vertical air-spaces in the wall, and no furring is required, the plaster being applied directly to the tile, thus eliminating all vertical passages which might carry flames from floor to floor.

There are no through mortar joints to weaken under high temperatures. In case of injury to the outer shell of the wall, rendering it useless, there would still remain sufficient supporting webs to provide a safe wall for salvage.

No Furring Required.

Owing to the non-conductive feature of the wall, no furring is required, plaster or stucco being applied directly to the tile itself.

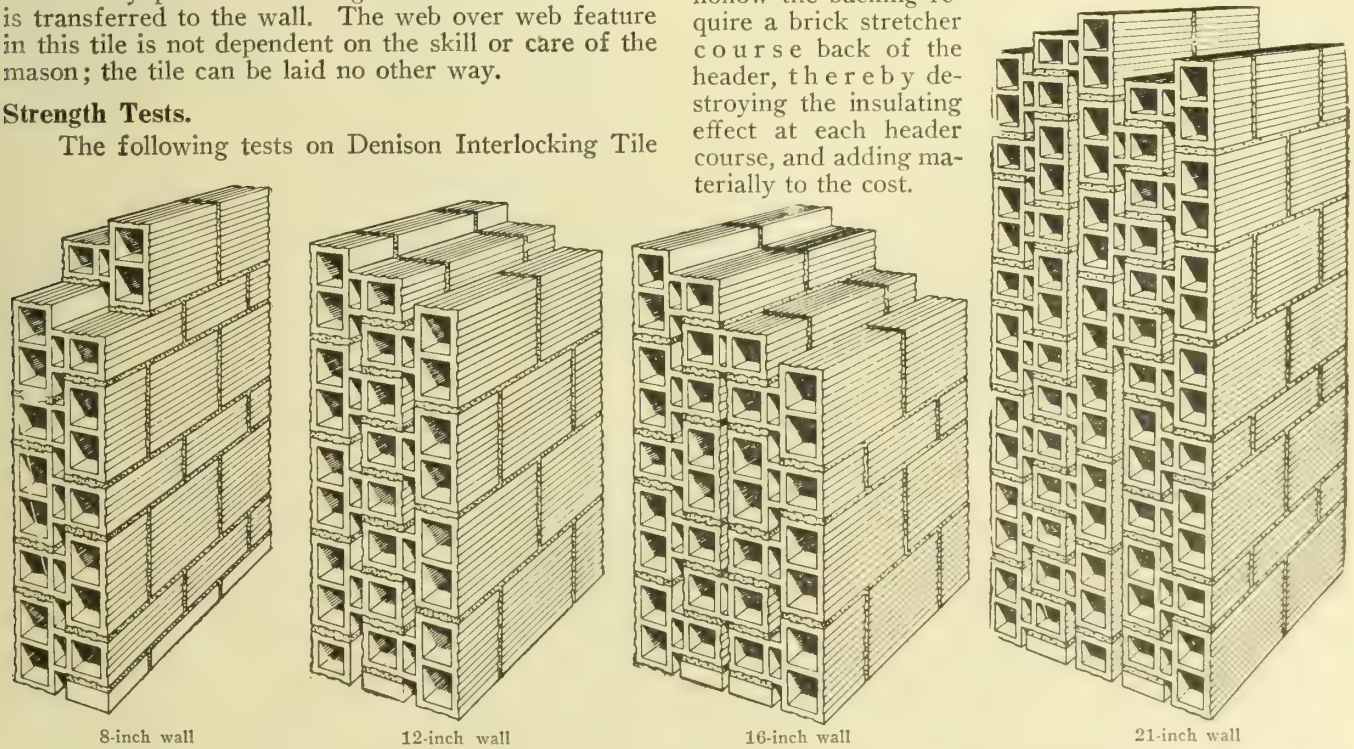
Builds Walls Any Thickness.

One shape and size of Denison Interlocking Tile builds walls of any thickness. Regardless of thickness, the wall retains all the advantages outlined on the previous page.

Three or four different thicknesses of walls are required on practically every operation, and one size of Denison Interlocking Tile takes care of them all. There are no left-over sizes, and the mason does not require three or four miscellaneous widths of block on his scaffold.

Bonds Perfectly With Brick.

The illustration shows the ideal bonding of Denison Interlocking Tile with face brick. All other forms of hollow tile backing require a brick stretcher course back of the header, thereby destroying the insulating effect at each header course, and adding materially to the cost.



8-inch wall 12-inch wall 16-inch wall 21-inch wall

ONE SIZE AND SHAPE DENISON INTERLOCKING TILE BUILDS WALLS ANY THICKNESS

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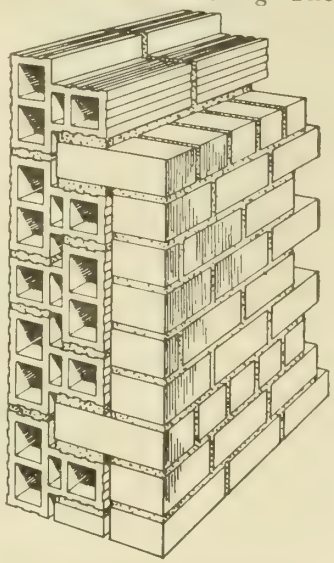
The brick facing on Denison Interlocking Tile becomes an integral part of the wall, and will not shrink away, bulge or crack. It bears its share of the vertical load.



WALL FACED WITH PRESSED OR COMMON BRICK

An Ideal Base for Stucco.

The wall is always dry, and the hard burned body prevents absorption of water from the plaster coat. The tile has practically the same expansion as the cement plaster, thus preventing cracking, and enabling it to withstand severe weather conditions. The horizontal dovetailed grooves make a perfect mechanical key to hold the plaster or stucco.

Lays Up Rapidly.

There is only one size and shape of Denison Interlocking Tile. The shape is such that the mason easily handles the tile with one hand, without laying down the trowel. All other tile of equal displacement requires use of both hands.

Each tile is equivalent to seven bricks (on basis of twenty-one bricks to the cubic foot). The bricklayer thus lays the equivalent of seven bricks in one operation. In addition to this advantage, only one third as much mortar is required as in the solid brick wall.

How to Order Denison Interlocking Tile.

If the number of square feet in the face of the wall and in the thickness of the wall are known, the number of Denison Tile required to lay it can be easily computed from the following table:

2.2 Tile lay 1 square foot of 8-inch wall.
3.4 Tile lay 1 square foot of 12-inch wall.

In ordering jamb or corner tile, the total linear feet (vertical) of jambs and corners should be given.

Weight of Wall.

Sixty pounds per cubic foot, including mortar.

Details, Catalogues and Data.

Each of the licensees is in position to submit details and other data, and to give valuable assistance to the architect or engineer. Correspondence should be addressed to the nearest Representative.

Besides the buildings illustrated here, the following, each of which is well known in its own territory, give some idea of the wide approval with which Denison Interlocking Tile has met for every class of building work throughout the United States and Canada.

Some Typical Buildings.

BUILDING AND LOCATION	ARCHITECT
Hotel Statler, Cleveland, Ohio	Geo. B. Post & Sons
Hotel Statler, Detroit, Mich.	Geo. B. Post & Sons
Mt. St. Mary's Hospital, Niagara Falls, N. Y.	W. P. Ginther
Sacred Heart Academy, Vancouver, B. C.	Chas. G. Badgley
Washington Apartments, Providence, R. I.	Frank Wyatt Woods
Residence, A. W. Eaton, Pittsfield, Mass.	Harding & Seaver
M., K. & T. Station, Parsons, Kan.	Henry John Schlesk
Chamber of Commerce Building, New Haven, Conn.	Brown & Von Beren
Santa Fe Depot, San Diego, Cal.	

(Over)

ACADEMY OF THE SACRED HEART, VANCOUVER, B. C.
Chas. G. Badgley, Architect
Denison Interlocking Tile faced with stone

HOTEL STATLER, CLEVELAND, OHIO
George B. Post & Sons, Architects
Denison Interlocking Tile curtain walls faced with brick

FRUIT EXCHANGE BUILDING, SACRAMENTO, CAL.
Chas. Kaiser, Architect
Denison Interlocking Tile curtain walls faced with stucco

RESIDENCE, CLEVELAND, OHIO
Bohnard & Parsson, Architects

MT. ST. MARY'S HOSPITAL, NIAGARA FALLS, N. Y.
Wm. P. Ginther, Architect
7-story wall bearing building.
Denison Interlocking Tile faced with brick

APARTMENT, PROVIDENCE, R. I.
Frank Wyatt Woods, Architect

M., K. & T. R. R. STATION, PARSONS, KAN.
Henry John Schlesk, Architect

Residence, Geo. McKesson Brown, Huntington, L. I., N. Y.	Clarence Luce
Church of Visitation, Tacoma, Wash.	C. Frank Mahon
May Co. Department Store, Cleveland, Ohio	D. H. Burnham & Co.
Jax Brewery Co., Jacksonville, Fla.	Halpensteller, Hirsch & Watson
Cleveland General Hospital Buildings, Cleveland, Ohio	Myron B. Vorce
Pacific Coast Condensed Milk Co. Factory, Stanwood, Wash.	
St. Louis Country Club, St. Louis, Mo.	Mauran-Russel & Croell
Elks Club, Seattle, Wash.	John Carrigan
Royal Connaught Hotel, Hamilton, Can.	Esenwein & Johnson
Fourth Presbyterian Church, Chicago, Ill.	Cram, Goodhue & Ferguson
Fleischmann Yeast Co., Sumner, Wash.	John Graham
Municipal Building, Dallas, Tex.	C. D. Hill & Co.
Christian Science Church Toronto, Can.	S. S. Beeman
First Presbyterian Church, Durant, Okla.	Jewell Hicks
Heer's Department Store, Springfield, Mo.	Opel & Torbitt
Ranier Brewery, San Francisco, Cal	Carl Siebrand
Dry Kiln Palmer Lumber Co., La Grande, Ore.	

THE HUMPHREY BRICK & TILE CO.

BROOKVILLE, PA.

Products.

Scored and Smooth Hollow Terra Cotta Blocks, Partition Blocks, Hollow Brick, Back-Up Blocks, Drain Tile, and other Clay Products.

Facilities.

The plant is located in a section where special advantages for the manufacture of terra cotta blocks, etc., are obtained, such as an abundance of material and water, railroad and shipping facilities and cheap fuel. All motive power in the plant is supplied by gas engines, natural gas being used exclusively for power and fuel, this Company operating its own gas wells. The plant is constructed entirely of terra cotta blocks and is under ownership management, assuring owners' personal attention to all orders.

Advantages.

Hollow terra cotta block construction insures the following advantages:

(1) Absolutely indestructible by fire. (2) A dry, warm and well insulated wall. (3) A positive saving in construction as compared with brick or stone. (4) A continuous saving in heating. (5) Less weight on walls. (6) No chance for mice or vermin in walls. (7) No metal lath to rust out. (8) No wood lath to rot or burn. (9) No furring strips to give trouble. (10) Saves space occupied by furring and lathing.

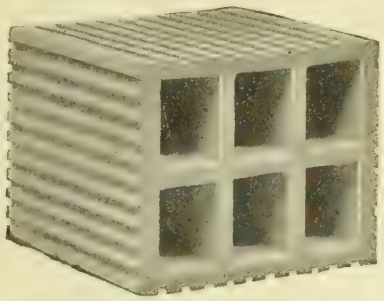
Strength Test.

Tests conducted by the United States Government Arsenal at Watertown, Mass., showed our six-cell wall blocks to have an ultimate crushing strength of over 111 tons per square foot of eight-inch wall. As this is many times the weight that could be put on any ordinary wall ample strength of material is assured.

Special Six-Chamber Wall Blocks.

Strongly recommended for exterior walls, floor arches, back-ups, pillars, or any work where a specially strong block is required. The extra cost is small, and the advantages of the extra cell in insulation and strength make it well worth the small difference in price.

Size, Ins.	Weight, Lbs.
8 x 12 x 12	36
10 x 12 x 12	45
12 x 12 x 12	50

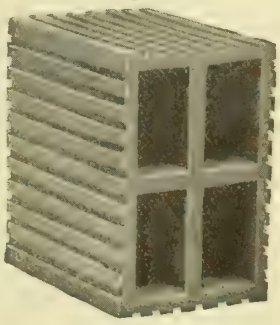


SPECIAL SIX-CHAMBER WALL BLOCK
Extra Strong

Four-Chamber Wall Blocks.

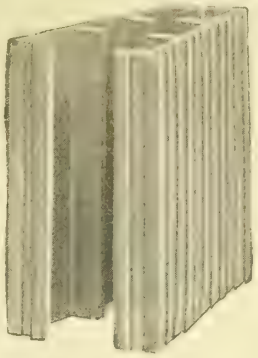
The four-cell block illustrated is that generally used where construction is required to be kept to a competitive basis. No special corner blocks are required, the regular block turned on end making the proper closure at corner.

Size, Ins.	Weight, Lbs.
6 x 12 x 12	26
8 x 12 x 12	32
10 x 12 x 12	40

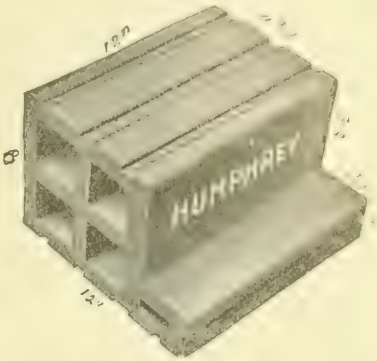


FOUR-CHAMBER WALL BLOCK

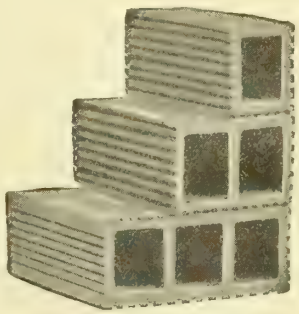
Four-cell blocks are the standard style blocks for exterior walls, partitions, floors and back-ups.



SPLIT FURRING
For lining exterior walls of brick or concrete. Easily separated on the job with a trowel
2 x 12 x 12 ins., 9 lbs.



RECESSED WINDOW JAMB BLOCK
For making a proper finish around windows



FIVE-INCH BACK-UP BLOCK
Five inches is ideal height for back-up block; it equals two courses of brick, and wall ties can be used every second course

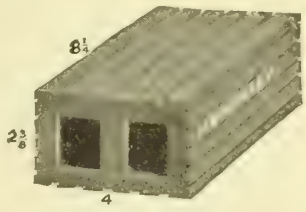
5 x 4 x 12 ins., 10 lbs.
5 x 8 x 12 ins., 16 lbs.
5 x 12 x 12 ins., 21 lbs.

HOLLOW PARTITION BLOCK
3-inch size for non-bearing partitions where partition only is desired. 4-inch size for general partition work where load is moderate. Sizes are:

3 x 12 x 12 ins., 16 lbs. for 3-in., par.
4 x 12 x 12 ins., 18 lbs. for 4-in., par.
6 x 12 x 12 ins., 22 lbs. for 6-in., par.
8 x 12 x 12 ins., 32 lbs. for 8-in., par.

Standard Hollow Brick.

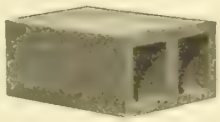
Used as inside lining course, they insulate a wall without increasing its thickness.



STANDARD HOLLOW BRICK

Humphrey Smooth Faced Brick.

These blocks are made (and carried in stock) with smooth faces and light red color, and are used for exterior walls without further finish. Can also be supplied in dark, fire flashed and light buff colors, when quantity is sufficient to justify making special.



SMOOTH FACED BRICK
5¼ x 8 x 12 ins. Also 5¼ x 4 x 12 ins.

Two blocks lay one square foot of wall surface; and their use, in nearly all cases, will cut the cost of even common brickwork in two, besides making a warmer, drier building.

The new buildings of the Baldwin Locomotive Works, at Eddystone, Pa., are constructed exclusively of these blocks. Over four miles of three-story walls are used in these buildings.

KEYSTONE FIREPROOFING COMPANY

Marbridge Building, 34th Street and Broadway
NEW YORK, N. Y.

BOSTON, MASS., Old South Building
PHILADELPHIA, PA., Perry Building
WASHINGTON, D. C., Woodward Building
MONTREAL, QUE., New Birks Building
TORONTO, ONT., 95 King Street, East
BUFFALO, N. Y., White Building

Products and Service.

Manufacturers and Erectors of KEYSTONE GYPSUM BLOCKS for Fireproof Partitions, Wall Furring, Column Protections, Book Tile, etc.; METROPOLITAN SYSTEM of FIREPROOF FLOOR and ROOF CONSTRUCTION; KEY-TILE SYSTEM of COMBINATION TILE-CONCRETE FLOOR and ROOF CONSTRUCTION.

This Company will sell Keystone Gypsum Blocks or Key-Tile; but prefers to submit bids on all work *erected in place,* as the efficiency of its Construction Department enables it, in this way, to *demonstrate economy* convincingly, and insure *maximum satisfaction* in the completed work. It permits the installation of the Metropolitan System by no one except its own Construction Department.

Keystone Gypsum Blocks.

These are gypsum and wood fiber, heat and cold insulating, fireproof blocks, made solid and hollow. Nova Scotia gypsum is used; this, when calcined, develops a higher degree of fire-resistance than any other gypsum, and is, besides, lighter and tougher.

Fire Resistance—Not merely non-combustible, but *fire resisting; non-conductors of heat,* actual tests showing maximum transmission of *only* eight per cent through 3-inch hollow blocks after exposure of two hours to 1,700 degrees Fahr. Successfully resists application of water at 50 pounds nozzle pressure after fire. *Non-expansive,* having coefficient of expansion of zero. Approved by National Board of Fire Underwriters, after test by Underwriters' Laboratories, Inc.

Lightness—About *one half the weight* of terra cotta or clay tile, and at least ten per cent lighter than any other plaster or gypsum block on the market.

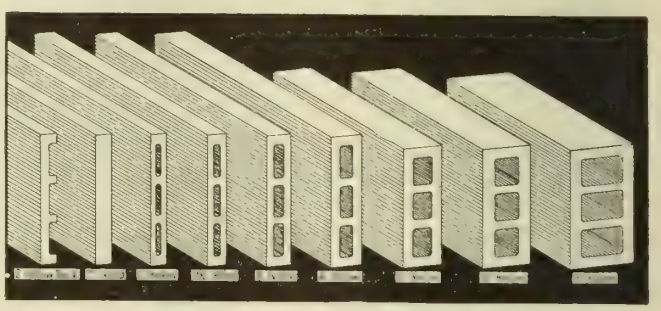
Rigidity—Made in units of 3 square feet, reducing joints. Laid up in gypsum cement mortar, the mortar and blocks bonding together naturally as well as mechanically, forming practically a monolithic partition.

Sound-Deadening—The most nearly perfect non-conductor of sound of any material on the market. Used throughout the New England Conservatory of Music, Boston, after a comparative sound test of every known form of fireproof partition.

Neater Workmanship—Can be *sawn* like wood to fit around openings, pipes, electric conduits, etc., and to break joints.

Economy—Peculiar quality of *toughness* minimizes waste through breakage; can be *sawn* like wood, making every piece usable; *lightness,* combined with an area of 3 square feet to each block, enables each brick mason to lay up from *two to three times as many square feet daily* as is possible with clay tile, and twenty per cent more than with any other plaster or gypsum block; the fewer joints reduce the amount of mortar by about fifty per cent. Keystone Gypsum Block Partitions *save in the cost of plastering,* every block being perfect in shape and in thickness, permitting their erection, plumb and true, to ½-inch grounds, necessitating only light brown and finish coats of plaster.

Rapidity of Construction—Each bricklayer setting from two to three times as many square feet daily as with clay tile, the increased speed with which this part of the building can be completed is obvious.



STANDARD KEYSTONE GYPSUM BLOCKS

STANDARD SIZES AND WEIGHTS OF KEYSTONE GYPSUM BLOCKS*

Thickness	Description	Size	Use	Weight per Sq. Ft.
7/8"	Solid	27" x 48"	Nailing to studs or joists	4 lbs.
1½"	Hollow-back	16½" x 26⅛"	Wall Furring	4½ "
2"	" "	16½" x 26⅛"	" "	5 "
2"	Solid	16½" x 26⅛"	Partitions, Column Covering, Pipe Chases, Ducts, etc.	8½ "
2"	Hollow	16½" x 26⅛"	Partitions, Pipe Chases, etc.	7 "
2½"	"	16½" x 26⅛"	" " " "	7½ "
3"	"	16½" x 26⅛"	" " " "	8½ "
4"	"	16½" x 26⅛"	" " " "	10 "
5"	"	15" x 19⅛"	" " " "	11¼ "
6"	"	15" x 19⅛"	" " " "	13½ "
8"	"	15" x 18"	" " " "	20 "
3"	Roof Blocks	16½" x 26⅛"	Book Tile Work	13½ "

* Large stock always carried to insure prompt shipments.

How to Specify.

Partitions—Construct all partition throughout, including skylight curbs and wall of pent houses, of Keystone gypsum blocks of thicknesses marked on drawings, or as follows: For partitions not over 13 feet in height, 3-inch hollow; from 13 to 17 feet, 4-inch hollow; from 17 to 21 feet, 5-inch hollow; and where over 21 feet, 6-inch hollow. Form all pipe chases and ducts, except those in brick or concrete walls, in same manner as partitions, using 2-inch solid or 3-inch hollow blocks. Partitions to start on rough floors, and to be firmly wedged against the under side of ceiling above.

All to be erected in a thoroughly workmanlike manner, plumb and true, breaking joints, bonding corners, and left ready for brown and finish coats of plaster.

This work shall be laid up in mortar composed of one part gypsum cement plaster, of a quality equal to "Victor" or "Keystone," to two parts clean, sharp sand, measured in bulk, thoroughly mixed. No mortar shall be re-tempered.

Column Covering and Pilasters—Columns and pilasters shall be laid up in same mortar as specified for partitions, erected plumb and true, bonding corners, and left ready for brown and finish coats of plaster.

Cover all exposed interior columns with 3-inch solid or 4-inch hollow Keystone gypsum blocks. Form pilasters, where shown on plans, and as per details, with Keystone gypsum blocks of the required thicknesses.

Wall Furring—Furr all exterior walls, where shown on drawings, with 2-inch hollow-back Keystone gypsum furring blocks. This furring shall be set tight against walls, and shall be fastened to same by metal ties set into the vertical joints of

SWEET'S CATALOGUE

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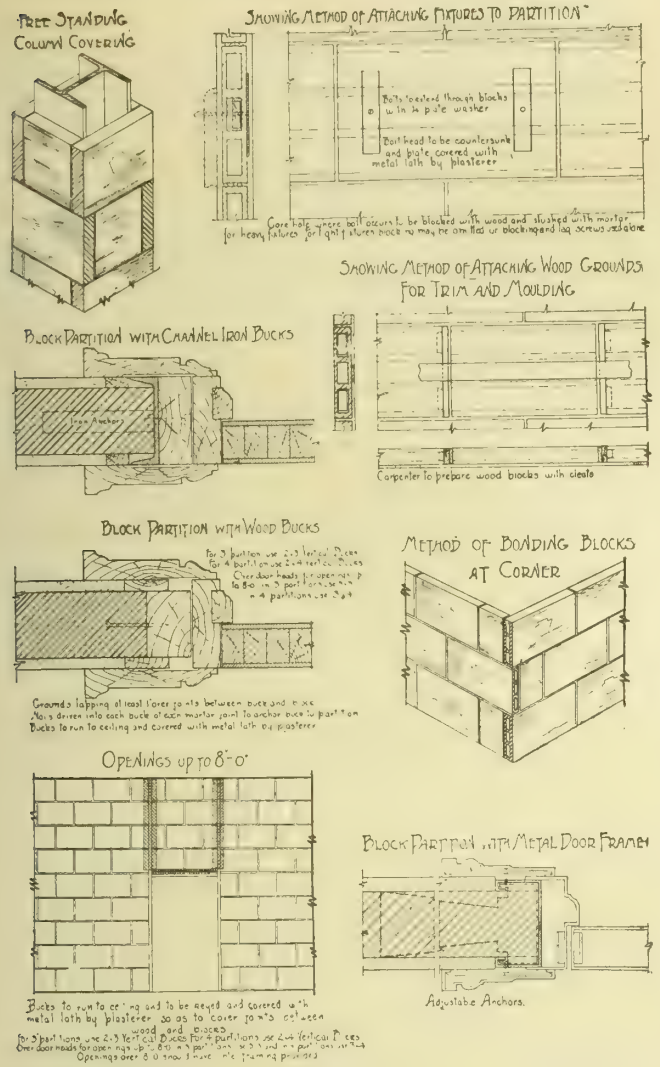

DETAILS SHOWING APPLICATION OF KEYSTONE GYPSUM BLOCKS

the brickwork by the mason contractor, which ties shall be staggered 4 feet on centers horizontally and vertically.

This work shall be laid up in same mortar as specified for partitions, with joints broken and all angles bonded, left ready for brown and finish coats of plaster.

Where furring shown on drawings is to be free standing, use same thickness of blocks and erect in same manner as specified for partition; or 2-inch solid blocks may be used for free standing furring, providing that anchors or ties have been built into wall at proper intervals to secure the furring as specified above.

Book Tile—For all mansards, or other sloping roofs and dormers, set 3-inch Keystone gypsum roof blocks, laid dry on T-irons, which shall be spaced 27 inches on centers, and shall be furnished and erected ready to receive blocks by the steel contractor. After being set dry, joints between these blocks shall be grouted in place with gypsum cement mortar.

For Insertion in Carpenter Specifications

Carpenter shall furnish rough frames or bucks for all openings in partitions, etc., and shall set same in place, properly plumbed ready for partition work (as per details above).

Carpenter shall also furnish and deliver on scaffolds to masons the necessary nailing strips and plugs, ready for installation by masons (as per details above).

For Insertion in Plastering Specifications

Partitions, column covering, and wall furring are to be of Keystone gypsum blocks, and require but one coat to bring up the ½-inch ground, ready for finish coat.

Plastering contractor shall furnish and apply metal lath over exposed faces of all wood bucks, same to be stapled securely to blocks on either side.

For Insertion in Plumbing and Electrical Specifications

This contractor shall have all pipes (or electrical conduits) that run in partitions or furring properly put in place ahead of the work of that contractor, so that such contractor shall be able to fit his material up to and around same in a workmanlike manner. Any cutting or repairing of partitions, furring, etc., made necessary by failure to do this, or by defective work or alterations, shall be done by the partition contractor at the expense of the plumbing (or electrical) contractor.

For Insertion in Mason Specifications

Where walls are to be furred, mason shall build into the same approved metal anchors in the vertical joints of brick or stone work, and staggered 4 feet on centers both vertically and horizontally.

Metropolitan Fireproof Floor and Roof Construction.

The Metropolitan system is *not* a reinforced slab, but is a *floor* or roof consisting of *closely spaced steel cables,* in deflection and tension, supporting and imbedded in a slab of Metropolitan composition, composed principally of pure calcined gypsum and asbestos. This composition solidifies in from twenty to thirty minutes, and within an hour the centering can be dropped and the floor is *firm enough to sustain the load* for which it is calculated. It is then ready for the laying of wood sleepers or concrete on top and the plastering, or metal furring and lathing underneath.

This system is approved by building bureaus in all large cities.

Advantages of Metropolitan System.

Strength—A stronger or safer fireproof floor construction cannot be conceived of, as the steel cables are designed to carry the *entire load,* with the factor of safety, without regard to the composition forming the slab, *which does not act in compression.* The slab, however, has a crushing value of from 400 to 500 pounds per square inch.

Fire Resistance—Not merely fire resisting in itself, but *affords complete protection* to the beams and girders by reason of its *high degree of non-conductivity.* Has successfully passed unusual fire and water tests for various cities, including that for New York City in 1897, after five hours' fire at 2,100 degrees Fahr. and twenty minutes of water at 60 pounds nozzle pressure. Even this test showed that sufficient heat did not reach the beams *to affect the paint.*

Lightness and Economy—It is the *lightest* floor construction known, weighing, for ordinary live loads, but *16 pounds per square foot.* Its cost compares favorably with any first-class concrete or hollow tile construction; but it is substantially *lower in cost* when the lightness in weight is considered in designing the steel work, and this *saving in steel* taken into consideration.

Rapidity of Construction—Can be installed more rapidly than any other system of fireproof floor construction on the market, by reason of its quick-setting properties, and the fact that the centering can be dropped *within an hour* after the floor is poured. As the composition will set before it will freeze, it can be installed in any weather when men can work irrespective of temperature.

Preservation of Metal—Actual observation in buildings erected from twelve to twenty years has shown the metal work, as well as the steel cables, to be *perfectly preserved from corrosion.*

Metropolitan System Types of Construction.

Type "A" includes slab, beam and girder protection, and metal furring and lathing in place underneath, ready for plastering.

Type "B" exactly the same as type "A," with metal furring and lathing omitted, and underside ready for plaster.

Type "C" consists of flat slab only, designed especially for roof construction of one-story manufacturing

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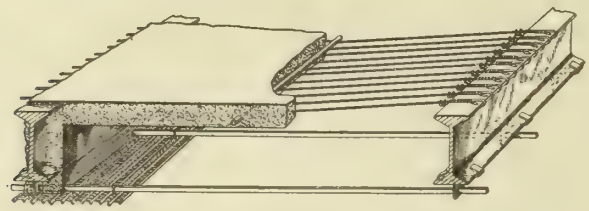
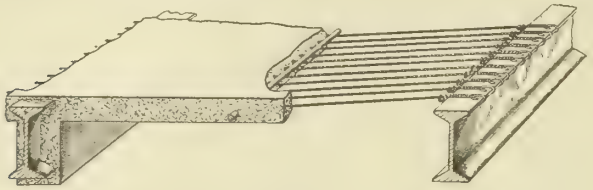


SECTIONAL VIEW OF METROPOLITAN FLOOR, TYPE "A"

Dead Load	
Floor slab, including haunches	16 lbs. per sq. ft.
Ceilings	8 lbs. per sq. ft.
2 x 3-ins. Sleepers and fill	12 lbs. per sq. ft.
⅞-in. Wood floor	4 lbs. per sq. ft.
Total	40 lbs. per sq. ft. + weight of beam.

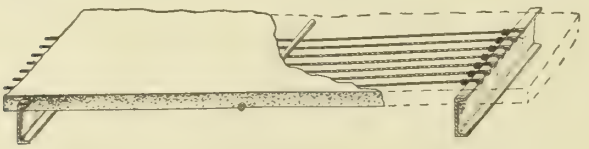
Note—If 1-in. cement, instead of wood floor, add 8 lbs. per. sq. ft.



SECTIONAL VIEW OF METROPOLITAN FLOOR, TYPE "B"

Dead Load	
Floor slab, including haunches	16 lbs. per sq. ft.
Plastering applied to under side	4 lbs. per sq. ft.
2 x 3-ins. Sleepers and fill	12 lbs. per sq. ft.
⅞-in. Wood floor	4 lbs. per sq. ft.
Total	36 lbs. per sq. ft. + weight of beam.

Note—If 1-in. cement, instead of wood floor, add 8 lbs. per. sq. ft.



SECTIONAL VIEW OF METROPOLITAN ROOF, TYPE "C"

Dead Load	
Roof slab	12 lbs. per sq. ft.
Slag roofing	5 lbs. per sq. ft.
Total	17 lbs. per sq. ft. + weight of beam.

buildings, without including encasing of beams, girders, purlins, trusses, etc., underneath.

Its strength, fire resistance and non-conductivity of heat and cold peculiarly adapt it for use on such industrial buildings as manufacturing plants, power plants, foundries, machine shops, warehouses, railroad buildings, etc.

The high degree of elasticity offered by this system of roof construction is of advantage in taking up, without cracking, the vibration caused by the operation of cranes, etc., which is especially severe in buildings where the columns supporting roof trusses also carry the crane tracks.

A distinct advantage of Metropolitan roof construction, due to its non-conductivity, is the elimination of ceiling condensation. This advantage is of particular importance where exposed machinery is to be taken into consideration.

A specification on this type of roof construction is not included herewith, but full working details and specifications will be supplied on receipt of particulars, indicating conditions and requirements.

How to Specify Metropolitan System for Floors.

Type "A" Floor—Metal clips shall be fastened to bottom flanges of floor beams, which shall support 1 x $^{3}/_{16}$-inch flat iron bars spaced 12 inches on centers, running transversely with floor beams; the tops of such flats to be on a level about two inches below bottom flanges. To take the plaster, there shall be fastened to the 1-inch flats approved metal lathing coated with asphaltum.

By means of forms or centers placed about webs and bottom flanges of floor beams and girders, a covering of Metropolitan composition shall be cast in place, protecting exposed portions of said beams and girders with not less than 1½ inches of said material at the extreme points of lower flanges, and two inches below said flanges.

Cables, each composed of two No. 12 galvanized wires, twisted, shall be carried over the tops of floor beams and shall be secured to walls by anchors or bars, or, where they end on a beam, shall be secured to it by strong hooks. These cables shall be laid parallel and pass under round iron bars, midway between beams, so as to cause cables to deflect uniformly. Cables shall be laid at distances apart from each other, varying from one to three inches according to spans and loads.

Forms or centers shall be put in place between floor beams about one inch below round iron bars mentioned above. The Metropolitan composition shall be poured in place and brought to a level about one quarter inch above the top flanges of said beams, forming a floor slab about 4 inches thick, ready for the laying of wood sleepers or concrete on top.

Type "B" Floor—By means of forms or centers placed about webs and bottom flanges of floor beams and girders, a covering of Metropolitan composition shall be cast in place, protecting exposed portions of said beams and girders, with not less than 1½ inches of said material at the extreme points of lower flanges, and two inches below said flanges.

Cables, each composed of two No. 12 galvanized wires, twisted, shall be carried over the tops of floor beams and shall be secured to walls by anchors or bars; or where they end on a beam, shall be secured to it by strong hooks. These cables shall be laid parallel and pass under round iron bars, midway between beams, so as to cause cables to deflect uniformly. The cables shall be laid at distances apart from each other, varying from one to three inches according to spans and loads.

Forms or centers shall be put in place between the floor beams, about one inch below the round iron bars mentioned above. The Metropolitan composition shall be poured in place and brought to a level about one quarter inch above the top flanges of the said beams, forming a floor slab about 4 inches thick, ready for the laying of wood sleepers or concrete on top.

Key-Tile System Floors and Roofs.

A combination tile-concrete system of floor con-

METROPOLITAN FLOOR READY FOR POURING SLAB

KEY-TILE FLOOR READY TO POUR CONCRETE

Continued on next page

struction, using any of the standard reinforcing bars, but employing Keystone gypsum floor blocks, in place of clay tile, between the concrete joists.

Advantages of Key-Tile System.

About *thirty per cent less weight* than clay tile, reducing substantially the dead load; blocks being made in two foot or four foot lengths *reduces the cost of laying* and eliminates the necessity of re-aligning before pouring concrete; blocks perfect in shape, as contrasted with irregularities in clay tile; enables concrete to set under ideal conditions of moisture, as blocks are wet down before pouring, giving water back to concrete as crystallization takes place; having coefficient of expansion of zero, blocks cannot destroy themselves by expansion under severe temperatures, remaining firmly in place, and their non-conductivity affording additional protection to concrete.

STANDARD SIZES AND WEIGHTS

Thickness	Description	Size	Weight per Sq. Ft.
4″	Hollow	12″ x 24″ or 48″	10 lbs.
5″		12″ x 24″ or 48″	12 lbs.
6″		12″ x 24″ or 48″	14 lbs.
7″		12″ x 24″ or 48″	16 lbs.
8″		12″ x 24″ or 48″	18 lbs.
9″		12″ x 24″ or 48″	20 lbs.
10″		12″ x 24″ or 48″	22 lbs.
11″		12″ x 24″ or 48″	24 lbs.
12″		12″ x 24″ or 48″	26 lbs.
14″		12″ x 24″ or 48″	30 lbs.

How to Specify.

Type "B"—(1) Fireproof filling between floor and roof beams shall be of Key-Tile system of combination tile-concrete floor construction, as installed by the Keystone Fireproofing Company, and which consists of joists, 4 inches in width, of stone or gravel concrete, spaced 16 inches on centers, with spaces between joists filled with Key-Tile (Keystone gypsum floor filler blocks), and on top of which joists and tile shall be placed a slab of stone or gravel concrete not less than 2 inches in thickness.

(2) Joists shall be reinforced with medium steel deformed bars, placed one inch above soffit or underside of same, the depth of joists and area of steel reinforcement to be designed to safely carry the required live and dead loads, with the proper factor of safety, in accordance with the standard specifications prepared by the Joint Committee on Concrete of the American Engineering Societies.

(3) The exposed portions of all steel beams and girders projecting below floor construction shall be protected with stone or gravel concrete, of a thickness which shall be not less than 1½ inches at the extreme ends of lower flanges and not less than 2 inches on soffits.

(4) Concrete shall consist of a medium quaking mixture, composed of one part of an approved brand of Portland cement, two parts of clean, sharp sand, and four parts of gravel, or broken stone, which will pass a ¾-inch ring.

(5) All Key-Tile shall be accurately spaced on the form work, duly aligned and thoroughly wet down with a hose stream before concrete is poured. The joists and the slab on top of same shall be poured at one operation, so as to insure a perfect bond between joists and slab on top.

Type "A"—(1) Same as first paragraph of Type "B" specifications above.

(2) Underneath, and forming the soffit of joists shall be placed solid gypsum slab ½ inch in thickness; lower surface of which slab shall be flush with lower surfaces of the Key-Tile, forming a continuous underneath surface of gypsum blocks to take plastering. These soffit slabs shall be anchored either to joists, or by means of grooves in the adjoining Key-Tile, so as to form a certain mechanical bond.

(3) Same as second paragraph of Type "B" specifications above.

(4) Same as third paragraph of Type "B" specifications above.

(5) Same as fourth paragraph of Type "B" specifications above.

(6) Same as fifth paragraph of Type "B" specifications above.

REFERENCES

BUILDING AND LOCATION	ARCHITECT
Keystone Partitions, Wall Furring, Column Covering, Etc.	
Chateau Laurier, Ottawa, Ont.	Ross & MacFarlane
Liberty Tower, Liberty and Nassau Streets, New York, N. Y.	Henry Ives Cobb
State Capitol, Augusta, Me.	G. Henri Desmond
Marlborough-Blenheim Hotel, Atlantic City, N. J.	Price & McLanahan
Curtis Publishing Co. Building, Philadelphia, Pa.	Edgar V. Seeler
General Y. M. C. A. Building, Boston, Mass.	Shepley, Rutan & Coolidge
Union Station, Pennsylvania R. R., Baltimore, Md.	Kenneth M. Murchison
Central Y. M. C. A. Building, Philadelphia, Pa.	Horace Trumbauer
U. S. Post Office, Suffolk, Va.	U. S. Treasury Department, Architects
Union Station, Houston, Tex.	Warren & Wetmore
Architects Building, New York, N. Y.	Ewing & Chappell
	LaFarge & Morris
Municipal and County Buildings, Wilmington, Del.	Palmer, Hornbostle & Jones and John D. Thompson
Delaware & Hudson Co. Office Building, Albany, N. Y.	Marcus T. Reynolds
Metropolitan Floors and Roofs	
Sixty Wall Street Building, 60-62 Wall Street, New York, N. Y.	Clinton & Russell
Forty-two Broadway Building, 36-42 Broadway, New York, N. Y.	Henry Ives Cobb
Atlantic Mutual Building, William and Wall Streets, New York, N. Y.	Clinton & Russell
Ingersoll-Rand Co. Plant, Phillipsburg, N. J.	Wm. Prellwitz, Chief Engineer
Boston Wesleyan Building, Boylston Street, Boston, Mass.	C. H. Blackall
Disturbed Patients Building, Boston State Hospital, Dorchester, Mass.	Kendall, Taylor & Co.
Baldwin Locomotive Works, Eddystone, Pa.	B. L. W.'s Engineers
Pennsylvania R. R. Station, Jersey City, N. J.	Pennsylvania R. R.'s Engineers
Central Technical School, Toronto, Ont.	Ross & MacDonald
Machine Shop, Foundry and Running Shed, Montreal Locomotive Works, Montreal, Que.	American Locomotive Co.
Office Building, Locomotive House, Physical and Chemical Laboratory and Crucible Mills, Bethlehem Steel Co., South Bethlehem, Pa.	Chas. E. Lehr, Chief Engineer
Poppenberg Building, Buffalo, N. Y.	Ulysses G. Orr
Highwood Co. Plant, Hamden, Conn.	Lockwood, Green & Co.
N. Y., N. H. & H. R. R. Station, Hartford, Conn.	N. Y., N. H. & H. Co.'s Engineers
Wm. K. Vanderbilt Residence, Jericho, L. I.	John R. Hill
Key-Tile Floors	
Hotel, Avery and Washington Streets, Boston, Mass.	C. H. Blackall
Warren Manfg. Co. Factory, Milford, N. J.	Campion-McClelland Co.
Burlington Apartments, Juniper and Spruce Streets, Philadelphia, Pa.	McIlvaine & Roberts
Immaculate Heart Academy, Group of Buildings, Frazer Pa.	Ballinger & Perrot
Philadelphia Turngemeinde, Broad Street and Columbia Avenue, Philadelphia, Pa.	Ballinger & Perrot
Hope Farm, Green Bank, Del.	John D. Thompson
Cooper Hospital, Camden, N. J.	Walter Smedley
Apartment House, 15th and Pine Streets, Philadelphia, Pa.	McIlvaine & Roberts

ESTABLISHED FIFTY-NINE YEARS.

HENRY MAURER & SON

MANUFACTURERS OF

Fireproof Building Materials made of Hollow Terra Cotta

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Products.

FIREPROOF BUILDING MATERIALS made of HOLLOW TERRA COTTA, Porous and Semiporous; also, all kinds of FIREPROOFING made of CLAY, for ARCHES (end and side construction), POROUS TERRA-COTTA BOOK TILES, PARTITIONS, FURRING, GIRDER and COLUMN PROTECTION, FIRE-CLAY FLUE LININGS, FIRE BRICK, CLAY and GLASS ROOFING-TILES.

Among our many specialties are the "PHOENIX" HOLLOW-TILE WALL CONSTRUCTION and the "HERCULEAN" FLAT ARCH (patented), "PEERLESS" FLOOR ARCH (patented), "SIMPLEX" FLOOR ARCH (patent pending), described on following page.

"Herculean" Flat Arch.

The "Herculean" Flat Arch (Fig. 1) is well adapted to wide spans up to 22 feet, eliminating entirely the use of steel beams, and is especially suitable where light weight in combination with great strength is essential.

The blocks, 12 by 12 inches, are of semiporous terra cotta, of uniform size and shape, with webs of from ¾ inch to ⅞ inch, and, according to the length of the spans, are 6, 8, 10 and 12 inches in depth.

The reinforcement consists of T steel 1½ by 1½ inches by $\frac{3}{16}$ inch. and of lengths to suit the spans required. They are embedded in grooves of the terra cotta blocks which have previously been filled with cement mortar, thus insuring the steel from corrosion; and, secured by the grooves in the blocks, absolutely preclude any shifting of the reinforcement. The T steel is further fireproofed, as shown, by being thoroughly protected by never less than 2 inches of hollow terra cotta.

For arches of greater depth than 8 inches, we use two Tees.

The weight of this construction per square foot, including necessary T steel, is as follows: 6 inches deep, 30 lbs.; 8 inches deep, 33 lbs.; 10 inches deep, 42 lbs.; and 12 inches deep, 54 lbs.

An arch measuring 20 feet from wall to wall, loaded with 120,000 pounds of hard brick, distributed over a surface of 200 square feet (600 pounds to the square foot), showed no perceptible deflection.

Official Indorsement.

"Herculean" Flat Arch Construction has been approved by the New York and Philadelphia Building Departments and by the Building Departments of many other cities, and by the United States Government Engineers.

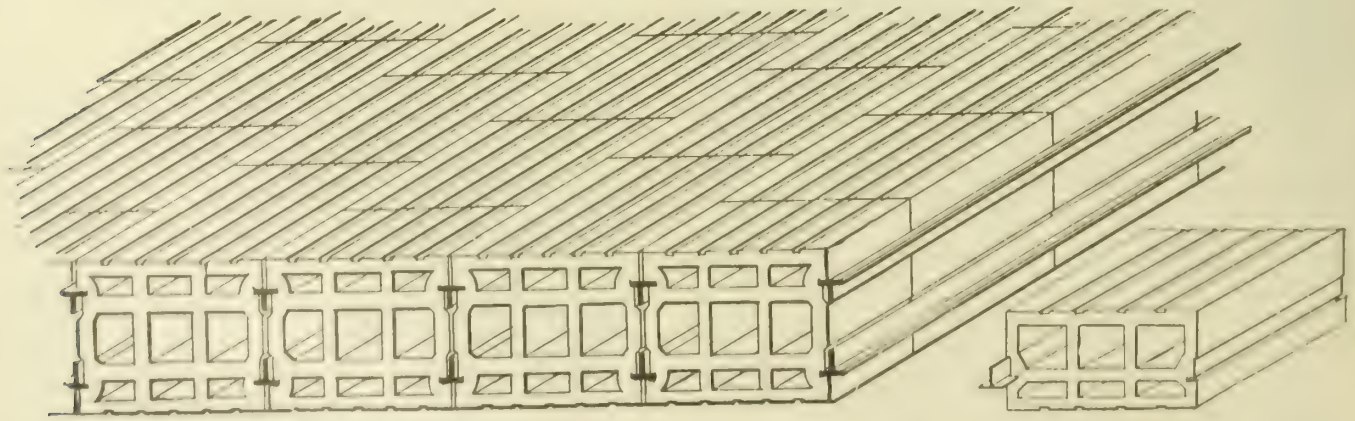

FIG. 1.—HERCULEAN FLAT ARCH—SECTION SHOWING METHOD OF CONSTRUCTION (Patented)

(See Catalogue)

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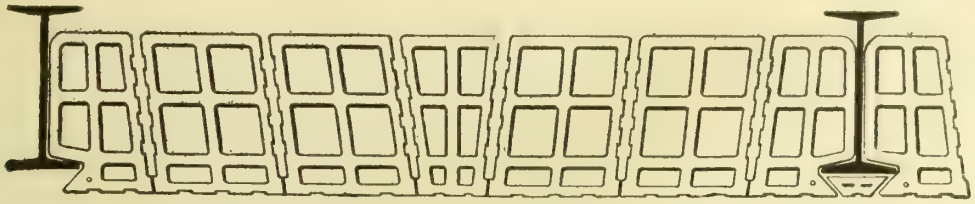


FIG. 2. "SIMPLEX" HOLLOW TILE FLAT ARCH
With joints between the members unfilled
(Patent Pending)

"Simplex" Floor Arch.

Particular attention is called to the "Simplex," our improved Fireproof Construction for Floors in buildings.

Hollow Tile Advantages—Hollow Tile has for many years been recognized as the best material for the fireproofing of buildings. It possesses many superior points over any other material made for a similar purpose.

Hollow tile is fireproof, resists moisture, is soundproof and gives stability to the building by filling the spaces between the beams. Its hollowness makes its weight not excessive.

Hollow tile can be erected in any season of the year without danger. Low temperature does not affect it, nor does it disintegrate in freezing (or thawing) weather as numerous other materials do.

Their cheapness, both to make and install, has overpersuaded many to use inferior material in this part of the building. The unsatisfactory after-results are fast correcting this mistake.

Our Latest Construction—In presenting to you our latest Construction we call attention to the pattern of the Hollow Tile members (shown in Fig. 2). Tiles so formed can be installed or erected in buildings for at *least 40 per cent less than the old method.* Observe that near the bottom of the various members composing the arch, a "lug" is formed so that, when two or more tiles are placed together (as shown), a recess is created. Cement, made to the proper consistency, and permitted to run in and to fill this recess from the top, forms a full joint for each member of the arch, thereby creating a perfect fireproof construction. The cement can be grouted in these recesses by use of a trowel.

Installation—In the installation of the "Simplex" Arch, the various tiles can be laid on a wooden center, dry, and erected as stated above—a distinct advantage over the old method.

Still another advantage of the "Simplex" Construction is that little or no cement adheres to the bottom of arch (forming the ceiling), thereby avoiding the risk of stains on ceilings where old methods are used.

The "Simplex" method is also used in the construction of Segmental Arches.

A Proved Success—The "Simplex" Floor Arch is not an experiment, but a demonstrated success as a simple and excellent construction for all classes of buildings. The cost of installation is greatly reduced on account of the shape of the tiles, as explained above. Better workmanship is attained by its use. Large areas can be quickly erected, and save much time in the completion of a building.

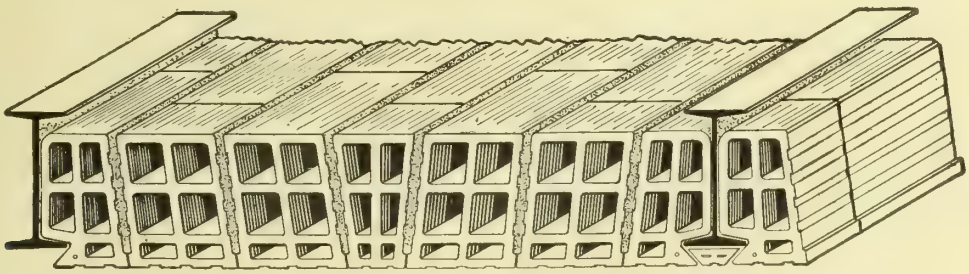


FIG. 3. "SIMPLEX" HOLLOW TILE FLAT ARCH
With joints between the members filled

NATIONAL FIRE PROOFING COMPANY

ORGANIZED 1889

MAIN OFFICE
Fulton Building
PITTSBURGH, PA.

CHICAGO, Webster Building
CANTON, City National Bank Building
DETROIT, Penobscot Building
MINNEAPOLIS, First National Soo Line Building
LOS ANGELES, Central Building
MILWAUKEE, First National Bank Building
SYRACUSE, University Building
NEW YORK, Flatiron Building
PHILADELPHIA, Land Title Building
BOSTON, John Hancock Building
WASHINGTON, Woodward Building
TORONTO, CAN.

TWENTY-THREE FACTORIES IN THE UNITED STATES AND ONE AT HAMILTON, CANADA

Products.

Manufacturers of DENSE and POROUS HOLLOW TILE for FIREPROOF FLOORS, ROOFS, CEILINGS, PARTITIONS, WALL FURRING, COLUMN and GIRDER COVERINGS, and for EXTERIOR WALLS of all kinds, including Barns, Silos, and other Farm Buildings; NATCO LOCK-JOINT SEWER TILE and TEX-TILE.

CONTRACTORS for FIREPROOF CONSTRUCTION in both HOLLOW TILE and REINFORCED CONCRETE.

Branding.

Attention is directed to the present policy, originated by this company, of branding all its hollow tile with the trade-mark name, Natco. The tile of special design will bear special marks of identification, as Natco, Natco XXX, Natco Bakup, Natco Tex-Tile, to show the particular part of the construction to which they are adapted.

Facilities.

The NATIONAL FIRE PROOFING COMPANY is the largest concern in the world devoted solely to the business of fireproof construction in both hollow tile and reinforced concrete. Its capital is twelve and one half million dollars, with an output from twenty-three factories in the United States and one in Canada. These factories, conveniently located, insure cheap transportation and prompt delivery.

Natco Floor Construction.

Floor arches of hollow tile can be set in winter, as the hollow tile dries out in a few days. They are more nearly soundproof than solid construction.

Following are illustrations and descriptions of some of the forms in common use. Only typical sections are given.

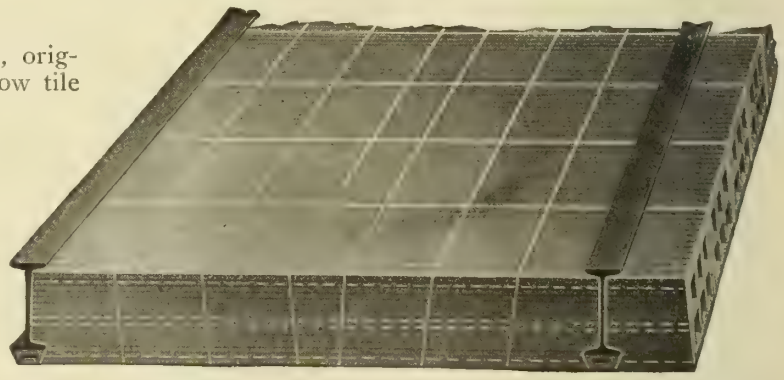
Natco Segmental Arch (without Tie Rod).

This form of arch combines great strength with cheapness and lightness. It is suitable for warehouses, lofts, factories, sidewalks, or wherever a flat ceiling is not essential. Metal lath and plaster ceiling may be used in combination with it, as installed in the New York public schools, and in private houses, stores, etc. The 6-inch arch is used for all ordinary purposes.

Weight of 6-inch hollow tile arch is twenty-seven pounds per square foot. Weight of 8-inch hollow tile arch is thirty-five pounds per square foot.

Natco Flat Arches.

The flat arch is the accepted type of Standard Fireproof Floor Construction, meeting every requirement as to strength, fire protection, architectural appearance and minimum weight. The "Natco" hollow tile flat arch construction, as illustrated below, has been developed as the company's standard for this type.



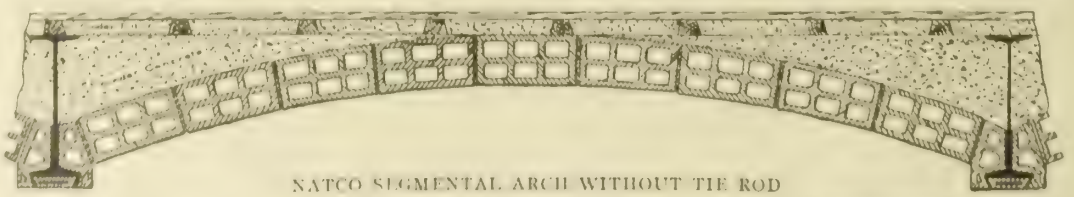
PERSPECTIVE OF STANDARD NATCO HOLLOW TILE FLAT ARCH

To find total dead load of any floor use the following weights: Tile, rock asphalt or cement finish weighs about 140 pounds per cubic foot; wood flooring, 3½ pounds per square foot; wood sleepers, 30 pounds per cubic foot; cinder concrete fill, 60 pounds per cubic foot; Hollow Tile arch, see table below; plastering, 5 pounds per square foot; steel I-Beam, divide weight of beam by span in feet.

TABLE OF WEIGHTS AND SPANS

Depth of Arch, Ins.	Weight, Lbs. per Sq. Ft.	Spans allowable between I-Beams Arch set flat	
		Ft.	Ins.
6	26	4	0
7	30	4	6
8	32	5	0
9	36	6	0
10	38	6	6
12	44	8	0
14	50	9	0
15	54	9	6
16	55	10	0

NOTE The strength of any arch depends as largely upon the workmanship as upon the material, therefore the maximum spans given can be used only where experienced workmen are employed and the work is guaranteed by a responsible contractor.



NATCO SEGMENTAL ARCH WITHOUT TIE ROD

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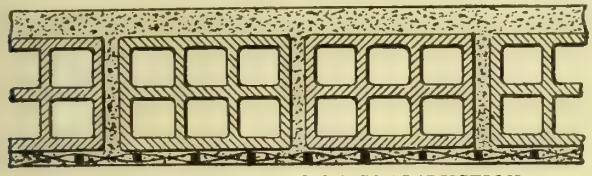
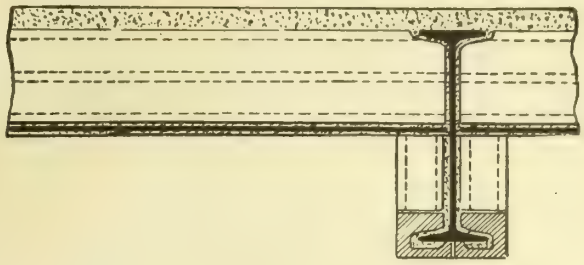
The "Johnson" System of Floor Construction.

This System makes a floor of wonderful strength and tenacity.



"JOHNSON" SYSTEM OF CONSTRUCTION
(End View)



"JOHNSON" SYSTEM OF CONSTRUCTION
(Side View)

It has been adopted in many modern buildings of the highest type, notably the Post Office building in Chicago.

The basis of this flooring is formed of large steel wires transversely interwoven with still larger wires placed four inches apart. These last run straight from bearing to bearing; the line of natural tension being in the line of bearing strain, therefore they do not deflect.

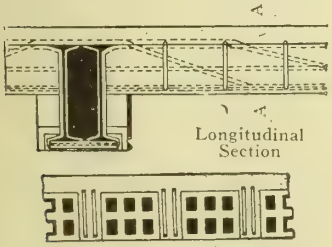
Over and through these wires is placed the cement which supports and unites the tiles—making a complete monolith. This System does away with the necessity for steel beams, thus saving weight and expense. It makes the floor a clean, solid monolith stretching from girder to girder or from wall to wall. Spans may safely be made as wide as twenty-five feet.

Combination Natco Hollow Tile and Reinforced Concrete Floor Construction.

Can be used without girders for clear spans up to twenty-five feet. Concrete joists four inches wide and top coat two inches deep to be mixed one part cement, two parts sand, and four parts gravel.

For semicontinuous and continuous spans proper reinforcement must be provided in top of slab over supports to take care of negative bending moment.

Where heavy loads and short spans are encountered, the vertical and longitudinal shear must be investigated.



Cross-section on Line A-A

DETAIL OF TYPICAL LONG SPAN COMBINATION NATCO HOLLOW TILE AND REINFORCED CONCRETE FLOOR CARRIED ON STEEL BEAMS

LOAD TABLE FOR "JOHNSON" FLOOR SLAB WITH 2-INCH CONCRETE TOP

SAFE LIVE LOAD IN POUNDS PER SQUARE FOOT—FACTOR OF SAFETY, 4

Area Reinforcing Steel per ft. of width, Span in ft.	12-in. Tile 1.0 sq. in. Weight of Floor per sq. ft., 79 lbs.	10-in. Tile .95 sq. in. Weight of Floor per sq. ft., 77 lbs.	9-in. Tile .90 sq. in. Weight of Floor per sq. ft., 72 lbs.	8-in. Tile .86 sq. in. Weight of Floor per sq. ft., 69 lbs.	7-in. Tile .82 sq. in. Weight of Floor per sq. ft., 66 lbs.	6-in. Tile .73 sq. in. Weight of Floor per sq. ft., 62 lbs.	5-in. Tile .68 sq. in. Weight of Floor per sq. ft., 59 lbs.	4-in. Tile .68 sq. in. Weight of Floor per sq. ft., 54 lbs.	3-in. Tile .6 sq. in. Weight of Floor per sq. ft., 51 lbs.
7	...	...	...	...	...	...	...	...	569
8	...	...	...	...	...	...	...	567	437
9	...	...	...	...	...	...	568	442	342
10	...	...	...	...	...	530	435	354	272
11	...	...	...	...	514	435	355	292	224
12	...	...	572	508	429	365	298	242	187
13	...	568	487	428	364	310	255	204	157
14	...	491	417	368	311	265	215	174	...
15	540	421	362	318	269	230	185	151	...
16	470	368	317	278	236	200	162	...	...
17	415	326	277	243	207	175	142	...	...
18	368	287	245	215	182	155	125	...	...
19	325	251	219	190	161	137	...	...	...
20	292	228	195	170	146	121	...	...	...
21	265	206	175	153	129	...	...	...	...
22	238	185	160	139	116	...	...	...	...
23	218	168	143	125	...	...	...	...	...
24	196	153	130	...	...	...	...	...	...
25	178	138	...	...	...	...	...	...	...

NOTE—Attention is called to the fact that this construction is reinforced in both directions. The reinforcing rods take the direct strains. The transverse strains are taken by a woven metal fabric running lengthwise of the arch, and through this fabric the rods are interwoven at intervals of four inches.

The above table is based on stresses not to exceed: 20,000 pounds per square inch in the steel, 800 pounds per square inch in the concrete, 900 pounds per square inch in the tile, and is for general information only, as each particular operation should be designed in accordance with the actual conditions.

LOAD TABLE FOR COMBINATION FLOOR SLAB WITH 2-INCH CONCRETE TOP

TOTAL SAFE LOADS (DEAD AND LIVE) POUNDS PER SQUARE FOOT

The figures on left in tables denote the depth of tile in inches, the figures on right the area of reinforcing steel in each concrete joist in square inches.
fc. 650 lbs. per sq. in.
fs. 16000 lbs. per sq. in.
$\frac{Ec}{Es} = \frac{1}{15}$
¾ in. of concrete below reinforcement
4 in. concrete joists 16 inches o. c.

TOTAL LOAD		150	165	180	195	210	225	240	260	300	335	375	450
Continuous Span (Some Cities)	W L / 12												
Continuous Span (Usual)	W L / 10	125	135	150	160	175	185	200	220	250	280	310	375
Semi-Continuous Span	W L / 9	110	120	135	145	155	170	180	195	225	250	280	335
Simple Span	W L / 8	100	110	120	130	140	150	160	175	200	225	250	300
Span, Ft.	6	...	...	...	...	...	3/.19	3/.20	3/.22	3/.26	3/.29	3/.32	3/.39
Span, Ft.	7	...	3/.19	3/.21	3/.23	3/.24	3/.26	3/.28	3/.32	3/.35	3/.38	3/.44	4/.42
Span, Ft.	8	3/.23	3/.25	3/.27	3/.30	3/.32	3/.34	3/.37	3/.40	3/.46	4/.41	4/.46	4/.55
Span, Ft.	9	3/.29	3/.32	3/.35	3/.37	3/.39	3/.41	3/.43	4/.40	4/.46	4/.52	4/.58	5/.57
Span, Ft.	10	3/.36	3/.39	3/.43	3/.46	4/.40	4/.43	4/.46	4/.50	4/.57	5/.53	5/.59	5/.71
Span, Ft.	11	3/.43	3/.47	4/.42	4/.45	4/.48	4/.52	4/.55	4/.61	5/.57	5/.64	5/.72	6/.73
Span, Ft.	12	4/.41	4/.45	4/.49	4/.53	4/.58	5/.51	5/.55	5/.60	5/.68	6/.65	6/.72	7/.78
Span, Ft.	13	4/.48	4/.53	4/.58	5/.52	5/.56	5/.60	5/.64	5/.70	6/.68	6/.77	7/.76	8/.80
Span, Ft.	14	4/.56	5/.51	5/.56	5/.60	5/.65	5/.69	6/.63	6/.69	6/.79	7/.79	8/.78	9/.85
Span, Ft.	15	5/.53	5/.58	5/.64	5/.69	6/.63	6/.68	6/.72	6/.79	7/.81	8/.81	8/.89	10/.88
Span, Ft.	16	5/.60	5/.68	5/.72	6/.67	6/.72	6/.77	7/.74	7/.81	8/.81	9/.84	9/.93	12/.83
Span, Ft.	17	5/.68	6/.64	6/.70	6/.75	6/.81	7/.78	7/.83	8/.80	9/.84	10/.84	10/.94	12/.93
Span, Ft.	18	6/.65	6/.72	6/.78	7/.76	7/.82	8/.77	8/.82	8/.90	9/.94	10/.95	12/.87	15/.83
Span, Ft.	19	6/.73	6/.80	7/.78	7/.84	8/.80	8/.86	9/.84	9/.92	10/.95	12/.87	12/.97	15/.93
Span, Ft.	20	6/.81	7/.79	8/.76	8/.82	8/.89	9/.87	9/.93	10/.91	12/.86	12/.97	15/.86	15/1.03
Span, Ft.	21	7/.79	8/.77	8/.85	8/.91	9/.89	10/.86	10/.92	12/.83	12/.95	15/.85	15/.94	...
Span, Ft.	22	8/.77	8/.84	9/.84	9/.91	10/.88	10/.94	12/.83	12/.91	15/.83	15/.93	15/1.04	...
Span, Ft.	23	8/.84	9/.84	9/.91	10/.89	10/.96	12/.85	12/.91	12/.99	15/.90	15/1.02	...	...
Span, Ft.	24	9/.84	9/.92	10/.90	12/.80	12/.87	12/.93	12/.99	15/.87	15/.99	...	...	...
Span, Ft.	25	9/.91	10/.89	12/.81	12/.87	12/.94	12/1.0	15/.86	15/.94	15/1.07	...	...	...

WEIGHT OF COMBINATION SLABS PER SQUARE FOOT

Tile	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.	15 in.
Weight	45 lbs.	50 lbs.	55 lbs.	60 lbs.	65 lbs.	70 lbs.	75 lbs.	80 lbs.	90 lbs.	105 lbs.

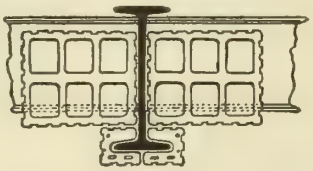
The load tables are for general information only as each particular operation should be designed in accordance with actual conditions. Other "Load Tables" and other types of floor systems shown in our book entitled "Long Span Fireproof Construction." Send for "Fourth Edition"—1915.

Our Engineering Department is at the entire disposal of anyone desiring further information.

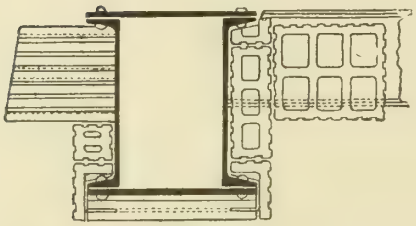
Continued on next page

Natco Girder Covering.

Hollow tile girder covering is made in various forms to meet special cases. It is usually self-supporting, except where the space to be covered is wider than twelve inches, when the soffit is supported by metal clips.



STANDARD SHAPE OF NATCO GIRDER COVERING



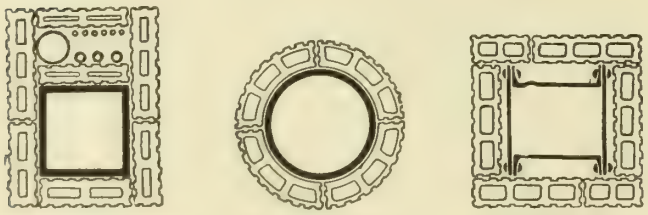
BOX-GIRDER PROTECTION HUNG ON METAL CLIPS

Natco Column Covering.

Steel and cast-iron columns must be covered by at least two inches of semiporous hollow tile.

For square columns we can also furnish Natco Hollow Tile in three- and four-inch thicknesses, and with rounded corners if necessary.

For circular columns we can furnish segmental column covering in two-, three-, and four-inch thicknesses.



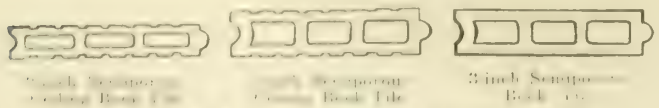
Column and Pipe Covering — Circular Column Covering — Square Column Covering

STANDARD SHAPES OF NATCO COLUMN COVERING

Natco Book Tile (for both roofs and ceilings).

Natco Book Tile is used between and supported on T-irons to form flat mansard and hip roofs. It is also used for flat or hung ceilings, for which purpose the ends can be rabbeted so that book tile are flush with bottom of steel T-irons.

Where necessary to nail tin, slate, or metal roofing directly to tile, we are in a position to manufacture a special porous book tile that will receive and hold a nail.



SECTIONS OF STANDARD ROOF AND CEILING TILE

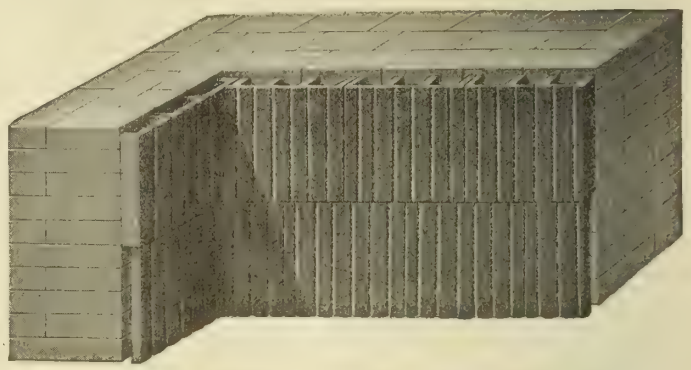
Natco Wall Furring.

Walls are furred to prevent the admission of moisture, either by lining the inside with Natco furring tile, or by building the inside face of the wall with hollow brick, "Haverstraw" size. The former method is more effective.

Header — Stretcher — Porous Stretcher

"HAVERSTRAW" BRICK

Stock Sizes
Stretcher, 2½" x 3½" x 8"
Header, 2½" x 3½" x 7¼"



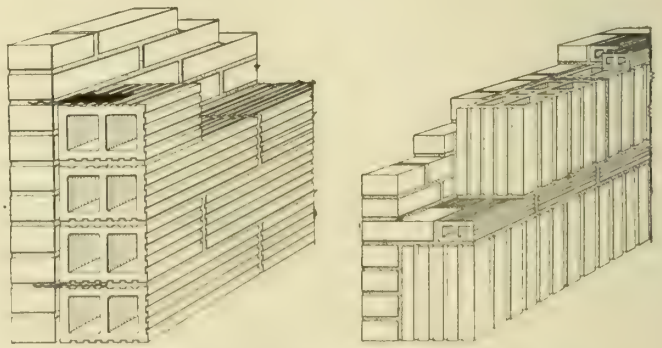
NATCO SPLIT FURRING TILE APPLIED TO BRICK WALL

1½" x 12" x 12", weight per square foot, 10 lbs.
2" x 12" x 12", weight per square foot, 10 lbs.

Natco Bakup and Building Tile.

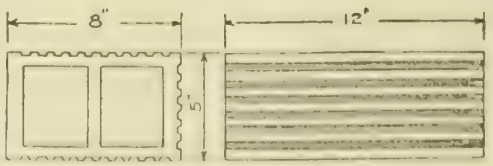
Called Bakup, for backing up face brick. Sizes 8 x 5 x 12 inches, and 4 x 5 x 12 inches, displacing six and three bricks respectively in 13-inch and 9-inch walls. Assuring decreased weight, an insulated wall and economy in material setting. Eliminates furring.

Called Building Tile, for a wall of plain tile, smooth on a 5- by 12-inch face and scored for mortar or plaster on other three sides, glazed or unglazed. Sizes 8 x 5 x 12 inches and 4 x 5 x 12 inches with necessary closures, jambs, corners and half lengths.



ISOMETRIC VIEW OF 13-INCH WALL

Showing two methods of backing face brick—Natco Bakup Tile and Natco XXX Hollow Tile, respectively

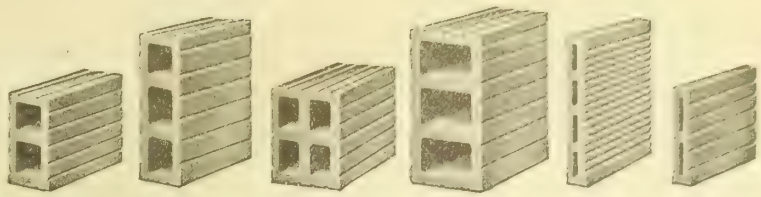


DETAIL OF 5" x 8" x 12" NATCO BAKUP TILE

Continued on next page

Natco Partition Tile.

Hollow Tile form absolutely the best fireproof and soundproof partitions now known and can be erected at a very reasonable cost. They are commonly built of semi-porous material, and 3-inch tile can be used safely to a height of 12 feet, 4-inch to 16 feet, 5-inch to 20 feet, and 6-inch to 24 feet.



TYPICAL SHAPES OF NATCO HOLLOW TILE PARTITIONS

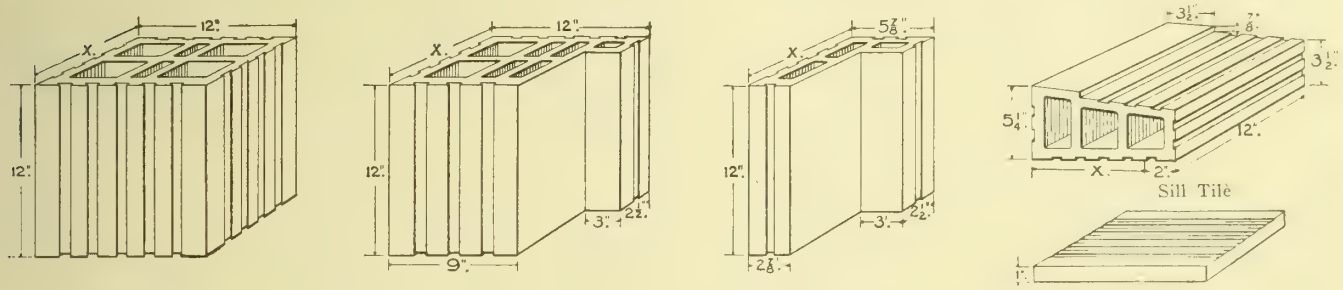
TABLE OF SIZES, WEIGHTS, ETC., OF NATCO PARTITION TILE

Sizes, Inches	No. of Cells	Weight, Lbs.	Sizes, Inches	No. of Cells	Weight, Lbs.
2 x 12 x 12	3	16	2 x 8 x 12	2	11
3 x 12 x 12	3	16	3 x 8 x 12	2	11
4 x 12 x 12	3	18	4 x 8 x 12	2	12
5 x 12 x 12	3	21	5 x 8 x 12	2	14
6 x 12 x 12	3	24	6 x 8 x 12	4	16
7 x 12 x 12	3	25	..	..	..
8 x 12 x 12	4	32	..	..	..
9 x 12 x 12	4	33	..	..	..
10 x 12 x 12	4	38	..	..	..
12 x 12 x 12	4	44	..	..	..

NOTE.—Short lengths are also carried in stock and a reasonable percentage shipped on all orders.

Natco XXX (Patented) Hollow Tile.

Natco XXX as compared with regular Natco merely represents added strength in one of the strongest and most stable of all building materials. It realizes the very *last* degree of complete structural efficiency, its design being such that, when set up, *every square inch of webs and shell is under direct compression.*



DETAILS OF TYPICAL SHAPES OF NATCO XXX HOLLOW TILE

Comparative Cost.

Natco Hollow Tile, with its superior qualities of extra heavy shells and webs, all in direct alignment when laid, and with its deep dovetail scoring which affords the best possible mechanical bond for the stucco, costs no more than the old style of tile and for walls alone, compares favorably in first cost with the ordinary type of frame construction.

TABLE OF SIZES, WEIGHTS, ETC., OF NATCO XXX HOLLOW TILE

Standard Sizes					Jamb Tile			Half Jamb Tile			Corners		
Thickness	Height	Length	No. of Cells	Weight Lbs. per Sq. Ft.	Thickness	Height	Length	Thickness	Height	Length	Thickness	Height	Length
(Inches—in Wall)					(Inches—in Wall)			(Inches—in Wall)			(Inches—in Wall)		
3	12	12	3	18	..	..	..	..	..	..	..	..	..
4	12	12	3	20	..	..	..	..	..	..	..	..	..
5	12	12	3	23	..	..	..	..	..	..	..	..	..
6	12	12	6	29	6	12	12	6	12	5⅞	6	12	12
8	12	12	6	34	8	12	12	8	12	5⅞	8	12	2
10	12	12	6	40	10	12	12	10	12	5⅞	10	12	4
12	12	12	9	52	12	12	12	12	12	5⅞	12	12	6
Slabs													
6	1	12	..	6									
8	1	10	..	8									
10	1	8	..	8									
12	1	12	..	12									
Sill Tile													
10	5¼	12	3	21									
12	5¼	12	4	23									
14	5¼	12	4	25									

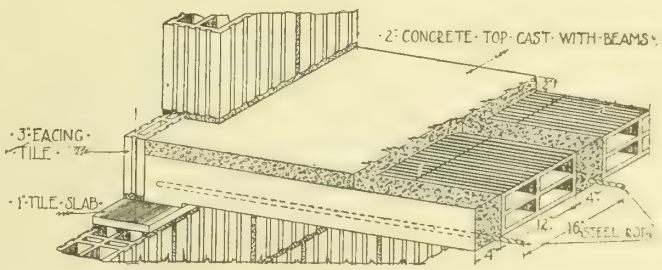
NOTE—We also manufacture and ship with all orders a reasonable percentage of short pieces cut 3, 6, and 9 inches in height to use with 1-inch slabs listed here in working up to story height.

Natco Tex-Tile.

As its name implies, this new product of this Company is in principle a hollow tile, adapted to afford a finished exterior surface. Its manufacture removes the former limitations as to size, while the beauty of color and texture of solid brick is attained in shades of brown and reds. Tex-Tile, having all the structural and artistic advantages of texture brick, with added air-spaces to check moisture and heat, can be laid at a cost of about thirty per cent less than brick.

Sample walls have been laid up in our various offices, where architects are invited to view this very desirable material.

Send for full details of Natco Tex-Tile.



TYPICAL DETAIL OF NATCO XXX EXTERIOR WALL AND COMBINATION FLOOR OF HOLLOW TILE AND REINFORCED CONCRETE

By erecting interior partitions of Natco Hollow Tile in conjunction with this type of construction, it is possible to completely fireproof private residences, stores, apartments, school buildings, libraries, etc., at a cost of from 20 per cent to 30 per cent over the ordinary frame construction.

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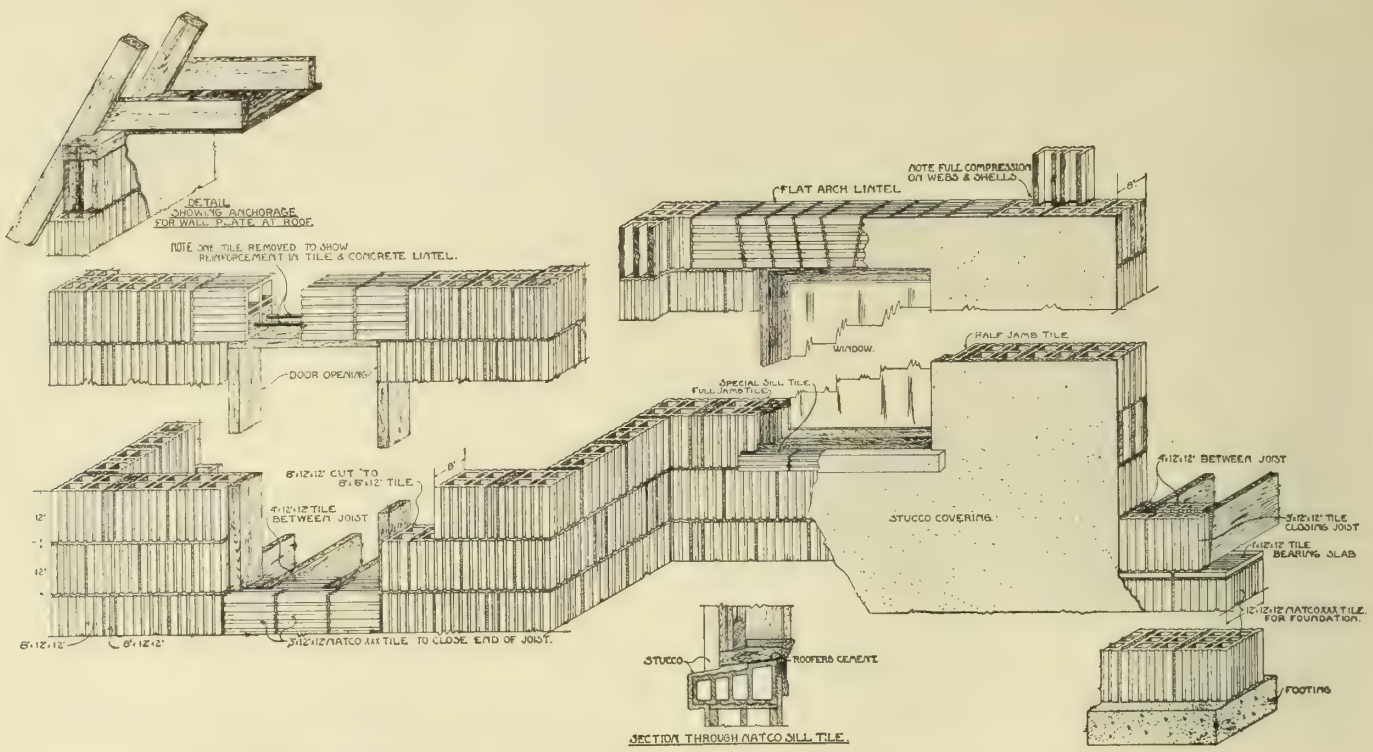


TYPICAL EXTERIOR WALL CONSTRUCTION OF NATCO XXX (PATENTED) HOLLOW TILE

Materials and Methods.

The materials and methods illustrated and described herein have been determined by wide practical experience in Natco Hollow Tile Construction, and have been approved by fireproofing engineers and architects generally.

Specification Notes.

For the assistance of all those desiring to take full advantage of hollow tile construction, with its low initial cost and minimum expense of up-keep, this Company offers the following specifications for wall construction, floor construction, and stucco finish, which have been carefully developed through years of use and may be regarded as the manufacturers' standard specifications. The adoption of these will insure equable conditions in estimating, and produce results in accordance with best practice.

For the convenience of specification writers it is suggested that the first clauses of wall or floor specifications entitled "General" might be quoted in full in the estimating specifications, followed by clauses stipulating: (1) Which contractor applies cement coat to exterior of foundation walls of tile; (2) whether dampproofing shall be integral or applied and by whom furnished and done; (3) whether door or window openings are to be calked by hollow tile layer, as specified, or by plasterer; (4) how and by whom fireplaces and chimneys shall be constructed; (5) by whom centering for any arched or clear openings shall be provided; (6) by whom centering and sleepers for floors shall be provided and set; (7) which system of floor construction is to be used, or whether alternate estimates are to be given, etc.; these to be followed by a clause similar to the following:

"The hollow tile work throughout is to be furnished, delivered, and set, in accordance with the typical details given and the manufacturers' standard specifications printed on pages (so and so) of Sweet's Catalogue, eleventh edition."

For stucco work the same latter clause, modified, could be well used after describing the number of coats, the kind of waterproofing, and the nature of the finished surface.

NOTE—While two coats of stucco carefully applied, having a total thickness of not less than three quarters of an inch, are allowable for rough cast or pebble dash finish, much better results can be obtained when three coats are applied. Three coats should always be applied when a smooth or flat finish is desired.

Co-operative Services.

The branch engineering departments maintained in many of the larger offices of this company are fully equipped to make complete plans and details of the fireproofing of buildings, estimate the cost, and give all possible help and information to patrons who wish to avail themselves of the advantages offered.

Specifications.

HOLLOW TILE WALLS

General—The contractor for this part of the work shall furnish, deliver and erect all materials required for exterior and interior bearing walls and any interior subdividing partitions, as indicated on plans, of hard burned hollow tile, together with all necessary special shapes required at corners, at joist-level, in working around openings, or to complete buildings as called for in this specification to approval of architect. All hollow tile shall be true and regular in size, manufactured of such design that all webs and shells are in direct compression when laid in the wall. Tile shall have all faces scored with special dovetail scoring to offer a good surface for the stucco and plaster finish. Tile cracked or broken on the outside shells will not be acceptable under this specification.

Sweet's Catalogue

Continued on next page

In general all exterior walls and interior bearing walls shall be of Natco XXX hollow tile; non-bearing subdividing walls shall be Natco partition tile as manufactured by the National Fire Proofing Company.

Laying—All tile used in the exterior walls and any interior bearing partitions must be laid with the holes or voids vertical in the wall, in order to develop their full strength. Interior subdividing, non-bearing partition tile may be laid on side if desired, but must be started on the structural floor and wedged against the floor above. Care must be taken that the top of all unfinished walls are thoroughly covered or protected against stormy weather.

The contractor for laying hollow tile is also to furnish and set all iron or steel or concrete incidental to the completion of the building as covered by these specifications—the materials in each case to be the best of their respective kinds to approval of architect.

Mortar—All mortar used for laying up the hollow tile shall consist of a standard Portland cement and clean sharp sand in the proportion of one part cement to three parts sand, well mixed to a smooth, moderately stiff mortar. Lime not to exceed 10 per cent of the cement by volume, will be allowed in the mortar.

Foundation Walls—Any foundation walls so indicated on plans from top of footings to the underside of first floor beams shall be constructed of proper combination of Natco XXX hollow tile to produce thickness shown. Care should be taken to use special Natco XXX hollow tile at the corners. Outside of walls from footing to a point above the ground shall be given a heavy coat of waterproofed cement or other approved damp-proofing.

Where columns or piers supporting heavy loads rest on the foundation wall, the same shall be filled with concrete from footing to top of wall to prevent the possibility of failure due to compression.

Jamb Tile—Provide for all double-hung windows Natco XXX jamb tile with rabbetted openings to receive the window frame box. Fill well with mortar the space between the tile and the frame box to within one inch of stop bead. The contractor for the setting of the tile is to calk to stop bead of all doors and windows with roofers' cement or oakum, furnished and set by him, to prevent the passage of air or moisture.

Lintels—Openings not exceeding 5' 0" in clear span may be spanned with Natco XXX arch lintel tile or with Natco XXX tile reinforced with proper steel rods in lower cells and filled solidly with stone or gravel concrete.

Openings over 5' 0" in clear span to be spanned with reinforced concrete girder faced with tile, or with steel angles—size of structural or reinforcing steel variable with load and span; all to be furnished and set by the contractor for tile laying to approval of architect.

Sills—Form all sills of Natco special hollow sill tile. Special care must be taken to fill all joints so as to prevent moisture working through the same; wood sill of frame to be set in a heavy bed of roofers' cement.

Arch Openings—Build all arch openings shown on plans of two course rowlock hollow brick header arches, carefully laid on substantial centers. Arches will spring from the hollow tile and must be well bedded on them.

Porch Columns and Piers—Construct any porch columns and piers, so indicated, of hollow tile to sizes as shown. Where column finish is round, build the same of three-inch circular hollow tile column covering, filling the column with concrete when the second story walls are supported by them. If steel reinforcement is used care should be taken to band the steel against lateral deflection. Square columns shall be built of the proper size Natco XXX tile.

Floor Beam Bearings—Provide and set tile slabs one inch thick under all floor beams as bearing plates for the same. These slabs shall also be used for working up to levels and story heights when the full or fractional tile do not work out correctly.

Beam Courses—Wood floor beams are to be framed into exterior walls as shown on detail, using Natco XXX hollow tile in accordance with the following: In eight-inch walls 3 x 12 x 12 for facing ends of beams, and 4 x 12 x 12 for filling between beams. In ten-inch walls 5 x 12 x 12 for facing ends of beams, and 4 x 12 x 12 for filling between beams. In twelve-inch walls 6 x 12 x 12 for facing ends of beams, and 5 x 12 x 12 tile for filling between beams.

Roof Plates—Embed in cement grout in two upper courses of wall at intervals of five feet, ¾-inch bolts twenty-four inches long. Bolt to project six inches above the top of the wall, to allow of plate being fastened down with nuts.

Floor Construction

General—Floor construction shall be the type known as the combination hollow tile and concrete floor construction, consisting generally of four-inch reinforced concrete beams spaced sixteen inches on centers with Natco hollow tile between, and covered with concrete top as shown, or the "Johnson" system of Natco tile laid on a one-inch bed of one to three cement and sand with metal fabric bedded therein, all to have at least four-inch bearing on walls.

Concrete—All concrete used in floor construction shall consist of one part Portland Cement, two parts clean sharp sand, and four parts broken stone or gravel of such size as will pass through a three-quarter inch ring. Concrete will be of wet mixture, and must be well tamped and worked around reinforcing steel after pouring.

Reinforcing Steel—Steel rods for floor construction must be of such type as will have a mechanical bond with the concrete. Corrugated, twisted or similar type will be accepted. Steel must have an elastic limit of not less than one-half the tensile strength. Rods must be clean and free from rust scales before placing in position, and must be placed not over one inch above bottom of floor.

Tile—Depth of Natco tile and size of steel reinforcement will be regulated by span and load to be carried, in accordance with standard tables of the manufacturers, and will be of size indicated on the plans. All tile must be wet before concrete is placed, so as to insure a proper bond with the concrete.

Centers—Centers must be of such size as to insure of their not deflecting under the weight of the wet concrete, and must be provided in such quantity as to insure of speedy work. Centers must not be removed before the concrete has properly set, and under long spans a center line of supports must be maintained for at least three weeks after the concrete has been poured. In cold weather the centers must be left in place until directed by the architect to remove them.

Stucco on Hollow Tile

The stucco shall consist of the following materials and be mixed in the following proportions:

(1) Portland cement which has met the requirements of the American Society for Testing Materials.

(2) Sand free from organic matter or loam, and uniformly graded in size from coarse to fine.

(3) Hydrated lime—any good brand of prepared hydrated lime or well burned slaked lime putty will be accepted.

First coat: 1 cement, 1/10 lime, 2 sand.

Second coat: 1 cement, 1/10 lime, 2½ sand.

Third coat: 1 cement, 1/10 lime, 3 sand.

All stucco should be applied immediately after being mixed; no retempered stucco shall be used. No stucco is to be applied when it is liable to freeze before it sets. All stucco work shall be kept thoroughly wetted down until cement has set, in hot or dry weather, as too rapid drying will cause cracking.

The tile surface shall be free from all foreign material, and shall be thoroughly wetted down before the first or scratch coat is applied. The first coat shall be applied with force so as to key behind the dovetail scoring, also to prevent air bubbles or holes, and shall be thoroughly scratched to insure proper bond with the next coat. The second coat should be applied as soon as the prior coat has sufficiently set to allow working upon the same, and should be straightened with darby and straight edge, then floated with cork or wooden float to prevent waves showing on the finished wall.

Should it be impossible to apply the second and last coats as soon as the former coat has become thoroughly set, wet down the coat already applied before applying others, to give a better bond between successive layers.

The finish coat should as far as possible, be applied to the entire area of one side of structure to the corners at one operation.

Thickness of each coat should average from one-quarter to one-half of an inch. If only two-coat work, the material must have a total thickness of not less than three-quarters of an inch, exclusive of the dovetail scoring.

Finish coat of stucco is to be waterproofed with an approved brand of Integral Waterproofing Compound or other approved compound in accordance with directions of manufacturers.

PENNSYLVANIA FIREPROOFING COMPANY

GENERAL OFFICES

ERIE, PA.

Products.

Manufacturers of Fire Clay Hollow Tile, Hard Burned, Dense and Semiporous, for Fireproofing Steel Buildings and for Partition Walls.

"Pentex Splits" Hollow Tile, "Pentex" Hollow Tile and "Elco" Hollow Block, for Exterior Walls; Hollow Brick, for backing up Solid Brick Walls.

Advantages.

By the use of a special mixture of the well-known "Elk County" fire clays, we obtain a very strong, tough tile, burned to a terra-cotta shade. It is very hard, is very slow to absorb moisture, and will not stair or discolor the stucco, or interior plaster decorations.

Pennsylvania Fireproof Tile.

The Pennsylvania Fireproofing Company operates one of the largest and best equipped fireproofing hollow tile factories in the United States. The capacity of the plant is more than five hundred tons of hollow tile each working day. This fireproof tile is a mixture of plastic clay with refractory clay (two distinct veins in the company's mines), producing an ideal hollow tile of a terra-cotta shade after burning; mixture enables the tile to be burned very hard, leaving it entirely free from fire cracks. Tile withstands action of water and fire under actual fire tests much better than if it were made from refractory clay alone, and the feature of brittleness—common to hollow tile made of refractory clay has been thoroughly eliminated.

Scope of Use—In addition to the uses set forth above (see Products) may be mentioned the following: Wall furrings; combination hollow tile and reinforced concrete floor arches; girder coverings; column coverings; partition nailing grounds; window jamb and sill blocks, etc.

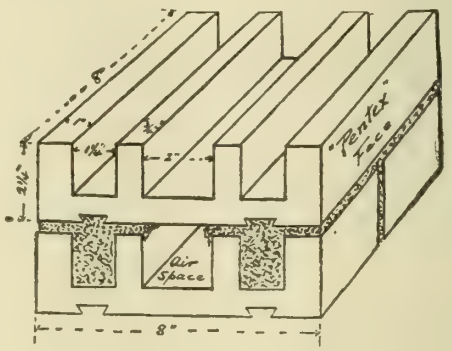
"Pentex Splits" Hollow Tile.

These products (made for eight- and twelve-inch walls) give a hollow tile wall with rough texture exterior face, at low cost, combining the beauty and soft exterior color scheme of high-grade face brick. Face of tile is not wire-cut, but is produced by a process that insures a more pleasing effect. The horizontal air space, the best insulator against cold or heat, absolutely prevents passage of moisture through wall, via horizontal or vertical mortar joints.

Colors—Varying shades of red, with shadows and lights of the rough surface, make an artistic wall exterior; buff shades also furnished.

Sizes—Each 2¼ × 8 × 8 inch block represents two standard solid brick. Seven of these splits equal one square foot of eight inch wall.

Cost—The cost of a square foot (exterior surface) of eight-inch wall is from twenty-five to forty per cent *cheaper* (by using "Pentex Splits") than a face brick wall of solid brick. Large savings accrue in freight, cartage and human energy in handling; also, in cost of steel framing where "Pentex Splits" are employed, as curtain walls in large office, apartment or factory buildings. Dead Load on steel reduced 25 per cent.



"PENTEX SPLITS" INSTALLED IN A HOLLOW TILE WALL

Guarantee as to Compression Load Tests.

This Company *guarantees* that "Pentex Splits" Hollow Tile will, when laid up in the wall in accordance with the standard specifications (see following page), meet the following compression load tests:

Maximum load in pounds per lineal foot of 8-inch wall or 96 square inches gross	75,000 lbs.
Maximum load in pounds per square inch net section under compression (48 inches)	1,800 lbs.
Maximum load in pounds per square inch, gross area 96 square inches	780 lbs.

"Pentex" Hollow Tile.

A hollow building tile for exterior use, with rough texture surface, and made from same materials under similar methods of construction (with like colors) as the "Pentex Splits" previously described. When laid *in rich black or other colored mortars* it has the appearance of massive brickwork.

Quality of Clay—The analysis herewith shows how high these plastic and refractory fire clays run in Alumina and Silica *which are the essential ingredients.*

Analysis

Composition	Plastic Clay, per cent	Refractory Clay, per cent
Silica—(SiO_2)	54.86	70.76
Iron Oxide—(Fe_2O_3)	5.43	1.71
Alumina—(Al_2O_3)	26.49	20.01
Lime—(CaO)	.66	None
Magnesia—(MgO)	1.44	.90
Alkalies—(K_2O Na_2O)	2.21	1.26
Loss on Ignition	8.50	5.35

Fire-Resisting Qualities—The remarkable fire-resistance shown by the mixture of plastic and refractory clays was recently well exhibited in a fire in the

Sweet's Catalogue

Continued on next page

Marine Bank Building, Erie, Pa. The walls, all interior partitions and ceilings, are fireproofed with tile of same quality clay as "Pentex" Tile. A store building occupied by a dealer in sporting supplies and containing large quantities of shells, cartridges and explosives took fire. The fire department was unable to go near the store for some time; but as soon as danger was over from explosives a stream of cold water from high pressure mains was thrown directly on the tile wall and ceilings, and there was not even a crack or spall in any of the tile, although the plaster, of course, peeled off.

Cost—"Pentex" Hollow Tile makes the *least expensive fireproof wall.* It costs much less than even stucco exterior, cannot discolor or deteriorate, improves with age and weathering, and washes clean with every rain. This type of tile wall (as has been demonstrated) can be built for an amount not exceeding five per cent greater than frame.

Specifications for Furnishing and Erecting "Pentex Splits" and "Pentex" Hollow Tile.

General—Provide and erect all the "Pentex Splits" hollow tile exterior walls as shown on the plans.

All material must be hard burned, true and regular in size, and shall have all faces with "Pentex" finish, as manufactured by the PENNSYLVANIA FIREPROOFING COMPANY. Blocks badly cracked or broken will not be acceptable under this specification.

Laying—All tile used in exterior walls must be laid with the air-cells horizontally, and in accordance with detailed drawing as furnished by the architect.

Mortar—(1) All mortar used for laying up "Pentex Splits" shall consist of a standard Portland cement and clean sharp sand in the proportion of one part cement, five parts coarse sand, two parts ¼-inch grit, and one-half part hydrated lime, or lime putty.

This will make a light gray mortar.

Brown—add to the above:

One-third part yellow powder; one-third part brown paste; one-fiftieth part black paste.

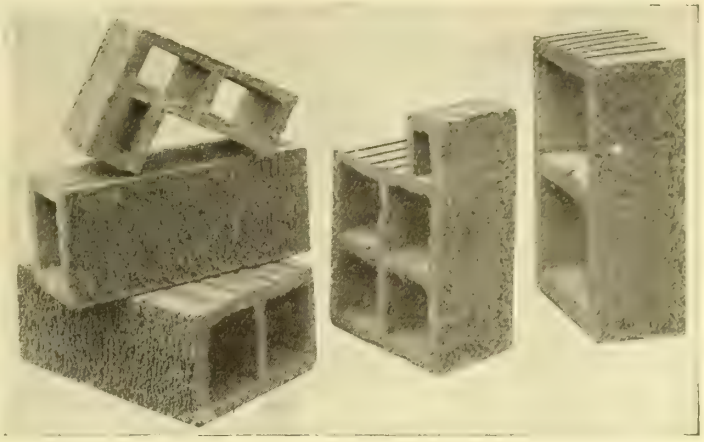
Dark Gray—add:

One-twelfth part yellow powder; one-sixteenth part black paste.

Cream Gray—add:

One-sixth part yellow powder.

(We would advise the use of French's Peerless Mortar Paste and French's Cement Mortar Powders as manufactured by Samuel M. French & Co., Philadelphia, Pa.)



"PENTEX" TILE, JAMB BLOCKS, CORNER BLOCKS AND REGULAR TILE

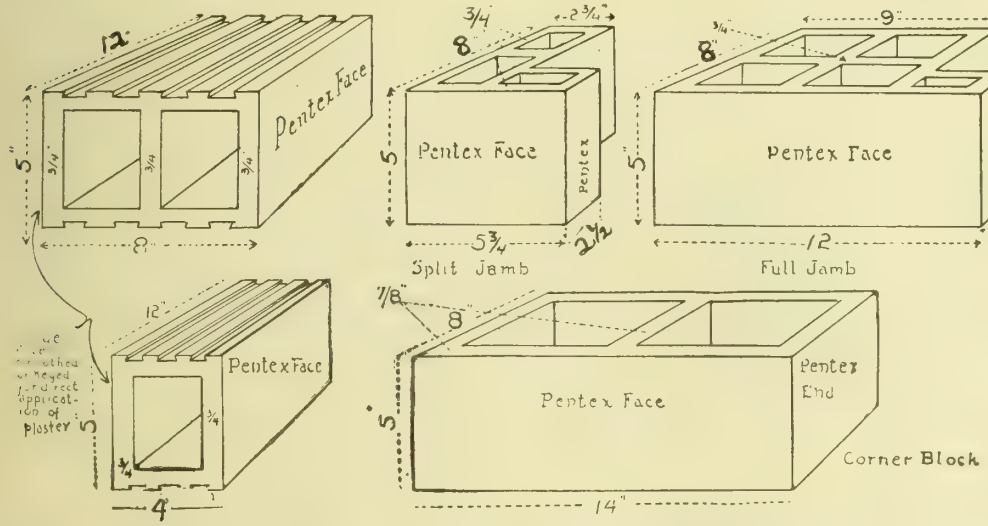
Contractor must not use mortar that is too soft. Mortar must be reasonably stiff, so that during process of laying tile it will not squeeze out and run over the "Pentex" face of the tile.

Mortar—(2) Mixing of same: The ingredients of each batch of mortar must be accurately measured. The slacking of lime and mixing with sand in a large storage bed, and then gauging small lots with cement as mortar is required by tile setter, will not be allowed.

Mortar Joint—A "raked out" joint must be used. This is obtained by cutting back the partly set mortar from the face of the tile work with the end (not head) of a 20-penny, or larger, cut nail, or some similar steel instrument, the sharp edges of which will thoroughly clean the mortar from arrises of tile and leave surface of joints flat and rough. The depth of the rake should be from ⅛ to ½ inch. The point of a trowel must not be used for this purpose, as it tends to rub the mortar into the rough edges of the tile, which is very undesirable. All joints to be one half inch thick.

"Elco" Hollow Block.

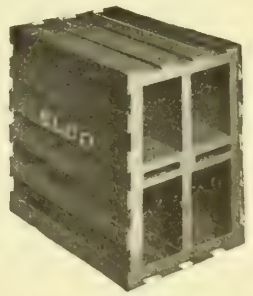
For exterior walls. Made for six-, eight-, ten- and twelve-inch walls. Standard blocks have six air-cells; for extra heavy work, nine air-cells. Sectional blocks for corners and jamb blocks for window frames furnished. Plaster applied directly to face of tile (no furring strips or lath required). Tile will not discolor plaster; wall will not warp or crack plaster.



DETAILS OF "PENTEX" TILE, SHOWING APPLICATION IN CONSTRUCTION

Showing sizes of Pentex Tile

Note inside faces of all blocks, jambs and corners can be smooth for paint or with key-shape grooves to receive plaster



"ELCO" HOLLOW TILE

WEIGHT PER BLOCK

Size of Block, Ins.	3-cell, Weight, Lbs.	6-cell Weight, Lbs.
4x12x12	20	..
6x12x12	28	..
8x12x12	..	36
10x12x12	..	40
12x12x12	..	50

HUNTINGTON ROOFING TILE CO.

OFFICE AND FACTORY

South 16th Street

HUNTINGTON, W. VA.

SALES OFFICES

ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
DETROIT, MICH.
ST. PAUL, MINN.
COLUMBUS, OHIO
DAYTON, OHIO
EVANSVILLE, IND.
GRAND RAPIDS, MICH.
LOUISVILLE, KY.
NEW YORK, N. Y.
PHILADELPHIA, PA.
PITTSBURGH, PA.
WASHINGTON, D. C.

Products

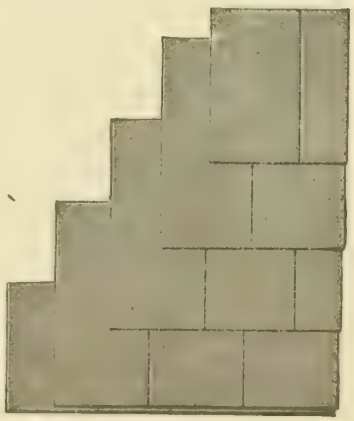
"Huntington" Shingle Tile.
"Huntington" Spanish Tile.
"Huntington" Promenade Tile.
Roof Trimmings of all Kinds to match Tile.

"Huntington" Tiles.

"Huntington" Tiles are made from a very pure quality of shale, free from any foreign matter. This shale insures a tile that is of uniform density, having little or no porosity, great strength, and free from lamination. By reason of their extended use for a long period of years architects generally are familiar with the good qualities of the "Huntington" Tiles.

"Huntington" Shingle Tile.

Our regular shingle tile is 6" x 13½" x ⅜", and weighs about 1100 pounds per square. When laid 5½" to the weather only 436 tiles are required for a square. "Huntington" Shingle Tiles are curved slightly so that they will lay closely at the butt. The edges are rounded off, forming, when laid, a groove or channel that enables any water which gets into the side joints to escape freely without spreading under the tile. This rounding of the edges also emphasizes the joints and makes a roof with more character than one of tile with square edges.



HUNTINGTON SHINGLE TILE

"Huntington" Spanish Tile.

"Huntington" Spanish Tiles, like "Huntington" Shingle Tiles, are in a class by themselves. They are made from the same superior shale, from an improved model designed by ourselves. This model affords much clearer lines than anything heretofore on the market. One square can be laid with 180 of our Spanish Tile.

HUNTINGTON SPANISH TILE

Color.

The natural color of the "Huntington" Tiles is red. By reason of the different degrees of heat we can apply in the burning, we can produce five different shades, varying from a very light red to a very dark red, almost brown. Uniform shades can be furnished if desired, or if all shades are used a beautiful mottled effect is obtained. This mottled effect has been used by many prominent architects with satisfaction, and seems to be very much in demand.

No. 1— 6 x 13½ Regular
No. 7— 3 x 13½ "Split"
No. 8 6 x 9½ Ridge Course
No. 9— 6 x 7½ Under Eaves

SHAPES FOR FITTING

They are also made in a beautiful matt green, in three to four shades. These varying shades relieve the monotony of the roof color, and produce an effect much desired by the leading architects.

Terra-Cotta Roof Trimmings.

Illustrations on following page show some of our standard patterns, such as ridge rolls, hip rolls, ridge saddles, etc. All rolls and saddles are made to lay one foot on the roof after allowing for necessary lap.

Hip and Gable Finials of standard pitches are carried in stock. Tower Finials usually have to be made to order.

A full line of finials and trimmings of all kinds are illustrated in our regular catalogue, which can be had upon application to the factory or any sales office.

Advantages.

"Huntington" Tiles are very uniform in quality, and are made from such a high grade of shale that they are very easily and accurately cut for hips and valleys. Our tiles are suitable for all classes of buildings, either in the city or country, and can be applied by any competent roofer.

Co-operative Service.

We are always pleased to furnish, promptly, estimates on all classes of Tile Roofing Work, upon receipt of the roof plan and the four elevations. Also, we will gladly make, at any time, special designs for tile or terra-cotta roof trimmings from the architect's drawings.

Orders.

In all cases where graduated tiles for circular towers or circular roofs are desired, these, and all terra-

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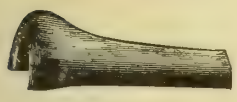
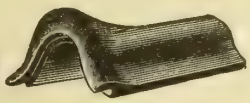
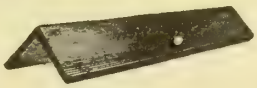


No. 11—3 x 9″
No. 12—5 x 13″
No. 13—7 x 13″
No. 14—9 x 13″

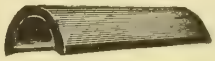


No. 15—6 x 13″
No. 16—7 x 13″

HIP AND RIDGE ROLLS

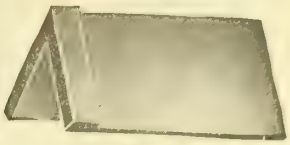


No. 20—5½ x 13″
HIP SADDLE



No. 18—3½ x 13″
No. 19—4½ x 13″

No. 26 Square Lip
Length 13″



No. 27—Square Lip
Length 13″

RIDGE SADDLES

cotta trimmings that must fit the pitch of roofs, are necessarily made to order and require from four to six weeks' time to make. It is therefore advisable to send orders promptly to avoid delays.

Scope of Market and Directions for Shipping.

As we always keep a full stock of tiles and standard trimmings ready for shipment, we are prepared to fill, on the shortest notice, orders of the largest size and deliver them to any point in the United States.

Directions for Laying.

As is customary with all tile and slate roofs, the sheathing is first covered with a suitable asphalt or roofing felt. "Huntington" Shingle Tile is then secured to the sheathing by means of two large-headed barbed nails, driven through the holes in each tile. In some cases galvanized-iron nails, and in others copper nails, are used. No cement is required to lay "Huntington" Shingle Tile.

The Spanish Tile is laid in the usual manner, with which all roofers are familiar.

References.

BUILDING, LOCATION AND ARCHITECT

Chicago University, Blaine Building, Chicago, Ill., Jas. G. Rogers
Convent Monastery of Visitation, Riverdale, N. Y., D. W. Daley
Duquesne Club, Pittsburgh, Pa., Rutan & Russell
Joliet Library, Joliet, Ill., D. H. Burnham & Co.
Mrs. Francis Kinnicutt's House, Dark Harbor, Me., Foster, Gade & Graham
St. Joseph's Convent, Brentwood, L. I., Schickel & Ditmars
U. S. Naval Academy Barracks, Annapolis, Md., James Knox Taylor, Supv. Architect
U. S. Post Office, Helena, Mont., James Knox Taylor, Supv. Architect
Arthur A. Carey, Residence, Cambridge, Mass., Hartley Dennett
Power-House, Springfield, Ohio, Hannaford & Sons
Epileptic Asylum, Gallipolis, Ohio, F. L. Packard
St. Paul's Church, Savannah, Ga., Jno. Sutcliff
A. F. Luke, Residence, West Newton, Mass., Chapman & Fraser

RESIDENCE OF W. H. WANAMAKER, JR., MERION, PA.
Roofed with "Huntington" Shingle Tile
THOMAS, CHURCHMAN & MOLITOR, Architects

LUDOWICI-CELADON COMPANY

MANUFACTURERS OF

Terra Cotta Roofing Tiles

GENERAL OFFICES

Monroe Building, Michigan Avenue and Monroe Street

CHICAGO, ILL.

BRANCH OFFICES

BOSTON, MASS., Old South Building
CLEVELAND, OHIO, Hippodrome Building
KANSAS CITY, MO., Grand Avenue Temple
MINNEAPOLIS, MINN., Plymouth Building
NEW YORK, N. Y., Fifth Avenue Building
PHILADELPHIA, PA., Weightman Building
PITTSBURGH, PA., Park Building
WASHINGTON, D. C., Union Trust Building
ST. LOUIS, MO., Pierce Building

FACTORIES

NEW LEXINGTON, OHIO COFFEYVILLE, KANS.

Products.

We manufacture TERRA COTTA ROOFING TILES, including the following shapes: In Spanish form—"IMPERIAL SPANISH," "IMPERIAL MISSION"; in Italian form—"IMPERIAL ROMAN"; in Continental Interlocking form—"IMPERIAL GERMAN"; in Shingle form—"IMPERIAL CLOSED SHINGLE" and "IMPERIAL ENGLISH."

We also manufacture IMPERIAL PROMENADE TILES in 6 x 9 x 1 inch and 6 x 6 x 1 inch sizes.

Illustrations.

In presenting, through this medium, a few of the many patterns which we make (see illustrations), we have selected those that take precedence in the favor of architects and engineers for architectural effect, mechanical accuracy, individuality and proved merit. These tiles are designed for use on roofs of not less than one quarter pitch.

Character.

All these tiles are made of shales, and subjected to high degrees of heat after painstaking preparation for the kilns. They are devised to interlock in the only practical and effective manner, so that water is carried to the surface of the next lower tile. Their durability is established by the only unassailable verdict—the test of time. The first product of this Company was put on the American market twenty-six years ago, at the rate of possibly three hundred squares per month. At present the output of our factories is approximately six hundred squares per day; an unmistakable evidence that builders recognize the merits of our ware.

Colors.

The standard color of Roofing Tiles is a terra cotta red. The greater development of color study in building has opened a field for glazed roofing tiles, of which we make a very complete line in varying shades. We furnish Tiles in the full glazes, and in dulled finish. An especially choice and pleasing color effect also is secured by the use of our Fire Flashed Tiles.

Installation.

Roofing Tiles are usually laid by experienced tile layers or slaters. We prefer to sell to contractors in this line, but will erect the material ourselves at points where there are no contractors sufficiently experienced or competent to do this work.

Estimates.

We shall be pleased to furnish catalogue and estimates on application, but inquiries for complete estimates should be accompanied with roof plan and the four elevations.

Specifications.

All pitched roofs shall be covered with [insert name of pattern of tile wanted] Tiles, made by LUDOWICI-CELADON COMPANY, with fittings suitable for each pattern as shown herewith. The tiles as specified above must be of shale, hard burned, of natural red color, and in accordance with samples deposited in office of the Architects.

Before roofer is sent for, the owner or general contractor shall construct roofs in strict accordance with plans, sheath roofs *tight*, have all chimneys and walls above roof line completed, have all vent pipes through roofs, furnish all strips of required width used under hip rolls and ridges, furnish all 1 x ⅞ inch cant strips used under tile at eaves, if required, and have all scaffolding ready for use of roofers. Metal contractor shall have all gutters in place on roof—gutters, whether box, hanging or secret, to extend over the roof sheathing and cant strip, if cant strip is required, and extend under felt and tile at least eight (8″) inches—and shall also have in place all valley metal, the width of which must be not less than 24 inches, with both edges turned up ½ inch the entire length of valley. Valley metal must be laid over one layer of felt running lengthwise the entire distance of valley. Metal contractor

Continued on next page

must have in readiness all flashing metal used along side and in front of dormers, gables, skylights, towers, perpendicular walls, also around vent pipes and chimneys, and place same after arrival of tile roofer and in accordance with requirements of the tiles.

After roofs have been thus prepared to receive felt and tile, tile roofer shall cover sheathing of the roofs with one thickness of asphalt roofing felt, weighing not less than 30 pounds to the square, laying same with a 2½-inch lap and securing in place with capped nails. Felt shall be laid parallel with eaves and lapped over all valley metal about 4 inches, and laid under all flashing metal and turned up against all vertical walls 6 inches.

The roof having been thus prepared, the tile roofer is to carefully space and properly line roof both vertically and horizontally to suit the pattern. Roofer should see that all tiles are laid smoothly, well locked together and fastened with copper nails of proper length. Tiles to be laid so that the vertical lines are parallel with each other and at right angles to eaves, and no attempt made to stretch the courses.

The tiles that verge along hips shall be cut close against the hip board, and a water-tight joint made by cementing cut hip tile to hip board with good elastic cement. Each piece of hip roll shall then be nailed to hip board, and hip rolls cemented where they lap each other. The interior spaces of hip and ridge rolls must not be filled with pointing material.

Imperial German Tile.

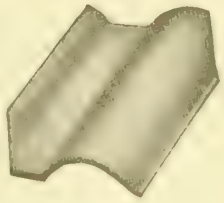
With the Imperial German pattern the following trimmings are used: Detached Gable Rakes, End Bands, No. 102 Hip Roll, No. 152 Hip Starters, No. 206 Ridge, Gable Terminal GT-206, and No. 405 Two-way Terminal for No. 102 Hip and No. 206 Ridge.

IMPERIAL GERMAN TILE

Length.....16″
Width..... 9″
Average Exposure.....8⅕″ x 13⅜″
Actual Weight per square.. 925 lbs.
Shipping Weight per square.1025 lbs.

Imperial Spanish Tile.

With the Imperial Spanish pattern the following trimmings are used: Top Fixtures, Mission Eave Closures, Detached Gable Rakes, End Bands, No. 102 Hip Roll, No. 152 Hip Starter, No. 215 Ridge, Closed End CE-215, No. 215 plain Terminal, and No. 405 Two-way Terminal for No. 102 Hip and No. 215 Ridge.

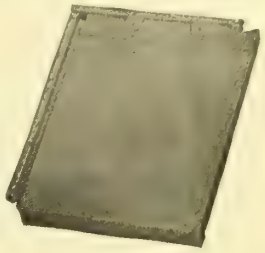


IMPERIAL SPANISH TILE

Length.....13¼″
Width..... 9¾″
Average Exposure.....8″ x 10⅛″
Actual Weight per square.. 950 lbs.
Shipping Weight per square.1050 lbs

Imperial Closed Shingle.

With the Imperial Closed Shingle pattern the following trimmings are used: Under Eaves, Detached Gable Rakes, End Bands, No. 118 Hip Roll, No. 168 Hip Starter, No. 211 Ridge, Closed End CE-211, and plain Two-way Terminal for No. 118 Hip and No. 211 Ridge.

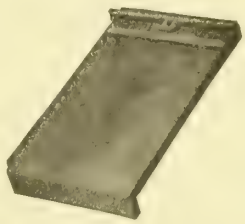


IMPERIAL CLOSED SHINGLE

Length.....11″
Width.....8¾″
Average Exposure.....7⅞″ x 8″
Actual Weight per square...850 lbs.
Shipping Weight per square..950 lbs.

Imperial English Tile.

With the Imperial English pattern the following trimmings are used: Detached Gable Rakes, End Bands, No. 120 Hip Roll, No. 170 Hip Starters, No. 211 Ridge, Closed Ends CE-211, and plain Terminals for No. 120 Hip and No. 211 Ridge.



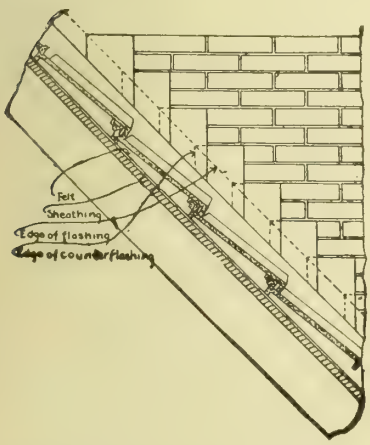
IMPERIAL ENGLISH TILE

Length.....13½″
Width .....9″
Average Exposure.....8″ x 10½″
Actual Weight per square..1000 lbs.
Shipping Weight per square.1100 lbs.

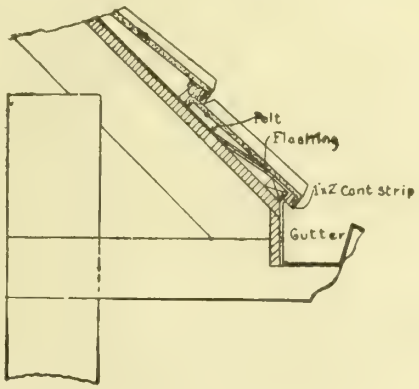
Imperial Promenade Tiles.

IMPERIAL PROMENADE TILE

Size.....6″ x 9″ x 1″
Number to square.....258
Weight.....4.1 lbs. each
Size.....6″ x 6″ x 1″
Number to square.....400
Weight.....2.8 lbs. each



Detail showing method of flashing against perpendicular walls for Interlocking and Spanish Tiles



Detail through gutter, showing cant strip and gutter metal under tile

NOTE—This detail applies only when no under eaves are furnished, in which case gutter flashing is to be placed flat on sheathing

DETAILS OF APPLICATION

THE MURRAY ROOFING TILE COMPANY

INCORPORATED

Manufacturers of "Murray" Shingle Tiles and Terra-Cotta Trimmings, Flat-Roof or Promenade Tiles

CLOVERPORT, KY.

AGENCIES

ATLANTA, GA., Roper & Strauss Co., Forsyth Building
BOSTON, MASS., Waldo Bros., 45-49 Batterymarch Street
BUFFALO, N. Y., Buffalo Builders Supply Co., Ellicott Square
CHICAGO, ILL., M. R. Duffy, 1119 Chamber of Commerce
CLEVELAND, OHIO, Cuyahoga Roofing Co., 604 Columbia Building
KNOXVILLE, TENN., Chandler & Co., 426 West Depot Avenue
NEW YORK, N. Y., C. T. Willard & Co., 110 East 23d Street
NORFOLK, VA., G. S. Friebus, 222 Ledger-Dispatch Building
PHILADELPHIA, PA., C. F. Shellenberger, 303 Builders Exchange
RICHMOND, VA., J. S. Archer, 203 Real Estate Building
ROANOKE, VA., Adams, Payne & Gleaves
WASHINGTON, D. C., M. C. Huddleston & Co., 2504 Hall Place N. W.

Products.

"Murray" Shingle Tiles and Trimmings; also, Flat-Roof and Promenade Tiles.

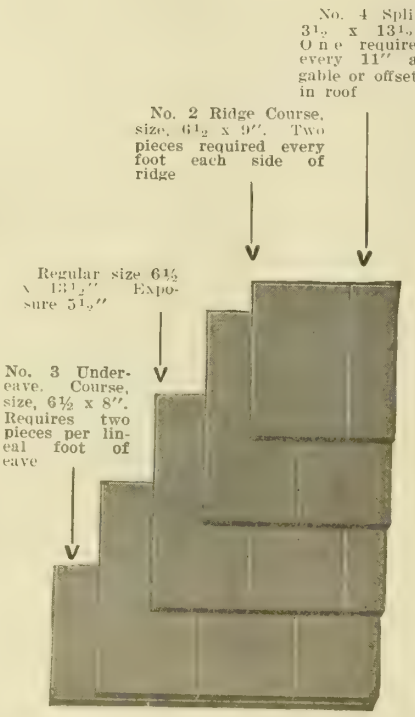
Qualities.

All "Murray" products are made of a shale especially adapted to the manufacture of such wares, and all are vitrified. The "Murray" plant is equipped for the perfect preparation of the raw material, and, under competent oversight, produces an approved product of marked excellence.

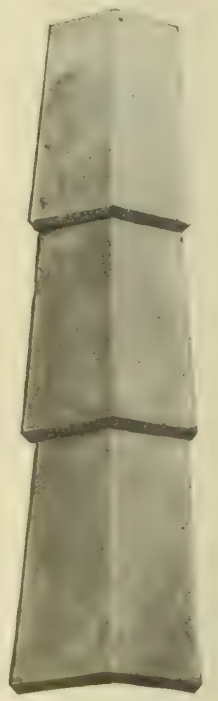
Shingle Tiles.

"Murray" Shingle Tiles are supplied with either smooth or grained surface, whichever you prefer. The grained surface is something new in shingle tiles, and very effective in giving soft tones to the roof.

In size the "Murray" Shingle Tiles are approximately 13½ by 6½ by ⅜ inches. They are easy to lay, are indestructible, and are unaffected by climatic or atmospheric conditions.



"MURRAY" SHINGLE TILES
Showing how tiles are laid on roof, also roof perfection and simplicity



THREE NO. 16 HIP SADDLES ASSEMBLED

Roof Trimmings and Ornaments.

In style and design our roof trimmings and ornaments are pleasing and mechanically correct. They are hard-burned, of strong texture, and time-resisting. Patterns and designs can be selected agreeable with roof contour and perspective, as desired. We are prepared to furnish our special woven hip plates which enable you to carry the horizontal butt line of the tile around the hip, thus doing away with the necessity of using a hip roll or saddle. Write for special information on this subject.

Color.

Colors are from the raw material, and are not artificial. They include various shades in reds and browns, from light to dark. We also fire-flash them, and can furnish either a straight run of color or a mottled effect, as desired. The brown fire-flashed tile with grained surface (brown rough velvet) gives a superior representation of a weather-stained, wood shingle roof.

Adaptability.

"Murray" Shingle Tile is adapted to any class of architecture. Our different patterns of terra-cotta roof trimmings will supply the needed finish best suited to the particular job.

Advantages.

The use of many forms of interlocking and overlapping roofing tiles has proven the fact of the superior

Continued on next page

practicality of shingle tiles. Shingle tiles make a leak-proof roof without use of cements and spun oakums! The shingle method of breaking joints in laying can not be improved upon, and architects and engineers of experience are most forcibly demanding that their work be protected by materials that will protect. There is no question as to the protecting qualities of "Murray" Shingle Tiles.

Cost.

The cost of "Murray" Shingle Tile is not high. The protection they afford a building from fire, the saving in insurance, and the elimination of repairs, make them the very best and most economical roofing.

Shipments, Territory.

We can make prompt shipment to any point in the United States on all our products except special pieces made to order; these would require from four to six weeks' time to make and burn.

Distribution.

Our Shingle Tile are handled and installed by the leading tile roofers throughout the United States. Write for names in your locality.

Estimates.

We shall be pleased to furnish catalogues and estimates on application, but inquiries for complete estimates should be accompanied with roof plan and four elevations.

Specifications for "Murray" Shingle Tile.

All pitched roofs shall be covered with "Murray" Shingle Tile made by The Murray Roofing Tile Co., Cloverport, Ky. (See illustrations opposite.) Standard Trimmings and special tiles adapted to the roof will be used. All to be well burned of color selected in accord with samples submitted. The roof shall be sheathed tight with level surface, ¾ by 1 inch cant strip placed at eave and one inch strip of proper width at all hips for nailing trimmings thereto; all chimneys, skylights, walls or other projections above the roof line must be completed, valleys and gutters in place, before starting to lay the tile.

After roofs are thus prepared there shall be laid horizontally thereon one thickness of asphalt roofing felt weighing not less than 20 pounds to the square with three-inch lap, fastened at each joint with large head nails not more than six inches apart. Felt shall overlap metal valleys to the edge line of the valley tiles as laid, and cross lapped at all hips.

Tile shall be laid to show 5½ inches to weather, keeping butts straight and in line, and laid so that the vertical lines up and down the roof are parallel with each other and at right angles to the eaves; use two large-headed, 1½-inch long, copper or copper-clad nails. Before reaching the ridge, roof should be spaced so that courses will run out and properly meet the cresting, as stretching and cramping of tile should not be permitted. Use No. 3 6½ by 8 inches for eave course; No. 2 6½ by 9 inches for finishing course at ridge and No. 4 splits at gables or offsets in roof to break joints.

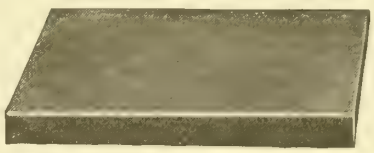
Verge line at all hips shall be pointed with a good elastic cement meeting hip-cover strips as placed, cement to be well forced in and left flush with tile; valley lines shall not be cemented, but left open and clear as laid.

Hip and Ridge covers shall be nailed to hip board. The hip covers cemented only where they lie over each other and pointed up at sides; under or interior spaces of hip and ridge coverings must not be filled with cement.

All work shall be flashed and counterflashed against all projections and breaks in an acceptable manner.

Flat Roof or Promenade Tile.

Made from a superior quality of shale, burned to a high degree of heat, producing an impervious tile that has a remarkably hard body with everlasting wearing qualities.



FLAT ROOF OR PROMENADE TILE

Size, 6 by 9 by 1 inch. Number to square, 260. Weight, 4¼ pounds each

Grades.

No. 1 Select Grade, Red, Standard Floor Grade—These are carefully selected, approximately level and with only slight variation in lengths, widths and shades. Will lay up well in floor work and will meet any test to which such material can be subjected. They are hard-burned and the color is absolutely permanent.

Second Grade, Red—These are tiles rejected from our first grade. The imperfections consist of slight edge checks or small cracks, small spawls or flakes chipped out from handling, and off in color. They are not selected with much care as to level surfaces, nor as to shades and colors, but will make a good roof in every particular and one that will stand climatic changes.

Kiln-Run Grade, Red—These tiles are not selected to shade nor to true level surfaces and outlines, as are the standard floor grade tiles, but are taken from kiln as they run, with all cracked tile taken out.

Tile Cutting Machine.

We can furnish your roofer with a tile cutting machine at a small cost, that will cut hip and valley tiles on the job as quickly and as good as they can be cut in the green before burning. Will also cut them at a less cost than cutting them at the factory. Full details and prices on application.

Samples, Catalogues.

Catalogues showing details, samples and prices furnished cheerfully upon request.

THE UNITED STATES ROOFING TILE CO.

Manufacturers of Roofing Tiles, Floor and Promenade Tiles

GENERAL OFFICES
Seventh Floor, Union Trust Building
PARKERSBURG, W. VA.

FACTORIES
PARKERSBURG, W. VA.
EAST SPARTA, OHIO

Products.

Roofing Tiles: Usco Spanish Roll Tiles, Usco Shingle Tiles (Pattern "A"), Usco Plain Shingle Tiles, El-zey-an Tiles (Pattern "A," Variegated Shades), Trimmings.

Floor Tiles: Quarry or Promenade Tiles; Cove Base, Angles, Stops, etc.

Material.

All Usco roofing and floor tiles are made from shale, by modern methods, and burned with natural gas, resulting in a perfect product, unaffected by climatic changes.

Colors.

Usco roofing and floor tiles are made in standard reds, and assorted into light, medium or dark shades. They are quite frequently furnished in kiln-run shades (light, medium and dark shades mixed), and also in fire flashed shades.

El-zey-an Tiles.

These are Pattern "A" tiles, made in variegated shades, producing a mottled effect in the roof, after the order of tapestry brick. The shades are the result of natural elements found in our Parkersburg shale, and range from a deep cherry red, through tans, browns, and purples to black. The shades are as permanent as the tiles themselves, and produce a very pleasing effect when mingled in the roof.

USCO
TRADE-MARK

Trimmings.

All standard patterns of trimmings are kept in stock for prompt shipment. Special designs made to order.

Cost.

The cost of roofing and floor tiles is not excessive; the raw material from which they are made costs little, and improvements in manufacture have brought them within the reach of all.

Our plain shingle tiles are made expressly to compete in price with slate and asbestos shingles.

Estimates.

Catalogue, samples, and estimates will be furnished on application. Requests for estimates should be accompanied with roof plan and the four elevations, which will be returned promptly.

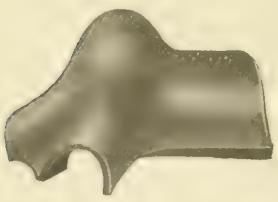
APPROXIMATE SIZES AND WEIGHTS OF ROOFING TILES

	Full Size, Ins.	Weather Exposure, Ins.	No. to Sq.	Wght. per Sq.	Nails to lay Sq., Lbs.	Length of Nail, Ins.	
Usco Spanish Roll Tiles	$9\frac{3}{4}$ x $13\frac{3}{4}$	$7\frac{3}{4}$ x $9\frac{3}{4}$	190	1000	$2\frac{3}{4}$	$1\frac{1}{2}$	
Usco Plain Shingle Tiles	7 x $13\frac{1}{2}$ x $\frac{7}{16}$	7 x $5\frac{1}{2}$	374	1250	$5\frac{1}{2}$	$1\frac{1}{2}$	Under eave tiles are additional to roof area.
Usco Pattern "A" Tiles	7 x 14	7 x 6	350	1550	7	2	

Note—Dimensions of tiles vary slightly in burning to the several shades, and sizes given apply in general.

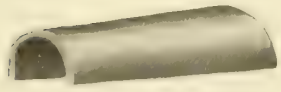
Roof Specifications.

All pitched roofs shall be covered with Usco Shingle Tiles Pattern "A," Usco Plain Shingle Tiles, Usco Spanish Roll Tiles, Usco El-zey-an Tiles, manufactured by The United States Roofing Tile Co., Parkersburg, W. Va.

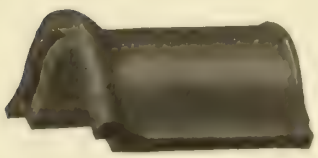


No. 195. Hip Terminal

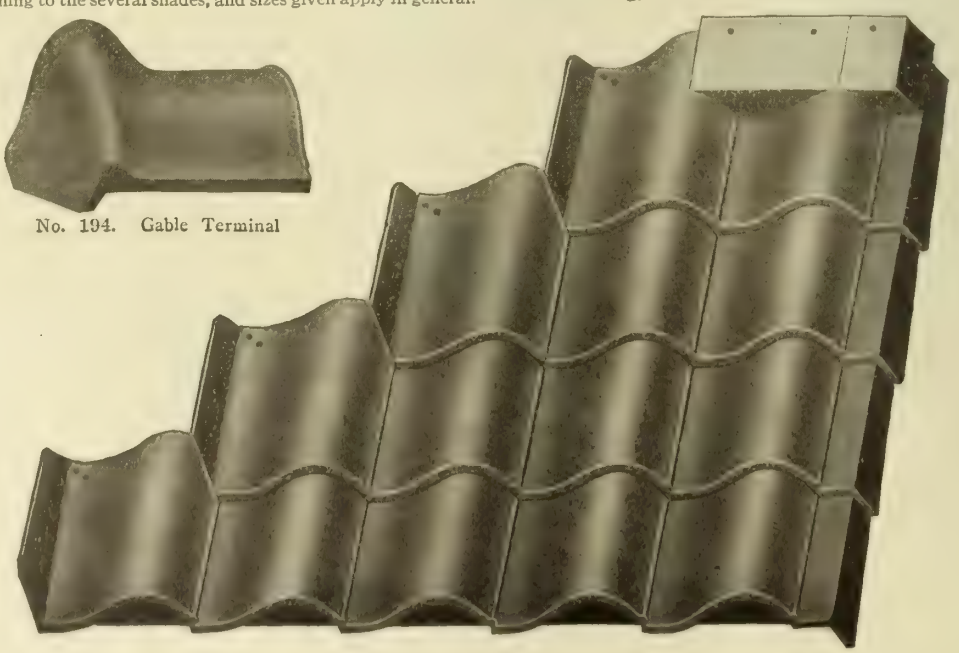
No. 194. Gable Terminal



No. 191. Hip Cover



No. 190. Ridge Saddle



Usco Spanish Roll Tiles Assembled

USCO ROOFING TILES

Continued on next page

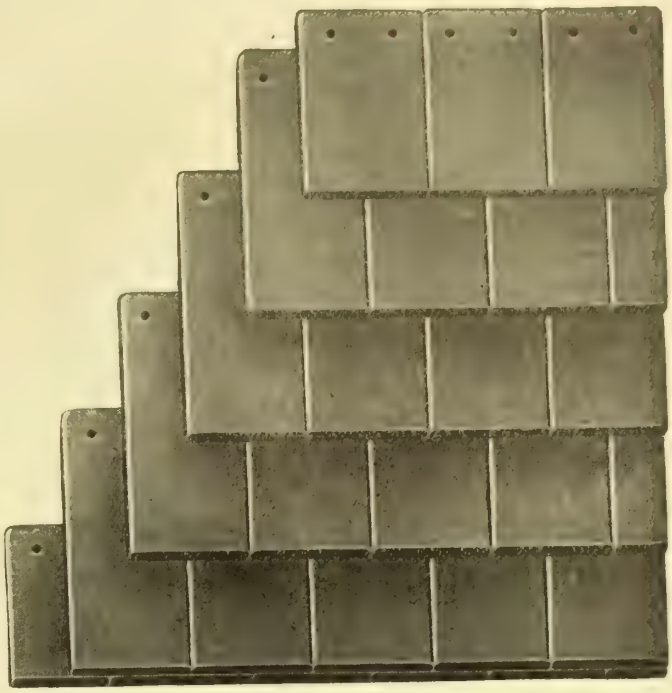
Standard trim and special tiles adapted to the roof shall be used. All to be well burned, of red color and in accord with samples submitted.

Roof shall be sheathed tight with level surface; all chimneys, walls, or other projections above roof line must be completed. All vent pipes shall be in place. Gutters, either box, hanging, or secret, shall extend over roof sheathing under the felt at least eight inches. All valleys shall be laid of a width not less than twenty-four inches with both edges turned entire length of valleys at least one fourth inch. Valleys to be fastened with clips or cleats and not nailed through or punctured Valleys shall be laid over one layer of felt placed lengthwise the distance of the valley. Flashing metal shall be ready for use as tiles are laid wherever required. (If Usco Plain Shingle Tiles are to be used, five-eighth-inch wood strips shall be nailed on sheathing at eaves, under gutter metal, to give tiles the necessary slant.)

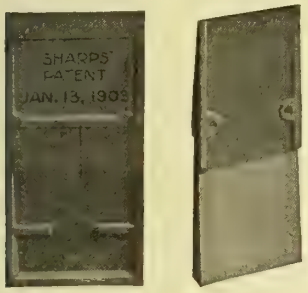
After roofs are thus prepared there shall be laid horizontally thereon one thickness of asphalt roofing felt, weighing not less than thirty pounds to the square, with three-inch lap either way, fastened at each joint with large head nails not more than five inches apart. Felt shall overlap metal valleys to edge line of valley tiles, as laid, and cross lap at all hips.

One-inch wood strips of proper width, for nailing trim thereto, shall be firmly fastened to roof at all hips and ridges to receive hip and ridge covers.

Roof shall be spaced from eave to ridge, that tiles may be laid with such even-distanced weather exposure that courses



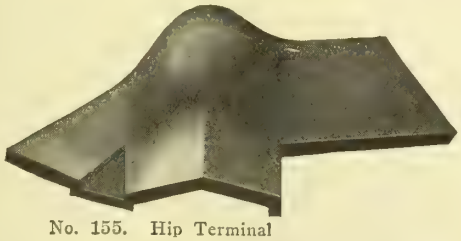
Usco Plain Shingle Tiles Assembled
Tiles are seven inches wide, and are sold at slate prices



Back

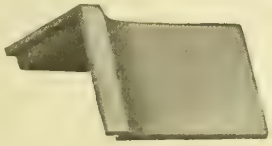
Front

Usco Shingle Tile, Pattern "A"



No. 155. Hip Terminal

No. 101. Hip Cover

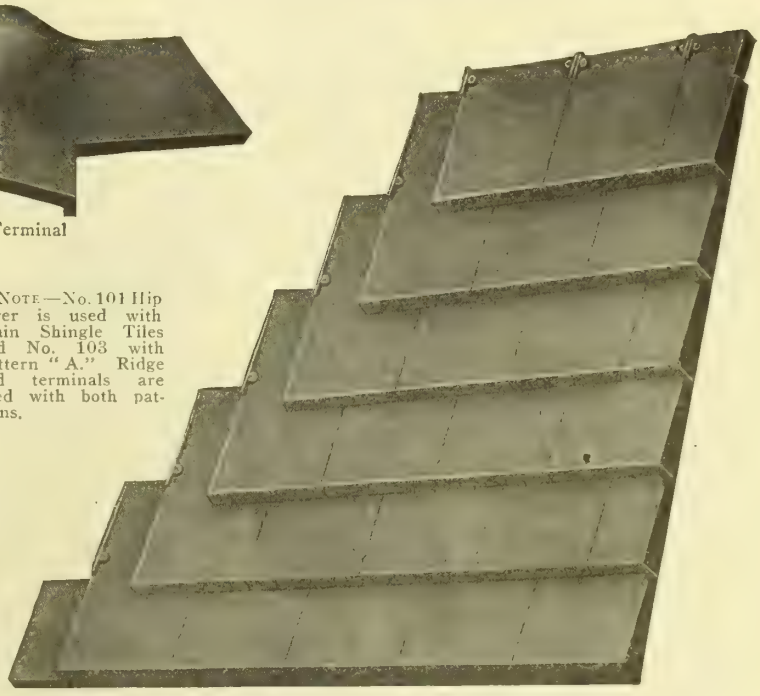


No. 102. Ridge Saddle

NOTE—No. 101 Hip cover is used with Plain Shingle Tiles and No. 103 with Pattern "A." Ridge and terminals are used with both patterns.

No. 154. Gable Terminal

No. 103. Hip Cover



Usco Shingle Tiles, Pattern "A," Assembled

OTHER TYPES OF USCO ROOFING TILES, SEPARATE AND ASSEMBLED

will run out and properly meet the cresting at ridge; no stretching or cramping in courses will be permitted, and butt lines shall be straight and true. Vertical lines must parallel each other. Each tile shall be fastened with two copper (or galvanized iron) nails with large heads—Pattern "A" with two-inch nails, Plain Shingle Tiles and Spanish Roll Tiles with 1½-inch nails.

Verge lines at hips and ridges must be pointed with a good elastic roofing cement meeting hip and ridge covers as placed. Cement to be well forced in and left flush with tiles. Valley lines shall not be cemented, but left open and clear as laid.

Hip and ridge covers shall be nailed to hip and ridge boards and cemented only where they lap each other. Under or interior spaces of hip covers and ridge saddles must not be filled with cement.

All work shall be flashed and counter-flashed weatherproof against all projections and breaks, in an acceptable and workmanlike manner.

Grades and Uses of Quarry or Promenade Tiles for Floors and Flat Roofs.

No. 1 Select (Red and Fire Flashed)—These tiles are sound and solid in every particular. Approximately level and regular in their lines, with only slight variation in lengths, widths and shades. Used for floors of terraces, porches, foyers, sun parlors, dens, rathskellers, buffets, kitchens, bathrooms, rotundas, corridors, roof gardens and railroad stations, and also for mantels and hearths.

Kiln-Run Grade (Red and Fire Flashed)—These tiles are firsts in every respect, except that they are not selected to size or shade, nor are they selected with a

Continued on next page

view to true level surfaces and outlines as are the No. 1 Select tiles. Used for the more particular flat roof work and for floor work where service is the main object.

Selected Seconds (Red and Fire Flashed)—These tiles are rejected from first grade. The imperfections consist of slight edge checks or small spawls chipped out from handling. They are not selected with as much care as to level surface and regular lines; but will make a good roof and one that will stand any weather conditions. This grade is not selected to shades and sizes. Used for general flat roof work where good service at low cost is desired, and also for walks, pergolas, etc.

DATA, QUARRY OR PROMENADE TILE

Shipping Weight, Not Crated

Size.....	12 x 12	9 x 9	6 x 9	6 x 6	4½ x 9	4 x 4	3 x 6	3 x 3
Per 1000 Pieces.	16850	6000	3700	2500	3000	1300	1500	750

Shipping Weight, Crated

Per 1000 Pieces.	19000	6700	4100	2800	3400	1550	1750	900

Number of Quarry Tiles Required to Lay 100 Square Feet

Laid Together..	100	178	267	400	357	900	800	1600
¼-in. Joint....	96	170	250	369	328	797	710	1364
⅜-in. Joint....	95	165	242	355	316	754	670	1264
½-in. Joint....	93	160	233	340	304	711	634	1176
⅝-in. Joint....	91	156	226	329	293			
¾-in. Joint....	89	152	220	317	282			

Number of Sq. Ft. per 1000 Pieces, Laid Together

1000	562	374	250	280	111	125	62

Specifications for Tile Floors.

Inside Floors—Foundation to be laid over wood subfloor, which shall be provided by the carpenter contractor and shall be approximately 4½ inches below the finished floor line.

After plumbing has been roughed in, lay concrete foundation composed of one part American Portland cement, two parts clean, sharp sand and five parts clean, fine, broken limestone. This to be thoroughly dry-mixed, then properly dampened and put in place, and tamped to a level surface 1½ inches below finished floor line.

In placing and tamping this concrete, use particular care not to damage or disarrange plumbing pipes.

On top of this concrete foundation place the setting bed composed of one part cement and two parts sand, same as before specified. On this setting bed lay the tile floor, using for this work [size and grade], made by The United States Roofing Tile Co., Parkersburg, W. Va.

This tile to be laid to a true, even, closely jointed surface, thoroughly grouted, carefully cleaned and left in first-class condition.

Outside Floors—There shall be placed on concrete floor a bed coat of mortar about ¾ inch thick. The mortar shall be mixed in the proportion of one part Portland cement to two parts clean, sharp, river sand, and sufficient clear water to form a mixture of required consistency. Two pounds of "Medusa" waterproofing, manufactured by the Sandusky Portland Cement Company [or equal], shall be added to each sack of cement before adding sand and water.

Tile shall be [size and grade] manufactured by The United States Roofing Tile Co., Parkersburg, W. Va.

Tile shall be laid with full .....-inch joint, with longest dimension of tile running the length of room. They shall be laid with broken lateral joints at center of the tile; all joints being in line. Tile shall be laid with an even surface, sloping gradually to floor drains.

There shall be placed in joints a cement grout mixed in proportion of one part Portland cement to one part clean, sharp, river sand. A waterproofing compound of same make, and mixed in same proportion as was used in bed coat, shall be added to cement grout.

Quarry Tile Fittings.

A complete line of cove base, wainscot cap, angles, plinths and stops is carried in stock. Specials made to order.

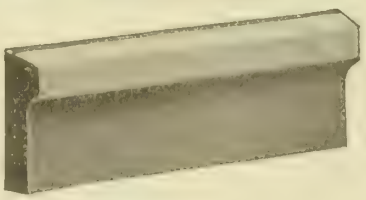
Blue-Print Booklet.

Ask for copy of Blue-Print Booklet, showing quarry tile fittings and designs for quarry tile floors.

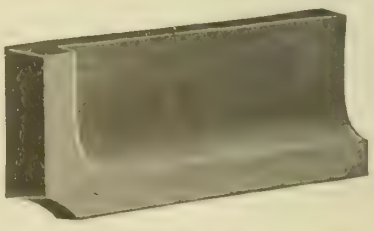
12 x 12 x 1½ inches

9 x 9 x 1 inches

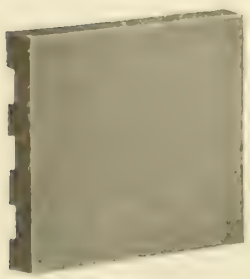
6 x 9 x 1 inches



Wainscot Cap

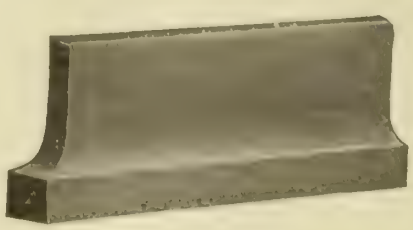


Internal Angle



6 x 6 x 1 inches

Cove Base



External Angle

USCO QUARRY OR PROMENADE TILES

For Floor and Flat Roofs

DETROIT ROOFING TILE COMPANY

308 Hammond Building
DETROIT, MICH.

WORKS
JUNCTION YARDS
AT M. C. R. R.
SPRINGWELLS, MICH.

REPRESENTATIVES

NEW YORK, N. Y., D. McKenzie, 1361 Fifth Avenue Building
CHICAGO, ILL., Bonner & Marshall Brick Co., 901 Chamber of Commerce Building
NEW ORLEANS, LA., Frank Bethune, 306 Carondelet Street
ATLANTA, GA., F. G. Perry, 514 National Bank Building
PACIFIC COAST, D. E. Fryer & Co.

AGENCIES IN ALL LARGE CITIES IN THE UNITED STATES

Products.

Modern Interlocking Roofing Tile, Spanish S. Tile, Crestings, Finials and Hip Rolls, all made in Natural and Glazed Terra Cotta.

Also, Vitrified (South Park Shale) and Non-Vitrified Tile.

Modern Interlocking Roofing Tile (Detroit Tile).

Made at the works, from clay particularly adapted to meet all the requirements of modern roofing tile. Large deposits of such clay, owned by this company, are located at Springwells, Mich.

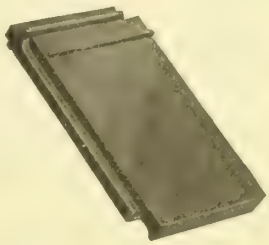
Modern Interlocking Roofing Tile provide a durable and attractive roof; and are adaptable to the construction of all varieties of structures. These tile are made from two materials; that from clay is well burned, while the one made from shale is vitrified to the highest point, so as not to absorb the dampness which contributes materially to the destruction of a building.

Method of Application.

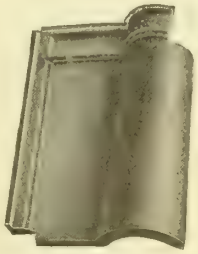
For Closed Construction—Roof is sheathed the same as for slate; sheathing covered with one thickness of heavy roofing felt, secured with tin caps and nails; and tile is nailed with galvanized or copper nails through holes provided in the tile.

Open Steel Construction—This tile is readily laid on steel or iron purlins in open steel construction, such as on factories, power plants, freight sheds and similar structures; tiles to be reinforced and pointed up, as in open wood construction.

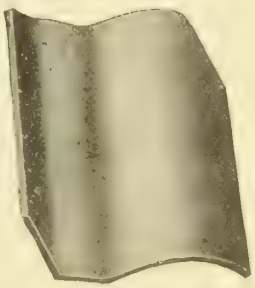
D-1 Tile



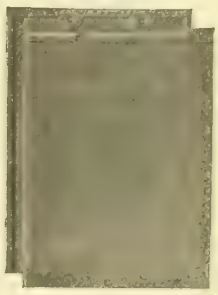
D-4 Tile



D-5 Tile



D-7 Tile



D-9 Interlocking Shingle

MODERN INTERLOCKING ROOFING TILE
DIMENSIONS, WEIGHT AND NUMBER OF TILE

No. of Tile	D-1	D-4	D-5	D-7	D-9
Length	16 1/4 ins.	13 3/4 ins.	14 1/2 ins.	13 ins.	11 1/4 ins.
Width	8 7/8 ins.	8 1/2 ins.	10 1/2 ins.	10 ins.	7 3/4 ins.
Exposure	8 1/4 x 14 ins.	7 3/4 x 10 1/4 ins.	8 1/8 x 10 1/4 ins.	8 1/8 x 10 1/8 ins.	7 3/4 x 9 1/2 ins.
Weight per sq.	800 lbs.	890 lbs.	1100 lbs.	675 lbs.	1000 lbs.
Number per sq.	125	180	165	180	203

Advantages.

Being a non-conductor, a tile roof is an absolute protection against lightning. Tile is an important and necessary roofing material where fire protection is inadequate; it is the handsomest and most attractive roof in appearance, of any material; and, further, adornment of the roof by erection of towers, dormers, etc., becomes unnecessary by reason of the beautiful colors and designs of the tile, thus greatly reducing cost of the building.

Colors and Glazes.

Standard color, carried in stock in almost all patterns, is red semiglaze; also, a complete line of dull matt and full glaze effects, including green, yellow, brown, white, black, etc.

Specifications and Prices.

The general specifications cover complete details for laying Modern Interlocking Tiles on all styles of buildings. These, with prices, will be furnished on application from interested persons.

References.

A partial list of buildings on which Detroit Tile has been used includes the following structures:

Y. M. C. A., Detroit, Mich.
United States Lighting & Heating Plant, Washington, D. C.
Church of the Incarnation, Cleveland, Ohio
Baker Motor & Vehicle Co., Cleveland, Ohio
Filtration Plant, Toledo, Ohio
St. Adalbert Church, Toledo, Ohio
Chicago, Milwaukee & St. Paul R. R. Stations (2), Evanston, Ill.
Shelter Building, Prospect Park, Brooklyn, N. Y.
Judge Dickey's Residence, Brooklyn, N. Y.
Delaware, Lackawanna & Western R. R. Stations at Buffalo, Binghamton, Convent, Ithaca, Minnetto, N. Y.; Blairstown, Bloomfield, Morristown, Montclair, N. J; and Slateford Pa.
St. Mary's Roman Catholic School, East Islip, L. I.
Cord Meyer Development Co., Forest Hills, N. Y.
Church-In-The-Gardens (Sage Foundation Homes Co.), Forest Hills, N. Y.
Jewish Protectory, Hawthorne, N. Y.
Elizabeth Public Library, Elizabeth, N. J.
Bonnie Burns Sanatorium, Scotch Plains, N. J.
Mt. Vernon Hospital, Mt. Vernon, N. Y.
R. B. Ward's Residence and Garage, New Rochelle, N. Y.
18th Precinct Police Station, New York, N. Y.
M. L. Schiff's Residence and Garage, Oyster Bay, N. Y.

KUSHEQUA KERAMIC COMPANY

ELISHA K. KANE, LESSEE

Manufacturers of Kushequa Ox-blood Floor and Roof Tiles

KUSHEQUA, PA.

DEALERS

NEW YORK, N. Y., C. T. Willard Co., Inc.
BOSTON, MASS., Waldo Bros.
CHICAGO, ILL., Thomas Moulding Brick Co.
ATLANTA, GA., Roper & Strauss Co.
ST. LOUIS, MO., Hydraulic Press Brick Co.
PHILADELPHIA and WASHINGTON, O. W. Ketcham
MONTREAL, QUE., Dartnell, Ltd.
DETROIT, MICH., Colonial Brick Co.
BUFFALO, N. Y., Buffalo Builders' Supply Co.
SYRACUSE, N. Y., Cummins Brick & Tile Co.
PITTSBURGH, PA., Scott A. White
And other dealers

Products.

Kushequa Floor and Roof Tiles.

Ox-blood Tiles.

Ox-blood Tiles show superiority in clear, deep red color, high vitrification, even texture and neat finish. No artificial glaze or coloring, the color and substance being uniform throughout.

Size and Grading

Ox-blood Tiles are made in three principal sizes: 1 by 6 by 9 inches (Promenade), $1\frac{3}{16}$ by 9 by 9 inches (Quarry), and 1 by 6 by 6 inches (Quarry).

The Promenade size is graded into three qualities: Flooring quality (very choice), Roofing quality (suitable for floors, excellent for roofs) and Seconds (serviceable for roofs or cheap floors). The Quarry sizes into Flooring quality (choice) and Seconds (slightly defective).

Color.

Each grade and size is sorted into three shades of clear red color: A (dark red), B (deep red) and C (bright red). Oriental tiles with dark red centers fading toward gray edges are also made, in 6 by 6 and 6 by 9 inches.

Specials.

A full line of sanitary cove base, quoins, angles, wainscot-caps, plinths, coping and other shapes are carried in stock. Also, key quoins, 3 inches and 1½ inch, in red or black, and diagonals and fractional tile for course starters. Other special shapes are made to order on reasonable notice. See opposite page.

Uses.

Vitrified tiles are used wherever there is need for a surface which is fire-, frost-, water-, acid-, grease- and dirt-proof. If, in addition to these requirements, beauty of color and resistance to wear are required, Kushequa Ox-blood Tiles are best.

The choice grades are adaptable for parlors, salons, halls, dining-rooms, restaurants, hospitals, operating rooms and laboratories. The cheaper grades are used on roof gardens, roofs, porches, promenades, kitchens, laundries, bridges, packing houses, etc.

Facilities.

A monthly output of 300,000 tile and large stock carried enables prompt deliveries. Transportation facilities unsurpassed, factory being connected with Pennsylvania R. R., Erie R. R., Buffalo, Rochester and Pittsburgh Ry., and Baltimore and Ohio R. R.

Copyrighted by Equitable Office Building Corporation

EQUITABLE BUILDING, NEW YORK, N. Y.
Roofed with Kushequa Promenade Tile, D. H. Burnham, Architect

References.

Stock Yards Inn, Chicago, Ill., R. L. Lindstrom, Architect
Engineering Laboratory, University of Michigan, Ann Arbor, Mich., Smith, Hinchman & Gryllis, Architects
Niagara Falls Bridges, Niagara Falls, N. Y.
Canadian Pacific Hotels, Edmonton and Laggan, Alta.
Tennessee Coal and Iron & Railroad Co., Fairfield, Ala.
Metropolitan Museum of Art, New York, N. Y., McKim, Mead & White, Architects
Swift & Co., Packing House, Montreal, Que.
Giles Residence, Orlando, Fla., L. Percival Hutton, Architect
Geological Building, Interior Department, Washington, D. C.
Bureau of Engraving and Printing, Washington, D. C.
J. K. Billings, Residence, Locust Valley, L. I., Guy Lowell, Architect
Rockefeller Institute, East 64th St., New York, N. Y., Shepley, Rutan & Coolidge, Architects
High School, Waterbury, Conn., Griggs & Hunt, Architects
St. Augustine's Church, Convent and School, San Juan, P. R

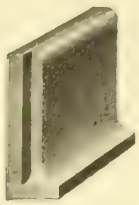
Continued on next page

OX-BLOOD PROMENADE TILE

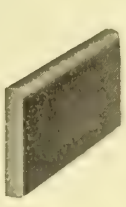
Straight Sizes	Fractional Sizes
Nos. 9 and 92, 9 x 9 ins.	No. 99 Diagonal, 9 x 9 ins.
Nos. 1, 10, 11, 12, 13 and 14, 6 x 9 ins.	No. 26 Diagonal, 6 x 6 ins.
Nos. 6, 60, 61 and 62, 6 x 6 ins.	No. 95 Starter, 9 x 4½ ins.
Nos. 3 and 22, 3 x 3 ins.	No. 24 Starter, 6 x 4½ ins.
Nos. 2 and 20, 1½ x 1½ ins.	No. 23 Starter, 6 x 3 ins.

Internal Quoin
No. 64, height, 6 ins.
No. 34, height, 3 ins.
Square top

External Quoin
No. 65, height, 6 ins.
No. 35, height, 3 ins.
Square top

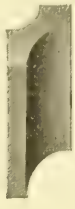


No. 54, Right Stop
No. 55, Left Stop



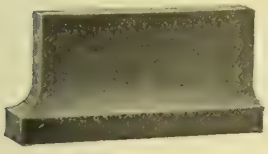
Bull Nose
No. 80, 6x9 ins.
No. 81, 6x6 ins.

Bull Nose Stop
No. 82, 6x6 ins.

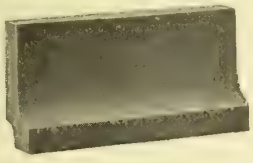


Internal Radius
No. 96, 6 ins.
No. 77, 9 ins.

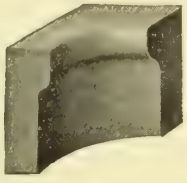
External Radius
No. 78, 6 ins.
No. 79, 9 ins.



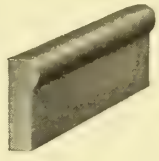
External Cove Angle L. H.
No. 43, height, 4½ ins.
No. 53, height, 6 ins.



Cove Base, 4½-inch, Square Top
No. 40, height, 4½ ins.; length, 9 ins.
No. 46, height, 4½ ins.; length, 6 ins.
No. 50, height, 6 ins.; length, 9 ins.
No. 56, height, 6 ins.; length, 6 ins.
No. 30, height, 3 ins.; length, 9 ins.
No. 36, height, 3 ins.; length, 6 ins.

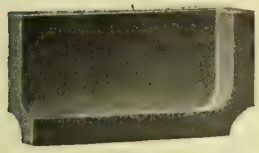


No. 72 Cap
Internal Quoin

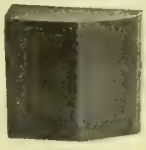


Wainscot Cap
No. 70, 4 ins. high, 9 ins. long
No. 71, 4 ins. high, 6 ins. long

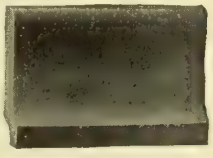
No. 73 Cap
External Quoin



Internal Cove Angle
No. 41, height, 4½ ins.
No. 51, height, 6 ins.



Square Plinth
No. 57, height, 6 ins.
No. 47, height, 4½ ins.
No. 67, Rounded



Cove Base, 6-inch Round Top
No. 63, length, 9 ins.
No. 66, length, 6 ins.

No. 100. Porch Coping

No. 101. Coping Corner

KUSHEQUA SANITARY BASES AND WAINSCOTS

NUMERICAL LIST OF ABOVE TO FACILITATE ORDERING BY NUMBER

1 **Promenade Tile, 6 by 9 by 1 ins., Flooring Quality**
2 **Key Quarry, 1½ by 1½ by 1 ins., Flooring Quality**
3 **Key Quarry, 3 by 3 by 1 ins., Flooring Quality**
4 Key Quarry, 4 by 4 by 1 ins., Flooring Quality
6 **Quarry, 6 by 6 by 1 ins., Flooring Quality**
9 Quarry, 9 by 9 by 1⅜ ins., Flooring Quality
10 Promenade Tile, Oriental, Flooring Quality
11 Promenade Tile, Roofing Quality
12 Promenade Tile, Second Quality
13 Promenade Tile, Third Quality
14 Promenade Tile, Oriental, Seconds
20 Key Quarry, 1½ by 1½ ins., Blackish
22 Key Quarry, 3 by 3 ins., Blackish
23 Course Starter, 6 by 3 ins.
24 Course Starter, 6 by 4½ ins.
25 Course Starter, 3 by 9 ins.
26 Diagonal, 6 by 6 ins.
30 Cove, 3 ins. high, sq. top, 9 ins. long
34 Cove, 3 ins. high, sq. top, Internal Quoin
35 Cove, 3 ins. high, sq. top, External Quoin
36 Cove, 3 ins. high, sq. top, 6 ins. long
40 Cove Base, 4½ ins. high, sq. top, 9 ins. long
41 Cove Base, 4½ ins. high, sq. top, Internal Angle
42 Cove Base, 4½ ins. high, sq. top, External Angle, R. H.
43 Cove Base, 4½ ins. high, sq. top, External Angle, L. H.
46 Cove Base, 4½ ins. high, sq. top, 6 ins. long
47 Cove Base, 4½ ins. high, sq. top, Plinth
50 Cove Base, 6 ins. high, sq. top, 9 ins. long
51 Cove Base, 6 ins. high, sq. top, Internal Angle
52 Cove Base, 6 ins. high, sq. top, External Angle, R. H.
54 Cove Base, 6 ins. high, sq. top, Right Stop
55 Cove Base, 6 ins. high, sq. top, Left Stop
56 Cove Base, 6 ins. high, sq. top, 6 ins. long
57 Cove Base, 6 ins. high, sq. top, Plinth
60 Quarry, 6 by 6 ins., Oriental, Flooring Quality
61 Quarry, 6 by 6 ins., Seconds
62 Quarry, 6 by 6 ins., Oriental, Seconds
63 Cove Base, 6 ins. high, round top
64 Cove Base, 6 ins. high, round top, Internal Quoin
65 Cove Base, 6 ins. high, round top, External Quoin
66 Cove Base, 6 ins. high, round top, 6 ins. long
67 Cove Base, 6 ins. high, Plinth, all edges rounded
70 Wainscot Cap, 4 ins. high, 9 ins. long
71 Wainscot Cap, 4 ins. high, 6 ins. long
72 Wainscot Cap, 4 ins. high, Internal Quoin
73 Wainscot Cap, 4 ins. high, External Quoin
74 Wainscot Cap, 4 ins. high, Internal Miter
75 Wainscot Cap, 4 ins. high, External Miter
76 Wainscot high, Internal Radius 6 ins.
77 Wainscot high, Internal Radius 9 ins.
78 Wainscot high, External Radius 6 ins.
79 Wainscot high, External Radius 9 ins.
80 Bull Nose, 6 by 9 ins.
81 Bull Nose, 6 by 6 ins.
82 Bull Nose Stop, 6 by 6 ins.
90 Quarry, 1⅜ by 9 by 9 ins., Oriental
92 Quarry, 1⅜ by 9 by 9 ins., Second Quality
95 Course Starter, 9 by 4½ ins.
99 Diagonal, 9 by 9 ins.
100 Porch Coping
101 Porch Coping Corner

MUELLER MOSAIC CO.

Makers of Artistic Tile

WORKS AND OFFICE
Cedar and Chambers Streets
TRENTON, N. J.

BELL TELEPHONE 1210

NEW YORK SHOWROOM: Rossman's, Seventh Avenue and 49th Street

Products.

Hand-made and Dust-Pressed Tile and Mosaics in Faience Glazes; also, Hand-made Unglazed Tile from natural Red, Gray and Buff Clays.

Faience Roman Mosaic.

Regular tesseræ in ¾-inch and ½-inch units, assembled in desired patterns for wainscots in residences, restaurants, baths, etc., and for the lining of swimming pools.

Faience Art Mosaics.

Art Mosaics made in special designs, such as trade-marks, coats-of-arms or name panels; also, pictorial subjects in any required design.

Faience Wall and Floor Tile.

This is a larger geometric tile in standard sizes, hand-made from plastic clay; used for walls, floors and exterior decoration.

Architectural Tile.

Base and cap mouldings, beads, well fountains, perforated screen tile, and such other members as may be necessary for a complete architectural treatment.

Flemish Tiling.

A hand-made unglazed tile of natural red, buff and gray clays, in standard sizes, burned to great hardness and showing considerable variety in shades and flashings; used for floors of porches, conservatories, lobbies, corridors, and all spaces where substantial non-slippery tile are required.

Norman Flashed Mosaic.

A Mosaic of natural buff clay in ¾-inch and ½-inch tesseræ, burned to great hardness in a variety of mixed shades; decorative features obtained by selecting light and dark tiles in the desired patterns.

Colors.

Customers may select from a carefully prepared palette of faience glazes, which when applied to the hand-made bodies, are proof against the elements.

Designs and Co-operation.

Upon receipt of the necessary data, we prepare special sketches for architects and other interested parties, together with such samples as may be required to illustrate the materials.

SHOWING INSTALLATION OF MUELLER MOSAIC TILE IN A SWIMMING POOL

Walter Kidde, Architect — Tile set by Wm. H. Jackson Co.

ROVAQUE TILE COMPANY

MAIN OFFICE AND WORKS
ROCHESTER, N. Y.

Product.

ROVAQUE VARIEGATED QUARRY TILE (Copyrighted): RO-Rochester, VA-Variegated, QUE-Quarries.

Description.

Rovaque Variegated Quarry Tile are made of a careful blend of three clays, selected as the result of forty years' experience in clay working. The clay is treated and prepared to insure a homogeneous mixture. The tile are then dried by a special method recently found peculiarly favorable, and are afterwards burned in kilns for six days. The burning process, controlled by electric pyrometers, is similar to that adopted by the leading manufacturers of paving brick, the purpose being to produce a tile of low absorption, and so annealed by the long cooling process as to make them tough but not brittle.

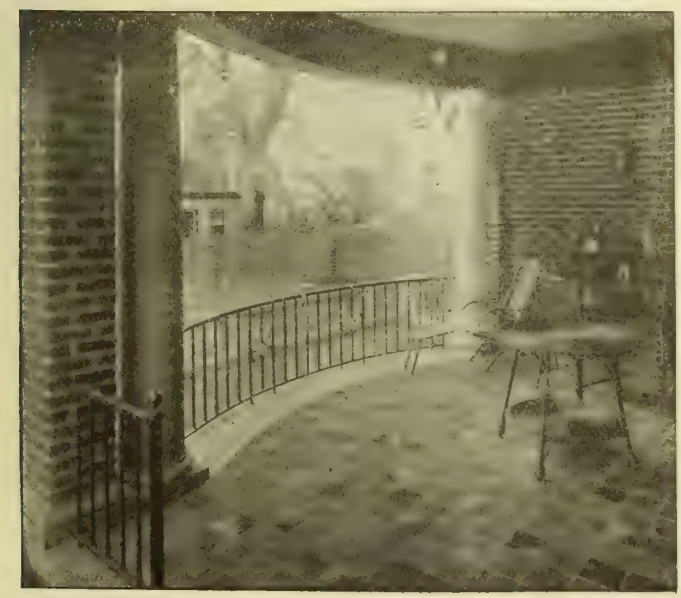
The face of Rovaque Tile is quite smooth, but not glossy. They are unglazed, pleasant to walk upon, and beautiful in a way that is new to the modern tile user. The color—obtained by proper burning and not by use of artificial coloring—varies from a rich cherry red to a dark purplish brown, with many shades between. The tile are therefore classified into three shades: red, medium and dark.

Color Ensemble.

While the general tone of Rovaque is red, a typical floor when laid should consist of about twenty per cent dark, thirty per cent medium and fifty per cent red. This combination of shades will give a very pleasing effect.

Buff Tile.

This organization also makes a full line of quarries and diagonals in buff colors, slightly variegated, running from a light buff to a crisp biscuit color. These go well with the green in conservatories, and are sometimes preferred in bathrooms and bedrooms. They are also very effective when laid in design with the red tile.



ROVAQUE TILE USED ON MAIN PORCH OF RESIDENCE

Sizes and Weights.

4 x 4 ins.	weigh about	8½ lbs. per sq. ft.
6 x 6 ins.	weigh about	11 lbs. per sq. ft.
9 x 9 ins.	weigh about	13½ lbs. per sq. ft.
12 x 12 ins.	weigh about	20 lbs. per sq. ft.

General Cost.

The price of Rovaque Tile is so reasonable that they can be used in almost any building. While costing a trifle more than a good grade of hardwood floor, there is no future cost of repair as there is with hardwood floors. The moderately priced house is just as adaptable for their use as the most expensive.

The cost of Rovaque varies according to the distance from Rochester, N. Y.; but they seldom cost more than other good quarries, and very often can be sold for less.

Brief Specifications.

Floors and walls, where indicated on plans and elevations, shall be finished with Rovaque Quarry Tile (ROVAQUE TILE CO., Rochester, N. Y.), in designs and in colors as indicated on special details for this work.

Floors—Floor tile shall be laid, in cement, over a good bed of concrete. In case of wooden beamed floors, floors shall be prepared for concrete bed by nailing ⅞-inch boards on cleats nailed to sides of beams. Top of boards to be (five inches), below top of finished floor. Bevel beams on both sides to an edge on top.

Walls—Wall tile shall be applied with cement to metal lath. In case of wooden walls and partitions, surface shall be prepared for the metal lath by nailing 2- x 3-inch scantlings horizontally between the studs, twelve inches apart, to height as indicated on special details.

Deliveries.

Rovaque Tile are kept in stock in large quantities, and can be shipped for average installations on same day order is received. In shipping, shades in proportions as mentioned in Color Ensemble, above, will be sent, unless order specifically mentions otherwise.

MOORISH INTERIOR WITH ROVAQUE TILE ON FLOOR AND WALLS

ROOKWOOD POTTERY COMPANY

MAIN OFFICE AND WORKS
TELEPHONE, Canal 3033
CINCINNATI, OHIO
EASTERN BRANCH OFFICE
NEW YORK, N. Y., Architects Building, N. E. Cor 40th Street and Park Avenue—Telephone, Murray Hill 6459

Products.

Mat-Glazed Architectural Faience and Tile in all colors, for exterior and interior use, including Tiles for Walls and Floors, Wainscoting, Mantel Facings and Hearths, and complete Mantels, Mouldings, Base Tiles (sanitary or plain foot), Fountains, Friezes and Wall Panels, Column Caps and Brackets; also, Garden Ornaments, Pottery and other Specialties. From architects' or our own designs.

Facilities.

Complete Architectural and Pottery Plants unrivaled in their technical resources and representing twenty-five years' experience in the making of faience bodies and colored glazes.

"Rookwood" Mat Glazes.

The charm of "Rookwood" Mat Glazes lies largely in their variations of shade and texture. These arise from delicate changes in the glaze structure occurring in the fire and calculated upon in the composition of the glazes. These variations are not great nor sufficient to throw any color out of harmony, but only such as stamp the material with its true character as a product of one of the arts of fire. No attempt is made to have it otherwise, and those who seek the monotonous uniformity of a painted wall will not find it in Rookwood.

Special Designs.

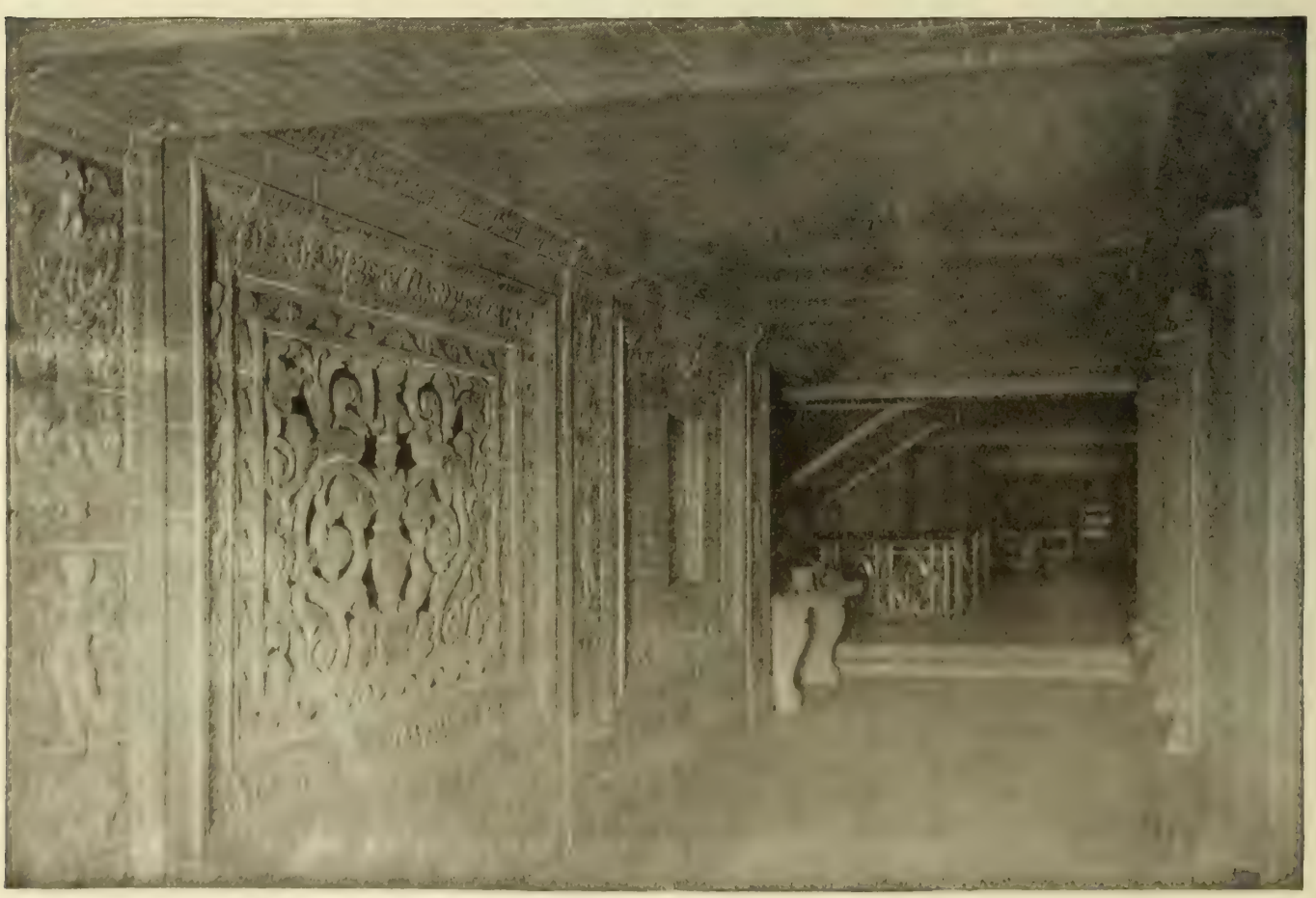
We are thoroughly equipped to execute the designs of architects and decorators, or special designs by our own artists, working in collaboration or independently.

Adaptability.

The widest range of decorative possibilities in color, combined with absolute permanence, sanitary merit, and fireproof qualities.

Estimates and Co-operation.

Assistance will be given in the adaptation of material and architects' designs, and in estimating costs for appropriations. Satisfactory results require that



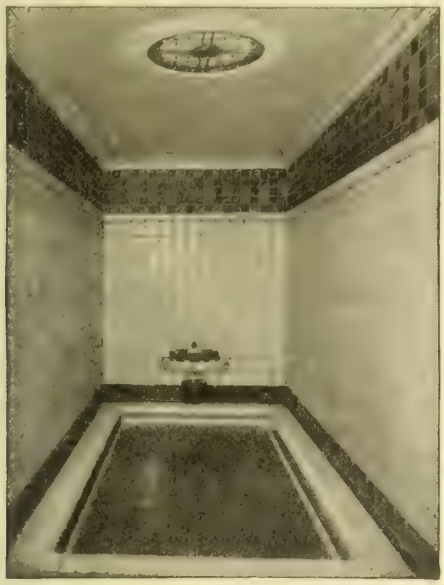
ASST. CUT FLOWER DEPARTMENT, LORD & TAYLOR STORE, NEW YORK
Starrett & Van Vleck, Architects
Rookwood Faience throughout the Department

Continued on next page

Faience should be specified under allowance, reserving to the architect the right of selection. Appropriate forms sent on request. We do not contract for installation.

Honors.

Grand Prizes: Paris, 1900; St. Petersburg, 1901; Turin, 1902; St. Louis, 1904; and other awards.



A956. ROOKWOOD SWIMMING POOL
Walls of Rookwood Mat Glaze in delicate colors, harmonizing with connecting rooms

A885. FOUNTAIN IN BAER-KAUFMANN STORE, PITTSBURGH, PA.
STARRETT & VAN VLECK, Architects C. J. BARNHORN, Sculptor
Fountain, except clock frame and upper bronze bowl, entirely of Rookwood Faience in colored mat glazes. Height approximately 19 ft.

A956. CAFE SAVARIN, EQUITABLE BUILDING, NEW YORK, N. Y.
Walls and floors throughout in Blue and Gray Faience Tile made by the ROOKWOOD POTTERY CO.
GRAHAM BURNHAM & Co., Architects for Building JOHN J. PETIT, Architect for Lessee

J. FRANCIS BOORAEM, M. E.

Sanitary Swimming Pool Construction and Equipment

52 Vanderbilt Avenue
NEW YORK, N. Y.

MEMBER OF AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Products.

SWIMMING POOL CONSTRUCTION and EQUIPMENT.

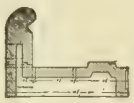
Contracts Executed.

Over one hundred operations furnished with this equipment under patents controlled by J. FRANCIS BOORAEM.

Swimming Pool Equipment.

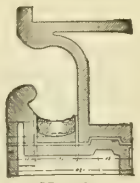
Index to details on pages 325-328.

(1) *T. C. Life Rail, Patented*—Combination flush, level uniform life rail with symmetrically spaced *integral life rail inlets* for surface cleaning and skimming of water. (See No. 6.)



No. 1

(2) *T. C. Gutter, Patented*—Longitudinally sloping gutter with symmetrically spaced *integral gutter flushing outlets* to promptly remove spittle and scum.



No. 2

(3) *T. C. Cap, Patented*—Arranged optionally with cap course enamel finish, or rabbeted for non-slip tile; cement, or corked insert for safe footing.

No. 3

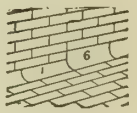
ends of plunge, one valve control. Hose connection also. (See Fig. 5.)

(7) *Pipe Trench*—Surrounding pool containing and making all piping systems accessible. Trench covered with standard non-slip floor plates. (See Fig. 3.)

No. 8

(8) *Ladders and Foot Rest, Patented*—Flush and non-obstructing step ladder units, and horizontal foot rest.

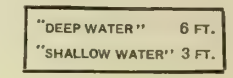
(9) *Sloping Sanitary Cove Base*—To avoid cutting and fitting of enameled brick at intersection of side walls and sloping bottom.

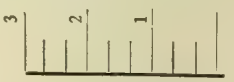


No. 9

(10) *Enameled Brick*—For sides, ends and bottom of pool with Lane and Guard marks in color. (See Fig. 1.)

(11) *Lettering on Terra Cotta*—Under-glaze lettering: "Deep Water," "Shallow Water" signs, intermediate Foot Marks on cap course face.





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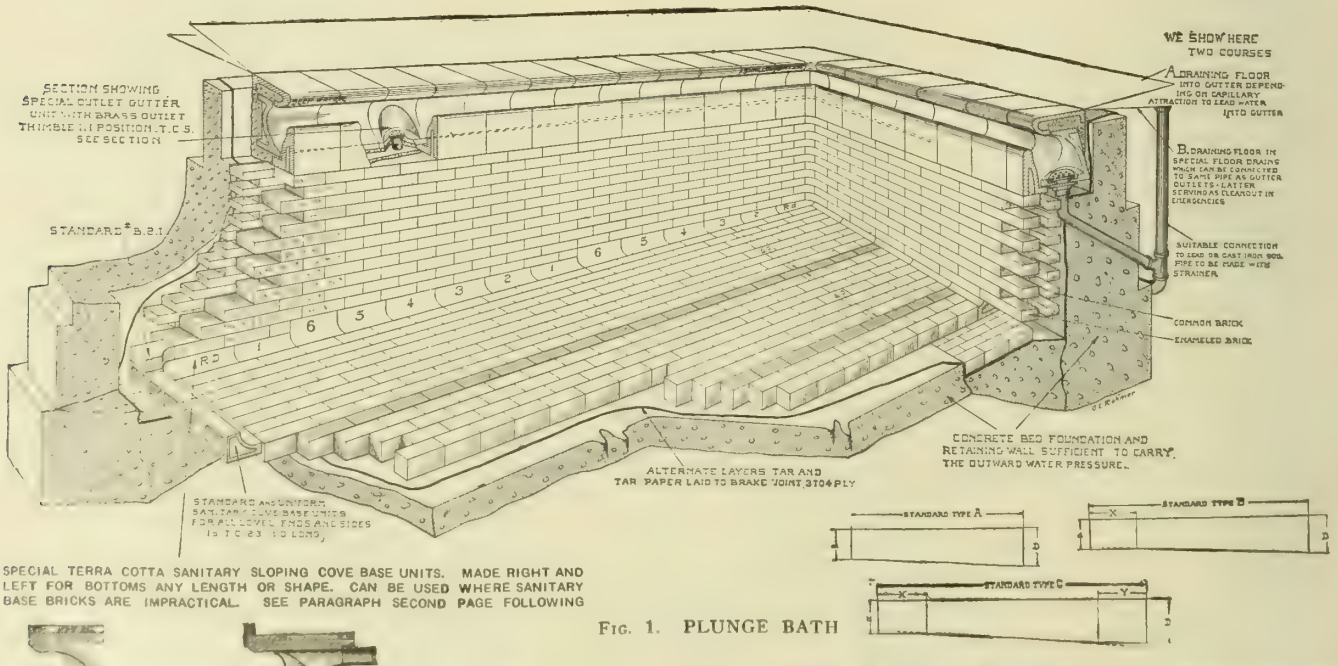
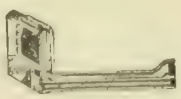


FIG. 1. PLUNGE BATH

No. 4

No. 5



No. 6

(4) *Bronze Outlets*—Thimbles and elbows with removable strainers standardized to fit all T. C. sections connected in batteries to piping system.

(5) *T. C. Ventilating Outlet, Patented*—Special integral T. C. gutter outlet unit, ventilators connected to ventilating system to remove smell of fermented organic matter in outlet system.

(6) *Bronze Flushing Inlet, Patented*—Integral with life rail arranged in batteries on one side and both

(12) *Waterproofing*—Fabric waterproofing with or without waterproofing compounds.

(13) *Anchorages*—Standard "Cinch" anchorages guaranteed waterproof; as manufactured by National Lead Co.

No. 13

(14) *Adjustable Springboard Holder, Patented.*

No. 14

(15) *Fabrication Plans and Setting Instructions*—Standard samples, fabrication plans, and skeleton specification furnished on application with full-sized cross section of all equipment.

Continued on next page

Skeleton Specifications and Installation Data.

All units uniform cross-section; no rights and lefts.

Life Rail—All life rail units furnished standard (12″) lengths (with firm finger grip recess), set level to the water line and arranged either flush or offset with respect to cap. See Figs. 2 and 5.

Gutter—All Gutter units furnished 12 inches long for 1914 models and 6 inches long for 1915 models, all to be set on a slope. (Standard slope ⅛ in. per foot arranged on 10-ft. slope lengths, right and left from high point determining outlets 20 ft. apart.) This affords a saving of 75 per cent of the cost of plumbing on 5-ft. spacing, the customary practice on level gutter system. See Outlets and Ventilators.

Cap Course—12-inch Units, 1914 Cap Course models rabbetted to reestablish level finish over sloping gutter. Caps for 1915 models are integral with back wall forming canalization for insertion of sloping gutter.

These caps are also rabbetted, but on upper exposed surface, to receive a non-slip finish tile furnished by us.

Floor drainage into gutter if desired.

Bronze Outlet Thimbles—Standard for all designs. T. C. Outlet Units made in three styles.

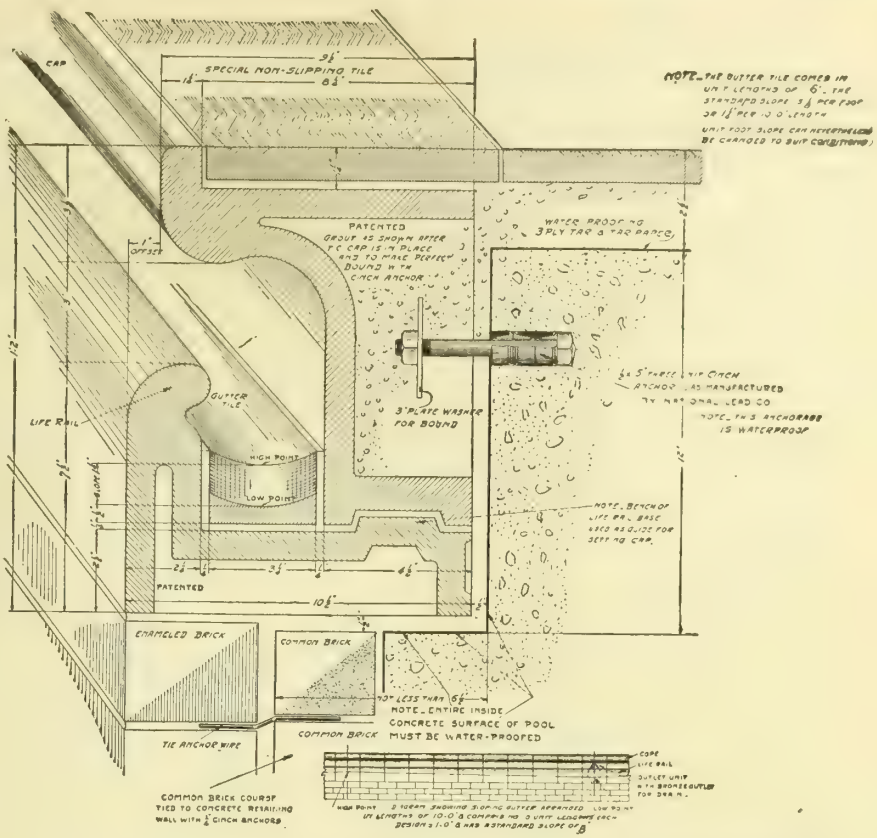


FIG. 2. Uniform Section Terra Cotta Rail, Cap and Sloping Gutter—1915 Model
1915 MODEL DESIGN NO. 6250, WITH OFFSET CAP (PATENTED)
See Figs. 6, 7 and 8 for 1914 Model

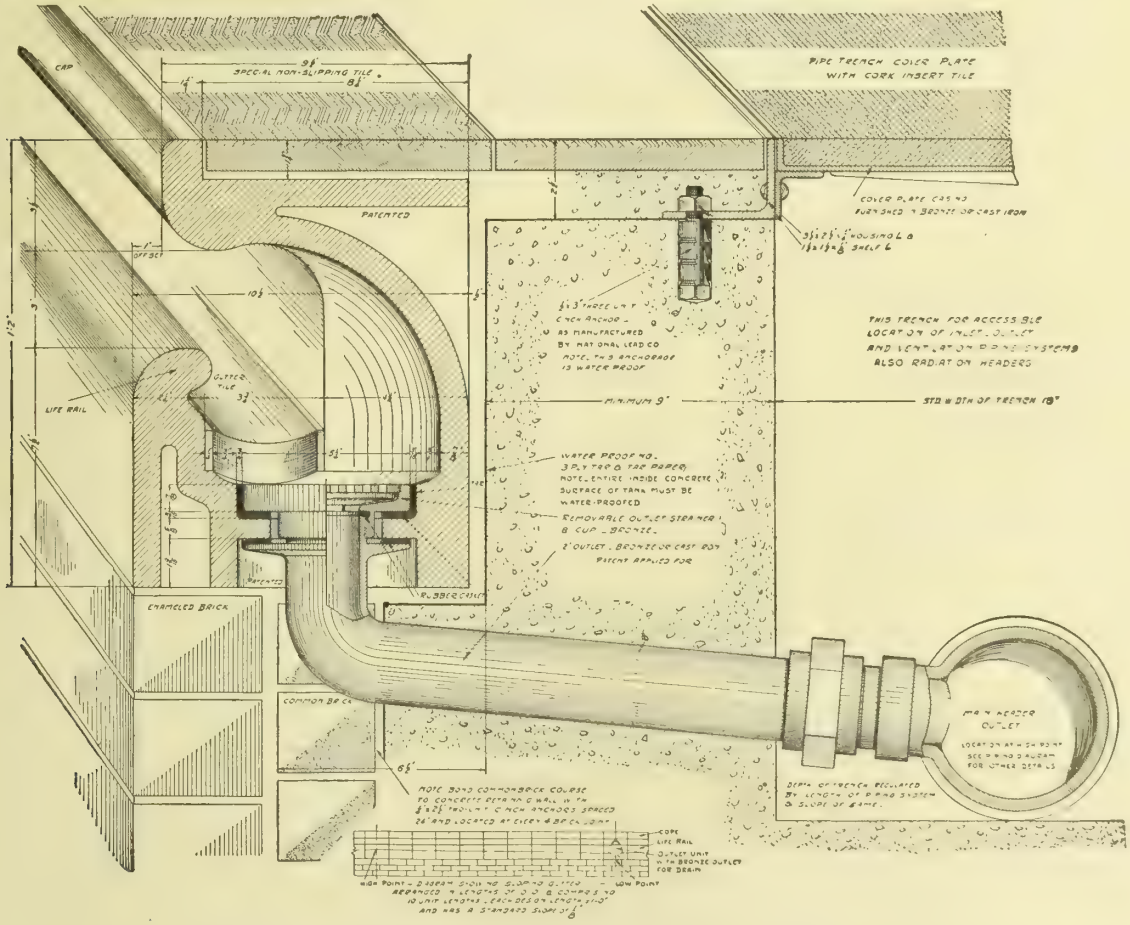


FIG. 3. Terra Cotta Outlet Section, with Bronze Outlet Piping Connections to Trench
1915 MODEL DESIGN NO. 6250, WITH OFFSET CAP (PATENTED)
T. C. No. 5, 1914 Model, is, however, adaptable to this outlet fitting if soft pipe is used

Continued on next page

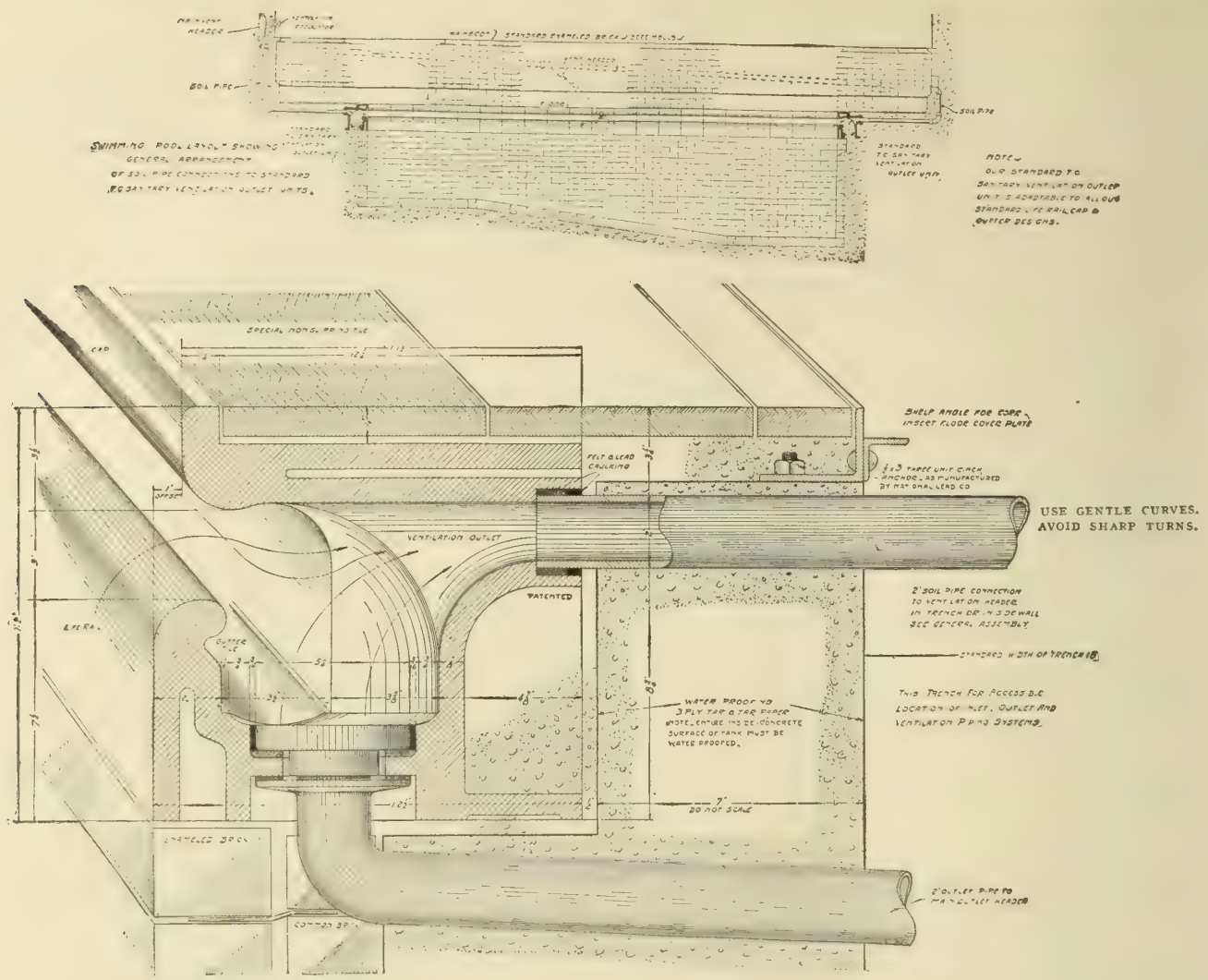


Fig. 4. 1915 MODEL DESIGN NO. 6250, TERRA COTTA VENTILATION OUTLET UNIT SECTION, WITH OFFSET CAP (PATENTED)
This Ventilation Unit is also adapted to receive the piping connection for the water outlet system

T. C. 5, 8 and 15, 1914 models, see Fig. 7, for sweating in lead pipe or copper sleeve for hard pipe connection. Furnished with lock nut for attachment to T. C. outlet units before setting.

1915 models adaptable to the above outlets, also to special bronze outlet members in elbow form, for leading waste to header in accessible pipe trench.

All outlet connections carry standard strainers removable from gutter for clean-out. See Trench.

Ventilating Outlet—Integral T. C. gutter outlet ventilator units 12-in. lengths, ventilating all outlets from top, leaving gutter and outlet unobstructed. Ventilator member connected to ventilating system with standard soil pipe; removing smell of fermented organic matter in gutter and outlet pipes.

Flushing Inlet—Constructed integral with the life rail, jointing with same.

Arranged to deliver from hydrant service and pressure a 2-inch diameter stream, reduced to ⅜- x 6-in. horizontal discharge, its center line flush with top of life rail or maximum water level.

All inlet units, connected in batteries to header in pipe trench with one accessible valve control, are located on side and both ends of plunge, discharging simultaneously at the surface of a full tank, and sweeping saliva, scum and floating impurities into the gutter on full perimeter.

The end inlet members are furnished with separate ¾-in. bore plug with independent piping and control for cleaning and scrubbing off (empty tank); also with by-pass control to suction pump for sweeping heavy impurities off bottom with vacuum cleaner nozzle (full tank). (See Fig. 5.)

Pipe Trench—Is recommended surrounding the pool (see details for housing of all piping, inlet, outlet; ventilation and radiation headers). For this, standard removable floor plates arranged for non-slip inserts can be furnished, making manholes unnecessary, and rendering whole trench accessible.

Ladder and Foot Rest—Flush and non-slipping T. C. step ladder units built in wall with uniform rise 12 inches, tread 8 inches, and in three standard lengths, 9, 12 and 18 inches for bonding with enameled brick. Tread specially designed for support of toe and arch of foot, and finger grip for the hands, rendering both easier and safer than the pipe rung or ship ladder.

The 18-in. units are economical for horizontal flush foot rest longitudinally of the tank, and are particularly recommended to be placed immediately under outlet points 4 ft. 6 in. below water to induce expectoration at the outles.

Sloping Sanitary Cove Base—Made in sections, of lengths established for each tank; each section comprises three or more units approximately 12 inches long. Sections made right and left for both sides of the tank. Coves of section establish slope of bottom. Tops of sections, all level, receive first course of brick, sections repeating to end of tank. Butting ends of each section stepped to receive corresponding course of brick, thus eliminating all cutting and fitting of bricks at intersections of sloping bottom.

Enameled Bricks—Enameled brick, for sides, ends and bottoms with lane and guard marks on bottom in colored bricks.

Enameled bricks should always be used for lining of tank because of the stability of construction afforded, as they can be bonded with common brick or cement lining, which should always be placed inside of the fabric waterproofing.

Lettering on T. C.—Under-glazed lettering in permanent

Continued on next page

below water to induce expectoration at the outlets.

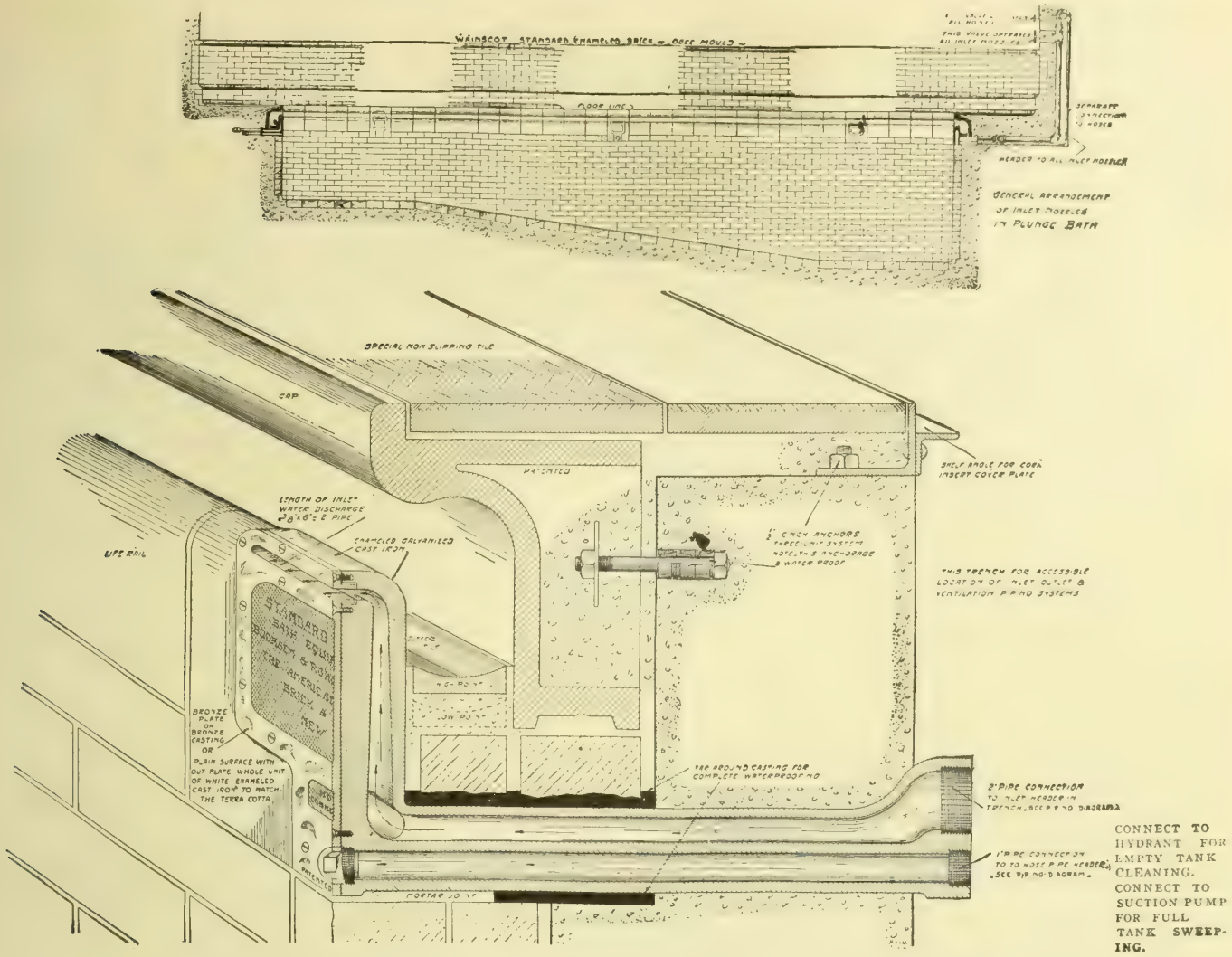


FIG. 5. 1915 MODEL DESIGN NO. 6250, WITH OFFSET CAP, INTEGRAL INLET LIFE RAIL UNIT
Patented

oxides can be furnished for the following features or others: "Deep Water," "Shallow Water" signs on face of cap course, as a warning to non-swimmers and reckless divers. "Goal" signs for polo game. Also yard marks with numerals 1 to length of tank with intermediate foot mark (1" x ¼"), on top of cap course to facilitate stretching a line for swimming and diving contests.

Waterproofing—Fabric waterproofing with liquid tar applied hot on alternate and bonded layers of tar paper or felt is unqualifiedly recommended, whether or not waterproof compounds are used.

An inside lining of 3-inch common brick is recommended for protection of waterproof and to serve as a means to bond enameled brick, forming an 8-inch wall simultaneously built.

Do not let the weight of the common brick wall rest upon the waterproofing cove, which should be backed up behind with cove in concrete. This to prevent rupture and leak in the waterproofing, which would be hard to locate and repair.

Anchorages—Cinch anchorage guaranteed waterproof and stronger than the tie rod used; readily caulked in the holes of standard size drilled or cored into concrete.

We have standardized these anchorages as manufactured by National Lead Co., because of their adaptability, ease of installation, strength and cheapness.

Adjustable Springboard Holder—This is designed for a purpose and is not a makeshift; always gives satisfaction.

Arranged for substitution of springboards of variable thicknesses, adjustable to the weight of the diver; also for adjusting springboards within reasonable limits for variable lengths of overhang; and lastly to provide for the complete removal of the entire equipment from the floor temporarily, when desired.

The device consists of four essential parts: (1) A base section bolted to the concrete floor with Cinch Expansion Bolts, which are removable; and (2) an adjusting or tightening hand screw arranged with (3) a sliding wedge to adjust and to hold board in firm position; (4) the upper section, bolted in the ordinary way to the lower frame, and arranged with a standing platform, corrugated to prevent slipping, and into which wedge portion operates.

The springboard can be of hickory or oak of 12-in. standard width, thickness up to 1½" to suit weight of divers. Be sure to provide adequate foundation for Cinch anchorage system. See F.S.D. T.C. No. 9.

Fabrication Plans and Setting Instructions—Fabrication details and setting plans for final acceptance of owner or architect will be furnished within ten days after order is placed. Shipment of brick at once, Terra Cotta and other equipment six weeks after approval of fabrication plans.

Be sure that the concrete tank bottom is reinforced throughout and has same slope as that given for and approved in fabrication plans for sloping base (with level tops), allowing clearance of 2 inches for grouting, which latter will avoid trouble from badly laid bottoms, and permit the tops of sloping base to be at level and proper slope secured, which is imperative.

Bottom Outlets—Should be located at deep end of tank in flat field if desired, but latter should be valleyed to T. C. box, forming trap to catch sediment, which will settle on bottom and can be swept, even with tank full, into pocket, and then trapped out at will with control valve.

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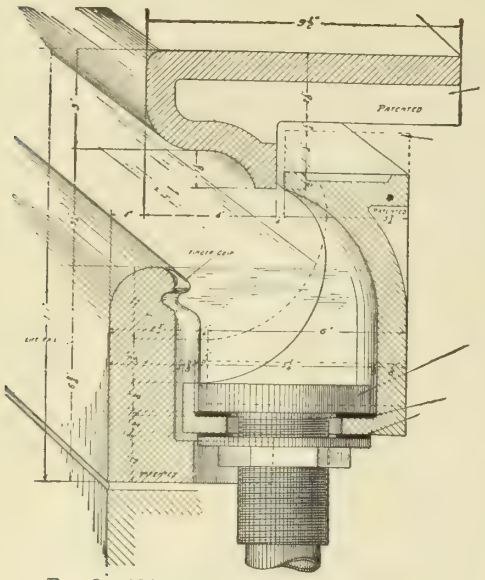
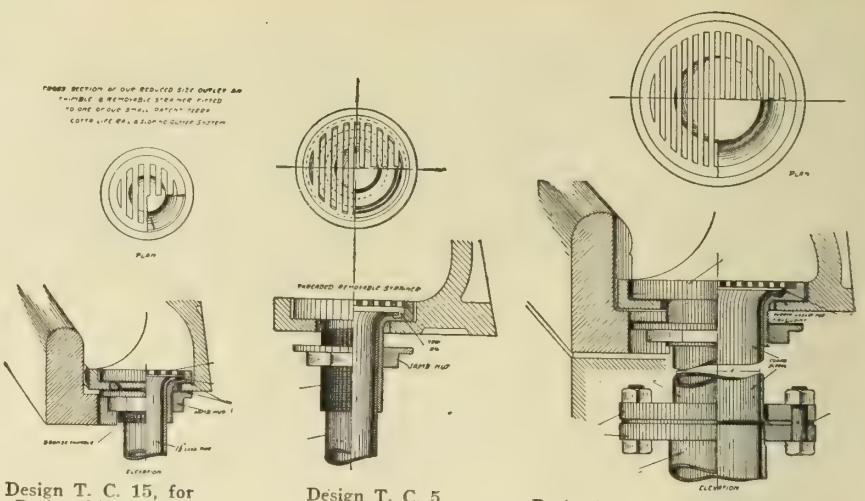


FIG. 6. 1914 MODEL, THREE-PART SLOPING GUTTER DESIGN
(Patented)

Design No. 73431, cap offset from face of rail. Companion design No. 70160 same dimensions; cap flush with face of rail. See Installation Data third preceding page

NOTE—Special Cap Course Units furnished for cork, rubber or other inserts

Send for blue-prints of full-sized details



Design T. C. 15, for Design 84198 only 1½" lead pipe

Design T. C. 5 2" lead pipe

Design T. C. 8, for 4" hard pipe connection with copper sleeve

FIG. 7. SECTIONS OF GUTTER OPENINGS

T. C. 5, 8 and 15 show Standard Bronze Outlet Thimbles with Removable Strainers arranged for sweating outlet connections, either to soft lead pipe direct, or to a copper sleeve for hard pipe connection

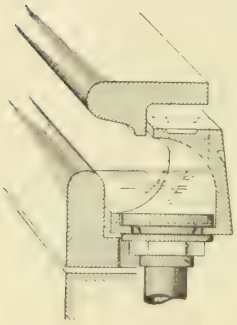
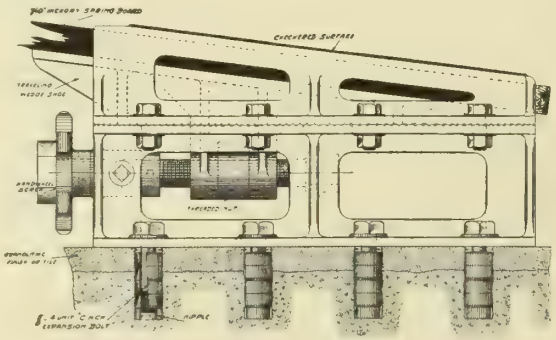
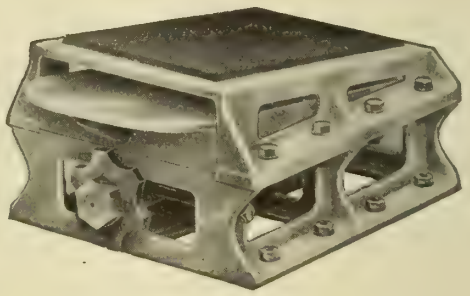


FIG. 8. 1914 MODEL THREE-PART SLOPING GUTTER DESIGN
(Patented)

No. 84198 for small tanks only, up to 25 feet in length. See Installation Data third preceding page



Longitudinal Elevation, showing Method of Anchoring



Perspective View

FIG. 9. BRONZE ADJUSTABLE SPRINGBOARD HOLDER T. C. 9
(Patented)

Concrete foundation for springboard to be 3' 0" long, 2' 0" wide and 6" to 8" thick, to be anchored with "Cinch" Expansion Bolts, obtainable from National Lead Co.

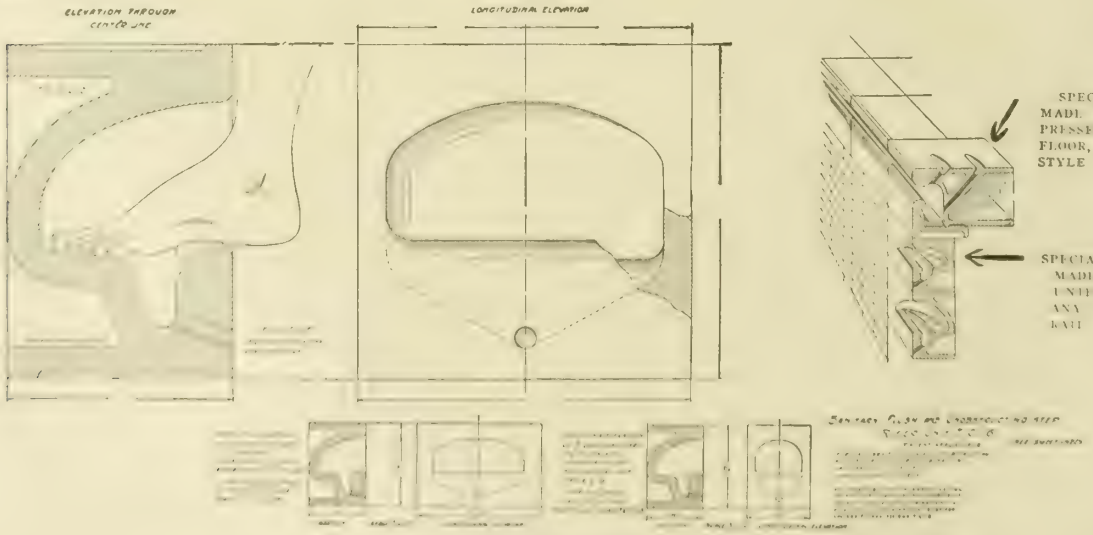


FIG. 10. FLUSH STEP LADDER T. C. 16 (PATENTED)

T. C. 16. Assembly and Detail Drawing of T. C. Sanitary Flush and Unobstructing Step Ladder and Combination Longitudinal Foot Rest for Swimmer (Patented)

ESTABLISHED 1827

WM. H. JACKSON COMPANY

Tile for Swimming-Pools, etc.

TELEPHONE, BRYANT 8430

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NEW YORK, N. Y.

OFFICES
CHICAGO, ILL., 902 So. Michigan Boulevard MONTREAL, CAN., New Birks Building
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TILE for the Lining of SWIMMING-POOLS, and for FLOORS, WAINSCOTING, FIREPLACES and GENERAL DECORATIVE PURPOSES.

For Metal Windows, see our name in General Index.

Co-operative Services.

This firm will co-operate with architects and others in the study of swimming-pool designs, and will furnish drawings and specifications for their tile construction, together with estimates for the supplying of the tile and the entire application of same.

Jackson Mosaic Tile.

This tile is applicable in simple or highly elaborate designs and color effects to floors, wainscoting, walls, fireplaces and interior columns. The Jackson Tile has a beautiful, soft and restful finish, which is absolutely non-crazing, and is impervious to moisture, grease, alkalis and most acids. The large color field to choose from, as offered by the Jackson stock, together with the co-operative service of the designing department, assures most effective and rich results in this kind of work.

A large list of instances in public and private buildings in which Jackson Tile was specified and applied by this firm will be supplied on request.

Jackson Tile-lined Swimming-pools.

The illustration shows one example of Jackson Tile-lined Swimming-pool Construction. These pools have been installed by this firm in many private and institutional buildings, clubs, colleges and so on. The same material being applicable to the pool, the floor, and the walls, it is possible to obtain with it a most satisfactory unity of effect.

The Mosaic Tile is applied by this firm to the rough concrete or brick basic construction, which is taken care of by other contractors. Special tile shapes are used as well as standard straight and curved units, which, from their small size, are easily applicable in any desired layout.

Special advantages in Jackson Pool Lining are: (1) Life Rail; (2) Grip Coping; (3) Longitudinally Sloping Overflow Gutter; (4) Depth and Distance Numerals; (5) Safety Lines; etc.

Further information regarding expert installation, comparative cost, etc., supplied on receipt of details of requirements.

References.

The following are a few of the pools recently installed by this firm:

Y. M. C. A., Boston, Mass.
Y. M. C. A., Montreal, Canada
Syracuse (New York) University
Stevens Institute of Technology, Hoboken, N. J.
Central Y. M. C. A., Brooklyn, N. Y.
H. L. Pratt, Glen Cove, L. I.
J. C. Brady, Gladstone, N. J.
Rutgers College, New Brunswick, N. J.
Detroit Athletic Club, Detroit, Mich.
Captain J. R. De Lamar, Glen Cove, L. I.
Y. M. C. A. Building, Youngstown, Ohio

SWIMMING-POOL, JAMES C. BRADY ESTATE, GLADSTONE, N. J.
WALTER KIDDE, Engineer

THE W. J. CLARK COMPANY

MANUFACTURERS OF

"Lane" Patent Joist and Timber Hangers

SALEM, OHIO

Products.

"Lane" Patent Wrought Steel Joist or Timber Hangers, Post Caps, Bases and Wall Boxes.

Also, we make Bar, Plate and Sheet Metal Products, including Elevator Buckets, Factory Furnishings of all Kinds, Lockers, Shelving, Benches, Bench Legs, Pressed Steel Wheels, Couplers for Air, Steam, Gas or Water Hose, Ideal Umbrella Holders, and Special Steel Work to order.

Co-operative Service and Information.

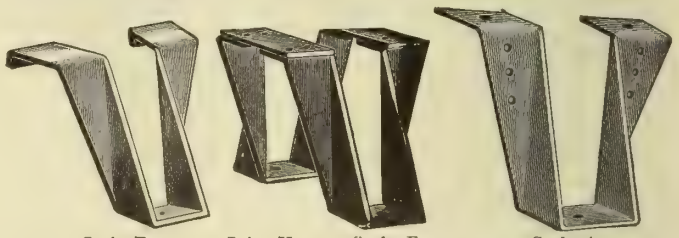
In order to aid the architect in drawing up specifications for construction work, we have published a very valuable pamphlet which we will be glad to mail upon request. A small model of the hanger will also be sent, if desired.

Pamphlet 29, besides amply illustrating and describing the hanger, contains tables of dimensions, estimated safe load strength, weight, actual load on hanger, etc., much of which matter is not in print elsewhere. The convenience of these reference tables warrants keeping the pamphlet handy. In addition to accompanying illustrations, the pamphlet shows many others, namely:

Fig. 90 Reducer
Fig. 91 For Concrete
Fig. 92 Diagonal, Right or Left
Fig. 93 Rafter, Right or Left
Fig. 94 Wall Plate
Fig. 95 For Concealed Spiking
Fig. 281 Comb made Central
Fig. 282 Hip Comb made Central
Fig. 789 Diagonal made Central
Fig. 1022 Hooks Forward for Spiking to Ceiling
Fig. 1059 For hanging Angle Timbers to another
Fig. 1111 For hanging one Timber under another

Construction of Hangers.

Wrought steel of best structural grade used. Is hot-shaped to preserve strength. Width and thickness uniform throughout design. Each size made in regular, medium and heavy weight, and kept in stock. Metal in each hanger size gauged in width and thickness to secure correct proportion between bearing area and load. Any shape and size made to order.



Style D Joist Hanger Style E Style A

"LANE" PATENT JOIST HANGERS

TESTS OF "LANE" HANGERS

Size of Hanger	Thickness and Width of Steel in Hanger	Estimated Safe Load of Hangers	Actual Load at which Timber and Hanger began to Yield
2 x 8	No. 14 = $\frac{5}{64}$ x 2	3,905 lbs.	12,000 lbs.
2½x 12	No. 12 = $\frac{7}{64}$ x 3	8,202 lbs.	16,000 lbs.
3 x 12	No. 12 = $\frac{7}{64}$ x 3	8,202 lbs.	16,000 lbs.
4 x 9	No. 11 = $\frac{1}{8}$ x 2¼	7,030 lbs.	16,000 lbs.
4 x 14	No. 10 = $\frac{9}{64}$ x 3½	12,302 lbs.	20,000 lbs.
6 x 12	No. 7 = $\frac{3}{16}$ x 3	14,062 lbs.	30,000 lbs.
8 x 10	No. 7 = $\frac{3}{16}$ x 2½	11,717 lbs.	25,000 lbs.
10 x 10	No. 5 = $\frac{7}{32}$ x 2½	13,670 lbs.	30,000 lbs.
10 x 14	No. 3 = ¼ x 3¼	21,875 lbs.	50,000 lbs.

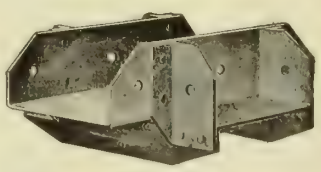
The Hanger showed *no sign of breakage* in any test.

Post Caps.

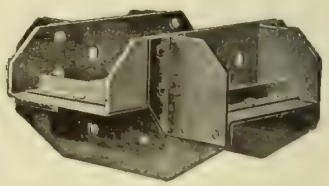
Regular post caps made in one-, two-, three- and four-way.

Each channel part supports its girder load without assistance from other parts, and the riveting of the side plates of the side girder seats is not depended on to carry the girder load.

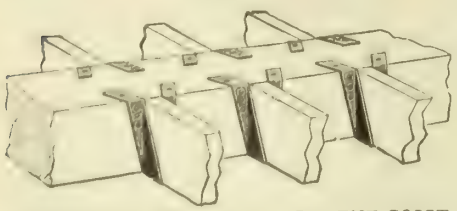
Medium and heavy post caps are extra heavy; the sides of the lower channel are bolted instead of spiked to the post. The girder anchorage is self-releasing, in case of fire.



REGULAR FOUR-WAY POST CAP

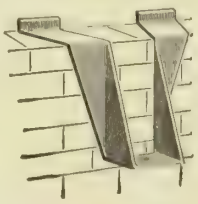


MEDIUM AND HEAVY POST CAP

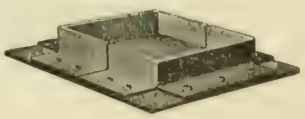


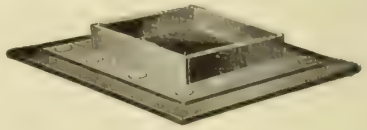
APPLICATION OF "LANE" PATENT JOIST HANGER

Showing flat bearing of all surfaces



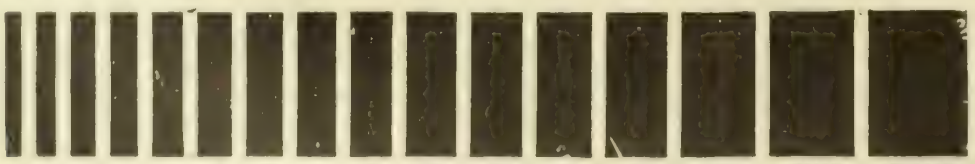
STYLE B, "LANE" PATENT JOIST HANGER





Regular Style Heavy Style

"LANE" PATENT WROUGHT-STEEL POST BASE



11 12 11 10 9 8 7 6 5 3 2 1 0 000 00000 0000000

FULL SIZE THICKNESS OF THE VARIOUS GAUGES OF STEEL IN "LANE" PATENT HANGERS

THE DUPLEX HANGER CO.

GENERAL OFFICE AND WORKS

East 53rd Street and Lakeside Avenue

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, 16 Warren Street
PHILADELPHIA, 217 North 15th Street
CHICAGO, 56 West Lake Street
BOSTON, 88 Broad Street

Products.

We are the sole manufacturers of the "Duplex" Joist, Wall and I-Beam Hangers; "Duplex" Post Caps, Post Bases, Wall Plates and Wall Boxes, both in Steel and Malleable Iron, for use in heavy mill construction, warehouses and factory buildings as well as in ordinary joist constructed buildings. Also, the "Cleveland" Galvanized Wall Ties and Snow Guards; "Duplex" Concrete Inserts.

Endorsement.

"Duplex" hangers and post caps are recognized by architects and builders as the standard. Endorsed by the Building Commissioners of the large cities and approved by the National Board of Fire Underwriters. Insurance credit is given where "Duplex" is used.

Specification.

If architects and engineers will, when specifying hangers and post caps, mention the name "Duplex," the proper hangers and caps for the timbers will be furnished. "Duplex" hangers and post caps are designed with a large factor of safety to carry the timbers for which they are intended.

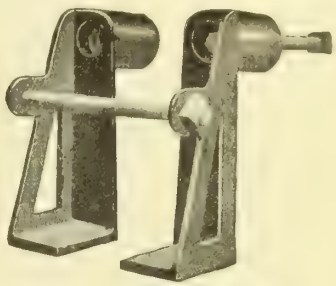
Catalogue.

The latest Catalogue, Edition No. 11, contains full information relative to "Duplex" line, and also valuable engineering information.

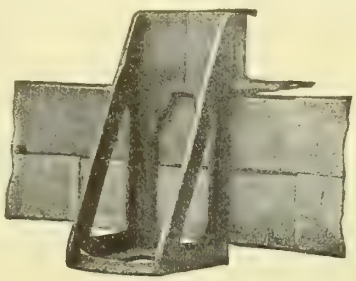
Reference.

We will furnish list of installations, upon request.

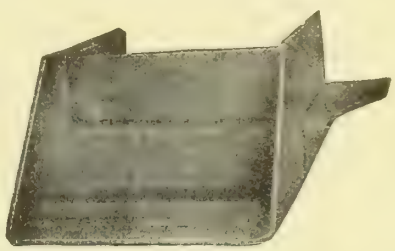
"DUPLEX" JOIST HANGER



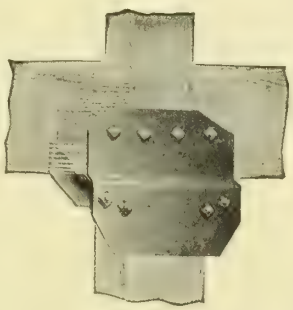
"DUPLEX" JOIST HANGER
For very heavy mill construction

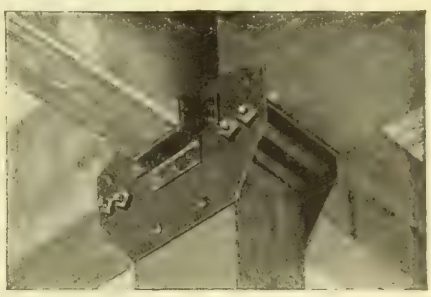


"DUPLEX" WALL HANGER

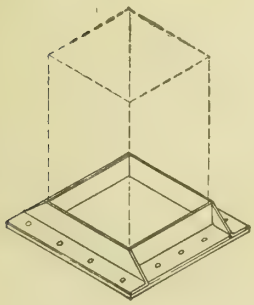


"DUPLEX" EXTRA HEAVY WALL HANGER





"DUPLEX" STEEL POST CAPS
For one, two-, three- or four-way to suit any framing



"DUPLEX" STEEL POST BASE

"DUPLEX" CONCRETE BLOCK WALL HANGER

"DUPLEX" WALL BOX

UNDERWRITERS' LABORATORIES, INC. INSPECTED STRUCTURAL MATERIAL 1

UNDERWRITERS' LABEL

PIERRE DUVINAGE

MANUFACTURER OF

Iron and Steel Work for Buildings and Spiral Stairs

253 Broadway
NEW YORK, N. Y.

TELEPHONE, Barclay 6319

Products.

Post Caps, Wall Plates, Pier Plates and Brackets, Roof Truss Castings and Rods, Special Castings, Trussed Girder Rods and Struts.

Cast-Iron Columns, Bases and Plates, Wheel Guards, Jamb Guards, Saddles, Sills, Shutter Eyes, Cast-Iron Clean-Out Doors, Trap Pit Covers.

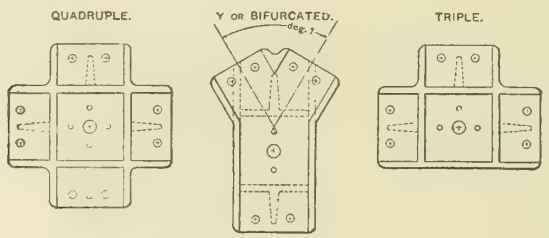
Steel Beams, Channels, Angles, Tees, Steel Columns, Girders, Trusses, Wrought Iron Fire-Escapes, Balconies, Railings, Fences, Pipe Railing.

Window Guards, Area Gratings, Wire Guards for Windows and Doors, Sheet Steel Shutters, Doors, Ornamental Iron Work.

Cast-Iron and Steel Stairs, Spiral Stairs, and all kinds of Iron and Steel Work required for Buildings. If made of iron or steel I can supply it.

Duvinage System of Anchoring.

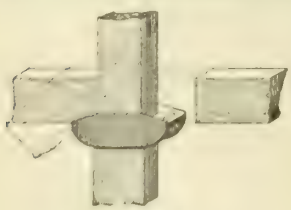
The Duvinage System for anchoring of buildings consists of post caps, wall plates, pier plate brackets, sill plates and roof truss castings having projecting hubs which fit into holes bored in beams.



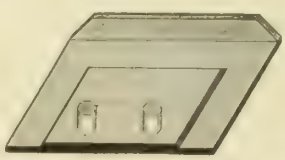
DUVINAGE POST CAPS
For self-releasing beams

PRICE-LIST OF DUVINAGE POST CAPS

Size of Post	Roof	¾ in.	1 in.	1¼ in.	1½ in.
6-in. squares	$0 70	$1 00			
8- " "	1 45	3.00			
9- " "	1.65	3.40		$4.90	
10- " "	1.90	3.65		5.00	$5.50
11- " "	2.00		$4.00	5.40	6.00
12- " "	2.15		5.00	5.55	6.50
13- " "			5.50	6.00	7.00
14- " "			6.00	7.00	8.00
15- " "			7.25	8.25	9.25
16- " "			8.00	9.25	10.25
17- " "			8.75	11.00	11.75
18- " "			9.10	12.00	12.40



POST CAP

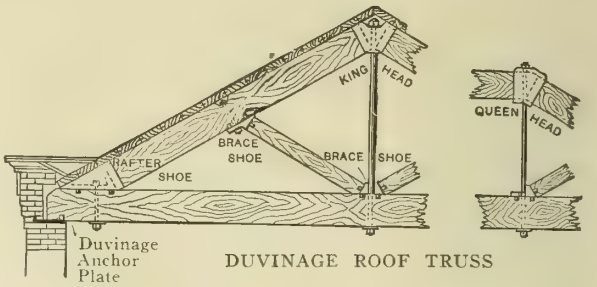


SINGLE ANCHOR WALL PLATE

PRICE-LIST OF WALL PLATES

Beam	Size of Plate	9 ins. deep	13 ins. deep
"	"		$0.25
"	"		.35
"	"		.55
"	"		.65 and $0.75
"	"		.75 " .90
"	"		.85 " 1.15
"	"		1.15 " 1.35
"	"		1.30 " 1.65
"	"		1.50 " 2.00
"	"		1.70 " 2.15

Send for Catalogue



DUVINAGE ROOF TRUSS

Duvinage Spiral Stairs.

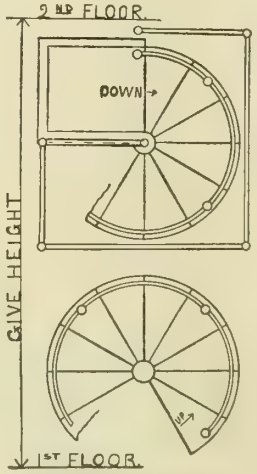
Made of the best grade of iron; single one-inch pipe railing around well hole and on stairs. Easy to go up and down on. Prices on application. Please give diameter, height of floors, starting point, position of landing.

STANDARD SIZES

Diam.	Treads to the Circle
72 ins.	16
60 "	12 and 16
54 "	12
48 "	12
42 "	12

Catalogue.

Send for special catalogue.



DETAILS OF SPIRAL STAIRS

DUVINAGE SPIRAL STAIRS

STABLE IN JERSEY CITY, N. J.
60 feet by 160 feet

THE IDEAL HANGER COMPANY

1270 East 53d Street

CLEVELAND, OHIO

Products.

"Ideal" Steel Joist Hangers, Wall Hangers, Post Caps, Post Bases, Wall Plates, Wall Boxes, Building Anchors, Wall Ties, Concrete Inserts.

Application.

The "Ideal" hangers are made of open-hearth steel bars, and so formed that the hanger fits flat against the timber. This permits spikes or lag screws to fasten the hanger to the timber and gives the advantage of holding the hanger close to the girder, increasing the carrying capacity of the hanger.

Double hangers are made by riveting single hangers to straps as shown.

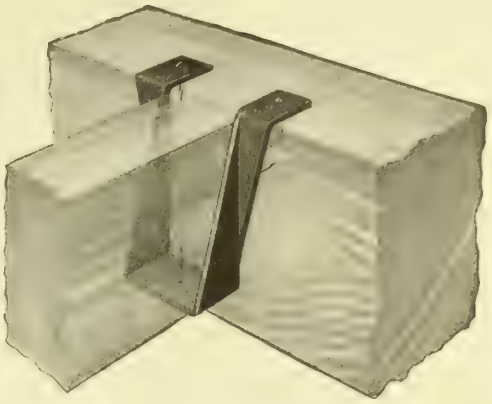
"Ideal" steel post caps require no expansive framing as they are set directly on the post and carry one-, two-, three- or four-way construction as required.

Stock.

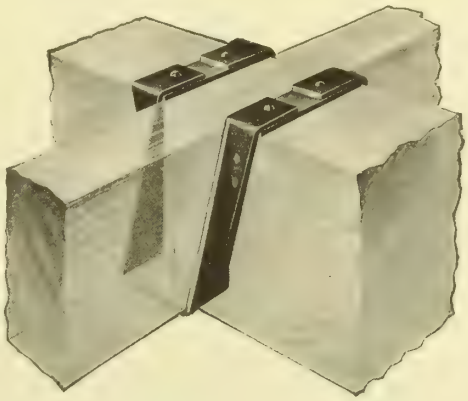
"Ideal" joist hangers, post caps and bases are standard construction, and every size is carried in stock for immediate shipment.

Catalogue.

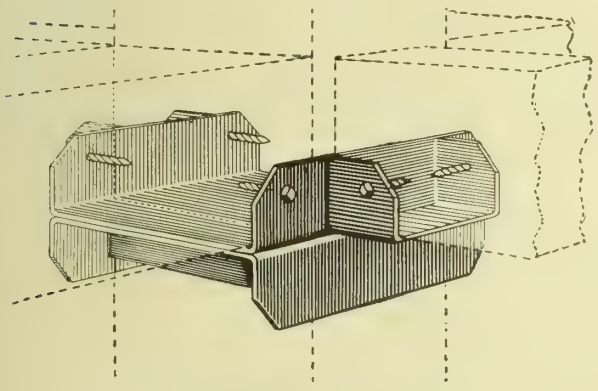
Catalogue "E" gives list prices and information.



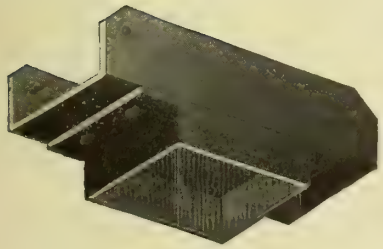
"IDEAL" SINGLE HANGER, STYLE "A"



"IDEAL" DOUBLE HANGER, STYLE "B"

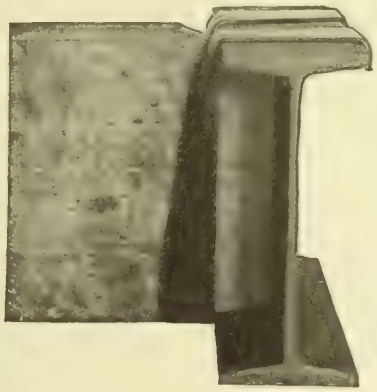


"IDEAL" STEEL POST CAP, NO. 1
Showing three- or four-way construction



"IDEAL" STEEL POST CAP, NO. 2

UNDERWRITERS' LABEL



"IDEAL" SINGLE HANGER, STYLE "C"

KENWOOD BRIDGE COMPANY

Engineers and Builders of Structural Steel Work

1416 First National Bank Building
CHICAGO, ILL.

TELEPHONE, RANDOLPH 1488

WORKS: CHICAGO, ILL.
Telephone, Hyde Park 1743

Products.

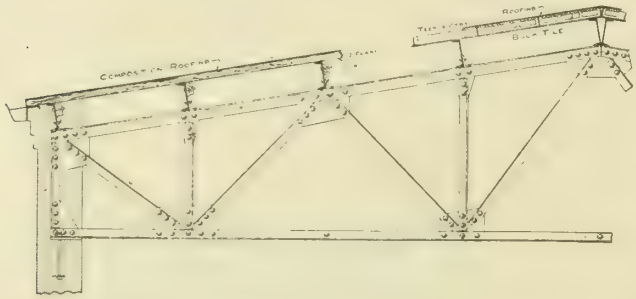
We design, manufacture and erect STRUCTURAL STEEL WORK for BUILDINGS, ROOFS, BRIDGES, VIADUCTS, COLUMNS, GIRDERS, ELEVATED TANKS, COAL and ORE UNLOADERS, COAL BUNKERS.

Facilities.

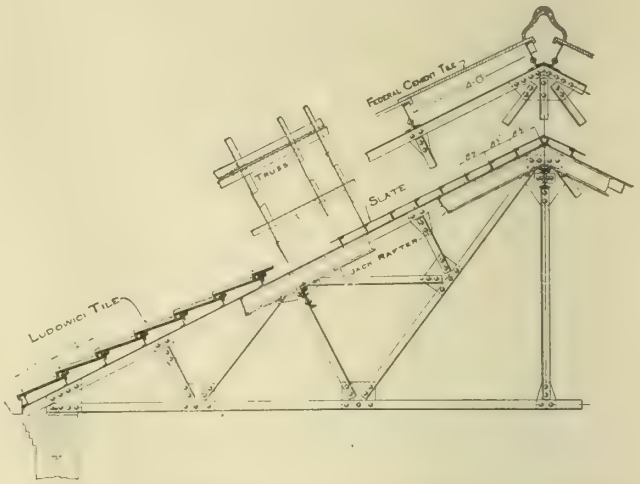
Our shops are completely equipped with modern facilities for executing first-class work, promptly, by skillful engineers and competent mechanics. Material taken from stock in yard when immediate shipments are required.

Estimates.

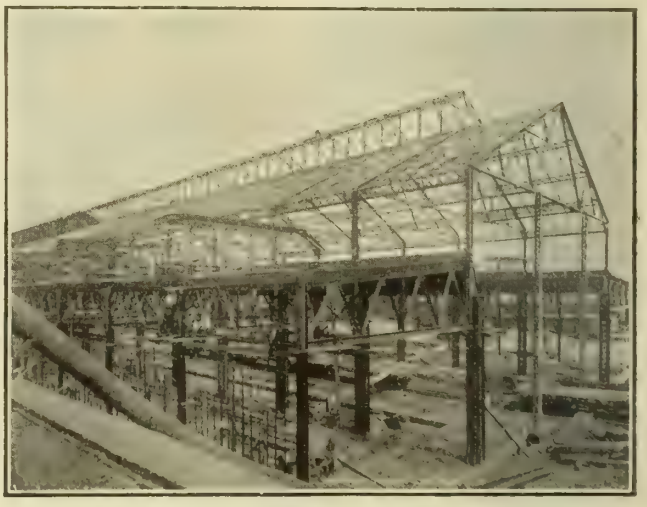
Carefully prepared estimates will be furnished on receipt of inquiries and necessary information.



ROOF CONSTRUCTION FOR WOOD SHEATHING AND BOOK TILE

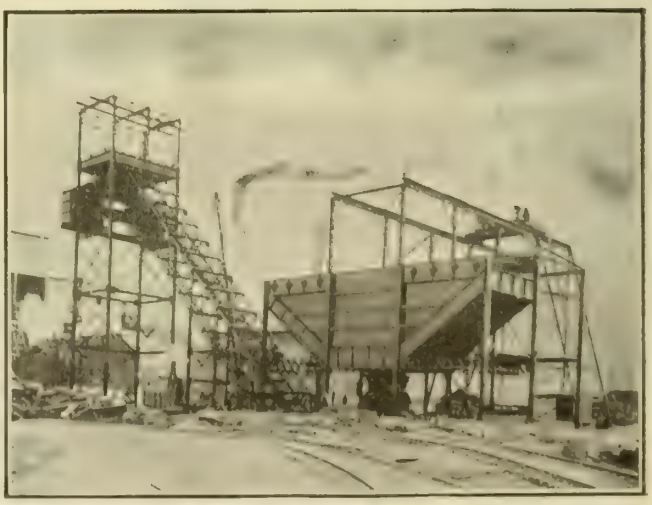


ROOF CONSTRUCTION FOR SLATE, LUDOWICI AND FEDERAL TILE



LOCOMOTIVE MACHINE SHOP

MANUFACTURING PLANT, 80 x 400 FEET, SIX STORIES



STONE CRUSHER PLANT

UNION FOUNDRY WORKS

Manufacturers of Structural and Ornamental Iron Work

Room 1427, First National Bank Building
CHICAGO, ILL.

FACTORY
76TH STREET AND
GREENWOOD AVENUE

Products and Services.

STRUCTURAL and ORNAMENTAL IRON WORK, including CAST-IRON COLUMNS, PLATES, SILLS, JAMBS, LINTELS, WHEEL-GUARDS, and general FOUNDRY WORK; STEEL COLUMNS, GIRDERS and TRUSSES, BEAMS, CHANNELS; IRON STAIRS and RAILINGS, ORNAMENTAL CAST- and WROUGHT-IRON GRILLES, AREA GRATINGS, FIRE-ESCAPES, STORE FRONTS, WINDOW-GUARDS, ELEVATOR ENCLOSURES, CANOPIES.

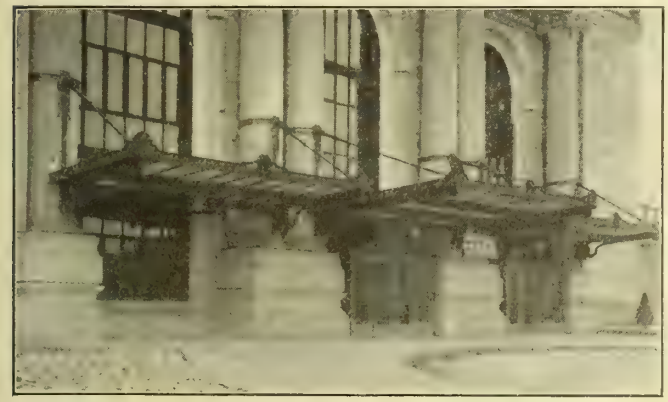
We contract to erect both our Structural and Ornamental Work. Structural Work we frequently furnish f.o.b. cars, but prefer to erect our own Ornamental Work. We can furnish competent workmen to superintend the erection, if desired.

Facilities.

We carry a large stock of structural steel shapes, which enables us to fill all orders promptly.

Estimates and Designs.

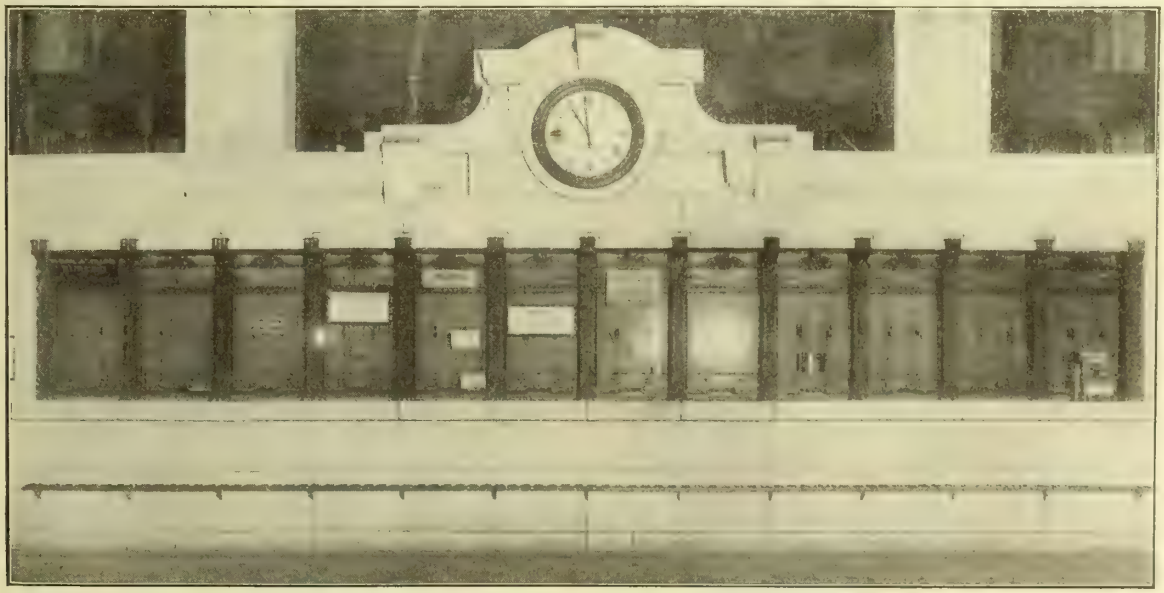
Estimates will be furnished in accordance with architects' plans and specifications, and designs will be submitted on application. We have a variety of designs for Ornamental Work, such as Stairs, Railings, Store Fronts, etc., and can submit stock designs where it is desired to save the expense of special patterns.



CANOPY FOR UNION TERMINAL STATION, WICHITA, KAN.

REFERENCES

BUILDING AND LOCATION	ARCHITECT
Drs. D. U. & A. Cameron, Chicago, Ill.	W. D. Mann
State Savings Bank, Escanaba, Mich.	H. R. Wilson & Co.
United States P. O., Robinson, Ill.	A. W. Lane, Contractor
Otto Huber Res., Rock Island, Ill.	Arthur Heun
Bowman Dairy Co., Poplar Grove, Ia.	G. M. Turnbull
Larsen Ice Mach. Co., Ft. Madison, Ia.	H. P. Henschien
St. Joseph's School, Harvard, Ill.	Jos. W. McCarthy
E. C. Minas Building, Hammond, Ind.	Wm. E. Walker
Wm. Schukraft Building, Chicago, Ill.	Frommann & Jebsen
Crawford Theater, Chicago, Ill.	Wm. Gauger
Venezuela Meat Products Syndicate, Ltd., Venezuela, S. A.	D. I. Davis & Co.
Third Regiment Armory, Aurora, Ill.	J. B. Dibelka
Theater, Northern Indiana Investment Co., Gary, Ind.	J. J. Verplank
Logan Square Theater, Chicago, Ill.	H. R. Wilson & Co.
Harper Theater, Chicago, Ill.	H. R. Wilson & Co.
M. Rosenwald Residence, Chicago, Ill.	Howard Shaw
Harold McCormick Residence, Lake Forest, Ill.	Charles Platt
C. S. Hatch & Thos. Gaynor Theater, Chicago, Ill.	Davis & Davis
E. T. Blair Residence, Chicago, Ill.	McKim, Mead & White
Sears-Roebuck Grocery and Box Factory, Chicago, Ill.	Geo. C. Nimmons
Children's Memorial Hospital, Chicago, Ill.	Holabird & Roche
Citizens Bank & Trust Co., Tampa, Fla.	J. C. Llewellyn
W. O. Goodman Residence, Chicago	Howard Shaw
Crane Co., Corwith Plant, Chicago	Graham, Burnham & Co.
Boulevard Theater, Chicago, Ill.	H. L. Newhouse
W. L. DeWolf Building, Chicago, Ill.	Graham, Burnham & Co.
First Nat. Bank, Rapid City, So. Dak.	Hoggson Bros.
Citizens' National Bank, Watertown, So. Dak.	Hoggson Bros.
Chicago, Milwaukee & St. Paul Railway Co., Great Falls, Mont.	C. F. Loweth, Chief Engineer
United States Post Office, Evanston, Ill.	Rogers & Kaiser, General Contractors
John P. Thompson Theater, Chicago	H. R. Wilson & Co.



TICKET OFFICE GRILLE, UNION TERMINAL STATION, WICHITA, KAN.

THE VAN DORN IRON WORKS COMPANY

Manufacturers of Joist Hangers and Post Caps

CLEVELAND, OHIO

Products.

STEEL JOIST HANGERS, WALL HANGERS, CEMENT BLOCK HANGERS, DOUBLE HANGERS, I BEAM HANGERS.

STEEL and MALLEABLE IRON POST CAPS, POST BASES and WALL PLATES.

Also, STEEL WALL BOXES and ANCHORS, WALL PLUGS, FLOOR PLUGS, and ADJUSTABLE STEEL CROSS BRIDGING.

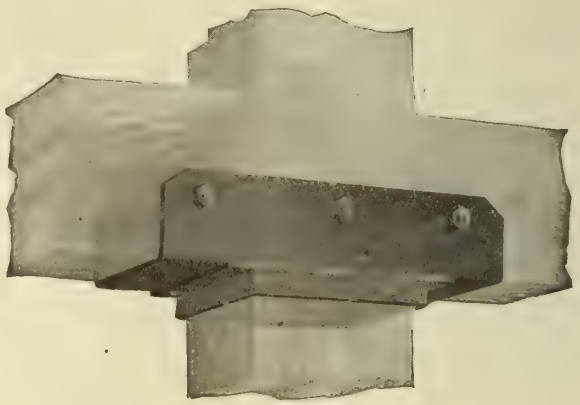
For Steel Jail Equipment, see our name in General Index.

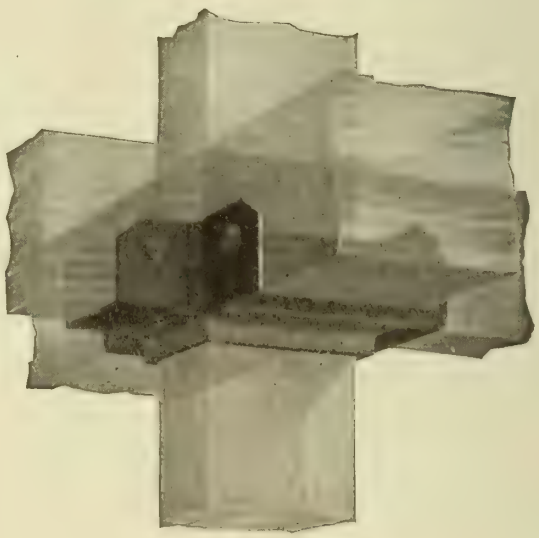
Description of Standard Post Caps.

Steel Post Caps—Van Dorn Standard Steel Post Caps have a girder carrying channel, six inches deep, made of $\frac{5}{16}$-inch mild steel plate. The overhang of six inches is reinforced by the riveted leg of the angle, which forms a closed socket fitting around the post.

Blue-Prints—Prints showing exact details of the separate designs of Van Dorn Post Caps are available. Write for these details, which attest the desirability of Van Dorn material.

UNDERWRITERS' LABEL


TWO-WAY CAP


FOUR-WAY CAP

Capacity of Post Caps.

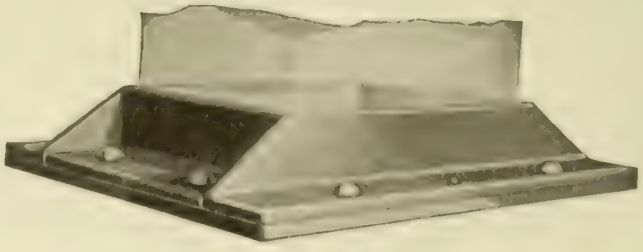
Van Dorn Post Caps possess assured carrying capacity. A cap identical in design with those illustrated, and of standard stock material, carried a sustained load of 150,000 pounds in test at Case School of Applied Science. Other tests substantiate this load.

Approved by the National Board of Fire Underwriters.

Steel Wall Box.

Van Dorn Steel Wall Box, as shown, has a close fitting cover, ample anchorage at back of box; timber is self-releasing and provides for ventilation around beam.

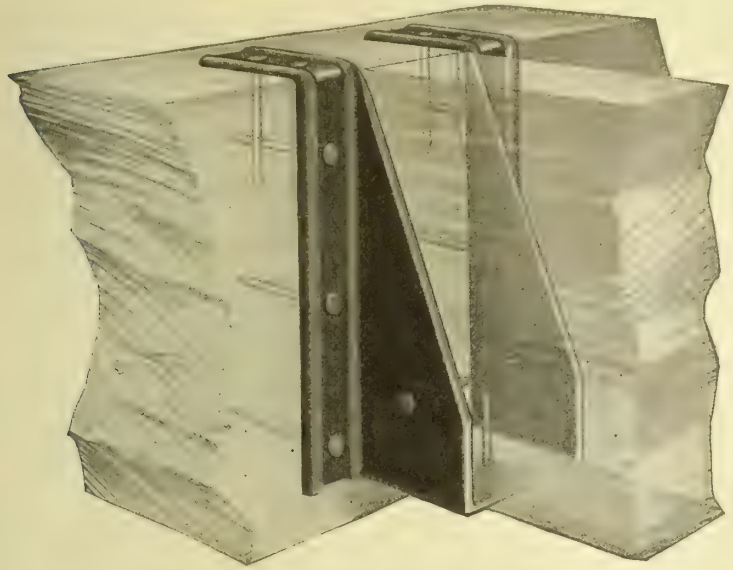
STEEL WALL BOX


POST BASE

Continued on next page

Description of Hangers.

No. 1, or Regular Hanger—The side flanges are wrought with a groove and ridge, the ridges serving as additional strength, especially at the angle of the prong where the severe strain comes. The groove allows the spike head to come level with the ridge, giving an attractive appearance. The spikes have a great carrying capacity and also serve to hold joist and headers together so that season cracks will not affect the strength.



NO. 1 HANGER

Materials and Guarantee.

The steel employed is the best obtainable. Every bar is subject to both surface and analysis inspection; and the construction is such that the best results can be obtained from any section of material.

Van Dorn malleable material is designed to give greater capacity than would result from the use of much heavier cast-iron material, and is intended for use in those types of structure where steel cannot be used, because of the presence of acid or ammonia fumes and their corrosive action on steel products, protected or otherwise.

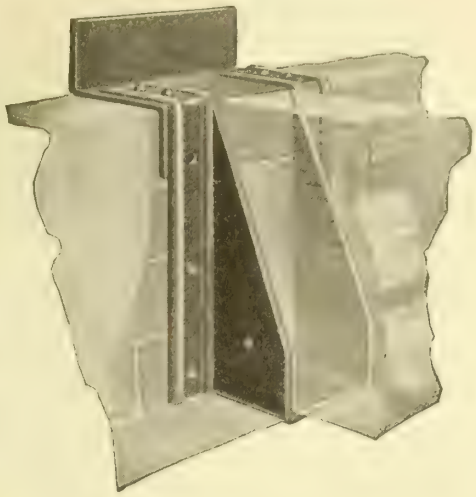
All goods are guaranteed to be first-class and "just as represented," and will be replaced if found to be defective.

DETAILS REGULAR HANGER NO. 1

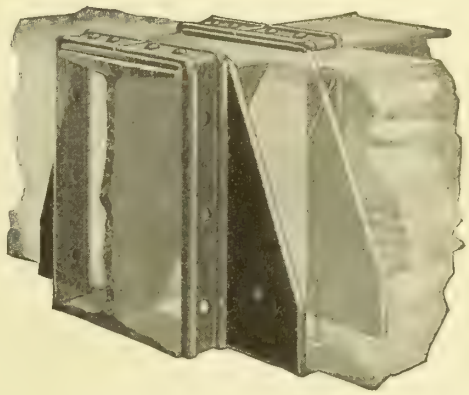
Size of Hanger Width All Depths	Length of Prong	Width of Prong	Width of Seat	Thickness of Metal in Seat
2 ins.	2 ins.	1 1/2 ins.	3 ins.	1/8 in.
3 ins.	3 ins.	1 1/2 ins.	3 ins.	1/8 in.
4 ins.	4 ins.	1 1/2 ins.	3 ins.	3/16 in.
5 ins.	4 ins.	1 1/2 ins.	3 ins.	3/16 in.
6 ins.	4 ins.	1 1/2 ins.	3 ins.	1/4 in.
8 ins.	5 ins.	2 ins.	3 1/2 ins.	1/4 in.
10 ins.	5 ins.	2 ins.	3 1/2 ins.	5/16 in.
12 ins.	5 ins.	2 ins.	3 1/2 ins.	3/8 in.

Adaptations.

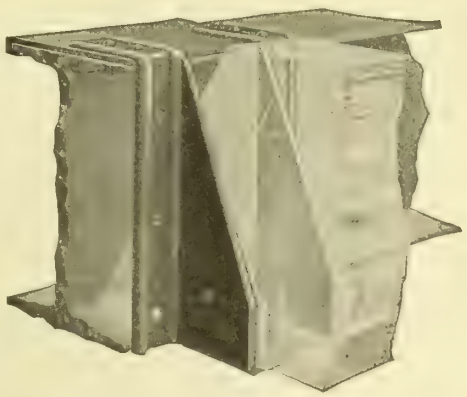
No. 1—Hanger is readily adapted to the production of different styles for a variety of purposes, by riveting bent plates of the desired shapes to the No. 1 Hanger, as shown in illustrations following.



NO. 4 HANGER



NO. 6 HANGER



NO. 7 HANGER

Catalogue.

Catalogue No. 82 gives valuable information regarding the design and relative carrying capacity of Van Dorn material.

We will furnish this catalogue and supplements at your request.

S. CHENEY & SON

Zimmerman Cast-Iron Porch Column Base

MANLIUS, N. Y.

Product.

Manufacturers of the ZIMMERMAN CAST-IRON PORCH COLUMN BASE, the C. E. Zimmerman patent.

Advantages.

A wood column or wood base set on a porch floor always decays in a few years, because of the constant moisture in the joint. This means regular repair bills to the property owner. The Zimmerman patent base does away with these repair bills, because it stops decay. It is set directly on the floor, and the column on top of it, leaving no joint for moisture to collect in.

Superiority.

The superiority of the Zimmerman base over other porch column bases lies in its central bearing, in addition to the four corner bearings. Bases 24 x 24 and upward have four corner and four inside bearings which are planed level and all bear alike, relieving the casting of any strain, and carry the weight without causing the corner supports to sink into the floor.

It is necessary that the turned wood base have an open center a trifle smaller than the opening in the column to ventilate the column shaft. Our base is no experiment, but an economic necessity which has been on the market for years and has given absolute satisfaction.

Model.

A miniature nickeled base will be mailed free on application. Write us to-day and see for yourself the merit of this base.

Sizes and List Prices.

On orders, state whether floor is wood or stone, and give diameter of turned wood base, as this determines the size of iron base required. This also applies to square column when separate wood base is used.

IRON BASES, ROUND COLUMNS

8 x 8 x 1⅞	$ .60
9 x 9 x 1⅞	.65
10 x 10 x 2	.80
11 x 11 x 2⅛	.95
12 x 12 x 2⅛	1.20
13 x 13 x 2⅛	1.40
14 x 14 x 2¼	1.60
16 x 16 x 2½	2.10
17 x 17 x 2½	2.25
18 x 18 x 2½	2.35
20 x 20 x 2¾	3.50
22 x 22 x 3	3.70
24 x 24 x 3⅛	6.00
26 x 26 x 3¼	7.50
28 x 28 x 3¾	9.75
30 x 30 x 7½	11.50
32 x 32 x 4	14.00
36 x 36 x 4½	16.75
48 x 48 x 6	Prices on
50 x 50 x 6	application.

IRON BASES, SQUARE COLUMNS

4 inch	$ .25
5 "	.35
6 "	.45
7 "	.55
8 "	.70
9 "	.75
10 "	.80
11 "	1.05
12 "	1.10
14 "	1.60
16 "	2.10

These sizes are ready to ship. Other sizes made to order.

Method of Installation.

First screw the turned wood base to the iron base, then screw the iron base to the floor, and fit the column upon the wood base.

Before fastening the column, paint the end of the column and paint up in; also, paint the wood block upon which the column rests. Where base is used on stone it should be set in cement. Paint base before using.

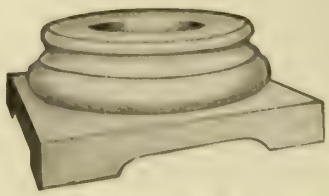
When the iron base is used on tin or canvas floors, place a rubber packing between the iron base and tin or canvas through which the screw will pass. When screwed down it will be water-tight.

TOP VIEW OF BASE

BOTTOM VIEW OF BASE
Showing bearing on sizes from 24 x 24 and upward

FRONT VIEW OF BASE

HALF BASE FOR HALF COLUMN



OPEN CENTER OF TURNED WOOD BASE

THE DOANE & JONES LUMBER COMPANY

"Perfect Joint" Columns

ELMIRA, N. Y.

NEW YORK CITY REPRESENTATIVE, Wilber N. Chapman, 20 South 10th Street, Newark, N. J.
Telephone, 559-M Branchbrook

Products.

We are patentees and sole manufacturers of the "Perfect Joint" Column for Exterior, Interior, or Pergola work.

Description.

The joint is simple and capable of easy and perfect construction, which gives the greatest possible glue surface between the staves. Note the short radial joints. We have never known any of our columns to break through the joint. Our lumber is all first-class air-dried material, and is also kiln-dried before the staves are made. The staves are then put together under intense pressure and heat, to prevent the glue from setting too quickly. The entasis is always secured in the rough. Our caps and bases are all mitered, doweled and glued so that the joints are effectually closed, and no end grain is exposed.

Composition Caps.

We are prepared to furnish promptly high-class composition work of standard design or made from special details. Dowels are always sent free of charge when caps are ordered.

Wire-Bound Columns.

Where columns have a turn-out they are wire-bound in the lathe under the turn-out with heavy copper wire, thus strengthening the shaft at the point where the strain is the greatest. In the case of the Doric columns, where there is no turn-out, we drive into the end of the shaft a heavy corrugated iron ribbon, thus counteracting any tendency to split from dampness incurred by resting directly on the porch floor.

Shipment.

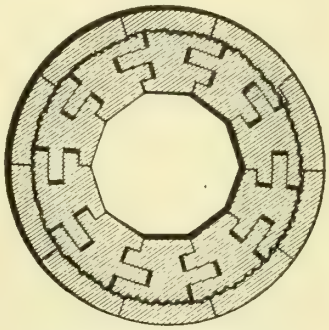
We prime free of charge all of our columns and pilasters with white lead and oil, unless otherwise specified, and carefully crate them.

Details.

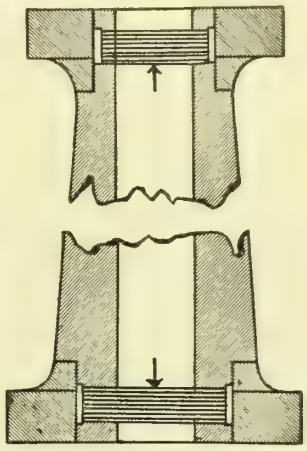
We are in a position to furnish our own details when so requested; but prefer to work to architects' details, which we follow carefully. Caps, bases and columns, made to conform to all periods of architectural design.

Estimates and Leaflets.

Our prices will, in all cases, be found low for the class of work furnished. We send out estimates the same day the inquiry is received. Will wire prices when requested to do so. Write for leaflet showing some of the many styles of columns manufactured by us.



CROSS-SECTION OF "PERFECT JOINT" COLUMN
Showing Corrugated Iron Ribbon



SECTIONS OF "PERFECT JOINT" COLUMN
Showing Wiring at top and bottom

HOME OF LAWRENCE L. GILLESPIE, MORRISTOWN, N. J.
Columns by The Doane & Jones Lumber Co. D'Oench & Yost, Architects

HARTMANN-SANDERS CO.

EXCLUSIVE MANUFACTURERS OF

Koll's Patent Lock-Joint, Staved and Turned Columns

EASTERN OFFICE
6 East 39th Street
NEW YORK, N. Y.

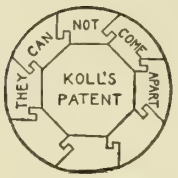
MAIN OFFICE AND FACTORY
2155-2187 Elston Avenue
CHICAGO, ILL.

PACIFIC COAST BRANCH
A. J. Koll Planing Mill
LOS ANGELES, CAL.

Products.

Koll's Patent Lock-Joint Stave, Porch Columns (Wood); Hardwood Staved and Veneered Columns; Composition Ornamental (Staff) Capitals; and Pilasters and Square Columns to match.

Also, Pergolas, Lattice Fences, Sundials and Garden Accessories; Plain or Fluted Columns up to 54 inches diameter and 35 feet long.



TRADE-MARK

Architects' Details.

Columns conform accurately to any detail; are of the best materials, and at as reasonable rates as are consistent with good work.

Our Patent 1904 Correct Entasis.

Correct Entasis, Secured in Forming Stave Itself—The staves in all columns manufactured under Koll's Patent are, in order to secure the proper entasis, straight one third and swell-tapered upper two thirds, so that when shaft is formed the correct entasis is obtained securing sufficient stock at top and bottom of shaft to permit turning to detail without cutting too close to joint.

Columns furnished with any style of fluting or reeding desired.

Spliced Butt Joint.

In addition to the perfect lock joint of the staves, a joint has been devised to splice the butts of the staves should the length of column call for material longer than can be secured in one piece. In this process joints are put together with screw pressure and hot glue, another feature which goes to make these columns mechanically perfect.

Steel Reinforcement.

A corrugated steel band or ferrule reinforcement is applied to the bottom end of all Doric Columns. The steel band, while adding considerable strength to the shaft, permits of some flexibility, so that no injury can be done by moisture that may be absorbed. This reinforcement is also added to both ends of all large column shafts.

Waterproofing.

The inside of all columns and pilasters 16 inches and over are waterproofed with a special waterproofing compound

Thickness of Stock.

As the price of a column is regulated largely by the amount and kind of lumber that enters into its construction, it is very important to state the thickness of stock of which columns are to be made. Many years' experience as specialists in column construction has demonstrated that the thickness of stock for the various sizes, as called for in the table on the following page, provides enough material to carry out properly the architectural detail and afford sufficient strength. Should an unusual load be placed on the columns, they can easily be reinforced by inserting a timber or iron column.

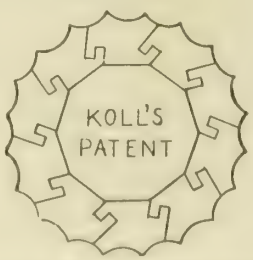
Facts in Regard to Installation.

Columns are primed with one coat lead and oil before shipment, but should be thoroughly painted as soon as possible after being placed in position. The ends of the columns should be temporarily covered with weatherproofed paper, if for any reason they cannot be used immediately or if roof is not in position.

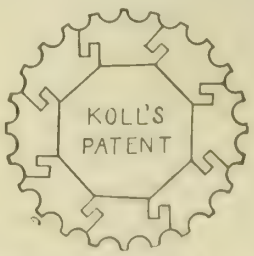
Ornamental capitals should be flashed with sheet lead or copper for protection. If the entire top of the capital is not covered with flashing, the water that strikes the cornice or facia is bound to run down and into the cap, which would disintegrate the cap as well as the column. This feature of flashing is so frequently omitted that it is considered advisable to call attention to it, and the architect should see that this very important matter is not overlooked in the specifications.

Catalogues.

Catalogue No. 40-8 on Wood Columns, and Catalogue No. 29-8, showing new designs for Pergolas and Garden Accessories—Lattice Fences, Garden Houses and Arbors—will be sent on request.



DORIC FLUTING COLUMNS, 195, 195A, 215 AND 215A



IONIC FLUTING USED ON ALL OTHER FLUTED COLUMNS SHOWN IN CATALOGUE

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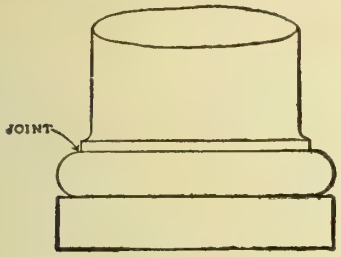
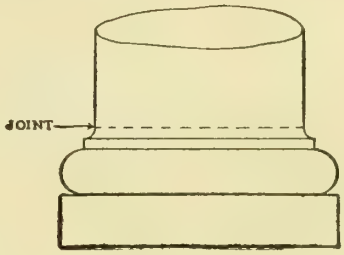
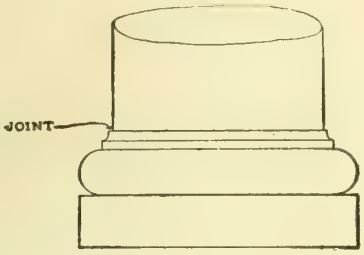


STYLE A COVE



STYLE B COVE



STYLE C COVE

SPLICED BUTT JOINT

WITH COVE ON SHAFT LIKE STYLE A

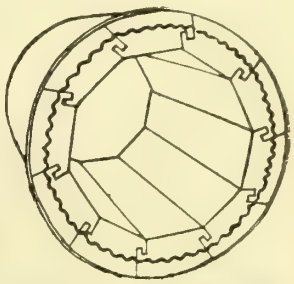
	2-inch Stock	2½-inch Stock	3-inch Stock	4-inch Stock
Plain Shaft	up to 18 in.	19 in. to 22 in.	23 in. to 30 in.	31 in. and up
Ionic Fluted	up to 16 in.	17 in. to 19 in.	20 in. to 27 in.	28 in. and up
Doric Fluted, No. 195 (With no cove at bottom of Shaft)	up to 20 in.	21 in. to 28 in.	29 in. to 39 in.	40 in. and up

COVE PLANTED ON LIKE B, OR MADE A BASE MEMBER LIKE C

	2-inch Stock	2½-inch Stock	3-inch Stock	4-inch Stock
Plain Shaft	up to 22 in.	23 in. to 30 in.	31 in. to 40 in.	41 in. and up
Ionic Fluted	up to 20 in.	21 in. to 28 in.	29 in. to 38 in.	39 in. and up

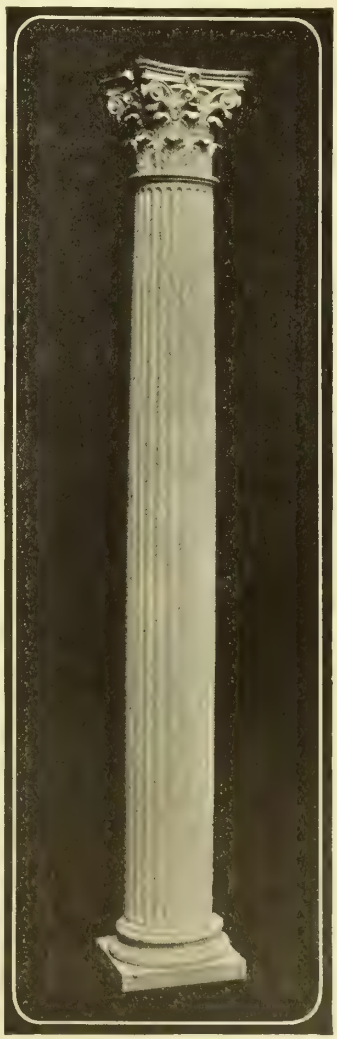
NOTE—Before ordering columns, it would be well to examine your detail closely and note whether the cove is to be part of the shaft, or whether this can be planted on. We can make the column either way, but of course shall have to be guided by what specifications and details call for.

A PERGOLA
LEWIS C. ALBRO, Architect


STEEL REINFORCEMENT

H. S. Co. No. 220

H. S. Co. No. 225


H. S. Co. No. 255

H. S. Co. No. 310

EXAMPLES OF PLAIN AND FLUTED COLUMNS

UNITED STATES COLUMN CO.

Manufacturers of Lally Patent Column

Erie and Albany Streets
CAMBRIDGE, MASS.

BRANCH OFFICES

CHICAGO, ILL., Lally Column Co., 4001 Wentworth Avenue

BROOKLYN, N. Y., Lally Column Co., Calyer and Russell Streets

Product.

Lally Patent Columns.

Description.

The Lally Patent Column is the best building support made. It is composed of an outside shell of steel pipe compactly filled with a high-grade concrete.

TRADE-MARK

Advantages.

The advantages of the Lally Patent Column are many. They can be procured in less time than any other column, and are absolutely guaranteed for the loads specified. By the use of our special machinery we obtain a filling entirely free from voids or air spaces. Our connections are made of steel, and are far better than cast iron.

Reinforcement.

By our methods of inner steel reinforcement we can get greater strength in the same diameter than with any other type of column. Our angle-iron reinforced column, consisting of four angles back to back, is the most efficient column made.

Fireproof Qualities.

Lally Columns have been tested in many large fires, and were found to be the only material remaining intact. The reinforced Lally column is the most compact fireproof column made, as the metal in the concrete is practically indestructible.

Neatness.

Lally Columns, being round, naturally present a neat, clear cut appearance. When desired, we make ornamental columns for exterior or interior work.

SECTION OF LALLY COLUMN REINFORCED

Strengths, Details and Prices.

We will be pleased, at any time, to furnish catalogues containing full description, safe load sheets, and price lists.

Specifications.

Architects and engineers who specify "Lally Patent Columns" will not only justify themselves, but benefit their client, by insisting upon getting what they specified—the genuine Lally Column.

Representation.

All inquiries in New York and New Jersey may be referred to our New York representative, The Lally Column Co. of New York, Calyer and Russell Streets, Brooklyn, N. Y.

All Western inquiries may be sent to our Chicago representative, The Lally Column Co. of Chicago, 4001 Wentworth Avenue, Chicago, Ill.

All New England and upper New York inquiries may be sent to home office, Cambridge, Mass.

References.

Lally Columns are accepted by the Building Departments of Boston, New York, Chicago, and of all other large cities in the United States and Canada. The following is a partial list of installations:

BUILDING	LOCATION
Kerr Mill, American Thread	Fall River, Mass.
Holmes Mfg. Co., Mill	New Bedford, Mass.
Shetucket Worsted Mill	Baltic, Conn.
Washington Mills	Lawrence, Mass.
Farr Alpaca Mill	Holyoke, Mass.
John Pilling Shoe Factory	Lowell, Mass.
Plant Shoe Factory	Boston, Mass.
Walter Law Stables	Briarcliffe, N. Y.
Sea View Hospital	Staten Island, N. Y.
New Home Sewing Machine Factory	Orange, Mass.
Neild Mfg. Co., Mill	New Bedford, Mass.
Booth Mfg. Co., Mill	New Bedford, Mass.
Ludlow Mill	Ludlow, Mass.
Fiat Motor Co.	Poughkeepsie, N. Y.
Connecticut Breweries Co. Building	Bridgeport, Conn.
D., L. & W. R. R. Station and Houses	Glen Ridge, N. J.
Erie R. R. Station	Allendale, N. J.
Standard Oil Co.	Brooklyn, N. Y.
Brooklyn Baseball Club, Ebbets Stadium	Brooklyn, N. Y.
State Armory	Red Bank, N. J.
Chicago Art Institute	Chicago, Ill.
Holcomb Steel Co. Warehouse	Chicago, Ill.
American Film Co. Building	Chicago, Ill.
Hotel Astor	Chicago, Ill.
Sears Roebuck & Co., Office	Chicago, Ill.
Garfield Park Storage Warehouse	Chicago, Ill.

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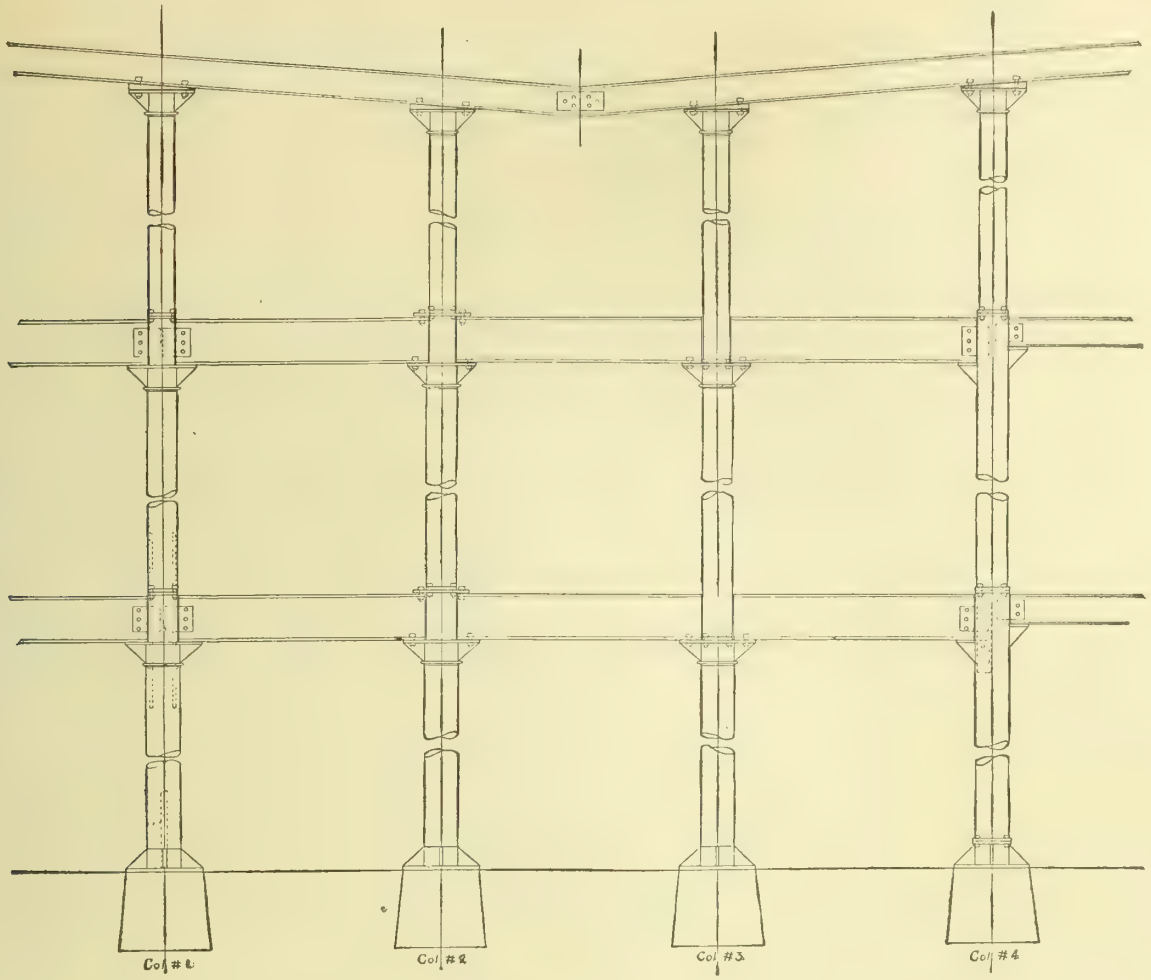


ILLUSTRATING OUR LATEST METHODS OF COLUMN CAP AND BEAM CONNECTION

Column No. 1—Shows steel cap with web connections for beams. Also shows upper and lower columns bolted together at a point above beam, making a rigid connection for beams and columns

Column No. 2—Same as Column No. 1, except tie to beam is on top and bottom flanges of beams, making a strong wind bracing connection for beams and columns

Column No. 3—Shows one flange tie only, which is commonly used. Upper columns set on caps of lower columns and are bolted thereto, making a simple and rigid tie

Column No. 4—Shows very latest construction. Brackets and ties are inserted into concrete in the pipe, making an absolutely safe construction and leaving column in one piece clear to top

Upper column sets on lower column above beams, and is bolted thereto, making a rigid construction, leaving column free from any projections other than the brackets

This construction is not furnished on columns of less diameter than five inches

SAFE CARRYING CAPACITY OF LIGHT-WEIGHT LALLY COLUMNS

Safety Factor of 4

Outside Diam.	Length of Column in Feet											Weight of Plain Col. Shaft per ft.
	6	7	8	9	10	11	12	13	14	15	16	
Ins.	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Pounds
3	6	6	5	.....	.....	.....	.....	.....	.....	.....	.....	9.64
3½	9	9	8	8	7	.....	.....	.....	.....	.....	.....	13.09
4	13	13	12	12	11	10	.....	.....	.....	.....	.....	17.02
4½	14	14	13	13	12	11	10	.....	.....	.....	.....	21.05
5	20	20	19	19	18	18	17	17	16	.....	.....	25.90
6	28	28	27	27	26	26	25	24	23	23	22	36.82

All lengths should be given over all, including caps and bases.

SAFE CARRYING CAPACITY OF HEAVY WEIGHT LALLY PATENT COLUMNS

Safety Factor of 4

Outside Diam.	Length of Column in Feet								Weight per ft.
	6	8	10	12	14	16	18	20	
Ins.	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Pounds
3½	12	11	10	9	..	..	..	..	15
4	16	15	14	12	11	..	..	..	20
4½	20	18	17	16	15	..	..	..	24
5	27	26	24	22	21	19	..	..	29
5½	32	31	29	28	26	24	22	..	36
6⅝	45	43	41	40	38	35	34	32	49
7⅝	58	56	54	52	51	49	46	44	64
8⅝	74	72	69	67	65	62	60	57	81
9⅝	93	89	87	85	82	79	77	75	100
10¾	111	109	107	104	101	99	96	93	123
12¾	150	146	144	141	139	135	133	130	169

These loads can be increased by reinforcing to suit any condition.

AYER & LORD TIE COMPANY

INCORPORATED

Manufacturers of Creosoted Wood Blocks for Floors

1515 Railway Exchange
CHICAGO, ILL.

BRANCH OFFICES
CLEVELAND, OHIO, 926 Illuminating Bldg. NEW YORK, N. Y., 2 Rector Street MEMPHIS, TENN., 1402 Exchange Bldg.
KANSAS CITY, MO., 1117 Rialto Bldg. PHILADELPHIA, PA., 319 Perry Bldg.

Products.

"Interior" Creosoted Wood Block Floors for Machine Shops, Foundries, Metal and Wood Working Plants, Bakeries, Paper and Textile Mills, Automobile Plants, Rolling Mills, Breweries, Barns, Loading Platforms and Warehouses; Railroad Shops of all kinds, Roundhouses, Freight Depots, Platforms and Driveways.

Also, Creosoted Ties, Piling and Lumber of all kinds.

AYER & LORD INTERIOR WOOD BLOCK FLOOR IN THE PLANT OF YOUNGSTOWN FOUNDRY AND MACHINE CO., YOUNGSTOWN, OHIO

Wood Block Floors.

Ayer & Lord Interior Wood Block Floors possess exceptional qualities of durability and high efficiency that recommend their use in any kind of industrial plant. The floor resists wear to an unusual degree; is unaffected by great loads or severe usage, and withstands extremely high temperatures. It is proof against decay, and practically impervious to water. It is dry, clean, noiseless, sanitary; easy on the feet, and does not originate dust. The small units of this floor are easily taken up and relaid, and the floor surface instantly restored. The dimensions of every block are so exact that they can be laid on smooth concrete.

Advantages.

Upkeep cost is eliminated. When properly laid, no repairs are necessary.

The permanently level surface allows trucks to operate with greatest efficiency and lessens chance of accident.

The absence of noise, vibration and light reflection; the warmth and dryness; the comfort afforded the feet, mean better and faster work from employees.

The freedom from dust saves machine bearings from injury.

The resiliency reduces damage to tools and breakage of castings that may happen to fall.

Construction.

Installations are made only after study of the conditions under which each floor must operate.

Our Engineering Department will be glad to investigate, make recommendations, and furnish proper specifications on request.

Cost.

Prices furnished on application. Measured by length of service, efficiency and low maintenance cost, Ayer & Lord Interior Wood Block Floors are more economical than any other.

How to Specify for Blocks.

All Creosoted Wood Blocks shall be Ayer & Lord "Interior" Blocks and must conform to the following specifications:

Timber—Timber shall be air-dried long leaf yellow pine and shall be sound, square edged, free from bark, loose or rotten knots, or any other defects detrimental to its strength or durability. The annual rings in three (3) inches measured radially from the center of the heart shall average not less than eight to the inch.

Size of Block—The block shall be three (3) inches in depth (parallel to the fiber), four (4) inches wide and five (5) inches to ten (10) inches long.

Creosote Oil—The creosote must be a pure distillate oil obtained entirely from coal gas or coke oven tar, and must not contain any admixture of tar, tar oils, petroleum or any other product.

The creosote must be complete liquid at thirty-eight (38) degrees Centigrade, and not more than three (3) per cent of the water-free oil shall be insoluble in chloroform or benzol.

Its specific gravity at thirty-eight (38) degrees Centigrade shall be not less than one and five hundredths (1.05) and shall not exceed one and nine hundredths (1.09).

When one hundred (100) grams of the creosote are placed in a retort and subjected to a distilling test as described in Bulletin No. 96 of the American Railway Engineering and Maintenance of Way Association, the amount of distillation shall not exceed the following:

Up to 200 degrees Centigrade, no distillate.
Up to 210 degrees Centigrade, less than 5 per cent.
Up to 235 degrees Centigrade, 25 per cent.

The distillation of the oil shall be carried to three hundred and fifty-five (355) degrees Centigrade and the residue shall be less than thirty-five (35) per cent.

The distillate between two hundred and ten (210) degrees and two hundred and thirty-five (235) degrees shall, on cooling to room temperature (seventy-seven degrees Fahrenheit), yield solids.

The oil shall not contain more than three (3) per cent of water.

HASBROUCK FLOORING COMPANY

Parquetry and Wood Block Flooring, Cork and Sanitary Tiling

501-509 East Seventieth Street

NEW YORK, N. Y.

Products.

PARQUETRY; PLANK FLOORS; WOOD CARPET; WOOD BLOCK FLOORING; CORK TILING; SANITARY TILING.

Parquetry, $\frac{7}{8}$-Inch.

This style of flooring is generally used in the better class of dwelling and apartment houses. In the plainer patterns, like squares or herringbone, it is made solid; but in the ornamental designs we use a pine or chestnut backing or frame $\frac{5}{8}$" thick, to which is glued the $\frac{1}{4}$" pattern veneer. We make this flooring in all designs; and tongue, groove and glue all joints in the old-fashioned cabinetmaker's way.

Fontainebleau, Versailles, Plank Floors.

These floors are used mostly in the reproduction of old rooms, and are made both solid and veneered in varied sizes and with pegs or dovetails for the plank floors.

Wood Carpet, $\frac{5}{16}$-Inch.

We make this floor in all the parquetry designs, as well as the plainer patterns. It is really a veneer, face-nailed to the existing finished floor; and it is an excellent floor covering to replace worn-out carpets, but should not be used in new building as the thinness of the material allows it to warp when subjected to dampness.

Wood Block Flooring.

Patent No. 768852. Wood blocks with ends and sides interlocking, set in an asphaltic composition on a cement foundation.

Advantages—It is fireproof; no air spaces under to feed flames.

Sanitary; no cracks or unevenness to hold filth or germs.

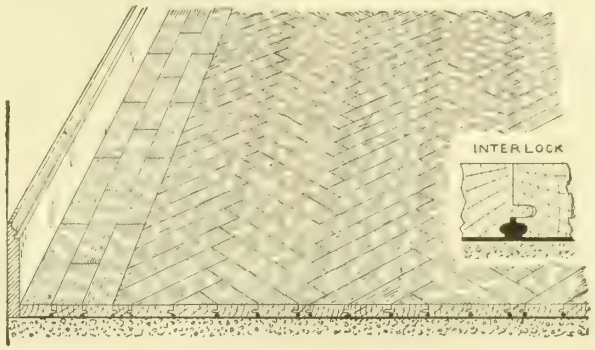
Damp-proof; the asphaltic composition effectually seals and prevents all passage of moisture, and prevents *dry rot.*

Noiseless; the composition fills up all hollow spaces, and acts as a cushion, making floor soft and easy to the feet, unlike tile, marble, terrazzo or cement.

Saving floor height; the cement foundation may be carried just high enough to cover conduits, pipes, etc., saving the thickness of sleepers and under-floor.

Thickness and Design—We make this flooring in two thicknesses, $\frac{7}{8}$" and $1\frac{1}{8}$" in any of the hard woods; and it can be laid in any of the simpler parquetry designs.

Uses—We recommend this floor for hospitals, schools, libraries, armories, and public buildings generally. The stability of this floor depends largely on the composition; we have the best.



HASBROUCK WOOD BLOCK FLOORING FOR FIREPROOF BUILDING

Cork Tiling.

Cork tiling is sanitary, noiseless, durable; will not crack nor disintegrate; requires no expensive finish or refinishing. Made of pure cork, compressed to almost the density of hard wood, yet still retaining the elastic qualities of the cork. This floor is particularly suitable for use where a noiseless floor is desirable; for instance, in churches, libraries, banks, court rooms, hospitals, museums, hotel corridors, etc., but it can be used in any room and worked into designs to harmonize with the decorations, as the process of manufacture brings out several shades, from light brown to the rich color of old teak. The delicate shading of the colors in the different pieces forms a very pleasing and artistic effect.

This floor may be laid on a wood or cement foundation; in either case the blocks are set in our special composition or cement which, besides holding the block firmly and permanently to its bed, seals the joints between blocks, making the floor water- and acid-proof. Made with sanitary cove and base.

Sanitary Tiling.

Hasbrouck sanitary tiling is a composition of ground cork, oxydized linseed oil and special gums.

Laid in waterproof cement on any kind of smooth, level foundation. Can be laid in parquetry designs.

Made in six colors—blue, brown, black, red, green, grey.

Noiseless, durable, sanitary and safe; it forms an excellent floor covering for public buildings, steamships, the service portions of clubs, hotels and dwellings, stair treads and landings.

THE JENNISON-WRIGHT COMPANY

Manufacturers of Kreolite Wood Block Floors

312 Huron Street

TOLEDO, OHIO

BRANCH OFFICES

CHICAGO, ILL. ALBANY, N. Y. ROCHESTER, N. Y. PHILADELPHIA, PA.
CLEVELAND, OHIO TORONTO, CAN. CINCINNATI, OHIO SPRINGFIELD, MASS.

Products and Services.

KREOLITE WOOD BLOCK FLOORS for use in Machine Shops, Warerooms, Loading Platforms, Annealing Rooms, Foundries, Pickling Rooms, Dye Rooms, Breweries, Beater Rooms, Garages, Barns and Stables.

Also, CREOSOTED PILING, STRUCTURAL and SPECIAL DIMENSION TIMBERS for every type of service.

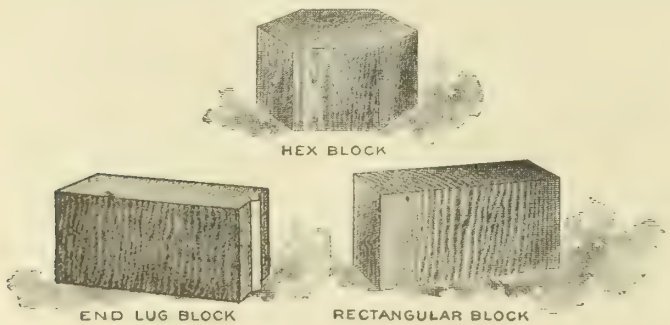
Kreolite Wood Block Floors
They outlast the factory
TRADE-MARK

Installation.

We maintain a corps of expert superintendents who are sent out to show purchasers how to properly install Kreolite wood block floors, wherever such supervision is desired; or, if preferred, we can arrange to have the floor installed in place.

Description.

Kreolite wood block floors present a smooth, compact surface more durable than plank or monolithic; efficient under either heavy or light service.



STYLES OF KREOLITE FLOOR BLOCKS

Special Advantages.

(1) Kreolite wood blocks are manufactured from long leaf yellow pine, thoroughly preserved against decay; and being cut to exact size, fit together in a solid, compact floor, with an extremely low rate of maintenance and depreciation.

(2) Kreolite hex blocks, because of their shape and the method of manufacture, are affected very little by heat or moisture; hence, are recommended for use under trying conditions.

(3) Kreolite end lug blocks automatically absorb expansion, and are especially desirable for floors that are subjected to water or acid solutions, or for loading platforms or driveways that are subjected to the weather. Lug blocks are ideal for stables.

(4) Kreolite wood block floors are extremely durable; and in metal working shops, or where there is hard service, will outwear any other type of practical floor construction.

(5) Workmen like these floors, as they are easy on the feet and far less fatiguing than most floors. They are also easy to truck over; hence, directly increase shop efficiency.

(6) Kreolite wood block floors, now seeing service in hundreds of the foremost factories throughout the country, have proven their worth, as is evidenced by the number of new buildings for which they are now being specified.

Specifications for Kreolite Wood Block Factory Floors.

The following method of laying Kreolite blocks is recommended for the average floor. If unusual conditions are to be met, we will gladly furnish special specifications.

Kreolite Hex Blocks—Hex blocks shall be hexagonal in shape. They shall be 3 inches in depth (parallel to the fiber), and shall average 6 inches, in diameter. Blocks shall be well manufactured from sound air-seasoned heart stock Michigan tamarack, free from injurious defects. (Treatment checks not to be considered defects.)

Kreolite End Lug Blocks—End lug blocks shall be of the same specification as Kreolite rectangular blocks, with the following exceptions: at the center of one end of each block there shall be one "V" shaped rib, or lug, $^3/_{16}$ inch in width at base and projecting $^1/_8$ inch, extending full depth of block in direction of the grain and being an integral part of the same.

Kreolite Rectangular Blocks—Kreolite blocks shall be rectangular in shape. They shall be 3 inches in depth (parallel to the fiber), and shall be 3 or 4 inches wide and from 6 to 9 inches long. All blocks in any one job to be of same width. Blocks shall be well manufactured from sound air-seasoned Long Leaf Yellow Pine and free from injurious defects.

Treatment—Blocks shall be treated by the Kreolite process standard for the type of block specified.

Concrete Foundation—As a concrete foundation is desirable, after earth floor is leveled and tamped, spread a layer of concrete about 4 inches in depth. After concrete is "set," spread a cushion of sand about ½ inch in depth over surface of same. If for any reason depth of sand cushion is increased, dry Portland cement should be mixed with sand in parts of one to four; the cushion then to be lightly sprinkled before laying blocks.

Manner of Laying—Blocks are to be laid directly on the sand cushion as prepared. After ten rows of blocks have been laid, a piece of 2 by 4-inch plank shall be laid along edge of blocks, and blocks driven as tightly together as possible so as to fit blocks snugly together. The piece of 2 by 4-inch timber shall then be removed and the operation shall be repeated as fast as each ten rows of blocks are laid, until floor is completed. The blocks in each separate row shall also be tightened, just before filler is applied, by forcing blocks together from end of row, with a lever, pick or other instrument. Hex blocks should not be forced together as indicated above.

The blocks should be laid with their length at right angles to the line of traffic. Care should be taken to break joints by about 1½ inches.

After a reasonable amount of blocks are laid they shall be tamped until they are brought to a true and level surface, after which Kreolite bituminous cement shall be heated and squeegeed over the surface of the floor, filling joints to within ¼ inch of top (care to be taken to leave as little cement filler as possible on surface of the blocks), remainder of joint to be filled with dry, sharp sand.

DAVID E. KENNEDY, INC.

Nalecode, Wood Block Floors, Parquet and Strip Floors

GENERAL OFFICES
55 Fifth Avenue
NEW YORK, N. Y.

BRANCH OFFICES

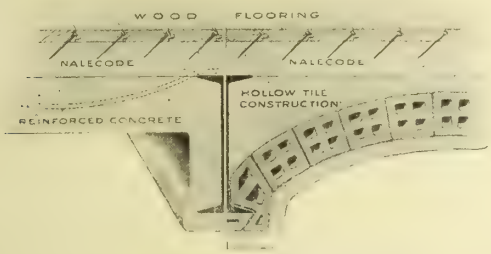
CHICAGO, ILL. MONTREAL, CAN. SAN FRANCISCO, CAL. ATLANTA, GA.
BOSTON, MASS. PHILADELPHIA, PA. WASHINGTON, D. C.

Products.

NALECODE; WOOD BLOCK FLOORS; PARQUET and STRIP FLOORS.

Nalecode.

Nalecode is a purely mineral compound, of secret formula. It contains no sawdust, cinders or other organic or chemically active matter.



SECTION SHOWING APPLICATION OF NALECODE OVER REINFORCED CONCRETE AND HOLLOW TILE CONSTRUCTION

CROSS-SECTION OF NALECODE SLAB CUT IN TWO WITH A HACK SAW
Illustrates penetration of nails and screws and their tenacious hold

Application—It is mixed with sand, Portland cement and water at the job, and this mortar is spread on top of structural floor and roof slabs, to which it securely bonds. It forms an indestructible, integral base, directly to which wood floors, linoleums, roof tile, slate and metal roofs can be readily and securely nailed without the expense of sleepers, wood underflooring, nailing strips or sheathing.

Advantages—Nalecode will receive and firmly hold nails at any time after it is dry. It will not disintegrate. It eliminates cinder concrete fill, wood sleepers and underflooring, taking the place of all. Cinders generate sulphurous fumes that destroy piping, conduit and structural steel. Nalecode is chemically inert; absolutely non-corrosive. Sleepers and wood underfloors frequently " dry rot " and have to be replaced in a few years. Nalecode eliminates the use of sleepers and underflooring. Nalecode is fireproof. It will not crack from heat or flame. It protects the wood floor from fire below, and the structural steel members from fire above. It is approved and recommended by the Building Department and Fire Underwriters' Associations of New York and other cities.

Nalecode is half the weight of stone concrete. Where cinder concrete fill is not desired or can not be obtained, Nalecode materially reduces the weight of the structure and permits of lighter steel construction. Nalecode saves headroom by elimination of underflooring. In loft or factory buildings, where it is not necessary to conceal piping and conduit, these can be kept out of the floors and Nalecode applied directly to structural slab, saving additional headroom. Nalecode is an insulator of sound, heat and cold, as it contains innumerable isolated air cells. In this respect particularly valuable for roof construction, especially mill roofs, as it eliminates condensation. Nalecode is less expensive than cinder fill, sleepers and wood underflooring, or any other type of good construction for wood floors.

Service—We are prepared to take contracts for the installation of Nalecode at any point in the United States or Canada, or will deliver the neat Nalecode to contractors for mixture and installation in accordance with our specifications. We will contract to furnish and lay wood floors of any type whatever on top of the Nalecode. Our large organization enables us to do this work at minimum prices. We will be pleased to furnish estimates to architects from plans, for comparison with other forms of construction.

Specifications—In all areas in which wood floors are to be laid (or wherever tile, slate or copper roofs are to be placed) install on top of slab, fill or arch a base of Nalecode to a depth of two inches. This Nalecode shall be of such composition that when dry it will receive and securely hold nails. It shall contain no cinders, sawdust, wood chips or other organic or chemically active matter. It shall be composed solely of neat Nalecode, Portland cement, and sharp, screened sand and water; mixed, installed and finished by (or in strict accordance with the instructions of) the manufacturer. It shall be installed immediately after the partitions are erected and shall be finished perfectly true and level ⅞ inch below the finished floor line. (The point at which the Nalecode base shall be finished is governed by the thickness of the wood flooring to be installed.)

Wood Block Floors.

Wood Blocks with ends and sides interlocking, set in an asphaltic composition on a concrete foundation. These wood block floors have all the beauty and advantages of parquet floors, without the necessity of wood sleepers and underfloors. They are laid directly on concrete, therefore fireproof, noiseless and sanitary. They are particularly adaptable for buildings containing finished concrete floors, the covering of which is always a problem. These floors are ⅞ or 1⅛ inch thick and can be laid in any design, herringbone, squares, etc.

Parquet and Strip Floors.

We manufacture and install Parquet and Strip Floors of every description of the highest class.

Woods Used.

Quarter cut white oak, walnut, maple, cherry and hard pine of the domestic woods. English oak, French and Italian circassian walnut, teak, mahogany, holly, ebony and rosewoods of the foreign woods.

DAVID E. KENNEDY, INC.

Nonpareil Cork Tile

GENERAL OFFICES
55 Fifth Avenue
NEW YORK, N. Y.

BRANCH OFFICES
CHICAGO, ILL. MONTREAL, CAN. SAN FRANCISCO, CAL. ATLANTA, GA.
BOSTON, MASS. PHILADELPHIA, PA. WASHINGTON, D. C.

Products.

NONPAREIL CORK FLOOR TILE and SANITARY COVE BASE, STAIR TREADS and RISERS, TABLE TOPS, BULLETIN BOARDS.

Nonpareil Cork Tile.

The wide use of Nonpareil Cork Floor Tile ranges from the highest class of architectural work, where appearance is the chief consideration, to places where service only is essential. It is the ideal floor for Court Houses, Hospitals, Libraries, Churches, Banks, Museums, Galleries, Gymnasiums, Running Tracks, Billiard Rooms, Dining-rooms, Restaurants, Kitchens, Laundries, Pantries, Bathrooms, Offices, Stores, Halls, Stair-treads and Steamship Work.

Colors and Appearance.

Nonpareil Cork Tile is obtained in three shades of brown. While its soft brown shades harmonize perfectly with any color scheme, it does not lack character. Each tile is laid separately and individually. The construction of the floor is obvious, and therefore distinctly architectural in appearance.

Sizes.

The Standard Sizes are:
Squares: 9 x 9 and 12 x 12 inches.
Oblongs: 9 x 18, 12 x 18, 12 x 24 inches.
Border Strips: 3 x 18, 4 x 18, 4½ x 18, 6 x 18, 3 x 36, 4 x 36, 4½ x 36, 6 x 36, 9 x 36, 12 x 36 inches.
The following Special Sizes can be furnished at a somewhat higher price:
Squares: 3 x 3, 4 x 4, 4½ x 4½, 6 x 6, 8 x 8 inches.
Oblongs: 6 x 12, 8 x 16 inches.

Nonpareil Cork Sanitary Cove Base.

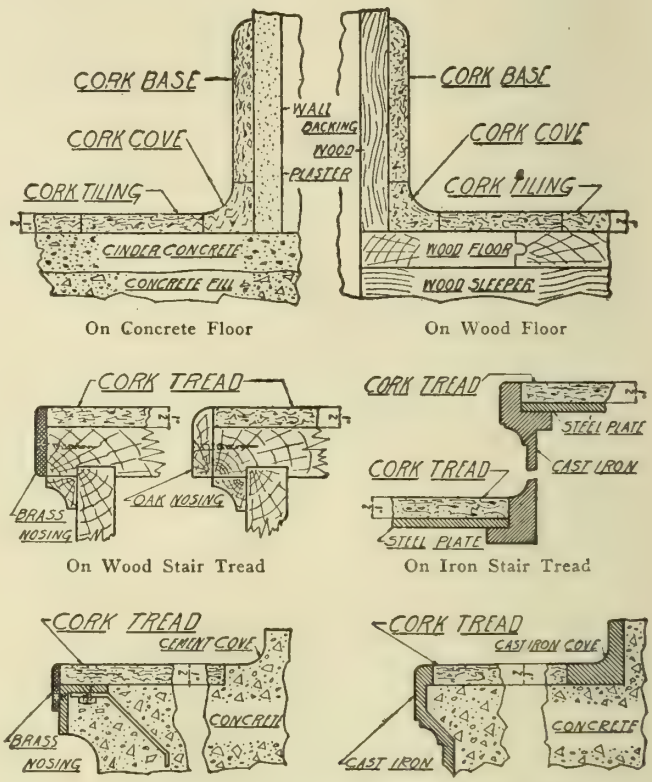
Nonpareil Cork Cove Base can be furnished to any height desired. Being elastic, it can not crack nor open. This base can be set against any smooth backing: wood, plaster, concrete, metal, etc.

Nonpareil Cork Tile Stair Treads.

Nonpareil Cork Tile makes a more durable stair tread than stone or metal, and a more agreeable and non-slippery tread (wet or dry) than rubber or carpet. It presents a plain, flat surface. There are no grooves for the retention of filth and disease germs, consequently dirt can be easily brushed off, which is impossible with grooved metal treads.

Standard Specifications for Cork Tile.

Floors (or Stair Treads, etc.) shall be of Nonpareil Cork Tile, ½ inch thick. This cork tile shall be of American manufacture, made of finest quality of clear cork shavings and granulated cork in standard proportions by weight, compressed solid in closed moulds and thoroughly baked. It shall be free from all foreign substances and cement of any kind other than the natural gum of the cork. It shall be set with a special elastic waterproof cement, so applied as to seal hermetically and bind all joints. All cork tile to be furnished under this specification shall be furnished and installed by a firm experienced in the installation of this material and that has made installations of Cork Tile in large areas in a period of not less than five years prior to the taking of bids on this work, which floors must have satisfactorily withstood wear and tear under similar conditions to those which will obtain in this building. Bidders must name in their bids three buildings in which they have laid Cork Floors that have been in use for the period required in these specifications, stating the dates these floors were completed. If Cove Base is desired, state height required.



On Concrete Floor — On Wood Floor

On Wood Stair Tread — On Iron Stair Tread

On Concrete Tread—A — On Concrete Tread—B

NOTE—The Tile is laid with a Waterproof Cement applied with a brush

DETAILS OF CORK TILE, COVE BASE AND STAIR TREADS

Specifications for Concrete Backing.

All surfaces to receive Cork Tile shall have a top layer or finish not less than one inch thick composed of one part Atlas Portland Cement (or equal) and five parts screened sand. This top layer shall be troweled to a smooth and level sidewalk finish exactly one-half inch below the required finished floor level. No lines shall be struck in the surface.

The surface of the fill shall be thoroughly swept and soaked with water, then dry cement shall be sprinkled upon the cement fill and spread with a broom, forming a thin grout distributed evenly upon the entire surface.

NOTE—Cork Tile can be laid on any smooth backing that exists or is most convenient to provide: concrete, wood, metal, stone or tile.

Backing for Cove Base.

Plaster, wood, metal, or any smooth material makes a suitable backing for Sanitary Cove Base. Whether of plaster or other material, the wall backing should be carried down and finished square with the floor backing, making a clean angle.

DAVID E. KENNEDY, INC.

Everlastic Tile

GENERAL OFFICES
55 Fifth Avenue
NEW YORK, N. Y.

BRANCH OFFICES
CHICAGO, ILL. MONTREAL, CAN. SAN FRANCISCO, CAL. ATLANTA, GA.
BOSTON, MASS. PHILADELPHIA, PA. WASHINGTON, D. C.

Products.

EVERLASTIC FLOOR TILE, STAIR TREADS, COVE and BASE.

Description.

An elastic flooring material capable of architectural construction and artistic color treatment. A utility floor as distinctly structural as ceramic tile, marble or mosaic.

Advantages.

Everlastic Tiles are a composition of which cork is the basic ingredient. Cork is recognized as a wonderfully durable and elastic flooring material, and it is the cork of which they are mainly composed that gives to Everlastic Tiles their great wear-resisting quality and their soft, pleasant and secure foothold. Under foot these tiles are as soft and noiseless as carpet, yet they are as sanitary and non-absorbent as glazed tile.

It is, however, the structural forms and color possibilities of Everlastic Tiles that make them distinctive. A material of great artistic possibilities, it combines the decorative and architectural features of marble and mosaics with the silent and non-slip advantages of cork and rubber. It presents an unlimited scope to the designer, who is unhampered with restrictions in shape, as with rubber tile, or in color, as with cork tile.

These tiles are odorless, more durable and sanitary than rubber tile, and cost about one third the price.

Utility.

Everlastic Tile is desirable wherever a durable, soft, serviceable, non-absorbent, artistic and inexpensive floor is required. For Kitchens, Laundries, Pantries, Bathrooms, Halls, Corridors, Vestibules, Elevators, Stair Treads, Restaurants, Libraries, Banks, Court Rooms, Offices, Stores, Aisles and Vestibules of Theaters, and Steamship Work.

Colors and Shapes.

Everlastic Tiles are made square, oblong and interlocking. The square and oblong tiles can be laid with a featured joint, thus emphasizing the tile construction. They can be made in any color, the following being the standard colors usually carried in stock:

White Slate Grey Light Green Light Blue Red Tan
Buff Dark Brown Dark Green Dark Blue Black

Sizes.

The tiles are made ¼ inch thick in the following standard sizes:

Interlocking: 2⅜ x 2⅜ and 3 x 3 inches.

Square: 6 x 6, 8 x 8, 10 x 10, 12 x 12, 16 x 16, 20 x 20 inches. Smaller squares furnished at a slightly higher cost.

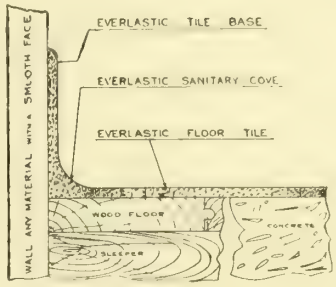
Oblong: 6 x 12, 8 x 16, 10 x 20, 12 x 24 inches.

Sanitary Cove Base.

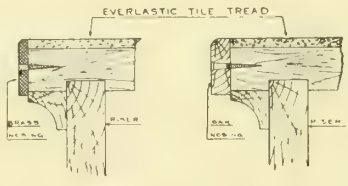
Everlastic Cove Base is made any height desired. Being elastic, it can not crack nor open. This base can be set against any smooth backing: wood, plaster, concrete, metal, etc.

Stair Treads.

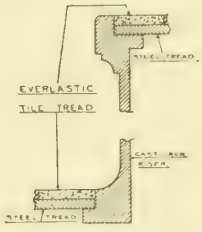
Everlastic Tile makes a stair tread as durable as the metal treads, and provides a non-slip foothold (wet or dry). It presents a plain, flat surface; no grooves for the retention of filth.



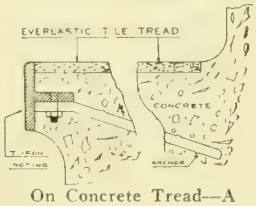
On Wood, Concrete, or any Smooth Backing



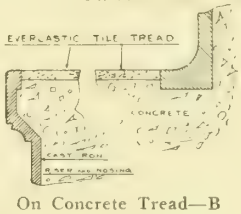
On Wood Stair Treads



On Iron Stair Tread



On Concrete Tread—A



On Concrete Tread—B

Note—The Tile is laid with a Waterproof Cement applied with a brush

FLOOR TILE AND COVE BASE ON VARIOUS BACKINGS

Specifications.

Floors (or Stair Treads, etc.) shall be of Everlastic Tile ¼ inch thick, cut true to size and shape. (State whether Interlocking, Square or Oblong Tile are desired.) This Tile shall be made of the finest quality of cork and other process ingredients and shall be set with Everlastic waterproof cement, a cement made specially for this purpose. All Tile furnished under this specification shall be of American manufacture, furnished and installed by a firm experienced in the installation of this material, that has made installations of Everlastic Tile in large areas at a period of not less than four years prior to the taking of bids on this work, which floors must have satisfactorily withstood wear and tear under approximately similar conditions to those which will obtain in connection with the floors in this building. Bidders must name in their bids two buildings in which they have laid tile floors of the manufacture and quality required in these specifications, stating the dates these floors were completed.

State color and size of tile desired.

If Cove Base is specified, state height required.

NOTE—Our name may be mentioned if desired.

Specifications for Backing for Everlastic Tile—Any smooth backing that exists or is most convenient to provide: wood, concrete, metal, stone or tile. In new work the backing should be finished ¼ inch below the finished floor level. Plaster, wood or any smooth material makes a suitable backing for sanitary base and wainscoting. Whether of plaster or other material the wall backing should be carried down and finished square with the floor backing, making a clean corner.

Samples and Catalogues.

Samples, catalogues, etc., furnished on request.

ARMSTRONG CORK & INSULATION COMPANY

Manufacturers of and Contractors for Linotile and Cork Brick Floors

135 Twenty-Fourth Street
PITTSBURGH, PA.
BRANCH OFFICES IN THE LARGER CITIES

Products.

LINOTILE FLOORING, LINOTILE STAIR TREADS, LINOTILE SANITARY COVE and BASE.

ARMSTRONG CORK PAVING BRICK for Cow Stalls, Horse Stalls, Sheep Pens, Piggeries, Kennels, Shipping Platforms, etc.

Also, Manufacturers of Nonpareil Heat Insulating Materials, for which see our pages in General Index.

Linotile.

Linotile is a composition of clean, powdered cork, wood flour, pure linseed oil, various gums and suitable color pigments, compressed into sheets one quarter-inch thick and thoroughly cured or seasoned.

Advantages—The result is a flooring material which can be readily laid over any smooth base—wood, concrete or metal. Due to its composition and the method of manufacture, it has all the requirements of an ideal floor. It is easy under foot, and not slippery. Being nonabsorbent, it is perfectly sanitary and is easy to clean and keep clean. It is a nonconductor of heat and, hence, a warm, comfortable floor to work on. It does not "draw" the soles of the feet, however, or make them hot and feverish. Linotile is practically noiseless, entirely free from objectionable odor, distinctly artistic in appearance, and lends itself readily to harmonious treatment, both in design and color.

Durability—The inherent wearing quality of Linotile is beyond question. The material has no grain like wood and, hence, will not splinter. It is not brittle or rigid like cement and, therefore, does not crumble. It stays "put," even under the heaviest sort of foot traffic. Linotile will wear for years, if properly installed and cared for.

Field of Usefulness—Linotile successfully solves the floor problem in offices, banks, stores, churches, lobbies, libraries, court rooms, restaurants, hospitals, museums, theaters, schools, etc., as well as in billiard rooms, kitchens, pantries, laundries, bathrooms, etc. While not a cheap floor, Linotile is not expensive, when its long life in service and other merits are taken into consideration.

Shapes, Sizes and Colors—Linotile is manufactured in a variety of shapes and sizes and in the following eleven colors:

Light Gray	Dark Brown	Light Green	White
Dark Gray	Light Blue	Dark Green	Black
Light Brown	Dark Blue	Red	

Samples, Catalogue and Designs—Samples, catalogue, and designs suitable for any room or building will be furnished on request. Branches or direct representatives may be found in the principal cities of the United States and Canada.

Cork Paving Brick.

Armstrong Cork Paving Brick are composed of 70 per cent of finely granulated cork and 30 per cent of asphalt by volume, thoroughly mixed and moulded under heavy pressure. They measure 9 x 4 x 2 inches, and are laid flat. Four cover exactly one square foot of surface.

LINOTILE FLOOR INSTALLED IN RESTAURANT

Merits of Cork Brick—For horse and cow stalls, hog and sheep pens, machine shops, factories, warehouses, shipping platforms, etc., Cork Brick solve the floor problem. They make a floor that is warm, resilient, and practically noiseless; never slippery when wet or dry; thoroughly sanitary, and remarkably durable in service. They have been tested out under various conditions for more than six years and have given perfect satisfaction.

Application—Armstrong Cork Brick are readily installed in either old or new buildings. The best results are obtained when laid over a concrete base, but they may be successfully put down over wood floors. Full directions for installing on application.

Samples and Literature—Further information, literature, samples, list of installations of Armstrong Cork Brick, will be gladly forwarded on application.

ARMSTRONG CORK BRICK FLOORS IN COW STALLS AT LONG VIEW FARM, LEE'S SUMMIT, MO.

UNITED CORK FLOORING COMPANY

DEPARTMENT OF UNITED CORK COMPANIES

BRANCHES AND AGENCIES IN ALL LARGE CITIES

50 Church Street
NEW YORK, N. Y.

FACTORY AND MAIN OFFICE
LYNDHURST, N. J.

Products.

CRESCENT CORK TILE and SANITARY COVE BASE, for Floors, Stair Treads, Desk Tops, Table Tops and Bulletin Boards.

UNICO ELASTIC TILE and SANITARY COVE BASE, for Floors, Stair Treads, Elevator Cars, Ship and Yacht Decks, Wainscoting and Drainboards.

STAR CORK BRICK, for paving Cow Barns, Horse Stalls, Bull, Calf, Hog and Sheep Pens, and Heavy-Duty Floors in Factories, Ferryboat Runways, Fire Stations, Machine Shops, Packing Houses, Shipping Platforms, Warehouses, etc.

Crescent Cork Tile.

Made from finest quality carefully selected pure cork shavings, from which have been eliminated all hard and foreign substances. These shavings are baked in closed moulds under hydraulic pressure, heat liquifying the cork's natural gum and binding the particles densely together. No foreign cementing substance is used. Finished product guaranteed by us as the best cork tile that can be produced.

Crescent Cork Tile is resilient, noiseless, non-slippery, sanitary, non-absorbent, odorless, sound-, moisture- and vermin-proof. It will last a lifetime without repairs, requiring no care but ordinary washing.

It can be laid on any smooth, level backing, attached by specially prepared waterproof cement so applied as to hermetically seal all joints.

Color—Brown, in a variety of pleasing shades, adaptable to artistic combinations.

Crescent Cork Tile is adaptable to a wide range of service. A list of prominent installations will be supplied on request.

Standard Sizes.

Square: 3x3, 4x4, 6x6, 8x8, 9x9, 12x12 inches
Oblong: 6x12, 9x18, 12x24 inches
Border: 3x18, 3x36, 4x18, 4x36, 6x18, 6x36 inches

Unico Elastic Tile.

This composition of cork, pigment and binder is essentially a service and utility floor. Resilient, noiseless, non-slippery, sanitary, durable; it is peculiarly adapted to areas where artistic appearance is essential as well as durability and security of foothold. Names and locations of a large number of installations will be cheerfully furnished on request.

Unico Elastic Tile can be laid on any smooth, level backing, wood, concrete or steel. It is laid in a specially manufactured cement which assures permanent adhesion.

Colors—Manufactured in ten true colors: black, red, light brown, light blue, light green, white, gray, dark brown, dark blue, dark green.

Sizes.

Unico Tile is uniformly ¼ inch thick, made in the following standard sizes:

Interlocking: 3x3 inches
Squares: 6x6, 8x8, 10x10, 12x12, 16x16, 20x20 inches
Oblongs: 6x12, 8x16, 10x20, 12x24 inches
Joint Strips: Any width desired
Cove Base: To any height desired
Stair Treads: Individual tile or one piece, as desired

Star Cork Brick.

Made from finely granulated cork and special quality asphaltic binder, thoroughly mixed in standard proportions by weight, and moulded under hydraulic pressure into bricks, 2 x 4 x 9 inches, weighing about 2½ pounds each. Four bricks laid flat cover one square foot area.

Resilient, noiseless, non-slippery (wet or dry); thoroughly sanitary, non-absorbent; unaffected by climatic conditions, urine, or liquid manure, they will not rot; are always warm and comfortable, and eliminate the necessity for large quantities of unsanitary bedding and the possibility of disease to which animals are liable from standing or lying on cold, wet, hard, slippery cement floors.

For heavy-duty paving service, Star Cork Bricks are unequaled. Their ingredients and process of manufacture make them so tough and durable that they will not chip, splinter or disintegrate under the most severe service.

These bricks can be applied to any foundation, but we strongly recommend concrete for best results. The concrete foundation should be finished 2½ inches below finished floor level. Brick should be laid flat and tamped to an even surface. All joints should be broken and filled with Portland cement grout. Laying instructions furnished with each order.

Samples.

Literature and information on the above products, as well as samples, cheerfully furnished on request.

STAR CORK BRICK

VESTIBULE UNICO ELASTIC TILE

TYPICAL FLOOR OF CRESCENT CORK TILE

AMERICAN ABRASIVE METALS CO.

Hudson Terminal Building, 50 Church Street
TELEPHONE, CORTLAND 7444, 7445 NEW YORK, N. Y.

Product.

Manufacturers of "FERALUN" ANTI-SLIP TREAD SURFACES.

Needfulness.

Slipping on stairs and sidewalks alone kills more people than do fires and surface cars. In 1914, in New York City (Manhattan), 170 persons were killed by falls on stairs and sidewalks, and only 118 by surface cars and fires. In 1914, in Massachusetts, there were 1,381 workmen reported injured through slipping on floor level.

Workmen's Compensation and Public Liability Insurance rates *penalize unsafe conditions.* State laws, municipal ordinances, and Underwriters' specifications now require the use of anti-slip surfaces.

UNDERWRITERS' LABEL

Awards and Approval.

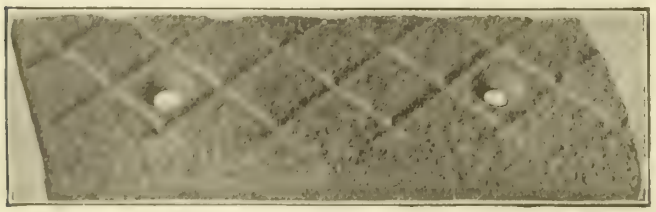
Gold medal at First International Exposition of Safety and Sanitation.

Grand Prize (highest award) at Second Exposition of Safety and Sanitation.

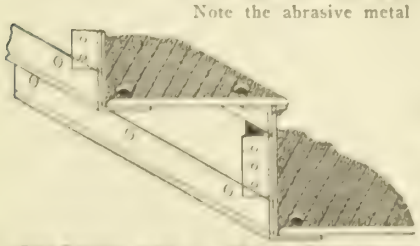
Approved by Underwriters' Laboratories as an anti-slip tread and inspected safety appliance.

Description and Adaptability.

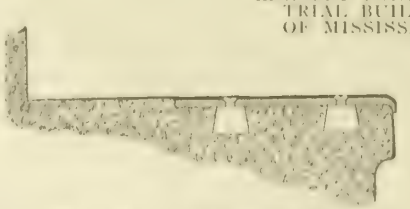
"Feralun" is made of *hard* metal, into which is cast alundum (electric furnace emery). Only the diamond is harder than this grit, which protrudes slightly above the surface and makes this tread unsurpassed as a durable and effective anti-slip tread. It is adaptable to all conditions to eliminate the slipping hazard, and withstand severest wear. It is made in any reasonable size and shape.



"FERALUN" ANTI-SLIP TREAD
Note the abrasive metal nosing



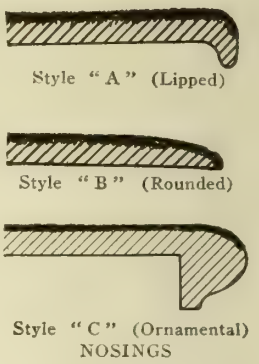
APPROVED METAL STAIR CONSTRUCTION, WITH "STYLE L" "FERALUN" TREAD



APPROVED CONCRETE STEP CONSTRUCTION, WITH "FERALUN" INSERT 6 INCHES WIDE

Safe Stair Treads.

"Feralun" anti-slip stair treads are fireproof, and last much longer than iron, steel, slate or marble. They have no dangerous, slippery nosing edges nor heel-catching grooves. A plain or hatched abrasive-metal surface, with the anti-slip element carried down over the nosing, makes "Feralun" stair treads unequalled as a preventive of stair accidents.



Style "A" (Lipped)
Style "B" (Rounded)
Style "C" (Ornamental)
NOSINGS

Results.

After twenty-one accidents in six weeks on one stair with grooved treads, in a large railroad terminal, "Feralun" was substituted, and there was not a single accident in the following three months. That railroad now will not permit the use of grooved treads in any new or repair work.

Sizes and Designs.

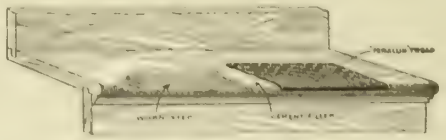
Made in any form in which it is possible to cast metal. Nosings in three forms are shown. Styles "A" and "B" are $\frac{5}{16}$-inch thick. Other designs are made $\frac{3}{8}$-inch thick, but are generally $\frac{1}{2}$-inch or $\frac{5}{8}$-inch thick. Forms shown are simply suggestive, and are types most frequently used; but original details are readily followed, as all "Feralun" castings are made to order.

Other Forms.

Coal-hole and trench covers, elevator and fire-door saddles, threshold plates, drainage gratings and other forms, where steel and cast iron have proved unsatisfactory and dangerous by wearing slippery, are made of "Feralun." Slippery sidewalks and vault lights are made safe by "Feralun" strips, crosses or buttons.

LARGEST CONCRETE INDUSTRIAL BUILDING EAST OF MISSISSIPPI RIVER

EQUITABLE BUILDING
Equipped with "Feralun" floorplates and treads



APPROVED METHOD OF REPAIRING WORN STEPS

AMERICAN FLOORING CO., INC.

Makers of Plastic-Linoleum Floors, and Amflorite Composition Floors

OFFICE
101 Park Avenue
NEW YORK, N. Y.

Products.

Plastic-Linoleum Floors, and Amflorite Composition Floors.

Plastic-Linoleum Floor.

After several years of experimenting, a floor of plastic material has been originated, in which the filler consists mainly of cork and oil, thereby producing a floor in which the expansion and contraction is reduced to a minimum, and cracking of the floor is prevented.

This meets the demand for a floor that is handsome in appearance and finish, sanitary, fireproof and waterproof, warm and resilient; that will not crack nor bulge, and that gives the greatest possible durability with least care and expense of upkeep.

How Laid—Plastic-Linoleum is laid in two separate layers. The first layer is a resilient, comparatively elastic foundation. The second layer, or finish, is more finely grained and a trifle harder in consistency. It is laid in a number of colors. The floor, wainscot, or sanitary base is laid on either wood, cinder concrete, or cement foundation.

Easy to Clean—Plastic-Linoleum needs no particular method or means of cleaning. Soap and water, with a thorough drying, are all that is required for ordinary dirt.

No Competition—As the formula is entirely different from that of any other floor in the market, and all our energies are devoted to making a successful plastic floor, we do not attempt to compete, but shall be pleased to quote prices.

Guarantee—The floor is fully guaranteed.

Amflorite Composition Floor.

This floor is made from the same formula as the Plastic-Linoleum, except that we have substituted another filler instead of the cork and oil, but do not use any wood flour. It is laid in either one or two layers, and makes a resilient floor with a fine finish. It costs considerably less than the Plastic-Linoleum.

SOME BUILDINGS IN WHICH PLASTIC-LINOLEUM AND AMFLORITE HAVE BEEN LAID

Hospitals

Animal Hospital, New York, N. Y.
Bellevue Hospital, New York, N. Y.
Burke Foundation, White Plains, N. Y.
Children's Free Hospital, Detroit, Mich.
Children's Hospital, Philadelphia, Pa.
Henry Ford Hospital, Detroit, Mich.
Higgins Memorial Hospital, Olean, N. Y.
Knapp Memorial Eye Hospital, New York, N. Y.
Orange Day Nursery, East Orange, N. J.
Ossining Hospital, Ossining, N. Y.
Post Graduate Hospital, New York, N. Y.
Sea Breeze Hospital, Rockaway Point, N. Y.
Sharon Hospital, Sharon, Conn.
Torrington Hospital, Torrington, Conn.

Public Buildings

Troy Gas Co., Troy, N. Y.
Institute for Instruction of Blind, New York, N. Y.
Parochial School of Our Saviour, New York, N. Y.
Public Libraries, 40th Street, Washington Heights, Melrose, and Woodstock Branches, New York, N. Y.
Harvard Club, New York N. Y.
Municipal Building, New York, N. Y.
County Court House, Wilmington, Del.
Wayne County Detention Home, Detroit, Mich.
Solomon and Betty Loeb Memorial Home, East View, N. Y.
Essex County Country Club, West Orange, N. J.
Essex Country Club, Manchester, Mass.
Lincoln Trust Co., New York, N. Y.
Hyatt Roller Bearing Co., Detroit, Mich.
Union League Club, New York, N. Y.
Ritz-Carlton Hotel, New York, N. Y.
Firestone Tire & Rubber Co., New York, N. Y.
Architects Building, Offices, New York, N. Y.
Varick House, New York, N. Y.
E. R. Squibb & Sons, Offices, New York, N. Y.
Prudential Building, Newark, N. J.
First National Bank, South River, N. J.
Brearley School, New York, N. Y.
American Tobacco Co., Brooklyn, N. Y.
B. P. O. Elks Club, Brooklyn, N. Y.
Parochial School of St. Mary's, Bensonhurst, N. Y.
Gedney Farm Hotel, White Plains, N. Y.
University of Michigan, Ann Arbor, Mich.
Fayette National Bank, Lexington, Ky.
First National Bank, Pittston, Pa.
Ford Dormitory, Rutgers College, New Brunswick, N. J.
Young Men's Christian Association, Watertown, N. Y.
Jacob Ruppert's Brewery, New York, N. Y.

Residences

Stephen Corning Clark, New York, N. Y.
Mrs. Amory S. Carhart, New York, N. Y.
James Speyer, New York, N. Y.
Mrs. Wm. H. Bliss, New York, N. Y.
Wm. McNair, New York, N. Y.
Dr. E. L. Dow, New York, N. Y.
Hon. Whitelaw Reid, White Plains, N. Y.
Thos. Hastings, Roslyn, L. I., N. Y.
Jno. C. Greenleaf, Hewlitt, L. I., N. Y.
J. C. Thaw, Southampton, L. I., N. Y.
J. R. De Lamar, Glen Cove, L. I., N. Y.
J. Howes Burton, Cedarhurst, L. I., N. Y.
F. Ambrose Clark, Westbury, L. I., N. Y.
W. J. Tully, Locust Valley, L. I., N. Y.
D. M. Ferry, Jr., Detroit, Mich.
Hon. Truman H. Newberry, Detroit, Mich.
Mrs. E. E. Widener, Newport, R. I.
Thos. B. Yuille, Bronxville, N. Y.
Frank R. Wells, Burlington, Vt.

ARCHITECTS OF NEW YORK CITY WHO HAVE SPECIFIED AND ORDERED PLASTIC-LINOLEUM FLOORS

Grosvenor Atterbury
Henry Bacon
H. M. Baer
Donn Barber
A. J. Bodker
Carrerre & Hastings
W. A. Cook and Welch
Crow, Lewis & Wickenhoefer
Ewing & Chappell
Ford, Butler & Oliver
J. H. Freedlander
C. P. H. Gilbert
Ernest Greene
Bertram G. Goodhue
Francis G. Hasselman
Hill & Stout
F. Burrall Hoffman, Jr.
Howells & Stokes
J. W. Ingle
Jackson & Rosencrans
E. Harris Janes
E. A. Josselyn
LaFarge & Morris
McKim, Mead & White
H. VanBuren Magonigle
Mowbray & Uffinger
Kenneth M. Murchison
Mann & MacNeille
A. C. Nash
Thomas Nash
Renwick, Aspinwall & Tucker
F. X. Rousseau
Starrett, Goldwin & Van Vleck
Trowbridge & Ackerman
Horace Trumbauer
Warren & Wetmore

GEORGE W. DE SMET, PRESIDENT

DE SMET QUARTZ TILE COMPANY

Colored Cement Tile and Colored Cement for Floors and Walls

Chamber of Commerce Building
CHICAGO, ILL.

TELEPHONE, MAIN 1065

FACTORY
AREA, LAKE COUNTY, ILL.

Products and Services.

Manufacturers of TILE for Floors, Walls, etc., namely:

DE SMET QUARZTILE, made of Quartz and Colored Cement, under heavy pressure.

DE SMET CARBOTILE, made of Carborundum and Colored Cement, under heavy pressure.

DE SMET QUARTZ COVE BASE—Sanitary.

DE SMET COLORED PORTLAND CEMENT, for Top Finish work.

Territory, etc.

No point too distant. Work has been executed in New York and California; also, Honolulu, H. I.

The factory from which shipments are made is about forty miles from Chicago, on the M., St. P. & S. Ste. M. R. R.

Description of Tiles.

Quarztile are made of De Smet Colored Portland Cement and Quartz, the latter giving a beautiful texture as well as rendering the tile practically wearproof.

Carbotile are similarly made of De Smet Colored Portland Cement and Carborundum, the latter producing a perfect non-slip surface which is also artistic. Will never wear out, as carborundum ranks next to the diamond in hardness.

Both Quarztile and Carbotile have a backing of the best gray Portland Cement and selected aggregates, which is welded, in steel moulds, to the facing (about ¼ inch thick), by especially constructed presses, under a minimum pressure of 4000 pounds to the square inch. The tile is then properly cured and hardened by special process. The resulting tile are very dense, non-warping and geometrically exact, insuring close fitting edges and a level floor; wearproof and highly impervious.

The minute inspection during manufacture, during the process of curing and at the time of packing insures shipment of only perfect tile.

Uses.

Used for finished floor work in apartment buildings, banks, churches, dining-rooms, halls, hotels, hospitals, libraries, mausoleums, offices, restaurants, schools, stores, inside and outside porches, corridors and power houses, also for fireplace hearth and for stair treads and all places subject to much wear.

The non-slip character of Carbotile adapts it especially for elevator approaches, entrance vestibules, stair treads, and all inclined surfaces.

The non fading and durable qualities of both Quarztile and Carbotile are particularly appreciated in exposed applications, such as porches, outside vestibules, terraces, etc.

Features and Advantages.

True shapes and absolute uniformity in sizes, making possible neat, snugly fitted joints and perfectly even and level floors.

Rich and dignified in appearance, the range in colors and softness of tonal effect permitting effects impossible with other materials.

Durable under all types of service; impervious; non-staining; sanitary; non-cracking; non-dusting; non-fading.

Easily kept clean; can be washed with soap and water or any antiseptic solution.

Widely adaptable, because of sizes, colors and durability, and also because of possibility of applying them with various width joints of suitable color.

Comparatively inexpensive.

Colors.

De Smet Tiles are furnished in black and near-white, and in rich, clear tones of red, pearl gray, yellow, écru and green. Special colors will be made to order.

Sizes and General Weight.

Regularly made in 8 by 8 by ⅞-inch and 12 by 12 by 1⅛-inch sizes. Either tile can be cut to any desired smaller size, including diagonal halves, diagonal quarters, etc.

Cove bases are of 1¼-inch radius, 6 inches high and 12 inches long.

Cavettes of 1¼-inch radius and 12 inches long.

Inside and outside corners, plinth blocks, etc., supplied as required.

DE SMET 12 BY 12 INCH BLACK AND NEAR WHITE QUARZTILE, SUN ROOM, D. M. CUMMINGS RESIDENCE, LAKE FOREST, ILL.
FREDERICK WAINWRIGHT PERKINS, Architect

Continued on next page

Special size tile, such as 10 by 10 inches, 8 by 16 inches, etc., will be made if quantity ordered warrants.

De Smet Tile weigh, approximately, 8 by 8-inch, 11 pounds, and 12 by 12-inch, 15 pounds, per square foot.

How to Specify De Smet Tile.

Floors shall be covered, in patterns and sizes indicated on plans, with Quarztile [Carbotile], furnished by De Smet Quartz Tile Co., Chicago, Ill., using cove bases, cavettes and plinths wherever indicated.

These shall be laid on a solid, perfectly level concrete foundation, surface of which is to be not less than 2½ inches below finished floor surface.

Tile to be bedded in fresh cement and sand mortar, stiff enough not to work between joints.

When mortar is sufficiently set (in about two days) joints shall be grouted with cement of consistency of cream.

De Smet Colored Portland Cement.

This material is a true Portland Cement, to be used in exactly the same manner as when handling ordinary Portland Cement, mixing same with sand on the job. It is not a coloring matter to be mixed with ordinary cement, but should be used straight as furnished. Meets all the requirements for Portland Cement of the American Society for Testing Materials. Lime- and cement-proof, which insures fast color.

Should be used in preference to ordinary cement to which coloring matter is added, as addition of coloring matter not only weakens the cement but often produces cloudy color effects due to unequal proportioning of coloring. Many colors, besides, are not proof against lime, cement or other causes of fading.

Better than painting concrete surfaces, as the color is incorporated in the material and is permanent, while the best kind of painting job is only temporary. Will not fade even when exposed to the elements.

Made in any color, the stock colors being red, black, pearl gray, yellow, écru and green.

DE SMET 8 BY 8-INCH NEAR-WHITE QUARZTILE, WITH BLACK JOINTS, BREAKFAST PORCH IN RESIDENCE, LAKE FOREST, ILL.
Charles S. Frost, Architect and Owner

DE SMET 12 BY 12-INCH BLACK AND NEAR-WHITE QUARZTILE, COOK COUNTY DETENTION HOSPITAL, CHICAGO, ILL.
Schmidt, Garden & Martin, Architects

Uses.

Should be used as a facing or finish coat in concrete construction of any kind where a permanent, uniformly colored surface is desired. Especially adapted for top finish work of floors, where the high quality De Smet Quarztile or Carbotile are not required, such as theater auditoriums, garages, porches, stores, corridors, stair halls, gymnasiums, dining-rooms, sidewalks and driveways.

Cost.

The cost per square foot, ½ inch thick (four parts De Smet Colored Portland Cement to seven parts sand), for any color except green, is from three to six cents higher than for ordinary gray cement topping.

Method of Using.

For top finish work of floors, we recommend a mixture of four parts De Smet Colored Portland Cement and seven parts fine, clean, sharp sand, with a minimum amount of water to produce a very stiff mortar. The mortar should be well gauged and sufficiently stiff so that when poured on the floor it will form a cone, instead of running. After running the mortar into position with a straight edge it should not be touched until ready for finishing with a steel trowel, when the finishing should be done quickly, taking care not to over-trowel the floor. Forty-eight hours after the floor has been laid, soak with water and keep wet for at least ten days, to insure setting of every particle of cement, thereby securing the best kind of finished cement floor. If mechanics must do work in the space after floor has been installed, protect with sand or non-staining sawdust against abrasion or soiling, or by other appropriate methods.

References.

De Smet Quartz Tile Co.'s products are specified by many prominent architects. List of names and of jobs supplied furnished on application.

DREADNOUGHT FLOORING COMPANY

154 West 18th Street
NEW YORK, N. Y.

AGENCIES

PHILADELPHIA, PA., Heaton & Wood, 1802 Chestnut Street
BOSTON, MASS., Boston Floor Company, 22 Kingston Street
TOLEDO, OHIO, E. G. McFillen, 1010 Monroe Street
DENVER, COLO., George W. Summers & Co., 420 Century Building
CHICAGO, ILL., E. R. Newcomb, 53 East Monroe Street
BALTIMORE, MD., J. M. Adams, 330 North Charles Street
SYRACUSE, N. Y., Abner Adams Company, 219 New Rosenbloom Building
LOUISVILLE, KY., Brecher-Buck Co., 307-309 West Walnut Street
YOUNGSTOWN, OHIO, Youngstown Hardwood Floor Co., 119 North Phelps Street
PITTSBURGH, PA., Pittsburgh Hardwood Floor Company, 923 Park Building
DETROIT, MICH., George R. Mehling, 106 Henry Street
INDIANAPOLIS, IND., National Flooring Co., 1200 Beecher Street
SEATTLE, WASH., S. W. R. Dally, 435 Globe Building
ROCHESTER, N. Y., Abner Adams Co., 47 East Avenue
BUFFALO, N. Y., Stevens Floor Co., 41 Elmwood Avenue
WASHINGTON, D. C., J. M. Adams, 1216 Connecticut Avenue
MILWAUKEE, WIS., J. Doubrawa & Son, 482 Market Street
MONROVIA, CAL., Doubrawa Brothers, 233 West Lemon Avenue

Product.

Manufacturers of "Dreadnought" Flooring.

Dreadnought Flooring.

Utility—"Dreadnought" is an ideal flooring for public buildings, such as hospitals, churches, libraries, court-houses, office buildings, banking institutions, hotels, etc. It has no equal in private houses for kitchens, laundries, hallways, pantries, bathrooms, bedrooms, billiard rooms and nurseries.

"Dreadnought" is light in weight, only one pound to the square foot, and is, therefore, especially suitable for elevator cars, yachts and steamships, where weight is an important factor.

Advantages—"Dreadnought," a compound of cork, embodies the most modern idea of floor covering, on account of its resilient and noiseless surface and attractive appearance. It is non-absorbent, has no objectionable odor, is easily cleaned and not slippery when wet. Liquids such as ink, grease, oil, etc., can be removed without leaving a stain.

Durability—"Dreadnought" Flooring has been thoroughly tested for durability, and evidence can be furnished showing how the flooring has worn under the severest use.

Description—"Dreadnought" is furnished in interlocking units (3 inches from center to center) and in squares and rectangles of any desired size. The two latter can be outlined with inserted "Dreadnought" seams (¼ inch wide and up) of any color, such as black, white, etc., producing the effect of Dutch or stone tile.

"Dreadnought" is always laid in an elastic and waterproof cement which adheres equally well to wood, concrete or steel.

Colors and Designs—"Dreadnought" is made in ten colors: Dark and light blue, dark and light green, buff, French gray, brown, black, red and cream white.

Designs in the above colors can be furnished to harmonize with interior decorations.

Stair Tread and Brass Nosing.

"Dreadnought" is especially suitable for stair treads, on account of its being non-slippery and noiseless, and, when edged with our special brass nosing, presents a neat and attractive appearance

Specifications.

"Dreadnought" Flooring is uniformly one quarter of an inch thick; and the under floor, if of concrete, must be troweled to a smooth and level surface, without lines, to within one quarter of an inch of the finished floor level desired; and if of wood it must be "tongue and groove," boards not over four inches wide, free from knots, well seasoned, nailed and planed.

Samples and Catalogues.

Designs, samples and our new catalogue, giving further information, will be furnished on request.

"Dreadnought" in Use.

The following list shows some of the buildings in which "Dreadnought" is installed:

The International Bank Corporation Building, 60 Wall Street, New York, N. Y.
Central Trust Co., New York, N. Y.
National State Bank, Newark, N. J.
Mechanics Bank, Brooklyn, N. Y.
Citizens Savings Bank, Stamford, Conn.
Fulton Trust Co., New York, N. Y.
Grand Central Station, New York, N. Y.
New Municipal Building, New York, N. Y.
American Museum of Natural History, New York, N. Y.
First Baptist Church, Plainfield, N. J.
Chapel, St. Mary's Hospital, Orange, N. J.
Congregational Church, New Canaan, Conn.
First Baptist Church, Montclair, N. J.
The Biltmore Hotel, New York, N. Y.
The Copley Plaza Hotel, Boston, Mass.
The Waldorf-Astoria, New York, N. Y.
The Plaza Hotel, New York, N. Y.
Columbia Theater, New York, N. Y.
Proctor's Theater, 125th Street, New York, N. Y.
Childs Company, 200 Fifth Avenue, New York, N. Y.
Chas. Scribner's Sons, 597 Fifth Avenue, New York, N. Y.
F. W. Woolworth Residence, New York, N. Y.
S. M. Colgate Residence, Orange, N. J.
Jacob H. Schiff Residence, New York, N. Y.

HALLWAY, 43 EXCHANGE PLACE, NEW YORK, N. Y.

THE FLEXOTILE FLOOR COMPANY

Flexotile Sanitary Plastic Flooring

ROCKFORD, ILL.

Products.

FLEXOTILE SANITARY PLASTIC FLOORING.

Also, Flexotile Stucco, for which see our name in General Index.

Description.

Flexotile is a composition flooring based on a special silico binder which amalgamates with the marble or gravel aggregate and the strong, rich earth and chrome colors of which it is composed, forming an absolutely fire-, water-, and vermin-proof floor surfacing, which is highly insulating, and impervious to grease, alkalies and most acids. It contains no cement, clay, marble dust, sawdust or any other such fillers; and, while highly elastic and resilient, owing to its special binder and to the expert supervision under which its ingredients are proportioned, has six times the crushing strength of ordinary concrete.

It can be applied on wood, brick, concrete, or metal underfloorings, and can be carried up as cove, base, or wainscoting, along walls, partitions, etc. Flexotile is also adaptable as a sanitary surfacing on stair-treads, mantels, newels, and so forth.

Flexotile itself is always applied as a second layer over an elastic cushion composed of dry "Rough Coat" in a silico binder solution of the consistency of cream. Can be laid, ready for use, within twenty-four hours.

Physical Characteristics and Advantages.

Flexotile has a pleasant temperature to the touch, and is not slippery, even when wet. It is quiet to the tread, does not dust, crack or chip, and, in fact, improves in surface finish with age. Flexotile is easily washed and kept clean.

Strength—Flexotile flooring will bear a crushing pressure of 8880 pounds and a tensile strain of 1100 pounds.

Flexibility—A 10-foot span will stand a 6-inch deflection without injury.

Fireproofness—Laboratory and actual fire tests have proved that Flexotile flooring is absolutely fireproof.

Non-Conductor of Electric Current—A current of 2300 volts used in test did not cause the slightest tremor of the voltmeter.

Freezing—Flexotile Flooring can be installed with perfect results in a temperature 20 degrees below zero.

Weight—Flexotile Flooring weighs 4½ pounds to the square foot ½ inch thick.

Color, Design, Etc.

Flexotile is prepared in twenty rich and unfading colors (including red, brown, blue, green, yellow, black and white), and can be applied in single colors or in combination color patterns. This flooring permits of unlimited design possibilities, in any degree of elaboration, including special ornament, lettering, monograms, coats of arms, etc.

Finishes.

Trowel finish (gravel aggregate) is completed with the trowel and leaves smooth surface with solid color.

Flake Mosaic Finish is obtained by grinding the surface to expose the marble or shell aggregate.

Tests.

"Most completely fireproof I have ever seen."—Fire Chief, Oak Park, Ill.

"Best Fireproof Flooring ever under my observation." — Fire Chief, Kansas City, Mo.

"Twenty-eight hundred degrees Fahrenheit did not affect it at all." — A. W. Swanberg, St. Paul, Minn.

NOTE — Mr. Swanberg's report is the result of a laboratory test.

FLEXOTILE FLOOR AND 6-FOOT WAINSCOT, BATHROOM, RESIDENCE, GILBERT H. COOK, BANKER, INDIANAPOLIS, IND.

Cap-Color, white; pearl aggregate exposed; dark blue line. Absolutely jointless throughout

"Eighteen days' immersion in sulphureted hydrogen, caustic soda solution, strong as strongest soaps, ammonia, containing sixty times as much ammonia as is present in human urine, undiluted antiseptic liquid soap, produced no visible effect; and odors entirely washed off in one to five minutes in clear, cold water."—C. E. Osborne, A. M., Oak Park, Ill.

Suggested Brief Specification Form.

Over Wooden Under-Floors—Flooring shall be laid one-half inch thick in accordance with the printed directions of THE FLEXOTILE FLOOR CO., Rockford, Ill., and in connection with 26-gauge expanded metal lath, securely nailed to the under floor.

Over Concrete Under-Floors—Flooring shall be laid one-half inch thick in accordance with the printed directions of THE FLEXOTILE FLOOR CO., Rockford, Ill. Concrete to be of a one-to-four mix, level and true, left with a combed surface, and to be at least ten days old.

Distribution.

Branch offices and warehouses throughout the United States and Canada, for prompt delivery of materials and execution of contracts.

Experts furnished to assist and supervise, where local contractors purchase materials and contract the work themselves.

References.

Brooks Hospital, Boston, Mass., 50,000 square feet
Washington Boulevard Hospital, Chicago, Ill., 40,000 square feet
Court House, Richmond, Mo., 20,000 square feet
Finley Hospital, Dubuque, Iowa, 20,000 square feet
Poor Farm, Lincoln, Neb., 12,000 square feet
Poor Farm, Belvidere, Ill., 15,000 square feet
Indiana Epileptic Village, 30,000 square feet
Michigan Epileptic Village, 30,000 square feet
Thousands of others on application

GENERAL KOMPOLITE CO.

MANUFACTURERS OF

"Kompolite" Floors, Wainscots and Stucco

OFFICE AND WORKS

TELEPHONE, HUNTER'S POINT 5361 325-327 Borden Avenue

LONG ISLAND CITY, N. Y.

Products.

"KOMPOLITE," a MAGNESIUM ASBESTOS COMPOSITION. An elastic, sanitary, seamless Material for FLOORS, WAINSCOTS and STAIR TREADS, in Plain Colors, Terrazzo and Marbled Effects.

Also, "KOMPOLITE" STUCCO and "KOMPOLITE" COMPOSITION FLOOR MIXTURES; both Magnesium-Asbestos Compounds requiring only the addition of water.

CALCINED MAGNESITE and DOLOMITE.

TILES, hydraulically pressed, for Floors and Walls, also for Street Pavements, in one-color or two- to five-color designs, dull or glazed.

"Kompolite."

"Kompolite" has proved wonderfully durable under the severest conditions. A floor now in use nearly seven years in a stable and warehouse building where other forms of floors failed, over which loads of two or four tons are drawn and sharp shod horses are driven, shows hardly any signs of wear.

Another floor, over which approximately 60,000 to 80,000 people have passed each day for the last three years, is in good condition.

Nearly a quarter of a million feet have been installed in a Public Institution and after two years of use not a single foot was removed, repaired or relaid because of defective or unsatisfactory material or workmanship.

After two years of test and service and in comparison with many other composition floors, "Kompolite" was the one accepted by the architects of the Grand Central Terminal, New York, and is the only composition floor laid in that great Railroad Station.

After careful scientific tests and numerous experiments by the Bureau of Standards, Washington, "Kompolite" was installed in many United States Post Offices, Government Printing Offices, the Capitol of the United States and others.

"Kompolite" has been laid in the palaces of the rich, who would not have it if it did not satisfy them, and in the tenements for the poor; in gorgeous hotels, and in plain restaurants; in factories, and in stores where the best at the lowest price is needed; in railroad stations and in hospitals. In all it has been satisfactory.

"Kompolite" is different and is right: (1) in character of materials, (2) in quality of materials, (3) in treatment of materials, (4) in method of laying, (5) in method of finishing.

"Kompolite" has been so perfected that it can be applied at a moderate price, the average of which is not higher than hardwood and is cheaper than stone. It is more durable and satisfactory than either.

It is the solution of many floor troubles.

Advantages.

Sanitary, fireproof, durable, sound-deadening, water repelling, easy under foot, germ- and dust-proof. For heavy service and hard wear; applied on cement, wood or iron, in new or old buildings.

Light in weight, so that it can be used on weak structures where heavier materials cannot be employed.

"Kompolite" is elastic and noiseless under foot, besides affording a firm foothold (wet or dry). Its elasticity saves it from cracking and breaking in the unsightly and unsanitary manner of tiling, marble or terrazzo floor, and it will not bulge or disintegrate.

Cement, tile, terrazzo, marble and mosaic weigh from three to five times as much as "Kompolite." They require, in addition to their own thickness of ½ to ⅞ inch, a cement bed of 1 to 1½ inches, which gives great additional weight and at least one inch greater height from the floor base than "Kompolite."

"Kompolite" has been subjected to severe tests and has been laid under the most difficult conditions. It is in daily use in places where wood, cement, asphalt, concrete, slate, marble, etc., had not been satisfactory.

You are requested not to compare "Kompolite" with any of the many disappointing composition floors, and not to class it with or condemn it because of past failures with sand-, sawdust-, or magnesium-cement floor mixtures. It contains no cement, lime, sand, marble, or other adulterant fillers. It contains a higher percentage of Oxides of Magnesium, Zinc, Iron and Aluminum, with Asbestos, than any other similar floor.

These oxides in a finely divided state fill the pores and give a surface of extreme toughness which resists severe wear and heavy traffic but does not destroy the resiliency.

We fully guarantee the material employed and the workmanship.

Continued on next page

How Laid.

Laid plastic and seamless in one solid and smooth surface, without crack or crevice.

"Kompolite" is laid in plain colors or with stripes and borders; also in marbleized or terrazzo and pebbled effects.

It is laid with an elastic cushion coat which protects the upper or finishing coat in case of cracking of the foundation floor.

The density of the top coat enables the floor to withstand successfully the most severe usage, and will outlast other floorings.

"Kompolite" mottled effect is distinctive. The delicately mottled surface is different from that of any other material and of great architectural and decorative possibilities.

Economy.

It is the highest grade of composition flooring at the lowest cost where a fireproof, vermin-proof, impervious, durable, resilient and elastic, seamless floor is required.

Adaptability.

The wide use of "Kompolite" Floors ranges from the highest class of architectural work, where appearance is the chief consideration, to places where service only is essential.

The most *serviceable* floor for public buildings, hospitals, railroad stations, schools, theaters, churches, hotels, restaurants, banks, stores, etc.

The most *practicable* floor for private houses in kitchens, lavatories, laundries, pantries, nurseries, halls, dining rooms, etc.

The most *enduring* floor for stables, garages, stair-treads, factories, cars, ships, etc.

A material which combines the decorative and architectural possibilities of marble, terrazzo, or tile with the silent and non-slip advantages of cork and rubber. It is more durable and sanitary than rubber or cork, has no disagreeable odor, and costs one third to one half as much as these.

For factory, warehouse, garage and stable floors "Kompolite" is unsurpassed. The cost of maintenance is practically nothing.

Stair Treads.

"Kompolite" produces a more durable and a more agreeable and non-slippery (wet or dry) stair tread than stone or metal, rubber or carpet. It is soft, elastic, noiseless, and architectural in appearance. It presents a plain flat surface. There are no grooves for the retention of filth and disease germs, so dirt can be easily brushed off, which is impossible with grooved metal treads.

Different from Other Flooring.

The laying of "Kompolite" Floors and Stair Treads is under the supervision of experienced, cautious superintendents. Much of the success of "Kompolite" floors is due to the care, caution and conscientious work at the vital period of the floor's life (at its birth), the time of making and laying.

Co-operative Service.

Our Service Department will be pleased to be permitted to offer suggestions, forms of specifications, tabulations of costs and help you in selecting the proper floor materials and the most approved methods of floor construction suitable to your particular needs. Proof and prices will be satisfactory.

Our wide experience with flooring problems has given us a fund of valuable information in first costs, relative values, cost of upkeep, repairs and replacements, embracing tile terrazzo, marble, cork, rubber, etc., as compared to plastically laid magnesium asbestos fiber composition.

Facilities.

A large plant with a competent staff of experts enables us to produce the highest quality floor at prices less than charged by those who attempt to compete with us in quality.

Guarantee.

A satisfactory guarantee is given with all work entrusted to us and if required a performance and maintenance surety company's bond as well.

References.

"Kompolite" has been subjected to most severe tests in practical use. References are not published, but will be given to architects, engineers, or contractors of standing to prove that "Kompolite" is the most reliable and, quality considered, the most moderate priced Monoplastic Floor and Wainscot now made.

It is specified by leading architects, endorsed by noted contractors, and approved by property owners everywhere.

Magnesia-Cement and Asbestos Products.

We are now the largest manufacturers of a general line of products for floors and wainscots made of Magnesia-Cements and Asbestos. "Kompolite" started as a composition floor, but now embraces a large and varied line of products which combine service, utility and attractive effects. Full particulars will be sent to architects on application.

THE FLEXSTONE CONSTRUCTION COMPANY

Armorite Floors

300 Hartman Building
COLUMBUS, OHIO

BRANCH OFFICE: CLEVELAND, OHIO, 701, The 1900 Euclid Building

Products.

ARMORITE, the mouldable, stone-hard-service and light-tread FLOORS adaptable to any floor usage; ARMORITE BASE and WAINSCOT.

Service and Permanence.

The construction world is relieved to know that, after many years of experimenting and testing, all required integral improvements necessary for a pure, perfect, simple, universal, mouldable stone have been discovered and perfected in the material Armorite.

Armorite, being an all-mineral stone product and containing no unoxidized ingredient, laid in ordinary thickness, without cracks or joints, gives a wearing surface of unusual permanence. Its strength and texture is such that ordinary wear and usage make no perceptible wearing away in a generation.

Adapted for floor, base and wainscot, in one continuous piece without crack or joint, non-absorbent of moisture, to answer the modern demands of sanitation.

Color.

Armorite can be had in various colors, such as red, buff, black and granite gray, and can be laid either in a solid color or with borders of other colors.

Utility.

Moderate price, nature and adaptability of material make Armorite the builder's universal material. Can be used in toilet rooms, hospitals, porches, all public buildings, stations, theaters, halls, drill rooms, gymnasium floors, school buildings, including class rooms, billiard and pool rooms and all servite portions of residences.

Wood Construction.

Armorite Floors are constructed:

On Old Work—By cleaning thoroughly whatever floor may be in use, repairing or tearing out any old loose material, and then applying the plastic Armorite about ⅜-inch thick, troweled to a smooth, hard surface.

On New Work—By making a rough wood construction capable of carrying the load for which the floor is designed, and then applying the plastic Armorite ⅜-inch thick and troweled to a smooth, hard surface.

Concrete Construction.

The concrete should be brought to a float finish to within ⅜-inch of the finished floor line. Concrete to be of one, two, four mix—one part good cement, two parts clean sand, four parts crushed stone or clean gravel, one half-inch ring size. Concrete should be allowed to dry thoroughly before applying Armorite. Cinder concrete should never be used as a foundation for Armorite.

Advantages.

No wire or metal lath used.

Armorite floors are *without a peer*. The mouldable stone armor plate for buildings, is cheap and universal, workable and purposeful, monolithic, and sanitary, without the ever changing, unconstant, ordinary, impure mineral binders and vegetable or pulp fillers.

A permanent product; unchanging, containing no unoxidized or vegetable property to weather, corrode, or deteriorate.

A strong product; firm, requiring no heavy, thick foundation to relieve it entirely of strain.

A workable product; simple, applied in plastic state; hardening and adhering to every material; giving quick and dependable construction.

A sanitary product; non-absorbent, monolithic, eliminating all unstable bonding materials.

A cheap product; universal, being used in the humble home, and in the most expensive of buildings; for the easiest tread floors, and for the hardest usage.

Relative Advantages.

The last word in Monolithic Construction, Sanitation and Service.

Lack of strength and durability and the presence of corroding properties have been the principal faults of all floors, but sectional and monolithic.

The requirement of expert workmen and the complicated mechanical mixing of composition floors have limited their use and adaptability.

Vegetable pulp and impure absorbent floors make composition floors so weak, abrasive and susceptible to deterioration that complete satisfaction cannot be expected.

Cements, so called, with a large percentage of gas in them waiting for moisture to explode, swell and corrode the products, have in the past rendered tiles and floors unstable, undependable and short lived.

With Armorite has come the solution of all floor material troubles. No unoxidized properties to work after the material is finished. All pure mineral ingredients. A cement, that once set and annealed, never changes.

Summary of Advantages of Armorite Flooring.

Cleanliness—Sanitary characteristics.
Quietness—No click under tread or use.
Immunity from abrasion—Not brittle.
Resilience—Gives and takes.
Immunity from slipperiness.
Appearance—Pleasing to the eye.
Degree waterproof—Less than three per cent absorbent.
Plasticity.
Warmth—Unusual thermal insulation.
Life—Immunity from deterioration with age.
Degree alkali-proof—Like marble.
Fire-resistance—Passes all severe building code requirements.
Elasticity—1½ inch to 6 feet.
Crushing strength—8000 pounds to cubic inch.
Structural strength—1400 pounds to inch.
Immunity from expansion and contraction—Absolute.
Lightness—3 pounds to square foot ⅜ inch thick.

THE HASTINGS PAVEMENT COMPANY

EXECUTIVE OFFICES
25 Broad Street
NEW YORK, N. Y.

TELEPHONE, Broad 1496

WORKS
HASTINGS-ON-HUDSON, N. Y.

Products.

Manufacturers of Compressed Asphalt Paving Blocks and Tiles.

Asphalt Paving Blocks.

The logical material for the wearing surface of streets and roads, and of piers, warehouses, loading platforms, bridges, factory floors, driveways, courtyards, etc. Manufactured at a permanent plant; shipped in block form ready to lay; and always obtainable in any quantity for extension or repairs.

Composition and Size—A properly proportioned mixture of natural asphalt, crushed trap rock and limestone dust is heated to 300 degrees Fahr., and shaped into uniform blocks under a pressure of 6000 pounds per square inch. The blocks are 5 inches wide, 12 inches long, and 2, 2½ and 3 inches deep. Specific gravity, 2.40.

Advantages—Asphalt block pavements are pleasing in appearance, smooth, noiseless, dustless, sanitary because non-absorbent, and next to granite the most durable. Present a gritty, non-slippery, non-skiddable surface. Easily taken up and relaid. Reasonable cost. Not affected by extremes of temperature. Made to suit any climate and traffic conditions.

Method of Laying—Asphalt blocks are usually laid on a concrete foundation, upon which there is laid a cushion bed of cement mortar one half inch thick, which is struck to a true and even surface. Upon this bed the blocks are immediately laid with close joints and uniform top surface, the joints being broken four inches. After being laid, the blocks are given a light coat of sharp, fine sand, well broomed into the joints. Traffic is permitted in four or five days.

Asphalt Tiles.

A wearing surface especially designed for sidewalks, floors, etc., subject to foot traffic. These tiles are manufactured under the same successful methods used for the blocks. White limestone, used instead of trap rock, makes a more attractive surface. They are of great density, free from voids, non-absorbent, and extremely durable, as tile laid over twenty years ago are still in service, showing but little wear.

Method of Laying—The large hexagonal and square tiles are usually laid on a foundation of six to eight inches of gravel and sand, with a curbing or border of square tiles set on edge. The small hexagonal tiles are laid on a foundation of three inches of concrete and one half inch of mortar.

REFERENCES

Manufacturing Plants, Etc.—Quintard Iron Works, Edison Electric Power Plant (201st Street), Shults Bread Co., Shaefer Brewing Co., New York, N. Y.; Remington Arms Co., Bridgeport, Conn.; Otis Elevator Co., Harrison, N. J.

Piers—Bush Terminal Pier No. 6, Brooklyn, N. Y. Largest pier in the world—30,000 square yards.

Loading Platforms—Arbuckle Building, Brooklyn, N. Y.; B. R. & P. Warehouse, Rochester, N. Y.

Stable Floors—Adams Express Co. and Hecker-Jones-Jewell Milling Co., New York, N. Y.

Cemeteries—Greenwood Cemetery, Brooklyn, N. Y.; St. Peter's Rectory, Haverstraw, N. Y.

Hospitals—Roosevelt Hospital, New York, N. Y.; United Hospital, Port Chester, N. Y.

Bridges—N. Y. C. R. R. Bridges, New York and Westchester Co., N. Y.; Pennsylvania Railroad Bridges, Sunnyside Yards, Borough of Queens, N. Y.; L. I. R. R. Bridges, Bay Ridge Improvement, Brooklyn, N. Y.

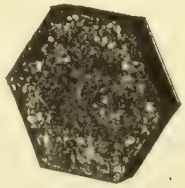
Driveways and Courtyards—St. Joseph's Seminary, Yonkers, N. Y.; Whitelaw Reid, Museum of Natural History, and Apthorp Apartments, New York, N. Y.

Cab Stands—Biltmore Hotel and Grand Central Station, New York, N. Y.

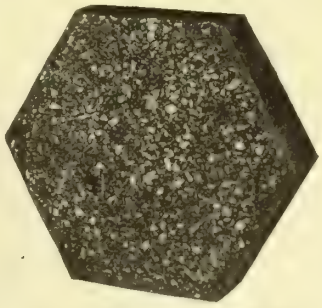
Tile Sidewalks—Van Cortlandt Park, New York, N. Y.; Prospect Park, Brooklyn, N. Y., and numerous other parks around New York City.

Streets and Roads—Over 4,000,000 square yds. laid in New York City; ten miles on upper Broadway; 87th St., from Columbus Avenue to Central Park West, laid 1889; Bronx and Pelham Parkway, laid 1910. The Albany Post Road for several miles north of Tarrytown, N. Y., paved in 1910 and 1911 with 2-inch block on 4-inch concrete foundation. The Boston Post Road, Rye, N. Y., laid 1912.

In Foreign Countries: Lima, Peru; Johannesburg, South Africa; Havana, Cuba; Manaos, Brazil; San Juan, Porto Rico; and Quebec, Canada, have streets paved with Asphalt Blocks.

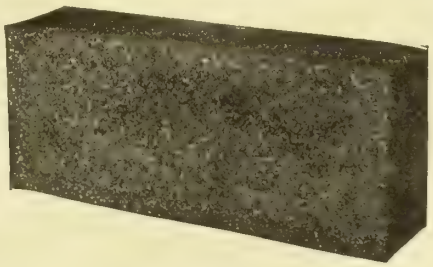


6″ x 1″ (deep) Hexagonal Asphalt Flooring Tile

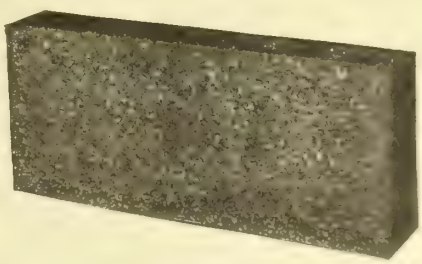


10″ x 2¼″ (deep) Hexagonal Asphalt Paving Tile

5″ x 12″ x 2½″ (deep) Compressed Asphalt Paving Block



5″ x 12″ x 3″ (deep) Compressed Asphalt Paving Block



5″ x 12″ x 2″ (deep) Compressed Asphalt Paving Block

TYPES OF BLOCKS AND TILE MANUFACTURED BY THE HASTINGS PAVEMENT COMPANY

INSULITE CHEMICAL COMPANY

MANUFACTURERS OF

Insulite Flooring, Roofing, Waterproofing, Damp-proofing and Iron Preservative Paints

AURORA, ILL.

Products.

INSULITE MASTIC FLOORING, INSULITE WATERPROOFING, INSULITE DAMP-PROOFING, INSULITE IRON PRESERVATIVE PAINT and INSULITE FLOOR POLISH.

Insulite Mastic Flooring.

The formula and process of manufacture of Insulite Mastic was developed and perfected by us, and it was the first material of its kind to be placed on the market.

Description—Insulite Mastic is a plastic material, formed principally by a combination of mineral rubber and asbestos fiber; no asphaltum, coal tar or vegetable matter is contained in its composition. Its elements are chemically inert and are unaffected by change of temperature, the acids or alkalies. It is furnished in shades of color from a dark brown to an attractive light chocolate.

Application—Insulite Mastic is applied without heating, with an ordinary trowel. The method is simple, and an expert workman is not required. When used for flooring it is laid one eighth of an inch in thickness. It sets rapidly and may be used for foot traffic within twenty-four hours after being laid. If necessary, the floor may be put down when room is in use during the day. No special finish or preparation of concrete or wood base is required.

Advantages—Insulite Mastic Flooring possesses the following advantages:

(1) It is practically wearproof; is not affected by foot usage, and will withstand the heavy trucking of warehouses.

(2) It is agreeable to the tread, and conserves the energy of those who must use a concrete floor—a matter of special importance in a workroom or factory.

(3) It deadens noise—a special advantage when used in corridors or class-rooms of schools.

(4) It is absolutely sanitary, being non-absorbent; is easily cleaned and kept in order.

(5) It is not affected by change of temperature, and may be used for exterior work in any climate.

(6) It will be unaffected by anything that may be used for scrubbing or cleaning, as it is alkaliproof and acidproof as well as waterproof.

(7) It bonds permanently to a base of either wood, concrete, brick or tile, and will not crack nor loosen under any usage.

(8) It is practically fireproof, as when fully set it will not sustain a flame.

(9) If injured in any way it can be repaired perfectly by any one, almost without expense or trouble.

(10) It retains its elasticity and always presents an attractive appearance.

General Use—Insulite Mastic Flooring is used as a covering for concrete or wood floors, either old or new; for exterior or interior work—concrete roofs, roof gardens, porches, walks, stair treads and wainscoting work, and wherever it is desired to protect concrete floors from dusting or wear of trucking; or to provide an elastic, sanitary floor having the advantages of high-grade linoleum. It is also used for swimming pool and reservoir work.

It forms an ideal floor for institutional buildings, such as schools, churches, hospitals, asylums, jails; and for theaters, restaurants, and all public or private buildings where sanitary considerations are of high importance.

Special Work—We are prepared to meet unusual conditions, and will furnish specially prepared material to meet any reasonable requirement. We also furnish the most experienced and expert assistance for special work or superintendence, when required. Our long experience with the development and use of this floor peculiarly fits us to render this service.

Installations—Installations of Insulite Mastic Floors and other Insulite Mastic Work throughout the United States and Canada have more than trebled during the past year, and we can refer to a great many important public and private buildings in which Insulite Mastic has been used in different parts of the country.

Insulite Waterproofing.

Description—Insulite Waterproofing is a pure mineral rubber gum held in solution by a volatile oil. It contains no asphaltum or coal tar; it is applied as a paint with a brush or spray. This paint possesses great

(Sweet's Catalogue)

Continued on next page

powers of penetration into the pores near the surface, and, when set, will not be affected by change of temperature. It fills the pores, forming a rubber-like film on the surface which is not easily injured by the elements or any chemical condition found in building materials, the atmosphere or soil.

Uses—Insulite Waterproofing is used to waterproof all concrete, brick or stone work on either exterior or interior surfaces; for basements, cisterns, reservoirs, swimming pools, and also for backing cut stone or marble.

Insulite Waterproofing is applied in comparatively light coats, as more reliance is placed on deep penetration of the pores and permanently filling them than on the soft, heavy film which must be used with asphaltic or coal tar preparations. Therefore, Insulite Waterproofing has a much greater effective spreading capacity than the various preparations sold at a low figure, and, all things considered, it is, in fact, much the cheaper material to use.

Insulite Damp-proofing.

Description—A paint in form, having the same base as Insulite Waterproofing, and possessing great penetration of the pores of concrete or brick, perfectly damp-proofing the wall to which it is applied, thus forming a strong bond for the plaster coat. Valuable space may be saved by dispensing with furring and lathing and plastering direct to the wall.

Uses—Insulite Damp-Proofing is for damp-proofing the inner surface of walls and furnishing a permanent bond for plaster. Aside from its special bonding feature it possesses the advantage that it will not stain through plaster or discolor the walls in any manner.

Insulite Preservative.

Description—Insulite Preservative is an acidproof, alkaliproof, and electricproof paint. It is not affected by sulphur dioxide or carbon dioxide. It is elastic, and metal to which it is applied may be bent without cracking or injuring the paint. Insulite Preservative will withstand a very high degree of heat and will not be affected by the most intense cold.

Uses—Insulite Preservative is used generally as an anti-corrosive paint for bridges, girders and structural steel, either above or below the ground; for smokestacks, boilers and hot surfaces. It is also used where special protection is required against the effects of fumes and gases.

Tests.

We can furnish various tests of our material made for different purposes. That of the Robert W. Hunt Co., Engineers, The Rookery, Chicago, Ill., is as follows:

CHICAGO, August 16, 1910.

INSULITE CHEMICAL CO.,
AURORA, ILL.

GENTLEMEN:—

We beg to submit the following report of tests made in our laboratory on a sample of your "Insulite" Waterproofing. The tests made and the results are given below:

RESISTANCE OF "INSULITE" TO THE ACTION OF ACIDS, ETC.

Pieces of sheet metal were given two coats of "Insulite" and after properly drying were immersed for 48 hours as follows:

Immersion in	50%	Nitric Acid	— Coating	Unaffected
"	"	Hydrochloric Acid		"
"	"	Sulphuric Acid		"
"	"	Caustic Acid		"

A crockery dish was coated on the inside with "Insulite" and, after drying, a quantity of burned lime was allowed to slake in the dish. The "Insulite" was absolutely unaffected.

TESTS TO DETERMINE THE USEFULNESS OF INSULITE IN BONDING OLD AND NEW CONCRETE

A certain area of old concrete floor, after thoroughly sweeping half of the space, was coated with "Insulite." After this coating had dried thoroughly, the whole was covered with new concrete. After 28 days this flooring was broken up and examined. The new concrete separated entirely from that part of the floor where *no* "Insulite" was used, but where "Insulite" was used as a binder, the new concrete adhered so firmly that in removing it pulled off the top finish of the old floor.

Specimens representing these tests are in our laboratories and subject to your disposal.

ROBERT W. HUNT & CO.

Information.

We gladly furnish samples, literature and desired information on request. We are represented in the larger business centers in the United States and Canada, and the names of agents will be furnished on request to home office.

THE LITOSILO COMPANY OF AMERICA, INC.

Pacific and Richmond Streets
PHILADELPHIA, PA.

BRANCH OFFICES

BALTIMORE, MD., F. A. Knowles, 205 St. Paul Street
WASHINGTON, D. C., Charles S. Salin, 3929 14th Street
CLEVELAND, OHIO, Frank A. Weaver, 602 Swetland Building
TRENTON, N. J., Stark & Faussett, 14 North Warren Street
PITTSBURGH, PA., Pittsburgh Brick Co., Bessemer Building

Products.

Manufacturers of Litosilo Flawless Decking and Flooring and Paratex Flexible Flooring.

Litosilo Decking and Flooring.

Litosilo is the most widely used composition flooring. Its use as a deck sheathing on hundreds of steamers has proven its ability to resist vibration, extreme climatic changes, and hard usage. Successful installations in hotels, apartment houses, office buildings, hospitals, factories, railroad stations and cars further demonstrate its practicability.

Description—Litosilo is a composition of magnesium oxychloride, scientifically combined with certain fillers to form a fireproof and waterproof material having resistance to abrasion with a minimum of contraction and expansion.

Depending on conditions, it is laid to a thickness varying from one half to two inches. Traffic—even trucking—over its surface will not damage it. Because of its elasticity, it will give itself to the expansion and contraction of steel foundation without cracking or buckling.

Litosilo, one half inch thick, weighs three pounds per square foot. Its specific gravity is 1.24. Tensile strength is six hundred pounds to the square inch.

Advantages—Litosilo is inexpensive, fireproof, water-tight; will not crack nor buckle. It is durable yet beautiful. It requires no special foundation, as do tile, terrazzo and marble, but may be laid over old or new wood floors, cement or asphalt floors.

To summarize, Litosilo saves in weight, time, cost of construction and repairs, while it has additional advantages of resiliency, sanitary qualities and beauty. Litosilo, being filled with dead air-cells, is non-conductive of heat and cold.

Standard Specifications for Litosilo.

General Requirements—(a) Foundations: Must be rigid, of even temperature throughout; free from lime, acid, or excess moisture; and without marked inequalities.

(b) Temperature: Litosilo must be applied when the temperature is not less than 40 degrees Fahr., this minimum temperature to be maintained day and night while material is drying out—approximately seventy-two hours.

(c) Preparation: All surfaces must be broom-clean and free from foreign incrustations. Hot-water or steam pipes must be surrounded with a loose insulated sleeve to permit their expansion independently and apart from the flooring.

(d) Continuity of work: Unless otherwise agreed, all work begun by this company shall be permitted to continue without interruption by either the general contractor or any sub-contractor until its proper completion.

(e) Storage of raw materials: The general contractor shall furnish free suitable storage room for raw materials which must be thoroughly protected from dampness.

Concrete Foundation—To be at least three inches thick and composed of:

Good Portland cement	1 part
Clean sharp sand (free from loam)	3 parts
¾ inch crushed stone or clean anthracite cinders	5 parts

The above to be thoroughly mixed and worked, and laid true and level to within required distance from finished floor or wall line. Surface of concrete should not have smooth or skin finish, and must be absolutely free from holes, soft spots or projections.

Hot-water or steam pipes imbedded in the concrete must first be covered with a non-conducting jacket.

If Litosilo is laid on a smooth cement floor, the latter must first be carefully cleaned and then scored with a pick or chisel every three inches over its entire surface.

Wood Foundation—Boards must be well-seasoned, preferably rough; maximum width 6 inches, minimum thickness ¾ inch, securely nailed to joists; with no loose ends, wide joints or large knot holes.

Terra Cotta, Brick or Plaster Block Foundation—Preferably given an initial brush coat of pure Portland cement and water mixed to consistency of paint. When this has set, it must be covered with a coat of Portland cement and sand, quality as described under "Concrete Foundation," proportion 1:3, minimum thickness ¾ inch. Surface to be broom roughed after having been laid level and true to within required distance from finished floor or wall line.

Iron or Steel Foundation—Must be free from rust, grease or paint. If so formed as to make a key, no further preparation is required. If flat, must be drilled and tapped for $^{7}/_{16}$-inch tap bolt every twenty-four inches each way and staggered. These bolts are used to fasten clips which key Litosilo to its metal foundation.

Clips will be furnished by this company at a price f.o.b. Philadelphia, Pa.

Base and Wainscot Backings—Must be of steel lath, securely nailed to studs; or as specified for terra cotta, brick or plaster block foundations.

If finished surface of Litosilo is to be flush with plaster wall, the metal lath or cement backing must allow for a ⅜-inch bed of Litosilo (Fig. 1); otherwise backing is required ⅛ inch removed from finished wall line (Fig. 2).

Plinths—Backing for Plinths may be as specified for base and wainscot; or of wood, as specified under "Wood Foundations."

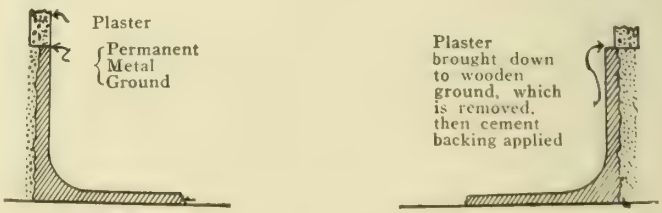


Fig. 1. Fig. 2.
LITOSILO BASE, SANITARY COVE AND FLOOR

Application of Litosilo.

This is of great importance in securing perfect results.

Work really commences in the laboratory, where every chemical must pass a standardization test. Thence the materials go to the factory, where they are scientifically mixed; from the factory to the operation, where another mixture takes place, the material, carefully protected is conveyed.

Litosilo is applied by picked and skillful mechanics under the supervision of a foreman from our own factory.

Continued on next page

Colors and Finishes, Litosilo.

Litosilo is applied in colors, according to standard samples, as follows: red, green, buff, gray, slate, brown, natural. Special colors on application.

Litosilo may be finished with:

(1) Utility finish, recommended for factories, warehouses, cars, ships or public buildings.

(2) Smooth finish, recommended for dwellings, theaters, and all places where beauty is a requisite.

Paratex Flexible Flooring.

Paratex is a flexible flooring applied in two or more coats in a jointless surface with a trowel. It is usually $\frac{3}{16}$ of an inch thick, and may be installed on a foundation of wood, concrete, iron or steel, asphalt or mastic. It is jointless and may be swept, mopped, scrubbed or washed down with a hose, as it sheds water without absorbing it. Paratex improves with time, as traffic compresses the fiber and basic compound, making the mass denser and smoother. It has been known to withstand trucking in a factory for twelve years.

The cost is about the price of good linoleum. Prices vary according to areas, colors and finish desired.

Colors and Finishes—Basic oxides are incorporated with the original materials, and the colors are unchanged by extreme temperatures or alkalies.

Paratex may be finished in three ways: rock fiber, cork or wax. The first is the usual way. The cork finish incorporates ground cork in the final coat. Where a glossy finish is desired either of these two finishes may be waxed.

Paratex is laid only in standard colors: brown, red, green and light green.

Specifications for Paratex.

General—Paratex can be applied and bonded securely to any surface which is, in the main, true and even and free from perceptible moisture and grease.

Foundations, Wood—Must be tongued and grooved boards securely nailed, with no knot holes and so placed that floor is tight with few cracks. In case there are cracks between the boards, Paratex can be laid over them provided they are no more than ¼ inch wide. Cracks are first filled with Paratex filler and at least two or three hours later Paratex is applied as hereinafter specified.

Paratex may be laid over old wood floors without previous treatment other than that specified above, unless the boards are badly worn, in which case a scratch coat or foundation of Litosilo must be laid at least ½ inch thick over the entire area. This scratch coat is to be laid over 30 pound slater's felt tacked down, over which No. 24-gauge black painted expanded metal lath is fastened to the floor with 4d wire nails turned over to form staples. Three or four days after this scratch coat has been applied, Paratex is to be applied as hereinafter specified.

If Cement—Must be stone concrete (1-3-5 or better) floated smooth, or concrete with cement sand finish brought to a true and even surface, free from holes, loose parts or projections.

If Iron or Steel—Must be free from rust and holes. In case of laps such as in decks of vessels, the difference in levels is to be nullified by laying Paratex filler first.

If Asphalt or Mastic—Must be free from holes or projections; the latter, if slight, can be leveled off with Paratex filler.

If Composition—Paratex can be laid over cracked composition floors provided no part of floor shows tendency to come away from foundation.

Protection—Paratex should be allowed to dry after each application with the aid of a free circulation of air. After the final coat has been laid, traffic should be suspended for forty-eight hours.

It will be noticed that the floor will become slightly dented when it is first used, but these dents will be rubbed down level after they have been walked over for two or three weeks.

Uses and Properties of Paratex.

Paratex is a floor which will stand up under heavy service in places such as the following:

Factories and Warehouses (on trucking surfaces up to 1000 pounds)
Schools
Department Stores
Institutions
Stores
Kitchens
Porches (prevents rotting of board floors)
Restaurants
Bar Rooms
Acid Plants
Passenger Cars
Railway Stations
Public Buildings
Offices
Apartment Houses
Paratex is used as a lining for acid tanks

Features of Paratex.

Paratex is absolutely water-tight and waterproof.
Paratex is absolutely acidproof.
Paratex is non-inflammable.
Paratex is stainproof.
Paratex is easily cleaned with a mop.
Paratex is resilient.
Paratex becomes more compact with wear.
There is nothing in it to dust off; consequently it is the most sanitary floor that can be had.

Guarantee.

We guarantee that Litosilo contains all of the qualities claimed for it herein. We guarantee it to be fireproof, water-tight and verminproof. It will neither crumble nor crack.

As the application of Litosilo is as important as its preparation, this guarantee is good only when it is applied by our own skilled mechanics.

Installations.

A few representative applications where we have applied Litosilo or Paratex:

Wm. Cramp & Sons Ship & Engine Building Co.
United States Marine Barracks, Norfolk, Va.
E. I. du Pont de Nemours & Co.
Clyde Station, Jacksonville, Fla.
Fore River Shipbuilding Corporation, Quincy, Mass.
Great Lakes Engineering Co., Detroit, Mich.
Newport News Shipbuilding and Dry Docking Co., Newport News, Va.
Church of the Transfiguration, Washington, D. C.
Baldwin Locomotive Works, Lakehurst, N. J., and Eddystone, Pa.
Curtis Bay Chemical Co., Baltimore, Md.
Evening Star Building, Washington, D. C.
Eshleman & Craig Co., 1304 Walnut Street, Philadelphia, Pa.
Pennsylvania Training School for Feeble Minded Children, Elwyn, Pa.
All Saints Church, Trenton, N. J.
Steamships Imperator, Vaterland, Great Northern, Northern Pacific and Henry M. Flagler, and yacht for Mr. H. P. Whitney
Bancroft Textile Mills, Wilmington, Del.
Cars for Interborough Rapid Transit Co., New York, N. Y. and Seaboard Air Line R. R.
Alliance Bank Building, Alliance, Ohio
Guilford, 15th and Chestnut Streets, Philadelphia, Pa.
Armour & Co., Chicago, Ill.

THE MARBLELOID COMPANY

MANUFACTURERS OF AND CONTRACTORS FOR

Marbleloid Fireproof Plastic Flooring, Compressed Cork Tiling, Tredlite Cork Composition Tiling

Broadway and Thirty-Fourth Street
NEW YORK, N. Y.

FACTORY
NEW DURHAM, N. J.

BRANCH OFFICES

PITTSBURGH, PA., 407 Commonwealth Building
CINCINNATI, OHIO, 507 Mercantile Library
CLEVELAND, OHIO, 1237 Schofield Building
DETROIT, MICH., 2232 Dime Bank Building
BOSTON, MASS., 200 Devonshire Street
WASHINGTON, D. C., Munsey Building
NORFOLK, VA., 1111 National Bank of Commerce
CHICAGO, ILL., People's Gas Building
MONTREAL, CAN., 603 Southam Building

AGENCIES THROUGHOUT THE UNITED STATES AND CANADA

Products and Services.

MARBLELOID FIREPROOF FLOORING, a Magnesia-Asbestos Plastic Composition for Floors, Coved Sanitary Base, Wainscot, Trim, Treads, etc.

MARBLELOID COMPRESSED CORK TILING, an Imported Flooring Product of superior merit.

MARBLELOID TREDLITE TILING, an elastic flooring material of cork composition superior to and cheaper than rubber tiling.

THE MARBLELOID COMPANY assures the high standard of its work wherever installed, through the efficiency of its organization and the resulting minute attention to detail. Trained workmen are maintained at the principal building centers of the country and, through the cooperation of its nine branch offices, the Company is fully equipped to execute work in any section of the country with an equal high standard of excellence.

Before actually beginning the work of installing the Marbleloid material, a preliminary inspection of the building is always made by an engineer who is an expert in foundation work and familiar with building construction. By means of this precaution, many conditions are frequently corrected which, otherwise, would result in the development of serious defects after the installation is made.

THE MARBLELOID COMPANY has in its employ a graduate chemist who has specialized in this line for the past twelve years. The laboratory is constantly engaged in research work; and all raw materials are carefully tested or analyzed.

The Draughting Department is prepared at all times to submit details covering any special construction, sketches showing proposed color schemes, etc.

Marbleloid Fireproof Plastic Flooring.

Marbleloid Fireproof Flooring is a standardized, permanent, light-weight, fireproof and resilient covering for floors, coved sanitary base, wainscot, trim, treads, etc. It contains no sand, Portland cement, marble dust or lime. It is laid plastic, usually one half inch thick, and sets in a few hours into a seamless, tough body, possessing a fine-grained, smooth surface, which offers neither joints nor crevices for the accumulation of germs, dirt or moisture.

Some ten different ingredients are used in the manufacture of Marbleloid Plastic Flooring, each of which is selected for the purpose of giving to the floor certain definite and desirable properties required for the particular service to which it is to be subjected.

This material adheres firmly to wood, concrete or iron; and may be used to cover old surfaces as well as for new construction. It is made in all colors, offering possibilities in the working out of any desired color scheme. Only inert mineral colors are used.

Advantages and Guarantee.

Marbleloid Plastic Flooring forms a sanitary hermetic seal over surfaces to which it is applied. It is light in weight, yet will stand the severest service without dusting or disintegrating. It is not cold to the feet, does not absorb moisture or greases, is easily washed and kept clean with a minimum of care. It is resilient, noise reducing, never slippery to the tread (even when wet). It is fireproof, has high crushing strength and possesses remarkable durability.

Wide Range of Adaptability.

Over four thousand Marbleloid installations of large area have been made in the plants and factories of many of our leading corporations, in many of our best known and loftiest office buildings, in schools, hospitals, association buildings, churches, hotels, railroad stations, libraries, theaters, banks, steamships, amusement halls, public buildings, stores, restaurants, cafés, power-houses, garages, and residences and apartment houses of the highest type.

The fact that millions of square feet of Marbleloid have been installed in the United States and Canada, every foot of which was installed only by skilled Marbleloid workmen, and is rigidly guaranteed, indicates the position and adaptability of this product in the building trade.

ACADEMY OF MUSIC, NEW YORK, N. Y.
Marbleloid Flooring installed throughout

Continued on next page

Application.

Marbleloid is installed in two coats, by which method a hard, fine-grained, smooth (but never slippery) top coat ($\frac{5}{16}$") is applied, which will resist wear under the severest conditions; while the under, fibrous layer ($\frac{3}{16}$") gives the floor great resilience and renders it pleasing and practically noiseless under the tread.

It should be noted that *experience and skill are most vital factors in the application of composition.* Proper preparation of foundation, mixing of materials, and application require far greater knowledge and accuracy than is required with concrete. Under certain conditions the foundation should have a priming coat, which would be harmful under others. An excess of chloride will cause a bloom, or efflorescence, on the finished work. Insufficient chloride will weaken the product materially. A temperature of fifty degrees or of ninety degrees at the place of installation calls for different methods in application. Troweling is a nice art, in which both time and method have much to do with the appearance and durability of the finished floor.

The architect should always require the manufacturer to lay his own material, and to guarantee the installation, for a definite length of time, against cracking, chipping or other structural defects.

Specifying.

The careful architect, engineer or contractor will not specify merely "Composition Flooring." He will name only those manufacturers whose material he has thoroughly investigated; and this investigation should include the inspection of work installed for some length of time, so that he may see for himself just how the material will stand up under service.

Before drawing up specifications covering the use of Marbleloid, we suggest that architects secure a copy of our printed specification sheet and details for sanitary base, iron stair construction, etc.

Cost and Estimates.

The cost of composition flooring varies with the area to be installed at one time, and the pattern and color layout required. The larger the installation, the lower the square foot price. The range is usually between twenty and fifty cents per square foot.

EXCHANGE BUFFET, NEW YORK, N. Y.
Marbleloid Flooring in Two-Color Design

Upon receipt of data giving information, regarding nature of foundation, the area of floor and wainscot, lineal extent of sanitary base, treads, etc., a definite proposal for the work, completely installed, will be furnished.

Marbleloid Compressed Cork Tiling.

This tiling is made in three shades and, unlike many of the domestic products, the structure is absolutely uniform throughout the tile. It is made only from the clear cork bark, and contains no extraneous matter of any kind. This tiling can be supplied in any size up to eighteen inches by twenty-four inches. Specifications covering this product will be furnished on request.

Marbleloid Tredlite Flooring.

This material is made from selected ground cork, oxidized oil, gums and color pigments. It is compressed into large sheets one quarter of an inch thick and is cut into tiling of any desired size or shape. Tredlite is highly resilient, noiseless, sanitary, non-absorbent, odorless, artistic, non-slippery and durable. It is made in ten standard colors and can be installed over a wood, concrete or iron foundation. Specifications covering this product will be furnished on request.

Samples, etc.

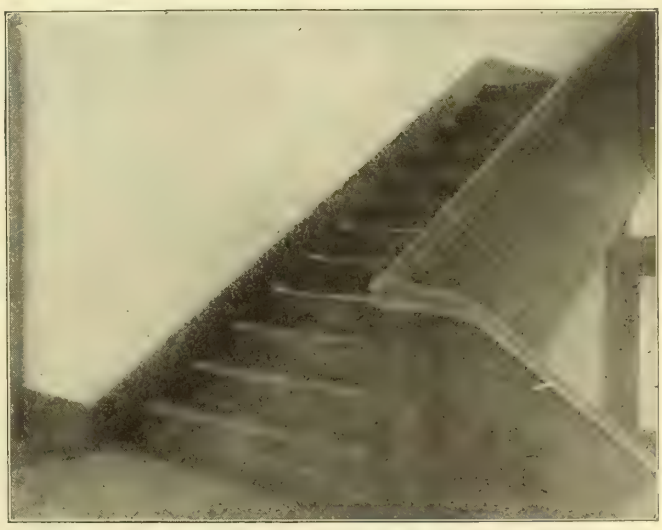
Samples of any of the above products, together with literature giving full information, will be gladly mailed on request.

References.

We are always glad to furnish lists of our installations, as we welcome the widest investigation and inspection of our past work as the most convincing proof of our claims for a product of superior merit.

Marbleloid is standard of specification and is being used extensively by the following corporations and Departments of the Federal Government:

The General Electric Company; The Standard Oil Company; New York Edison Company; American Platinum Company; General Chemical Company; Willys-Overland Company; Pennsylvania Railroad Company; New York Central Railroad Company; Western Electric Company; Armour & Company; American Can Company; United Gas Improvement Company, Philadelphia; Huylers; F. W. Woolworth Company; L. E. Waterman Company; Singer Manufacturing Company; Bethlehem Steel Company; Pennsylvania Steel Company; The Department of Commerce and Labor; War Department; Navy Department; Treasury Department; Department of the Interior and Lighthouse Service.



STAIRWAY OF PUBLIC SCHOOL AT NATRONA HEIGHTS, PA.
Corridor Floor, Sanitary Base, Stair Treads, etc., of Marbleloid

TROEGERLITH TILE COMPANY, INC.

MANUFACTURERS OF

Composition Flooring, Wainscoting, Stair Treads, etc.

103 Park Avenue

TELEPHONE, MURRAY HILL 5754

NEW YORK, N. Y.

Products.

TROEGERLITH COMPOSITION FLOORING; CORK COMPOSITION FLOORING; COMPOSITION WAINSCOTING, BASE, STAIR TREADS AND RISERS—FIREPROOF, SANITARY, WATER-REPELLENT.

Also, "POLLO OIL" and "N. B. WATERPROOFING," for cleaning and oiling Troegerlith Floors.

Composition Flooring.

Troegerlith Composition Flooring consists of chemicals and fillers of the best quality obtainable. It contains neither Portland cement, sand, lime nor mortar; but one of its chief ingredients is asbestos—a mineral which adds greatly to the strength, warmth, resiliency and fire-resistancy of the floor. It is laid in a plastic state, half an inch in thickness and in a single layer. It bonds directly to either wood, cement or concrete. The material is finished by troweling; takes its initial set in a few hours, and may be walked upon after twenty-four or thirty-six hours.

In appearance, cleanliness, lightness and resiliency, Troegerlith Composition ranks among the best flooring materials. It may be installed in almost any color—red, buff and gray being the most popular. These floors may be installed with a border or with a sanitary cove base, and may also be scored to represent tiles.

Troegerlith Composition weighs about three pounds to the square foot when laid half an inch in thickness. It is quiet, easy on the tread, non-slippery, and reasonable in price. Good linoleum or wooden floors cost almost as much as Troegerlith Composition, yet are not as durable, attractive or fire-resistant.

Composition Wainscoting, Base, Stair Treads and Risers.

Wainscoting, three sixteenths or one quarter of an inch in thickness, may be installed with Troegerlith Composition. Sanitary cove base, stair treads and risers are also frequently laid with this material. A sanitary base may be installed without joints or cracks of any description.

Specifications and Foundations for Troegerlith Floors.

Specifications calling for the installation of Troegerlith floors should state that the material shall be laid in a single layer, half an inch in thickness. They should also provide for a solid floor foundation, of either cinder or gravel concrete, or solid boards of not less than seven eighths of an inch in thickness.

Cork Composition Flooring.

Troegerlith Cork Composition contains a large amount of granulated cork. It, too, is laid in a plastic state, half an inch in thickness and in a single layer, but is finished by means of machinery in a manner similar to terrazzo floors. This rubbing process exposes the small grains of cork, with the result that these floors are exceedingly attractive in appearance. They also rank very high in the qualities of lightness, quietness, non-slipperiness, resiliency and durability.

Samples of our Cork Composition, and also of our regular composition, will be furnished upon application.

Official Tests and Approvals.

Troegerlith Composition has been tested and approved, as a fireproof material, by the New York Bureau of Buildings and by the New York Fire Insurance Exchange.

A seven-day test, made by the Stevens Institute of Technology, Hoboken, N. J., shows that the average tensile strength of Troegerlith Composition half an inch thick is 579 pounds to the square inch.

Tests conducted at the Pratt Institute, Brooklyn, N. Y., show that it has a crushing strength of approximately 10,000 pounds to the square inch, when laid half an inch thick.

Reliability Tests.

Our installations have been given every test that could be devised, that might show architect, builder and owner that we have an efficient organization, backing its *make good* policy with a guarantee of real value. This policy has compelled such confidence and faith in our work that we enjoy an ever-increasing business—slow in growth, but sure of results—measured by the selection of trained brains from the man with the trowel up through the heads of departments to the chief executive.

Each year a large percentage increase is noted in our non-competitive contracts.

Efficient supervision of labor enables us to render the most perfect work possible.

Painstaking care in detail makes for a satisfied client.

References.

A list of references will be furnished on request.

WARREN CHEMICAL & MFG. DIVISION

THE BARRETT COMPANY

Manufacturers of Asphalt Paving and Waterproofing Material

17 Battery Place
NEW YORK, N. Y.

49 Federal Street
BOSTON, MASS.

Products.

Warren's Anchor Rock Asphalt Mastic Floors and Pavements; Purock Magdeburg Mastic; and Warren's Anchor Asphalt Filler.

For other Asphalt Products, see our name in General Index.

Qualities.

Rock asphalt floors afford sure foothold. No joints. Elastic, silent, tough, durable, dustless, non-absorbent, sanitary, acid-resisting, and waterproof.

Adaptability.

For breweries, packing-houses, cold storage, canning and pickle establishments, dairies, ice cream plants, distilleries, tobacco, starch and glue factories, sugar, syrup and molasses refineries, hotel kitchens, bottling plants, stables, lavatories, comfort stations, tennis courts, jails, operating rooms, damp-proof cellars, laundries, shower baths and swimming-pools.

Storage battery rooms, laboratories, metal pickling and plating plants, tanneries and morocco factories.

Freight and passenger stations, piers, ferry terminals, roundhouses, shops, factories, warehouses, shipping and baggage rooms, loading platforms, sidewalks, driveways, and armories.

Schoolhouse corridors, stair-treads and landings, play rooms, gymnasiums, manual training rooms, toilets, locker rooms, and lavatories.

Anchor Rock Asphalt Mastic.

A combination of natural asphalt and crushed rock tempered with natural asphaltic fluxes to a uniform consistency; when properly mixed with clean sand, grit, etc. (see specification), produces a wearing surface superficially resembling cement but much superior because of certain desirable qualities above mentioned.

CAKE OF ANCHOR ROCK ASPHALT MASTIC

Put up in round cakes weighing about 50 pounds, and branded as per illustration.

Warren's No. 1 Hard Trinidad Flux.

A fluxing agent with a hardening tendency. Used where floors are to be subjected to high, natural or artificial temperatures. Put up in single-head barrels weighing about 350 pounds each. Barrels stenciled "Warren's No. 1 Trinidad."

Warren's Bitumen.

A fluxing agent with a softening tendency. Used where floors must remain elastic under reduced temperatures. Put up in double-head barrels weighing about 550 pounds each, or in single-head barrels weighing about 300 pounds each. Barrels stenciled "Warren's Bitumen."

Specification for Rock Asphalt Mastic Floors.

(To follow specifications for concrete or wood foundation):

All grades shall be properly established before the mastic is laid, so that latter shall be of uniform thickness.

The mixture shall consist, by weight, of:

	From	To
Genuine Anchor Brand Rock Asphalt Mastic	55	57 parts
Sand and Grit	36	38 parts
Warren's Bitumen or No. 1 Hard Trinidad Flux	9	5 parts
	100	100

The Mastic to be brought to the work in the original branded cakes, and the Bitumen, or No. 1, in the original barrels. The sand and grit to be so graded that the voids shall be reduced to a minimum, none of the particles of grit, however, to run over ¼ inch in diameter. These materials to be mixed in mastic kettles, in the usual manner (the kettle temperature at no time to exceed 400 degrees Fahr.), and spread at a temperature of from 300 to 325 degrees Fahr., so that the finished floor shall have a uniform thickness of * 1½ inches.†

After spreading, and as the hot mastic cools and sets, it should be lightly sprinkled with fine, hard sand and rubbed up to a smooth surface finish by means of the usual smoothing tools or floats.

The exact quantity of sand and grit, and also of the flux, to be subject to the approval of the architect.

No asphalt to be allowed in the mixture which has been derived from the distillation of petroleum. This specification contemplates natural asphalt throughout.

The architect reserves the right to reject any bid or bids; and the name of the contractor or sub-contractor who proposes to lay this floor must be submitted to him and receive his approval before the work can proceed.

Notes for Architect—* This can be changed to any thickness between one and two inches, depending upon traffic expected; one inch is sufficient for ordinary foot traffic.

† If finished floor is to be over one inch thick, insert here, "mastic to be laid in two layers of equal thickness."

Ordinarily it can be estimated that each 2,000 pounds of mastic, with its quota of other ingredients, will cover 183 to 200 square feet one and one half inches thick.

Purock Magdeburg Rock Asphalt Mastic.

Used for the same purposes and laid by the same formulæ as the Anchor Mastic. Popular among the most discriminating architects and engineers. We aim to constantly keep a large supply in stock at the yard in New York.

Put up in round cakes weighing about 55 pounds.

Warren's Anchor Asphalt Filler for Block Pavements or Floors.

An elastic, tenacious compound, completely filling all joints and producing an unbroken and sanitary surface. Prevents accumulation of dirt between blocks, and by providing for necessary expansion, bursting is prevented. Can be used at intervals throughout floor or pavement if desired for purposes of expansion only. Invaluable in wood block construction where its omission falls nothing short of extravagance. Packed either in double-head barrels weighing about 550 pounds, or single-head barrels weighing about 300 pounds. Each barrel is marked "Anchor Asphalt Filler."

P. M. BRUNER GRANITOID CO. ALBERT GRAUER & CO.

Frisco Building
ST. LOUIS, MO.

216 Columbia Street, East
DETROIT, MICH.

Manufacturers of Dustless Cement Floor Finish

BRANCH OFFICES AND AGENCIES

AKRON, OHIO, Flower Mantel Co.
ATLANTA, GA., Strafford R. Hewitt
BUFFALO, N. Y., Albert Grauer & Co.
CLEVELAND, OHIO, McWatters & Co.
ERIE, PA., W. J. Carson
FT. WAYNE, IND., Jocquel-Schulz Co.
LANSING, MICH., W. T. Britten
LIMA, OHIO, Lugabill Fuel & Builders Supply Co.
GRAND RAPIDS, MICH., Frank L. Dykema Co.
MONTREAL, CAN., Window Strip & Supply Co.
NEW YORK, N. Y., Albert Dahlman
PITTSBURGH, PA., J. B. Booth & Co.
ROCHESTER, N. Y., American Clay & Cement Corporation
SYRACUSE, N. Y., Paragon Plaster Co.
TOLEDO, OHIO, Building Products Co.
TORONTO, ONT., CAN., Scott, Hammond & Pratt
WASHINGTON, D. C., Southern Fire Proofing Supply Co.
YOUNGSTOWN, OHIO, Lau Iron Works Co.

Products.

Dustless Cement Floor Finish.

For the "Bruner" System of Reinforced Concrete Sidewalk Lights, Skylights and Floor Lights, Flush, Plain and Illuminated Doors with concealed hinges, Coal Hole Covers and Rings, and Vent Doors, see our name in General Index.

Dustless Cement Floor Finish.

We are now introducing a new product for the finishing of reinforced concrete floors in office buildings, apartments, hotels and warehouses; in short, for any location where a smooth, durable, dustless floor is desired.

Process.

Cement sidewalks are the standard paving in all cities, and cement, by our process, will become the standard material for floors in public buildings.

We guarantee to lay on reinforced concrete a topping coat or wearing coat, one half to three quarters of an inch thick, that will become monolithic or integral with the foundation, so as to be solid, even, durable and agreeable.

Colors and Finishes.

These floors can be laid in plain cement color, or in different shades, of black, green, red or other colors. They can be ground and polished to produce variegated color effects.

Hardening.

Hardening method patented by P. M. Bruner.

Thinner and Lighter Than Wood Floors.

Dustless Cement Floors add but one half to three quarters of an inch in thickness, and only five to eight pounds per square foot in weight to the floor load, while a wooden floor would add two and one half inches to the thickness of floor and from twenty to twenty-five pounds per square foot to the floor load of each story.

Preparation of Sub-Floors.

The sub-floor should be laid so that not over one half or three quarter inch of topping is necessary in order to meet all grades. This must be done by the use of straightedge or grade sticks. This sub-floor should also be laid with a view to having as little laitance as possible.

Specification.

Specify, "Cement finish to be laid according to the 'Bruner Process,' and to be guaranteed not to turn sandy or dusty, nor to break up or become uneven."

Cost.

The cost of Dustless Cement Floors is but one half as much as wooden floors on concrete and less than half as much as other kinds of floors.

We will gladly supply circulars, terms and prices, on request.

References.

Chicago Bell Telephone Co., Wisconsin Bell Telephone Co., and many private owners; Holabird & Roche, Marshall & Fox, and E. E. Roberts, all architects of Chicago, Ill.; A. B. Groves, William Levy, Theodore C. Link, and Ittner & Brueggeman, all architects of St. Louis, Mo.; also the following general contractors: James Black Masonry & Contracting Co., St. Louis, Chicago, Omaha, Detroit, Cleveland, Boston; James H. Bright Contracting & Building Co. and W. M. Sutherland Building & Construction Co., both of St. Louis, Mo.

THE KLEIN MANUFACTURING CO.

Concrete Floor Hardeners and Waterproofers

CLEVELAND, OHIO

Products.

METALCRETE, a Hardener, Binder, Densifier and Waterproofer of Concrete. Made in natural (gray) or red.

Metalcrete

TRADE-MARK

Description.

Metalcrete, as the name implies, is made of metals. After the metals are pulverized and certain impurities are removed, it is chemically treated so that *each particle* of metal will expand upon coming in contact with moisture. This expansion continues as long as subjected to moisture and until the voids are hermetically sealed. Thus the concrete is made dense, the voids are sealed and the thin walls reinforced. A dense surface will not dust. A sealed surface will not absorb water. The walls can not wear down faster than the metal particles that reinforce them.

Advantages.

Metalcrete, therefore, produces absolutely watertight concrete, dustproof concrete, and concrete that will stand many times more hard wear, etc., than concrete made by any other system.

Fifty million feet laid to date, without a single case of dissatisfaction.

Specifications.

NO. 1. FOR FLOORS IN SCHOOLS, OFFICE BUILDINGS, THEATERS, GARAGES, ETC. (WHEN TOPPING AND BASE ARE LAID AT SAME TIME)

First—Thoroughly mix one half each of Metalcrete and good tested Portland cement by weight. They should be mixed (dry) until absolutely uniform in color and showing no streaks. Then set aside until ready for use.

Second—Lay your floor base and topping as usual. The topping should be at least ¾ inch thick and should be made of one part good tested Portland cement and two parts clean, sharp, coarse sand (free from loam and clay). See that the topping is not made too wet, then float well.

Third—After the topping is laid and evened, as is usually done, *powder* or *dust* the floor with the Metalcrete-Cement mixture, using 30 pounds of mixture (15 pounds each Metalcrete and cement) to each 100 square feet of topping. Use a small flour sieve for sifting or distributing this mixture over the surface. Allow dust coat to stand about five minutes, then *float mixture in well* (this is very important) with wooden trowel.

Fourth—Then trowel hard.

Fifth—When fairly set, showing no signs of surplus water on surface, trowel a second time until the topping has a smooth, hard finish.

Sixth—After floor is from 24 to 48 hours old, cover evenly with inch layer of wet pine sawdust or shavings, sand or cinders and rewet same twice daily for four or five days. Do not apply sawdust, etc., until the floor is thoroughly set, as same may adhere to and ruin the finish of the floor.

NOTE—If the topping and base are not laid at the same time, we recommend a bond coat as per our Specification No. 3.

Copy of full specifications will be mailed on request.

CAUTION—Do not use floor for 7 days, or while it is curing. Under no circumstances should heavy trucking be done on floor less than 30 days old. We suggest covering the floor with boards to assure complete protection.

NO. 2. FOR FACTORY FLOORS, ETC., SUBJECTED TO EXTREME WEAR AND HEAVY TRUCKING (WHEN TOPPING AND BASE ARE LAID AT SAME TIME)

Same as No. 1, except that 20 pounds of Metalcrete, instead of 15 pounds, are used to each 100 square feet of floor.

NO. 8. FOR LAYING A METALCRETE SYSTEM MONOLITHIC FLOOR

First—The concrete slab should be one, two and four mix, using coarse gravel in preference to crushed granite. Same should be thoroughly mixed, and laid or poured very wet.

Second—Dust the surface with a mixture of one part cement and two parts clean, coarse sand, sufficient to absorb surplus water, the quantity depending upon the amount of water. This is to be floated.

Third—Mix 100 pounds of Metalcrete, two sacks of cement and one sack of clean, coarse sand. This should be thoroughly mixed. Then sprinkle this dry mixture over a surface of about 330 square feet (in other words, use about 30 pounds of Metalcrete, 60 pounds of cement and 30 pounds of sand to each 100 square feet). When this dry mixture is distributed and thoroughly saturated (absorbing remaining water) same should be well floated, then troweled. A second hard troweling should be given when the floor is fairly dry.

Fourth—After the floor has been finished, allow same to *set hard*, then cover the floor with wet sawdust or shavings and keep same wet for three or four days. Under no circumstances should the floor be used for at least a week and no trucking allowed on the floor for about two weeks.

Co-operative Service.

Our engineering department will be pleased at any time to advise you free on any special work. Consult us as often as occasion demands.

Testimonials.

We have hundreds of letters like the following:

CINCINNATI, OHIO, October 5, 1914.

GENTLEMEN:

In reply to your letter of the 3rd inst., regarding Metalcrete that we are using, we wish to state that we are using this in our construction of steel racks, this being used on a floor which carries the steel standing up.

We put in a body about seven inches of concrete and put on a surface coating of about one inch of Metalcrete. In some places we have piled on an average of 10,000 pounds to the square foot, and have yet to find a crack or defect in this material, and it seems to be wearing like iron. It certainly has a fine wearing quality, and would prove a satisfactory floor where there is heavy trucking to be done.

We cannot recommend this too highly from what experience we have had so far with it.

Yours very truly,

THE BOURNE-FULLER COMPANY.

MESSRS. LEENHOUTS AND GUTHRIE, ARCHITECTS,
424 Jefferson Street, Milwaukee.

MILWAUKEE, October 12, 1914.

GENTLEMEN:

Replying to your communication of October 10th, regarding Metalcrete floor hardener, beg to state that we have used same in about 40,000 sq. ft. of floor in and around the brewery, with satisfactory results. In some of the old buildings we have ripped out the old asphalt floors and replaced them with cement, laid with Metalcrete, which will show my faith in the mixture. Yours truly,

JOS. SCHLITZ BREWING CO.

THE MASTER BUILDERS COMPANY

Concrete Floor Hardner

CLEVELAND, OHIO

SALES OFFICES

NEW YORK CHICAGO PHILADELPHIA DETROIT DALLAS INDIANAPOLIS
MONTREAL TORONTO LONDON, ENG.
AMSTERDAM, HOLLAND CHRISTIANIA, NORWAY VIENNA, AUSTRIA SYDNEY, N. S. W.

Product.

MASTER BUILDERS CONCRETE HARDNER, used in accordance with the MASTER BUILDERS METHOD for making Concrete Floors dustproof, wearproof and waterproof.

Patents.

Master Builders Method Patents granted as follows:

U. S. Patents—July 22, 1913; October 6 and 13, 1914.

Canadian Patents—December 30, 1913; May 5, 1914.

Also Patents in England and other Foreign Countries.

Master Builders Method

TRADE-MARKS
Registered United States Patent Office

Description and Advantages.

To have concrete floors that will not dust, crumble nor disintegrate, the worst fault of concrete—its porosity—must first be overcome. Porosity makes concrete floors fragile and dusty; shortens their useful life, and leads to patching and renewals. To prevent this porosity in concrete floors, they must be made right and laid right. Master Builders Method has proved, under many varying conditions, that it best performs this vital work.

Master Builders Method provides for the use of Master Builders Concrete Hardner, a finely divided mineral substance having the qualities of high tensile and compressive strength, and withstanding abrasion to an exceptional degree. Added to ordinary concrete by Master Builders Method, Master Builders Concrete Hardner creates a concrete floor that is extremely dense, wear-resisting, dustproof and waterproof. It is not merely a surface treatment or filler, but is mixed with the sand and cement when the topping of the floor is installed.

Master Builders Method is the original and standard method for making concrete floors that will not dust nor absorb moisture, and that will resist the hardest kind of wear. Master Builders Method is scientific; and wherever a concrete floor can be used, Master Builders Method Concrete Floors will best answer all requirements. These concrete floors are giving ideal service to-day in 50,000,000 square feet of Master Builders Method Floors, and in buildings of every type and description in all parts of the world.

Master Builders "Standard Specification."

Recommended for making wearproof, dustproof and waterproof concrete floors in every type of building.

Wherever practicable, topping to be laid before base has set.

Proportions of Topping—Topping (thickness at least full ¾ inch) shall consist of the following proportions:

One part tested Portland cement; two parts coarse, gritty, clean sand.

If rock or grit is used in addition to sand, specify as follows, instead of above:

One part tested Portland cement; one part crushed rock or grit (not over ⅜ inch in size), free of dust; one part clean, coarse gritty sand.

Measuring Volumes—These proportions shall be accurately measured by volume, in suitable size boxes. No counting by shovels, or measuring by wheelbarrows or other approximation will be permitted.

To determine proper proportions, it is understood that one bag of cement shall be equal to one cubic foot of sand or grits.

Addition of Water—Mix thoroughly dry until uniform in color, showing no streaks or patches of the constituents; if mixed by hand, topping aggregate shall be turned over dry three times. Add sufficient water to saturate mixture and mix thoroughly again. Topping shall at no time be made sloppy.

Application of Topping—Lay and straightedge the topping to a true and even surface; float the surface well with wooden floats to close all voids and hollows.

The Wearproof Finish—A dry mixture of one part Master Builders Concrete Hardner to one part tested Portland cement (by weight), mixed to an even color, shall be sprinkled evenly over surface. Not less than 20 pounds of Master Builders Concrete Hardner and 20 pounds of Portland cement shall be distributed in this manner over each one hundred square feet. This shall be floated in thoroughly and troweled. A second troweling shall be given surface when it has set sufficiently to finish hard and smooth.

Under no circumstances shall the wearproof finish be applied when there is any surplus water on the floated surface.

Safeguarding the Floor—After topping has set up, contractor shall cover it with a uniform layer of soft wood sawdust, shavings, or other suitable covering. This covering must not be applied until experiment shows surface hard enough to prevent covering from scratching or injuring the finish. Surface shall be kept wet for at least five days. Floors, if protected as above, will be ready for light traffic in a week, and for heavy traffic in three weeks, under favorable weather conditions.

Exceptions—The foregoing "Standard Specification" is the standard method of procedure for the average building. The 20 pounds of Master Builders Concrete Hardner recommended per one hundred square feet will give a surface which will withstand any average service. However, there are some cases where the quantities should be varied. These exceptions follow:

In buildings where floors are subjected only to light foot traffic, specify 15 pounds of Master Builders Concrete Hardner to every one hundred square feet, for the wearproof finish.

For floors, piers and loading platforms, etc., which receive extremely heavy wear, specify 25 pounds of Master Builders Concrete Hardner to every one hundred square feet, for the wearproof finish.

For railroad repair shops, forge shops, etc., specify 30 pounds of Master Builders Concrete Hardner to every one hundred square feet, for the wearproof finish.

Master Builders Red Concrete Hardner.

After the elimination of porosity in concrete floors, the second consideration has been appearance and color. There are many uses for an attractive red concrete floor that will have the wearing qualities of a regular Master Builders Concrete floor, and also a good red color that is permanent. Many attempts have recently been made to produce such floors, but no coloring matter could be found that would not decrease the strength and durability of the floor. Our laboratories have developed the right material, and its suitability for the purpose has been tested by a number of years of actual service.

Master Builders Red Concrete Hardner is a combination of the hardening elements found in regular Master Builders Concrete Hardner, with a specially manufactured pure metallic red color. Its employment gives a floor that is as suitable, in most respects, as a tile or composition floor, at a great saving over the cost of either. For all buildings where the decorative fitness of the floor is as important as its lasting qualities and its economy, Master Builders Red Concrete Hardner makes an ideal floor.

PYRAMID PRODUCTS COMPANY

Manufacturers of Concrete Hardeners

BAY CITY, MICH.

BRANCH OFFICES

CHICAGO, ILL., 860 Monadnock Building DETROIT, MICH., 602 Hodges Building

Products.

"Black Diamond" Concrete Hardener, for hardening all kinds of Concrete Floors; "No Dust" Liquid Concrete Hardener, for hardening Concrete Floors and for permanently waterproofing Concrete and Stucco Walls.

"Black Diamond" Concrete Hardener.

"Black Diamond" Concrete Hardener is a finely powdered metallic compound, which, when mixed with cement and sand, makes floors wearproof under the severest trucking conditions, dustproof, waterproof, and oilproof.

Concrete Floors—Due to their porosity and subjection to hard wear, concrete floors break up and disintegrate in time and become useless. "Black Diamond" Concrete Hardener transforms concrete floors from a porous material to a homogeneous mass, which will withstand maximum wear.

Heavy Duty Floors—"Black Diamond" Concrete Hardener, when used on floors of factories and warehouses, and floors subjected to heavy strains, gives a hard, smooth surface impervious to wear, and creates a non-porous surface.

Preparation and Application—Make concrete base in the usual way. Where oil or grease spots show, scrub surface with a solution of two parts of water and one part of muriatic acid. Remove all foreign particles and flood with clear water, allowing two hours for absorption, after which remove all surplus water and apply bonding coat. Mix thoroughly equal quantities of dry "Black Diamond" Concrete Hardener and Portland cement. Thin with water to consistency of heavy paint, and apply with brush. While still fresh, lay topping so that perfect bond may be attained.

Topping—Topping should be ¾ inch in thickness. Mix five pounds of dry "Black Diamond" Concrete Hardener with one hundred pounds of standard Portland cement, after which add 200 pounds of clean, sharp sand. When this has been done, add water necessary for proper consistency and apply to base in the same manner as ordinary concrete, tamping well.

Finishing Coat—Over the entire surface sprinkle evenly a mixture of five pounds of "Black Diamond" Concrete Hardener (dry) and five pounds of Portland cement and trowel to smooth metallic finish. When finishing coat has set, sprinkle the entire surface with sawdust. Soak this thoroughly with water twice a day, for one week. Floor will then be ready for light service, and will withstand heavy trucking thirty days after application.

"No Dust" Concrete Hardener.

"No Dust" Liquid Concrete Hardener is a transparent liquid chemical which transforms concrete into a flint-like mass, making the floor dustproof and waterproof.

Advantages—"No Dust" Liquid Concrete Hardener absolutely stops erosion of concrete floors. The chemical penetrates the pores of the concrete, making it hard as flint. All concrete floors need such treatment. It starts a chemical action which eliminates porosity and transforms concrete into a non-porous mass, making it both waterproof and oilproof.

Application—Clean concrete floor of all foreign matter and flush on "No Dust" Liquid with a long handled stiff brush, applying evenly. The preparation is mixed in the following proportions: First application, one part "No Dust" Liquid to two parts of water; second application, one part "No Dust" Liquid to one part of water; third application, two parts "No Dust" Liquid to one part of water.

Guarantee—The chemical change made by the application of "No Dust" Liquid Concrete Hardener is guaranteed to be permanent.

Covering Capacity—One gallon to one gallon and a half will cover one hundred square feet, three applications.

Co-operation and Prices.

Architects and others are invited to write for further information regarding our products; also, for full specifications for any special work.

L. SONNEBORN SONS, INC.

Manufacturers of Lapidolith, a Liquid, Chemical Concrete Floor Hardener Cemcoat and Special and Technical Paints

262 Pearl Street
NEW YORK, N. Y.

FACTORY
AVONDALE, N. J.

Products.

LAPIDOLITH, a HARDENER for Concrete Floors and a permanent WATERPROOFER for Concrete and Stucco Walls; CEMCOAT, a Wall and Floor Coating for Concrete and other building materials.

Also, HYDROCIDE, for Damp-proofing Foundations and Walls; STRUCTURAL STEEL PAINTS.

Lapidolith.

Lapidolith is a liquid chemical which renders LAPIDOLITH TRADE MARK concrete floors hard, dustproof, wearproof and watertight. When applied to old concrete floors, Lapidolith will prevent further dusting and disintegration.

Advantages of Lapidolith.

Prevents dusting and wear of floors because the texture of the floor, after this chemical has permeated it, is as hard as granite.

The best concrete needs Lapidolith. No two lots of cement are exactly alike and the mixture and troweling always varies. Lapidolith is flushed on the floor and combines with the Portland cement, giving the floor a granite-like hardness which holds the sand and other aggregate so firmly in its grip that friction cannot tear it from its bed.

After Lapidolith is used there is no dust to work up and out, thus saving expensive repairs to machinery, injury to merchandise, etc.

Lapidolith is effective on concrete, cement, stucco.

The labor cost of applying Lapidolith is negligible. Only unskilled labor is required, and an average man should be able to cover from 10,000 to 15,000 square feet per day with one application.

TESTS OF LAPIDOLITH

ABRASION TEST ON BAUSCHINGER APPARATUS

Cubes, two weeks old, treated with Lapidolith and untreated, showed the following results after 200 revolutions of the abrasion disk:

Treated sample weighed before the test	770	grams
After the test	742	"
Loss	28	grams
Untreated sample weighed before the test	750	grams
After the test	429	"
Loss	321	grams

OTHER ABRASION TESTS

Brass weight dropped four times on concrete treated with Lapidolith produced same results as dropping it once upon untreated concrete.

Saw blade drawn eight times across concrete treated with Lapidolith produced same results as drawing it once across untreated concrete.

PERMEABILITY TEST

Water was forced, under 30-pounds pressure, through sections of pipe, one inch deep and six inches in diameter, filled with concrete treated with Lapidolith and untreated concrete. Concrete used was composed of one part of Portland cement and three parts of 20-30 Ottawa sand. Figures below express in cubic centimeters the water which permeated the bodies of concrete in given times.

Time	Lapidolized	Untreated
1 minute	0.135	1.132
30 minutes	0.074	0.186
60 minutes	0.046	0.174

Covering Capacity.

One gallon will cover eighty to one hundred and twenty-five square feet for three applications.

This will vary according to porosity of the cement.

Three coats are sufficient to harden the ordinary floor.

Specifications for Concrete Floors.

Harden and dust-proof with Lapidolith, manufactured by L. SONNEBORN SONS, INC., New York, as per the following directions:

How to Apply—Clean the floor of all dust, dirt and oil. Flush on and distribute Lapidolith evenly with a long-handled stiff brush.

Allow the concrete to dry thoroughly between applications, i. e., allow several hours or longer for drying.

Dilute Lapidolith with water for well laid dense floors.
First application, 1 part Lapidolith to 2 parts water.
Second application, 1 part Lapidolith to 1 part water.
Third application, 2 parts Lapidolith to 1 part water.

NOTE—Lapidolith is especially indicated in the case of poorly laid, or much used floors which begin to show disintegration or excessive dusting.

Guarantee.

The chemical change effected by Lapidolith is guaranteed to be permanent.

An Investigation of the Action of Lapidolith on Concrete.

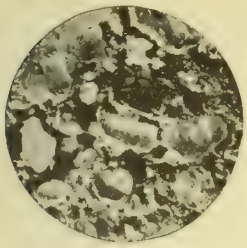
Prof. R. J. Colony, the Petrographer of Cooper Union, New York, a leading consulting authority on concrete, made an examination of treated and untreated

Continued on next page

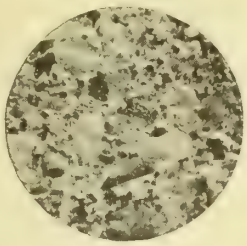
concrete under the microscope, and we quote from his official report:

"The external application of Lapidolith to concrete surfaces results in (a) the formation of an optically isotropic but crystalline substance, derived by a reaction between components of the Lapidolith and the 'cement' matrix of the concrete which (b) has a tendency to fill in voids and cavities and act as a binding agent, thus rendering the surface smoother and more uniform."

Lapidolith actually forms a new crystalline component, which reduces the pores of the concrete.



Untreated. Note large numerous voids (black spots) and roughness of surface



Lapidolized. Note roughness is reduced and voids filled with network of newly formed hard crystalline substance

MICROPHOTOGRAPHS OF SPECIMENS
Magnified fifty diameters

Testimonials from Users.

Chalmers Knitting Company, Amsterdam, New York.

"We have used one barrel of your 'Lapidolith' hardener on our concrete floors, using it only in the runway where we do trucking; and after three applications, finding it so satisfactory, we have placed an order for another barrel to use in other places in our concrete flooring, which is subject to wear and dusting.

"We are pleased to learn by experience that 'Lapidolith' is all you claim for it."

McGucken & Hyer, Engineers & Contractors, Tampa, Florida.

"Two years ago we applied Lapidolith, according to directions, to our office floor which was dusting very badly, and it has given entire satisfaction. We have on the strength of it, used this material in hardening the cement floors in a large moving picture theatre in which the floors are subject to extreme wear, and to-day they are giving entire satisfaction."

SOME PRESENT USERS

Ford Motor Co., Philadelphia, Pa.
Alleghany Steel Co., Pittsburgh, Pa.
Crane Co., Detroit, Mich.
Republic Rubber Co., Youngstown, Ohio
American Woolen Co., Lawrence, Mass.
The Edison Portland Cement Co., 1133 Broadway, New York, N. Y.
Fleischmann Mfg. Co., Peekskill-on-Hudson, N. Y.

Cemcoat for Interior and Exterior Use.

Cemcoat is an ideal enamel-like wall and floor coating, in white and colors.

Cemcoat
TRADE-MARK

Absolutely free from all poisonous ingredients. It forms an even, non-porous surface which affords no lodgment for dust and cannot be injured by soap and water or even water applied by a hose.

The pigment and vehicle used in Cemcoat produce a tough, wear-resistant and smooth surface, to which dust and smoke will not adhere and which can easily be maintained in a perfect, sanitary condition.

Cemcoat for Interior Walls—Not affected by extreme heat or extreme cold, steam or water; prevents oil, water, and lime stains, and will not crack, crumble or wear off.

White Gloss Cemcoat—Reflects all the light and disseminates it equally throughout the room. It does not turn yellow. Unlike enamel, it needs no under coat, thus lessening the cost.

Covering Capacity—One gallon of Cemcoat will cover 200 to 250 square feet of surface with two coats and requires no filler or primer.

Colors—Made in any desired shade. The following standard colors are always in stock:

Gray, red, green, stone, brown, terra-cotta, cream, white, concrete, moss green, maroon and black.

Cemcoat for Exterior Walls—Used effectively on brick, tile, slate, stone, wood shingles, canvas or felt and on plaster or concrete. It seals the pores and minute cracks on the surface; and on account of high degree of elasticity and intense adhesion to surfaces, is not affected by expansion or contraction of building material and will not peel off or crack. Lasts indefinitely and will remain waterproof under the most trying conditions.

For walls where moisture must not be allowed to penetrate, Cemcoat is the logical coating.

Cemcoat for Flooring—When a decorative effect is desired, concrete floors may be treated with Cemcoat. It renders them not only attractive, but also free from dust and dampness.

Specifications for Cemcoat.

For *exterior and interior walls or for floors* apply two coats. Allow two days before floors are subjected to heavy wear.

How to Apply—Clean the surface to be coated of all dirt and grease. Thoroughly stir the Cemcoat with a broad paddle, before using, so as to mix the pigment and vehicle, and do not allow any sediment to remain at the bottom of the container.

Apply the Cemcoat with a flat wall brush, working it well into the pores so as to secure an even and well-bonded coat.

If any thinning is necessary, use only a little turpentine.

WEARCRETE ENGINEERING COMPANY

MANUFACTURERS OF

Mastic Flooring, Damp-proofing, Preservative Compounds, Etc.

GENERAL OFFICES

People's Gas Building

CHICAGO, ILL.

BRANCH OFFICES IN PRINCIPAL CITIES

Products.

REZILITE MASTIC FLOOR COMPOUND; WURTZITE DAMP-PROOFING and WATERPROOFING; WURTZITE STONE-BACKING and PLASTER BOND; ELATERITE PRESERVATIVE PAINT; LIQUID CEMENT, and WEARCRETE FLOOR HARDENER.

Rezilite Mastic Floor Compound.

Description—Rezilite Mastic Floor Compound is a combination of what is scientifically known as mineral caoutchouc, asbestos fiber, and a calcine, so especially treated as to form a plastic material of the consistency of mortar which when applied cold, quickly solidifies and forms a coating or covering for concrete, steel, wood or any other hard substance that is firm and stable.

Unlike other mastic compounds, Rezilite Mastic contains no asphalt, Gilsonite, coal tar, organic vegetable or other cheap matter that will deteriorate or disintegrate. Rezilite Mastic is superior to any other known mastic compound, since it becomes not only harder but more elastic with age, thereby possessing unusual strength, toughness, wear-resisting and resilient qualities.

Rezilite Mastic Floors combine all the good features of concrete, wood and linoleum. They have the wearing qualities of concrete, the warmth of wood, and the resilient, noiseless and dustless qualities of linoleum.

Uses—Rezilite Mastic is unequaled for use in hospitals, sanitariums, schools and dormitories, jails and other buildings where sanitary floors are desired, as under the heaviest service conditions it remains absolutely sanitary. It will not originate dust, and it can be quickly and thoroughly cleaned by the simple process of flushing, after which it dries off immediately. Can be used indoors and outdoors, as exposure to weather conditions does not affect it. Where strong chemical solutions are used, as in nickel-plating rooms, laboratories and the like, it is unequaled.

Advantages—Unlike various kinds of composition floors, cork, tile and many other flooring materials, Rezilite Mastic will not crack, check, peel or crumble. Being elastic, it deadens sound, and expands and contracts with the base to which it is applied.

This flooring is absolutely sanitary. By reason of its perfect adhesion, it becomes a part of the permanent construction; dirt, vermin and disease germs cannot penetrate it or get between it and the base to which it is applied, as is the case with linoleum or wood floors.

Rezilite Mastic is the only satisfactory covering for concrete floors. Paint wears off. Liquid hardener does not conceal defects in cement topping. Integral hardener is at the mercy of unskilled finishers and climatic conditions. Linoleum frays at the edges; is unsanitary, and cannot be permanently cemented to concrete. Composition topping generally cracks from settlement and loosens from sub-base. Asphalt toppings are black, unsightly and unfinished in appearance; too thick and soft for many purposes.

Rezilite Mastic is absolutely waterproof and fire-resisting. It is not affected by heat or cold, acids, alkalies or brines.

Rezilite adds greatly to the efficiency as well as the comfort of employes in light manufacturing and other industries, as it does not cause foot soreness and fatigue, like concrete and other non-yielding floor surfaces. Furthermore, as it is waterproof and easily cleaned, dampness due to mopping is eliminated by its use. It is an efficient protection against rheumatism and other ailments common to damp and cold floor conditions.

Rezilite Mastic is a rich terra cotta color, which will never fade, and makes a very attractive floor for offices, schools, hospitals, churches, hotels, Young Men's Christian Association rooms, clubs, factories, stores, etc.

Application—Rezilite Mastic is applied with a trowel and rolled in one continuous sheet one-eighth of an inch thick over the entire floor; and if desired it can be extended up over cove, base or wainscot, forming one continuous covering or sheath which is waterproof, germproof, and fire-resisting.

Rezilite Mastic is easily laid and readily repaired. If changes in the floor are made necessary at any time, even after the lapse of years, the old surface can be covered with a layer of new mastic of any desired thickness, since the new mastic will vulcanize to the old mastic without danger of separation. It leaves no cracks or joints, and no trace of repaired portions. Thus, old Rezilite Mastic Floors can be kept in the best state of preservation at lowest possible upkeep expense. It is superior to other floorings for many various types of buildings.

It is furnished in a mortar-like consistency, troweled on in three coats, second and third coat rolled; the result being a rubbery floor, with no noise, no dust, no dirt. It will not crack, because it is elastic and sticks tenaciously to any hard, firm surface to which it is applied.

Economy—Rezilite in the beginning is not only cheaper than most other flooring, but is less expensive in the long run, as it improves in appearance by use instead of showing signs of wear. The longer the service, the smoother it gets; yet it never becomes slippery.

In a building of several stories in height enormous saving can be effected in building material, whether it be of steel, stone, brick, terra cotta or a combination of these or other materials, as the thickness of mastic is but one-eighth of an inch, as compared with the usual concrete base, sleepers and cinder fill, wood or other thick toppings of several inches in thickness.

Continued on next page

It adds less to the dead load than any other topping as the standard thickness of one-eighth of an inch weighs only one pound in place. This thickness is sufficient to withstand heavy service such as trucking and the like, since it will outwear the same thickness in concrete.

A very appreciable economy is obtained in the use of Rezilite Mastic. The price per square foot varies naturally with the area, nature of the work, kind of foundation, and location of work. Upon receipt of information carrying these data, a definite estimate for the work installed will be promptly submitted.

Antislip—Rezilite Mastic is antislip whether wet or dry. It is, therefore, indicated for elevators, safety landings, stair treads, stair landings, hallways, runways, etc.

Insulation—Rezilite is a perfect insulator or non-conductor, and can safely be used as a floor covering around switch boards in electric generating stations, power plants and the like.

Wurtzite Waterproofing and Bonding Compound.

Wurtzite Compound is a complete distillate, of paint-like consistency, black in color, having a non-porous, acidproof, alkaliproof and waterproof base of extremely elastic, tough, intensive adhesive and rubber-like qualities.

Advantages—When applied cold with a brush to concrete, brick or stone, it seals the pores, destroying capillary attraction, and forms an elastic, rubber-like covering which completely shuts out dampness, besides having permanent waterproofing qualities. Its intensely adhesive character gives it most positive bonding qualities, permitting doing away with lath or furring, as plaster coats can be applied directly over it. Its extremely elastic qualities permit of maximum expansion and contraction without cracking or checking; and unlike asphalt or coal tar products, it will not soften nor crawl when hot, nor become hard or brittle so as to hair-crack in freezing weather.

Application—Wurtzite is applicable for every character of waterproofing there is in connection with cement, concrete, brick or stone work, for building reservoirs or any other structure; as bonding for plaster wherever used, or between new and old concrete, or beneath tilings or cork and other linoleums.

Where Wurtzite is specified it is not necessary for the architect to specify different material for outside foundation, inside walls, and bonding or stone-backing, as Wurtzite meets every requirement, thereby saving much by the purchase of one material in large quantities.

Elaterite Preservative Paint.

Elaterite Preservative is a black enamel, proof against acid, alkali, water, and electricity. It is the best coating for smokestacks, steam-pipes, ovens, metal lath, steel reinforcements, tin over roofs, corrugated iron, structural steel and bridges.

Advantages—Since Elaterite Preservative is a non-conductor and not affected by the elements, sulphur or carbondioxide, it is impossible for any metal to which Elaterite Preservative is applied to rust, until coating is worn off and leaves the metal bare. It is tough and elastic, will contract and expand and dent with the surface to which it is applied, and the metal can be bent without breaking the surface. It will not get soft and run when hot, nor brittle and hard in freezing weather.

Wearcrete Floor Hardening Compound.

Wearcrete is a finely powdered metallic compound which, when mixed with cement and sand, produces a top finish for concrete floors that will not dust, will be waterproof and oilproof, and one that will withstand the most severe wear and tear.

Ordinary concrete floors are porous. Notwithstanding its many advantages, concrete has one besetting fault—porosity. This is especially troublesome and annoying in floor construction. Porosity causes concrete to be very dusty and granulate; and it need not be subject to more than ordinary wear to cause it to break down and disintegrate, thus granulating and rendering the floor useless. The Wearcrete System presents a commercial and practical method of treating concrete mixtures so as to overcome the existing difficulties. A small portion of Wearcrete to every bag of cement used in the top dressing is all that is required.

Wearcrete Compound combines with the cement and sand and, through its subsequent action, forms a dense, compact and practically cell-like, homogeneous mass which presents a surface virtually proof against wear when laid in accordance with our standard specifications.

Guarantee.

The Wearcrete Engineering Company guarantees the quality of its material and all work performed by its own workmen, and will repair free of charge all defects due to the use of improper materials or workmanship.

Samples.

Samples, together with full specifications and literature, will be gladly mailed on request, free of charge.

REFERENCES

BUILDING	LOCATION	OWNER	ARCHITECT
Y. M. C. A. Building	Rock Island, Ill.	Young Men's Christian Association	C. D. McLane
Deerfield Township High School	Highland Park, Ill.	Board of Education	J. C. Llewellyn
Y. M. C. A. Building	Galesburg, Ill.	Young Men's Christian Association	C. D. McLane
Warehouse Building	Rock Island, Ill.	Henry Darts Sons Co.	C. D. McLane
Chemistry Building	Urbana, Ill.	University of Illinois	James M. White
Service Building	Chicago, Ill.	Overland Motor Stores Co.	C. A. Eckstorm
Store Building	Sterling, Ill.		Ashby & Schultz
Municipal Plant	Chicago, Ill.	City of Chicago	Chas. W. Kallal
Office Building	Bettendorf, Iowa	Zimmerman Steel Co.	Owners
Church Building	Galesburg, Ill.	First Christian Church	S. R. Rodgley
Club Rooms	Chicago, Ill.	Wm. Hale Thompson Republican Club	Remodeled
Church Building	Wilmette, Ill.	First Church of Christ, Scientist	H. Vernon Lee
Office Building	Chicago, Ill.	American Three Color Type	Geo. M. Mayer
Industrial Building	Grand Rapids, Mich.	Clipper-Belt Lacer Co.	Robinson & Campau
Office Building	Davenport, Iowa	Crescent Macaroni & Cracker	Clausen & Krause
Nurses' Home	Grand Rapids, Mich.	Union Benevolent Association	Robinson & Campau
Y. M. C. A. Building	Streator, Ill.	Young Men's Christian Association	W. Foster

AMERICAN MASON SAFETY TREAD CO.

LOWELL, MASS.

BRANCH OFFICES

BOSTON, MASS., 813 Old South Building
NEW YORK, N. Y., 1565 Fulton Building, 50 Church Street
CHICAGO, ILL., and ST. LOUIS, MO., Joseph T. Ryerson & Son, General Western Distributors
KANSAS CITY, MO., 604 Ridge Building
PHILADELPHIA, PA., 900 Widener Building
WASHINGTON, D. C., 511 Eleventh Street, N. W.

Products.

"Mason" Safety Tread (lead or carborundum filled); "Mason" Black Diamond Safety Tread; "Mason" Safety Tread and Cork Composition; "Mason" Safety Sidewalk or Vault Lights; "Mason" Safety Coal-Hole and Ash Lift Covers; "Mason" Non-Slip Ladder Shoes; "Stanwood" Tread; Brass and Dentil Nosings; Karbolith Flooring.

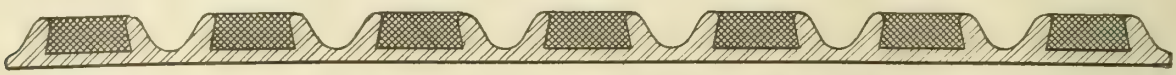


Fig. 1. 6-inch Section, Flat

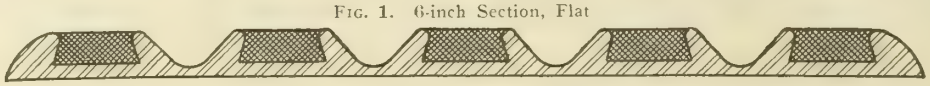


Fig. 2. 4¾-inch Section, Flat

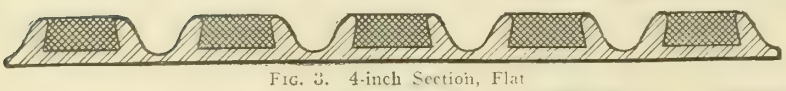


Fig. 3. 4-inch Section, Flat

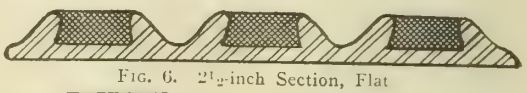


Fig. 6. 2½-inch Section, Flat

Fig. 3A. 3¾-inch Section, Flat

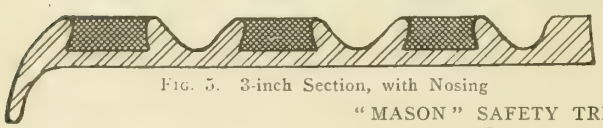


Fig. 5. 3-inch Section, with Nosing

Fig. 4. 3½-inch Section, with Nosing

"MASON" SAFETY TREAD FULL-SIZED CROSS-SECTIONS
Steel Base, Lead or Carborundum Filled

Uses of "Mason" Safety Tread.

It is adapted for any situation where a safety tread is needed, such as stairways, thresholds of doors and elevators, fire-doors, inclined passageways, vestibules of cars, around machinery where the presence of oil is dangerous, etc.

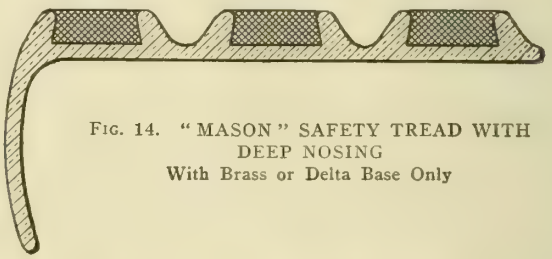
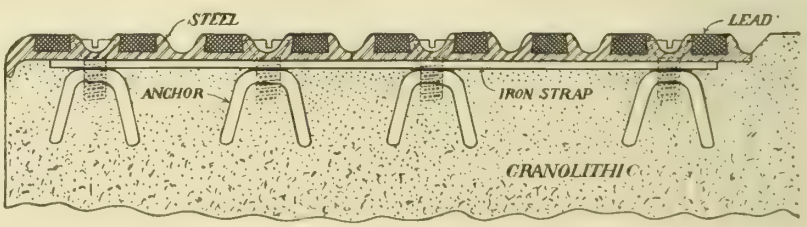


Fig. 14. "MASON" SAFETY TREAD WITH DEEP NOSING
With Brass or Delta Base Only

Description of "Mason" Safety Tread.

"Mason" Safety Tread prevents accidents caused by persons slipping. Is unaffected by moisture or frost, and is fireproof; materially adds to the structural strength of the tread, and gives an absolutely secure footing. It is recognized by leading architects and engineers as the best, most reliable and most durable safety tread manufactured. It has been in constant use for many years and every year has shown an increased sale. Over ninety per cent of the safety tread in use is "Mason" make.

Made of rolled steel or extruded hard brass base of substantial thickness (¼ inch), with dovetailed grooves filled with lead or carborundum. Open grooves occupy alternate spaces, hence filling and continuous supports wear evenly; there is no filling of open grooves with mushrooming or creeping lead, no jagged edge for the retention of filth and germs, and dirt can be readily swept and washed out. No top dressing to wear off and leave a polished, dangerous surface, as its non-slippery parts remain intact during the whole life of the tread.



CROSS-SECTION ON GRANOLITHIC STEP
Showing "Mason" Safety Tread 3½" wide, with Nosing on outer edge backed by 4" width, connected by Iron Strap to Iron Anchors.
Scale, ½ full size

Standard Sizes.

Manufactured with steel base, in widths of 2½", 3¾", 4", 4¼", and 6" flat; 3" with nosing or overhang and square back, and 3½" with nosing and beveled back. Combination of these sizes will give any desired width.

REPAIRING WORN STAIRS

Continued on next page

It is cut to order, with necessary countersunk holes, and with anchors if for cement work.

Manufactured with hard brass base in widths of 2", 2¼", 2½", 2¾", 3", 3½", 4", and 6" flat; and with nosing in widths of 2⅛" and 3½" with nosing similar to that with steel base, 2" and 2¾" wide with deep nosing.

For repair work it is the best known material, being applicable upon outer or inner stairs of iron, granite, marble, slate, cement or wood. Used on concrete stairs it saves the edges from chipping.

The illustration at bottom of opposite page shows repairing of worn stairs by use of "Mason" Safety Tread in a half pan; the worn places being filled with Karbolith and tread backed with Cork Composition.

"Mason" Black Diamond Safety Tread.

The "Mason" Black Diamond Safety Tread (Fig. 25) consists of a non-slip stair tread, of a deformed surface for the catching of foreign substances, and the necessary open end grooves for drainage. The non-slip diamond shaped units are of an abrasive mixture, of asphaltum and carborundum, surrounded by a frame of metal on edge, assuring durability. This form is particularly useful for door thresholds and elevator sills. Its neat appearance and its beveled edges make it especially adapted for this purpose. It is furnished in steel or brass.

"Mason" Safety Tread and Cork Composition.

For interior stairways, landings and passageways this composition gives excellent satisfaction and is more economical than a complete safety tread installation. It is in use in nearly all the large department stores in New York, Boston, Philadelphia, Chicago, and numerous other cities.

Dentil Nosings.

It is often desirable to have the nosing and safety tread in one piece. This is furnished in the combination "Mason" Tread and Nosing (Fig. 26) and the "Mason" Non-slip Dentil Nosing (Fig. 27). The latter prevents the foot from slipping forward over the extreme edge of the nosing, and sidewise as well. Both types are especially suited for use with concrete, asphalt, or composition filling.

"Cooper" Brass Nosings.

For stair treads; made of hard brass. (Figs. 15, 16 and 20.)

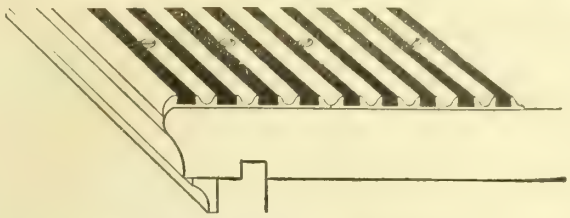
"Stanwood" Tread.

This tread is made up of a number of thin strips of high carbon steel, bent so as to form a series of openings in its surface. This is an exceedingly strong and serviceable step. It is especially adapted where a non-slipping self-cleaning tread would be of advantage, such as on stairways to engine rooms, areaways, etc. It is made to order in any size or shape.

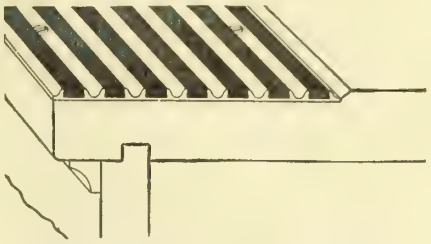
The "Stanwood" Tread has been used for years by the U. S. Government on its war vessels; as well as on the cars of the leading railroad companies, and by automobile makers.

Karbolith Flooring.

Made of a composition of materials, largely of magnesium base, that produces a hard, durable surface. It is fireproof, ratproof and germproof; and is adapted to all interior floors, especially car floors, sanitary base and wainscoting. It is impervious to heat, cold and dampness; and will not chip, crack, tear loose from its base, nor disintegrate. Its surface is smooth, fine grained, but not slippery. It can be laid over cement, granolith, iron or wood, and binds firmly to its base.

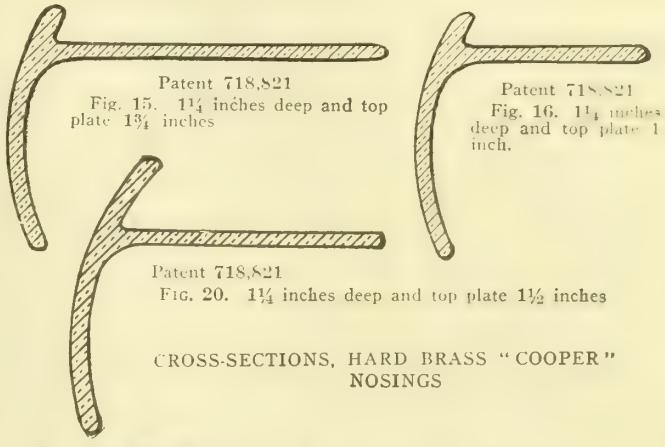


With Nosing placed on Top Stair



Without Nosing (Flat) Showing Rebate

"MASON" SAFETY TREADS



CROSS-SECTIONS, HARD BRASS "COOPER" NOSINGS

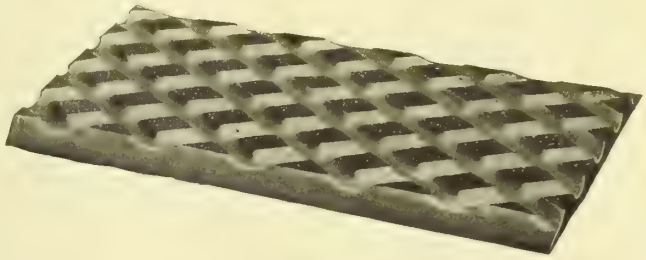


Fig. 25. "MASON" BLACK DIAMOND SAFETY TREAD

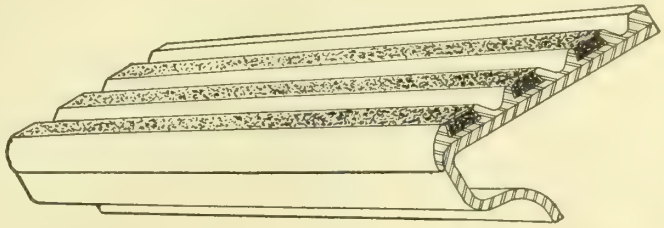


Fig. 26. "MASON" SAFETY TREAD AND NOSING

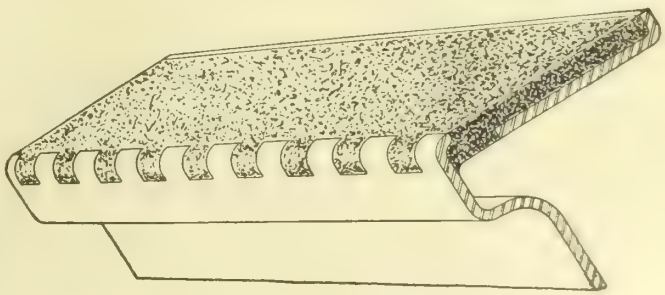


Fig. 27. "MASON" NON-SLIP DENTIL NOSING

UNIVERSAL SAFETY TREAD COMPANY

MAIN OFFICE AND FACTORY

WALTHAM, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 17 Madison Avenue
PHILADELPHIA, PA., 1825 Widener Building
CHICAGO, ILL., 168 North Michigan Avenue
SAN FRANCISCO, CAL., 523 Market Street

Products.

Manufacturers of Safety Treads, for Stairways, Floor Coverings, Car Steps, Platforms, Ramps, etc.; "Universal" Anti-Slip Metal Safety Tread; "Universal" Standard Safety Tread, Steel or Brass Base (Lead Filled); and Asbestic Flooring.

"Universal" Anti-Slip Metal Tread.

This is undoubtedly the most durable and efficient safety tread on the market. Experience and severest tests have shown this to be the case. Composed of abrasive grains of alundum, held together by a lead composition, fastened to a steel plate in so perfect a manner that it is impossible to separate them, the tread is constant in its efficiency, as the material is the same throughout its entire safety tread thickness. The idea of using the binder of lead composition is to take advantage of the fact that lead is non-adhesive to ice or snow. The plate on which the tread surface is built is lead-coated on the bottom as well as on the top in order to prevent rust. It is obvious how desirable this feature is, especially in naval architecture.

This tread is designed primarily for hard service as well as efficiency. It may be had in either the corrugated style or a flat surface, as shown by the cuts (Figs. 1 and 2), the latter being specially recommended where sanitary conditions are of the greatest importance, such as in hospitals, or where a large area is to be covered, and where ease of cleaning is of great importance. Another feature of importance (and especially where traffic is severe) is the "reinforced" nosing (Fig. 3). This is especially valuable on stairways which are largely devoted to "down traffic." Most treads wear out very rapidly at this point; but this nosing is so designed that it is in perfect proportion to the rest of the tread, and will wear out even with it.

Notable installations are on the main stairway of the Brooklyn Bridge and on the test stairway of the Interborough Subway at Dey Street in New York City, where the Anti-Slip Metal Tread has outworn any other tread ever placed there.

"Universal" Safety Tread.

The "Universal" Safety Tread is constructed of a steel or brass base-plate, in which are punched openings forming rows of vertical steel teeth; lead strands are used for the non-slip filling of the tread. This filling is held firmly in position by the teeth and is clinched to the underside of the base-plate. The plate is so constructed as regards the teeth that it is impossible for the lead strands to creep out in any way. By this construction a constantly increasing, non-slipping surface is presented until the tread is entirely worn out. This tread may be had in any width desired in one piece up to 12 inches, and can be made with nosing of any length or shape. (Fig. 4.)

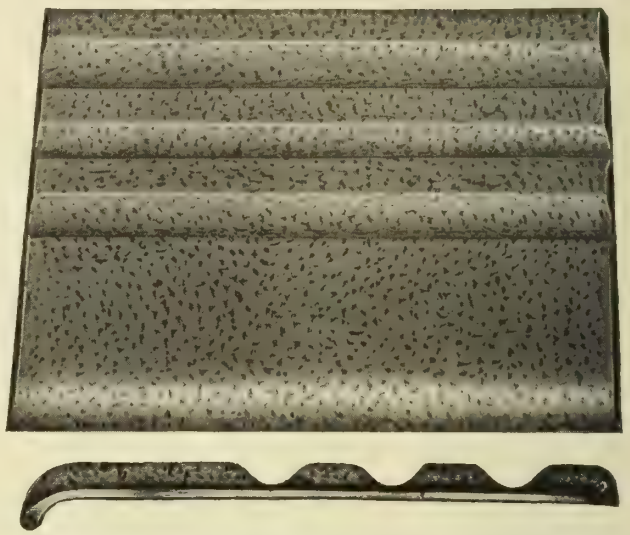


Fig. 1. CORRUGATED TYPE "UNIVERSAL" ANTI-SLIP SAFETY TREAD, WITH WIDE FRONT EDGE AND NOSING.

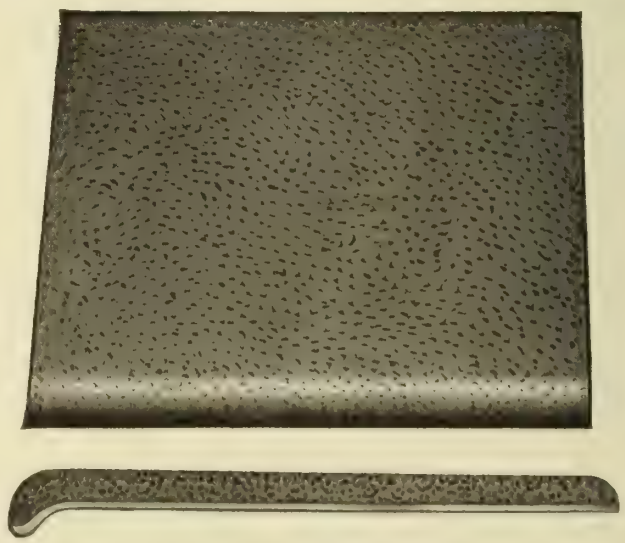


Fig. 2. FLAT TYPE "UNIVERSAL" ANTI-SLIP SAFETY TREAD, WITH "LIP" NOSING.

Fig. 3. FULL-SIZE CROSS-SECTION REINFORCED NOSING ON CORRUGATED TYPE
For extraordinary heavy service

Continued on next page

SAFETY TREAD INSTALLATIONS

PHILADELPHIA, PA.

Columbia Avenue Station, P. & R. R. R.
Rapid Transit Stations
Woolworth Five and Ten Cent Stores
Broad Street Station, Pennsylvania R. R.
Philadelphia American Ball Park
New Curtis Publishing Building
John B. Stetson Building

NEW YORK, N. Y.

Grand Central Terminal
Grand Central Palace
City Police Stations
Third Avenue Railway
Vanderbilt Hotel
Ritz Carlton Hotel
Interborough Rapid Transit Company

BOSTON, MASS.

Boston Elevated Railway, Elevated and Subway Stations
Boston Theater
United States Post Office
Keith's Theater
Gilchrist Department Store
United States Hotel
Old Colony Trust Company

CHICAGO, ILL.

American Brake Shoe Foundry Company
Congress Hotel
American Snuff Company
St. Ann's School
Kline's Department Store
Fuller & Fuller Company
Sears Roebuck Company

DETROIT, MICH.

Detroit Free Press Building
Ford Motor Company
Continental Motor Company
Hudson Motor Company
Western Electric Company
University Buildings
Michigan Central Terminal

In addition to these installations there are a great many others, but the above give an idea of who are the users of our Safety Treads. If interested in further installations, perhaps in your own city, we will be pleased to advise regarding the same.

Asbestic Flooring.

A specially prepared mastic, sanitary flooring. Used also for leveling worn stairs. (See Fig. 5.)

Concrete Stairs.

To protect the edges of stairs of this kind in some way to prevent their chipping off is very important, and a piece of safety tread with small nosing should be used. This not only indefinitely prolongs the life of the stairs, but has the added advantage of rendering them safe against accidents by slipping. Specially designed anchors are used to hold the tread securely in position in the concrete.

Combination Carpet.

The Safety Tread and Cork Carpet Combination will be supplied when desired and where the wear is not severe.

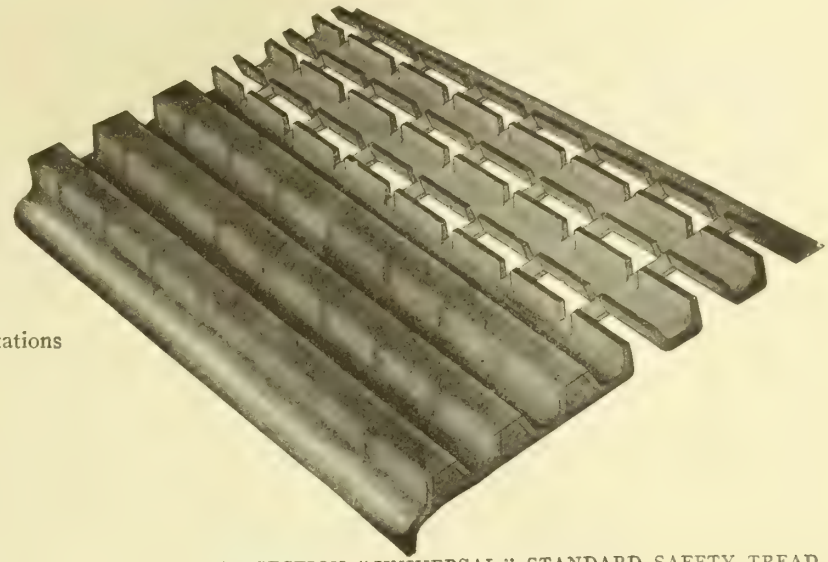


FIG. 4. SECTION "UNIVERSAL" STANDARD SAFETY TREAD, SHOWING BASE-PLATE BEFORE AND AFTER LEAD IS ROLLED IN

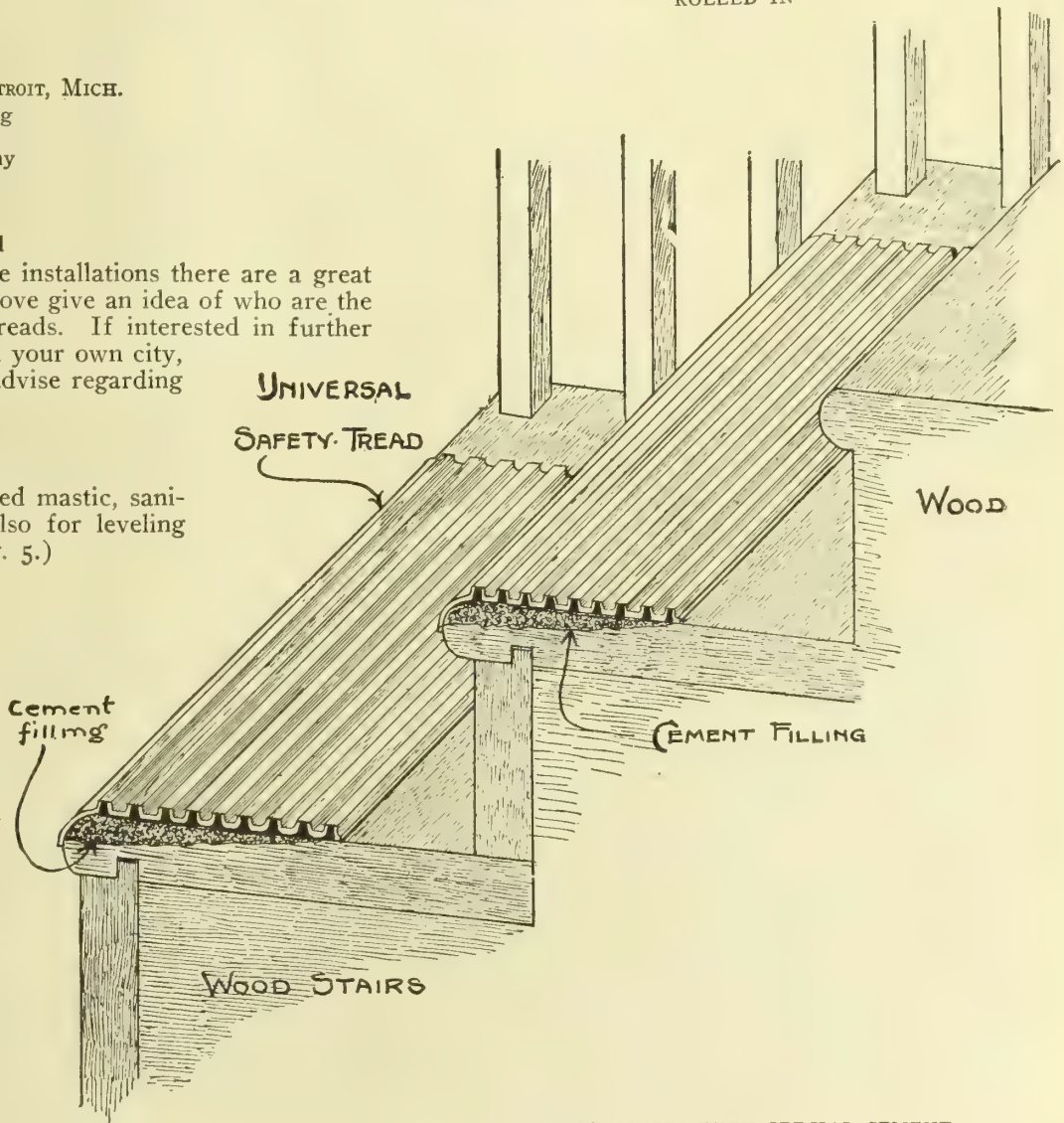


FIG. 5 METHOD OF LEVELING WORN WOOD STAIRS WITH SPECIAL CEMENT
Also applicable to Marble or Slate. Easily installed

NEW YORK BELTING & PACKING CO.

ORIGINAL MANUFACTURERS

Interlocking Rubber Tiling

91-93 Chambers Street

NEW YORK, N. Y.

TELEPHONE, WORTH 2400

BRANCH STORES

CHICAGO, ILL., 130 West Lake Street
PHILADELPHIA, PA., 821-823 Arch Street
MINNEAPOLIS, MINN., W. S. NOTT Co., Second Avenue and Third Street
BOSTON, MASS., 65 Pearl Street
PITTSBURGH, PA., 420 First Avenue
ST. LOUIS, MO., 218-220 Chestnut Street
SAN FRANCISCO, CAL 519 Mission Street
SPOKANE, WASH., 157 South Monroe Street

Products.

INTERLOCKING RUBBER TILING, SANITARY RUBBER BASE, RUBBER STAIR TREADS and RISERS, and RUBBER and BRASS STAIR NOSINGS.

Interlocking Rubber Tiling.

Interlocking Rubber Tiling is manufactured of high-grade, wear-resisting rubber in two skilfully designed tiles which interlock perfectly (Fig. 1).

The impervious liquid cement employed in the laying hermetically seals the joints, rendering the floor absolutely water- and germ-proof, and making it impossible for the tiles to become separated or loosened from the underfloor.

FIG. 1. INTERLOCKING RUBBER TILES

Adaptability—The increasing use of Interlocking Rubber Tiling *as originated by us over twenty-five years ago,* demonstrates that the merits of our products are well established.

Universally recognized as the ideal floor for Residences, Churches, Banks, Office Buildings, Theaters, Court Houses, Clubs, Hospitals, Libraries, Railroad Cars, Steamships, etc.

Wearing Quality—Floors of Interlocking Rubber Tiling are wonderfully durable. Will last a lifetime under the most severe traffic conditions.

The resiliency of the rubber prevents wear resulting from the effects of abrasion and friction. The elasticity of the rubber saves it from cracking and becoming unsightly, as is sometimes the case with mosaic and marble floors.

Other Advantages—Interlocking Rubber Tiling is odorless, non-slippery, sanitary, non-absorbent, waterproof, fire-resisting, and noiseless.

Colors and Designs—Many artistic effects can be produced by combining any of the following colors: red, white, light and dark green, buff, salmon, black, light and dark gray, blue, light and dark brown.

Uniform price for all designs.

Interlocking Rubber Nosing.

Used in connection with Rubber Tiling, it forms a safe, non-slippery stair tread. Made in five sizes for iron, wood or marble steps, and in any color.

FORTY-SECOND STREET BUILDING, MADISON AVENUE AND 42ND STREET, NEW YORK, N. Y.

BUCHMAN & FOX, Architects

Main Hall, Basement Hall and Subway Entrance floored with Interlocking Rubber Tiling

Polished Brass Nosing.

Especially recommended for public buildings, steamships and places where the traffic is excessive. 1½ inches wide by $\frac{3}{16}$ inch thick.

Sanitary Rubber Base.

Protects woodwork and walls against discoloration when cleaning floors. Made from the same high-grade rubber as the tiling, in any color and in continuous lengths without joints.

Furnished with cap moulding in any height up to 7¾ inches, or without moulding in any height up to 7 inches. Suitable for stair risers.

Catalogue and Samples.

Full information, samples, and illustrated catalogue in colors will be sent on request.

THE JOHN D. EMACK CO.

Artistic Roofing Slate

PHILADELPHIA, PA.

QUARRY OFFICE
POULTNEY, VT.

NEW YORK OFFICE, 45th Street and Vanderbilt Avenue

Products.

Roofing Slate in all colors and grades.
Structural Slates and Slate Blackboards.

Colors.

Greens—Dark colonial green, light colonial green, mottled green.

Grays—Colonial gray, rustic gray, shingle gray.

Purples—Mottled purple, clear purple.

Reds—Bright red, dark red, variegated red.

Hard Vein Variegated—Containing many different shades including purples, greens, browns, buffs, grays and blacks in various shades.

Blacks—All grades including Bangor, Peach Bottom, Chapman, Albion, Lehigh.

Old Stonesfield Slate.

This is one of our most interesting productions, containing many soft neutral shades that weather very beautifully after being laid, producing a most pleasing and restful effect. In texture this slate is unexcelled. The surfaces are rough and irregular, overcoming the usual smooth, sleek appearance of most slate.

Garden Walks and Terraces.

There is no rock more suited for this purpose than slate, as the colors are natural and blend perfectly with flowers and shrubbery.

Graduated Slate Roofs.

The Architect of today who does not realize the wonderful, artistic possibilities to be obtained with roofing slate in graduated sizes and varying colors should stop and give this subject close attention and deep thought, as there is no other known roofing material from which equal results can be had.

The old English and Welsh roofs put on centuries ago in a crude fashion (such as shown below) are in reality works of art, and have proven so intensely interesting to tourists travelling abroad that their duplication on modern buildings is now desired.

The John D. Emack Co. have made a deep study of various effects to be had in Graduated Slate, and produce individual results that have been greatly admired and show the wonderful possibilities of slate. This is due to their wide experience and to having in their production a range of colors including every known shade ever found in roofing slate. They contend that each building should be treated individually and a roof built to conform with its particular lines, as this is positively the only way in which the best results can be had.

Detailed Drawings for Roofs.

We furnish, with all of our graduated orders, detailed drawings giving the exact number of courses of each thickness and length, drawn to scale, and from which roofers should not be allowed to deviate or the even graduated effect would be lost. We make no charge for this service, our object being to give the very best possible results.

References.

The John D. Emack Co. have been in business continuously since 1873, and will gladly furnish references of their work on request.

A COTTAGE AT HORSHAM, SUSSEX
One of the early examples of Graduated Stonesfield Slate

THE AULD & CONGER COMPANY

PRODUCERS OF

Roofing Slate, Blackboards, Structural Slate, Slaters' Tools, Etc.

Bangor Building

CLEVELAND, OHIO

QUARRIES
POULTNEY, VT.
BANGOR, PA.

Products.

Roofing "Slates of Quality." Blackboards, Structural Slate, Slaters' Tools, Machines, and Supplies.

Roofing Slates.

We own and operate five quarries, and have for nearly fifty years produced annually a large output of Selected Clear Purple, Mottled Purple and Green, Unfading Green, Purple Vein, Rough Rustic Gray, Weathering Green, Genuine Certificate Bangor.

Selected Clear Purple.

All that the name signifies, and a material of rich purple color.

Mottled Purple and Green.

Purple slates, mottled by nature with green and mixed together with light and dark greens. (See illustration.)

We can supply more of green and less of the mottled purple, or vice versa, as one may prefer.

Purple Vein.

A roof everlasting, artistic and most distinctive. (See illustration.)

Rough Rustic Gray.

Green slates shaded to gray.

Weathering Green.

Various shades of green laid together with buffs and browns. (See illustration.)

Genuine Certificate Bangor.

Our Bangor Union Quarry slates have always been considered the standard of excellence. Black, strong, durable and unfading. Each bear a label, and shipments are accompanied by certificate and warranty insuring genuineness.

Stocks.

Complete stocks of all grades carried in standard thickness slate, sizes 12 by 6 to 24 by 14 inclusive. Special slates $\frac{3}{16}$ to 1 inch in thickness; lengths 14 to 30 inches, regular or random widths.

Illustrations—Illustrations shown herein are all thick slates, random widths.

MOTTLED PURPLE AND GREEN

Continued on next page

WEATHERING GREEN

PURPLE VEIN

PRICES AND WEIGHTS APPROXIMATE ALL GRADES F. O. B. QUARRY

	Per Square	Approximate Weight
Standard No. 1 according to quality and grade	$4.50 to $7.00	
Nail Holes Drilled and Countersunk:		650 Lbs.
Selected 3/16-inch	7.00	750 Lbs.
Selected 1/4-inch	10.00	1000 Lbs.
Selected 3/8-inch	15.00	1500 Lbs.
Selected 1/2-inch	20.00	2000 Lbs.
Selected 3/4-inch	30.00	3000 Lbs.
Selected 1-inch	40.00	4000 Lbs.
Selected 1 1/4-inch	50.00	5000 Lbs.
Selected 1 1/2-inch	60.00	6000 Lbs.

Write for Delivered Prices.

Graduated Lengths, Random Widths.

We specialize on slates of graduated lengths and random widths, and suggest a typical layout for 21- to 22-ft. rafter as follows; other lengths proportionate:

TYPICAL LAYOUT OF GRADUATED LENGTHS AND RANDOM WIDTHS

	Courses	Thickness, Inches	Length of Slate, Inches	Exposure per Course, Inches	Total Exposure, Inches
	4	3/16	14	5 1/2	22
	4	3/16	16	6 1/2	26
	4	3/16	18	7 1/2	30
This under-	4	1/4	20	8 1/2	34
eaves with first	4	1/4	22	9 1/2	38
regular course	3	3/8	24	10 1/2	31 1/2
makes 1 inch	3	1/2	26	11 1/2	34 1/2
thickness at	1	3/4	28	12 1/2	12 1/2
eaves.	1	3/4	30	1 x 1/2	13 1/2
	1	1/2	30	13 1/2	13 1/2
	Undereaves	1/2	17	none	.....

Specifications.

Standard No. 1 Slates—Cover all roofs having a pitch with No. 1 Purple Vein [or other grade as desired] "Slates of Quality" from the quarries of The Auld & Conger Co.

Slates to be carefully sorted and machine punched by the slater on the job, and fastened with [size nail] copper or galvanized nails.

Slates to be [.... x ....] size and in no case to have less than 3-inch head lap. Slates at hips and valleys laid in slater's cement for distance of ..... inches each way, and to be thoroughly flashed. Slates to be underlaid with two-ply [kind of felt], lapped, and securely nailed.

Slating to be done in a thorough and workmanlike manner, to the satisfaction of the architect, and guaranteed tight for ..... years after completion.

Graduated Slates—Cover all roofs having a pitch with No. 1 Mottled Purple and Green [or grade as desired] "Slates of Quality" from the quarries of The Auld & Conger Co. Slates to be of full thicknesses specified below; to be machine drilled and countersunk; to be laid in random width throughout the roof and mixed as to color. Where differing elevations occur and in the case of dormer roofs and cheeks, the slates should tie in with similar lengths and thicknesses of slates on the main roof.

[Follow with underlay, flashings, fastenings, cement.]

[Kind of valleys and hips, guarantee, etc., in usual form.]

The thicknesses from 3/16 to 1 inch and lengths from 10 to 30 inches may be changed to suit conditions, but the exposures, based on 3 inch head cover, should always appear in specifications.

Undereaves slates	17" long; 1/2" thick; exposure, none
One course	30" long; 1/2" thick; exposure, 13 1/2"
—— courses	30" long; 3/4" thick; exposure, 12 1/2"
—— courses	28" long; 1/2" thick; exposure, 12 1/2"
—— courses	26" long; 1/2" thick; exposure, 11 1/2"
—— courses	24" long; 3/8" thick; exposure, 10 1/2"
—— courses	22" long; 3/8" thick; exposure, 9 1/2"
—— courses	20" long; 1/4" thick; exposure, 8 1/2"
—— courses	18" long; 1/4" thick; exposure, 7 1/2"
—— courses	16" long; 3/16" thick; exposure, 6 1/2"
—— courses	14" long; 3/16" thick; exposure, 5 1/2"

In case it is desirable to have all slate of one thickness, but of graduated size, make the graduations from 24 inches to 10 inches long for 3/16 inch thickness; 24 inches to 12 inches long for 1/4 inch or thicker. In all specifications call for random widths, which break the tiresome appearance of perpendicular joints

Blackboards and Structural Slate—From the quarries of The Auld & Conger Co., which are too well known to require further mention. Estimates and prices furnished upon application.

Samples.

Samples of any of our materials gladly furnished to interested parties. Wire inquiries at our expense.

THE CHAPMAN SLATE COMPANY

MAKERS AND SHIPPERS OF

"William Chapman" Roofing Slate

BETHLEHEM, PA.

Products.

"William Chapman" Roofing Slate in graduated lengths and thicknesses and random widths; also in all the regular stock sizes.

Quarries.

The quarries of The Chapman Slate Company were opened in 1850, and today, with a capacity of over six thousand squares per month, produce more roofing slate than any other single quarry operating in the country.

Our product today is quarried from a depth of over two hundred feet; is made by highly skilled mechanics, many of whom have long been in the service of the Company, and the entire output is most carefully inspected to insure the proper grading.

Heavy Slate.

Owing to the numerous and constantly increasing demands from architects, we have, for the past year, been making a heavy rough slate ranging from one quarter inch to one inch in thickness, and in graduated lengths and random widths. The artistic effect of a roof laid with the genuine "William Chapman" special rough slate, gives tone and character to a building which cannot be produced by the use of any other roofing material.

If an especially heavy effect is desired, we recommend extra thicknesses, slate to be laid in graduated lengths and thicknesses, and random widths.

Where a roof has a high pitch, a very desirable effect will be produced by using at the eaves a slate thirty inches long, graduating from sixteen to fourteen inches long at the ridge, and in thicknesses from one inch at the eaves to one quarter inch at the ridge. All laid in random widths.

For manufacturing plants or other places where particularly hard wear is required, we recommend the use of "William Chapman" special rough slate, one quarter inch thick.

We can make any thickness, length or width slate, and will gladly co-operate with architects by submitting detailed plans showing the sizes of slates to be used in the various courses, to produce the most artistic effect as well as most efficient results.

Specification.

The following specification form is offered as a suggestion for specifying slate for graduated roofs:

"All roofing slate to be "William Chapman" Heavy Slate, of graduated thickness and random widths, same to be laid in accordance with plans approved by the architect.

Next Column

Description.

The excellence of the "William Chapman" roofing slate lies in the toughness of the fiber, which is very hard and close grained, thus insuring a durability beyond any known limit of time. "William Chapman" roofing slate absorbs no moisture and will not decompose. Largely owing to these characteristics there is practically no breakage in transportation.

Stock Slate.

The stocks of regular sizes are large and complete. This slate is about three sixteenths of an inch thick, weighing approximately six hundred and eighty pounds to the square, allowing for the standard three-inch lap. There are fourteen different sizes, ranging from six by twelve inches to fourteen by twenty-four inches. Special sizes will be made to order when required.

Specifications.

To insure your getting the best roofing slate, the following specification form is given as a suggestion:

"All roofing slate to be 'William Chapman' slate, size ..... (as best adapted to the different buildings). Allow a full three-inch lap of the third slate over the first, and provide two [galvanized, or copper] nails to each slate. Each row of slates to break joints with the adjoining row. The slates at the eaves, ridges and valleys to be so cut that every bond will be uniform with the rest, and the slate on one side of the ridge shall project and finish without cresting. In steel construction when slate is laid direct on steel purlins, use copper nails, which should be bent under the lower part of the flange of angle or purlin; or if preferred, punch four holes in each slate and tie under purlins."

Labels.

To prevent substitution of inferior quality slate, we have instituted the practice of labeling about two per cent of each shipment of genuine "William Chapman" roofing slate with a label, facsimile of which is reproduced herewith, on which is indicated the grade, whether No. 1, B's, or No. 2.

"WILLIAM CHAPMAN" SLATE LABEL

Continued on next page

Shipping Facilities.

We can ship direct from the Chapman Quarry to every State in the Union, to Canada and Mexico, or to seaboard for export to England or France. With our present capacity, we can supply any size order for "regular" stock, promptly.

References.

Herewith we give a partial list of buildings covered by "William Chapman" slate roofs:

Building and Location	Building and Location
Brooklyn Bridge Buildings, New York, N. Y.	St. Barnaby's P. E. Church, Philadelphia, Pa.
Holy Trinity Church, New York, N. Y.	The Orphanage, Paterson, N. J.
Central Park Buildings, New York, N. Y.	Hackensack Water Co., New Durham, N. J.
Isabella Heimath Residence, New York, N. Y.	Hackensack Water Co., New Milford, N. J.
Long Island Historical Society, New York, N. Y.	Buildings of Asylum, Overbrook, N. J.
Metropolitan Opera House, New York, N. Y.	Morris Plains Asylum, Morris Plains, N. J.
Monastery, Hoboken, N. J.	U. S. Fort Terry, Plum Island, N. Y.
Mutual Life Insurance Co.	U. S. Fort H. G. Wright, Fishers Island, N. Y.
P. & R. Freight Station, Subway, Philadelphia, Pa.	Convent Buildings, Lodi, N. J.
Roman Catholic Cathedral, New York, N. Y.	St. Ledislaus Polish Catholic Church, Philadelphia, Pa.
R. C. Church of the Epiphany, Philadelphia, Pa.	Names of some of our clients:
Staats-Zeitung, New York, N. Y.	Bethlehem Steel Company, Bethlehem, Pa.
State Capitol, Albany, N. Y.	C. M. Taylor & Co., Philadelphia, Pa.
State Capitol, Hartford, Conn.	Coleraine Iron Co., Philadelphia, Pa.
St. George's Church, New York, N. Y.	Consolidated Gas Co., New York, N. Y.
St. Vincent's Hospital, New York, N. Y.	Midvale Steel Co., Philadelphia, Pa.
U. S. Military Academy, West Point, N. Y.	Vulcan Iron Works, Wilkes-Barre, Pa.
First Presbyterian Church, Newark, N. J.	Wm. C. Allison & Sons, Philadelphia, Pa.
Mt. St. Mary's Convent, Plainfield, N. J.	Wm. Sellers & Co., Philadelphia, Pa.

ROOF OF THE KNEPPER HOUSE, BETHLEHEM, PA.
Showing the effect produced by the use of "William Chapman" Heavy Graduated Slate in random widths

Sizes of Slate on End Roofs		Sizes of Slate on Dormer Roofs	
Six Courses	24 ins. Long, 1 in. Thick	Four Courses	24 ins. Long, 7/8 in. Thick
Six Courses	22 ins. Long, 3/4 in. Thick	Four Courses	22 ins. Long, 7/8 in. Thick
Six Courses	20 ins. Long, 1/2 in. Thick	Four Courses	20 ins. Long, 1/4 in. Thick
Six Courses	18 ins. Long, 3/8 in. Thick	Four Courses	18 ins. Long, 1/4 in. Thick
Six Courses	16 ins. Long, 1/4 in. Thick	Four Courses	16 ins. Long, 1/4 in. Thick
Six Courses	14 ins. Long, 1/4 in. Thick	Four Courses	14 ins. Long, 1/4 in. Thick

The courses correspond on Dormer Roof so as to meet equal lengths on the End Roofs

ESTABLISHED 1884

E. J. JOHNSON, INC.

Quarrier of Roof Slates, Slate Blackboards, Structural Slate

BRANCH OFFICE
PITTSBURGH, PA., 1423 Park Building

38 Park Row
NEW YORK, N. Y.

QUARRIES
BANGOR, PA.
NORTH POULTNEY, VT.
NORTH GRANVILLE, N. Y.

Products.

ROOF SLATES, SLATE BLACKBOARDS, STRUCTURAL SLATE, SLATERS' TOOLS, SNOW GUARDS.

Roof Slates.

We operate our own quarries, producing Black, Grey, Green, Purple and Red Roof Slates. "Out of the Ordinary" Roof Slates are our specialty.

Old European Style of Slate Roofing.

We have given special study to the reproducing of Old European Styles of Slate Roofing and maintain a service department giving attention of a strictly technical character to the arrangement of color effects, making up of plans, and supervising the carrying out of the proper arrangements. This method was followed in European countries centuries ago, and is being introduced into this country through the suggestions of prominent architects.

Specifications for Old European Method, with the E. J. Johnson, Inc., Slate.

Leading architects have pronounced our varying shades of Purples and Greens, Red, and Greys, as being particularly suited to this method, the colors supplying a soft tone and effective color schemes of highly artistic character; and they specify them either in one solid color, varying shades of one color, or a mixture of two or more colors. Slates of graduated thickness, random widths all laid haphazard, suggest some of the striking features of the Old European Slate Roofs. (Ask for Brochure "Old European Slate Roofs.")

Cover all sloping roofs with one thickness of heavy tarred roofing felt to be approved by architect, over which lay the E. J. Johnson, Inc., Unfading Green Roofing Slate (or other color as may be desired) with nail-holes drilled and countersunk and in random widths and graduated lengths as follows:

Under eave course 17½" long by ½" thick; eave course 30" long by ½" thick, 13½" to weather; the next course 30" long by 1" thick, 13½" to weather; the next two courses 28" long by ¾" thick, 12½" to weather; the next three courses 26" long by ½" thick, 11½" to weather; the next three courses 24" long by ⅜" thick, 10½" to weather; the next three courses 22" long by ¼" thick, 9½" to weather; the next three courses 20" long by ¼" thick, 8½" to weather; the next three courses 18" long by 3/16" thick, 7½" to weather; the next four courses 16" long by 3/16" thick, 6½" to weather; the next four courses 14" long by 3/16" thick, 5½" to weather; the next five courses 12" long by 3/16" thick, 4½" to weather. All slate to be fastened with galvanized wire nails of suitable lengths for the various thicknesses.

NOTE—The foregoing is for a roof with a 22-foot rafter. The arrangement may be varied to suit any length rafter, the thickness increased or decreased or the cost reduced by using thinner slates, as the random and graduated effect would be obtained even though full 3/16" slates were used entirely. A uniform length of slate and exposure throughout the roof with random widths is another scheme specially adapted to 3/16" thickness. In general the color effects obtainable are solid colors in Blue-Black, Grey, Green, Purple and Red. In each color are varying shades—in some mottled effects—making it possible to introduce several shades of one color in a roof, or two or more colors in several shades. The use of "weathering" slate, in part or entirely, adds further possibilities. Specify by number from our pamphlet "Old European Roofs," or we will supply special color schemes.

FIG. 1. E. J. JOHNSON EUROPEAN METHOD OF LAYING SLATE

Prices and Weights.

Prices and weights of special thicknesses of our Unfading Green, Purple, Unfading Mottled Purple and Green, and Blue-Black, f. o. b. quarry, including nail-holes:

3/16" thick per square	$7.25	weight 750 lbs.
¼" thick per square	10.00	weight 1,000 lbs.
⅜" thick per square	16.00	weight 1,500 lbs.
½" thick per square	20.00	weight 2,000 lbs.
¾" thick per square	30.00	weight 3,000 lbs.
1" thick per square	40.00	weight 4,000 lbs.
1¼" thick per square	50.00	weight 5,000 lbs.
1½" thick per square	60.00	weight 6,000 lbs.

Red Roof Slate produced of same thickness. Prices sent on application.

Continued on next page

Consulting Service.

This service offers practical value to the Architect and Roofing Contractor by supplying them with the technical facts needed in preparing specifications and carrying them out. These facts include personal consultation where possible; the submitting of samples showing arrangement of colors to harmonize with surrounding conditions, working it out from the standpoint of quarry possibilities, and the making up of layouts showing the varying sizes and thicknesses of slates.

Where our Old European Method is adopted, we make up and supply blue-prints of roof plans, outlining in detail how slates are to be laid, and, finally, any further necessary practical advice to aid the Architect and Roofing Contractor. The Old European Method of laying slate is becoming so exceedingly popular and has grown to such magnitude that the service department which we have inaugurated has been made necessary. Our idea is to aid the Architect and Roofer in order that all the technical points may be reduced to so simple a proposition that any roofer may work out and comply with the conditions of the specifications.

During thirty odd years of practical handling of slate propositions, we have accumulated a fund of slate information which we place at the disposal of Architects and Roofers through our Consulting Service Department.

Old European Slate Floor.

Random and irregular size slabs, wide joints, semi-smooth surfaces, random colors, purple, green and red, especially adapted to church aisles, floors, etc., reproducing the old European cathedral floor effects. Sound deadening.

Full description with interesting suggestions furnished on application.

Our Standard No. 1 Roof Slate Full $\frac{3}{16}$ Inch Thick.

"Standard No. 1 Slate" is the trade-name applied to the ordinary thickness of Roof Slate, which approximates $\frac{3}{16}$" in any of the colors, and implies the best material as to quality and smoothness of surfaces. Thickness is not sufficiently or properly established in the trade to make that important point clear and definitely fixed as it should be, but leaves the question open to the use of thin or substantially split slate as may be the policy of those who supply it. We are earnest advocates of substantially split slates and make in all our Roof Slates a Standard No. 1 full three sixteenths inch thick; and if architects will specify the "E. J. Johnson, Inc., Standard No. 1 Slates *full three sixteenths inch thick*" it will insure this point of maximum strength and thickness which is so properly expected in a slate roof.

Among our grades of Standard Roof Slates, full $\frac{3}{16}$" thick, are the following:

The E. J. Johnson, Inc., Bangor Vein (Blue-Black), a slate of superior strength, excellent color and wearing quality. Each slate is labeled with the Bangor Slate Association label and accompanied with our own certificate.

The E. J. Johnson, Inc., Unfading Green, a slate of uniform green, being a light green when first quarried, but weathering to a beautiful delicate shade of green, greatly admired.

The E. J. Johnson, Inc., "Superior Grey," a slate of dark grey color, unusual strength, suitable for solid color or mixture with two or more shades of Blue-Black.

The E. J. Johnson, Inc., Variegated Green, consisting of several shades of green to be laid at random throughout the roof; the shades of green varying slightly, but enough to give a pleasing variation throughout the roof.

The E. J. Johnson, Inc., Variegated Green and Purple, contains slate of the two colors laid at random throughout the roof. Many of these slates will weather to a yellowish tinge.

The E. J. Johnson, Inc., Mottled Purple and Green, a slate containing the two colors; a goodly proportion of the individual slates showing the two colors in more or less mottled effect, purple predominating, other slates being solid green or purple, but colors that are not in strong contrast.

The E. J. Johnson, Inc., Clear Purple, the slates making a roof of solid purple color.

The E. J. Johnson, Inc., Clear Red, being a handsome uniform shade of terra cotta red, making an exceedingly rich appearing roof.

The E. J. Johnson, Inc., Mottled Red, a slate of slightly varying shades, with occasional slates having markings of a brownish color and others with very slight markings of green. A roof of this slate gives a pleasing variation throughout its surface, which is most delicate and without any sharp contrasts. Its unique appearance is highly artistic and exceedingly attractive.

"Rough Effect" Slates in any of the above grades are made up by us, these consisting of slates with more or less rough surfaces. Highly effective results are being obtained through the use of these slates.

Variety in color effects are being sought in roofs as never before. It is not generally realized that such a variety of colors is to be found in slate. With our own quarries producing every known color, with their variations, we are in position to work out roof schemes in slate of great effectiveness.

It is recommended that in all of the above slates the nail-holes be drilled and countersunk at the quarry. In specifying our slates and seeing that they are used, the architect will be assured of substantial, well-made slates that are not put on the market to meet cheap competition, and yet they are sold at the lowest prices, quality and make-up considered. We will issue our own certificate with each shipment, which should be required by the architect.

Specifications for Ordinary or Standard No. 1 Slate of Full $\frac{3}{16}$ Inch Thickness.

Cover all sloping roofs with one thickness of single-ply tarred roofing felt properly lapped and of quality as may be approved by the architect, over which lay the E. J. Johnson, Inc., Unfading Green Roof Slate (or otherwise as may be desired) Standard No. 1 full $\frac{3}{16}$" thick, nail-holes drilled and countersunk, size 20" x 10", each Slate fastened with two yellow metal slating nails 1¼" long. All Slates to be laid with 3" lap and exposure of 8½" (or other dimensions suitable to size of Slate used), with butts laying tight. Under-eaves and top courses to be of same width (10") and with grain of Slate vertical; no "stretchers" or Slate with grain running horizontal will be permitted. Slates at valleys, hips, rakes and ridges to be laid in elastic cement of same color as Slate.

Small pieces of Slate at valleys and hips will not be allowed. Metal at gutters must run well up under Slate. Ridging of 16-oz cold-rolled copper (or other metal), 3" flange coming down over Slate, covering all nail-holes; 14-oz. copper flashings and 16-oz. cap flashings wherever necessary.

(Detailed information respecting specification requirements will be furnished architects upon request.)

Continued on next page

Roof Slate Samples.

We are furnishing these in sizes suitable for mailing, packed in a convenient box. In case a sample is wanted quickly, we shall be pleased to forward same on request, although full-sized samples will always be supplied if desired.

The E. J. Johnson, Inc., Slate Blackboards.

These we produce at our quarry located on the celebrated Bangor vein of slate. This slate rock is of a particularly tough, elastic nature and very close-grained, the surface thereby being susceptible to a very smooth finish which is permanent. We make no attempt to meet prices of cheaply surfaced Blackboards.

Our method of surfacing the slate is by hand-shaving; and our special method of perfect jointing enables a section of any length to be erected in the class-room where joints will not interfere with marking. Blackboards when crated and shipped are carefully marked with room and section number. (See our Blackboard pamphlet for full instructions covering the proper setting of Blackboards in the class-room.)

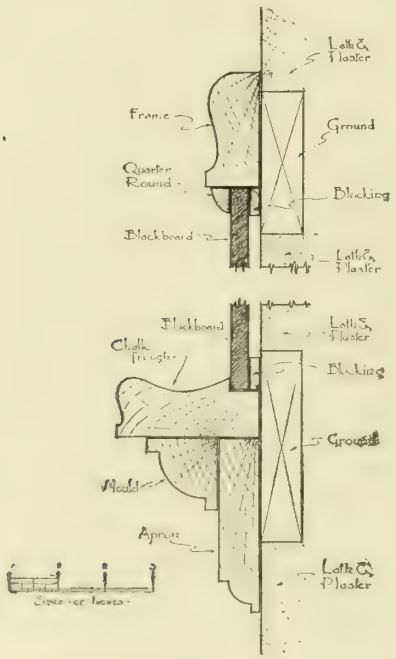


FIG. 2. METHOD FOR CONSTRUCTING SLATE BLACKBOARD FRAMES

Specifications for Erecting the E. J. Johnson, Inc., Slate Blackboards.

In frames erected by carpenter (see Fig. 2) set the E. J. Johnson, Inc., Bangorvein Quarry Slate Blackboards ..... high, and to be solidly backed wherever necessary with well-seasoned pine blocks thoroughly glued. All joints to be filled with good glue before bringing together. When glue at joints has thoroughly dried, scrape the surfaces of blackboards at joints to an even face, after which rub such scraped surface with a proper stone or shave with a knife to restore the perfect face of the slate.

Sections up to 5′ 6″ shall be in one piece; sections over 5′ 6″ and up to 11′ in two pieces; sections over 11′ and up to 15′ in three pieces; sections over 15′ and up to 20′ in four pieces, and sections over twenty feet in pieces not less than four feet long and approximately even lengths.

NOTE—Architects should insist upon every slate in the section being firmly backed so that when completed no slate may yield to pressure; that joints fit tight, and that surfaces of slates at joints be perfectly flush so that chalk marks may be readily made across the joint. All these desirable results are obtainable with the E. J. Johnson, Inc., Bangorvein Quarry Slate Blackboards.

Regular Sizes of Blackboards.

Slate Blackboards are regularly made up 3′ 0″, 3′ 6″ and 4′ 0″ high, and often on special order 4′ 6″ and higher. Any height desired can be made on order. Regular thickness will run from ¼″ to ⅜″. Weight approximately five pounds per square foot.

Double-faced Slate Blackboards are made for door panels.

Structural Slate.

We make Structural Slate for all purposes, including Treads, Platforms, Urinals, Base, Lintels, Hearths, Grave Vaults, etc.

The E. J. Johnson, Inc., Bangorvein Ribbon Structural Slate is made from black rock of unusual toughness and finish, with greatest care for perfect fitting.

Orders will be executed by us from blue-prints, with exactness and practical precision, so important and necessary to the erection of a perfect job.

Details are not here supplied because of the very great variation applying to this character of work, but when requested we will supply any detail suggestions desired.

Slate in Green, Purple, and Mottled Purple and Green can also be supplied.

Snow Guards.

These are of two general types: the individual Wire Snow Guard, scattered throughout the roof, and the Rail or Pipe Guard, consisting of two, three or four pipes properly supported along eaves of roofs.

The Wire Guard consists of spirals of wire standing two inches above the roof and in quantities according to pitch of roof, the steeper roofs requiring 150 to the square, while on roofs of flattest pitch 75 is sufficient (intermediate pitches proportionately). The idea is that these guards will hold the snow on the roof until it melts. The E. J. Johnson, Inc., Style "A" is the strongest Wire Snow Guard, and is made in copper and also galvanized. The Rail or Pipe Snow Guard consists of supporting standards along eaves which hold two, three or four pipes. The snow sliding off the roof is scattered by these pipes, thereby preventing damage. The E. J. Johnson, Inc., patented "B" Galvanized Snow Guard Standard should be placed five feet apart along all eaves. Three galvanized pipes (1″ outside diameter) are recommended.

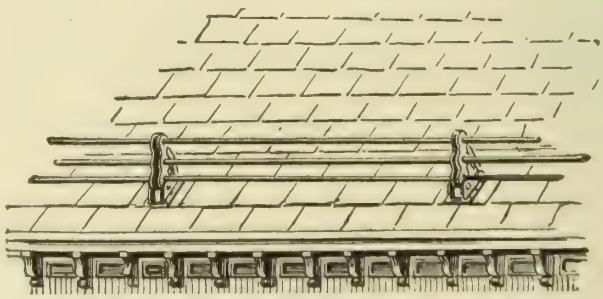


FIG. 3. THE E. J. JOHNSON, INC., STYLE "B" RAIL SNOW GUARD

Delivered Prices.

We will guarantee cost of transportation on our goods to any point upon application.

Switch to Catalogue

Continued on next page

References.

The final test of any building material is found in its selection by prominent architects for their better class of work, where simplicity, purity and durability are sought. Space does not permit of our quoting more than a few of the buildings on which our Roof Slate has been used, but we will gladly furnish to prospective builders or architects names of buildings in their particular locality which may be inspected, or supply such information as will lead to a better understanding of the unusual advantage which our Slate has over other material.

Correspondence implies no obligation. It is a privilege to submit our suggestions.

Among buildings where our slate productions of "Out of the Ordinary" Roof Slates have been used are the following, the architects' name also being given:

Roof Slate

Algonquin Hotel, St. Andrews, N. B., Barott, Blackader & Webster
E. H. Harriman Residence, Arden, N. Y., Carrère & Hastings
Burke Foundation, White Plains, N. Y., McKim, Mead & White
C. K. G. Billings Estate Buildings, Mill Neck, N. Y., Guy Lowell
Cathedral College, Church of the Immaculate Conception, Brooklyn, N. Y., Gustave E. Steinback
Gordon Mather Residence, Toledo, Ohio, Mills, Rhines, Bellman & Nordhoff
St. Peter's Parish House, Morristown, N. J., Bertram G. Goodhue
Mrs. Francis Carolan Residence, Burlingame, Cal., Willis Polk & Co.
Colony Club, New York, N. Y., Delano & Aldrich
E. L. Ford Residence and Garage, Grosse Point, Mich., Albert H. Spahr
Cornell University, Residential Halls "A" and "D," Ithaca, N. Y., Day & Klauder
Nelson Hall (Geo. Blow, owner), Yorktown, Va., Griffen & Wynkoop
Fred. P. Humphreys Residence, Convent, N. J., Harrie T. Lindeberg
College of the City of New York, New York, N. Y., Geo. B. Post & Son
Graham Ryle Residence, Harrison, N. Y., Arthur C. Jackson
Paul Moore Residence, Convent, N. J., Harrie T. Lindberg
St. Cazunires Church, Worcester, Mass., John William Donohue
Effingham Lawrence Residence and Farm Buildings, Cold Spring, N. Y., Foster & Gade
Congregational Church, Williamstown, Mass., Chas. C. Grant
R. S. Pierrepont Residence, Peapack, N. J., Montague Flagg, 2nd
W. W. Wiard Residence, Syracuse, N. Y., Ward Wellington Ward
University of Michigan, Martha Cook Dormitory, Ann Arbor, Mich., York & Sawyer
Hugh Herndon Residence, Pelham, N. Y., W. H. Orchard
Julius McVicker Residence, Larchmont, N. Y., Little & O'Connor
Trinity Church, Asheville, N. C., Cram, Goodhue & Ferguson
Hugh Stephens Residence, Jefferson City, Mo., Tracy & Swartwout
Astor Memorial, Rhinebeck, N. Y., Albro & Lindeberg
Joseph D. Schlotman, Residence, Garage and Service Buildings, Grosse Point, Mich., Albert H. Spahr
Yale University, St. Anthony Hall, New Haven, Conn., C. C. Haight
John T. Gillespie Residence, Morristown, N. J., Albro & Lindeberg
University of Michigan, Chi Psi Fraternity House, Ann Arbor, Mich., York & Sawyer
C. H. Smithers Residence, Great Neck, L. I., Caretto & Forster
First Presbyterian Church, San Francisco, Cal., Wm. C. Hay
Women's Reformatory, Chapel, Clinton, N. J., Delano & Aldrich
Dr. Dudley Allen Residence, Cleveland, Ohio, Chas. Schweinfurth
Cathedral of St. John the Divine, Choir School, New York, N. Y., Cook & Welsh
Yale University, Zoological Laboratory, New Haven, Conn., C. C. Haight
Sage Memorial Church, Far Rockaway, N. Y., Cram, Goodhue & Ferguson
Women's Club, Evanston, Ill., E. O. Mayo
Musical Art Building, New York, N. Y., Donn Barber
South Methodist University, Dallas, Tex., Shipley, Rutan & Coolidge
Woman's College, Cleveland, Ohio, C. F. Schweinfurth
First Baptist Church, Pittsburgh, Pa., Cram, Goodhue & Ferguson
University of Indiana, Gymnasium, Bloomington, Ind., R. P. Daggett & Co.
Hopewell Clarke Residence, St. Paul, Minn., P. J. Linnon
Victor Morawitz Residence, Garage and Stables, Delano & Aldrich
Public Library, Mishawaka, Ind., A. F. Wickes
Rutherford Stuyvesant Pierrepoint Residence and Garage, Peapeck, N. J., Montague Flagg II.
Jerome Mendleson Residence and Garage, Albany, N. Y., Lewis Colt Albro
F. C. Soule Residence, Syracuse, N. Y., A. L. Brockway
Y. M. C. A. Building, Greenwich, Conn., M. L. & H. G. Emery
Elementary School, Scarsdale, N. Y., Guy Lowell
Bryan Mullanphy School, St. Louis, Mo., William Ittner

Structural Slate

Astor House Building, New York, N. Y., Charles A. Platt
American Machine & Foundry Co. Building, Brooklyn, N. Y., Francisco & Jacobus
Harvard Club, New York, N. Y., McKim, Mead & White
Forestry Building, State College, Syracuse, N. Y., Lewis F. Pilcher
Agricultural Buildings, State College, Farmingdale, N. Y., Lewis F. Pilcher
Chapel of the Intercession, New York, N. Y., Bertram G. Goodhue
Battin High School, Elizabeth, N. J., C. Godfrey Poggi
Paul Moore Residence, Convent, N. J., Harrie T. Lindeberg
Long Island State Hospital, Brooklyn, N. Y., Franklin B. Ware
Osborn Hall Nurses' Club, New York, N. Y., Parish & Schroeder
Times Building Annex, New York, N. Y., Buchman & Fox
Horace Mann School, New York, N. Y., Edgar A. Josselyn and Howells & Stokes
Elks Club, Brooklyn, N. Y., H. Van Buren Magonigle
Rockefeller Institute of Medical Research, Animal House, New York, N. Y., Shepley, Rutan & Coolidge

Slate Blackboards

High School, Albany, N. Y., Starret & Van Vleck
High School of Commerce, Springfield, Mass., Kirkham & Parlett
High School, Binghamton, N. Y., C. Edward Vosburg
Regis High School, New York, N. Y., Maginnis & Walsh
High School, Flushing, N. Y., C. B. J. Snyder
East Academic Building, West Point, N. Y., Cram, Goodhue & Ferguson
West Orange School, West Orange, N. J., Dillon, McLellan & Beadel
School, Irvington, N. Y., Ewing & Chappell
School, Leonardo, N. J., Clarence Brazer
School, Glen Cove, N. Y., Mason R. Strong

PROVIDENT SLATE CO.

P. O. Box 517
SLATINGTON, PA.

Products.

Miners, Manufacturers, and Shippers of UNFADING BIG-BED ROOFING SLATE of the following brands: PROVIDENT NO. 1, OLD WASHINGTON NO. 1, EXCELSIOR BIG-BED, STANDARD WASHINGTON NO. 1 and NO. 1 PENNSYLVANIA BLACK.

STRUCTURAL SLATE, SLATE BLACKBOARDS, SLATERS' TOOLS and SUPPLIES.

TRADE-MARK

Unfading Provident No. 1 Slate.

Every careful architect naturally selects as the crowning piece for his most artistic design for a residence or public building the most beautiful, durable, unfading roof. To insure this result we recommend the use of our Provident No. 1 grade, and your desire will be fulfilled. The superiority of this make of slate consists in its absolutely uniform color, that will neither spot nor fade, and its fine working qualities. The best "unfading slate" and the PROVIDENT SLATE CO. have become synonymous. This brand is taken from a bed of slate 38 feet 2 inches over the surface, and which runs to a great depth, and is clear of ribbon or any other defect that might discolor the superior rich, uniform, blue-black hue of this most celebrated bed of slate in America. A guarantee, as shown in Fig. 1, accompanies every car.

These slates are very durable, and the longer they are laid on the roof and exposed to the weather the richer they grow in color. Architects and roofers specify and recommend their use especially for school buildings, churches, expensive private residences, and government buildings, owing to their great strength, elasticity, toughness, unfading color, smoothness, and uniformity in thickness. Average price $5.50 per square.

PROVIDENT SLATE COMPANY
MINERS MANUFACTURERS AND SHIPPERS OF
UNFADING BIG BED ROOFING SLATES
SLATINGTON, PA., U. S. A.
We hereby certify that the Roofing Slate located in ... which contains ... GENUINE PROVIDENT ... which we GUARANTEE to be absolutely uniform and unfading in color ...
Signed PROVIDENT SLATE CO

FIG. 1. GUARANTEE FURNISHED WITH PROVIDENT NO. 1 SLATE

Unfading Old Washington No. 1 Slate.

Old Washington has stood the test for the past fifty years, possessing superior strength, permanency of color, and durability of metal. The only difference between this grade and the Provident No. 1 is that they are not as smooth in grain and split, otherwise they are their equal and are in great demand by every roofer who knows them. A certificate is mailed with every car. Average price $5.00 per square.

Unfading Excelsior Big-Bed Slate.

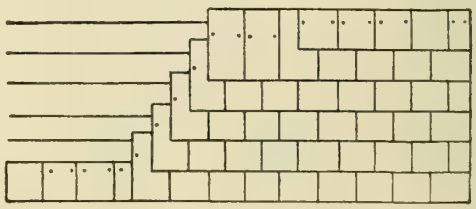
The reputation which Excelsior Big-Bed Slate has made for itself is merited because of its superior strength, toughness, uniformity and permanency of color, as well as evenness of split. Our superior facilities for manufacturing this grade of slate enables us to sell at lower prices than this class of goods commands. Accompanied with certificate. Average price $4.75 per square.

Standard Washington No. 1 Slate.

The best grade of cheap slate on the market today. This slate is manufactured out of a bed of good color, and gives satisfaction wherever used. They are all well selected; and where a slate of moderate cost is required, you can do no better than by using this grade. Average price $4.50 per square.

No. 1 Pennsylvania Black Slate.

The color of these slates is of a very dark black and their surface is as smooth as the best slate manufactured in this region. They are uniform in thickness and make a good substantial roof, giving satisfaction where uniformity of color is not an object. Average price $4.00 per square.



HOW A SLATE ROOF IS LAID

Uniformity of Color.

Working each vein separately, we are in a position to ship slate of a uniform color.

Prices.

Prices quoted on application, either f.o.b. quarry or f.o.b. destination.

Slaters' Tools.

Fig. 3 represents tools used by roofers in putting on a slate roof—hammer, ripper, and stake. The tools manufactured by us are made by hand, from the best saw steel, and the set costs $5.50. We will ship the set, or any one of these tools, to any address in the United States or Canada, on receipt of price.

Prices: Hammer, $3.00; Ripper, $1.75; Stake, 75 cents.

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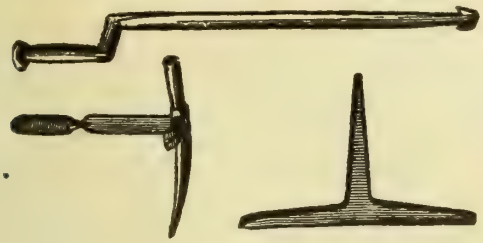


FIG. 3. TOOLS USED IN SLATE ROOFING

Slaters' Machine.

This machine will cut octagon, hexagon, diamond, or any other desired angle. Also, two sets of circle knives to cut convex and concave. For ornamental work it is indispensable, and will cut and punch any sized slate from 6 to 16 inches wide and from 12 to 28 inches long, and has on bed-plate figures to represent the various sizes of slate so that an inexperienced hand can set the machine to cut and punch to standard gauge. Price $22.00, f. o. b. cars at factory.

Sizes and Weight.

Sizes, 6 by 10 inches up to and including 14 by 24 inches. Average weight per square, 650 pounds.

Co-operative Service.

All desired assistance will be given architects by correspondence and personal call of representative to enable the specifying of our products.

FIG. 4. IMPROVED SLATERS' MACHINE
For punching and cutting slate to pattern

REFERENCES

The following are some of the most prominent buildings throughout this country on which Provident No. 1 Slates have been used:

Office Building, Phoenix Silk Co., Allentown, Pa.
Residence, O. N. Clauss, Allentown, Pa.
M. E. Church, Pottsville, Pa.
Trinity Lutheran Church, Hazleton, Pa.
Catholic Church, Lansford, Pa.
Court House Offices, Cape May Court House, N. J.
At Glenwood Cemetery, Superintendent's House, Stable and Wagon Sheds
Eastern Star Home, District of Columbia
Henry T. Blow School Building, District of Columbia
J. W. Ross School Building, District of Columbia
Anthony Hyde School Building, District of Columbia
Petworth School Building, District of Columbia
Ludlow School Building, District of Columbia
Pierce School Building, District of Columbia
Workhouse, District of Columbia
Engine Houses and Police Stations, District of Columbia
Eighty Houses for L. E. Breuninger, District of Columbia
Twenty-eight Houses for Osterman & Butler, District of Columbia
Forty-four Houses for J. F. Lynch, District of Columbia
Parish Hall for Grace P. E. Church, District of Columbia
All buildings at Georgetown Gas Light Company's plant
Several buildings for Washington Gas Light Company
The following buildings at United States Soldiers Home: King Building, wagon sheds, tool houses, cow barn, and silos
Residence, Courtland H. Smith, Virginia
Residence, David R. Rust, Virginia
Braddock House, Alexandria, Pa.
Residence, John L. Prosise, Virginia
Twenty houses for S. L. Spitzer, Virginia
Court House, Colby, Kan.
High School Building, Atchison, Kan.
Elks Club House, Kansas City, Mo.
Elks Club House, Hutchinson, Kan.
Presbyterian Church, Hutchinson, Kan.
High School Building, Gilliam, Mo.
High School Building, Lawrence, Kan.
Court House Building, Lawrence, Kan.
Holy Trinity College, Dallas, Tex.
High School Building, Slater, Mo.
Power Plant, St. Joseph, Mo.
Power Plant, Kansas City, Kan.
Five School Buildings, Kansas City, Mo.
Catholic Church, Argentine, Kan.
School Building, Prospect, Ohio
Muessel School Building, South Bend, Ind.
Studebaker School, South Bend, Ind.
Big 4 Freight House, Cincinnati, Ohio
Olney Avenue School, Marion, Ohio
Epworth M. E. Church, Marion, Ohio
City Library, South Bend, Ind.
At the Bureau of Engraving and Printing, North West Building and Stable, Washington, D. C.
Magazine Buildings at Navy Yard, Norfolk, Va.
Building for the Bureau of Animal Industry, Department of Agriculture, Washington, D. C.
Duke's Farm Buildings, Somerville, N. J.
Residence, J. Harper Smith, Somerville, N. J.
Residence, Richard Lynch, Old York Road, Raritan, N. J.
Second Reformed Church, Somerville, N. J.
Dutch Reformed Church, South Branch, N. J.
Raritan Woolen Mills, Raritan, N. J.
The Somerset Mfg. Co., Raritan, N. J.
Christian Church, Logansport, Ind.
Market St. M. E. Church, Logansport, Ind.
Columbia Schoolhouse, Logansport, Ind.
Grass Creek Schoolhouse, Grass Creek, Ind.
Lucerne Schoolhouse, Lucerne, Ind.
Walton Schoolhouse, Walton, Ind.
Northern Indiana Hospital for the Insane, Logansport, Ind.
Orphans Home, Logansport, Ind.
Elks Home Building, Logansport, Ind.
Nelson Opera House, Logansport, Ind.
Public Library, Logansport, Ind.
P., C., C. & St. L. R. R. Co. Buildings, Logansport, Ind.
Vandalia Railroad Co., Logansport, Ind.
Winfield Block, Logansport, Ind.
Residence, W. E. Haney, Logansport, Ind.
Residence, Wm. Kraut, Logansport, Ind.
Residence, Minnick, Logansport, Ind.
Residence, Frank Bligh, Logansport, Ind.
Residence, Fred Seybold, two, Logansport, Ind.
Residence, Himmelberger, Logansport, Ind.
High School Building, Kankakee, Ill.
Steuben School Building, Kankakee, Ill.
Emergency Hospital, Kankakee, Ill.
Riverview Hospital, Kankakee, Ill.
St. Mary's Church, Kankakee, Ill.
County Jail and Sheriff's Residence, Kankakee, Ill.
Seminary, Beaverville, Ill.
Public School Building, Crescent City, Ill.
St. Patrick's Academy, Momence, Ill.
Physics Building, State University, Neb.
White Memorial Building, University Place, Neb.
High School Building, Lincoln, Neb.
M. E. Church, Jamesburg, N. J.
High School Building, Jamesburg, N. J.
Industrial Building, State Home for Boys, Jamesburg, N. J.
State Normal School, Marysville, Mo.
Home for Feeble Minded, three Buildings, Marshall, Mo.
Barracks, National Soldiers Home, Leavenworth, Kan.
Mess Hall and Kitchen, Soldiers Home, Leavenworth, Kan.
Old Folks' Home, Liberty, Mo.
Washington State Reformatory Buildings, Monroe, Wash.

ESTABLISHED 1869

RISING & NELSON SLATE CO.

Miners, Makers and Shippers of High-Grade Roofing Slate

MAIN OFFICE
WEST PAWLET, VT.

NEW YORK OFFICE
47 WEST 34TH STREET

BOSTON OFFICE
4 POST OFFICE SQUARE

CHICAGO OFFICE AND YARD
2554 WEST HARRISON STREET

RISING & NELSON ARCHITECTS' SERVICE DEPARTMENT: NEW YORK, 47 W. 34th Street

Products.

ARCHITECTURAL SLATE for buildings, in period effects, or otherwise requiring special roof treatment: TUDOR STONE, VERDE - UNIQUE, QUICK - WEATHERING, RUSTIC SHINGLE, etc.

Tudor-stone
TRADE-MARK
(Copyrighted)

STANDARD SLATES, for general purposes: UNFADING GREEN, MOTTLED GREEN and PURPLE; HARD VEIN VARIEGATED, WEATHERING SLATE, RED, BLACK, etc., in smooth, rough or medium effect, graduated to any specification as to size, thickness or width.

STANDARD ROOFINGS: A full line of strictly high-grade ROOFING SLATE, in standard sizes and thicknesses, for immediate shipment.

Architects' Service Department.

We have now completed installation of this department in Room 1058, Marbridge Building, at 47 West 34th Street, New York. This department is under management architecturally trained and experienced and is maintained solely to further the use of architectural roofings. This Service will be found of particular value to architects in that its work or suggestion is architectural expression unqualified. On this basis, free consultation may be had at all times, and the co-operation of the architectural experts can be obtained to any desired extent. They will design the material outright, if desired.

Samples and photographs are on exhibition showing some of the possibilities which have already been brought out with Tudor Stone and other materials of our original design.

In *antique reproductions* and other extraordinary work this Service is continued to include supervising the laying on the roof.

Tudor Stone.

The first serious architectural attempt at roofing for two centuries. Designed and made under architectural supervision for Period Reproductions and for work requiring special roof treatment.

Tudor Stone is original with, is standardized by, and is exclusively the product of the RISING & NELSON SLATE CO. It is so called from appearing, when laid, almost identical with certain XVI. Century English roofs, now so attractive to tourist and student.

TUDOR STONE
Two Effects on One Roof

It is obtained from a group of selected beds, in our deep quarry, cleaving irregularly with curious surface. It is worked in a special manner by workmen trained to approximate the crude slating methods in vogue during the English Tudor period.

The Service Department studied the color, and the result is effective beyond description. The harshness

RESIDENCE OF REV. HENRY J. DENNISON, FRAMINGHAM, MASS.
CHARLES M. BAKER, Boston, Architect
Unfading Mottle Slate, Sold in 1913 to Cote & Cazeault

SWEET'S CATALOGUE

Continued on next page

of assembled mixtures is not possible, inasmuch as the entire selection comes from contiguous beds. Its color is dependent to a large extent on the ultimate weathering, which we govern to specification. With several tone effects offered and wide texture variations, the combinations are legion, from an inexpensive shingle effect to the most faithful period reproduction, including Colonial wood shingle, English or German stone roofs, etc. Tudor Stone has the widest artistic availability of any single roofing material known. The Architectural Service Department exists to further explain the possibilities of this slate.

Specification—All sloping roofs to be covered with genuine Tudor Stone from the Rising & Nelson Slate Co.'s quarries, West Pawlet, Vermont, as per approved schedules, layouts and samples on file with their Architects' Service Department, 47 West 34th Street, New York.

Verde-Unique.

The greenest slate ever mined and plenty of it, for a roof as well as a sample. It is so green that blinds and other trimmings painted to match will themselves be green also. Thirty-one years' exposure proves this green to be of everlasting quality and absolutely fast color, except for becoming slightly deeper in tone as it ages.

The Company have now uncovered commercial quantities, own the entire deposit, but limit its sale to buildings approved on arrangement with the architect. Verde-Unique, therefore, will not be sold on the general market nor handled by brokers or dealers except as above noted. Every order will be certified to by the Rising & Nelson Slate Co. Surface ranges rough to medium. Minimum thickness supplied, one fourth inch.

Specification—All roofs to be covered with Verde-Unique, every slate as green as sample in architects' office supplied from the quarries of the Rising & Nelson Slate Co., West Pawlet, Vermont, in sizes, graduations, and thicknesses, as per the following schedule (see "Architects' Service Department" on preceding page).

Quality of Our Slate Products.

The production is and has been of but one quality —everlasting. It is considered standard by the leading architects in the United States, including State and Federal government architects; also, by architects in Canada, Europe and Australia.

Roofs supplied by the Rising & Nelson Slate Co. are giving satisfaction in nearly every part of the civilized world.

Capacity of Quarries.

Excess of 150,000 squares annually. Immense stocks of standard thickness of slate are carried on the banks at all times, the majority of regular orders can be filled on receipt of same, and many others almost as quickly. Special work given prompt attention, Summer or Winter. The quarries, four hundred feet deep —deepest in the world—are unaffected by surface weather and are worked throughout the year.

Samples.

On application are sent, without charge, convenient desk size samples covering every preliminary requirement. Larger samples or full-size slates are also sent on request, or we will send our representative.

Samples of our slates are also on file with the Architects Samples Co., 101 Park Avenue, New York.

References.

In the forty-five years during which these quarries have been continuously and successfully operated by the families of the present owners, an extensive list of buildings (many times too long for listing here) has been supplied with various kinds of slate. Below are a few of the more important structures for which the Rising & Nelson slate has been recently furnished.

Every name mentioned is a reference and may be used as such.

BUILDING OR OWNER	ARCHITECT
Residences	
I. T. Starr, Laverock, Pa.	Chas. A. Platt
Louis A. Ferguson, Evanston, Ill.	Holabird & Roche
Stuart Duncan, Newport, R. I.	John Russell Pope
Cavour Hartley, Duluth, Minn.	B. G. Goodhue
Theo. N. Vail, Norristown, N. Y.	W. W. Bosworth
Colleges and Universities	
Harvard Freshman Dormitories	Shepley, Rutan & Coolidge
Vassar Auditorium	McKim, Mead & White
University of Virginia Buildings	Cram, Goodhue & Ferguson
Cornell, Prudence Risley Hall	William H. Miller
Dartmouth Gymnasium	Chas. A. Rich
Johns Hopkins University, Academic Building	Parker, Thomas & Rice
Connecticut College for Women, New London, Conn.	Ewing & Chappell
Institutions	
Iowana Farm, Davenport, Iowa	Howard Van Dorn Shaw
Phelps Exeter Academy, Exeter, N. H.	Cram & Ferguson
Perkins Institute for the Blind, Watertown, Mass.	R. C. Sturgis
St. Joseph's Convent Chapel, Milwaukee, Wis.	Brust & Phillip
Loomis Institute, Windsor, Conn.	Murphy & Dana
Christian Orphans' Home, Dallas, Tex.	J. H. Lynch
State and Federal Work	
Asylum for the Chronic Insane, Wauwatosa, Wis.	State of Wisconsin
State Reformatory for Women, Marysville, Ohio	State of Ohio
Great Meadows Prison, at Comstock, N. Y. (1,000 squares)	State of New York
State Asylum at Central Islip, L. I. (2,000 squares)	State of New York
State Infirmary, Tewksbury, Mass.	State of Massachusetts
U. S. Quartermasters' Stables, San Francisco (820 squares)	U. S. Government
Post Office Building, Searcy, Ark.	U. S. Government
Miscellaneous Work	
Belmont Park Stables, Queens, L. I. (7,000 squares)	Chas. W. Leavitt
Essex County Club House, Manchester, Mass.	Parker, Thomas & Rice
Chattanooga Golf and Country Club, Chattanooga, Tenn.	W. T. Downing
Ursuline Convent, New Orleans, La.	Andry & Bendernagel
Hudson Valley Station, Saratoga, N. Y.	Ludlow & Peabody

F. C. SHELDON SLATE COMPANY

MAIN OFFICE
GRANVILLE, N. Y.
WESTERN OFFICE: CLEVELAND, OHIO, 10411 Parkgate Avenue

Products.

Manufacturers of ROOFING SLATES, of every known variety; UNFADING MOTTLED SLATES, in several Tints and Shades; STRUCTURAL and PLUMBING SLATE; SLATE BLACKBOARDS; THICK SLATES, in all colors.

Also, WIRE SNOW GUARDS; SLATER'S TOOLS; PUNCHING and TRIMMING MACHINES.

Co-operative Service.

A representative of the F. C. SHELDON SLATE COMPANY will confer with architects and roofing contractors anywhere at any time, with a view towards preparing specifications, submitting samples of slate in several colors to effect the necessary harmony with surrounding conditions, making sketches illustrative of different thicknesses and sizes of slates, and rendering such other assistance as may be a technical help in furtherance of the architect's or owner's requirements.

Quarries.

The attention of architects, roofing contractors and owners is directed to the fact that the genuine Unfading Mottled Purple Slates and the genuine Unfading Green Slates, manufactured by the F. C. SHELDON SLATE COMPANY, are mined, fabricated and shipped from Poultney, Vermont, the only place in the world where slates of this description have ever been produced.

Process of Manufacture.

Huge blocks of slate are skillfully cleft from solid rock formation by use of explosives; then conveyed from the mines and quarries by overhead cableways to the surface, where skilled workmen "split" them into pieces of required thickness, which are then trimmed to size on a special machine.

Scope of Use.

Mined in a variety of natural colors, sizes and thicknesses, a wide selection of Sheldon Slates permits use of an individual color scheme in harmony with the character of any structure. Different kinds of Sheldon Slates are installed extensively on every type of high-class residences and public buildings.

Advantages of Sheldon Slates.

These slates are a natural *rock* product, with qualities of everlasting endurance against the natural elements; they will not rust or decay, crack, tear, warp or shrink, disintegrate, melt, burn or smoulder; they will not contract or expand under influence of heat or cold; never need painting; do not increase the load by becoming water-soaked; do not retain ice or snow; do not attract lightning; and do not permit growth of moss or [illegible] subject to decay.

Insurance—They will not catch fire as a result of sparks from fire on adjacent property or from passing locomotives. For this reason, insurance rates are reduced on slate-covered buildings.

Weight—Any building, strong enough for shingles, will support slate. A loaded shingle roof is heavier than [illegible] Sheldon slate roof.

Description.

These unfading types of slates (in popular demand for high-class buildings) are briefly described below.

Sheldon's Genuine Unfading Green Slates—Three distinct colors: Light unfading green and dark unfading green, both clear in color; and rustic gray, mottled with dark streaks or spots. May be used individually or collectively with marked effectiveness. Furnished in any size or thickness desired.

Sheldon's Genuine Unfading Mottled Purple Slates—Two classes: (1) Dark unfading mottled purple, almost clear purple, predominating tone being more or less impregnated with clouds of green; (2) light unfading mottled purple, in which a greenish tone predominates, having purplish tints or clouds, stronger in some slates than others, no two being exactly alike in that respect.

Both classes are frequently employed on same roof, or used individually with equal effectiveness, according to taste and requirements. Any size or thickness desired.

Sheldon's Hard Vein Variegated Green and Purple Slates—These hard vein slates are furnished either in varying shades of green and purple that fade upon exposure, or can be supplied in *unfading material* by mixing several shades of unfading green with the light and dark mottled purple, as desired. Either selection gives a roof of marked individuality. All sizes and thicknesses.

Sheldon's Unfading Crimson Red Slates—The brighest shade of slate produced in this color. Costs less than tile or asbestos shingles and *outlasts* them indefinitely. All sizes and thicknesses.

Sheldon's National Unfading Black or Superior Black Slates—Represent the highest standard of Pennsylvania productions.

Sheldon's Weathering Green Slates—A strong, tough slate. Color gradually changes to varying shades of brown and tan—a weathered effect, free from sharp contrasts, in harmony with Colonial or rustic surroundings. No. 1 type costs but little, if any, more than wood or other form of shingles. Any size or thickness.

Sheldon's Variegated Purple Slates—Fading slates. Purple tone predominates, with a few spots of green. Adapted for roofs of bungalows and suburban homes, especially on buildings of stucco construction. Any size or thickness desired.

Sheldon's Graduated or Old English Slates—A specialty among Sheldon slate productions, during many years. The former executive officer of the Matthews Slate Co. (originators of Graduated Slate in this country) has charge of this department. Material supplied in any color or combination of colors desired. Suggestions made; blue-prints and layouts furnished.

Sheldon's Flat Slate Roofs and Manner of Laying

A roof of this type covered with our No. 1 (or thicker) fading green, any size, will last a lifetime without repairs or additional expense, and is much cheaper than a tile roof. Roof boards are first covered with one layer of sheathing paper weighing ten pounds to the square, single thickness. Upon this, lay four layers of best all-wool roofing felt, weighing twenty-five pounds

Continued on next page

to the square, single thickness, felt to be twenty-eight inches wide, exposed six and one half inches to the weather, using pitch between sheets. Entire surface of same to be coated with hot composition of pitch and best asphalt, in which slates are imbedded and joints filled up.

Kent Stone—The use of this product, one of our exclusive specialties, permits a wider range of tone effect for artistic roof treatment than is afforded by any other known material. Hand-wrought by skilled old-world artisans imported by us to insure the faithful reproduction in texture and appearance of the type of roof peculiar to the Elizabethan period. More explicit information as to the architectural possibilities of this material will be promptly furnished on request.

Sheldon Slate Co's Certificate.

This certificate is intended to protect the architect against an unscrupulous attempt to furnish slate that may be represented as being as good as Sheldon's, but which in reality is a very poor substitute.

The certificate is furnished with each shipment. Architects are strongly advised, in specifying Sheldon products, to make the production of such certificates an absolute indispensable condition, in order to avoid the possible substitution of other and inferior slates.

Suggested Form for Ordinary Specifications.

All roofs to be covered with Sheldon's (here name color, etc., as, for example) Genuine Light Unfading Green, standard No. 1 (or full 3/16", 1/4", 3/8", 1/2", 3/4", etc., if thicker than No. 1), with holes drilled and countersunk.

Size—To be laid with standard three-inch lap of the third course over the first course. Contractor shall furnish a certificate signed by the producers, guaranteeing material to be as specified.

Suggested Form for Specifications Covering Sheldon's Old English or Graduated Roofs.

Cover all roofs with Sheldon's (here mention color or colors required), as Hard Vein Variegated Green and Purple (fading or unfading), to be laid in the following courses and thicknesses (here name the number of courses, the length of slate, and the thicknesses desired for each course). All slate up to three-eighths of an inch in thickness to have two holes drilled and countersunk, and all slate thicker than three-eighths to have four holes drilled and countersunk. The under eaves course shall be (name thickness desired). Contractor or roofer shall furnish a certificate signed by the producers guaranteeing material furnished to be in accordance with specifications.

Prices.

Prices quoted upon application, either f.o.b. destination, or f.o.b. quarry, and are subject to change without notice.

Booklet for Architects.

The F. C. Sheldon Slate Company has published a booklet for the use of architects throughout the country, in which the various slates, mined and produced from their own quarries, are fully described. A copy of such publication, containing valuable information concerning the subject matter of these pages, will, on request, be sent to architects, general contractors, owners and other interested persons.

A FEW RECENT APPLICATIONS OF SHELDON SLATES

BUILDING	LOCATION	KIND OF SLATE	ARCHITECT
Municipal Auditorium	San Francisco, Cal.	Sea Green	Architectural Commission
Onondaga County Tuberculosis Hospital	Syracuse, N. Y.	Unfading Green	Taylor & Bontan
Pennsylvania Railroad Station	Canton, Ohio	Unfading Green	P. R. R. Architect
Banff Springs Hotel	Banff, Alta.	Unfading Green	W. S. Painter, C. P. R. Co.
Robinson Residence	Bridgeport, Conn.	Mottled Purple	Guy Solvay
First Methodist Church	Franklin, Pa.	Variegated Purple	C. Porter & Sons
State Training School for Girls	Hudson, N. Y.	Black	New York State Architect
Salamanca Baptist Church	Salamanca, N. Y.	Sea Green	Owner
Goff Memorial Hall	Rehoboth, Mass.	Mottled Purple	Martin & Hall
Worcester Y. M. C. A.	Worcester, Mass.	Unfading Green	Louis E. Jallade
Hope Farm	Verbank, N. Y.	Mottled Purple	Delano & Aldrich
Ladies' Residence, Regina College	Regina, Sask.	Unfading Green	J. H. Puntin
Tuberculosis Sanitarium	Fort Qu'appelle, Can.	Unfading Green	J. H. Puntin
Keith School	Brockton, Mass.	Black	Waldo V. Howard
St. Paul's Episcopal Church	Brockton, Mass.	Black	Brigham, Covenay & Bisbee
Stephen Palmer School	Needham, Mass.	Mottled Purple	Clarence P. Hoyt
Oxford School	Fair Haven, Mass.	Black	Brigham, Covenay & Bisbee
Warehouse, American Window Glass Co.	Jeannette, Pa.	Sea Green	Owner
French Catholic Church	West Springfield, Mass.	Black	Owner
Mrs. E. C. Donnelly Residence	Springfield, Mass.	Black	Owner
State Fair Ground Buildings	Syracuse, N. Y.	Sea Green	New York State Architect
Arts Building, University of Alberta	Edmonton, Alta.	3/8-inch Sea Green	Knobs & Hyde, Montreal
Reed Memorial Chapel	Bridgeport, Conn.	3/8-inch Mottled Purple	Don Barber
Good Will Farm Office Building	Hinckley, Me.	Mottled Purple	Edgar A. Josselyn
Pittsburgh Male Asylum	Marshalsea, Pa.	Black	John P. Brennan
D. & H. R. R. Station	Cooperstown, N. Y.	Graduated Green and Purple	New York State Architect
Masonic Temple	Salem, Mass.	1/4-inch Mottled Purple	Lester S. Couch
Elks Home	Findlay, Ohio	Mottled Purple	McLaughlin & Huskins
Pennsylvania State Normal School	Indiana, Pa.	Black	Owners
Yorktown Heights Training School	Yorktown Heights, N. Y.	Mottled Purple	New York State Architect
Searle Residence	Minneapolis, Minn.	Graduated Unfading Green	Trowbridge & Ackerman
Williamstown College Buildings	Williamstown, Mass.	Hard Vein Variegated	Owners
Middlebury College Buildings	Middlebury, Vt.	Vt. Fading Green	E. K. Rossiter
American Steel & Wire Company Buildings	Worcester, Mass.	Fading Green	Owners
Gedney Farm Hotel	White Plains, N. Y.	Variegated Green	Kenneth Murchison
Scarsdale High School	Scarsdale, N. Y.	1/4-inch Fading Green	Guy Lowell
D., L. & W. R. R. Station	Plymouth, Pa.	Black	Owners
State School for Blind	Batavia, N. Y.	Black	New York State Architect
Jewish Orphan Asylum Buildings	Rochester, N. Y.	Mottled Purple	Leon Stern
Perkins Institution for Blind	Watertown, Mass.	Mottled Purple	R. C. Sturgis

THE MONSON LUSTRE SLATE COMPANY

SUCCESSOR TO THE MAINE SLATE COMPANY OF MONSON

Roofing Slate

SALES AND GENERAL OFFICE

200 Devonshire Street

BOSTON, MASS.

Product.

Monson Lustre Slate.

Description.

Like all Maine slates, Monson Lustre slate is quarried from very narrow, deep and nearly vertical beds. Its cost of production, and consequent selling price, is therefore high in comparison with that of the Vermont and Pennsylvania fading and black commercial slates; but high price is offset, for important work, by beauty and quality of the material, and by careful manufacture and inspection.

We are the largest producers of Maine roofing slate.

Monson Lustre slate possesses the following conspicuous advantages:

Strength—Its "metal" is the strongest found in America, if not in the world. By reason of strength, conjoined with fine grain and perfect cleavage, it splits down to a weight of 550 pounds to the square, of sound, tough slate—ordinary slate weighing 750 pounds. For roofing wide spans, and for re-laying weak roofs formerly shingled, where lightness with strength is essential, no other slate can equal the Monson Lustre "Thins."

Color and Lustre—Its color is an absolutely unfading pure, dark gray-blue, not unlike that of the deep sea. It closely resembles the celebrated Brownville slate, now no longer produced in quantity; and is distinguished from other Maine slates by its marked lustre, which on the roof tends to reflect the blue of the sky. For churches, monumental public buildings, and important residences of formal architecture, especially those built of finely surfaced stone or brick, this slate has no peer.

The foregoing statements as to color and lustre can be verified by examining one or two slates; and, as to strength, by picking one of them full of holes; for which purpose samples will be sent by parcel post on request of any responsible architect.

Grades and Thicknesses.

Standard No. 1—Full $\frac{3}{16}$-inch thick; both sides smooth and clean; all four corners full and square; nail holes drilled and countersunk; weight averages 750 pounds to the square.

Extra No. 2—Sorted from No. 1 in splitting; slates which come a little rough or irregular on one or both sides, or with corner not quite full; good, strong slates of good color nevertheless, and preferred by many architects for rough effect, with certain wall materials.

"Thins"—Made to order from selected stock and split thin, to $\frac{1}{8}$ inch or so in thickness; strong, sound and smooth, and very light; weighing about 550 pounds to the square; not drilled, but can be punched full of holes without breaking; all corners cut full and square.

"Thick" Slates—Made to specification; all sizes; $\frac{1}{4}$ to $1\frac{1}{2}$ inches in thickness; rough or smooth.

Specification Notes.

In writing specifications, it should be noted that thickness is more important than size in producing architectural effect; and that small slates go better on many roofs than the popular sizes usually specified. "Thick" and "graduated" slates also have their fit and most important places.

By giving the quarry some latitude as to sizes, far more prompt deliveries are made possible, both in thick and ordinary slates.

Suggestions, layouts, and special estimates will be made upon request of architects.

Freight Rates and Shipping Facilities.

The Company's private siding, right at the quarry (three miles west of Monson Village, Me., on Greenville Division, Bangor and Aroostook Railroad), permits prompt placing and loading of cars, with an advantage of thirty cents per square in freight as compared with other Monson slates. The Monson Lustre "Thins" can be shipped in carloads of one hundred squares or more—sixty-five squares of ordinary slates constituting the standard carload—at a further large saving in freight, especially to trans-Mississippi points.

M. L. TINSMAN & CO.

MINERS AND MANUFACTURERS OF

Roofing Slate, Blackboards and Structural Slate

PEN ARGYL, PA.

Products.

We are miners and manufacturers of ALBION BANGOR SLATE, and produce the following:

NATURAL SLATE BLACKBOARDS.

ROOFING SLATE.

STRUCTURAL SLATE, including everything for which slate has been or can be used in the structural finish of a building, as follows: STAIR TREADS, PLATFORMS and RISERS; BASE, WAINSCOTING, FLOOR TILE, and SANITARY FLOORING in large slabs; LINTELS, WINDOW SILLS, COPING; HEARTHS; FIREBOARDS, SHELVING, PASTRY BOARDS, TABLE TOPS, REFRIGERATOR FITTINGS and SWITCHBOARDS.

Also, MAUSOLEUM COMPARTMENTS, GRAVE VAULTS, GRAVE COVERS, and MORGUE SLABS.

SANITARY SLATE for the Plumbing Trade, Hospital Service, Laboratory Equipment, Manufacturing Work, etc., comprising the following: BATHROOM PARTITIONS, SHOWER-BATH ENCLOSURES, URINAL STALLS, LAVATORY TOPS, SINK TOPS, WATER-CLOSET FLOOR SLABS, FEED and WATER TROUGHS, OYSTER TROUGHS, LABORATORY SINK TABLES, SURGEONS' OPERATING TABLES, BILLIARD TABLE SLABS, etc.

Our Quarries.

We operate our own quarries on the well-known Albion Bangor Strata of Slate Rock.

Natural Slate Blackboards.

Our blackboards are made from the famous Albion Bangor Stock, are uniform in thickness and color, and are manufactured to dimensions and detailed plans so as to fit accurately. We give them a fine hand-shaved finish, which is smoother and better than any other.

Blackboard Stock Sizes.

The standard heights of blackboards carried in stock are 3 feet, 3 feet 6 inches, and 4 feet.

Spaces are filled with good proportionate length boards carefully jointed to make one continuous writing surface. All pieces are marked so that any one can set them in place properly.

Special sizes are supplied upon request, but require extra time for manufacturing.

Roofing Slate.

We supply Roofing Slate in all the commercial sizes of the same quality of rock; also, in special dimensions and shapes in accordance with architects' specifications. We take the utmost care in manufacturing and assorting, which insures a fine appearance, when Slate is properly applied.

Quotations for specific orders or carload shipments sent promptly, on application.

Structural and Sanitary Slate versus Marble.

It is rapidly becoming recognized by architects and the plumbing trade that, from the point of view of durability and genuine sanitary qualities, good slate is vastly superior to any of the white or light-colored marbles.

All such are softer in texture and, therefore, more absorbent than even the average quality slate; they soon become stained and unsightly looking, and can not be cleaned. This is particularly true in regard to toilet room partition work and plumbing marble generally, as may be seen in any public building ten years old or less. Wherever showiness of appearance is the less important factor, slate should be given the preference over marble for all such purposes.

Capacity.

We have ample capacity for the largest orders, and can guarantee prompt deliveries.

Prices.

Prices and estimates cheerfully submitted from plans and details or from general specifications.

Co-operative Service.

We shall be pleased to furnish estimates on plans; will send samples of slate on request; and will submit reliable references as to contracts executed by us.

RAYNER & PARKER

Hand Made, Clear Heart Cypress Shingles

Commercial Trust Building
PHILADELPHIA, PA.

Product.

Clear Heart Cypress Shingles, "1754" brand stock, hand made.

Stock.

The Clear Heart Cypress Shingles, "1754" brand, is a superior product, split and shaved by hand at the stump of the tree in the swamp bordering the Santee River in South Carolina.

The cypress used is perfect in quality, of straight grain, and free from knots and other defects, which is, of course, the only kind that can be handled successfully and rapidly by hand manufacture. The stock is well seasoned by air drying only.

Process.

The tree is first cut in bolts of shingle lengths. These bolts are then split with wedges to the width and thickness required, and the shingles finished by hand-operated drawing knives. This method avoids breaking the grain of the wood and produces shingles that will better shed water. The shingles are then removed to high ground, put up in bundles of twenty-five, and racked to allow free circulation of air, the natural and best method of drying and the only one used. This drying process requires from 90 to 120 days, at the end of which time the shingles are thoroughly dry and ready for use.

Effect.

Heart Cypress "1754" brand shingles, with their variable proportions and slightly uneven surfaces, and with their irregular cut butts, produce all the old time characteristics which contribute to charm and beauty in the roof; and long service is assured, because they are of heart cypress.

Sizes and Weights.

The standard shingle sizes are 7 inches wide by 24 inches long with a butt 5/8-inch thick, and 6 inches wide by 20 inches long with a butt 1/2-inch thick.

Finished shingles of the larger size weigh 1500 pounds per thousand; of the smaller size, 1000 pounds per thousand.

How to Lay Shingles.

A shingle roof should have a pitch of forty-five degrees or more.

In laying the shingles, the best results are obtained by exposing the 24-inch shingles 7 inches to the weather, and the 20-inch shingles 6 inches to the weather. This requires 300 of the larger size and 400 of the smaller size per hundred square feet to be covered.

Shingles should be laid on 1 by 2½-inch, or 1 by 3-inch shingling lath, which is nailed directly to the rafters. Shingling, for lasting service, should never be laid on tight sheathing. An air space equal to the depth of the rafters is essential to the best results. If sheathing is necessary, it should be applied beneath the rafters; but the essential need being an air space of at least two inches, same may also be secured by laying the sheathing on top of the rafters and double strip lathing over same, the first laths to run with the rafters, the second across. Care should be taken in laying the shingles to see that the side away from the tree is laid up exposed to the weather. Joints should be broken one third and two thirds the width of a shingle.

If a shingle is inclined to split in nailing or by weathering, it will generally split in the center. By breaking joints at thirds the evil results of splitting are minimized

Durability.

In addition to their attractive appearance, these shingles are most durable when properly laid.

We have seen them in good condition after service of seventy-five years. Reports of the United States Department of Agriculture cite instances of cypress shingled roofs still in use after a service of over two hundred years.

Fireproofing.

At a comparatively small expense, these shingles may be rendered flameproof by treatment with any of several compounds now on the market. On request we will advise as to the various materials used for this purpose and the best methods of application.

Shipping Facilities.

From our distributing yard at Georgetown, S. C., we can ship by rail or steamer to any part of the country and in any quantity desired.

Prices.

These will be quoted on request for any quantity either f. o. b. Georgetown, S. C., or f. o. b. any point in the United States.

STANDARD STAINED SHINGLE CO.

Originators and Sole Manufacturers of "Creo-Dipt" Stained Shingles

GENERAL OFFICES, WAREHOUSE, AND FACTORY

NORTH TONAWANDA, N. Y.

DISTRIBUTING PLANT: CHICAGO, ILL., FOR WESTERN TRADE

Products.

"CREO-DIPT" TRADE-MARK

"Creo-Dipt" Stained Shingles of first growth British Columbia Coast Cedar, preserved with Creosote; delivered to the job all bundled; stained any shade desired.

"Creo-Dipt" Shingle Stains, including "Creo-Dipt" Dixie White Stain.

"Creo-Dipt" Stained Shingles to produce the Imitation Thatched Effect.

Originators and Sole Manufacturers.

The Standard Stained Shingle Co., with general offices, warehouse and factory at North Tonawanda, N. Y., distributing plant, at Chicago, Ill., are the pioneers in the production of stained shingles, and the originators and sole manufacturers of "Creo-Dipt" Stained Shingles. They have been on the market for over eight years. They have stood the test against all conditions. They are being specified by leading architects throughout the country, endorsed by responsible contractors, and approved by home builders, and the most representative lumber dealers are recommending and selling them to their customers.

Quality.

"Creo-Dipt" Stained Shingles are sawed from logs cut from the best portions only of the bodies of selected first growth British Columbia coast cedar, sawed from live timber and not from stumpage left in the forest. Neither are they baked to death in a dry kiln. One hundred per cent vertical grain; all parallel widths; no wedge-shaped "Creo-Dipt" Stained Shingles, and free from sap. Quality guaranteed.

Treatment.

Our process of creosoting and coloring "Creo-Dipt" Stained Shingles causes each one to be treated separately, so that the shades are uniform and permanent and the preserving sure and thorough.

Creosote as a Preservative.

Creosote is the best known wood preservative. Wood treated with it is not subject to dry rot or other decay, and no process of wood preserving is better established than the process that "Creo-Dipt" Stained Shingles undergo. "Creo-Dipt" Stained Shingles will last twice as long as shingles painted, brush-coated, or treated in any other manner.

Do Not Require a Brush-Coat.

"Creo-Dipt" Stained Shingles do not require an additional brush-coat, as the color on every shingle is uniform, and the shades are exactly as intended, selected, and specified.

Colors.

The colors used in the creosoting and staining of "Creo-Dipt" Stained Shingles are the strongest and most expensive pigments, ground to the finest possible condition in pure linseed oil in our own mills. They are then suspended in a vehicle of pure creosote oil, which is especially refined so it will properly carry the colors without injuring them and will thoroughly preserve the wood against dry rot and other decay. No kerosene, gasoline or other cheapeners used.

Colors Permanent.

"Creo-Dipt" Stained Shingles, being perfectly dry at the time of creosoting, allow the wood to absorb more of the preservative; and the ground colors are taken up into the pores in a much greater quantity, obtaining a permanent color that is impossible to procure by the old method of treating on the premises where the shingles have been exposed to the weather and dampness before staining.

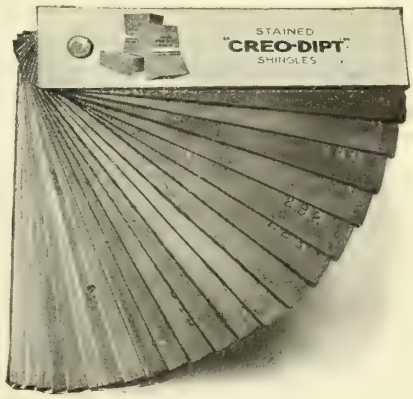
"CREO-DIPT" STAINED SHINGLES

Thirty Regular Shades.

"Creo-Dipt" Shingles are manufactured in thirty regular shades, or we will make any special shades and submit samples without charge.

Color Samples.

A color pad showing all regular shades on Red Cedar Shingles will be sent to architects on request. Shades are shown on Red Cedar Shingles sawed 2½ by 10 inches, put up as shown, for convenient handling.



COLOR PAD

Labor Saving.

"Creo-Dipt" Stained Shingles are handled as easily and quickly as unstained shingles, saving the unnecessary cost of double handling, which is necessary when treating on the premises. They save the labor of dipping, and the cost of an additional brush-coat, which is usually necessary when the shingles are treated on the premises.

Cost.

"Creo-Dipt" Stained Shingles cost twenty-five per cent less than shingles dipped on the premises, or painted. They cost at least fifty per cent less to lay; and the results are as anticipated, and not a disappointment, as is often the case when the shingles are treated in any other manner.

Continued on next page

Where Roof Water is Used.

Creosote is not in the least harmful, and after the first few rains leaves no taste in the water. The first two or three rains should be allowed to go to waste, and not get into the cistern, as they wash off the superfluous stain, oil of cedar and dirt. "Creo-Dipt" Stained Shingles have been used on a great many fine country homes where cistern water is used, and we have not had a single complaint.

Architectural Effects.

"Creo-Dipt" Stained Shingles, properly selected, blend and harmonize with all surroundings. There is no handsomer or more permanent roof or side wall covering that will save continual repairing and repainting cost. They combine utility and beauty, satisfying every requirement so essential in the best of architecture.

Specifications.

We advise incorporating in specifications the full wording "Creo-Dipt Stained Shingles (giving color number, grade, width, and length desired), manufactured only by the STANDARD STAINED SHINGLE Co., of North Tonawanda, N. Y." This will avoid misunderstanding and substitution.

Grades and Sizes.

"Creo-Dipt" Stained Shingles are manufactured in seventeen grades and sizes, as follows:

DESCRIPTION OF SHINGLES

RANDOM WIDTHS

Imperials—24 inches long, clear shingles, random width, 9/16 inch in thickness at butt end.

Royals—24 inches long, clear shingles, random width, 4 shingles to 2 inches at butt end.

Perfections—18 inches long, clear shingles, random width, 5 shingles to 2¼ inches at butt end.

Eurekas—18 inches long, clear shingles, random width, 5 shingles to 2 inches at butt end.

Extra Clears—16 inches long, clear shingles, random width, 5 shingles to 2 inches at butt end.

XXX Clears—16 inches long, clear shingles, random width, 6 shingles to 2 inches at butt end.

Star-A-Stars—16 inches long, random width, 6 shingles to 2 inches at butt end. These admit of defects in 20 per cent of the shingles above 10 inches from butt end, such as knotholes and feather ends; 80 per cent are clear.

DIMENSION WIDTHS

Perfections—18 inches long, 6 inches wide, clear shingles, 5 shingles to 2¼ inches at butt end.

Perfections—18 inches long, 5 inches wide, clear shingles, 5 shingles to 2¼ inches at butt end.

Extra Clears—16 inches long, 6 inches wide, clear shingles, 5 shingles to 2 inches at butt end.

Extra Clears—16 inches long, 5 inches wide, clear shingles, 5 shingles to 2 inches at butt end.

Star-A-Stars—16 inches long, 6 inches wide, 6 shingles to 2 inches at butt end.

Star-A-Stars—16 inches long, 5 inches wide, 6 shingles to 2 inches at butt end.

We can also furnish 24-inch shingles in 5-inch and 6-inch widths. Send for quotations delivered to freight station nearest to job.

"Creo-Dipt" Dixie White.

Is a successful white shingle stain. When applied, one brush-coat to our "Creo-Dipt" Shingles which have been creosoted and stained with a special preparation, will give the desired whitewashed effect. Special samples on request.

24-inch "Creo-Dipt" Stained Shingles.

The larger "Creo-Dipt" Stained Shingles have become very popular with architects and home builders who are designing and building homes a little different from the ordinary shingled house or bungalow. The butts are very heavy, and give the appearance of the old fashioned shingles of Colonial days, and are especially adapted to the Colonial style of architecture. Can be given from 7- to 11-inch exposure.

Shipped to All Parts of the Country.

"Creo-Dipt" Stained Shingles are shipped in perfect safety to all parts of the United States from our North Tonawanda, N. Y., and Chicago, Ill., plants.

Co-operative Service.

Our Service Department is at the disposal of architects, contractors and home builders. We want to make suggestions which we feel will be of great benefit to you. There is no charge.

HOME OF A. L. SOPER, LAKEWOOD, OHIO

Designed by the JOHN HENRY NEWSON Co., **Cleveland, Ohio, showing the** "Creo-Dipt" Royal 24" long, promiscuous widths, with an exposure of 10" on side walls, treated with "Creo-Dipt" Dixie White. These boxes "Creo-Dipt" Stained Shingles with the Dixie White, are being used very popularly with architects especially for the Colonial type of architecture. The appearance is more attractive and more effective than the wide clapboards. "Creo-Dipt" Extra Clears 16" long, promiscuous widths, in moss green, on roof

Continued on next page

Thatched Effect with "Creo-Dipt" Stained Shingles.

A great many American architects have desired to use the thatched effect with shingles; but it has been a vexing problem to produce this effect, principally because the workmen are inexperienced in this work and are not equipped to handle it.

In attempting to do the work on the premises, to produce the thatched effect, it would require the constant supervision of the architect, and then the results would be disappointing, and not as intended; and when done this way, the expense would be too great to consider for most buildings.

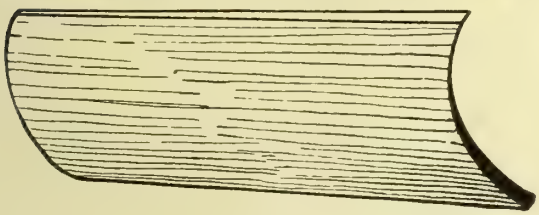
We have solved this vexing problem, and are equipped to furnish " Creo-Dipt " Stained Shingles all shaped, stained any shade, creosoted, bundled, ready for instant application, to produce the thatched effect.

The butts of the " Creo-Dipt " Stained Shingles are sawed in a variety of patterns to present the wavy, thatched appearance. Of course, with this effect there are no corners or sharp angles; all roof lines are softened by using " Creo-Dipt " Stained Shingles that are bent on the eaves, ridges, gable ends, and dormers.

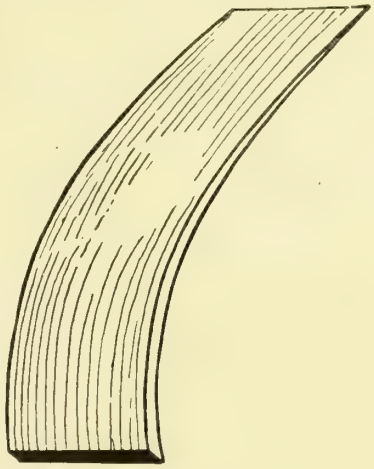
For over eight years we have been manufacturing " Creo-Dipt " Stained Shingles in the square sawed butts, for use on roofs and side walls, and are now making them, all ready for use, to give the thatched effect.

Detailed information about laying " Creo-Dipt " Stained Shingles to produce the thatched effect will be furnished on request.

A Dormer on a Thatched Roof House



Bent with the Grain



Bent Across the Grain

"CREO-DIPT" STAINED SHINGLES TO PRODUCE THATCHED EFFECT

Tietig & Lee, Architects, Cincinnati, Ohio, for Clifford Greene

Miller & Mallory, Architects, Ithaca, N. Y., for J. F. Weller, Rochester, N. Y.

J. Frederick Beckbissinger, Architect, Saginaw, Mich., for S. A. Sommers

Whitsitt & Schulzke, Architects, Moline, Ill., for Wm. H. Schulzke

James H. Causey Residence
Denver, Colo.

S. J. Eckenrode Residence
Maumee, Ohio

RESIDENCES WHERE "CREO-DIPT" STAINED SHINGLES WERE USED ON ROOFS TO PRODUCE THE THATCHED EFFECT

TRANSFER STAINED SHINGLE CO., INC.

Inventors and Producers of Weatherbest Stained Shingles

MAIN OFFICE

NORTH TONAWANDA, N. Y.

DISTRIBUTING YARDS: NORTH TONAWANDA, N. Y., AND EAST CHICAGO, IND.

Products.

WEATHERBEST STAINED SHINGLES for use on Roofs and Side Walls. Manufactured according to our rigid specifications. Bundled and ready to lay.

Weatherbest STAINED-SHINGLES
TRADE-MARK

Quality.

Only the finest grades of Pacific Coast Red Cedar or Michigan White Cedar Shingles used for staining. Each shingle inspected after every operation, and so thoroughly stained that we use a gallon more stain per thousand shingles than any other manufacturer.

Colors.

Twenty standard, dependable colors and shades; special colors exactly reproduced without extra charge. Weatherbest stain is a combination of the highest grade color pigments, pure linseed and creosote oils, compounded to insure unusual wearing and preserving qualities. Weatherbest Stained Shingles do not need to be brush-coated when laid, but if brush-coated every five or six years should last for generations.

Sample Color Pads—Write us for sample pad showing twenty different colors and shades on shingle wood.

Stained Full Length.

The entire shingle is treated from tip to butt, not merely one half or two thirds as in most cases, which prevents parasitic growths.

Stained Separately.

Weatherbest Stained Shingles are stained separately, then rebundled and shipped ready to carry on roof or scaffolding, which insures every shingle being uniform in color and reduces cost of Stained Shingles to contractors and consumers to a minimum.

Imitation Thatched Effects.

We have always made a specialty of shingles bent and stained in imitation thatched effects so popular with the English type of home.

Wood Grain Visible.

The beautiful, transparent Weatherbest stain brings out the natural texture of the wood and lends a distinctively artistic appearance to the building.

No Effect on Roof Water.

Weatherbest Stain does not in any way affect rain water, if the first two or three rains, which wash off the superfluous stain and dirt, are allowed to run to waste.

Sizes.

All sizes of random and dimension width shingles can be furnished. Square or fancy shaped butts.

Saving in Cost.

Cost less to buy, less to lay, and less to maintain than home-stained shingles. All staining done in our own factory, under direct supervision of our own trained color experts, insuring reliability and uniformity of color. Weatherbest Stained Shingles save time, labor and the waste due to staining on the job. Every Weatherbest Shingle is usable, and costs no more than other ready-stained shingles.

Guarantee.

The Weatherbest label on every bundle guarantees to you the utmost satisfaction from each shingle, placing directly upon the manufacturer all responsibility. We stand back of every Weatherbest Shingle, insuring to you quality of wood and stain, color permanency and uniformity of shades.

Specifications.

Protect yourself against mistakes of contractors and builders, by using following wording in your specifications:

Weatherbest Stained Shingles [giving color number, grade, width and length required] produced by TRANSFER STAINED SHINGLE CO., INC., North Tonawanda, N. Y., and East Chicago, Ind.

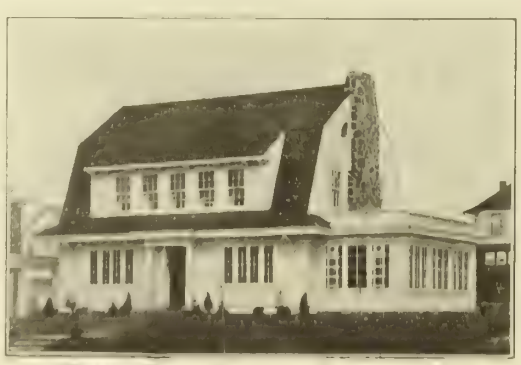
Services.

All orders executed and shipped within forty-eight hours from time received. Prompt delivery is assured —we trace every shipment from factory to destination.

If you want assistance in the preparation of specifications for any particular style of Weatherbest roof, write us and we will promptly co-operate with you. Color schemes worked out and submitted with estimates, etc., without cost or obligation to you.

Distribution.

Weatherbest Stained Shingles are sold by Lumber and Shingle Dealers everywhere. If your dealer can not quote prices, write direct to this Company.



VERNON REDDING, Architect, Mansfield, Ohio

H. W. HOMELIUS, Architect, Batavia, N. Y.

TWO OF MANY HOMES MADE ARTISTIC WITH WEATHERBEST STAINED SHINGLES

ASPHALT READY ROOFING COMPANY

Manufacturers of Roofing Materials

BRANCH OFFICE
BOSTON, MASS., 153 Milk Street

9 Church Street
NEW YORK, N. Y.

WORKS
JONES POINT, NEW YORK

Products.

"Hudson" Asphalt Shingles; "Protection," "Arrow" and "Rockland" Asphalt Roofings; "Fulton" Smooth-Surfaced Roofings; Asphalt Roofing and Sheathing Felts, and other Roofing Accessories.

TRADE-MARK

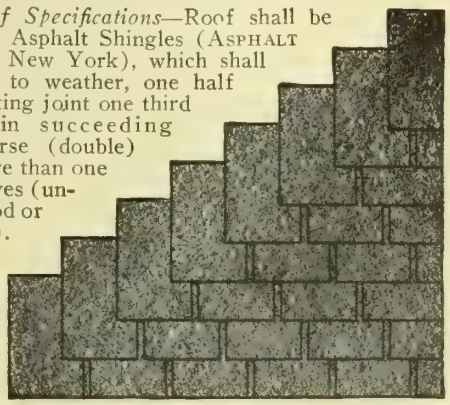
"Hudson" Asphalt Shingles.

For roofing or siding. Made from asphalt felt, coated with specially prepared asphalt, into which red or green crushed slate—separately or mixed to produce a mottled effect—is embedded. Size, 8 inches wide, 12¾ inches long. Very attractive in appearance and durable. Need no painting or staining. Fire-resisting. Will not rot nor crack. Many cities have approved the use of "Hudson" Shingles within fire zones.

A permanent red or green or mottled roof, at moderate cost, can be obtained by using these shingles. Buildings covered with them do not require heavy timbering. Weight approximately 220 pounds per square.

ARROWHEAD INN, SARATOGA, N. Y.
Roofed with "Hudson" Asphalt Shingles

Suggestive Brief Specifications—Roof shall be laid with "Hudson" Asphalt Shingles (Asphalt Ready Roofing Co., New York), which shall be laid four inches to weather, one half inch apart, and breaking joint one third width of shingle in succeeding courses. First course (double) shall not project more than one quarter inch over eaves (unless supported by wood or galvanized drip edge). Bottom row of latter course to be nailed about one inch from lower edge; all succeeding courses to be nailed four and one half to five inches from lower edge. Nail all shingles with two nails, about one inch apart, and see that these are covered by succeeding shingles. Rockland Roofing (Asphalt Ready Roofing Co.) [or metal] shall be used for valleys.



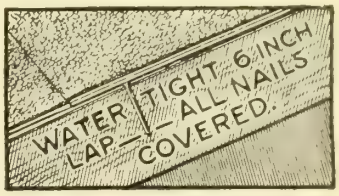
APPLICATION OF "HUDSON" ASPHALT SHINGLES

Note—For siding, shingles should be laid not more than three inches to the weather.

"Protection" Asphalt Roofing.

"Protection" Asphalt Roofing is constructed of a layer of asphalt felt, a layer of waterproof asphalt cement, another layer of asphalt felt, and a layer of waterproof asphalt cement, into which fine sand or sea gravel is imbedded. This roofing is made from genuine asphalt, contains no tar, will not rust, and remains pliable. A permanent roofing which can be easily laid. Painting is unnecessary.

"Protection" No. 5 Roofing is surfaced with sand and weighs approximately 90 pounds per square. "Protection" No. 6 Roofing is surfaced with gravel and weighs approximately 140 pounds per square. These surfaces afford protection from sparks and from damage by hail, ice and snow. This roofing is shipped on a six-inch slatted spindle to enable the user to unroll it easily in cold weather, and to prevent damage in transit. "Protection" Roofing will be made to order with red or green slate surfaces.



SECTIONAL VIEW "PROTECTION" ROOFING
Showing 6-inch Welded Lap (Pat. Nov. 18, 1902). No nails exposed. Joints absolutely tight

Method of Laying—Several sheets of the roofing are nailed down through the unsurfaced ends and sides of the underlapping sheets; then the overlapping sheets are lifted up and the asphalt cement applied. The top sheets are pressed into the asphalt cement and securely welded down, covering all nails.

"Arrow" Roofing.

Made in the same manner as the "Protection" Roofing, but has a three-inch lap and is laid by driving the nails through overlapping sheet. "Arrow" Sand Surfaced Roofing is covered with fine beach sand and weighs 85 pounds per square; "Arrow" Gravel Surfaced Roofing, with medium sifted gravel, weighs 135 pounds per square, and has a clear white appearance.

"Red, Green and Gray" Rockland Roofing.

For roofing or siding. Made in red, green and gray colors. Surfaced with red slate, green slate and gray feldspar. Has three-inch lap for roofing; no lap for siding. Attractive for bungalows and small cottages, when its simple decorative color possibilities are taken advantage of. Approximate weight, 80 pounds per square.

"Fulton" Roofing.

Smooth-surfaced; recommended for buildings of light construction and structures where very low-priced roofing is required. Three qualities: one-ply, weight about 35 pounds per square; two-ply, weight about 45 pounds per square, and three-ply, weight about 55 pounds per square. Made 32 inches wide. Is easily and quickly laid.

"Hudson" Asphalt Felts.

For reinforcing tile and slate roofs and for sheathing buildings. These felts are saturated with genuine asphalt and contain no tar; and do not become hard and brittle with age. They are pliable in zero weather; free from kinks and buckles; clean, and easy to handle. Made in the following approximate weights per square: 10, 14, 17, 24, 30, and 40 pounds. Special weights upon application.

Samples, etc.

Samples and full information will be sent on request.

PATENT VULCANITE ROOFING COMPANY

GENERAL OFFICES
49th Street and Oakley Avenue
CHICAGO, ILL.

BRANCH OFFICES
NEW YORK, N. Y., 438 Woolworth Building
BIRMINGHAM, ALA., 1624 First Avenue, North
CINCINNATI, OHIO, 425 Main Street
KANSAS CITY, MO., Twelfth Street and Crystal Avenue

FACTORIES
CHICAGO, ILL. KANSAS CITY, MO. FRANKLIN, OHIO ANDERSON, IND. SAN FRANCISCO, CAL.

Products.

Manufacturers of "VULCANITE" BRANDS of ROOFING, embracing individual SHINGLES, STRIP SHINGLES, ROLL ROOFING and 4-PLY BUILT-UP ASPHALT ROOFS.

Description.

Vulcanite Specifications require the use of an all-wool felt as a basis. This felt is made in their own mills from the best grade of rags and undergoes a rigid test for tensile strength. The coating is a wear-proof mineral rubber compound, saturated with a composition of mineral wax and asphalt. Finishes are flaked mica, gravel, silica and crushed granite (reds, greens and grays), all natural colors and selected for permanency and artistic beauty.

Advantages.

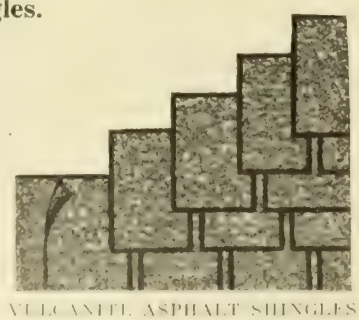
Vulcanite saturated fabrics produce a fire-resisting, weather-proofing material outliving wood shingles two to one; twenty years' service is a reasonable expectancy. They add a graceful finish wherever used. Vulcanite Roofings will meet the most exceptional conditions and will, without paint or repairs, outlast any other similar roof covering.

Styles.

Individual shingles, and shingle effects in continuous strips, for residences. In full rolls for houses, garages, barns, sheds, granaries, warehouses and mills.

Vulcanite Asphalt Shingles.

Constructed of imperishable, non-fading materials; remain indefinitely bright and require neither paint nor stain. Storm-proof. Do not curl up and blacken, warp or crack. Spark-proof. Fire-resisting. Will outwear and outlast any wooden shingle.

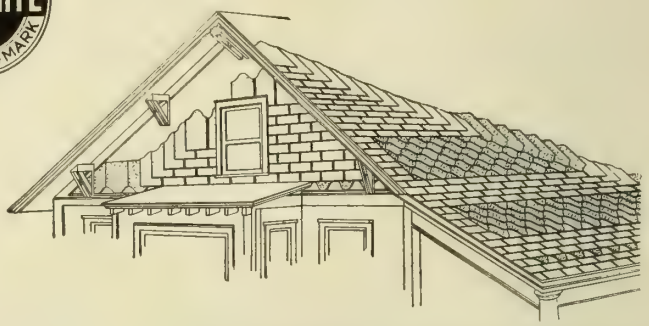


VULCANITE ASPHALT SHINGLES

Individual shingles are packed in cartons. Four cartons will lay one square and weigh approximately 225 pounds. Size, 8 x 12¼ inches. They lay 4 inches to the weather, giving a protection of three thicknesses; four where nailed.

Vulcanite Reversible Shingles.

A separate individual shingle, one end square, the other rounded, making possible a variety of attractive designs. Finish red and green. Colors absolutely permanent. Of excellent weather-resisting quality. Packed in cartons. Weight, 200 pounds per square.



AN ATTRACTIVE APPLICATION OF VULCANITE REVERSIBLE SHINGLE

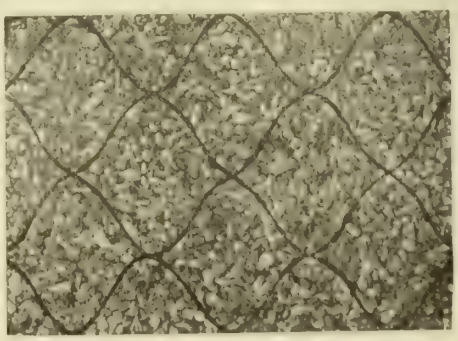
Vulcanite Jumbo Shingles.

Extra large and heavy; 50 per cent increased bulk gives longer life and greater weather-resistance. Self-spacing. No "laying off" needed. Unexposed portion forms a solid back which knits together and gives practically the same storm protection as solid strip shingles. Colors, gray green and red. Natural rock colors and permanent. Packed in cartons four to the square. Weight, approximately, 250 pounds.

VULCANITE JUMBO SHINGLE

Vulcanite Mosaic Roofing.

It is the latest and greatest accomplishment in prepared roofing. Made in different designs, which are obtained by imbedding the natural colored rock in the hot coating of the roofing. The actual size of design, as shown, is 14 x 15 inches. In rolls, 40 feet 6 inches long, 32 inches wide—enough to cover 100 square feet. Weight, 90 pounds.



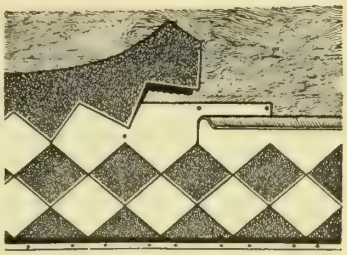
VULCANITE MOSAIC ROOFING, TWO COLORS ON THE SAME ROLL

Swett's Catalog

Continued on next page

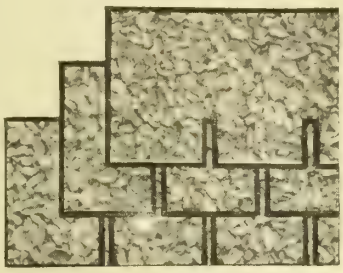
Vulcanite Strip Shingles.

Style A, Diamond Effect—Diamonds are 9¾ inches long and 6¼ inches high, the right size when viewed from a distance. Each roll is 16 inches wide and contains a double strip. This pattern allows for many distinctive combinations or groupings.



VULCANITE STRIP SHINGLE
Style A, Diamond Effect

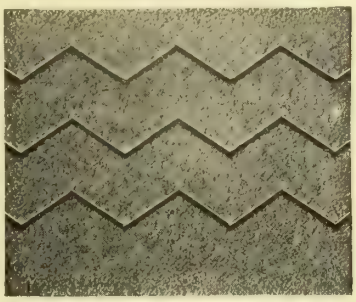
Style D, Square End—Made and laid in strips. Is easy and cheap to lay, and makes a strong, safe and thoroughly watertight roof. Spaces are cut only 4 inches deep, leaving the upper unexposed strip a solid sheet.



VULCANITE STRIP SHINGLE
Style D, Square End

Surfaced and finished with crushed rock. Four beautiful and permanent shades of red and green.

Style B, V-Shaped Notch or Saw Tooth—Each sheet is cut and separates readily on opening the roll; notches are 3 inches deep. Sheets are long, in several colors, including Vulcanite red and green.



VULCANITE STRIP SHINGLE
Style B, V-Shaped Notch

These strip shingles are made in rolls; same finish, material and specifications as other Vulcanite products. One roll covers one square. Shipping weight 100 pounds per square.

Vulcanite Roll Roofing.

Finishes: Red and gray green crushed rock, ground mica, bird's-eye gravel, ground marble and silica. All manufactured, without the use of tar and straw paper, under Vulcanite specifications. Roll is 32 inches wide and 40½ feet long, containing 108 square feet.

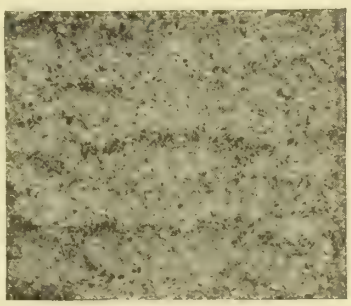
Mica finish, 34 to 54 pounds.

Red or Green finish, 80 pounds.

VULCANITE ROLL ROOFING
Red Finish

Vulcanite Rubber Roofing.

A high-grade rubber and asphalt product of superior quality, coated with flake mica.



VULCANITE RUBBER ROOFING

Vulcanoid.

An exceptionally tough and durable roofing of full standard Vulcanite quality.

Reverso.

Medium priced, of good quality. One side sanded finish, the other smooth.

Alligator Rubber.

Low priced and of good quality.

This class of roofing is put up in rolls 32 inches wide and 40½ feet long, containing 108 square feet, with cement and nails for laying packed in each roll.

1-ply, 34 pounds; 2-ply, 44 pounds; 3-ply, 54 pounds.

Specifications for Vulcanite Built-Up Asphalt Roof.

MATERIALS

Roofing—Shall be Vulcanite asphalt roofing weighing not less than 50 pounds per square, single thickness.

Asphalt—Shall be Vulcanite roofing asphalt, of which not less than 50 pounds per square shall be used.

Nails—Shall be ⅞-inch No. 10 roofing nails.

Roof Deck—Shall consist of well-seasoned 1-inch kiln-dried sheathing, preferably T. & G., surfaced on one side and swept clean of all chips, nails and other refuse. All projecting pipes or skylight holes are to be in place before roofing is laid, and shall be provided with suitable flashings. All knot holes shall be covered with tin. A 4-inch kant strip shall be placed at the intersection of the roof line and fire-walls, skylight, flues, etc.

APPLICATION

First—Beginning at the lowest point in the roof, lay a half sheet of Vulcanite asphalt roofing, sand surface to be laid next to roof surface, and nail sufficiently at the lower edge to hold in place.

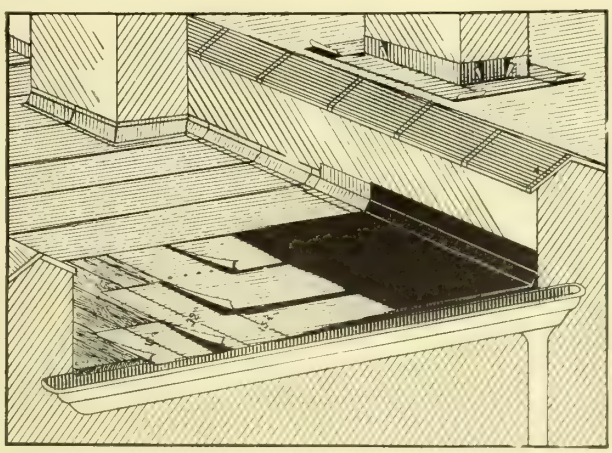
Second—Coat the entire surface with a uniform coating of Vulcanite roofing asphalt, into which, while hot, roll a full width sheet, sand surface to be laid next to the roof surface, making two layers of roofing at the lowest edge. Nail every six inches so as to catch the upper edge of the half sheet.

Third—Proceed over the entire surface of the roof, lapping each sheet one inch more than half its width over the preceding sheet, and mopping the full width of the lap.

Fourth—Coat the entire surface with a uniform coating of Vulcanite roofing asphalt, same to weigh not less than 25 pounds per 100 square feet of surface.

Flashings—Shall be made by extending all roofing six inches up all walls, chimneys, skylights or other projections.

Counter-flashing—According to plans and specifications of architect.



VULCANITE BUILT-UP FOUR-PLY ASPHALT ROOF
Can be applied over concrete or wood

Trade-Mark.

"Vulcanite" stands for one half century of painstaking care and effort in perfecting a roofing product that now has few if any equals. This Trade-Mark is an absolute assurance that full value in service and satisfaction will be received.

Guarantee.

Vulcanite Roofings are sold under an absolute guarantee of quality and wear.

ESTABLISHED 1868 INCORPORATED 1901

H. M. REYNOLDS ASPHALT SHINGLE CO.

ORIGINAL MANUFACTURERS OF

Reynolds Flexible Asphalt Shingles

GRAND RAPIDS, MICH.

Products.

REYNOLDS FLEXIBLE ASPHALT SHINGLES; REYNOLDS ASPHALT ROLL ROOFING.

TRADE-MARK

Organization.

The original company, from which the present one was incorporated, was established in 1868. Practically the same personnel is maintained in the present company.

Flexible Asphalt Shingles.

Reynolds shingles are manufactured from selected long-fiber wool felt, saturated with pure asphalt, coated with a heavy layer of asphalt, and surfaced with minerals, as later described under "Brands." The process of manufacture and the kind of materials used make it unnecessary to paint Reynolds shingles at any time.

Asphalt being a non-conductor of heat or cold, temperature does not affect a roof of Reynolds shingles.

These shingles are naturally impervious to moisture or water, either through the surface or under the laps; are proof against climatic changes, and are unaffected by frost.

It is impossible for water to creep or blow up under these shingles. No capillary attraction exists to admit water, which rusts nails and causes shingles to loosen and fall off.

Reynolds shingles are handsome, attractive and durable; will not rust, split, warp nor curl. Their life is an indefinite period. They have been in use for about fifteen years, and the early roofs are still in good repair.

Adaptability.

Reynolds shingles are adapted for any type of roof of one quarter pitch or greater. Being flexible, they are peculiarly suitable for thatched effects, eyebrows, and such other feature designs of roofs and dormers as are becoming popular.

Any particular shapes the architect may have been endeavoring to put into roof designs in the past are now possible without difficulty, for the designer is free to use great or small curves or reasonable angles, knowing that Reynolds shingles are adaptable to these curves or angles, and are not difficult to lay.

Reynolds shingles are built up to the specifications, not down to a price.

Sizes.

Reynolds shingles measure 8 by 12½ inches.

Coloring.

The coloring matter is inherent in the composition of the surfacing material, the natural colors being preserved without paint or chemicals.

Brands.

Reynolds flexible asphalt shingles are branded under six distinct names, each brand having reference either to the surfacing or weight of shingles, as follows:

Red or Green Slate—The standard weight Reynolds shingle, having a surfacing of granulated slate, in either red or green coloring.

Red or Green Rock—Same as above, but having a red or green rock surfacing.

Garnet—Same as above, with a surfacing of a very dark red rock of unusual beauty.

Pioneer—Same as above, but surfaced with a natural gray Michigan rock.

Midway—This differs in weight from the standard Reynolds shingle, and is of a weight midway between the standard and the Hercules. The amount of asphalt carried in this shingle is greater than in the regular or standard weight, and it is surfaced with either red or green rock.

Hercules—The heaviest and stiffest shingle of Reynolds manufacture. This shingle is designed to meet the demands of the architects for an extra thick shingle. Hercules shingles are sometimes laid five inches to the weather. This, however, is optional with the builder. Hercules shingles are approved by the Underwriters' Laboratories when laid four inches to the weather; but when laid otherwise, they are not entitled to classification under the Laboratories' approval. Surfaced with either green or red rock.

Shipping Weights.

Reynolds shingles weigh from 230 to 270 pounds per square, a variation experienced in all asphalt shingles.

Package Quantities.

All Reynolds shingles are regularly packed in bundles or cartons (as ordered), each package containing 106 shingles (sufficient to lay one quarter square when laid according to directions); excepting Hercules shingles, which are packed 85 shingles (sufficient to lay one quarter square, 5 inches to the weather).

Fire Resisting.

Reynolds shingles are fire retardants of prime preventive value. Owing to their fire-retarding qualities, Reynolds shingles have been approved by the Underwriters' Laboratories (class E), with the result that they take a lower rate of insurance than any unapproved shingle.

Guarantee.

Reynolds shingles are guaranteed by the manufacturer for a period of ten years. If, on account of any defect in the shingles, an imperfect or leaking roof results within this period, the manufacturers will furnish enough new shingles to replace the imperfect shingles, free of cost. This guarantee applies only when shingles are laid according to directions.

How to Specify.

The roofing on this building shall be of H. M. Reynolds Flexible Asphalt Shingles [or equal—but no shingle will be considered the equal of Reynolds unless approved by the Underwriters' Laboratories]. Shingles to measure 8 by 12½ inches. Color of shingles to be of natural colors. (Specify grade and brand).

Roofing boards to be of ⅞-inch seasoned lumber. No boards to be wider than 3 inches; and to be laid close, not allowing more than 1 inch space between. All flashings in connection with brickwork to be of a good old style tin, as also for all valleys.

Continued on next page

Contractor may use, instead of tin valleys, two thicknesses of the sheet roofing of 12 and 20 inches width, with the wide piece on top. All shingles to be laid 4 inches to the weather, and nailed 4½ inches from lower end, with ½ inch space between shingles. First course to be laid double, with broken joints projecting on a metallic drip edge, or lip. (A wood strip or one course of wood shingles may be used for this same purpose.)

All ridges of roof to be protected with a galvanized iron ridge roll or double thickness of the sheet roofing. Where shingles are specified on sides of dormers, or in gables, lay 3 inches to weather, and lay long way, with narrow way perpendicular.

All shingles should be laid straight. First course with shingles one third in width, next course two thirds in width, and third course with full width shingles. Continue in same manner, alternating one third, two thirds and full width over the whole job.

Reynolds Asphalt Roll Roofings.

These roofings are made in the following brands:

Ideal Red or Green—Red or green slate surfacing.

Buckeye—Red rock surfacing.

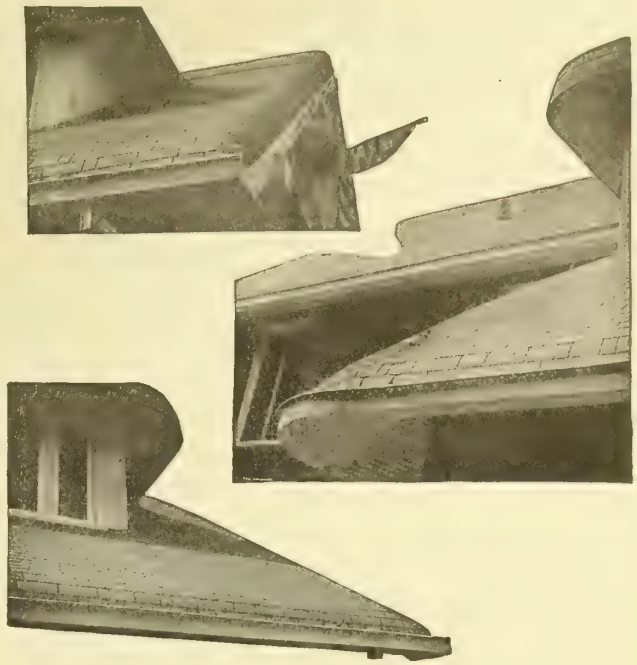
Peninsular—Green rock surfacing.

Ideal Granite—Gray rock surfacing.

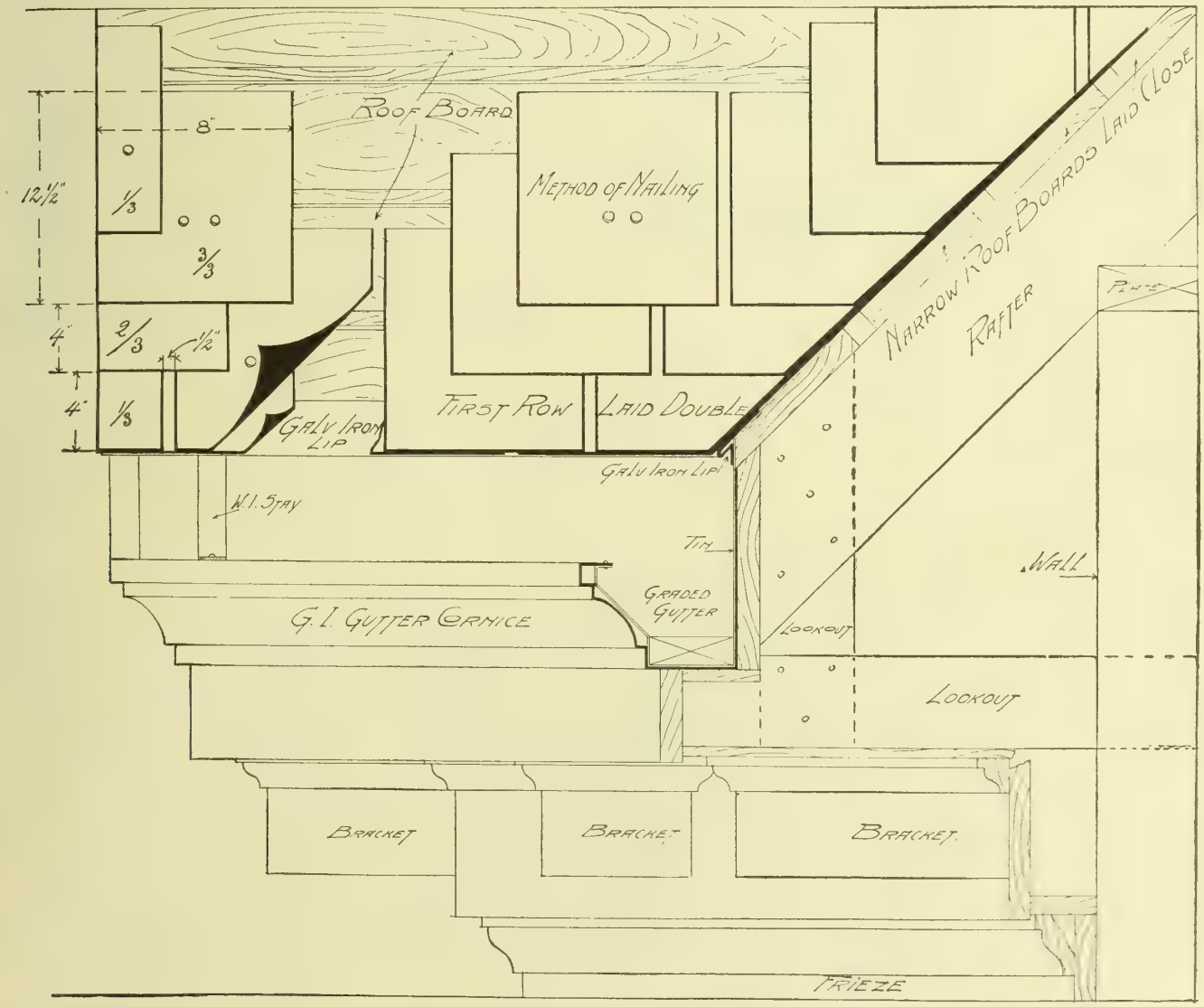
Ideal Granite (6-inch lap)—Gray rock surfacing.

Wolverine—A new red rock surfacing of unusual beauty.

Gibraltar—Gray rock surfacing, same as Ideal Granite, except lighter in weight.



VIEWS SHOWING APPLICATIONS OF REYNOLDS FLEXIBLE ASPHALT SHINGLES



SECTIONAL DETAIL SHOWING METHOD OF APPLYING REYNOLDS FLEXIBLE ASPHALT SHINGLES

ARMSTRONG PAINT & VARNISH WORKS

W. E. PRUZAN AND M. F. KRAUS, DEPARTMENT MANAGERS

Kling-Tite Asbestos Plastic Roofing

ESTABLISHED 1854

SALES OFFICE
5 North La Salle Street
CHICAGO, ILL.

FACTORY
2524 South Paulina Street

Products.

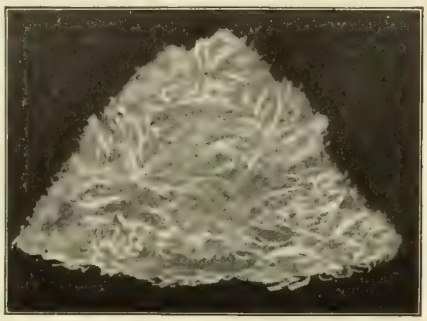
KLING-TITE ASBESTOS PLASTIC ROOFING, for Metal, Felt or Concrete Roofs, or for any roof that has a Wood Sheathing.

LEAK KNIT, a primer for use on new roofs before the application of main product.

TRADE-MARK

Kling-Tite Asbestos Plastic Roofing.

This is a cement-like composition that is spread over a roof without the use of a single lap, seam, joint or nail. It is a combination of semi-drying carbonaceous materials that are thoroughly interlaced with long, staple asbestos fibers, and tempered by chemical fusion with heavy, waterproofing oils that add materially to the durability of the cement, and so temper the product that it will not sag nor run at a temperature of two hundred degrees Fahr., or become hard and brittle at the low temperature of fifty degrees below zero.



LONG FIBER ASBESTOS
Used in making Kling-Tite Roofing

Asbestos is a mineral product known for its resistance to chemical influences as well as to heat and cold. The carbon products with which it is mixed and fabricated in the making of Kling-Tite Plastic Roofing are absolutely acid-, alkali- and gas-proof. The resultant product, because of chemical activity and great tensile strength, is not injured by vibrations, expansion or contraction due to temperature changes, snow, sleet and rain. Because it is a carbon-asbestos product it is a natural fire-retardant.

Advantages—No high-priced labor is required to apply this roofing. By following explicit and simple directions, and without having to send for a roofer or a tinner, any one can apply it in a workmanlike manner. This fact alone is of great value, as a bad leak, which might cause considerable damage during a heavy storm, may be checked at once. No cutting, fitting or estimating is required, such as would be necessary if felt, metal or similar materials were used.

Kling-Tite need never be melted or heated. It works freely under a trowel in zero weather or in the hottest day of midsummer. It is always ready for use.

Kling-Tite will adhere securely to a wet surface; it can be laid during a heavy rain with facility and positive results.

No roof is too steep for it; none is too flat. Slag and gravel roofs make splendid foundations for it.

The first cost is the only cost, as Kling-Tite will never chip, crack or break loose, and therefore does not require painting or patching.

No matter how old or worn a roof may be, it can be made absolutely waterproof with a coat of this preparation. It is not necessary to tear up the old material; for Kling-Tite can be spread over any warped or torn portions, and will permanently stop the leaks.

Uses—Kling-Tite may be used for protecting new roofs over felt, concrete, wood sheathing, etc., or for resurfacing over composition, felt, wood sheathing or like materials.

APPLICATION OF KLING-TITE PLASTIC ROOFING

It is also adaptable as a damp-proofing for foundation work and as a caulking for ships' bottoms. It stops leaks in skylights, rain spouts, gutters and valleys, and seals up metal flashings. It may be used to repair leaks in copings, sidewalks, driveways, cisterns, tanks, etc.

Sizes—Kling-Tite is put up in sizes named below:

Barrels About 550 lbs.	Large Kegs About 200 lbs.	Large Kits About 50 lbs.	Gallon Cans 10 lbs.
Half-barrels About 350 lbs.	Small Kegs About 100 lbs.	Small Kits 25 lbs.	Half-gallon Cans, 5 lbs.

KLING-TITE USED TO REPAIR OLD, LEAKY ROOFS

KLING-TITE APPLIED AS A DAMP-PROOFING FOR FOUNDATIONS OF BUILDINGS

Continued on next page

Leak Knit.

This is a paint that should be used as a priming coat on new cement, wood sheathing, flat and metal roofs, before the application of Kling-Tite Plastic Roofing. It is a pure asphalt product, and will both seal up voids and prevent suction. It should be applied with either a large wall brush or a three-knotted roofing brush.

Other Uses—It will also serve as a coating for the inside of silos, to stop and prevent air leaks. Silage acids and gases have no effect on it, nor is the silage tainted by it. Full directions with each shipment.

Sizes—Leak Knit is put up in the following sizes:

Barrels	Half-barrels	Kits	Cans
About 50 gals.	About 25 gals.	5 gals.	1 gal.

Specifications for Roofs.

On New Wood Sheathing—To secure the best results the roof boards should be of well-seasoned lumber, straight-edged and laid so as to fit closely together. Wide cracks between boards are to be particularly avoided. Cover all knot holes with metal patches in the way described in "Over Old Metal." Plane off any projections. The roof should be cleaned of all loose chips, nails, etc.

To secure a good, even foundation on which to apply the roofing, the roof should be covered with asphalt-saturated felt weighing not less than 14 pounds to 100 square feet. In figuring the amount of felt needed, allow for a 6-inch turn-up on all walls and a 2-inch lap on each strip.

Start laying the felt at the eaves, turn over the edge and nail down at intervals of 2 inches with ⅞-inch tinners' nails, driven through flat tin caps. Coat the loose edge of the felt with a 2-inch-wide strip of Kling-Tite. Now lay the second strip of felt overlapping the first strip 2 inches. Press down with a trowel, to squeeze out the coating and make a smooth lap. Be sure that the first strip is pulled smooth and even before nailing down. Nail down the lap with ⅞-inch barbed tinners' nails driven through flat tin caps placed at intervals of 3 inches. To prevent the felt from wrinkling, a row of nails should be driven through the center of the strip. Place at intervals of 15 inches. Lay strips in the manner indicated above until the whole surface is covered.

To secure a snug weatherproof roof, follow closely the directions for laying the felt at all angles between roof and walls. Allow 6 inches of felt for a turn-up. Two inches from the wall nail down the felt as indicated above. Press back the felt and spread on Kling-Tite to a height of 6 inches. Now press the felt into the angle until a snug fit is obtained. Start working upward with the trowel in such a way that the Kling-Tite is squeezed out at the top and the felt lies smooth and even. Nail down the upper edge.

At a distance of 4 inches above the edge of the felt, start applying the Kling-Tite with a trowel. Work down over the edge of the felt and out upon the roof. Apply a coat $\frac{1}{16}$ of an inch in thickness over the whole roof. Allow six days for the roof to become hard enough to walk on. In calculating the amount of Kling-Tite you will need, allow 35 pounds of Kling-Tite for every 100 square feet of surface to be covered. For flashing allow 45 pounds to each 100 lineal feet.

On New Concrete—To secure the best results, the roof surface should be smooth, clean and hard. If the roofing is to be applied to cement which has been recently laid, make sure that the cement has set and has completely dried out. If the walls are not of wood, fix a 2-inch strip of wood into the wall 4 inches above the roof on which the felt can be nailed.

Before applying roofing, prime the roof with Armstrong's Leak-Knit Primer and allow this to dry for at least four hours. Then flashing at the walls and reinforcing at the valleys should be done as recommended below.

In flashing at walls, coat the wall and roof for a distance of 6 inches from the angle, with a heavy coat of Kling-Tite. Take a 12-inch wide strip of 14-pound asphalt-saturated felt and fit it snugly into the angle. Now start working upward with the trowel in such a manner that the roofing is pressed out at the top, and the felt lies smooth. Nail the top edge of the felt to the wooden strip. With the trowel, work outward from the angle, squeezing the Kling-Tite out at the edge of the felt so that the felt lies smooth on the roof; 4 inches above the upper edge of the felt start to trowel on the roofing, working downward over the edge of the felt and out upon the roof. Precaution: Be sure the roofing forms a smooth continuous layer over the edges of the felt.

If gussets are set against the wall, make the felt strip wide enough to reach 6 inches above the gusset and out on the roof 12 inches from the edge of the gusset. Where there is a gutter in the angle between roof and wall, make the flashing strip 30 inches wide, and lay it so that it reaches 6 inches up on the wall and 24 inches out on the roof. Apply the Kling-Tite as directed above, except that it should be applied *8 inches above the top edge of the felt.* Valleys should be reinforced with a strip of felt 18 inches wide laid in Kling-Tite.

After the work of flashing and reinforcing is done, apply a coat of the roofing over the roof $\frac{1}{16}$ of an inch thick. Allow the roofing to dry six days before walking on it. In calculating the amount of material you will require, allow 3 quarts of Leak-Knit primer and 35 pounds of Kling-Tite for each 100 square feet of roof surface, and 45 pounds for each 100 lineal feet of flashing.

Over Old Metal—In order to secure the proper adhesive effect, Kling-Tite should be applied only to clean surfaces. In the case of old metal roofs, remove loose rust and paint scales with a stiff wire brush. Nail down all loose parts of the roof. Patch all holes larger than ¼ of an inch in diameter in the following manner: Coat one side of the metal patch with Kling-Tite, press down firmly over the hold and nail down around the edges.

On standing seam roofs, if the seams are not entirely eaten away by rust, they may be coated over. In order to get the roofing into the crevices and angles of the seams apply it with an old, hard paint brush. In case the seams are rusted out, cut them off with an adz. Patch the opening with a 3-inch strip of metal as directed above.

On flat seam roofs, trowel the roofing against the seams, as this will fill them up and give a smooth waterproof surface.

Coat the entire surface with a layer of Kling-Tite $\frac{1}{16}$ of an inch thick. In calculating the amount of Kling-Tite needed for a job, allow 30 pounds for each 100 square feet of standing seam roof and 25 pounds for each 100 square feet of flat seam roof.

On Old Felt—Before applying the roofing go over the felt with a stiff broom, to remove any loose particles. Patch all holes with metal patches as directed in "Over Old Metal." If the felt is wrinkled, cut through the wrinkles and nail down the loose edges thus formed so that the felt lies smooth.

NOTE—Do not apply coating over felt that is rotten; over felt which is covered with old, cracking tar; or over felt heavily coated with tar which will run in hot weather.

Spread the coating over the surface with a trowel, to form a layer $\frac{1}{16}$ of an inch in depth, working the roofing against the laps. The amount required differs with the condition of the felt, but usually 30 to 40 pounds to 100 square feet is sufficient.

Specifications for Damp-proofing Foundations.

Paint the foundation work, whether of concrete or brick, on the outside, with a thick coat of Leak Knit. Allow to dry from four to six hours. Trowel on Kling-Tite to a depth of ⅛ of an inch until a continuous, unbroken layer is obtained over the whole surface. Shovel back the earth, and you will have a permanently water-tight foundation. In applying Kling-Tite over rough surfaces be sure that the projections are entirely covered with the roofing; otherwise a leak will result.

Guarantee.

Kling-Tite Plastic Roofing, when used as a roof covering and applied according to the specifications of the ARMSTRONG PAINT & VARNISH WORKS, is guaranteed for a period of ten years. If it fails to fulfil this warranty, the company will furnish free of charge sufficient Kling-Tite Plastic Roofing to keep the roof watertight for the ten-year period.

REFERENCES

Edgewater Beach Hotel, Marshall & Fox, Architects, Chicago, Ill.
Swift & Co., Construction Department, Chicago, Ill.
A. Charvat, Architect, Chicago, Ill.
American Steel & Wire Company, Chicago, Ill.
Sumner Sollitt & Co., Contractors, Chicago, Ill.
J. J. Badenoch Company, Grain Elevator, Chicago, Ill.
Knickerbocker Roofing and Paving Co., Chicago, Ill.
Holpuch Roofing Company, Chicago Heights and Joliet, Ill.
Monarch Brewing Company, Chicago, Ill.
Charles W. Kallal, City Architect, Chicago, Ill.
Frank A. Carpenter, Architect, Rockford, Ill.
City Fire Department, Rockford, Ill.
City Waterworks Department, Rockford, Ill.
Worlds Furniture Company, Rockford, Ill.
Illinois State Penitentiary, Joliet, Ill.
Chicago Surface Lines, Chicago, Ill.

THE BARBER ASPHALT PAVING COMPANY

Trinidad Lake Asphalt Bermudez Lake Asphalt

Asphalt Products for Paving, Roofing, Waterproofing and all Industrial Purposes

NEW YORK, N. Y. PHILADELPHIA, PA. CHICAGO, ILL.

Products.

TRINIDAD LAKE ASPHALT.
BERMUDEZ LAKE ASPHALT.
TRINIDAD LAKE ROOFING ASPHALT.
TRINIDAD LAKE STEEP ROOFING ASPHALT.
ASPHALT SATURATED FELTS (Wool and Asbestos).
"VULCANITE" ASPHALT MASTIC and FLUX.
"POSITIVE SEAL" WATERPROOFING ASPHALT, PAINTS, FELTS and BURLAP.
"GENASCO" ASPHALT ROOF COATING and ROOF PAINT.
"GENASCO" READY ROOFINGS of all types, both Smooth and Mineral Surfaces.
"GENASCO" SLATE SURFACE SHINGLES (Red and Green).
"GENASCO INSULITE" BUILDING PAPERS.
"GENASCO" MINERAL RUBBER.
"GENASCO" BLACK ASPHALT PAINTS for Metal.
"GENASCO" ACID PROOF ASPHALT VARNISH.
"GENASCO" ASPHALT PUTTY.
"GENASCO" INSULATING and PIPE COATING COMPOUNDS.
"GENASCO" TILE CEMENT.
BINDER for Bituminous Subfloor Construction.

TRADE-MARKS

"Vulcanite" Asphalt Mastic.

Three ingredients enter into mastic construction: mastic block, hard or soft flux and mineral aggregate of sand and grit. "Vulcanite" Asphalt Mastic is supplied in cylindrical blocks weighing approximately sixty pounds each. Trinidad Lake Asphalt, hard or soft, is universally recognized as the proper flux for mastic construction.

These two materials are shipped to the site of the work, there melted and prepared with a proper proportion of sand and grit. The proportions of the ingredients depend upon the nature of the work.

No better asphalt mastic can be produced than our "Vulcanite" brand, manufactured from Trinidad Lake Asphalt and impalpable mineral dust.

"Vulcanite" Asphalt Mastic has service tests under every condition of usage, extending over a period of many years. It has been successfully used in

Breweries	Station platforms
Railroad shops	Engine houses
Lavatories	Abbattoirs
Stables	Sugar refineries
School corridors	Stair treads

Warehouses

and, in fact, wherever an impervious waterproof floor finish is desirable.

"Vulcanite" Asphalt Mastic withstands the heaviest traffic conditions. For trucking areas in warehouses, loading platforms and sidewalks, it is superior to granolithic or brick surface; also as a lining for concrete acid tanks, and for waterproofing of reservoirs, swimming pools, bridges and subways, and for roofs subject to foot traffic. Mastic may be applied over concrete, wood or brick.

Asphalt mastic is unequalled as a flooring material where conditions require an even, waterproof, sanitary, dustless and lasting surface, and where ability to withstand heavy traffic is essential.

Specifications for any required type of floor furnished on request. Our booklet "Vulcanite Asphalt Mastic" fully describes the manufacture, uses, method of manipulation and advantages of this product.

Specifications for Standard Four-Ply Trinidad Lake Asphalt Roof, to Be Applied on Boards.

Materials—Wool felt shall be of standard quality, 32 inches wide, containing 150 per cent saturation of asphalt, and weighing not less than 14 pounds per 100 square feet of single thickness.

The roofing cement shall be Trinidad Lake Roofing Asphalt, of which not less than 100 pounds per square foot of finished roof shall be used. Where the slant is greater than 3 inches to the foot, Trinidad Lake Steep Roofing Asphalt shall be used.

The surfacing material shall be slag or gravel; no particles shall be larger than ⅜ inch or smaller than ¼ inch in diameter, and shall be free from dust, clay and other injurious foreign matter. Not less than 300 pounds of slag or 400 pounds of gravel shall be used to 100 square feet.

Application—The surface shall be swept and carefully examined for projections that might puncture the felts, or depressions that would hold water, and these faults shall be corrected. Over the roof boards apply four thicknesses of felt, lapping each sheet three-quarters of its width over the preceding one, and mopping the entire surface between the felts with hot Trinidad Lake Roofing Asphalt.

Begin laying the felts at the lowest points on the roof, nailing the upper edge of the felt sufficiently to hold it in place, using 1-inch wire nails, driven through flat tin discs, approximately 1 inch in diameter, so that the succeeding layers of felt will cover all nail heads. Half-sheets of felt shall be used at the lowest points to bring the thickness to the required number of four sheets.

Felts shall be turned up at least 6 inches against all walls, monitors, vents, etc., and fastened securely with wooden roofing cleats, ⅜ inch by 1½ inch in size, to a continuous wood nailing strip imbedded in the brick walls.

The entire surface of the felts shall be mopped with a heavy coating of Trinidad Lake Roofing Asphalt. This mopping to extend up and over the wooden roofing cleats; and while the roofing asphalt is hot there shall be imbedded in it the required amount of slag or gravel. The slag or gravel shall be dry, and if the weather is below 40 degrees Fahr., shall be heated before application.

Intent—It is the intent of these specifications to secure a water-tight roofing that will not slip, slide nor run in summer, or become hard and crack in winter.

The contractor shall use only the materials herein indicated, and perform the work in strict compliance with the specifications. Genuine Trinidad Lake Roofing Asphalt is readily recognized by the Horseshoe Trade-Mark on every barrel.

Continued on next page

NOTES—No rosin-sized sheathing nor dry felt is required before applying the saturated felts, as Trinidad Lake Roofing Asphalt will not run, creep nor shove in the hottest summer sun. There is, therefore, no danger of cement dripping through—a common fault with coal tar.

"Positive Seal" Felt—Where there is excessive moisture in the building, resulting in condensation on the under side of the roofing, as in paper-mills, or where the felt is exposed to the fumes of gases, as in train sheds, railroad shops, chemical works, etc., satisfactory results will be obtained by first applying a layer of "Genasco" Positive Seal Felt, lapping each sheet 2 inches over the preceding one and cementing it with hot Trinidad Lake Roofing Asphalt. Mop the entire surface of the "Positive Seal" Felt with roofing asphalt, and while hot apply three layers of roofing felt, mopping each sheet two thirds of its width over the preceding one.

The "Positive Seal" felt has an asphalt coating which thoroughly protects the fiber from acids and gases as well as moisture, thus overcoming a serious difficulty heretofore experienced with this class of buildings.

The above specifications may be used for roof over concrete or hollow tile with the addition of a heavy mopping of roofing asphalt preceding the first layer of felt making total requirements of roofing asphalt one hundred forty pounds per one hundred square feet.

We have complete specifications covering other types of built-up roofs, in all of which the waterproofing agent is Trinidad Lake Roofing Asphalt—the recognized standard for uniformity and durability—combined with saturated felts, both wool and asbestos, in various weights to meet specific service conditions.

Under these specifications the gravel surface is eliminated, and a smooth, fire-resisting finish provided by a top sheet of asbestos, protected with Trinidad Lake Roofing Asphalt.

These specifications furnished upon request.

"Genasco" Ready Roofings.

Made of a high grade felt, waterproofed with genuine Trinidad Lake Asphalt, to which they owe their great weather resistance.

Manufactured in several types, viz:

Smooth Surface—1-, 2- and 3-ply.
Sanded Surface—1-, 2- and 3-ply.
Asbestos Surface—1-, 2- and 3-ply.
Stone Surface with finish of gravel.
Whitestone with finish of quartz.
Model—burlap back with finish of quartz.
Slate Surface—colors red and green.

Each roll furnished complete with trimmings consisting of the "Kant-Leak Kleet" with smooth and sanded surface roofings; large head nails and cement with the types having heavy mineral surface.

"KANT-LEAK KLEAT"
Furnished with "Genasco" Smooth and Sanded Roofings

The "Kant-Leak Kleet" is a remarkably efficient device for applying ready roofings, inasmuch as it obviates the use of large head nails and cement, and produces an absolutely tight lap and an attractive roof free from danger of leaks.

"Genasco" Asphalt Shingles.

Made of the same high-class materials as "Genasco" Roofing in rolls, finished with a surfacing of finely crushed slate, red and green.

The "Genasco" Shingle is unique, inasmuch as it has a heavy coat of asphalt on the under side which provides for the close adhesion of the different layers after application.

Made in two weights, known as "Genasco" and "Genasco Extra Heavy." The former is laid 4 inches, and the latter 5 inches, exposed to the weather; all 8 by 12¾ inches in size. Shipped in cartons, each containing sufficient shingles to lay one quarter square.

The mineral surfacing being natural slate, the color is permanent.

"Genasco" Shingles are entirely suitable for residences, providing, as they do, a roof that is durable, attractive, and fire-resisting.

"Positive Seal" Waterproofing Materials.

Under the "Positive Seal" brand we produce a complete line of waterproofing materials consisting of asphalts of varying characteristics, especially suiting them for use both under and over ground—paints, felts and fabrics.

Recognizing the necessity of special treatment of waterproofing problems in practically each individual instance, we do not offer a standard specification for waterproofing, but solicit inquiries and offer suggestions based on experience.

Our booklet "Waterproofing by the Positive Seal Method," a general outline of this subject, available to all interested.

TERMINAL OF PHILADELPHIA & READING RY CO., 12TH AND MARKET STREETS, PHILADELPHIA, PA.
Covered with "Genasco" Stone Surface Red Roofing

THE STANDARD PAINT COMPANY

Ru-ber-oid Roofing, Building Papers and Metal Preservative Paints

Woolworth Building
NEW YORK, N. Y.

People's Gas Building
CHICAGO, ILL.

Beacon Building
BOSTON, MASS.

MONTREAL, CAN., THE STANDARD PAINT CO. OF CANADA, LTD.

Products.

ROOFING; DECORATIVE ROOFING; COMPOSITION SHINGLES; ASPHALT FELTS; ASPHALT WATERPROOF SHEATHING FELT; REINFORCED or BUILT-UP ROOFING; DECK CLOTH.

INSULATING and SHEATHING PAPERS; FLOORING; BITUMINOUS COMPOUNDS; WATERPROOFING, for Cement; WALLBOARD.

PAINTS—Oil Base with Pigment; MASONRY PAINTS; BITUMINOUS PAINTS; ELECTRICAL INSULATING COMPOUNDS.

TRADE-MARK

Roll Roofings.

Ru-ber-oid Roofing, Gray Color—The original smooth surface ready-to-lay roofing, made from the *same* formula for twenty-four years. It costs more than ordinary prepared roofings, but it *wears* longer. Made in four weights, light (one half-ply), weighing 25 pounds per square of 108 square feet (including fixtures); medium (one-ply), weighing 35 pounds per square; heavy (two-ply), weighing 45 pounds; and extra heavy (three-ply), weighing 55 pounds. Width, 36 inches. Special large headed, sherardized (zinc coated) nails and Ru-ber-ine cement are packed in every roll. Furnished also in 216 square foot rolls.

Colored Ru-ber-oid Roofing—Made in two attractive colors, tile red and copper green. These are finished with a smooth surface. The colors are permanent—*built into* the roofing. Possesses the same wearing qualities as the Gray Ru-ber-oid. Put up in rolls 24 inches or 36 inches wide, and *crated*. Rolls contain 108 square feet of the 36-inch width, and 110 square feet of the 24-inch width. Fixtures furnished with the rolls, including cement of the same color as the roofing. Weight, crated, as follows: medium weight 45 pounds per square, and heavy weight 55 pounds per square. The green is furnished in the heavy weight only.

Plastex Roofing—Furnished in rolls containing 108 square feet, either 36 or 18 inches wide, weighing 45 pounds per square. A smooth surfaced roofing backed with burlap and waterproofed *throughout* with special bituminous compound. The surfacing of this roofing has the same wearing qualities as Ru-ber-oid.

Imp Roofing—Smooth surfaced on both sides, dusted with talc (no corrugations or roll marks on the surface). Made in three plies, weighing 35, 45 and 55 pounds per square of 108 square feet, including fixtures. Rolls 36 inches wide. This is a moderate priced high-grade roofing.

Cronolite Roofing—Surfaced with coarsely ground talc on both sides of the sheet, imparting to it a distinctive "finish." Furnished in three plies, weighing 35, 45 and 55 pounds per square of 108 square feet, including fixtures. Rolls 36 inches wide.

Zylex Roofing—Corrugated surface on both sides of the sheet, dusted with talc. A low priced roofing of high quality. Put up in three plies, weighing 35, 45 and 55 pounds per square of 108 square feet, including fixtures. Rolls 36 inches wide.

Staco Roofing—Corrugated surface on one side, dusted with talc; the other side surfaced with fine sand (silica). Same quality as Zylex, but with a different finish on one side of the sheet. Manufactured in three plies, weighing 35, 45 and 55 pounds per square of 108 square feet, including fixtures. Rolls 36 inches wide.

Duplex Roofing—Surfaced on both sides with fine sand (silica). Same quality as Zylex, but sand surfaced on both sides, also heavier in weight. Made in three plies, weighing 50, 60 and 70 pounds per square, including fixtures. Rolls 36 inches wide.

Starex Roofing—Special talc silica surface both sides of sheet. Made in three plies, weighing 35, 45 and 55 pounds per square, including fixtures. Rolls 36 inches wide.

Pabco Gravel Roofing—Made of a felt base, saturated and coated with asphalt, and surfaced with granite chips of a uniform texture. Color of surface, gray. Made in one weight only, 80 pounds per square. Rolls 36 inches wide. Furnished with a 2-inch uncoated marginal edge for forming the lap.

SPC Slate Surfaced Roofing—Made of a felt base, saturated and coated with asphaltic compound, surfaced on one side with finely crushed slate, of either a red or green color. Put up in one-ply only, weighing 80 pounds per square, including fixtures. Rolls 36 inches wide.

Decorative Roofing Sheet.

Ru-ber-oid Shadow-roof — Throws the same shadows and has similar proportions to a copper roof laid over battens. Suitable for sloping roofs on residences, schools, libraries and hotels.

Is an improvement over the use of exposed wooden battens in that the roofing *covers* the battens and protects them from the weather. The battens (to be supplied and laid by carpenter) are exactly 1¾ inches square, laid on 20-inch centers.

The main seams need not be cemented, as they meet on top of the battens, removed from any possible leakage.

Since a "breathing space" is provided for expansion, the roof lies absolutely smooth under severest conditions.

Shadow-roof is made from regular 2-ply Ru-ber-oid, which can be painted tile red or copper green. It is packed in flat crates containing 40 sheets, sufficient

Continued on next page

for four squares of roof. The sheets are 24 inches wide and 74 inches long, prepared with grooves for easy bending.

Send for illustrated folder.

Composition Shingles.

Ru-ber-oid Shingles—Made in the same finish as Ru-ber-oid Roofing, and in slate gray and tile red colors. Composition also the same. Size, 8 by 12¾ inches. 424 shingles furnished per square, weighing 240 to 250 pounds. Packed in wooden crates, containing one quarter square each.

SPC Shingles—Manufactured in the same finish and of the same composition as SPC Slate Surfaced Roofing; viz., furnished in two colors, red and green. Size, 8 by 12¾ inches. 424 shingles per square, weighing 220 pounds. Packed in wooden crates, containing one quarter square each.

Asphalt Felt.

SPC Saturated Felt—Consists of felt, saturated only with pure asphalt. Manufactured in two weights, known as No. 1 and No. 2, weighing 11 pounds and 16 pounds per square of 108 square feet respectively. No. 1 furnished in four square rolls, and No. 2 furnished in three square rolls. No fixtures supplied.

SPC Waterproofing Felt—Consists of a sheet of felt, saturated and coated on both sides with pure asphalt. Put up in two weights, known as No. 1 and No. 2, weighing 18 and 28 pounds per square of 108 square feet respectively. Width, 36 inches. No fixtures supplied.

Ru-ber-oid Waterproofing Felt—An extremely high-grade product, possessing unusually great strength. Made in one weight only, 15 pounds per square; put up in rolls containing two squares. Width, 36 inches. No fixtures supplied.

Asphalt Waterproof Sheathing Felt—An inexpensive sheathing, consisting of paper stock saturated only with asphalt. Put up only in rolls containing 500 square feet; and in three weights, known as No. 1 weighing 50 pounds, No. 2 weighing 40 pounds and No. 3 weighing 30 pounds per roll of 500 square feet. Width 36 inches. No fixtures supplied.

Built-Up Roofs.

Method C1—Adapted for either concrete or wood roofs. Composed of three layers built up on the roof, and cemented together with SPC Compound. The under layer is composed of saturated felt, and the two upper layers of one-ply Ru-ber-oid, finished with a smooth surface. Specifications furnished on request.

Method C2—Adapted for either wood or concrete. Similar to Method C1, with the exception that the Ru-ber-oid Roofing is replaced with one-ply Staco. Detailed specifications furnished on request.

Deck Cloth.

SPC Single Coated Waterproof Cloth—Consists of a sheet of duck surfaced on one side only with a bituminous coating. Put up in rolls 60 inches wide, containing either one square weighing 20 pounds or two squares weighing 37 pounds, wound on wooden cores. Tin tacks furnished separately. The duck side should be painted when laid.

Insulating and Sheathing Papers.

Giant Insulating Paper—This is the highest grade paper we manufacture, and is saturated and coated on both sides. Has unusually great strength. Made in four plies, weighing 20, 30, 40 and 50 pounds respectively, per 500 square foot roll; 36 inches wide. Also put up in 1000 square foot rolls.

Jet Insulating Paper—A moderate priced paper, saturated and coated on both sides. Made in one weight only, of 45 pounds per 500 square foot roll; 36 inches wide.

Hercules Insulating Paper—A high-grade saturated paper, put up in four plies, weighing 15, 23, 30 and 38 pounds per 500 square foot roll; 36 inches wide. Also put up in 1000 square foot rolls.

P&B Insulating Paper—A high-grade paper, coated on both sides, but not saturated. Made in three plies, weighing 15, 24 and 35 pounds per 500 square foot roll; 36 inches wide. Also furnished in 1000 square foot rolls.

Universal Sheathing Paper—A low priced paper, coated on both sides, but not saturated. Put up in two plies, weighing 17 and 23 pounds per 500 square foot roll; 36 inches wide. Also furnished in 1000 square foot rolls.

Sovereign Sheathing Paper—A medium priced paper, coated on both sides, but not saturated. Put up in one weight only, of 30 pounds per 500 square foot roll; 36 inches wide. Also furnished in 1000 square foot rolls.

Pearl Sheathing Paper—A low priced paper composed of rosin sized stock, coated on one side only with asphalt. Furnished in one weight, of 23 pounds per 500 square foot roll; 36 inches wide.

Case Lining Paper—Made in two grades: L, composed of a Kraft paper stock, weighing 10 pounds per 500 square feet, put up in rolls weighing 100 pounds, 36 inches wide; R, composed of a moderate priced paper stock, weighing 17 pounds per 500 square feet, put up in rolls weighing 150 pounds, 36 inches wide. Both L and R case lining papers are coated with asphalt on one side of the sheet only.

Waxed Waterproofing Paper—Paper stock saturated with a transparent wax mixture, put up in two weights, No. 1 and No. 2, weighing 20 and 25 pounds respectively, per 1000 square feet; 36 inches wide.

Little Giant Insulating Paper—An extremely high-grade paper for electrical insulating purposes. Saturated and coated on both sides of the sheet. Weighs 50 pounds per roll, containing about 2400 square feet; 36 inches wide. Withstands 750 volts.

Flooring.

Ru-ber-oid Flooring—Made in two surface finishes, either gray or red; 1/16-inch in thickness, either 36 inches (4/4) or 72 inches (8/4) wide. Put up in rolls containing approximately 25 lineal yards, weighing 3½ pounds per square yard net, or 4½ pounds per square yard, including crates.

Bituminous Compounds.

SPC Hot Compound—A special adhesive compound adapted to be melted and applied hot for built-up roofing and waterproofing work.

SPC Cold Compound—Made up of a plastic consistency. Hardens after application. To be spread with a trowel. Made in three colors, black, red and green, and is of an asphaltic nature.

Continued on next page

Imp Asbestogum—Made of a plastic consistency; and to be used with a trowel. Composed of asphalt, asbestos and solvent. Hardens after application. Made in black only. Used for roof repair work.

SPC Pipe Seal Compound—A bituminous composition for making water-tight joints in vitrified sewers. Liquefies by heating; cools rapidly; prevents infiltration and penetrations of roots of trees.

Waterproofing for Cement.

Impervite Integral Waterproofing Paste—Impervite is unique, being an asphaltic emulsion (patented) and free from "calcium stearate" or other soap. Received Gold Medal (highest award) at California Exposition. A ¾-inch inside facing of Impervite mortar is guaranteed to waterproof a leaky wall 50 feet below the ocean. Specify Impervite in stucco, as it is the only way to secure waterproofing and avoid hair-cracks.

For full description, see General Index for our page on Waterproofing.

Wallboard.

Amiwud—Furnished in either plain or grained, in imitation of the natural wood; 48 inches wide and $\frac{3}{16}$ inch thick. Full data furnished on request.

Paints—Oil Base with Pigment.

Flexite Paint—The highest-grade oil paint we manufacture. Used for metal and woodwork exposed to the weather. Not adapted for under ground or under water. Composed of pure linseed oil and pigment mixtures. Made in black, red, gray, olive and green.

SPC Graphite Paint—Same general composition and high qualities as Flexite, but with a graphite pigment.

Structural Paint—Made in the same general colors as Flexite, but with a lower quality oil and pigment mixtures. Lower in price, but do not spread as far as Flexite per gallon.

Structural Graphite Paint—Same general characteristics as Structural Paint, with the exception that a graphite pigment is used.

Masonry Paints.

SPC Masonry Finish—High-grade enamel paint, drying with a flat finish, for coating exterior or interior brick or cement walls and stucco. Made in the following colors: Natural, cream, mentone yellow, brick red, caenstone, French caenstone, and cement gray.

SPC Masonry Primer—Supplied for use as a first coating on new wall.

SPC Cement Floor Finish—High-grade enamel paint, drying with a *glossy* surface; recommended for interior floors. SPC Cement Floor Filler to be used for first coat. SPC Cement Floor Finish made in the following colors: Warm gray, light stone, medium dark stone, dark stone, drab, spruce, tile red, and antique brown.

SPC Sanitary Coating—A very high-grade white enamel made either in gloss or flat finish for interior use. Recommended for wood, metal, cement or plaster. Masonry surfaces should first be primed. Forms a very hard, washable surface.

SPC Dampproofing Paint, Black—A high-grade bituminous paint, for the *inside* of brick and concrete walls before plastering. Forms a perfect bond between the masonry and the plaster. Prevents moisture penetrating the wall.

SPC Dampproofing Paint, Clear—A transparent liquid for use on the outside of masonry walls. Makes porous walls water-tight.

Bituminous Paints.

P&B Paint—A rapid-drying black asphaltum paint. The oldest acid- and alkali-resisting paint on the market. Made in three consistencies: No. 1, light; No. 2, medium; No. 3, heavy. Dries very *rapidly*. Recommended for indoor or submerged work. Unaffected by continued moisture.

SPC Non-inflammable Paint—Of the same general characteristics as P&B, with the exception that the vapors are non-inflammable. Suitable for use in confined locations, and where it must be applied in the vicinity of an open flame. Recommended for inside of acid tank cars.

SPC Boiler and Stack Paint—A high-grade, varnish-like preparation for painting metal stacks and other surfaces subjected to a high temperature.

SPC Flexible Iron Paint—The best grade of asphaltum paint, recommended for metal and other surfaces, and especially for metal roofs. Made in two colors, black and maroon.

Peacock Ready Roofing Paint—An asphaltum paint intended for prepared roofing other than Ru-ber-oid.

Ru-ber-ine Paint—Intended primarily for coating Ru-ber-oid. Made in three colors, black, red and green. The red and green Ru-ber-ine are also recommended for prepared roofing other than Ru-ber-oid.

Star Asphaltum Paint—A medium grade of asphaltum paint for all general purposes. Color, black.

Special Asphaltum Paint—A low priced grade of black asphaltum paint, to be used where long wearing qualities are not essential.

SPC Asphaltum Varnish—A very high-grade black varnish, drying to a *hard* and lustrous coating. Good for indoor or outdoor use, and for either metal or wood surfaces subjected to severe wear. A good, slow drying black enamel.

Electrical Insulating Compounds.

Electrical Insulating Varnishes—A full line of varnishes for dynamos, motors, switchboards, etc., including baking, air drying and finishing, black and clear; also, special paint for meter boards. Catalogue supplied on request.

P&B Electrical Compound—The oldest insulating varnish on the market. Dries very quickly. Universally used and handled by all electrical supply jobbers.

Solid Insulating Compounds—Junction Box; Battery Box; Pot Head and Vacuum Impregnating Compound (oilproof and non-oilproof). All these are liquefied by heating. Full information on request.

Electrical Insulating Tape—P&B Tape used for either outdoor or underground purposes (street railway, telephone and mines). Heavily saturated, and very adhesive. Black in color. Weatherproof.

Imp Friction Tape—A high grade insulating rubber tape.

ESTATE OF J. G. HETZEL

Manufacturer of Roofing Cement and Paints

67 Maine Street
CABLE ADDRESS, "HETZEL, NEWARK" NEWARK, N. J.

Products.

"HETZEL'S" ELASTIC RUBBER ROOF CEMENT for all kinds of roofs, glass skylights, coping stones, etc.; "HETZEL'S" PIPE-JOINT COMPOUND; "HETZEL'S" ASPHALT PAINTS; "HETZEL'S" DAMP-RESISTING PAINT for brick walls; "HETZEL'S" RUB-ON ROOFING PAINT; "HETZEL'S" BLACK and GREEN ENAMEL PAINTS for boiler fronts and steam pipes; "HETZEL'S" "R. O. P." CEMENT COATING; "HETZEL'S" ACID-PROOF PAINT for metal work, ammonia and gas tanks.

TRADE-MARK

"Hetzel's" Rubber Roof Cement.

"Hetzel's" Rubber Roof Cement, which has been in general use throughout the United States and Europe for many years, is especially valuable for covering and repairing all holes, cracked joints, breaks, or leaks in roofs of all kinds. It is also used for pointing around chimneys, skylights, and dormer windows; for repairing coping stones, gutters, wood and stone work which require to be made water-tight; and for laying and bedding slate and tile roofs.

Supplied in the following colors: brown, gray, black, green, gray and red. It is also made to order to suit every purpose, and is the only Slaters', Tinners' and Tile Roofers' cement.

Advantages.

"Hetzel's" Rubber Roof Cement is equally well adapted for use on slate, tin, asbestos, glass, wood and metal roofs; is permanent; does not run or loosen from joints or cracks, and is not affected by any extreme of temperature or climatic changes. It does not harden, but preserves its complete elasticity even when exposed to extreme heat, cold, dryness or humidity.

"Hetzel's" R. O. P. Cement Coating.

A specially prepared material for stucco, brick and concrete surfaces.

Impervious to moisture, and positively unaffected by any of the alkalies in cement and brick materials.

It renders these surfaces waterproof and prevents efflorescence. Adheres naturally to these surfaces, drying with a soft toned, pleasing effect; altogether unlike a paint, and will not chip or peel.

As a cement floor coating it dries hard and is proof against oil, grease or water. Will withstand the utmost hard usage, besides preventing the disintegration of the cement and the annoyance of constant dust.

Color card sent on request.

Pipe-Joint Compound (Red and Gray).

This compound adheres to metal, and is used for gas-, steam-, water-, and air-pipe joints. It will not harden, and prevents joints from rusting. It will make absolutely tight joints, which can be disconnected at any time, without injury to fittings.

Specifications for the Use of Hetzel's Elastic Rubber Roof Cement.

All nail-holes and joints between the slates shall be sealed with Hetzel's Elastic Rubber Roof Cement as manufactured by the ESTATE of J. G. HETZEL, Newark, N. J., in such quantities as to hold the slates in position should they break or the nails rust away. (See Fig. 1.)

The joints of all tiles shall be sealed with Hetzel's Elastic Rubber Roof Cement as manufactured by the ESTATE of J. G. HETZEL, Newark, N. J. To prevent leaking, the hip and ridge rolls shall be sealed in a like manner. (See Fig. 2.)

All cap flashings shall be carefully pointed up with Hetzel's Elastic Rubber Roof Cement as manufactured by the ESTATE of J. G. HETZEL, Newark, N. J. (See Fig. 3.)

The joints of all copings will be set and sealed with Hetzel's Elastic Rubber Roof Cement as manufactured by the ESTATE of J. G. HETZEL, Newark, N. J. (See Fig. 4.)

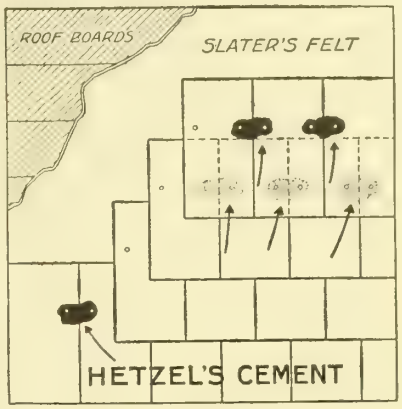


FIG. 1. For Slate Roofs

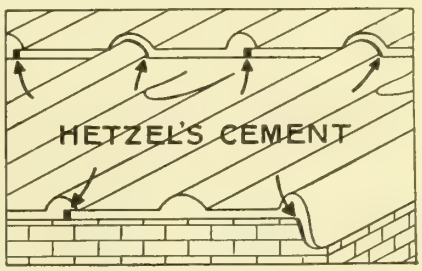


FIG. 2. For Spanish and Flat Tile Roofs

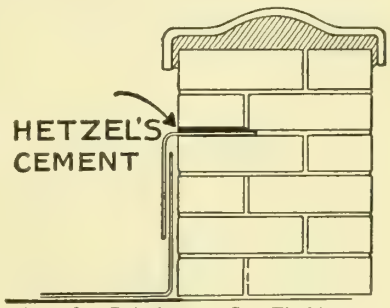


FIG. 3. Pointing up Cap Flashings

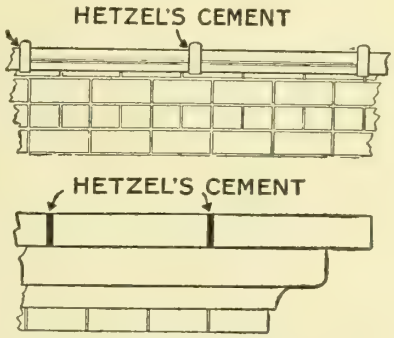


FIG. 4. For Tile and Stone Copings

APPLICATIONS OF HETZEL'S ELASTIC RUBBER ROOF CEMENT

"Hetzel's" Damp-Resisting Paint.

A compound black paint for damp-proofing foundations and walls above and below grade. When applied to inner side of exterior walls, forms a good damp-proof surface for direct application of plaster, rendering plaster stain-proof, and saving cost of furring and lathing.

PYRAMID PRODUCTS COMPANY

Manufacturers of "Cowhide" Roof Cement and "Cowhide" Built-Up Roofs

BAY CITY, MICH.

BRANCH OFFICES

CHICAGO, ILL., 860 Monadnock Building DETROIT, MICH., 602 Hodges Building

Products.

"Cowhide" Roof Cement and "Cowhide" Built-Up Roofs.

"Cowhide" Roof Cement Compound.

"Cowhide" Roof Cement is a scientific combination of specially selected, pure, asbestos, hydro-carbon gums, waterproof lacquer and non-volatile oil. Its large percentage of pure asbestos makes it practically fireproof.

Guarantee.

We guarantee that "Cowhide" Roof Cement, when laid in accordance with our specifications, will make a perfect, water-tight roof covering for at least fifteen years from date of application. If at any time it should fail to do this, we will furnish, without further charge, all the "Cowhide" Roof Cement that may be necessary to keep it in perfect condition that length of time.

We guarantee that a "Cowhide" Roof Cement roof will never require painting.

Specifications.

SPECIFICATION "A"

Roof Deck—This specification is applicable where the roof deck is of board sheathing, which must be well seasoned and free from nails, etc.

Material—The material shall be two sheets of "Cowhide" Specification Roll Roofing weighing not less than 30 pounds each to the 100 square feet, single thickness, and not less than 60 pounds of "Cowhide" Roof Cement to the 100 square feet, all laid in the following manner:

Application—Beginning at the eaves, lay one half sheet of the "Cowhide" Specification Roll Roofing 16 inches wide, nailing the upper edge to the roof boards, then plaster over this sheet, with a plaster trowel, a coating of "Cowhide" Roof Cement, using on a basis of 25 pounds to 100 square feet. In nailing this "Cowhide" Specification Roll Roofing to the roof boards, nail it every two feet, or more often if necessary. Lay the second sheet, which will be 32 inches wide, so that the lower edge comes even with the lower edge of the one-half sheet already laid. Nail the second sheet to the roof boards by nailing it along the upper edge every two feet, or more often if necessary, as above described. Then cement where the sheets are to be lapped with "Cowhide" Roof Cement, using on a basis of 25 pounds to the 100 square feet. Lay the third sheet one inch more than half its width (17 inches), nailing the top edge as before described, and in the same manner lay the succeeding layers, completing the roof with the same lap, so that the entire area has two thicknesses of "Cowhide" Specification Roll Roofing at every point, and a coating of "Cowhide" Roof Cement, 25 pounds to the 100 square feet. Then coat the entire surface with "Cowhide" Roof Cement, 35 pounds to the 100 square feet.

SPECIFICATION "B"

Roof Deck—This specification is applicable where roof deck is of board sheathing, which must be well seasoned and free from nails, etc.

Material—The material shall be one sheet of "Cowhide" Specification Roll Roofing, weighing not less than 30 pounds to the 100 square feet, single thickness, and not less than 35 pounds of "Cowhide" Roof Cement to the 100 square feet, all laid in the following manner:

Application—Beginning at the eaves, lay one sheet of "Cowhide" Specification Roll Roofing, cementing along the top edge two inches wide with "Cowhide" Roof Cement and nailing every two inches at the outside edge of the sheet. Lay the second sheet so it lays over the edge of the first sheet two inches and nail and cement as before described, and in the same manner lay the succeeding layers, completing the roof with the same lap. Then coat the entire surface with "Cowhide" Roof Cement not less than 35 pounds to the 100 square feet.

SPECIFICATION "C"

Roof Deck—This specification is applicable where roof deck is of concrete, which must be smooth and evenly graded to all gutters and outlets.

Material—The materials shall be not less than one gallon of "Leak-No-More" Roof Coating to 100 square feet, and not less than 50 pounds of "Cowhide" Roof Cement to 100 square feet, all laid in the following manner:

Application—Thoroughly coat the concrete with Liquid "Leak-No-More" Roof Coating. Then plaster "Cowhide" Roof Cement over the entire surface.

Flashings—The walls shall be coated with "Leak-No-More" Roof Coating and then plastered with "Cowhide" Roof Cement.

Labels—The materials above mentioned shall bear the labels of the PYRAMID PRODUCTS COMPANY and shall be delivered in the original packages of the correct amounts to cover area as specified, and all shall be used.

GUARANTEES

Specification A—This roofing shall be guaranteed for a period of twenty years from date of laying; also, that the material of same shall remain in a condition which will not permit water to go through it for that period of time.

Specification B—This roofing shall be guaranteed for a period of fifteen years from the date of laying; also, that the material of same shall remain in a condition which will not permit water to go through it for that period of time.

Specification C—This roofing shall be guaranteed for a period of fifteen years from the date of laying; also, that the material of same shall remain in a condition which will not permit water to go through it for that period of time.

General Conditions.

Roof must be dry in all cases for application.

Estimates.

Estimates furnished, on request, to meet any requirements.

WILLIAM L. BARRELL CO.

Manufacturers of Con-Ser-Tex Canvas Roofing

8 Thomas Street
NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS., 185 Devonshire Street
CHICAGO, ILL., Royal Insurance Building

DISTRIBUTORS

SAN FRANCISCO, CAL., Waterhouse & Price Co.
CHICAGO, ILL., Geo. B. Carpenter & Co.
LOS ANGELES, CAL., Pacific Building Materials Co.

Products.

Con-Ser-Tex Canvas for Roofing, and Floor Covering of Porches, Balconies, Piazzas, Kitchen and Laundry Floors, etc.

CON-SER-TEX CANVAS ROOFING
TRADE-MARK

Con-Ser-Tex Canvas for Roofing and Floor Covering.

Con-Ser-Tex is a specially woven, chemically treated, tough cotton fabric. Prepared for durable and highly efficient service in covering flat roofs and exterior and interior floors. Besides being ideal for covering roofs and floors of porches, sleeping balconies, piazzas and other exterior surfaces having slopes not over four inches to the foot, Con-Ser-Tex is most effective as a covering for floors of kitchens, laundries, garages, etc.

The chemical process to which Con-Ser-Tex is subjected renders it in its every fiber permanently waterproof and immune to the ravages of dry-rot or mildew. The effectiveness of the process is proved by the great endurance of the similarly bitumen-soaked mummy cloths of the ancient Egyptians. This treatment also exercises a distinct rot preventive and antiseptic effect upon the wood over which it may be laid.

Con-Ser-Tex, being specially woven, is constructed to overcome the tendency to curl of the ordinary cotton fabrics, with the result that it lies flat, as is essentially necessary. This fabric will, moreover, never split —not even under severe vibration and strain, as is proved by the fact that it has been the accepted standard for passenger car roofing for twelve years.

Architects who have consistently specified Con-Ser-Tex in preference to any other material for exterior roofs used as floors are now advocating the use of Con-Ser-Tex in place of other forms of floor covering, in kitchens, laundries and similar places. In addition to the economical, lasting and sanitary features, it is one of the most comfortable under-foot materials made. It may also be turned up at all sides to form a sanitary, vermin-waterproof base, integral with the floor.

Characteristic Features.

Both sides of Con-Ser-Tex are finished with a tooth to which paint readily adheres.

The chemical treatment protects the fabric absolutely from the rotting tendency of the oil in paints.

Con-Ser-Tex is immune from the attacks of coal gas or acid fumes.

Con-Ser-Tex is sound-deadening and non-heat-radiating as well as non-conductive of heat or cold.

How to Specify.

Notes—Where it is customary to have the finished painting done by the painting contractor, the clause which follows should be amended to state that only the painting under the canvas shall be done by the contractor laying same.

The outside coats need only be two in number with Con-Ser-Tex, a distinct saving over ordinary canvas treatment.

Provision should be made in the specification for turning up the Con-Ser-Tex at all walls or adjoining roofs, etc., allowing for a substantial lap of the counterflashing or other materials against which the canvas abuts.

For Wood Surfaces—Surfaces to be canvas-covered, as indicated on plans, shall be covered with (where practicable indicate grade desired) Con-Ser-Tex Canvas Roofing (William L. Barrell Co., 8 Thomas Street, New York, N. Y.). These surfaces shall first be coated with one heavy coat of white lead in oil paint, and Con-Ser-Tex laid, dark side down, while paint is wet. Laps of canvas to be arranged so as to permit free drainage and to be not less than 1½ inches, the edge of canvas below being painted before next piece is overlapped. The laps shall be fastened while canvas is being slightly stretched, with flat head copper or galvanized tacks ¾ inch apart.

When canvas is laid and set, apply two coats of good lead in oil paint.

All work to be done in a thoroughly workmanlike manner.

LIST PRICES PER LINEAL YARD *

Widths	E	G	I
30-inch	$0.53	$0.59	$0.67
36-inch	.64	.71	.81

*Notes—E Grade is intended for roofing small porches and floors where the traffic is limited or light, and in sizes that do not exceed 10 feet by 20 feet.

G Grade is admirably adapted for seashore residences, porch floors and roofs.

I Grade is used principally for public buildings and all places where the most onerous conditions exist.

Co-operative Service.

On receipt of sketch showing dimensions of surface to be covered, a diagram showing cost and most economical method of laying will be supplied by this Company, so as to avoid waste of material.

A FEW REFERENCES

W. J. Wilkins & Co., Florence, S. C.
David Bloomfield, Meriden, Conn.
Charles I. Barber, Knoxville, Tenn.
O. J. Dean, Huntingdon, Pa.
A. F. Rosenheim, Los Angeles, Cal.
Sage Foundation Homes Co., Forest Hills, N. Y.
John Bacon Hutchins & Sons, Louisville, Ky.
D. Everett Wade, Ferruccio Vitale, Jardine, Hill & Murdock, Taylor & Mosley, Hoggson Brothers, E. S. Straffle, New York

HOME OF CHAS. L. CORNELL, ORANGE, N. J.
Wilson Eyre, Architect
Porch Floors Covered with Con-Ser-Tex

THE BARRETT COMPANY

MANUFACTURERS OF

Coal Tar Products for Roofing, Waterproofing, Damp-proofing and Paving
Also, Sheathing and Lining Papers

NEW YORK	CHICAGO	PHILADELPHIA	BOSTON	CLEVELAND	ST. LOUIS
CINCINNATI	PITTSBURGH	DETROIT	NEW ORLEANS	BIRMINGHAM	KANSAS CITY
NASHVILLE	MINNEAPOLIS	LOUISVILLE	SALT LAKE CITY	SEATTLE	PEORIA

THE PATERSON MANUFACTURING CO., LIMITED

MONTREAL · TORONTO WINNIPEG VANCOUVER ST. JOHN, N. B. HALIFAX, N. S. SYDNEY, N. S.

Products.

The Barrett Company TRADE-MARK

ROOFING MATERIALS:

BARRETT SPECIFICATION (a Built-up Roofing); AMATITE, AMAZON, EVERLASTIC, RED SEAL READY ROOFINGS; TYLIKE SHINGLES and TYLIKE ROOFING; ASBESTOS ROOFING; BARRETT'S SLATERS' FELT.

INSULATING, SHEATHING, LINING and WATERPROOFING MATERIALS:

BARRETT'S TOMB BRAND DEADENING FELT; BARRETT SPECIFICATION FELT; RED SEAL FELT; TARTEX WATERPROOFING FELT.

DAMP-PROOFING and PRESERVATIVE PAINTS:

HYDRONON, "the Damp-proofing Paint"; EVERJET ELASTIC PAINT; BARRETT'S VELVEX CREOSOTE SHINGLE STAINS; ETERNIUM METAL PAINT.

WOOD PRESERVATIVES:

BARRETT'S GRADE ONE LIQUID CREOSOTE OIL.

FLOORING:

TAR-ROK SUB-FLOORS.

PAVING MATERIALS:

TARVIA, which Preserves Roads and Prevents Dust.

Barrett Specification Tarred Felt.

Made from specially selected materials for use with Specification Pitch in roofing and waterproofing, also sheathing. (See Specification following.) Particular care is given each step of manufacture, and there is no other felt so uniformly good for the purposes mentioned. It weighs from fourteen to sixteen pounds per hundred square feet, is put up in measured rolls containing four hundred square feet, and every roll is labeled, as per illustration, except that the label is printed in red and black.

TRADE-MARK LABEL

Barrett Specification Pitch.

Made from selected coal tars mixed in the proportion which experience and modern laboratory tests show will give the best results when used for roofing and waterproofing purposes. It is of high quality, and will be vouched for by all expert roofers, who well know that poor pitch is never cheap enough to warrant its use. Other pitch may have the same appearance; but whether it is as good or not can be determined only in a well-equipped laboratory by one familiar with not only the technical, but also the practical, side of the business. Every barrel of Barrett Specification Pitch is labeled as per illustration, except that the label is printed in red and black. It is put up in barrels weighing from three hundred to six hundred pounds, and is sold by the hundredweight.

TRADE-MARK LABEL

The Barrett Specification.

The following specification is for a slag or gravel roof laid over boards. A roof of this kind is adapted for use on all kinds of buildings (except where the roof is very steep), and is preeminently the best roof for most purposes. Its cost per year of service is much less than that of any other form of reliable roof covering known. As compared with metal roofing, it is immeasurably superior and more economical, as it requires no painting and no repairs of any kind for years after it has been laid.

Barrett Specification Roofs

TRADE-MARK

Roof Deck—The following specification is applicable where roof deck is of *wood*.

Incline—This specification should not be used where roof incline exceeds three (3) inches to one (1) foot.

Tracings—Tracing of roofing details is provided, so that same may be inserted in plans.

Roofing Specification for Use Over Board Sheathing.

First—Lay one (1) thickness of Sheathing Paper or Unsaturated Felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often

Continued on next page

as is necessary to hold in place until remaining felt is laid.

Third—Coat the entire surface uniformly with Specification Pitch.

Fourth—Over the entire surface lay three (3) plies of Specification Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding one, mopping with Specification Pitch the full twenty-two (22) inches on each sheet, so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of felt.

Fifth—Spread over the entire surface a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of Gravel or three hundred (300) pounds of Slag to each one hundred (100) square feet. The gravel or slag shall be from one quarter (¼) to five eighths (⅝) inch in size, dry and free from dirt.

Labels—All felt and pitch shall bear the manufacturer's label.

Flashings — Flashings shall be constructed as shown in detailed drawings.

Inspection—The roof may be inspected before the gravel or slag is applied, by cutting a slit not less than three (3) feet long at right angles to the way the felt is laid. (This method of inspection is recommended by the National Association Master Gravel and Slag Roofers.) The cut can be repaired by sticking five (5) thicknesses of felt over it, and the spot will then be as strong as any part of the roof.

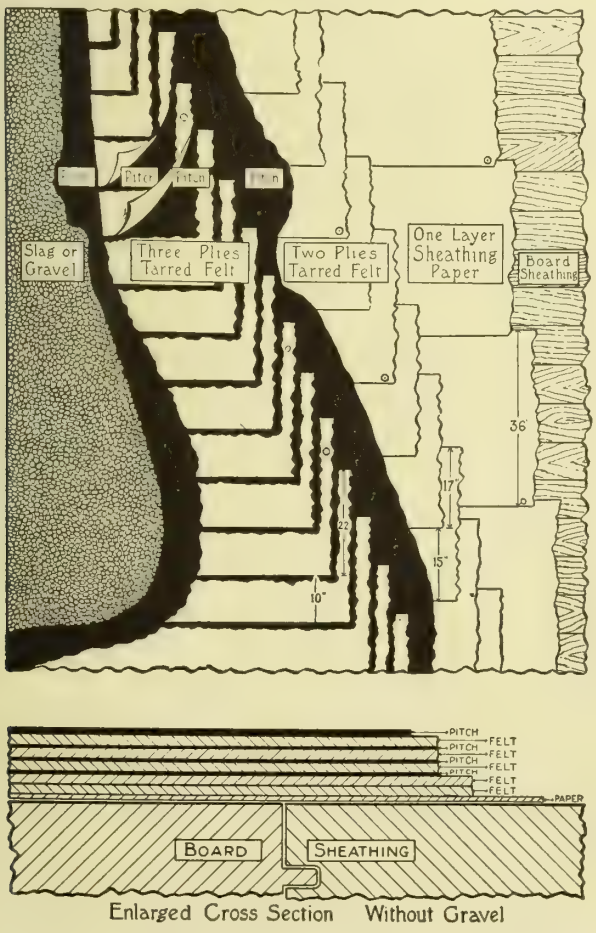


DIAGRAM SHOWING CONSTRUCTION OF STANDARD SLAG OR GRAVEL ROOF

NOTE—We advise incorporating the full wording of the Specification and inserting roofing details in plans, in order to avoid any misunderstanding. If an abbreviated form is desired, the following is suggested:

Roofing—Shall be a Barrett Specification Roof (for use over board sheathing), laid as directed in printed Specification, revised August 15, 1911, using the materials as specified, and subject to the inspection requirement.

Quantities.

To comply with the above specification, the materials necessary for each one hundred (100) square feet of roof are approximately as follows:

108 square feet Sheathing Paper.
540 square feet Specification Tarred Felt.
120 to 160 pounds Specification Pitch.
400 pounds Gravel or 300 pounds Slag.

In estimating pitch, the incline of the roof deck, weather conditions and expertness of the workmen will affect the amount necessary for the moppings, and to properly embed gravel or slag.

Roofing Specifications for Use Over Concrete.

Roof Deck—The following specification is applicable where roof deck is of *concrete*.

Incline—This specification should not be used where roof incline exceeds three (3) inches to one (1) foot; and when incline exceeds one (1) inch to one (1) foot, the concrete must permit of nailing, or nailing strips must be provided.

Tracing—Tracing of roofing details is provided, so that same may be inserted in plans.

Roofing—(1) Coat the concrete uniformly with hot Specification Pitch.

(2) Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Specification Pitch the full seventeen (17) inches on each sheet, so that in no place shall felt touch felt.

(3) Coat the entire surface uniformly with Specification Pitch.

(4) Over entire surface lay three (3) plies of Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Specification Pitch the full twenty-two (22) inches on each sheet, so that in no place shall felt touch felt.

(5) Spread over the entire surface a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of Gravel or three hundred (300) pounds of Slag to each one hundred (100) square feet. The gravel or slag shall be from one quarter (¼) to five eighths (⅝) inch in size, dry and free from dirt.

Continued on next page

Flashings—Flashings shall be constructed as shown in detail drawings.

Inspection—The roof may be inspected before the gravel or slag is applied by cutting a slit not less than three (3) feet long at right angles to the way the felt is laid. All felt and pitch shall bear the manufacturer's label.

NOTE—We advise incorporating the full wording of the Specification and inserting roofing details in plans, in order to avoid any misunderstanding. If an abbreviated form is desired, the following is suggested:

Roofing—Shall be a Barrett Specification Roof (for use over concrete) laid as directed in printed Specification, revised August 15, 1911, using the materials specified, and subject to the inspection requirement.

Quantities.

To comply with The Barrett Specification for concrete roofs, set forth above, the materials necessary for each one hundred (100) square feet of completed roof are approximately as follows:

540 square feet Specification Tarred Felt.
200 pounds, average, Specification Pitch.
400 pounds Gravel or 300 pounds Slag.

In estimating pitch, the incline of the roof deck, weather conditions and expertness of the workmen will affect the amount necessary for the moppings and to properly embed gravel or slag.

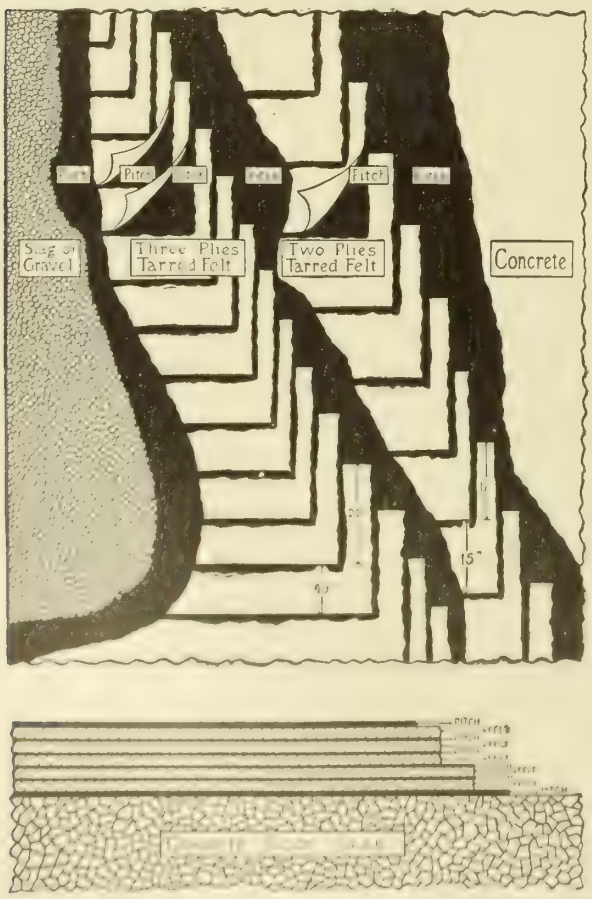


DIAGRAM SHOWING CONSTRUCTION OF CONCRETE ROOF

Amatite Ready Roofing.

The best and most economical ready roofing. Used for buildings of all kinds, being especially adapted for steep roofs. As it is mineral-surfaced, it is all ready to use. It needs no painting. Put up in rolls thirty-two inches wide and containing one hundred and ten square feet, weighing about ninety-five pounds. Nails and cement for laps furnished free.

Amatite
TRADE-MARK

Red Seal Ready Roofing.

Two- and three-ply Red Seal is composed of two thicknesses or three thicknesses of tarred felt, cemented together with pitch. It is used extensively for temporary roofing on buildings of all kinds, for inside and outside covering for poultry houses, and especially for sheathing, where a warm, permanent vermin-proof material is required.

Amazon Ready Roofing.

This is a "rubber," or smooth-surface, ready roofing of the highest grade, made in one-, two- and three-ply, in rolls thirty-six inches wide, containing one hundred and eight square feet, weighing thirty-five, forty-five and fifty-five pounds, respectively. Nails and cement are packed in the center of each roll. This is largely used for steep surfaces in place of shingles or slate.

Amazon
TRADE-MARK

Everlastic Roofing.

Everlastic Roofing is ready roofing, cheaper in price than Amazon. Like Amazon it is smooth surfaced and made in one-, two- and three-ply thicknesses, thirty-six inches wide. Largely used for temporary structures.

Barrett's Slaters' Felt.

This is a well-seasoned felt, and is made especially for sheathing under slate. Put up in rolls thirty-six inches wide, containing five hundred square feet.

Barrett Tomb Brand Deadening Felt.

A sound deadener for use in walls and floors; also insulates against heat and cold. Made in three weights: four and one half, six and nine square feet to the pound. Put up in rolls thirty-six inches wide, containing four hundred and fifty square feet.

Sheathings.

For sheathing purposes use Barrett's Tarred Felts, namely, Barrett Specification Felt and two- and three-ply Red Seal Felt. Composed as they are largely of coal-tar products, they are far superior to the so-called rosin sized sheathing for all sheathing purposes. These felts are warmer, far more permanent, air tight, and a protection against vermin of all kinds.

Continued on next page

Hydronon.

A damp-proofing paint, especially recommended for use above the ground level on the interior of stone, brick or concrete walls, to exclude dampness. Plaster may be applied directly on the Hydronon, as Hydronon has ample adhesive power, thus saving all the costs of furring or lathing, and expediting construction. Where walls are masonry, every living room should be protected with Hydronon. Send for Hydronon booklet.

Hydronon TRADE B MARK The Damp-Proofing Paint
TRADE-MARK

Tarvia.

Tarvia preserves roads and prevents dust. It acts as a binder of macadam, prolongs its life, and decreases maintenance charges.

Three grades: "Tarvia B," applied cold for dust suppression and road preservation, one application lasting a season; "Tarvia A," applied hot for thorough surface work; "Tarvia X," for road and pavement construction. Special booklets on request.

Tarvia Preserves Roads Prevents Dust
TRADE-MARK

Tartex.

Reinforced waterproofing felt of extra tensile strength for use in waterproofing foundations, tunnels, etc., where the waterproofing course will be subjected to unusual strain.

TARTEX
TRADE-MARK

Everjet Elastic Paint.

A dense, glossy black waterproof paint for metal and woodwork. A high-grade, waterproof, carbon paint; brilliant black, durable. Will not rub, peel, scale or crack. Especially good for rubber and all felt ready roofings, farm machinery, silos, fences, pipes, metal roofs and other metal surfaces. Very low in price.

Everjet ELASTIC PAINT
TRADE-MARK

Eternium Metal Paint.

Especially prepared for use over red lead priming coat on structural steel. Extensive tests prove that a red lead priming coat on structural steel is essential, and that such a coat, followed by a coat of Eternium Metal Paint, furnishes the best protection yet devised.

Barrett's Velvex Creosote Shingle Stains.

The ideal coloring and preservative for shingles and all rough, unplaned timber. Cheaper than paint and easier to use. The creosote penetrates and preserves the wood. All colors, in beautiful, soft, velvety tones. Color samples on request.

Barrett's Grade One Liquid Creosote Oil.

A standardized, pure coal-tar distillate, from which all objectionable properties of crude creosote oil have been completely eliminated.

Barrett's Grade One Liquid Creosote Oil is superior to the patented or proprietary wood preservative, because it is purely a refined coal-tar creosote, the action and results of which are understood and proved. No further claims are made.

Barrett's Grade One Liquid Creosote Oil
TRADE-MARK

Tar-Rok Sub-floor Construction.

Provides the most suitable surface on which to bed plank (without the use of sleepers) where a wooden lower floor is desirable in factories, machine shops, storehouses, etc., effecting a maximum of strength, rigidity and protection against dry rot or decay and fire, at a minimum cost.

TAR-ROK
TRADE-MARK

Additional Information.

We are at all times prepared to submit additional information on the subject of either roofing or waterproofing, and to substantiate our position in any further way desired.

We shall be very glad to hear from architects and engineers regarding this Specification, and will welcome criticism or suggestion. Address The Specification Department of The Barrett Company, 17 Battery Place, New York, N. Y.

ESTABLISHED 1795

BIRD & SON

Manufacturers of Roofings, Waterproof Building Papers, Waterproofing Felt, Roofing Paints, Waterproofing Products

EAST WALPOLE, MASS.

BRANCH OFFICES

NEW YORK
HAMILTON, ONT.
WASHINGTON
WINNIPEG, MAN.
CHICAGO
VANCOUVER, B. C.
SAN FRANCISCO
ST. JOHN, N. B.

MILLS

EAST WALPOLE, MASS.
NORWOOD, MASS.
PHILLIPSDALE, R. I.
PONT ROUGE, QUE.
HAMILTON, ONT.

Products.

WATERPROOF BUILDING PAPERS: NEPONSET RED ROPE, NEPONSET BLACK, COTED.

WATERPROOF INSULATING PAPERS: NEPONSET INSULATING PAPER.

SOUND DEADENING FELT: NEPONSET FLORIAN.

WATERPROOFING FELT: NEPONSET WATERDYKE.

SHINGLES: NEPONSET SHINGLES, Gray, Green and Red.

ROOFINGS: NEPONSET SHINGLES, NEPONSET PAROID, NEPONSIT RED ROPE, NEPONSIT ASPHALT FELT for Built-up Roofs.

WALL BOARD: NEPONSET WALL BOARD.

PAINTS and COMPOUND: NEPONSET WATERDYKE PRESERVATIVE PAINT, NEPONSET PAROID PAINT, NEPONSET COMPOUND.

TRADE-MARK
Reg. U. S. Pat. Office

Neponset Black Waterproof Building Paper.

A high-grade waterproof building paper, the standard of architects for general use. For use under stucco, shingles, or clapboards; under slate or tile roofs and between floors, especially in fireproof construction over the screeds and under the finished wooden floors to prevent warping and lay dust. Put up in rolls 36 inches wide, containing 500 square feet. Price, 45 cents per 100 square feet. (See under "Help in Specifying.")

Neponset Red Rope Sheathing and Roofing.

The highest grade waterproof sheathing paper for use under stucco, shingles or clapboards and under slate or tile roofs. Particularly valuable where the building is to be stuccoed at some future time, as it will remain waterproof if exposed to the weather for several years. Also used as a low-cost and temporary roofing or siding. Put up in rolls 36 inches wide, of 500 square feet. Price, $1.00 per 100 square feet. (See under "Help in Specifying.")

Bird's Coloured

Neponset Florian Sound Deadening Felt.

A scientific, sanitary sound deadener for use under floors, under metal roofs and for partitions. Built on the dead-air cell principle. Put up in rolls 40 inches wide, containing 500 square feet. Price, 75 cents per 100 square feet. (See under "Help in Specifying.")

Coted Waterproof Building Paper.

A waterproof paper at low cost; used as an all-round building paper. Put up in rolls 36 inches wide, containing 1000 square feet. Price, 30 cents per 100 square feet.

Neponset Insulating Paper.

For cold-storage and refrigerator work. Used in the majority of refrigerator cars in use to-day and by such representative concerns as Cudahy Packing Company, Swift & Company and Anheuser Busch Brewing Company. Standard stock rolls 36 inches wide containing 1000 square feet, and 112 inches wide containing 3110 square feet; special widths to order. Price, 40 cents per 100 square feet.

Neponset Asphalt Felt.

For built-up roofs and general waterproofing work in connection with Neponset Compound. Specifications furnished upon application. Made in two weights, 14 and 30 pounds per 100 square feet: 14 pound, 400 square feet to the roll, $1.20 per roll, 30 cents per 100 square feet; 30 pound, 200 square feet to the roll, $1.28 per roll, 64 cents per 100 square feet.

$42.50 per ton, f.o.b. East Walpole, Mass.

Neponset Waterdyke Felt.

For waterproofing foundations, mill floors, battery room floors, swimming-pools, bridges, tunnels, etc. Comes in rolls of 400 square feet. Price, $1.25 per 100 square feet. (See under "Help in Specifying.")

Continued on next page

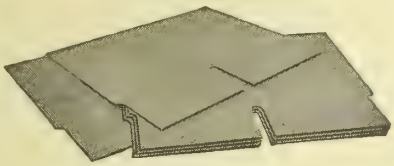
Neponset Waterdyke Felt and Neponset Compound form an elastic membrane which vibrations, settling of foundations, etc., will not disturb. That is why they are used in such structures as the Rochester Station; on the D., L. & W. Railroad; Viaduct at Hainesburg, N. J., one of the largest concrete viaducts in the world, and other important works.

Neponset Wall Board.

Neponset Wall Board is made in two finishes: oak and cream white and with waterproof surfaces. Used instead of, or directly over, laths and plaster and for partitions in all kinds of low-cost work. Sheets 32 and 48 inches wide, 8, 10 and 12 feet long, and about ⅛ of an inch thick.

Price, 3 cents per square foot.

Neponset Shingles.



NEPONSET SHINGLES

Neponset Shingles are for all pitch roofs. They make a roof which really possesses all the artistic merits of a wooden shingle roof; provide protection against fire from sparks and embers, and outlast wooden shingles.

The Neponset Shingle—An asphalt shingle, with a crushed-slate surface, either red or green.

The Built-up Neponset Shingle—Similar to the above, except that the butt end is built up consisting of three layers, so that when the shingles are laid on the roof there is at no point less than seven layers.

NEPONSET SHINGLES
When laid the "twin" feature is not visible

The Built-up Shingle is also furnished with a smooth gray surface—of a slate color.

A distinctive feature of all Neponset Shingles is the "twin" form, which reduces the labor of applying almost one half.

It requires four bundles to cover one square of roof surface.

Price, 5¼ cents per square foot; built-up, 7 cents per square foot. In red or green colors, ½ cent additional.

Neponset Paroid Roofing, Colored (formerly Proslate).

For cottages, bungalows, porch roofs, and all similar buildings requiring an artistic roofing or siding. Red or Green in color. With or without tile or slate design. Put up in rolls 18 and 36 inches wide. Directions for laying and fixtures for applying inside each roll. Price, 4 cents per square foot.

Neponset Paroid Roofing.

For industrial, railroad, farm and similar buildings. Slate in color. Endorsed by National Board of Fire Underwriters. Already has a past record of over sixteen years' service on buildings throughout the world. Complete directions and fixtures (large headed, flexible nails and cement) for laying packed in each roll. Put up in rolls 36 inches wide, containing 108 and 216 square feet. Price, 2½ cents per square foot for Neponset Paroid Roofing and 3¼ cents per square foot for Neponset Paroid Roofing, Heavy. (See under "Help in Specifying.")

Neponset Paroid Roofing Paint.

Red or Green. Especially adapted for ready roofing; also on outside metal construction. The red, put up in 1, 5, and 25 gallon containers, price, $1.05 per gallon. The green, put up in 1 gallon cans only, price, $1.40 per gallon.

Neponset Waterdyke Preservative Paint.

A black paint for use on prepared or metal roofings or metal surfaces of any kind exposed to the weather. Also, on battery room floors. Put up in 1, 5, and 25 gallon packages; price, $1.05 per gallon.

Help in Specifying.

You will find our book, "Specifications for All Roofing, Building Insulation and Waterproofing Work," helpful in making out your specifications. Let us know if you have not a copy on file. With this you can specify, for all kinds of work, the products you prefer, and always get the most effective results.

Co-operative Service.

Any special waterproofing or other problems upon which you desire advice may be referred to our Engineering and Consulting Department.

Neponset Orders Easily Filled.

There are 10,000 dealers in this country carrying Neponset Waterproof Building Products, so your specifications can always be easily and quickly filled. Where there is no dealer, we pay the freight.

JOHN BOYLE & CO., INC.

MANUFACTURERS OF

"Bayonne" Roof and Deck Cloth, Cotton Duck and Awning Materials

112-114 Duane Street, 70-72 Reade Street

NEW YORK, N. Y.

BRANCH HOUSE: ST. LOUIS, MO., 202-204 Market Street

Products.

"Bayonne" Roof and Deck Cloth.
"Gulf Stream" Roofing Canvas.
Awning Stripes.
Cotton Duck.

"Bayonne" Roof and Deck Cloth.

"Bayonne" Roof and Deck Cloth is a special cotton canvas, treated by a process which renders it waterproof and increases its tensile strength and wearing quality. Being applied under high pressure, the treatment thoroughly permeates the fabric, depositing a preservative coating on each strand of the cotton and rendering the whole cloth absolutely waterproof. It is therefore the most practical covering for porch floors and decks, flat roofs, and like places.

BAYONNE ROOF AND DECK CLOTH

TRADE-MARK

Architects have specified and used "Bayonne" Roof and Deck Cloth for a great many residences and institutions throughout the country and it has in every case fully proved our claims for it. Names and addresses where this material is in use, in any locality specified by inquirers, will be given on request.

It is made in three weights as follows: Fabric 1287, Fabric 1288, and Fabric 1299. Sample book will be furnished on application; also, discount from the list prices given below.

It is applied directly to the boards, instead of being laid in wet paint as is usual with unprepared duck, thereby making a much simpler operation, a neater appearance generally, and a saving of material and labor. Directions for laying accompany each shipment, but it would be well to incorporate them in the specifications also.

After laying, only one coat of paint need be applied, unless the floor is to be subject to considerable walking on, in which event we recommend two coats.

METHOD OF APPLYING "BAYONNE" ROOF AND DECK CLOTH

LIST PRICES OF "BAYONNE" ROOF AND DECK CLOTH, PER LINEAR YARD

Width	Fabric 1287	Fabric 1288	Fabric 1299
30 inch	$0.59	$0.74	$0.86
36 inch	.68	.82	.95

Subject to discount. The above widths carried in stock. Other widths processed to order.

How to Specify.

The floors and decks of porches shall be covered with "Bayonne" Roof and Deck Cloth, Fabric [1288] made by John Boyle & Co., Inc., 112 Duane Street, New York, N. Y. Material shall be laid directly on the floor or deck boarding, with 1½- or 2-inch laps, fastened with flat head [copper] tacks spaced not over ½ to ¾ inch apart and within ⅛ inch of the edge of canvas. Cloth shall be held taut while being tacked.

After laying, give decks [one] and floors [two] coats of white lead and linseed oil paint of color directed.

"Gulf Stream" Roofing Canvas.

"Gulf Stream" Roofing Canvas is our best grade of white untreated canvas for covering porch floors and decks, flat roofs and like places. It is made in four standard grades as follows: Grade D and Grade F for surfaces subject to considerable walking, and Grade H and Grade J for surfaces where the traffic is light. Samples will be furnished on application.

GULF STREAM ROOFING CANVAS

TRADE-MARK

LIST PRICES OF "GULF STREAM" ROOFING CANVAS, PER LINEAR YARD

Widths	GRADES			
	D	F	H	J
26-inch	$0.46	$0.40	$0.35	$0.30
30-inch	.53	.46	.41	.34
36-inch	.63	.55	.49	.41

Discount on the above and quotations on other widths on application.

How to Specify.

The floors and decks of porches shall be covered with "Gulf Stream" Roofing Canvas, made by John Boyle & Co., Inc., 112 Duane Street, New York, N. Y. Grade [D] shall be used for the floors and grade [H] for the decks. The floors and deck boarding shall be given a coat of paint and the canvas shall be laid while the paint is wet. Fasten with flat head [copper] tacks spaced not over ½ to ¾ inch apart and within ⅛ inch of the edge of the canvas. Laps shall be at least 1½ inch and the edge of canvas below shall be painted before being covered by the lap of the next piece. Canvas shall be held taut while being tacked.

Paint canvas [two] coats, the first immediately after laying and the other after first is dry. Use white lead and linseed oil paint of color directed.

Awning Stripes.

"Boyle's" guaranteed Awning Stripes have been the standard for over fifty years. They are the best looking and longest wearing Stripes, and retain their colors better than any others.

Awnings made from this cloth are guaranteed to give permanent satisfaction.

THE PHILIP CAREY COMPANY

Carey Flexible Cement Roofing

LOCKLAND, CINCINNATI, OHIO

FACTORIES
LOCKLAND, OHIO
PLYMOUTH MEETING, PA.

FIFTY BRANCHES AND DISTRIBUTING POINTS IN NORTH AND SOUTH AMERICA AND EUROPE

Products and Services.

CAREY FLEXIBLE CEMENT ROOFING, CANVAS and ASBESTOS TOP ROOFING, RUBBER ROOFING, ASPHALT SLATE SHINGLES, MANCO ASPHALT ROOFING CEMENT, WATERPROOFING FELTS, FELTEX (Asphalt Saturated Wool Felt), FIBREROCK (Asphalt Saturated Asbestos Felt), FABRICSEAL (Saturated and Coated Burlap), FIREPROOF INSULATING PAPER, ELASTITE EXPANSION JOINT, ROOF REPAIR and SLATER'S CEMENT, CAREY MAGNESIA STEAM PIPE and BOILER COVERINGS.

This company contracts to furnish and apply Carey Flexible Cement Roofing to any style of roof surface in any part of the United States and Canada, guaranteeing material and proper application of same.

For Waterproofing, Damp-proofing, Ceilboard (for Walls and Ceilings), see our name in General Index.

Carey Flexible Cement Roofing.

Carey roofing is made in sheets 36 inches wide by 36 feet long, sufficient to cover 100 square feet surface measure. Constructed almost entirely of our Asphalt Cement Composition, thoroughly reinforced with wool felt foundation and a strong Calcutta burlap, and firmly compressed into an indivisible sheet of enduring flexibility.

CAREY FLEXIBLE CEMENT ROOFING

Used on buildings in all climates since 1885, it is the most durable roofing ever produced. Tempered during process of manufacture, Carey roofing will not dry out or be affected by either extremes of heat or cold, maintaining its elasticity and life indefinitely. The built-up form of Carey roofing gives protection, also, against fumes, gases, acids, and other extreme conditions of exposure in actual practice.

Scope of Use—Suitable for all classes of buildings—flat or steep surface, concrete, tile or wood sheathing construction. Carey built-up specifications and Carey asbestos built-up specifications are prepared to meet the requirements of existing conditions as may be found in the case of railroad roundhouses, fertilizer plants, chemical works, etc.

Specification Booklet—Send for a copy of the Carey Specification booklet, which covers the subject thoroughly.

The Patent Lap.

The Carey Patent Lap is an exclusive feature formed by an extension of the burlap in the main body of the roofing sheet and used for covering the nail heads as well as the joint of the sheets, preventing rust and completing a thoroughly water-tight and windproof joint, making practically a solid sheet over the entire roof surface.

Carey Built-Up Specifications.

Carey Flexible Cement Roofing Specification, Style "B," for Wood Sheathing—Carey roofing laid over wood sheathing surface. Weight per square, when applied, approximately 106 pounds.

Specification, Style "B," for Concrete or Tile—Carey roofing thoroughly bonded to concrete or tile surface, with Carey Asphalt Cement. Weight per square, when applied, approximately 164 pounds.

For Wood Sheathing

For Concrete or Tile Surfaces

CAREY ROOFING, STYLE "B"

Carey 5-Ply Built-Up Specification No. 1, for Wood Sheathing—Carey roofing applied over 1-ply Fibrerock Felt, with broken joints. Weight per square, when applied, approximately 146 pounds.

Specification No. 2, for Tile and Concrete—Carey roofing applied over 1-ply Fibrerock Felt bonded thoroughly to concrete. Weight per square, when applied, approximately 204 pounds.

No. 1, for Wood Sheathing

No. 2, for Tile or Concrete

CAREY 5-PLY ROOFING

Carey 4-Ply Built-Up Asbestos Roofing Specification No. 3, for Wood Sheathing—A 2-ply Asbestos Roofing laid complete over roof surface, after which two sheets Fibrerock Felt are cemented securely to same. Weight per square, when applied, approximately 152 pounds.

Specification 3-Ply No. 4, for Concrete and Tile Surfaces — Three sheets Fibrerock Felt bonded thoroughly to concrete. Weight per square, when applied, approximately 179 pounds.

4-Ply No. 3, for Wood Sheathing

3-Ply No. 4, for Tile and Concrete

CAREY ASBESTOS ROOFING

GENERAL ROOFING MANUFACTURING COMPANY

MANUFACTURERS OF

Asphalt Roofing, Building Papers, Wall-Boards, Waterproofing Materials and Paints, and Coal Tar Products

COMPLETE MILLS AND FACTORIES

EAST ST. LOUIS, ILL. MARSEILLES, ILL. YORK, PA.

SALES OFFICES

NEW YORK	CHICAGO	PHILADELPHIA	ST. LOUIS	BOSTON	CLEVELAND
PITTSBURGH	DETROIT	SAN FRANCISCO	CINCINNATI	MINNEAPOLIS	KANSAS CITY
SEATTLE	ATLANTA	HOUSTON	LONDON	HAMBURG	SYDNEY

Products.

Asphalt Roofings (all grades and prices), Slate Surfaced Shingles, Slate Surfaced Roofing, Asphalt Felts, Building Papers, Insulating Papers, Wall Boards, Plastic Roofing Cement, Asphalt Cement, Roof Coating, Metal Paints, Out-Door Paints.

Also, Shingle Stains, Deadening Felts, Tarred Felts, Refined Coal Tar, Tar Coating and Pitch.

TRADE-MARK

Facilities and Distribution.

We are the World's largest manufacturers of roofing and building papers.

The favorable locations of our big mills give us the advantage of obtaining the lowest possible freight rates; and the geographical positions of the various sales offices connected with them enable us to handle all orders, large or small, with the greatest facility.

Our products are sold by jobbers in all the principal cities. They are handled everywhere by retail lumber, hardware and building material dealers, who constantly carry a stock on hand.

Certain-teed Roofing.

An extra quality, fully guaranteed, smooth surfaced roofing, suitable for all classes of buildings.

Certain-teed roofing is made by thoroughly saturating a high grade long fibered felt with a specially blended soft asphalt, which by cementing the fibers together closes the pores, makes it waterproof, and confers upon it the weatherproofing qualities of asphalt. This saturated felt, which forms the base of the roofing, is then coated with a solid sheet of harder asphalt, which seals and protects the soft center from the direct action of the weather and greatly retards its drying out. Roofs do not wear out, they dry out; therefore, in order to insure a long lived roofing, a large amount of slowly drying, properly blended asphalt is necessary. To prevent sticking in the rolls, Certain-teed roofing is covered with talc, or soap stone.

CERTAIN-TEED ROOFING

Certain-teed roofing, besides its many other uses, is especially good as a damp-course between the foundations and the brickwork when applied on top of the foundations before the brick course is begun.

The roofing is put up in rolls 32 inches wide containing 108 or 216 square feet per roll. Nails, cement and full directions for laying are packed in the center of each roll.

1-ply Certain-teed roofing is guaranteed for five years, 2-ply ten years, and 3-ply fifteen years, and this guarantee is backed by the largest manufacturers of roofing and building papers in the world.

In addition to Certain-teed roofing, the General Roofing Manufacturing Company manufactures several other grades of roofing in various kinds of surfaces and finishes, and of lower qualities and prices.

Certain-teed Construction Roofs.

These are built-up roofs consisting of several layers of Certain-teed roofing carefully cemented together with our Certain-teed construction cement, forming permanent waterproof, weatherproof, and acidproof roofs for years to come. There are two principal types that we recommend for buildings of the finest character: Type A, consisting of three layers of Certain-teed roofing cemented together in accordance with our specifications, guaranteed for fifteen years; Type B, the same as type A with the cap sheet eliminated, being guaranteed ten years.

A Certain-teed construction roof is the most modern, scientific way of covering high-class buildings having flat or partly inclined roofs. In many ways a Certain-teed construction roof is superior to tar and gravel. It does not collect dust, soot, dirt or other matter, like tar and gravel roofs, and is therefore more sanitary.

In the territory adjacent to St. Louis and Philadelphia, Certain-teed construction roofs are applied direct by our own men; in other cities they are applied under the supervision of the nearest Sales Manager, or by responsible roofers approved by us.

Copy of specifications will be furnished by us free on request.

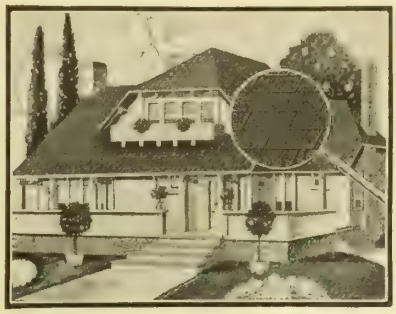
Building and Sheathing Papers.

Complete line of building papers, includes all weights of red, gray and blue rosin-sized sheathing, white fibre board, blue plaster board, gray and blue carpet lining (plain and corrugated), and all weights of deadening felt.

Continued on next page

Certain-teed Slate Surfaced Shingles.

Consist of a thick sheet of saturated felt, heavily coated with asphalt and with red or green crushed slate firmly imbedded therein. These shingles make an artistic and durable roof, suitable for cottages, bungalows or high-class residences.



CERTAIN-TEED SLATE SURFACED SHINGLES

Certain-teed Slate Surfaced Roofing.

This is made of the same materials as are used in the manufacture of Certain-teed smooth surfaced roofing, but it is heavily surfaced with genuine crushed slate in natural red or green colors. It is put up in rolls containing 108 square feet, weighing about 80 pounds per roll. Not only does this roofing produce a good appearance, but its fire-resisting qualities are most important.

Certain-teed Asphalt Felt.

This is made in three thicknesses, weighing approximately 11, 15, and 22 pounds per hundred square feet. It is extensively used for damp-proofing, built-up roofs, and sheathing; it is especially good when used as a membrane method of waterproofing on the exterior face of foundation walls from footing to grade line. It has also been used to advantage over subconcrete floors before the finished floor is applied and through the footings, but when used in this manner Certain-teed hard asphalt should be applied at a temperature of about 300 degrees Fahrenheit. Being saturated with our Certain-teed blend of asphalts, it has an exceedingly long life and possesses many advantages over tarred felts.

Certain-teed Insulating Paper.

Made from especially prepared paper, saturated and coated with asphalt, making a durable, waterproof and acidproof product. The closely woven fibers of the paper, being saturated and coated with a solid sheet of asphalt, form an impervious sheet which, in addition to its value as a weatherproofing agent, acts as an insulator against heat or cold. It is the most satisfactory and highest grade sheathing paper made. Being odorless, and on account of its insulating properties, it is extensively used for cold storage and refrigerator work, where its low cost and long life add to its value for this class of construction. For sheathing purposes under floors and walls of buildings, it will last many years longer and give far more satisfactory results than the ordinary rosin-sized sheathing papers. It is made in three weights saturated and coated, and in two weights saturated only. It is put up in rolls 36 inches wide containing 500 square feet each.

Certain-teed Roof Coating.

A durable, permanent, weatherproof and waterproof compound, for renewing felt and composition roofs; also a preservative for metal roofs, structural iron work and general weatherproofing purposes.

It is supplied in barrels, half barrels, and in cans of ten, five and one gallon each.

Certain-teed Plastic Roofing Cement.

For patching leaks and holes in any kind of a roof. Its consistency is about the same as putty, and it can be easily and quickly applied with a putty knife or trowel. It is a convenient thing to have around a farm, store or factory, and can be used for a great variety of purposes. It is elastic, waterproof, weatherproof and acidproof.

It is supplied in barrels, half barrels, 50 pound and 25 pound metal pails, and in small cans, six to a crate.

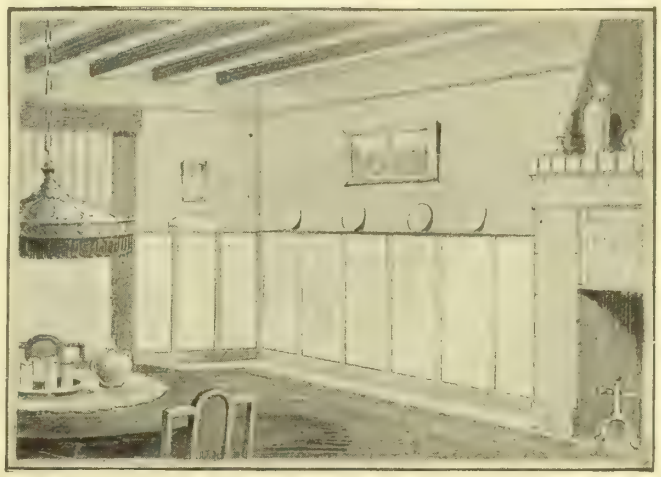
Certain-teed Paint Products.

Certain-teed out-door paints in oxide red, moss green, and bronze green are especially manufactured for use in painting barns, fences, bridges, warehouses, and metal roofs. We also have a complete line of high-grade shingle stains, creosote wood preservative, metal paints, etc.

Certain-teed Board.

This high-grade wall board is made to secure the maximum service with good appearance. We do not recommend wall board of any kind for the best residences except for finishing garrets or attics; but Certain-teed board can be used to advantage, instead of lath and plaster, for finishing houses of modest pretensions, and for booths, exhibits, and cheaper partitioning in offices or factories. Certain-teed board has also been used to a large extent for small moving picture houses and for store windows.

Certain-teed board is made in widths of 32 and 48 inches, and in lengths of 6, 7, 8, 9, 10, 12, 14 and 16 feet, weighing approximately 610 pounds per thousand square feet. It is packed in bundles containing ten sheets each, and is carefully wrapped up so that no damage will result in shipping.



CERTAIN-TEED WALL BOARD

Co-operative Service

We will cheerfully submit samples and detailed information relative to any of our products. Expert advice will be given regarding any roofing or waterproofing problem.

We maintain at St. Louis and Philadelphia special Construction Departments, where we have a corps of expert men who do the actual work of laying Certain-teed construction roofs, tar and gravel roofs, or repair roofs of any kind. If such work is desired at any other points, the Managers in charge of our sales offices can attend to this work properly.

H. W. JOHNS-MANVILLE CO.

EXECUTIVE OFFICES
296 Madison Avenue
NEW YORK, N. Y.

Roofing Materials

AKRON	CINCINNATI	GALVESTON	MILWAUKEE	PITTSBURGH	ST. PAUL
ALBANY	CLEVELAND	HOUGHTON	MINNEAPOLIS	PORTLAND	SYRACUSE
ATLANTA	COLUMBUS	HOUSTON	NASHVILLE	ROCHESTER	TOLEDO
BALTIMORE	DALLAS	INDIANAPOLIS	NEWARK, N. J.	SALT LAKE CITY	TULSA
BIRMINGHAM	DAYTON	KANSAS CITY	NEW ORLEANS	SAN DIEGO	WASHINGTON
BOSTON	DENVER	LOS ANGELES	NEW YORK	SAN FRANCISCO	WILKES-BARRE
BUFFALO	DETROIT	LOUISVILLE	OMAHA	SEATTLE	YOUNGSTOWN
CHICAGO	DULUTH	MEMPHIS	PHILADELPHIA	ST. LOUIS	

Products.

ROOFING MATERIALS: J-M ASBESTOS READY ROOFING and (ASBESTOSIDE) SIDING, J-M ASBESTOS BUILT-UP ROOFING, J-M CORRUGATED ASBESTOS ROOFING, J-M REGAL READY ROOFING, J-M TRANSITE ASBESTOS SHINGLES, J-M ASBESTOS SLATERS' FELT.

INSULATING and SHEATHING MATERIALS: J-M KEYSTONE HAIR INSULATOR, J-M SEA GRASS LINING, J-M HAIR FELT, J-M PURE COMPRESSED CORK SHEETS, J-M IMPREGNATED CORK BOARD, J-M WEATHERTITE PAPER, J-M MINERAL WOOL, J-M ASBESTOS FIRE- and DAMP-PROOF FLOORING FELT.

BUILDING MATERIALS: J-M CORK FLOOR TILING, J-M SANITARY PLUMBING SPECIALTIES, J-M ASBESTOS WOOD, J-M VITRIBESTOS SMOKE STACK LINING, J-M VITRIBESTOS VAULT LINING, J-M ASBESTOS CLOTH and VITRIBESTOS THEATRE CURTAINS, J-M TRANSITE ASBESTOS WOOD PICTURE MACHINE BOOTHS, J-M TRANSITE ASBESTOS WOOD VENTILATORS, J-M HIGH TEMPERATURE CEMENT, J-M ASBESTOS ROLL and SHEET MILL BOARD, J-M NON-BURN BUILDING PAPER, ARCHITECTURAL ACOUSTICS, J-M WATERPROOFING MATERIALS, J-M MASTIC FLOORING.

PIPE and BOILER COVERINGS: J-M ASBESTOCEL, J-M ASBESTO-SPONGE FELTED, J-M 85% MAGNESIA, J-M ASBESTOS FIRE-FELT, J-M VITRIBESTOS, J-M AIR CELL, J-M WIRE-STITCHED ANTI-SWEAT, J-M ZERO, J-M PLUMBING, J-M AQUA, J-M CHAMPION, J-M BRINE and AMMONIA, J-M SHEETS and BLOCKS for BOILERS, HEATERS, etc., J-M ASBESTOS and MAGNESIA INSULATING CEMENTS, J-M SECTIONAL UNDERGROUND CONDUIT.

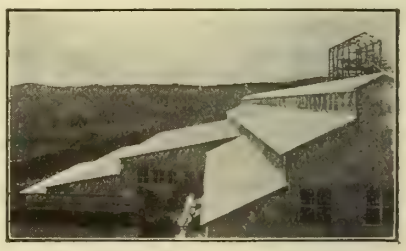
ELECTRICAL MATERIALS: "NOARK" STANDARD FUSE DEVICES, "NOARK" SERVICE BOXES, "NOARK" UNIVERSAL SYSTEM OF METER PROTECTIVE DEVICES, FRINK and J-M LINOLITE SYSTEMS of ELECTRIC LIGHTING for SHOW WINDOWS, SHOW CASES, THEATRE STAGES, SIGNS, FRINK REFLECTORS, MITCHELL VANCE LIGHTING FIXTURES, GILL BROS. CO. PARIAN WARE, J-M FIBRE CONDUIT, etc.

J-M Asbestos Ready Roofing.

Approved by Underwriters' Laboratories, Chicago. The basis of J-M Asbestos Roofing is pure asbestos, made into sheets of fabric, after which each sheet is individually saturated. They are then securely cemented together with a Trinidad Lake asphalt compound, especially prepared by us for this type of roofing, and the result is a solid, homogeneous mass of asbestos (stone) and asphalt (mineral)—making a roofing that is *all mineral all the way through*

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT
TRADE-MARK

Advantages—J-M Asbestos Roofing affords excellent fire protection, and will not rust, rot, crack or deteriorate with age. Ordinary gases and chemical fumes do not affect it. This roofing is still in good condition on buildings in all parts of the country, after more than a quarter-century of service.



MILL OF MIAMI COPPER CO.
Roof construction of J-M Asbestos Roofing

J-M Asbestos Roofing will not burn like shingles and ready roofings made of organic materials; will not rot, crack or warp, and has no gravel to be washed or blown off and clog up outlets. Like all stone, this roofing never needs coating, gravel or any other protection. J-M Asbestos Roofing is cheaper in first cost than slate, shingles, tin or iron, and costs less per year of service than any other roofing.

As this roofing has a smooth surface, any leaks, which may be caused by nails protruding from the roof-boards, or by carelessness on the part of workmen, can be readily located.

Another advantage in the smooth surface of J-M Asbestos Roofing is that it sheds water more rapidly than gravel or slag roofings, thus avoiding ice. Ice causes much damage to gravel and slag roofings, as it loosens the gravel and opens up the plies.

J-M Asbestos Roofing is shipped ready to apply, with J-M Roofing Cleats, nails, and Lap Cement, and full instructions for applying, packed in each roll.

When laid with J-M Roofing Cleats this roofing presents an unbroken surface, as the cleats do away with the necessity of smearing the outside edges with cement to secure water-tight joints.

Brands.

Although we furnish a variety of brands of J-M Asbestos Roofing, it should be distinctly understood that *there is but one quality.* The difference between the brands consists only in the number and arrangement of the plies. Where maximum durability is desired, the Four-Ply Brand is recommended, while for lighter and more temporary construction the lower priced grades will be found satisfactory.

Four-Ply Brand—An all Asbestos and Asphalt Four-Ply Roofing, shipped in flat sheets 32 by 80 inches, so that it will always lie flat.

Continued on next page

Three-Ply Brand—A very permanent roofing when laid over good, smooth sheathing boards. While not as serviceable as the Four-Ply Brand, owing to its lighter weight, it is made of exactly the same materials. Furnished in one- and two-square rolls, 32 inches wide.

Specifications—Remove all loose nails, chips and other rubbish, leaving the surface perfectly clean. See that all ends of boards are resting on a joist or purlin, so that they can not spring. If edges of boards are curled up, draw them down and smooth off any projections. See that all knot holes are covered or filled up before commencing to lay roof, constructed as follows:

Work to be commenced at the eaves or gutters, running the roofing parallel with the same, applying the roofing in sheets not more than 20 feet long, lapping the perpendicular seams 3 inches and the horizontal seams 2 inches, breaking the joints. J-M Asphalt Lap Cement to be applied between the laps, after which the roof shall be nailed with large-headed (½-inch) galvanized nails (⅞-inch shank), nailing ¾ of an inch back from the edge, 2 inches apart, center to center. After nailing is completed, seams are to be coated with J-M Asphalt Lap Cement or J-M galvanized cleats and nails, the cleats spaced ½ inch between ends on pitched surfaces and butted when on flat surfaces. No cement on top of the laps is then necessary.

All valleys and wooden gutters to be covered with the roofing specified. Material to be placed in same so that the sheet runs lengthwise with the valley or gutter, so that no unnecessary laps or joints will occur in the same. J-M Built-up Asbestos Roofing, under most circumstances, will be best for use under such conditions.

Base flashings shall be composed of the same material as the roofing, made from a sheet 10⅔ inches wide, placing 4 inches on the flat part of the roof and 6⅔ inches on the upright, cementing solidly to the upright work with J-M Asphalt Cement, after which the flashing shall be nailed in the usual manner. Cap flashing to be composed of J-M Asbestile Cement, which shall be troweled to the wall and over the base flashing, and while soft a layer of Single-Ply Asbestos Felt 3 inches wide, weighing not less than 9 pounds to 100 square feet, shall be embedded in same; over this shall be troweled another layer of J-M Asbestile Cement. All brick walls, chimneys and upright work to be flashed with the J-M Asbestile System.

J-M Asbestoside.

J-M Asbestoside is a wall siding for factories, warehouses, barns, etc., made of the same material as J-M Asbestos Roofing, previously described.

J-M Asbestos Built-up Roofing.

Approved by Underwriters' Laboratories, Chicago. This roofing is built-up on the roof of successive layers of pure asbestos fabric and a Trinidad Lake asphalt compound made special for this type of roof construction. It is especially recommended for flat roofs or for use over concrete.

Advantages—Like J-M Asbestos Ready Roofing, previously described, J-M Asbestos Built-up Roofing, due to its *all-mineral* construction, gives excellent fire protection; it never needs coating, gravel or slag to protect it from the elements. It also has all the other advantages of our Ready Roofing above mentioned.

8TH REGIMENT ARMORY, BRONX, NEW YORK, N. Y.
PILCHER AND TACHAU, Architects
J-M Asbestos Built-up Roofing used

Specifications, Standard J-M Asbestos Built-up Roofing Over Sheathing Boards, Black Finish—Owner or general contractor shall remove all loose nails, chips and other rubbish from the roof, leaving the surface perfectly clean. See that all ends of boards rest on joists or purlins; boards to be secured with not less than two nails if 6 inches wide or less, and at least three nails where wider boards are used. If edges of boards are curled up, properly draw them down and smooth off all projections. See that roof is graded properly to outlets, and that all knot holes are covered or filled up before commencing to lay roof, constructed as follows:

First, lay one thickness of J-M Phoenix Brand two-ply Asbestos Roofing, consisting of two impregnated sheets of asbestos properly cemented together at the factory with J-M Ajax Brand of refined asphalt, the Phoenix felts to be lapped two inches, and thoroughly cemented at the laps with Ajax Asphalt; this ply to be nailed with ⅞-inch barbed nails driven through flat tin caps at intervals of 6 inches, along laps and in parallel lines 10 inches apart and 10 inches from the edges of each sheet, the nails to be 18 inches center to center staggered. After this ply is in place, mop the entire surface with J-M Ajax Brand Asphalt; and while thoroughly hot, embed into it two plies of J-M No. 2 Asbestos Ajax Fabric, these felts to be rolled close behind the mop so that no possible missing of asphalt can take place. The two upper plies of felt (32 inches wide) shall each have 15 inches exposed to the weather; the first to be nailed with barbed nails and flat tin caps along the upper edge of the sheet at intervals of 9 inches, and in such a manner that all nails shall have two plies of felt over them. At the walls, chimneys and other openings, the roofing material shall be turned up at least 2 inches.

Wherever flashings are necessary, the base flashing shall be bent into the angle of the wall, and shall be fitted closely, so that no sagging can take place; the base flashing to consist of an apron piece of J-M Asbestos Flashing Material at least 10½ inches wide, to be laid 6 inches up on the wall and 4 inches out on the roof; this flashing to be thoroughly nailed to roof, and occasionally to the wall, after which a ply of No. 2 J-M Asbestos Ajax Fabric shall be laid in hot asphalt in such a manner as to cover all nail heads in flashing material.

NOTE: Metal may be used for this base flashing if desired.

Above the base flashing there shall be placed a counter flashing of J-M Asbestile or metal, same to be properly cemented to the wall and brought down over the base flashing at least 2 inches.

NOTE: If fire walls do not exceed 12 inches in height, the flashing may be all in one piece to be carried up and turn in on top of the brick wall, the coping to be laid over this flashing.

Otherwise a ply of J-M Fabric, cut to the desired width, should be laid over the top of all fire walls before coping is put in place.

After the roof is properly laid and otherwise finished, there shall be spread over it an even thickness of J-M Asphalt Liquid Roof Coating, applied cold and thoroughly brushed out, in order that the entire roof may have a black and even appearance. This coating to be carried up to the top of base flashing, and finished neatly under the lower edge of counterflashing.

J-M Asbestos Built-up Roofing Over Concrete, Black Finish—The owner or general contractor agrees to give the roofing contractor the deck of the building absolutely free from all obstructions and to maintain it free from all obstructions other than the materials, tools and appliances belonging to the roofing contractor, and to remove all loose nails, chips, and other rubbish, leaving the surface perfectly clean.

The owner or general contractor also agrees to give the roofing contractor a smooth concrete surface, free from holes, depressions or projections, and truly graded so as to provide for the free flow of water toward gutters and downspouts. The guarantee on this roof is contingent upon the contractor doing the aforesaid.

Over the foregoing shall be laid a 3-ply J-M Ajax Asbestos and Asphalt Roofing to be constructed as follows:

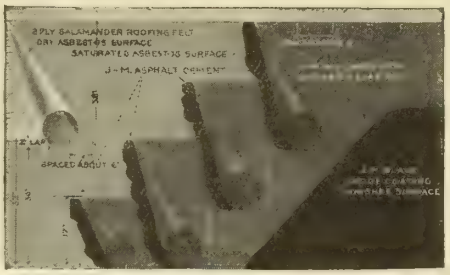
Three plies of J-M Asbestos Ajax Fabric to be Asphalt saturated and to weigh not less than 14 pounds per hundred

NEW YORK CENTRAL R. R. STATION AT ROCHESTER, N. Y.
J-M Asbestos Built-up Roofing used

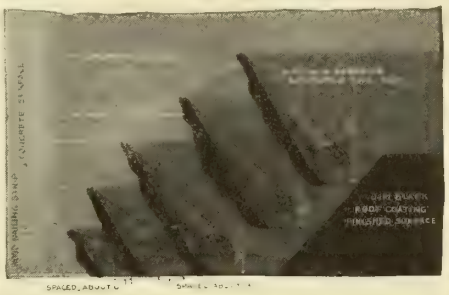
Continued on next page

square feet, single thickness. The Asphalt Cement shall be best quality Trinidad Lake asphalt, refined by the H. W. Johns-Manville Co., known as their Ajax Asphalt Cement, and there shall be used not less than 80 pounds gross weight per hundred square feet of completed roof.

The liquid asphalt coating shall be H. W. Johns-Manville Co.'s J-M Asphalt Roof Coating, using not less than one gallon per hundred square feet of completed roof. The materials shall be used as follows:



DETAILED APPLICATION OF J-M ASBESTOS BUILT-UP ROOFING OVER SHEATHING BOARDS—BLACK FINISH



DETAILED APPLICATION OF J-M ASBESTOS BUILT-UP ROOFING OVER CONCRETE SURFACES—BLACK FINISH

First coat the concrete with J-M Concrete Primer so as to form a perfect bond between the concrete and the asphalt. Then mop the surface with J-M Ajax Brand of asphalt, heated to flow freely, and into it, while hot, embed three plies of No. 2 J-M Asbestos Impregnated Ajax Fabric. The entire surface between plies shall be mopped with hot Ajax Asphalt and the felts shall be rolled close behind the mop, so that no missing of asphalt can possibly take place. The felts shall be so laid that ten and one-half inches (10½") of each ply will be exposed to the weather.

Over all steep concrete surfaces the felts must be laid up and down the roof, and proper fastenings shall be provided to prevent any possible movement of felts during hot weather.

J-M 3-Ply Built-up Asbestos Roofing shall be carried up on the fire walls at least two inches (2"), and for base flashing there shall be provided an apron of J-M Asbestos flashing material 10½" wide, bent to conform to angle and mopped to roof with J-M Ajax Asphalt.

Above the base flashing there shall be placed a counter flashing of J-M Asbestile or metal, same to be properly cemented to the wall and brought down over the base flashing at least 2 inches.

NOTE: If fire walls do not exceed 12 inches in height, the flashing may be all in one piece to be carried up and over the top of brick wall, the coping to be laid over this flashing. Otherwise a ply of J-M Ajax Fabric, cut to the desired width, should be laid over the top of all fire walls before coping is put in place.

After the roof is so laid, the entire surface shall be coated with J-M Asphalt Roof Coating, as above, to give a uniform and even appearance.

J-M Regal Roofing.

To meet the demand for a low-priced roofing, we are prepared to furnish J-M Regal. This is a smooth-surfaced, ready roofing, composed of a high grade wool felt, which is manufactured in our own mills, and Trinidad Lake asphalt. The asphalt is also processed in our own refineries, which enables us to offer in J-M Regal the best grade of "rubber" type roofing that can be made.

J-M Regal Roofing is put up in rolls of 108 or 216 square feet, with nails or J-M Roofing Cleats, if specified, packed in each roll.

J-M REGAL ROOFING

J-M Transite Asbestos Shingles.

Approved by Underwriters' Laboratories, Chicago. These shingles are made by moulding pure asbestos fibre and Portland cement into a solid, compact mass, under hydraulic pressure. They have no layers or laminations to separate or curl.

RESIDENCE OF D. T. DICKSON, WAYNE, PA.
FRANCES T. GUGERT, Architect, Wayne, Pa.

Advantages—They are not affected by continued weather changes. Freezing and thawing only hasten the setting of the binding material. The more severe the weather conditions, the stronger and harder the shingles become. They never rot or decay; never warp or split.

J-M Transite Asbestos Shingles can be handled without the usual breakage. Loss due to breakage, from the time they are shipped until they are in place on the roof, is such a small factor that in ordinary work no allowance for this item is taken into consideration. They are tough and resilient—not brittle like slate and tile—and are much stronger than laminated asbestos shingles. Fire can not, of course, burn asbestos any more than it can burn stone—Portland cement. So J-M Transite Asbestos Shingles contain nothing that can burn.

Like all minerals or stone, J-M Transite Asbestos Shingles do not require paint or protection of any kind to preserve them. These shingles, being composed largely of asbestos, are excellent non-conductors of heat and cold. They keep a building cool in summer and warm in winter.

Weighing much less than slate, these shingles are much easier to handle, do not require such a heavy and expensive roof construction, and save considerable in freight.

Sizes, Colors, etc.—They are furnished in uniform standard sizes and require no cutting or trimming except around the valleys, dormer windows, etc. Are furnished punched and ready to apply.

J-M Transite Asbestos Shingles are furnished in gray, Indian red and mottled brown colors, in shapes most desirable for various roof constructions, and in two styles—⅛-inch thick with smooth edges, and ¼-inch thick with rough edges. A number of the standard sizes are shown here, but we will be pleased to quote on special designs upon request.

We are prepared to furnish J-M Asbestos Shingle Coating in moss green, light green, Indian tile red, and weathered brown, where desired to color these shingles to conform to the general color scheme of the building, or where it is desired to use the ordinary gray shingle and coat them to save the expense of the solid color. This coating is intended only for decoration and is not necessary to preserve the shingle.

Specifications—American Method—Lay roof boards in the usual manner, breaking joints and nailing securely in place, leaving no loose ends. The roof boards should be well seasoned and of narrow width. Over the roof boards lay one

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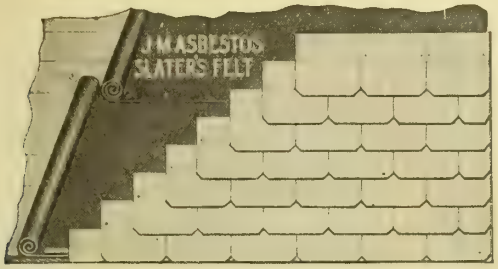


Fig. 1. CLIPPED CORNER AMERICAN METHOD

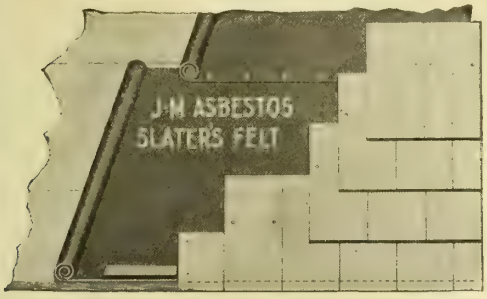


Fig. 2. STANDARD AMERICAN METHOD

thickness of J-M Asbestos Slater's Felt, described in the illustrations above, laying horizontally with a 4-inch lap, and with 12-inch laps on hips and valleys.

Apply ¼-inch to ½-inch thick by 1½-inch wide furring strip parallel with and flush with eaves, then apply one course of No. 16 8-inch by 16-inch shingles at eaves, lengthwise and parallel to same, overhanging the eaves, about one-half inch. Apply the second course, using No. 5 shingle, entirely covering first course (see Fig. 2), breaking joints; after which proceed in the regular manner as with wooden shingles, or slate, exposing 7 inches to the weather, and fastening each shingle in place with at least two galvanized iron roofing nails furnished for the purpose. Never drive nails down tight; it is only necessary to drive them firmly as with slate. Over the ridges and hips apply J-M Transite Asbestos Ridge and Hip Rolls with not less than 3-inch lap, fastened in place with special ridge roll fasteners furnished for the purpose.

Where ridge pole does not project high enough above the roof boards to allow direct application of ridge roll, it is necessary to put in a false pole so that it is possible to get a direct fastening through top of ridge roll. (See Fig. 3.)

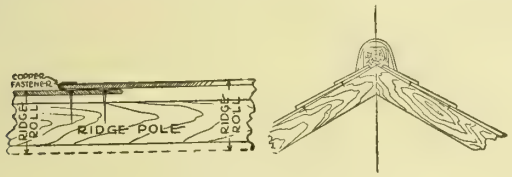


Fig. 3. DETAILS OF RIDGE ROLL CONSTRUCTION

Flashings—Flash all chimneys and valleys with copper or other approved material.

Hexagonal Method—The hexagonal or "honeycomb" method of applying J-M Transite Asbestos Shingles, in the ⅛-inch thickness, is cheaper than the American method and much more artistic than the diagonal method. The hexagonal method apparently shows six sides of the shingle, thus overcoming objection to severely straight lines and producing a most beautiful effect.

It not only renders roof attractive to the eye, by breaking up regularity of surface, but affords better protection than the diagonal method, owing to the fact that overlap at lower end of each shingle is almost twice as great as in diagonal method.

RESIDENCE OF LOUIS STERN,
BROOKLYN, N. Y.
C. R. Shubert, Architect
Transite Asbestos Shingles used

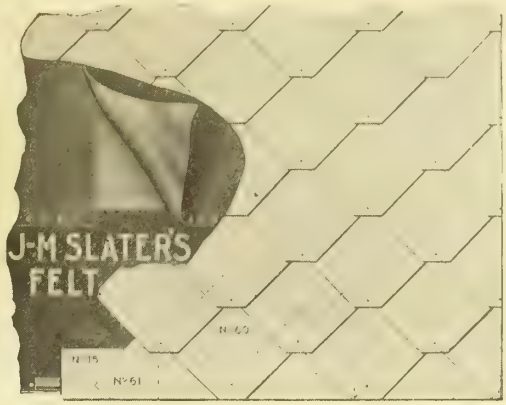


Fig. 4. HEXAGONAL METHOD OF APPLYING J-M SHINGLES

We most highly recommend the hexagonal shingles, as in our estimation the French or diagonal shingles in no way compare with them, either from a construction or artistic point of view.

Lay roof boards in usual manner, breaking joints and nailing securely in place, leaving no loose ends. The roofing boards should be well seasoned and of narrow width. Over the roof boards lay one thickness of J-M Asbestos Slater's Felt, laying horizontally with a 4-inch lap, and with 12-inch lap on hips and valleys.

Over the felt lay J-M Transite Asbestos Shingles in the following manner: Apply a ¼- to ½-inch thick by 1½-inch wide furring strip parallel with and flush with eaves, then lay one course No. 15 J-M Transite Asbestos Shingles end to end, parallel with and overhanging the eaves ½ inch; over which apply one course of No. 61 shingles, entirely covering the starter, No. 15, breaking all joints, as shown in detail (Fig. 4.)

Cover balance of roof with No. 60 Shingles 12 in. by 12 in., laid as shown, exposing 9½ in. by 9½ in. to weather. Securely fasten all shingles in place with galvanized, needle-pointed nails; and fasten the points of the No. 60 main body shingles with special J-M Copper Storm Nails. Never drive nails down tight; it is only necessary to drive them firmly as with slate. All main body shingles, i. e., the No. 60, should be laid with the diagonal lines on a 45-degree angle with eaves. Over ridges and hips apply J-M Transite Asbestos Ridge and Hip Rolls, with not less than 3-inch lap, fastening in place with special ridge roll fasteners furnished for the purpose.

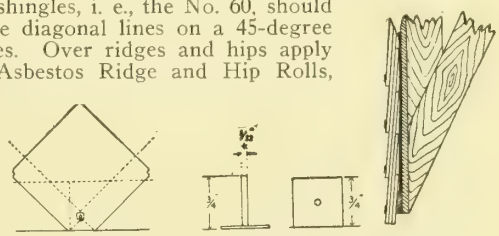


Fig. 5. SHOWING USE OF COPPER STORM NAIL

Flashings—Flash all chimneys and valleys with copper or other approved material.

The Diagonal Method—Figure same number of shingles to square as for the hexagonal method. The starting courses for this method will be No. 15, 6 x 12, punched with four holes, then No. 14, while main body shingle will be No. 12, these numbers to apply to 12 x 12 size. In the 16 x 16 the main body shingles. (See Fig. 6.)

Sidings—These shingles are particularly adapted for the sides of all classes of buildings where fireproof materials are desired. Very attractive designs may be worked out with red asbestos shingles on the roof and gray asbestos shingles for the siding.

Fig. 6. THE DIAGONAL METHOD OF APPLYING J-M SHINGLES

WARREN CHEMICAL & MFG. DIVISION

THE BARRETT COMPANY

Manufacturers of Asphalt Roofing, Insulating and Waterproofing Materials

17 Battery Place
NEW YORK, N. Y.

49 Federal Street
BOSTON, MASS.

Products.

Warren's Anchor Brand Asphalt Roofing and Waterproofing Materials; Tile-Tite Asphalt Roofing Felt; Aquanon Asphalt Waterproofing Felt; Aquanon Asphalt Waterproofing Compound; "Safeguard" Granite Roofing; Anchor Asphalt Roof Coating and Anchor Asphalt Paint.

Also, Sheathing and Lining Papers.

For Asphalt Floors and Pavements, see our name in General Index.

Asphalt as a Roofing Material.

Asphalt possesses a certain enviable reputation as a roofing material. Obviously this rests upon the service rendered by the earlier asphalt roofs. Except for a very few isolated cases, such old roofs were laid with the Anchor Brand materials described below. The first asphalt ever employed for roofing was Anchor Brand.

Warren's Composite Roofing Felt.

Used for roofing (specifications on next page) and sheathing. A sheet of long fiber wool felt saturated with natural asphalt and reinforced by, and cemented to, a tough jute paper with natural asphalt cement. In roofing it makes a tough waterproof foundation, obviating need for the usual extra sheathing paper. Strength and damp-proof characteristics combined, qualify it as desirable sheathing for walls. Has neither taint nor odor. Put up in rolls 32 inches wide, containing 432 square feet, and weighing 67 to 70 pounds. Rolls labeled (see illustration), the label being printed in red and black.

Warren's Anchor Asphalt Felt.

Used for roofing (specifications on next page), waterproofing and sheathing. Consists of a felt made from high-grade wool fiber saturated with a natural asphalt compound which forty years' experience has proved the most permanent. No taint nor odor, thus making it especially suitable for insulating and waterproofing cold-storage compartments. Put up in rolls 32 inches wide, containing 324 square feet, weighing 50 to 54 pounds. Rolls labeled (see illustration), the label being printed in red, black and grey.

Warren's Anchor Asphalt Roofing Cement.

Refined from highest grades of natural asphalts fused together in the proper proportions to produce a compound combining to the fullest degree those cementitious and enduring qualities most essential to a perfect roofing cement. Our cement is unique in that it is refined by the old style process, insuring a continuance of high quality which experience has demonstrated can not result from the newer and less thorough methods now generally employed. Put up in double-head barrels of fifty gallons capacity, and weighing about 550 pounds each. The head of each barrel is stenciled (see illustration) in black on a grey background.

Warren's Eclipse Asphalt Cement.

A modified form of Anchor Roofing Cement tempered to render it particularly adaptable for coating and sealing the pores of concrete surfaces before applying roofing or waterproofing felt. Shipped in double-head barrels of fifty gallons capacity, weighing about 550 pounds each. The head of each barrel is stenciled (see illustration) in black on a blue background.

Quantities.

A roof laid according to the specifications requires the following materials for each 100 square feet of surface:

1/2 roll (216 square feet) Composite Felt.
2/3 roll (216 square feet) Anchor Felt.
120 to 150 pounds Anchor Cement, over boards.
150 to 180 pounds Anchor Cement, over concrete.
40 to 50 pounds Eclipse Cement, over concrete.

The quantity of Roofing Cement varies with weather conditions and the skill of the workmen employed.

Specifications for Warren's Anchor Brand Roofing.

Many architects and engineers appear to be laboring under the mistaken impression that it is impossible to successfully maintain a high-class built-up composition roof on inclined surfaces. While this may be true where certain materials are employed, the difficulty can be solved by using the felts and cements described. Many years' experience with sawtooth and other steep surfaces has proved this conclusively. We confidently advocate the Anchor Brand Roof up to six and seven inches to the foot incline.

The following specification is for a slag or gravel covered roof laid over boards (form suitable for concrete surfaces furnished on request). This roof is adapted for use on both steep and flat surfaces.

LABEL ON ROLL OF WARREN'S COMPOSITE ASPHALT FELT

STENCILED LABEL ON BARREL OF WARREN'S ANCHOR ASPHALT ROOFING CEMENT

STENCILED LABEL ON BARREL OF WARREN'S ECLIPSE ASPHALT CEMENT

LABEL ON ROLL OF WARREN'S ANCHOR ASPHALT FELT

Continued on next page

For Use Over Board Sheathing—Cover the roof with two thicknesses of Warren's Composite Roofing Felt, manila side down, lapping each sheet 17 inches over the sheet preceding, securing both edges with nails driven through tin discs not more than 20 inches apart.

Mop over this entire surface with a thorough coating of Warren's Anchor Roofing Cement, into which while hot lay two thicknesses of Warren's Anchor Roofing Felt, lapping each sheet 17 inches over the sheet preceding, cementing the full width between the laps with Warren's Anchor Roofing Cement and securing with nails through tin discs along the upper edge,* nails to be not more than 20 inches apart.

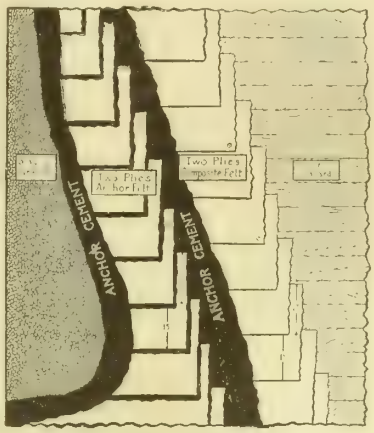


DIAGRAM SHOWING CONSTRUCTION OF STANDARD SLAG OR GRAVEL ROOFING

Over the entire surface thus laid, spread an even coating of Anchor Cement, covering it immediately with a sufficient body of dry crushed slag †or gravel. If the roofing is applied in cold weather, the slag or gravel must be heated.

All layers of felt must be turned up at least 4 inches against battlement walls, skylight curbs, or any other projections raised above the roof.

In case of sawtooth roofs, an extra layer of Anchor Brand Felt shall be laid in all valleys, turning up 10 inches against the front of the monitor, and rising up the back of the next monitor to a height equal to 20 inches perpendicular. This layer must be laid in hot Anchor Cement, and receive a thorough mopping over its surface. It must be laid over the Composite Felt before the two layers of Anchor Felt are applied.

We recommend that the full text of the specifications be used. If, however, an abbreviated form is desired, we suggest:

"*Roofing* shall be Warren's Heavy Standard Anchor Brand Roofing for use over boards or planks‡ laid strictly in accordance with printed specifications revised September 15, 1913, using the material specified."

Notes—* For steep roofs add "and through the center."
† For steep roofs omit the words "or gravel."
‡ Insert here "steep surfaces" or "flat surfaces," as required.

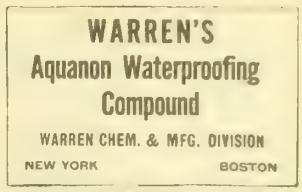
Tile-Tite Asphalt Felt.

Placed beneath tile or slate roofs it prevents leaking, especially that which results from drifting snow. The necessity for such reinforcement is admitted by the tile makers themselves. It is also a most effective damp-proof sheathing, and an invaluable insulator, reducing fuel requirements. Made of warm wool felt protected by a thorough saturation of natural asphalt. In rolls 32 inches wide, containing 108 square feet. Two weights, Nos. 30 and 40, weighing approximately 30 and 40 pounds respectively. Each roll is labeled (see illustration) with green and red colored label.

LABEL ON ROLL OF WARREN'S TILE-TITE ASPHALT FELT

Warren's Aquanon Asphalt Waterproofing Compound.

Prepared from the purest grades of asphalt to withstand the peculiar conditions of underground waterproofing. High in cementing value, producing in conjunction with asphalt felt a permanently unbroken and impenetrable membrane. Plastic enough to allow for necessary expansion without that excessive softness which results in settling. Shipped in either metal or wooden barrels weighing from 300 to 500 pounds. Barrels marked with this label.

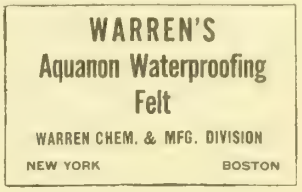


LABEL ON BARREL OF WARREN'S AQUANON WATERPROOFING COMPOUND

Warren's Aquanon Asphalt Felt.

Used for roofing, waterproofing and sheathing. A long fiber wool felt saturated with high-grade natural asphalt. No taint nor odor.

This makes it especially desirable for insulating and waterproofing cold-storage compartments. Put up in rolls 32 inches wide, each containing 324 square feet, weighing 50 to 54 pounds. Rolls bear this label.



LABEL ON ROLL OF WARREN'S AQUANON ASPHALT FELT

Granite Roofing.

A gravel-surfaced ready roofing with a record of service equaling many built-up roofs. Made with a three-inch lap, bare of gravel, allowing a perfect bond at the seams and assuring an absolutely water-tight joint.

In rolls 32 inches wide, containing 110 square feet and weighing about 145 pounds, including necessary nails and cement for applying.

"Safeguard" Granite Roofing.

Same as above, with a six-inch lap. Used as a special precaution on roofs of slight incline.

The "Safeguard" Roofing is almost unique in that the nail heads are completely covered, preventing all corrosion at that vital point.

In rolls 32 inches wide, containing 120 square feet and weighing about 150 pounds, including necessary nails and cement for applying.

Anchor Asphalt Roof Coating (99.8 Per Cent Pure).

Prepared especially for treating composition roofs, and restoring the life and waterproof qualities which have been exhausted by exposure to the sun. For treating all surfaces where a paint with saturating properties is desired, including rubber roofing, prepared roofing, gravel-surfaced roofings, asphalt shingles and kindred roofings.

Shipped in	Capacity
Barrels	50 gallons
Half-Barrels	25 gallons
Kits	10 gallons
Kits	5 gallons
Cans	1 gallon

(6 Cans packed in strong wooden case)

Anchor Asphalt Paint (99.8 Per Cent Pure).

Prepared especially for protecting metal surfaces against the ravages of the elements. Dries quickly and with a glossy lustrous finish sufficiently flexible to prevent scaling.

For treating roofs of all kinds, smokestacks, boilers, fences and metal surfaces generally.

Shipped in	Capacity
Barrels	50 gallons
Half-Barrels	25 gallons
Kits	10 gallons
Kits	5 gallons
Cans	1 gallon

(6 Cans packed in strong wooden case)

THE NATIONAL ROOFING CO.

Manufacturers of Asphalt Roofing

FACTORIES AND GENERAL OFFICES
TONAWANDA, N. Y.

PITTSBURGH OFFICE
607 PUBLICATION BUILDING

BALTIMORE OFFICE
548 MONUMENT STREET, EAST

DISTRIBUTORS

BALTIMORE, MD., Clarke Asphalt Roofing & Paint Co., 546 Monument Street, East
BINGHAMTON, N. Y., Gillett-Barnes Co., 91 State Street
BUFFALO, N. Y., Cordes, Ayrault & Co., Inc., 51 Broadway
CLEVELAND, OHIO, National Roofing & Supply Co., 6318 Kinsman Road
DETROIT, MICH., National Supply Co., 301 Penobscot Building
LOUISVILLE, KY., Central Paint & Roofing Co., 314 West Main Street
MILWAUKEE, WIS., Cream City Roofing & Paint Mfg. Co.
NEW ORLEANS, LA., Kracke & Flanders Co., 715 Perdido Street
PROVIDENCE, R. I., Narragansett Supply Co., 830 Eddy Street
SYRACUSE, N. Y., Onondaga Builders Supply Co., 569 South Clinton Street

Products.

Prepared Asphalt Roofings surfaced with Gravel, Crushed Red and Green Slate, and Feldspar Rock, including Security Wide-Weld, Sparkloid and Natroco Asphalt Roofing; Natroco Asphalt Shingles.

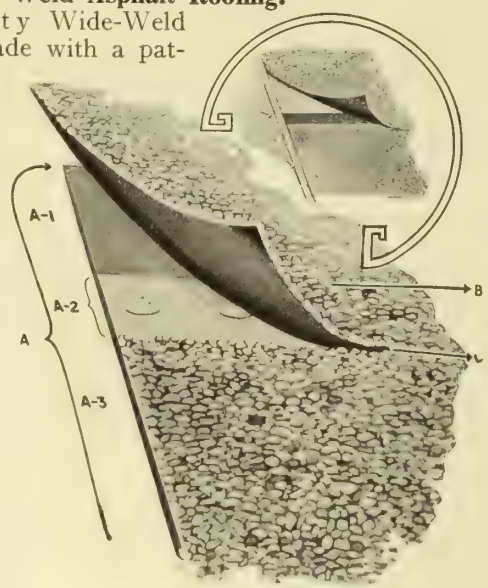
Also, Triumph, Jefferson and Champion Rubber Roofing; National Asphalt Felt Roofing; "Fixit" Mineral Asphalt and National Liquid Asphalt Cements; National and Union Roofing Cements.

For Special Paints and Roof Coatings, see our name in General Index.

TRADE-MARK

Security Wide-Weld Asphalt Roofing.

Security Wide-Weld Roofing is made with a patented 6-inch joint that cannot leak, welds the whole roof into one continuous piece and covers all nail-heads with the full thickness of the roofing. Each sheet is lapped over the 6-inch ungraveled margin of the sheet below and welded to it with hard asphalt cement.



SIX-INCH CEMENT WELD

Our Roofings are approved by the National Board of Fire Underwriters.

How the Cement Weld is Made—In the illustration above the indication of the lettering is as follows:

A —Upper portion of a sheet of Security Roofing lying on the roof.

B —Lower portion of sheet lying next above on the roof, turned back to show ungraveled margin of sheet "A."

A-1—Bottom layer of lower sheet of asphalt-saturated felt, 36 inches wide, extending four inches beyond other layers, and along the upper edge or margin of the entire sheet or roll of roofing.

A-2—Full thickness of two layers of felt and two of natural mineral asphalt, 32 inches wide, extending two inches beyond the surfacing, and covered with tissue-paper tape to prevent sticking in the roll. The nails are driven through this full thickness of the roofing as shown in the illustration.

A-3—Gravel-surfaced portion of sheet "A," 30 inches wide, composed of two layers of asphalt-saturated felt, two of mineral asphalt, one of white sea gravel (coarse or fine feldspar if preferred).

In applying, the roofing "A-1" and "A-2" are covered with a thick layer of hard asphalt-cement (hot) and "B" is then brought down over the entire six inches and welded firmly to it. Thus you have one unbroken sheet of gravel-surfaced roofing covering all nail-heads and making a continuous one-piece roof without a nail-hole in it.

No Coal-Tar—Security Roofing is made of special high-grade, long-fibered wool-felt, saturated with natural mineral asphalt, which we refine by our own formula, the result of over twenty-five years' experience. Not a particle of coal-tar or pitch in any form enters into the composition of any of our roofings.

Surfacing—The surfacing of Security Roofing is a heavy layer of natural mineral asphalt cement, in which is permanently imbedded a final layer of white sea gravel, crushed slate or crushed feldspar rock. This adds to the durability, weatherproofing and fire-resisting qualities, and obviates all need of painting and repairs. It can, however, be changed in color by using our "Asphaltus" Coating.

Four styles—Security Roofing is made in four styles: Gravel surface, red slate, green slate, and fine feldspar. It can also be furnished with burlap insertion for siding or roofs over one half pitch. Security Roofing is satisfactory for all classes of roofs, and easily applied by any intelligent workman.

Natroco Asphalt Shingles.

Natroco Asphalt Shingles are made from the same high-grade materials as our roofings, surfaced with crushed red and green slate or gray rock. They are fire-resisting, durable and sightly for residences, public buildings and similar structures.

They are cut 8 inches wide by 12¾ inches long, to be laid about ½ inch apart and 4 inches to the weather; 424 shingles cover 100 square feet. Shipped in cartons, each containing one quarter square, of 106 shingles.

Other Brands.

Sparkloid Asphalt Roofing is made in three weights, surfaced with crushed feldspar, finished on lower side with protective layer of flake mica. Natroco Roofing is made in four styles, surfaced with gravel, red and green slate and feldspar rock.

CORTRIGHT METAL ROOFING CO.

Manufacturers of Cortright Metal Shingles

50 North Twenty-Third Street

PHILADELPHIA, PA.

WESTERN OFFICE
CHICAGO, ILL., 538 S. Clark Street

Products.

CORTRIGHT METAL SHINGLES, made in four designs, as shown below: METAL SLATES, VICTORIA SHINGLES, ORIENTAL SHINGLES and IMPERIAL SHINGLES.

Designs.

The characteristics of each of the four designs are very sharp, strong, and uniform, so that whatever the height of the building, ornament remains a feature of the roof. The variation in design is only an effort to meet the demands of individual taste.

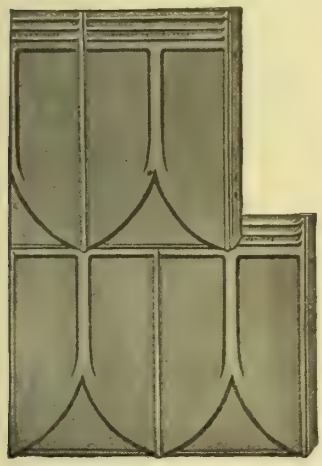


FIG. 1. METAL SLATES

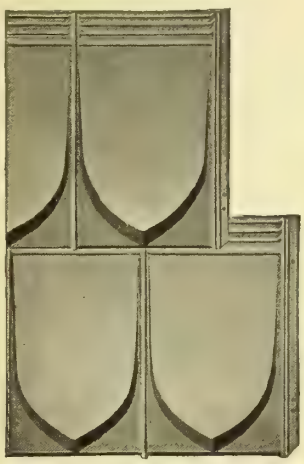


FIG. 2. VICTORIA SHINGLES

Materials Used in Manufacture.

These shingles, in all four patterns, are made of three kinds of material as follows:

Painted Tin—Made of a fine quality of prime full weight roofing tin; all plates carefully selected, which, after stamping into shape, are painted red or green.

Painting is by a dipping process, insuring a thorough coat on the under side, as well as the upper side, and in all the folds. The Cortright Paint for Metal Shingles is made under our own formula, and is the ideal paint.

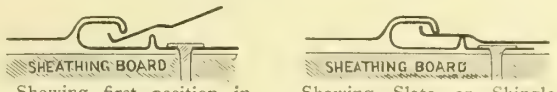
Hand-Dipped Galvanized Tin—Stamped into shape from sheets of roofing tin, then galvanized by dipping each shingle separately into a bath of melted zinc, which adds a coat of about twenty pounds on each square of goods, greatly increasing the durability. No raw edges are exposed, every piece being perfectly covered.

Stamped from Special Tight-Coated Galvanized Sheets—Cortright Metal Shingles will be furnished, when requested, made in any of our regular patterns from galvanized sheets. This material has a special tight coating, which does not crack, scale nor peel in the stamping.

Where there is preference for galvanized rather than painted tin shingles, and the element of first coat prevents the use of our standard Hand-Dipped Galvanized Tin Shingles, we recommend these.

Protective Feature.

By reason of the special feature, the Side Lock (Fig. 3), the roofing automatically expands or contracts without the slightest injury to the material or its absolutely storm-proof tightness.



Showing first position in laying Slate or Shingle on roof

Showing Slate or Shingle laid in place

FIG. 3. SIDE LOCK, FULL SIZE

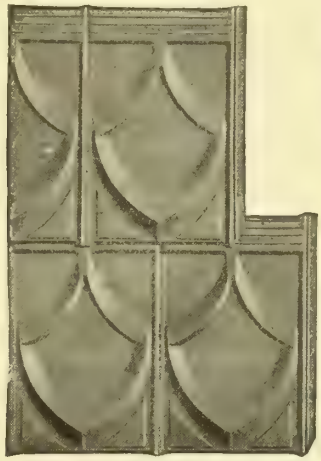


FIG. 4. ORIENTAL SHINGLES

FIG. 5. IMPERIAL SHINGLE

How Distinguished.

Every genuine Cortright Metal Shingle is stamped "Cortright Reg. U. S. Pat. Off."

Sizes.

Cortright Metal Shingles are made in the following sizes:

	No. required to cover square (100 sq. ft.)
Metal Slates, 10 x 14 in.	141 Slates
Metal Slates, 7 x 10 in.	297 Slates
Victoria Shingles, 10 x 14 in.	148 Shingles
Victoria Shingles, 7 x 10 in.	319 Shingles
Imperial Shingles, 14 x 20 in.	68 Shingles
Oriental Shingles, 10 x 14 in.	142 Shingles
Oriental Shingles, 14 x 20 in.	68 Shingles

Prices and Delivery.

We have found that it is much more satisfactory to our customers to know just what our roofing will cost them delivered at destination, and there is so much variation in freight rates, we usually quote prices for the goods delivered, all charges prepaid.

Further Details.

Catalogue, "Concerning That Roof," fully illustrated and describing in detail the Cortright System of Metal Shingle Roofing, mailed free on request.

Samples, full size, sent without charge to any architect requesting same.

AMERICAN SHEET AND TIN PLATE COMPANY

GENERAL OFFICES
PITTSBURGH, PA.
DISTRICT SALES OFFICES
CHICAGO CINCINNATI DENVER DETROIT NEW ORLEANS
NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS
EXPORT REPRESENTATIVES: NEW YORK, N. Y., UNITED STATES STEEL PRODUCTS COMPANY
PACIFIC COAST REPRESENTATIVES:
SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE, UNITED STATES STEEL PRODUCTS COMPANY

Products.

Manufacturers of SHEET and TIN MILL Products of every description; BLACK SHEETS for all purposes; AMERICAN BESSEMER and AMERICAN OPEN-HEARTH STEEL SHEETS; W. DEWEES WOOD COMPANY'S CLEANED, REFINED, SMOOTH FINISH, and PATENT PLANISHED IRON SHEETS; WELLSVILLE POLISHED STEEL SHEETS; APOLLO BEST BLOOM, KEYSTONE COPPER STEEL and CHARCOAL HAMMERED BLOOM GALVANIZED IRON SHEETS.

AMERICAN COKE and AMERICAN CHARCOAL BRIGHT TIN; TINNED DAIRY STOCK; AMERICAN OLD STYLE, AMERICAN NUMETHODD, and MF TERNE PLATES.

CORRUGATED SHEETS; FORMED METAL ROOFING and SIDING MATERIALS; KEYSTONE COPPER STEEL SHEETS, either BLACK or GALVANIZED.

General.

The standing and superiority of American products is so thoroughly appreciated by the building trades throughout the country that a detailed account of their various points of merit is not necessary here. Full information and quotations will be furnished by addressing the nearest district sales office.

Terne Plates.

The roofing tin now produced by this Company is made exclusively of Open-Hearth Keystone Copper Steel. It is perhaps needless to say that our decision to use this new alloy in preference to regular open-hearth steel was arrived at only after careful thought and exhaustive research.

The service tests we have made, however, in the rural districts, in the coke regions, and at the seashore, have convinced us that Keystone Copper Steel is far more durable, either coated or uncoated, than regular steel, and we have no hesitancy in recommending it to architects and builders as the *best* roofing tin on the market.

Copper Steel Roofing Tin is stamped "Keystone Copper Steel" in addition to the brand.

We direct your special attention to our MF brand. This plate has been made continuously since 1822, and is unquestionably the most popular roofing tin manufactured. The coating—32 pounds—is applied by the hand-dipped, pure palm oil process.

Other high-grade roofing plates are also made under the following brands:

U. S. Eagle.....40 pounds coating
American Old Style AAAAA ...40 pounds coating
American Old Style AAAA .....35 pounds coating
American Old Style AAA .....30 pounds coating
American Old Style AA .....25 pounds coating
American Old Style A .....20 pounds coating
American Special.....15 pounds coating
American Extra .....12 pounds coating
American .....8 pounds coating
American Numethodd B .....40 pounds coating
American Numethodd D .....30 pounds coating
American Numethodd F .....20 pounds coating
American O. H. Fire Door Stock.20 pounds coating

Keystone Copper Steel terne plates bear the stamp, "Keystone Copper Steel," added to brand and weight of coating, as indicated by MF trade-mark.

MF TRADE-MARK

Galvanized Sheets.

Apollo Best Bloom Galvanized Sheets are without question the highest quality and best known galvanized sheets manufactured. The sheets are produced from selected materials, by the most modern and scientific methods. The non-corrosive coating is always reliable, and the sheets are true to gauge, uniform in working qualities and trustworthy in every respect. Made in gauges 10 to 30 inclusive.

Send for our Pocket Reference Book, giving full information, and an Apollo Weight Card.

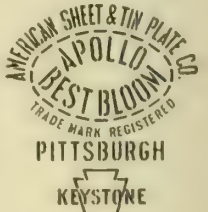
APOLLO TRADE-MARK

We also manufacture Charcoal Hammered Bloom Galvanized Iron Sheets, adapted to all purposes requiring sheets with a pure iron base. Gauges 14 to 28 inclusive.

Keystone Copper Steel Sheets.

Having retained all of value that has made our Apollo Best Bloom Galvanized Sheets the standard in all markets of the world, we are now prepared to supply this product made with a copper bearing base, thereby insuring longer life should the coating, for any reason, be injured.

Write for full information relative to Apollo-Keystone Copper Steel Galvanized Sheets.



KEYSTONE TRADE-MARK

Corrugated Sheets.

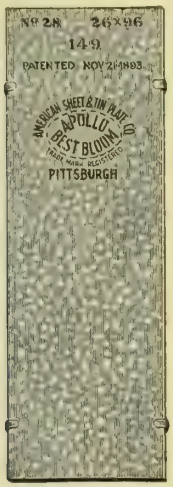
Corrugated sheets are the strongest form of sheet metal known, and do not suffer from contraction or expansion. These sheets are full standard weights per square, and are specially adapted to roofing and siding purposes. Furnished either in black, painted or galvanized.

SHEETS CONTINUED

Continued on next page

The galvanized patterns are stenciled "Apollo," as indicated; the plain and painted, "American." Following are the standard corrugations: 5/8", 1¼", 2", 2½", 3" and 5", in lengths of 5, 6, 7, 8, 9, 10 and 12 feet, with a covering width of 24 inches.

We also manufacture 2½" Patent Edge Corrugated Sheets, with a covering width of 24 inches; Genuine Reworked Iron Corrugated Sheets, with Standard corrugations; and Special Corrugated Sheets.



APOLLO BEST BLOOM GALVANIZED SHEETS

APOLLO CORRUGATED ROOFING SHEETS

Formed Roofing Materials.

V-Crimped Roofing is made from No. 20-gauge and lighter; black, painted or galvanized sheets. Standard lengths, 5, 6, 7, 8, 9 and 10 feet; maximum length 12 feet. Standard covering width 24 inches. Wood sticks furnished if desired.

Three V-Crimped Roofing is made from No. 20-gauge and lighter; in lengths same as the V-crimped.

Pressed Standing Seam Roofing is made from No. 20-gauge and lighter; black, painted or galvanized sheets. Standard lengths, 5, 6, 7, 8, 9 and 10 feet; maximum length 12 feet. Standard covering width 24 inches. Cleats furnished if desired.

V-CRIMPED ROOFING

PRESSED STANDING SEAM ROOFING

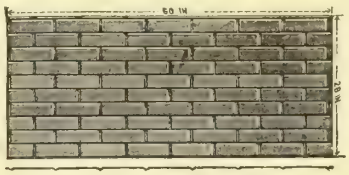
Roll Self Cap Roofing or Plain Roll Roofing is made from No. 24-gauge and lighter; black, painted or galvanized sheets. Standard full width, 26½ inches. Each roll contains 50 lineal feet, and when applied will cover 100 square feet. Cleats furnished if desired.

Roll and Cap Roofing is made from No. 24-gauge and lighter; black, painted or galvanized sheets. Standard full width, 26 inches. Each roll contains 50 lineal feet, and when applied will cover 100 square feet. Caps and cleats are furnished. Cross locks are single seamed, but double seamed can be furnished.

ROLL AND CAP ROOFING

Formed Siding Materials.

Plain and Rock-Face Brick Siding are exceptionally popular patterns. Made from black, painted or galvanized sheets, 28 by 60 inches; size of each brick approximately 2⅘ by 8⅘ inches.

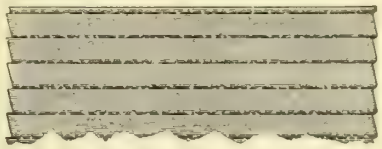


PLAIN BRICK SIDING

Rock-Face Stone Siding is made from No. 26-gauge and lighter; black, painted or galvanized sheets, 28 by 60 inches. Size of single stone, approximately 7 by 12 inches, and 9⅓ by 20 inches.

ROCK-FACE STONE SIDING

Weatherboard Siding is made from No. 22-gauge and lighter; black, painted or galvanized sheets. Standard lengths, 5, 6, 7, 8, 9 and 10 feet. Maximum length, 12 feet. Covering width, 24 inches.



WEATHERBOARD SIDING

Beaded Ceiling or Siding is made from No. 24-gauge and lighter; black, painted or galvanized sheets.

BEADED CEILING OR SIDING

Standard lengths, 5, 6, 7, 8, 9 and 10 feet. Maximum length 12 feet. Standard covering width, 24 inches. Beads are 3 inches from center to center.

ASBESTOS PROTECTED METAL COMPANY

PRINCIPAL OFFICE

CABLE ADDRESS, "ASPROMET, NEW YORK"
Western Union Code

First National Bank Building
PITTSBURGH, PA.
WORKS: ECONOMY, PA.

ASBESTOS FELT WORKS
WALTHAM, MASS.

SALES OFFICES AND AGENCIES

ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
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CINCINNATI, OHIO
CLEVELAND, OHIO
DALLAS, TEXAS
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EASTON, PA.
EL PASO, TEX.
KANSAS CITY, MO.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
OMAHA, NEB.
PHILADELPHIA, PA.
PORTLAND, ORE.
ST. LOUIS, MO.
SALT LAKE CITY, UTAH
SAN FRANCISCO, CAL.
SCRANTON, PA.
SEATTLE, WASH.
MONTREAL, P. Q., CAN.
SAN JUAN, PORTO RICO

EXPORT DEPARTMENT: NEW YORK, N. Y., 52 Broadway

Products.

Manufacturers of ASBESTOS PROTECTED METAL (APM) (patented), a lasting Roofing and Siding Material for Building Purposes, made in CORRUGATED, BEADED, FLAT, and CLAPBOARD SIDING SHEETS; RIDGE CAPPING and FLASHINGS, Rust-Resisting Materials for fastening sheets to the structure; ASBESTOSTEEL ROOF, FLOOR and WALL CONSTRUCTION (patented); "WAUGH" GLAZING CONSTRUCTION (patented).

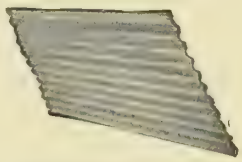
Also, ASPHALT PAINTS and CEMENTS, and ASBESTOS BUILDING PAPER.

TRADE-MARK
Reg.U.S.Pat.Off.

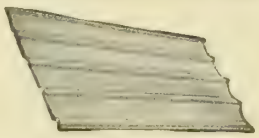
Asbestos Protected Metal.

The products manufactured by the ASBESTOS PROTECTED METAL COMPANY are based on Asbestos Protected Metal (APM) (patented).

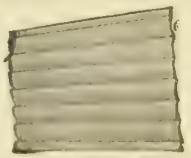
The steel sheets are coated on each side and over all edges with a prepared asphalt compound. The asphalt is protected by layers of pure long-fiber asbestos felt, specially hardened and waterproofed, applied while the asphalt is hot. The asphalt provides permanent protection to the metal against corrosive influences of moisture and fumes, and the asbestos protects the asphalt from mechanical abrasion, and prevents evaporation and carbonization of the natural life-preserving asphaltic oils.



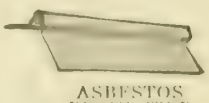
CORRUGATED SHEET



BEADED SHEET



CLAPBOARD SIDING



ASBESTOS PROTECTED METAL RIDGE CAPPING

While asphalt is impervious to moisture and corrosive fumes, it will deteriorate under the influences of sunlight and heat. The asbestos is opaque, and has high heat insulating properties. It entirely protects the asphalt from its most active enemies. Asbestos is absolutely inert, and cannot rot or decay. Moreover, it is unaffected by the elements.

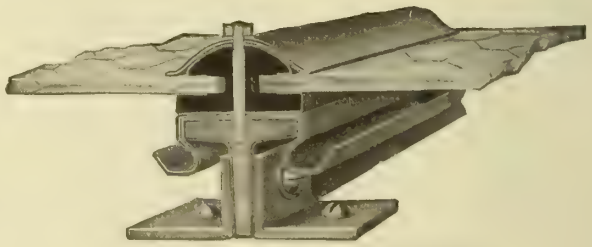
Asbestos Protected Metal is as easily applied as any metal sheet, and will last indefinitely without paint. The sheets are made in three colors: Asbestowhite, two shades of Gray and Terra Cotta, and in various forms such as corrugated sheets, beaded sheets, clapboard siding, flat sheets, ridge caps, flashings and trim, louvers, etc.

Prominent railroads, oil companies, public service corporations, chemical works, steel makers and coal operators have standardized it as the roofing and siding of all metal covered buildings. It is used in large quantities to cover mills, smelters, fertilizer factories, gas plants, car barns, chemical storage warehouses and glass works; also as a covering for runways, galleries, viaducts, etc. There is only one Asbestos Protected Metal. Its record of performance under the severest exposure is its recommendation.

CROSS-SECTION OF ASBESTOS PROTECTED METAL CORRUGATED FORM

"Waugh" Glazing Construction.

The "Waugh" Monitor, Sawtooth, Skylight, and other Steel Sashes employ Asbestos Protected Metal and its component materials to the fullest advantage. The resulting products have a thoroughness of detail, simplicity, endurance, etc., to a degree of perfection which has not been before attainable. The principal details of "Waugh" Skylight construction are clearly shown by the illustrations.



"WAUGH" GLAZING CONSTRUCTION

Advantages—The steel bars have ample *initial* stiffness to resist snow and wind loads without that deflection which inevitably results in glass breakage. That stiffness is preserved by hermetically sealing the steel bars so as to render them permanently corrosion-proof under any atmospheric condition. Condensation on barbeams is prevented, because they are completely insulated against outside cold. The cushions prevent any abutment against strain producing agencies, such as bolts. The cap fillers adhere to, rather than lie on the glass, making leakage impossible; no hollow spaces are left to invite condensation, ice formation, or corrosion. Condensation gutters, caps, aprons and flashings, being made of Asbestos Protected Metal, are permanent where even copper fails, and they cost less than copper.

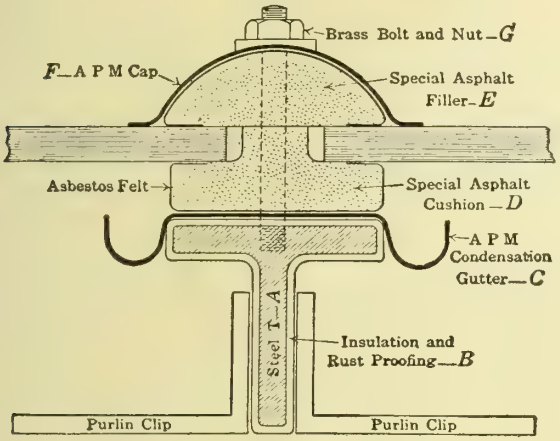
"Waugh" Glazing involves no charges for maintenance; requires no periodic painting; prevents glass

Continued on next page

breakage; is not affected by acids nor alkalis. It has smooth lines, and is therefore architecturally pleasing as well as structurally satisfactory.

"Waugh" Glazing Construction is in use on many important structures, such as the Boston Museum of Fine Arts, Picture Gallery Wing (17,000 square feet); Payne Whitney's Tennis Court Building, Manhasset, L. I.; several power-houses of the Public Service Corporation of New Jersey; Davison Chemical Company's plant; Southern Railway Company's shops; dyehouse of Stephen Sanford & Sons Company, Amsterdam, N. Y.; Viscose Company's silk mill buildings (using about eight miles of our rust-proof bars); Washington Avenue passenger station of Terminal Railroad Association, St. Louis. It has recently been adopted by the Pennsylvania Railroad, Bethlehem Steel Co., Buffalo Bolt Co., Firestone Tire and Rubber Co. and others.

Literature, standard or special detail drawings, estimates and suggestions are freely offered for consideration. Prices are moderate on large and exacting contracts, especially when "ultimate economy" is considered.



CROSS-SECTION OF "WAUGH" GLAZING CONSTRUCTION

A—Rolled Steel Bar Beam: stiff enough to carry load without deflection—the main cause of glass breakage.

B—Protective Coating: acid-, alkali-, and moisture-proof, heat- and fire-resisting; absolutely preserves steel beam from corrosion and loss of stiffness.

C—Asbestos Protected Metal Gutter: not a part of beam; collects condensation from glass; cannot corrode—never needs painting.

D—Asphaltic Glass Cushion: provides a non-absorbent, resilient, and insulating bed for glass; positively keeps glass from contact with hard substances, even bolts, and gives it a broad and continuous bearing; hence, avoids destructive strains.

E—Asphaltic Cap Filler: leaves no hollow spaces; follows contour of glass surface, and adheres to it, absolutely excluding water.

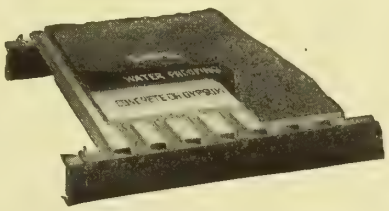
F—Cap: protects filler and distributes pressure evenly and continuously; spring tension locks cap nuts; of pleasing appearance, and does not cause snow and dirt to lodge.

G—Cap Bolt: clamps the glass between flexible cushion and filler, insuring permanently waterproof joints; supports cleaner's bridge planks without straining glass.

Note—In sawtooth and continuous monitor sash, the condensation gutter illustrated above (C) is omitted.

Asbestosteel.

Asbestosteel is a patented construction consisting of a combination of rectangularly corrugated APM sheets and concrete or gypsum. Where the load to be carried requires it, reinforcing rods are installed over the APM sheets, and great strength is thus obtained.



ASBESTOSTEEL SLAB ON CHANNEL PURLINS

Indicating locations of APM rectangular corrugated sheet, the concrete, reinforcing rods and waterproofing

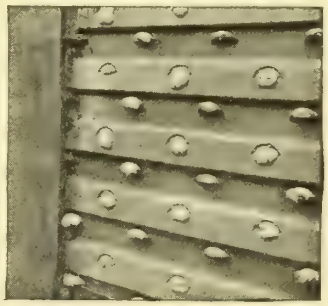
A leading engineer has referred to Asbestosteel as "the most efficient combination yet devised of steel and concrete for the construction of roofs and curtain walls," and says, "its advent makes possible, for the first time, absolutely permanent, light, moderate cost construction."

In roof construction the APM sheets are laid directly on the purlins and fastened by special self-punching clip-rivets. No wooden furring strips are necessary. This part of the operation can be more quickly and more easily executed than the erection of an ordinary corrugated steel roof. The sheets are furnished in lengths up to twelve feet. A purlin spacing of four feet is recommended. Spans up to ten feet may be used, although spans over five feet usually require temporary shoring during construction. Where reinforcing rods are required they are quickly and easily placed by means of special attachments furnished for the purpose.

The concrete or cement plaster can be laid on whenever it is convenient. This completes the Asbestosteel construction, on top of which any desired waterproof covering may be applied. The underside requires no back-plastering, as the Asbestos Protected Metal makes an attractive ceiling absolutely corrosion-proof.

Asbestosteel Walls.

For curtain or non-bearing walls the same rectangularly corrugated APM sheets are punched with crescent-shaped cuts. These sheets may be used as lath for either exterior or interior wall surfaces, and may be plastered on either or both sides. The vertically corrugated sheets may be erected without studs or girts. They are regularly made in lengths up to twelve feet. The horizontally punched sheets are carried in lengths up to ten feet.



ASBESTOSTEEL LATH, HORIZONTAL TYPE
Showing plaster locked in crescents

Asbestosteel Lath is the best material available for the construction of stucco walls. It is permanent and rust-proof. On account of its low conductivity, it keeps the building cool in summer and makes it easy to heat in winter. For walls or partitions, it is the strongest and most durable material for the price now on the market. It is easily erected, is highly fire-resistant, moisture-proof, and can be made to occupy a total thickness of but one and one half inches.

Asbestosteel Gutters.

An important adaptation of Asbestosteel is in the construction of gutters for any valley or sawtooth construction as shown in illustration.

ASBESTOSTEEL VALLEY GUTTER FINISHED, READY FOR WATERPROOFING

THE CARNAHAN TIN PLATE & SHEET CO.

Manufacturers of High-Grade Roofing Tin Plate

MAIN OFFICE AND MILLS

CANTON, OHIO

DISTRICT OFFICES

PHILADELPHIA, PA., 537 The Bourse
CHICAGO, ILL., 332 South Michigan Boulevard
ST. LOUIS, MO., 1100 Third National Bank Building
KANSAS CITY, MO., 114 West Third Street
SAN FRANCISCO, CAL., Wells Fargo Building
DETROIT, MICH., 555 Fort Street, West

Products.

Genuine Charcoal Iron Roofing-Plates, Open-Hearth Steel Base Terne Roofing-Plates, Bright Charcoal Tin Plate, Best and Regular Cole Tin Plate, High-Class Polished and Blued Sheets, Special Pickled and Cold-Rolled Black Sheets, Special Pickled and Annealed Enameling Stock, One Pass Cold-Rolled Black Sheets.

Genuine Charcoal Iron Roofing-Plates.

Made in 10-lbs. to 40-lbs. coating, inclusive, as follows:

McKinley, 40-lbs. coating; Garfield, 35 lbs. coating; Harrison, 30 lbs. coating; Lincoln, 25 lbs. coating; Cleveland, 20-lbs. coating; Grant, 15 lbs. coating; Washington, 10 lbs. coating; Mar Was, 10 lbs. seconds.

Basis consists of *Old Fashioned Genuine Charcoal Iron, which is smelted in a knobbling fire, and charcoal only used as fuel, the process being exactly the same as used in South Wales fifty years ago.*

Genuine Charcoal Iron Plates are finished in Old Style, Hand-made Process or Streaky, and Blue Oil.

The Blooms produced in these charcoal knobbling fires are hammered and re-hammered under large steam hammers, making the sheets from these blooms soft and of perfect working quality.

The sheets are tinned and re-tinned by hand only, in pure, genuine Logas Palm Oil, no acid whatever being used in this tinning process. Mixture used for tinning is 25 per cent pure tin and 75 per cent pure lead.

Every sheet is re-squared before tinning and stamped with brand and thickness as shown.

CARNAHAN'S
IC
CHARCOAL IRON
OLD STYLE
40LBS GRADE

TRADE-MARK

U. S. Government Specifications Plates.

Terne Plates for roofing purposes, made on genuine charcoal iron base, by the process mentioned. The base is guaranteed to contain a chemical analysis of not more than .03 per cent each of carbon, sulphur or manganese. Pure lead and tin coating, with not less than 25 per cent portion of tin. Total coating of 40 pounds to a box of 112 sheets, 20 by 28 inches. All plates are re-squared before coated.

IC
CARNAHAN'S
U.S.

TRADE MARK

Test.

Department of Commerce and Labor.
Bureau of Standards, Washington, D. C.

Report of chemical analysis of block plate, submitted by Carnahan Tin Plate & Sheet Company, Canton, Ohio.

Test No. 8414 Laboratory No. 6431

Size of Sheet 20 x 28 inches

Carbon	0.03 Per cent
Manganese	0.03
Silicon	0.024
Phosphorus	0.012
Sulphur	0.041

S. W. Stratton, Director

February 7, 1911.

Terne Roofing-Plates, Open-Hearth Base.

Terne Roofing-Plates, 8-lbs. coated to 40-lbs. coated, inclusive. Basis is of a special analysis open-hearth steel of high-grade working qualities and Bessemer steel. All plates are made on open-hearth base unless otherwise specified.

If specified, Terne Plates will be made on Copper-Bearing Base, Bessemer Base and Low-Carbon Steel Base.

Product is finished in Bright Dry, Blue Oil, Old Style and Streaky. All plates are very soft and are perfectly assorted. They are evenly coated and are full weight.

CARNAHAN'S
IC
OPEN HEARTH
40LBS.
STEEL TERNE PLATE

TRADE-MARK

Sizes.

Made in 14 by 20 inches and 20 by 28 inches, and in both IC and IX gauges; IC or No. 29-gauge weighing eight ounces to the square foot, and the IX or No. 27-gauge weighing ten ounces to the square foot.

Fire-Door Ternes.

Made in strict accordance with Underwriters' specifications.

Roofing Suggestions.

The sizes of tin plates commonly used are 14 by 20 inches and 20 by 28 inches, the latter size being most used; but for roofs with less than one third pitch the smaller sheets should preferably be used, as the greater number of seams stiffen the surface and help to prevent buckling.

Roofing is laid with flat seam or with a standing seam. In the former method the sheets of tin are

Continued on next page

locked into each other at the edges, the seam is flattened and fastened with tin cleats or is nailed firmly and soldered water-tight. Rosin is the best flux for soldering, although some tinners recommend the use of diluted chloride of zinc. For flat roofs, the tin should be locked and soldered at all joints, and should be secured by tin cleats, not by nails. For steep roofs, the tin is commonly put on with standing seams, not soldered, running with pitch of the roof and with cross seams double locked and soldered. One or two layers of tar paper should be placed underneath the tin.

Painting—In painting tin, all traces of grease and resin should be removed, benzine or gasoline being excellent for this purpose. A paint composed of ten pounds Venetian red and one pound red lead to one gallon of pure linseed oil is the best. The underside of sheets should be painted before laying. Tin roofs should be painted every two or three years. All eaves-troughs, down pipes and flashing should be of IX tin.

Number of Sheets Required to a Square.

For flat-seam roofing, a sheet of tin 14 by 20 inches, with ½-inch edges, measures when edged or folded 13 by 19 inches, or 247 square inches, consequently the number of sheets required to a square equals 14,400 ÷ 247, or 58½. To cover 1000 square feet requires 583 sheets. A box of 112 sheets 14 by 20 inches will cover approximately 192 square feet.

Sheets 20 by 28 inches measure when edged or folded 19 by 27 inches, or 513 square inches. To cover 1000 square feet (ten squares) requires 288 sheets.

The standing seams and locks on a steep roof require 2¾ inches off the width and ¾ inch off the length of the sheet. A sheet 20 by 28 inches with the seams on the narrow edges will cover 486 square inches, and with the seams on the long edges 470 square inches. The former requires 297 sheets to 1000 square feet and the latter 307 sheets.

Specification.

A Standard Tin-Roofing Specification for Architects' use is as follows:

Tin Roofing Work—All tin used shall be "Carnahan's Genuine Charcoal Iron Old Style [Terne Roofing-Plate, Open-Hearth Base, or U. S. Government Specifications Plate] 40-lbs. Grade" made by The Carnahan Tin Plate & Sheet Co., Canton, Ohio. No substitute for this brand will be allowed.

Use IC thickness for the roof proper, decks, etc., and IX thickness for valleys, gutters and spouts, as required by design.

One coat red lead, iron oxide, metallic brown or Venetian red paint, with pure linseed oil, shall be applied to the under side of the tin before laying.

Where Obtained.

Large stock of "Carnahan" Terne Roofing-Plate, Open-Hearth Base; Charcoal Iron Old Style Roofing-Plate; U. S. Government Specifications Plate, etc., are carried by Jobbers of Sheet Metals in all principal cities. Large stocks on hand at mill at all times to insure prompt delivery.

Samples.

For independent chemical analysis we will send, on application, a sample of the bar from which charcoal iron plate is rolled, or, if preferred, a full-size tinned sheet.

Information.

We have published for free distribution a booklet entitled "The True Story of Genuine Charcoal Iron Tin Plate," describing in plain language the full processes used by us in the manufacture of "Carnahan Charcoal Iron Old Style 40-lbs. Grade"—a really instructive description that every architect and builder should read.

References.

NAME	ADDRESS	NAME	ADDRESS
W. F. Potts, Son & Company, Inc.	Philadelphia, Pa.	H. R. De Milt Company	New York, N. Y.
Riter Brothers & Company	Philadelphia, Pa.	Empire Iron & Steel Company	Chicago, Ill.
L. D. Berger	Philadelphia, Pa.	Friedley-Voshardt Company	Chicago, Ill.
Fries, Beall & Sharp	Washington, D. C.	Wm. Frankforth Hardware Company	Milwaukee, Wis
C. H. Nelson Metal Company	Baltimore, Md.	Forderer Cornice Works	San Francisco, Cal.
Bruce & Cook	New York, N. Y.	Glockner & Blue	New York, N. Y.
Kahl-Holt Company	Baltimore, Md.	L. J. Heim & Company	Pittsburgh, Pa.
J. M. & L. A. Osborn Company	Cleveland, Ohio	Hall & Carpenter	Philadelphia, Pa.
Lockwood-Luetkemeyer-Henry Co.	Cleveland, Ohio	Hammond Sheet Metal Mfg. Co.	St. Louis, Mo.
George Worthington Company	Cleveland, Ohio	Harwi Hardware Company	Atchison, Kan.
Reeves Mfg. Company	Canal Dover, Ohio	T. H. Speddy & Company	San Francisco, Cal.
Garry Iron & Steel Company	Niles, Ohio	N. B. Handy Company	Lynchburg, Va.
Milwaukee Corrugating Company	Milwaukee, Wis.	Henkle & Joice Hardware Company	Lincoln, Neb.
Berger Mfg. Company	Canton, Ohio	W. C. Hopson & Company	Grand Rapids, Mich.
Eller Mfg. Company	Canton, Ohio	Janney, Semple, Hill & Company	Minneapolis, Minn.
Dowman-Dozier Mfg. Company	Atlanta, Ga.	Jones & Hopkins Mfg. Company	Nashville, Tenn.
Walter Tips Estate	Paris, Tex.	R. M. Kinney & Company	San Francisco, Cal.
Mobile Steel Company	Mobile, Ala.	Kelley-Howe-Thomson Company	Duluth, Minn.
Hoy & Company	Albany, N. Y.	Knight Marshall Hardware Company	Sedalia, Mo.
Republic Metalware Company	Buffalo, N. Y.	Lee Hardware Company	Salina, Kan.
J. A. Best & Company	Allentown, Pa.	R. J. Letcher & Sons	Jersey City, N. J.
Blodgett & Clapp Company	Hartford, Conn.	C. C. Lewis & Company	Springfield, Mass.
J. L. Lindsay, Inc.	Richmond, Va.	Conklin Tin Plate & Metal Company	Atlanta, Ga.
Gordon Metal Company	Richmond, Va.	Luthe Hardware Company	Des Moines, Iowa
Brown-Camp Hardware Company	Des Moines, Iowa	Merchant & Evans Company	Philadelphia, Pa.
H. S. Bettes Hardware Company	Paris, Tex.	C. S. Mersick & Company	New Haven, Conn.
Baldwin & Brown, Inc.	Richmond, Va.	M. C. Mitchell Company	Washington, D. C.
Carter, Donlevy & Company	Philadelphia, Pa.	Marshall Wells Hardware Company	Duluth, Minn.
E. A. Huenefeld Company	Cincinnati, Ohio	Messenger & Parks Mfg. Company	Aurora, Ill.
Lyon, Conklin & Company	Baltimore, Md.	Morley-Murphy Hardware Company	Greenbay, Wis.
Dickelman Mfg. Company	Forest, Ohio	Nash Hardware Company	Fort Worth, Tex.
Decatur Cornice & Roofing Company	New Decatur, Ala.	Berger Mfg Company	New York, N. Y.

FOLLANSBEE BROTHERS COMPANY

MANUFACTURERS OF

Hammered Open-Hearth Tin Plate and Sheets

GENERAL OFFICE AND WAREHOUSE

PITTSBURGH, PA.

MILLS
FOLLANSBEE, W. VA.

BRANCHES

NEW YORK, N. Y.
CHICAGO, ILL.
BUFFALO, N. Y.
KANSAS CITY, MO., Excelsior Heating Supply Co.
MILWAUKEE, WIS.
NASHVILLE, TENN.
ROCHESTER, N. Y.
DALLAS, TEX., Edwards Mfg. Co., Distributors
MEMPHIS, TENN.
INDIANAPOLIS, IND.
DETROIT, MICH.
LOUISVILLE, KY.
ST. LOUIS, MO., Stockhoff Supply Co.
WILMINGTON, N. C., J. W. Murchison Co.

PRODUCTS CARRIED IN STOCK BY LEADING TIN PLATE DEALERS IN ALL PRINCIPAL CITIES

Products.

"Scott's Extra Coated," "Follansbee Banfield Process" and "Old Reliable Redipped" Hammered Open-Hearth Roofing Tin; Fire-Door Standard Terne Plate; Bright Tin Plate; Galvanized and Black Sheets, in both Iron and Steel; Flat Sheets and Formed Roofing and Siding; Conductor Pipe; Eaves Trough; Ridge Roll; Keystone Ventilators; Metal Thresholds.

Roofing Tin.

"Scott's Extra Coated" and "Follansbee Banfield Process" Roofing Tin, our leading brands, have a base of hammered open-hearth material, the purest practical quality, a product of our own open-hearth works, made entirely by us, beginning with the selection of the pig iron through to the finished product. The refining of the raw materials as well as every other operation is under our daily supervision. Our metallurgists being in charge of our own open-hearth works and all of our metal tested at our own laboratories, we are always certain of the quality, and as it is made entirely at our own plant we completely control and maintain this high quality.

Follansbee Hammering Process.

Instead of merely rolling the metal, as is done by other makers, we first hammer the red-hot ingots into billets. The repeated blows of our immense hammer, striking with a force of 800 tons, welds to the greatest density every particle of the metal. It completely drives out the air or blow-holes, a physical defect remaining in other cast metal, such as ingots. The hammering removes from the surface the scale, resulting in a clean, pure metal with which the coating thoroughly amalgamates. The hammering makes the metal stronger, yet more pliable, consequently better in working and wearing qualities. The superiority of hammered or forged metal over cast metal is generally recognized.

"Scott's Extra Coated" Roofing Tin.

TRADE MARK SCOTT'S IC EXTRA COATED REGISTERED HAMMERED OPEN HEARTH

TRADE MARK SCOTT'S IX EXTRA COATED REGISTERED HAMMERED OPEN HEARTH

"Scott's Extra Coated" has been in use during the past thirty years. The coating is very rich in block tin, evenly applied to all parts of the sheets, and it carries about 20 per cent more coating than most plates stamped 40 pounds.

"Follansbee Banfield Process" Roofing Tin.

FOLLANSBEE BROS. CO. BANFIELD PROCESS IC PITTSBURGH 1914 HAMMERED OPEN HEARTH

BRAND MARK

With this plate we give a written guarantee that it will wear not less than fifteen years, or will be replaced at our expense.

Warranty—The warranty given with "Follansbee Banfield Process" Hammered Open-Hearth Roofing Tin over our official signature is as follows:

FOLLANSBEE BROS. CO. BANFIELD PROCESS IX PITTSBURGH 1914 HAMMERED OPEN HEARTH

BRAND MARK

"We guarantee 'Follansbee Banfield Process' Roofing Tin, painted with pure linseed oil and Venetian red iron oxide, soldered with rosin, will wear on roofs, gutters and valleys for not less than fifteen years, or will be replaced at our expense.

(Signed) Follansbee Brothers Company."

In case of failure within fifteen years, we not only supply the tin plate, but pay the entire cost of applying it to the roof. Replacements, if necessary, are assured by the "Follansbee Banfield Process" Guarantee Reserve Fund.

No such protection can be secured upon other roofing of any kind.

"Old Reliable Redipped" Roofing Tin.

FOLLANSBEE OLD RELIABLE IC RE-DIPPED HAMMERED OPEN HEARTH

BRAND MARK

This plate, also, has a base of hammered open-hearth. It is manufactured entirely at our own mill, and is well known since first produced many years ago. While being lighter in coating than "Scott's Extra Coated," it compares favorably with the best 40-pound coated plates of other makers and jobbers, and in addition it has the hammered open-hearth base.

HAMMER WITH AN 800-TON BLOW

The repeated 800-ton blows of this immense hammer upon the red-hot ingots welds together every particle of the metal, making it stronger and more pliable, and producing the only Hammered Open Hearth Tin Plate in America

Continued on next page

Fire-Door Standard Terne Plate.

This plate is made in accordance with the Fire Insurance Underwriters' Specifications. Our certificate as to the quality is placed in each box. The trade-mark, "Follansbee Brothers Company, Pittsburgh, Fire-Door Standard IC," is embossed on each sheet.

Roofing, Siding, etc.

Full information regarding iron and steel roofing and siding, galvanized or painted, conductor pipe, eaves trough, and ridge roll given in catalogue, sent on request.

Catalogues.

"Tin Truth," "Scott's Extra Coated" Roofing Book, Follansbee Catalogue, with tin plate sample hangers; also, the Follansbee Estimate Book and Cost Record for architects—all sent free, prepaid, on request.

Stock Sizes.

Roofing tin 20- by 28-inch and 14- by 20-inch stock sizes, IC and IX weights.

Standard Tin Roofing Specifications.

All tin used for roofing all parts of this building shall be "Scott's Extra Coated" IC, except valleys and gutters, which shall be IX. Each sheet embossed with brand name and gauge. No substitute for the above brand will be allowed.

All tin shall be laid on selected waterproof paper (tar paper and other qualities containing acids prohibited). No nails shall be driven through the sheets. All solder used shall be strictly half and half. Rosin only shall be used as a flux for soldering and all rosin must be removed from seams before painting.

All tin shall be painted one coat on under side and two coats on upper side with Venetian Red oxide of iron paint ground and mixed in pure boiled linseed oil. Lower coat to be applied in the shop and thoroughly dry before sheets are laid. First upper coat applied immediately after roof is completed, second coat three days later. All painting shall be done with a hand brush and well rubbed in, and shall be part of the roofing contract.

The roofers should wear rubber shoes, and no unnecessary walking over the roof or using the same for storage of other material will be allowed. All workmanship guaranteed for one year.

When pitch of roof is 3 inches or less to the foot it is to be laid Flat Lock (see diagrams) 14 x 20 inch sheets, each sheet carefully notched and edged, edges ½-inch. Sheets are to be laid on roof one sheet at a time, the narrow way. Each sheet is to be secured to sheathing with three cleats, two on the long side, one on the short side; cleats to be one and one half inches wide and carefully hooked over one half inch edge and nailed to sheathing with two one-inch roofing nails to each cleat. The seams are to be thoroughly and smoothly hammered down with wooden mallet and carefully soldered with large coppers, using not less than six pounds of solder to each square of roofing.

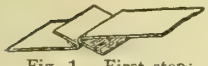


Fig. 1. First step; edges turned over

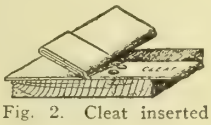


Fig. 2. Cleat inserted

Fig. 3. End of cleat turned over nail-heads

Fig. 4. Adjoining sheet in position

Fig. 5. Flat seam finished, showing cleat

FIGS. 1 TO 5. DETAILS OF FLAT-SEAM ROOFING

When pitch of roof is over three inches to the foot it is to be laid Standing Seam (see diagrams) 20 x 28 inch sheets, courses applied the narrow way, the 20-inch ends to be locked with ½-inch seams and carefully soldered. The 20-inch courses are to be locked with double Standing Seam and secured to sheathing with cleats every eight inches, using two 1-inch roofing nails to each cleat. The edges for Standing Seam shall be turned up one and one quarter inches and one and one half inches, the Standing Seam to be one inch high when complete.

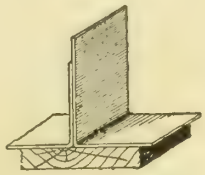


Fig. 6. Adjoining edges turned up

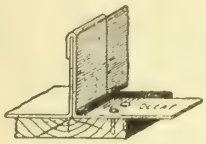


Fig. 7. Cleat inserted

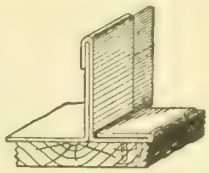


Fig. 8. End of cleat turned over nail-heads

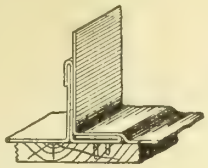


Fig. 9. Adjoining sheet in position

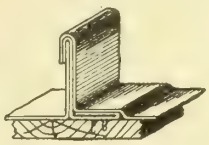


Fig. 10. First step in forming lock; top of sheet turned over

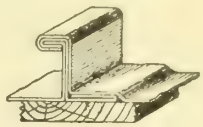


Fig. 11. Second step, showing seam turned half over

FIGS. 6 TO 12. DETAILS OF STANDING SEAM ROOFING

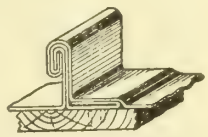


Fig. 12. Standing seam finished, showing cleat

All valleys and gutters shall be applied Flat Lock, sheets laid the narrow way, and a sufficient pitch to prevent any water standing therein.

Flashings—Tin to be turned up 6 inches at chimneys and fire walls and to be cap flashed 4 inches, cap flashings to extend into brick work one inch and to be firmly wedged in with wedges not over 15 inches apart. Fill openings in brick work with Portland cement.

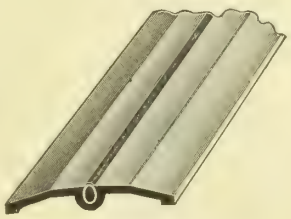
Painting—See third paragraph of these specifications.

Metal Thresholds.

These are made of solid drawn brass, polished or brush finished. Samples sent on request.

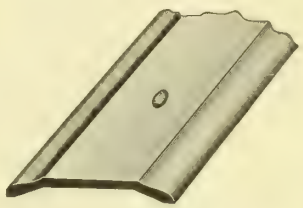
Air-Tight Design—The Rubber Tubing inserted forms the air-tight feature, and conceals fastenings. It can be moved freely in space provided and can be removed or replaced when desired.

Plain Design—Supplied, drilled with countersunk holes, in lengths up to 12 feet.



AIR-TIGHT DESIGN

No. 1, 4" wide, ⅝" high, ½" tubing
No. 2, 5" wide, ¾" high, ⅝" tubing



PLAIN DESIGN

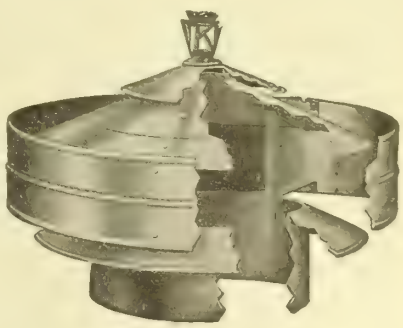
No. 3, 4¼" wide, ½" high
No. 4, 5" wide, 9/16" high
No. 5, 6" wide, ½" high

Keystone Ventilator.

The Keystone is thoroughly practical and most substantial in construction. It has no movable parts that need attention and will work under all conditions.

Manufactured of copper, brass, or galvanized material in sizes from 5 to 72 inches. Supplied with dampers when required.

Write for blue-prints and prices.



KEYSTONE VENTILATOR

MEURER BROS. CO.

Manufacturers of Roofing Specialties

TELEPHONE, WILLIAMSBURG 1567

567-577 Flushing Avenue
BROOKLYN, N. Y.

WORKS
BROOKLYN, N. Y.
LONG ISLAND CITY, N. Y.

AGENCIES AND STOCKS
NEW YORK, N. Y. LOS ANGELES, CAL. DALLAS, TEX.

PACIFIC COAST MANAGER, A. H. McDONALD, 628-30 Third Street, SAN FRANCISCO, CAL.

Products.

Manufacturers of High-Grade Brands of ROOFING TIN; "MEURER FIRE-DOOR TERNES"; METAL SPANISH ROOFING TILE, METAL MISSION TILE, METAL SLATES, METAL SHINGLES; HIP and RIDGE ROLLS; and ANCHOR VENTILATORS.

Sole importers of "MEURER'S" GENUINE TINNED IRON SHEETS.

"Meurer's" Genuine Tinned Iron Sheets (Imported).

"Meurer's" Genuine Tinned Iron Sheets are a heavily coated plate on a base of pure re-hammered charcoal iron, manufactured in Wales and furnished the trade in original boxes. They are coated with palm oil, by hand, in old-style open pots. Only prime plates come to this country.

These plates have been in use over twenty years on private, public and government buildings throughout the United States and we have never had a complaint. With care they will last a lifetime.

FIG. 1. HIGH-GRADE BRANDS OF ROOFING TIN

Domestic Manufacture.

Our steel base plates are all coated on a base of high-grade puddled steel and are well known for their lasting qualities.

Meurer Old Method.

Meurer Old Method, as its name denotes, is a hand-dipped, palm-oil plate made in old-style open pots. Carries 40 pounds of rich coating and is the best plate made.

Meurer Roofing.

Meurer Roofing is made the same way as Old Method, except it is dry finished and has a large, handsome mottle. Carries 40 pounds of coating and differs only from Old Method in the finish.

Flushing.

Flushing is a dry-coated plate very rich in tin; has a small, beautiful mottle; carries 25 pounds of coating and is one of the best plates made of medium grade.

Pullman.

Pullman is an oil-finished plate; carries 20 pounds of coating. One of the best for cheap work.

California.

California is a handsome mottled plate made expressly for Western Coast trade. Carries 15 pounds of coating and is very popular.

"Meurer Fire-Door Ternes."

"Meurer Fire-Door Ternes," IC, for fire-doors and shutters, are made under exact specification of the National Board of Fire Underwriters. Terne plates, 14 by 20, stamped with brand and thickness.

Anchor Ventilators.

As an automatic ventilator the Anchor (Fig. 2) stands alone. It is the only ventilator that works at the low wind velocity of 1¼ miles an hour. Its exhaust capacity is very great. This, added to the fact that from its peculiar construction it is absolutely storm-proof, renders it the most perfect of all ventilators. Made with glass tops it combines the advantages of skylight and ventilator. Made principally in galvanized iron and copper.

Send for our book on "Automatic Ventilation and Tests." It is free.

FIG. 2. ANCHOR VENTILATOR, METAL TOP

Continued on next page

Metal Spanish Roofing Tile, Tiffany Design.

Meurer's Metal Roofing Tile (Fig. 3) produces that most desirable of all architectural effects, viz., lights and shadows, as is demonstrated in the picture (Fig. 4). The nose is square, thereby casting a deep shadow. Round off or bevel the nose and you lose the shadow. The end is recessed, thereby producing a deep shadow, and giving a clean, sharp, clear-cut eave line.

This starting tile, designed by the late Stanford White for the Tiffany building, is the only one of its kind made and is patented.

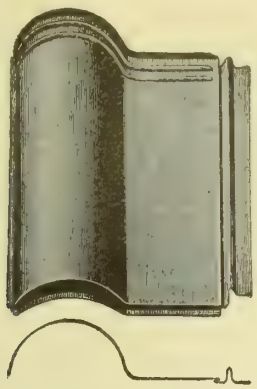


FIG. 3. METAL SPANISH TILE, SHOWING HIGH-WALL SIDE-LOCK

Metal Mission Tile.

Our new Metal Mission Tile (Fig. 5) is a perfect reproduction of the old California Clay Mission Tile and was designed especially for mission buildings. It is bold and handsome and the only one of its kind made. The starting tile is also recessed, giving the same clear-cut sharp eave line and light and shadow effect as our Tiffany starter.

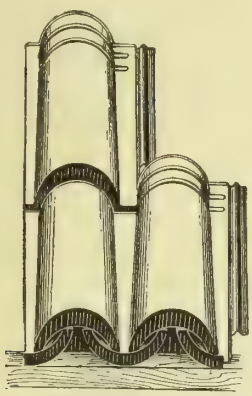


FIG. 5. METAL MISSION TILE

Side-Lock, Material and Application.

Our tiles all have our patent high-wall side-lock, making it impossible for them to leak. Made in tin painted, tin galvanized, zinc and copper. Our shingles and tiles are as easily put on as wood shingles or slate and require no soldering except at valleys.

Hip and Ridge Covering.

Suitable finials, hip and ridge rolls are made for our shingles and tiles.

Unique Metal Slates.

Unique Metal Slates (Fig. 6) are different from the ordinary metal shingles in that they do not break joints. The lines are all straight, giving the appearance on the roof of ribs. Having our patented high-wall side-lock they never leak even on a low pitch. Made in tin painted, tin galvanized, zinc and copper. The galvanized are stamped out of terne plates, then galvanized, thus insuring no scaled edges to rust out.

FIG. 6. UNIQUE SLATES

Specification.

When in want of the best goods of their class specify any of the above, not forgetting the word "Meurer," and insist on getting them.

FIG. 4. PACIFIC TELEPHONE AND TELEGRAPH BUILDING, CHINATOWN EXCHANGE, SAN FRANCISCO, CAL.

NATIONAL SHEET METAL ROOFING CO.

Metal Shingles and Tiles

339 to 345 Grand Street

JERSEY CITY, N. J.

TELEPHONE, Jersey City 485

Products.

Sole manufacturers of Walter's and Cooper's Metal Shingles and Tiles in Pure Copper, Painted or Galvanized Tin.

Materials.

We use the recognized standard material "I. C. Prime Full Weight Roofing Tin," weighing 214 pounds per box of 112 sheets, each 20 x 28 inches in size, its use guaranteeing long wear. We also use 12, 14 and 16 ounce copper when desired.

Each individual shingle is stamped out of this best material without a flaw, and then hand-dipped in hot molten zinc or painted, unless it be of copper, which needs no coating. This puts so heavy a coat over the original iron or tin that this base is never exposed to rust.

Advantages.

A roofing ready to be applied and requiring no skilled labor to do so; no soldering pots, mallets, seamers or tongs, and in which the expansion and contraction are provided for in each individual shingle; storm and wind proof.

A roof so perfectly ventilated that rust will not occur on the under side, having one sixth the weight of slate, one fourth that of wood and requiring lighter framework. Will last longer without repair than slate or wood.

A roof that is fireproof—accepted by all fire insurance companies at a less rate. Strong, durable, ornamental; cannot rattle; inexpensive and beautiful. The metal formed into any desired shape to meet special requirements.

Designs.

We manufacture nine forms and designs of shingles and tiles, some examples of which are shown here. We also furnish gable finish moulds, wall flashing, eave beads, valleys, ridge terminals, finials, snow guards, etc., to complete the roof mechanically and artistically.

The Spanish Tile—One of our best forms of roofing—are given an extra heavy coating of zinc and will stand for years without painting and show no signs of rust.

Expansion Locks.

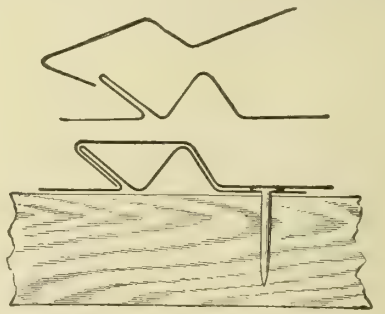
Walter's Patent Expansion Lock is termed a covered or protected lock. It is of simple construction and represents the easiest and most secure manner of locking metal shingles and tiles together. At no time can any moisture enter any portion of it.

The improved Cooper's Lock is formed in such a manner as to stand above the level or flat surface of the shingle. Hooks are turned over in a circle with a corrugation to the right, forming a concealed gutter and affording a double protection; making it impossible for rain or snow or any moisture to penetrate beneath it.

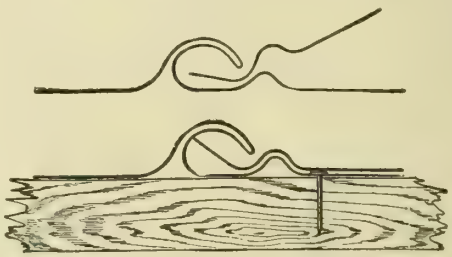
Construction of both of these locks not only allows full expansion of the metal shingle, but full circulation of air between shingles and wooden sheathing.

Guarantee.

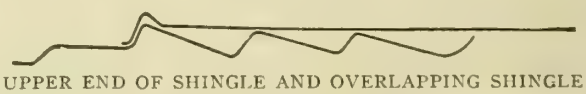
All our products are guaranteed to be of quality and construction represented, and a copy of said guarantee is enclosed with each square of goods. Customers are at liberty to return to us, at our expense, any goods found not to be as represented, and have their money refunded.



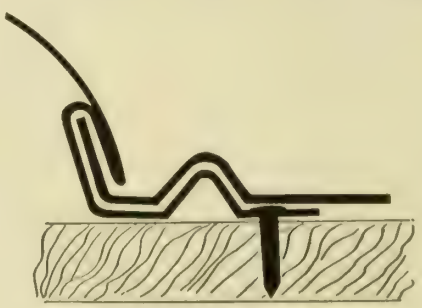
WALTER'S PATENT EXPANSION JOINT
Full-sized sections



COOPER'S PATENT EXPANSION JOINT
Full-sized sections

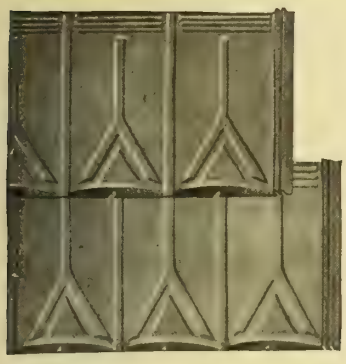


UPPER END OF SHINGLE AND OVERLAPPING SHINGLE
Full-sized sectional view
Note four raised corrugations and close fitting of overlapping shingles

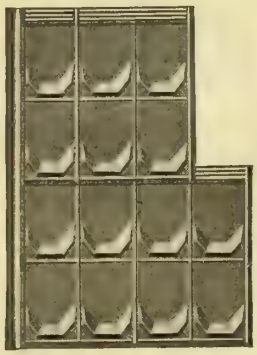


LOCK USED ON SPANISH TILE
High point of lock extends higher than on any other Spanish Tile; it stands above top side of tile. No water can possibly enter

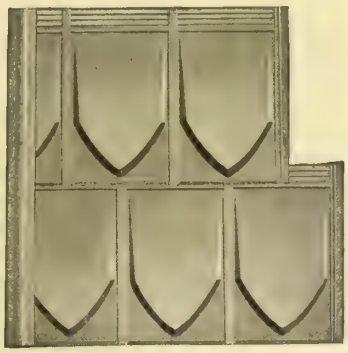
Continued on next page



WALTER'S STANDARD SHINGLE



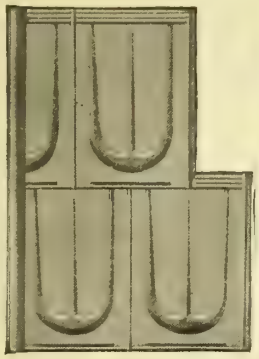
COOPER'S ACME SHINGLE



WALTER'S EXCELSIOR TILE

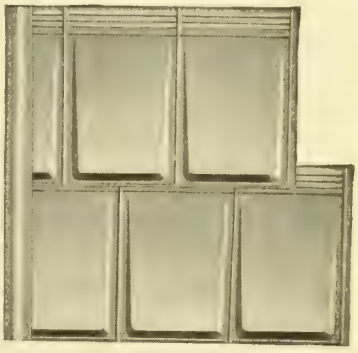
WALTER'S OCTAGON TILE

COOPER'S JERSEY SHINGLE

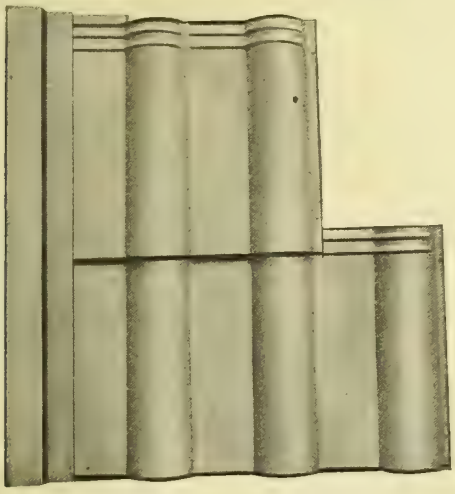


COOPER'S HUDSON SHINGLE

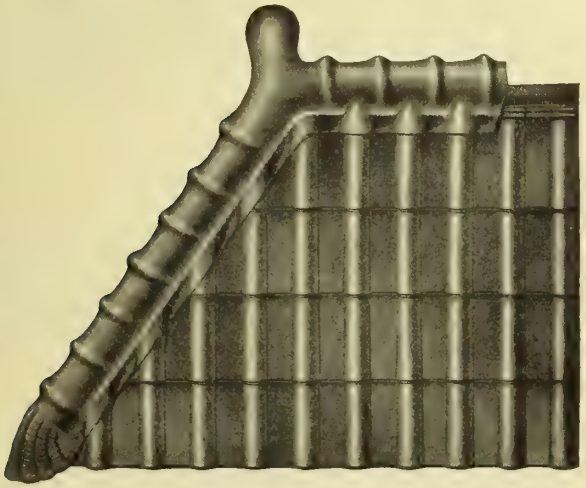
COOPER'S DIAMOND SHINGLE



COOPER'S CORINTHIAN SHINGLE



COOPER'S SPANISH TILE



EXAMPLE OF METAL SPANISH TILE ROOF WITH RIDGE AND HIP FINISH

PRICE-LIST OF SHINGLES, TILES AND TRIMMINGS

	Painted Tin	Galvanized Tin
Walter's Standard Shingles, 7 x 10 in., per square	$6.00	$7.50
Walter's Standard Shingles, 10 x 14 in., per square	5.50	6.87
Walter's Standard Shingles, 14 x 20 in., per square	5.25	6.25
Walter's Excelsior Tile, 7 x 10 in., per square...	6.25	8.00
Walter's Excelsior Tile, 10 x 14 in., per square...	5.75	7.25
Walter's Octagon Tile, 7 x 10 in., per square.....	6.25	8.00
Walter's Octagon Tile, 10 x 14 in., per square.....	5.75	7.25
Cooper's Diamond Shingle, 10 x 14, per square..	5.15	6.40
Cooper's Corinthian Shingle, 10 x 14, per square	5.15	6.40
Cooper's Jersey Shingle, 10 x 14, per square.....	5.15	6.40
Cooper's Acme Shingle, 14 x 20, per square.....	4.90	5.85
Cooper's Hudson Shingle, 14 x 20, per square....	4.90	5.85
Plain Hip, per foot	.06	.08
Roll Hip, per foot	.08	.10
Gothic Hip, per foot	.08	.10
Wall Flashing, per foot	.07	.08
Climax Ridge Coping, per foot	.11	.13
Plain Ridge Coping, per foot	.08	.10
Gable End Finish, per foot	.03	.04
Valley, 14 inch, per foot	.08	.10
Valley, 20 inch, per foot	.11	.13
Eave Bead, per foot	.03	.04
Cooper's Spanish Tile, per square	8.00	10.00
Large Ridge No. 1, per foot	.17	.20
Large Hip No. 2, per foot	.17	.20
Large Finial No. 3	3.35	3.35
Large Finial No. 4	3.35	3.35
Large Finial No. 5	3.35	3.35
Large Hip Starters No. 6	.80	.80
Small Ridge No. 7, per foot	.15	.17
Small Hip No. 8, per foot	.15	.17
Small Finial No. 11	3.35	3.35
Small Finial No. 12	3.35	3.35
Small Finial No. 13	3.35	3.35
Small Hip Starters No. 14	.80	.80
Wall Flashing No. 9, per foot	.16	.20
Crown Mould No. 10, per foot	.15	.17
Valley, 20-in. girt, per foot	.11	.13
Gable Finish No. 15, per foot	.10	.10

Eave Starting Tile, 3 cents per lineal foot extra, net.

Price on Copper Tile furnished on application.

Tiles and Shingles packed in boxes, each containing sufficient quantity of material to cover one hundred square feet after being laid on roof according to our directions.

POWELL EVANS, PRESIDENT

MERCHANT & EVANS CO.

OFFICES
AND WAREHOUSES
PHILADELPHIA
NEW YORK
BALTIMORE
WHEELING
CLEVELAND
CHICAGO
KANSAS CITY

ESTABLISHED 50 YEARS
(1866-1916)

MANUFACTURERS OF
Metal Roofing Products

PHILADELPHIA, PA.

WORKS
PHILADELPHIA
WHEELING
CHICAGO

Products.

MERCHANT & EVANS CO. HIGH-GRADE ROOFING and BRIGHT PLATES; SHINGLES, made from Galvanized Terne Plate or Copper; GALVANIZED TILES, made from Galvanized Terne Plate or Copper—many Designs. SOLDER, LEAD, ZINC, BRASS, BRONZE and COPPER; IRON and STEEL of every sort.

For Fire-Doors and Ventilators, see our name in General Index.

Merchant & Evans Co. Tin and Terne Plate.

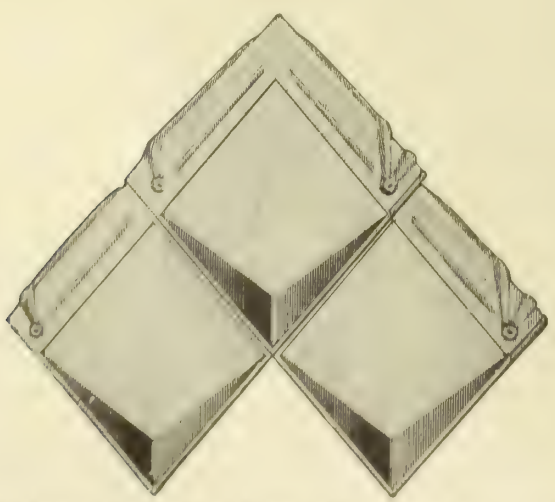
This Company's Works at Wheeling (Warwood) specialize in high-grade plates for building purposes, and for use in the arts; producing the whole range of special sizes, weights and coatings, to meet the most exacting requirements. We rigidly conform to all representations as to quality of both Tin and Terne Plates. Three of its numerous brands of Terne Plate stand out prominently for use in building construction.

(1) *"Merchant's Old Method"* — (Twenty-five years' service) one of the best known, hand-made, heavy, high-grade roofing tins in the world.

(2) *"Franklin Old Style"*—Equal to any of the usual heavy weight plates sold throughout the country.

(3) *"Camaret"*—More than 1,000,000 square feet of this well-known Terne Plate are in use on mills and factories.

In specifying Roofing Tin, require Merchant & Evans Co. [specify grade]—using IC thickness for roofing and flashing; and IX thickness for gutters and valleys.



TYPICAL MERCHANT & EVANS CO. GOTHIC SHINGLES

Merchant & Evans Co. Metal Shingles.

Made of sheet metal in accord with scientific principles. These are in wide use on every form of buildings for siding and gables, as well as roof. They are fire-resistant, stormproof and ornamental. In first cost, lightness and endurance they are superior to slate, asbestos or wood shingles. They require no soldering, are laid with side lock having a large overlap, and do not leak. The galvanized shingle is produced from Terne Plate redipped after forming, thus giving double protection, which does not crack or scale. Many designs.

Merchant & Evans Co. Metal Spanish Tiles (Copper or Steel).

These are made of sheet metal, in the form of the usual clay product, with none of its disadvantages, such as weight, cracking, etc. They are fire-resistant, absolutely stormproof, easily adjusted, durable and ornamental. Graduated tiles are supplied for domes, towers and all conical surfaces.

MERCHANT & EVANS CO. SPANISH TILES

Sizes: 7 by 10 inches; 10 by 14 inches; 14 by 20 inches and graduated sizes. Tin, painted; copper; or galvanized-terne

Steel, Iron, Brass, Bronze and Copper Products.

MERCHANT & EVANS CO. also supply metal products of every character for building purposes, such as sheet iron, steel, brass, bronze, copper, lead and zinc in every form, also metal roofing, siding and ceiling, and a complete line of roofer's and tinner's supplies.

Catalogues and Prices.

Send for illustrated catalogue and prices. Millions of square feet of our products are in use throughout the United States and all over the world.

MILWAUKEE CORRUGATING CO.

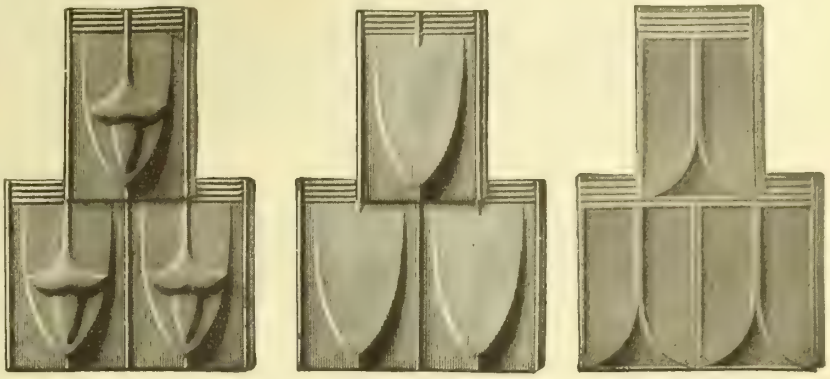
MILWAUKEE, WIS.

BRANCH AT KANSAS CITY, MO.

Products.

Manufacturers of "Titelock" Metal Shingles and "Titelock" Spanish Tile; Copperoid Metal Sheets.

Also, Crimp Edge Gutter, Interlock Conductor Pipe, Milwaukee One-piece Elbows and Shoes, One-piece Miters, Ends and Drops, Kuehn's Korrekt Kut-Offs, Steel and Wire Hangers, Steel Roofing and Siding, Metal Building Corners, Metal Lath and Metal Corner Bead.



Style "A" Style "B" Style "C"

"TITELOCK" METAL SHINGLES

Quality, Designs and Advantages.

"Titelock" Metal Shingles and Spanish Tile are made from the best full-weight open-hearth terne plates. The designs, as the illustrations will show, are artistic, durable, and neat in appearance. They are perfect protection against fire and lightning, are absolutely water-tight, and will give thirty or more years' service at a nominal cost.

COPPEROID METAL
TRADE-MARK

Embossing.

The nature of embossing embodies features exclusively original and not obtainable in any other shingles. The crimps or narrow corrugations formed lengthwise of the plates produce the highest degree of rigidity and strength, and prevent buckling of the plates, at the same time providing perfectly for the natural expansion and contraction of the metal.

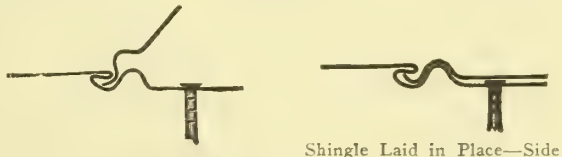
Galvanizing.

Galvanized shingles are galvanized after they are formed; therefore all parts, crevices, and edges are thoroughly covered by immersion in the hot metal, insuring absolute proof against rust formation.

For galvanizing we use only prime spelter which makes the heaviest coating.

Painting.

Painted shingles are treated to a coat of iron oxide paint mixed with pure boiled linseed oil, by a dipping process which thoroughly covers all parts, including the lock and edges.



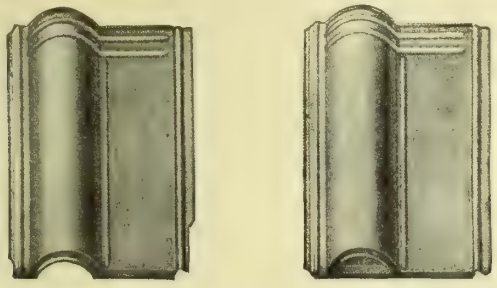
Laying Shingle—Side View Shingle Laid in Place—Side View

"TITELOCK" SIDE-LOCK

Side-Lock.

The side-lock is so formed that the matching beads are absolutely straight and true to size. The outer flange is pressed to such an angle that, after it is inserted in the recess of the adjoining shingle, the act of laying the shingle springs it into a perfectly tight contact at both the top and bottom with the beads positively nested.

The nailing flange being covered by the inserted shingle, the nails are underneath and not exposed.



Roof Tile Starter Tile

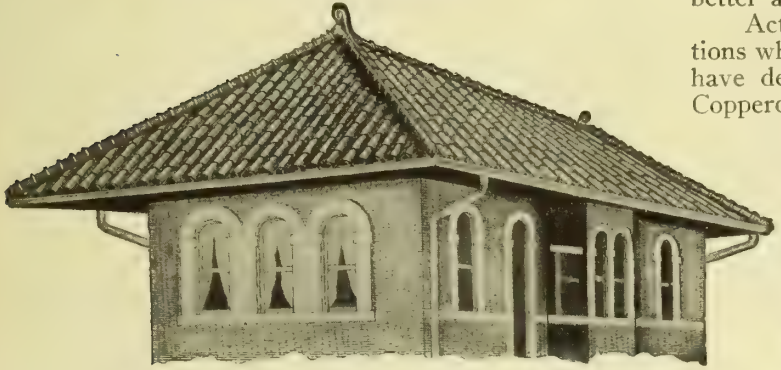
"TITELOCK" SPANISH TILE

Copperoid Metal.

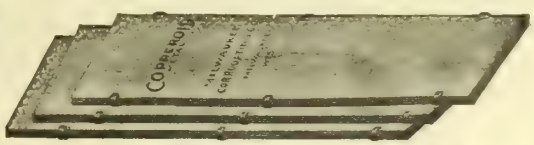
Copperoid Metal Sheets contain approximately .25 per cent copper; are rust-resisting, and will give better and longer service.

Actual tests made in coke regions, and other locations where conditions are especially injurious to metal, have demonstrated the superior wearing qualities of Copperoid Metal.

Especially recommended for cornices, skylights, and other special work where extra quality is desired.



BUILDING COVERED WITH "TITELOCK" SPANISH TILE



COPPEROID METAL SHEETS

THE STARK ROLLING MILL COMPANY

MANUFACTURERS OF

Toncan Metal, Rust- and Corrosion-Resisting Sheets, Roofing, Siding and Accessories

MILL AND MAIN OFFICE

CANTON, OHIO

Products.

Toncan Metal Black and Galvanized Rust-Resisting, Anti-Corrosive Sheets for Roofing, Siding, Cornice, Eaves Trough, Conductor Pipe, Lath, Shingles, Window Frames, Blower Systems, Ventilators, Skylights, Reinforcing, Tanks, Refrigerators and all other Purposes where durable Sheet Metal is needed.

Toncan Metal.

Toncan Metal is a pure, homogeneous and scientifically made sheet metal, from iron ore, possessing rust- and corrosion-resisting properties hitherto considered impossible in an iron ore product.

Durability and Economy.

There is no more durable sheet metal made from iron ore than Toncan Metal. Years of service under the most trying conditions have proved far beyond all possible doubt the true value of Toncan Metal and its wonderful ability to combat corrosion.

Toncan Metal costs less than so-called modern charcoal irons, and not much more than steel. Its moderate first cost, and its greatly increased lasting qualities, make it far more economical than either.

Adaptability.

The roofing, siding, eaves trough, conductor pipe, cornice, ventilators, skylights, shingles, expanded lath, reinforcing, window frames, blower system, air ducts, water-tanks and refrigerators can all be made from Toncan Metal sheets, and greatly increased service is procured. The maintenance cost can be reduced to a minimum, if Toncan Metal is used, regardless of whether the structure is a factory, office building, residence, church, school, garage, farm building or barn.

Fire- and Lightning-Proof.

Toncan Metal is absolutely fireproof, consequently takes a low fire insurance rate; and a building can be made lightning-proof by simply running the Toncan Metal conductor pipe from the Toncan Metal roof into the ground.

The Real Test—Actual Service.

On the buildings shown below, and many thousand more, Toncan Metal is in actual use, and is proving its extreme durability.

The discriminating architect or engineer is spared the trouble of exhaustive investigation by this evidence of Toncan Metal in actual service.

Source of Supply.

Jobbers everywhere sell Toncan Metal products.

Identification.

This trade-mark identifies every sheet of genuine Toncan Metal; and on formed products, the maker's name also appears.

TONCAN METAL

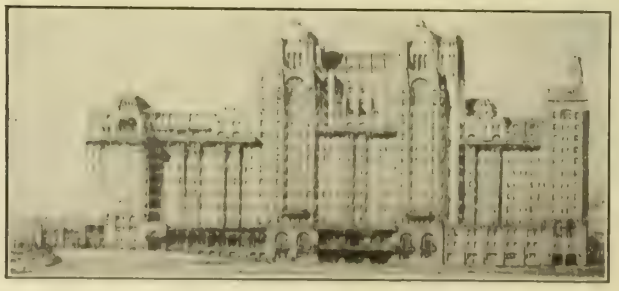
TRADE-MARK

TONCAN METAL

MAKERS NAME

TRADE-MARK

CITY HALL, DALLAS, TEXAS
C. D. Hill & Co., Architects, Dallas, Texas
8,500 square yards Toncan Metal Lath used

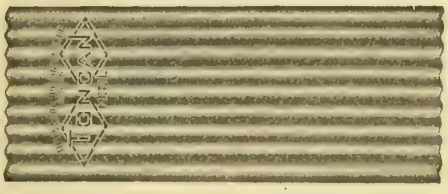


HOTEL TRAYMORE, ATLANTIC CITY, N. J.
Price & McLanahan, Architects, Philadelphia, Pa.
All Window Frames made of Toncan Metal Sheets

Continued on next page

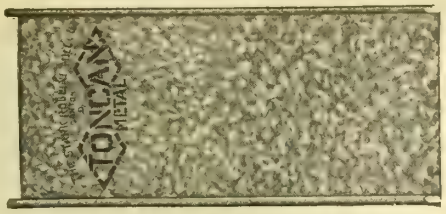
Roofing.

For roofing and siding. Gauges, Nos. 10 to 28, inclusive. All standard sizes.



CORRUGATED ROOFING

Covering width 24 inches. Gauges, Nos. 20 to 28, inclusive; 5- to 12-foot lengths.



PRESSED STANDING SEAM ROOFING

Covering width 24 inches. Gauges, Nos. 16 to 28, inclusive; 5- to 12-foot lengths.

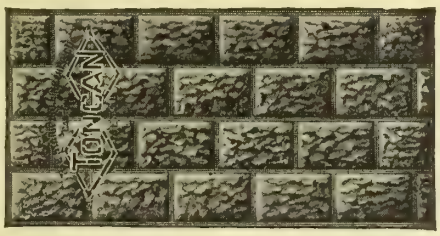
V-CRIMPED ROOFING

Covering width 24 inches. Each roll contains 100 square feet.

ROLL ROOFING, ALL STYLES

Siding.

Sheets 28 by 60 inches. Gauges, Nos. 24 to 28, inclusive.

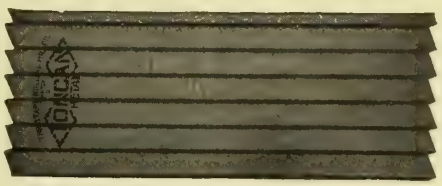


IMITATION ROCK FACED STONE SIDING

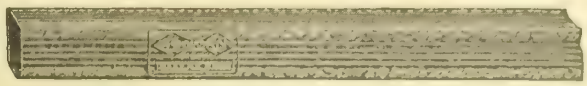
Sheets 28 by 60 inches. Gauges, Nos. 24 to 28, inclusive.

IMITATION BRICK FACED SIDING

Covering width 24 inches. Lengths 5 to 10 feet inclusive.

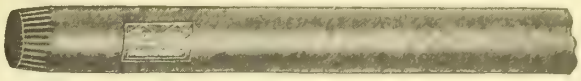


IMITATION WEATHER BOARD SIDING

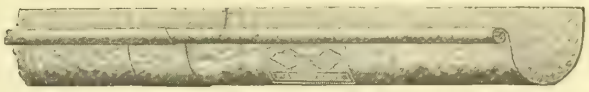


SQUARE CORRUGATED CONDUCTOR PIPE

ROUND CORRUGATED CONDUCTOR PIPE



PLAIN ROUND CONDUCTOR PIPE



TONCAN METAL EAVES TROUGH

TONCAN METAL CONDUCTOR PIPE ELBOWS
All Sizes and Angles are Procurable

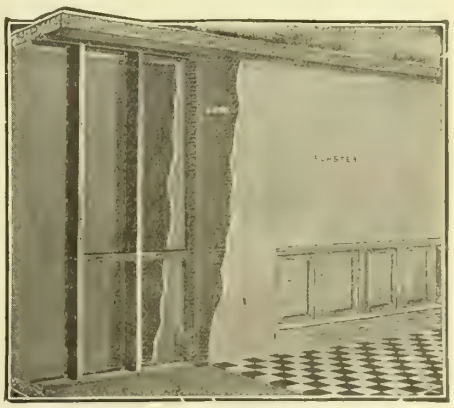
Shingles.

Toncan Metal shingles meet the demand for ornamental and durable roof covering suitable for residences, churches, schools, garages and similar buildings. The style shown is only one of many.

TONCAN METAL SHINGLE

Expanded Lath.

Toncan Metal lath is fireproof, crackproof, insectproof; is easily applied; has maximum strength with minimum weight and economizes space. It is designed to combat the severe corrosive influences constantly present in certain kinds of plaster.



APPLICATION TONCAN METAL EXPANDED LATH

N. & G. TAYLOR COMPANY

Manufacturers of Tin Plate of All Kinds

ESTABLISHED 1810
107TH YEAR

GENERAL OFFICES
Chestnut and Third Streets
PHILADELPHIA, PA.

WORKS
CUMBERLAND, MD.

Products.

"Target and Arrow" Brand of Roofing Tin, formerly known as "Taylor's Old Style"; "Taylor's Special 40-Pound Coating, Pure Open-Hearth Base," "Columbia Extra Coated, 32-Pound Coating," "Fire Protection Terne"; Other Brands of Roofing Tin, Ternes, Bright Tinplate, Blackplate; also, Accessories.

Distribution.

Large stocks of "Target and Arrow" Roofing Tin are carried at principal distributing points throughout the United States, as follows: Philadelphia, New York, Chicago, St. Louis, San Francisco, Omaha, Kansas City, Denver, Baltimore, New Orleans; Los Angeles, Portland, Seattle, Cumberland, Md.

This popular brand is also handled by leading wholesale hardware jobbers and sheet metal supply houses in all parts of the country.

"Target and Arrow" Brand Roofing Tin.

This is our highest grade and the same durable quality of roofing tin that we have supplied to the American sheet metal roofing trade for more than sixty years. It is an old specialty of ours, made by a process handed down from the early days of our business. The base-plate is a special quality, developed in our complete works, following the best practice of former years. Extreme durability is obtained by an exclusive coating process of ours, which we term the "full seven open pot, palm-oil hand-dipping stack," by which an exceptionally heavy coating is applied, rich in pig tin. The black sheets used are cut accurately to the finished standard sizes, 14 by 20 inches or 28 by 20 inches, before tinning, to prevent uncoated edges. The finished sheets are closely inspected, and only the primes or perfect sheets are stamped with the "Target and Arrow" trade-mark.

This tin has in many cases lasted in good condition on the roof for more than sixty years.

Furnished in three standard thicknesses, known as IC (pronounced *eyesee*), approximately 30-gauge U. S. Standard; IX (pronounced *one-cross*), approximately 28-gauge, and 2X (pronounced *two-cross*), approximately 27-gauge. Odd sizes can be made to order.

Price.

The only brand of tin sold at a fixed resale price to the roofing trade. Printed price-list sent on application.

SECTION OF "TARGET AND ARROW" TIN
Note appearance of trade-mark stamped on each sheet

This tin costs a little more than other brands, so you are not likely to get "Target and Arrow" quality if you write a specification that permits substitution.

Cost of Finished Roof.

Approximately 10 to 12 cents per square foot, more or less, depending upon the location and character of the work. Less for large roofs, and more for small or irregular surfaces.

Maintenance.

A coat of paint every four or five years, to keep the surface in first-class condition. Use only metallic brown, Venetian red, iron oxide, or red lead, with pure linseed oil. Cost of painting about ½ cent per square foot. Each painting restores the roof to its original condition. With this slight attention a "Target and Arrow" tin roof will usually outlast the building it covers.

Advantages of Tin Roofing.

These can be summed up briefly as follows: (1) Durable. (2) A time-tried, long-established material. (3) Easily applied. (4) Adaptable to any kind of surface. (5) Moderate first cost. (6) Low cost of maintenance. (7) Easily and quickly repaired, if damaged. (8) Loses nothing in appearance with age. (9) Light in weight. (10) Weatherproof. (11) Not affected by heat or cold. (12) Gives protection against lightning. (13) Incombustible and prevents spread of fire.

Continued on next page

Recommendations in Laying Tin Roof.

The following suggestions are in accordance with the standard working specifications adopted by the National Association of Sheet Metal Contractors:

Slope of Roof—If tin is laid flat seam or flat lock, roof should incline one half inch or more to the foot; and if laid standing seam, two inches to the foot. Gutters, valleys, etc., should have sufficient incline to prevent water standing in them or backing up. A good pitch is always desirable.

Tongued and grooved sheathing-boards are recommended. Dry lumber, narrow width, even thickness, free from holes. If laid thus, sheathing paper is not necessary. If steam, fumes or gases are likely to reach underside of tin, use a standard waterproof building paper. Never use tar paper.

Never lay a new tin roof over old tin, rotten shingles or tar roofs. No nails should be driven through the sheets.

Never use graphite or tar paints on tin roofing.

Specifications for Standing- and Flat-Seam Roofing.

The National Association of Sheet Metal Contractors has recommended for the use of architects the following form of specifications:

Tin Roofing Work—All tin used on this building shall be ..... brand. No substitute for this brand will be allowed. Use IC thickness for the roof proper, decks, etc., and IX thickness for valleys, gutters and spouts, as required by design. One coat of red lead, iron oxide, metallic brown, or venetian red paint, with pure linseed oil, shall be applied to the underside of the tin before laying.

For Flat-Seam Roofing—Edges of sheets to be turned one half inch; all seams to be locked together and well soaked with solder. Sheets to be fastened to the sheathing-boards by cleats spaced eight inches apart; cleats locked into the seams and fastened to the roof with two one-inch barbed wire nails; no nails to be driven through the sheets.

For Standing-Seam Roofing—Sheets to be put together in long lengths in the shop; cross seams to be locked together and well soaked with solder. Sheets to be made up the narrow way in the rolls and fastened to the sheathing-boards by cleats spaced one foot apart.

Valleys and gutters to be formed with flat seam well soldered; sheets to be laid the narrow way.

Flashings to be let into the joints of the brick or stone work, and cemented. If counterflashings are used, the lower edge of the counterpart shall be kept at least three inches above the roof.

Solder to be of the best grade, bearing the manufacturer's name, and guaranteed one half tin and one half lead—new metals. Use rosin only as a flux.

Caution—No unnecessary walking over the tin roof or using same for storage of material shall be allowed. In walking on the tin, care must be taken not to damage the paint nor break the coating of the tin. Rubber-soled shoes or overshoes should be worn by the men on the roof.

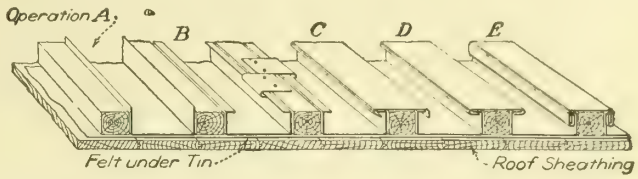
Painting Tin Work—All painting of the tin work to be done by the roofer, using red lead, iron oxide, metallic brown, or venetian red paint, with pure linseed oil. No patent dryer or turpentine to be used.

All paints to be applied with a hand brush and well rubbed on. Tin to be painted immediately after laying. A second coat shall be applied in a similar manner, two weeks later.

No deviation from these specifications shall be made unless authority be given in writing by the architect. Only a first-class roof will be accepted.

Specification Forms.

A supply of these, ready for insertion in building pecifications, will be sent upon request.



TIN ROOFING, LAID OVER WOODEN BATTENS, FOR SPECIAL HEAVY RIBBED EFFECT

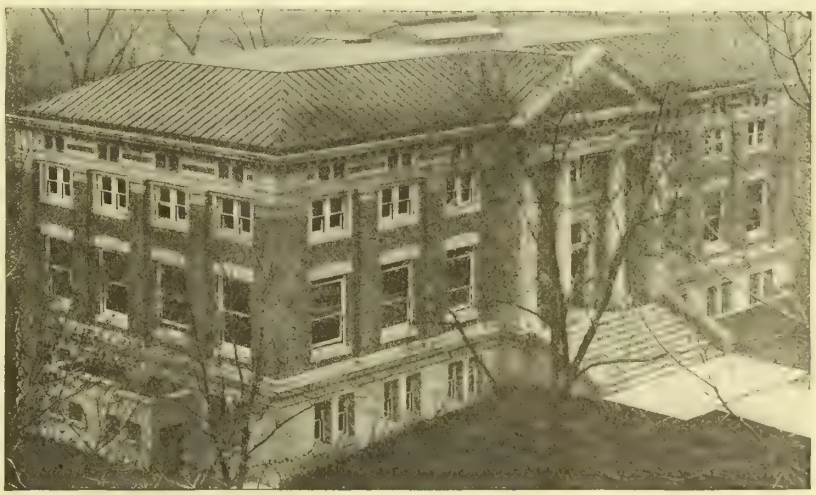
Shows the various steps in forming the seams, without regard to the distance between the ribs. More detailed information, with working drawings showing this and other methods of applying tin roofing to flat or curved surfaces, to secure distinctive architectural effects, will be sent on request

Other Specialties.

"Taylor's Special 40-Pound Coating, Pure Open-Hearth Base"—Stamped with our name and the weight of coating. Guaranteed equal to any other 40-lb. coated roofing tin. An excellent modern quality, made for competitive purposes. For use in specifications where more than one brand is named.

"Taylor's Columbia Extra-Coated, 32-Pound Coating"—Sold in large quantities for work where a good, standard, *extra-coated* roofing tin is required.

"Taylor's Fire Protection Terne"—For covering fire doors and shutters.



CARNEGIE LIBRARY, HOWARD UNIVERSITY, WASHINGTON, D. C.

Covered with 7500 square feet IX "Target and Arrow" Roofing Tin laid over wooden battens to give a heavy ribbed effect. A very handsome and effective style of roof, particularly well suited to public buildings of this type. Combines beauty and lightness with protection against fire, lightning and the weather

W. F. NORMAN SHEET METAL MFG. CO.

Metal Spanish Tile, Metal Shingles, and Sheet Metal Building Material

NEVADA, MO.

Products.

METAL SPANISH TILE; METAL SHINGLES; STEEL CEILINGS.

Also, NORMAN'S SNOWPROOF LOCK JOINT CORRUGATED ROOFING, CORNICE, STORE FRONTS, MARQUEES, SKYLIGHTS, WALL TIES, CONDUCTOR PIPE, EAVES TROUGH, VALLEY, ROOF CRESTING, RIDGINGS, VENTILATORS, VENTILATOR PIPE, etc.

Metal Spanish Tile.

This makes one of the most beautiful roofs known. We are the inventors of "Two in One," illustrated herewith, and "Ten in One" Metal Tile. Metal tile is acknowledged by many builders to have more desirable features than any other roofing. The valley tile fit any pitch and require no mitering and soldering. There are no open ends.

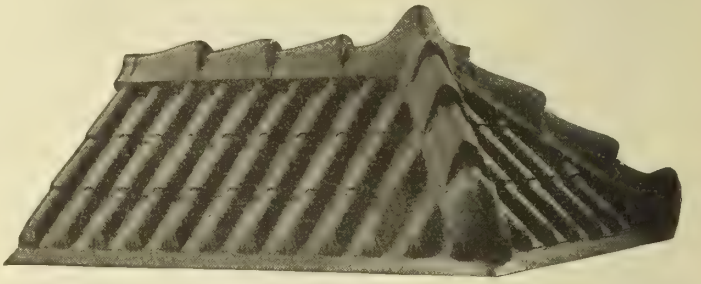
FIRST CONGREGATIONAL CHURCH, GREAT BEND, KANSAS
Roofed with Norman's "Two in One" Metal Spanish Tile

Metal Shingles.

Our metal shingles are bold and artistic in design, and will not buckle up. They can be put on by any workman of ordinary ability, and require no soldering. All nail heads are covered. We have spent much money and time in perfecting the lock on our metal shingles and metal Spanish tile, and have developed a lock which is absolutely waterproof under all conditions. They are waterproof, durable, economical, fireproof—thus reducing cost of insurance ten per cent in most states—easily laid, and lightning-proof. The weight is only about one sixth that of clay tile or slate, and one quarter that of wood shingles. They will not crack nor split if roof springs or settles. Metal shingles and metal Spanish tile are made from terne plates, galvanized iron, and copper.

Norman's "Hi-Art" Steel Ceilings.

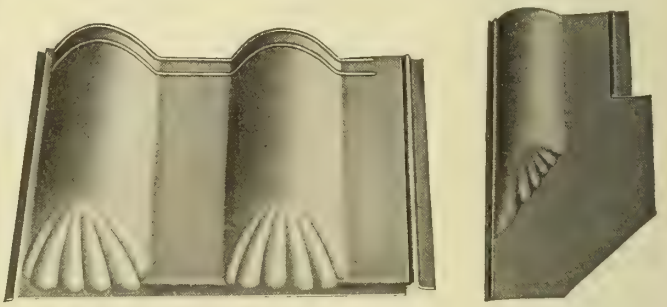
These ceilings are designed by the best artists obtainable, and are stamped by expert workmen from the best open hearth steel that can be obtained. The beads and buttons are machine made, insuring a perfectly fitting joint. Only a limited number of plates are stamped from each die, so that the design is always clear and distinct. We have special designs for special purposes.



NORMAN'S "TWO IN ONE" SPANISH TILE, HIP FINISH

Quality.

Quality has been the watchword of this business, and has enabled us to build up the large trade we have enjoyed for more than twenty years.



CLOSED END FOR LOWER COURSE VALLEY TILE

Facilities.

Our plant is large and well equipped with a view to the rapid and satisfactory handling of all orders, regardless of size. We have excellent railroad connections.

Estimates, Catalogues, etc.

We are prepared to give estimates promptly from plans or sketches, or give any information regarding products. Correspondence solicited. Catalogues of general or special lines on request.

STEEL CEILING PLATE, NO. 250

HOLT ROOF CONNECTION CO.

LAWRENCE, MASS.

Products.

Holt Roof Water and Roof Vent Connection.

Description.

The Holt Roof Water and Roof Vent Connection takes care of all strains, prevents the breakage of roof flashing, and eliminates the chance of damage by water. It consists of a No. 13-gauge seamless-drawn copper pipe brazed to the roof flange, which is locked to the roof by a casting riveted to the copper pipe. This part of the Roof Connection forms an integral part of the roof, but is free to move with the roof without straining or affecting any of its attachments, because of the expansion joint through which it passes and which forms a water-tight and gas-tight connection with the pipe line. A gasket of asbesto-graphite mineral fiber is pressed against the copper pipe by stuffing-box and thumb nuts.

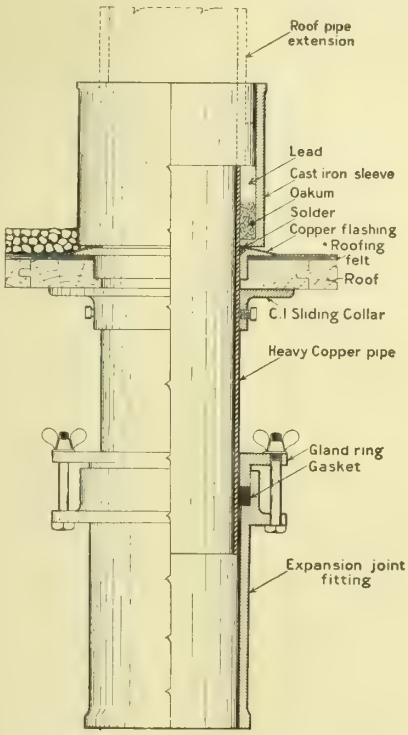
Roof Flange made of 16-ounce soft rolled copper. Connections furnished for any thickness of roof construction.

Special Type—Connections furnished of special form for column drainage use.

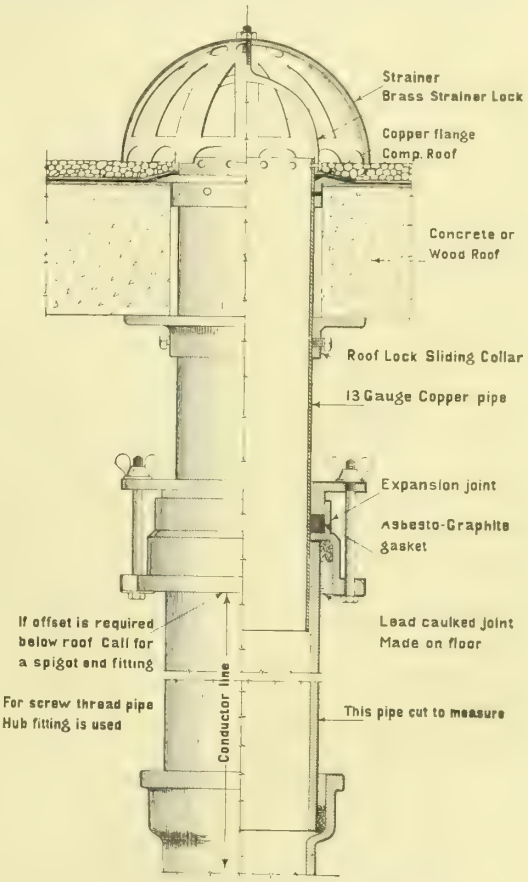
Medal—Awarded a silver medal at the Panama-Pacific Exposition.

Recent Installations.

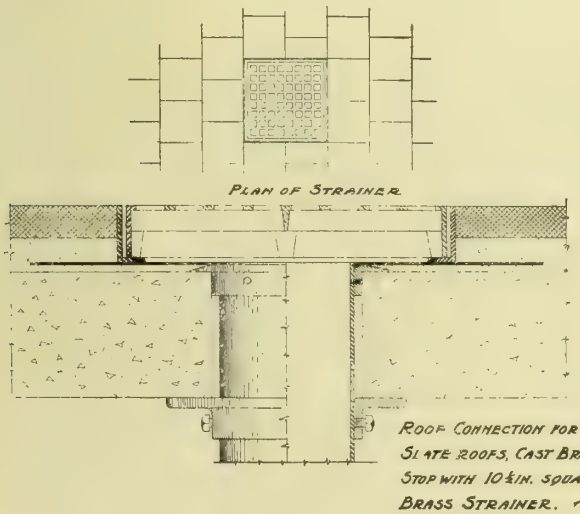
Massachusetts Institute of Technology, William Welles Bosworth, Architect, Stone & Webster Engineering Corp., Constructing Engineers
American Woolen Co., Private Engineers
General Electric Company, Schenectady and Pittsfield, Private Engineers
Arlington Mills, Lawrence, Mass., Private Engineers
Naumkeag Steam Cotton Co. Mills, Salem, Mass., Lockwood, Greene & Co., Engineers
S. Slater & Sons Mills, Webster, Mass., Charles T. Main, Engineer
U. S. Post Office, New York, N. Y., Volckening & Holler, Architects

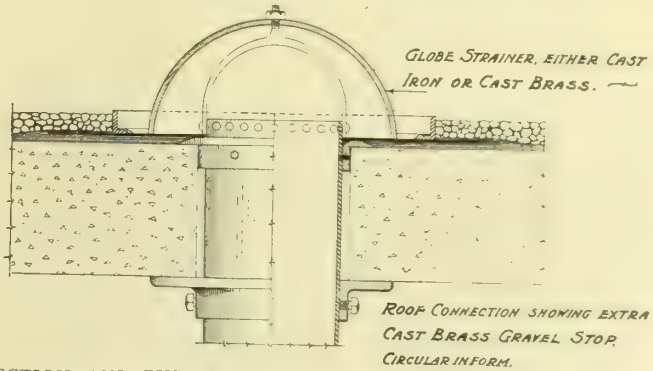


TYPE NO. 4. DETAILS OF HOLT ROOF CONNECTION AND EXPANSION JOINT FOR ROOF VENT
With Cast-Iron Sleeve for roof pipe extension



TYPE NO. 1. DETAILS OF HOLT ROOF CONNECTION AND EXPANSION JOINT
Types No. 3 and 2 show connections at roof line only. Lower part of these connections same as Type No. 1





TYPES NO. 3 AND 2. DETAILS OF HOLT ROOF CONNECTION AND EXPANSION JOINT FOR ROOF WATER

Expansion joint made gas- and water-tight by turning up thumb nuts, pressing gasket against copper pipe. Pipe will move easily through joint and take care of all changes due to settlement, shrinkage, vibration or condensation. It will remove the last objection to the internal system of drainage

THE AMERICAN CEMENT PLASTER COMPANY

MANUFACTURERS OF

American Reinforced Gypsum Roofing Blocks

CABLE ADDRESS: "AMPACO"

OFFICES

CHICAGO, ILL. TOLEDO, OHIO FORT DODGE, IOWA BUFFALO, N. Y. LAWRENCE, KANS.

Products.

AMERICAN REINFORCED GYPSUM ROOFING BLOCKS and AMERICAN ROOF JOINT FILLER.

For full line of Gypsum Products, see our name in General Index.

Description.

American Reinforced Gypsum Roofing Blocks are made of pure gypsum reinforced with heavy galvanized wire.

They weigh about 14 pounds per square foot and the standard size is 3 by 12 by 29½ inches. They can be supplied in shorter lengths to accommodate steel construction already designed or in place.

These blocks are designed with beveled edges so as to obtain the best as well as the most economical construction. They are waterproofed to insure a perfect condition for receiving the finished roofing and so that moisture can not penetrate them.

Advantages.

American Reinforced Gypsum Roofing Blocks are formed in metal moulds, straight and true and precise in all dimensions, which insures straight surfaces and edges and economy in placing.

The beveled edges of these blocks permit filling of the joints after they are in place, making installation more rapid and economical. They make a closed joint on the under surface, so improving the appearance from below on exposed roof construction.

Being reinforced with heavy interwoven galvanized wire, these blocks will carry more than 600 pounds per square foot, evenly distributed load.

American Reinforced Gypsum Roofing Blocks do not expand or contract under temperature changes, so that the finished roofing is not strained by this action.

Since gypsum is a non-conductor of heat, its use in roofing insures a more even temperature, summer and winter, in open roof constructions, and also prevents condensation.

The fireproofing qualities of gypsum are generally recognized, and render it particularly valuable as a roofing material.

VIEW OF FINISHED ROOF, CITY LAUNDRY BUILDING, AKRON, OHIO
FICHTER & BROOKER, Architects

UNDERNEATH VIEW, ROOF OF CITY LAUNDRY BUILDING, AKRON, OHIO
Bevel edge blocks used here

DIVISION AVENUE PUMPING STATION, CLEVELAND, OHIO
Reinforced Gypsum Blocks used

UNDERNEATH VIEW, DIVISION AVENUE PUMPING STATION, CLEVELAND, OHIO
Bevel edge blocks not used; joints show

SWEET'S CATALOGUE

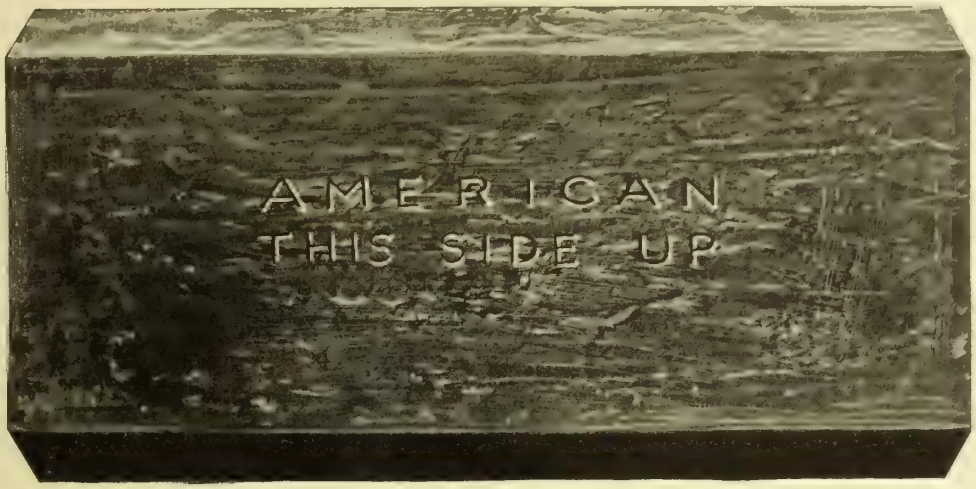
Continued on next page

Application.

The American roofing block system is adaptable to either pitched or flat roof constructions.

The blocks can be cut or sawed with ease and can be fitted perfectly around valleys, hips, angles, etc. Nailing blocks are rendered unnecessary.

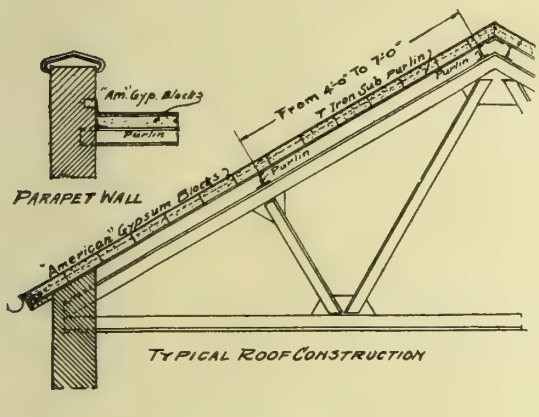
Because of the texture of the American Reinforced Gypsum Roofing Blocks, composition roof covering can be mopped directly to their surface, obtaining a perfect bond.

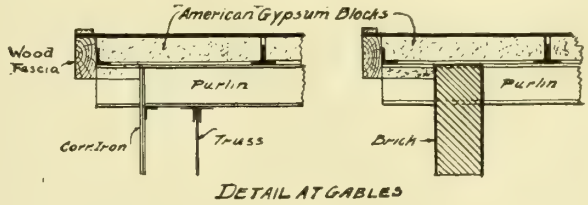


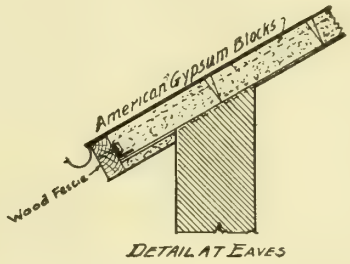
REINFORCED GYPSUM ROOFING BLOCK

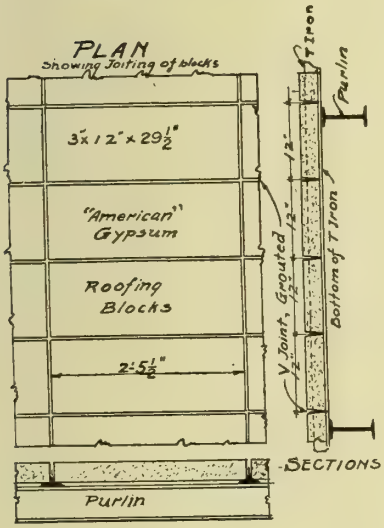
Specification.

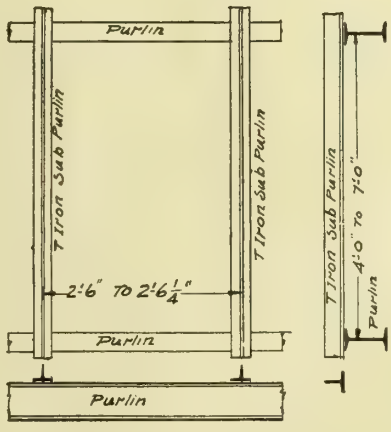
Three-inch American Reinforced Gypsum Roofing Blocks shall be properly placed with bottom joints well closed, and after same are in place all joints shall be filled tight with American Roof Joint Filler and these joints carefully waterproofed.

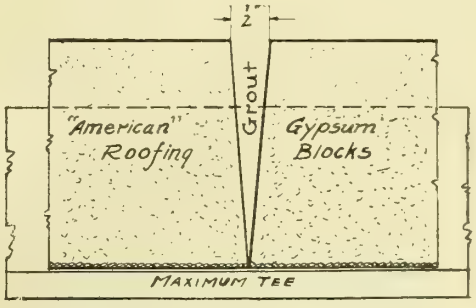






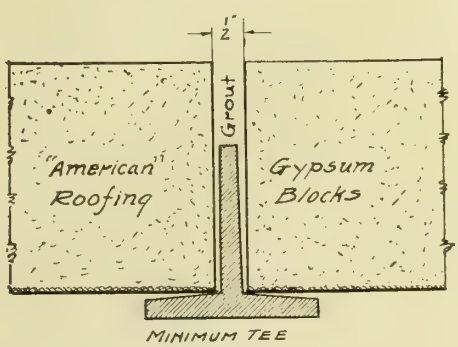


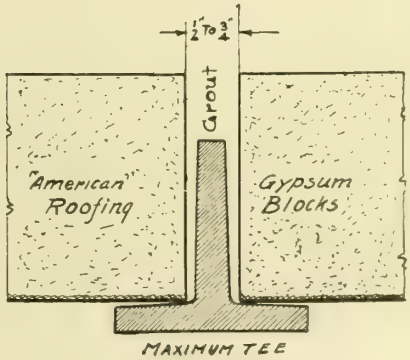




SCHEDULE OF SUB-PURLINS		
SPAN	STEEL TEES SIZE	WEIGHT
4'-0"	2"x2"	4.1#
4'-6"	" "	" "
5'-0"	" "	" "
5'-6"	" "	4.9#
6'-0"	2½x2½"	5.5#
6'-6"	" "	" "
7'-0"	" "	6.4#

Total of Live and dead load 50 lbs per sq ft.





GENERAL DETAILS, REINFORCED GYPSUM ROOFING BLOCKS

AMERICAN CEMENT TILE MANUFACTURING CO.

Cement Tile Roofing

INCORPORATED 1902

Oliver Building
PITTSBURGH, PA.

WORKS
WAMPUM, PA. LINCOLN, N. J.
COREY, ALA.

BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street
BIRMINGHAM, ALA., P. O. Fairfield, Ala.
PHILADELPHIA, PA., Perry Building
CLEVELAND, OHIO, Schofield Building

Products and Services.

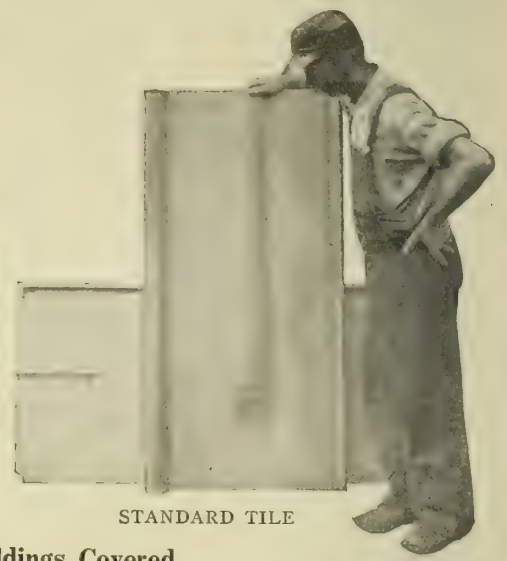
We manufacture and erect in place on the roof our "Bonanza" Reinforced Cement Tile Roofing, Cement Tile Gutter Plates and Cement Tile Wall Plates.

Construction.

The tiles are made with best Portland cement, reinforced with expanded metal. The reinforcing metal is placed in its theoretically proper position, which is near the lower side of tile, the metal being well protected. The underside presents a smooth appearance, white in color (not ordinary cement finish), which adds greatly to the light in building, so that painting is not necessary.

"Bonanza" is simplicity in modern roof construction. Can be applied in any weather.

TILE WITH GLASS INSERTED



STANDARD TILE

Properties.

Cement Roof Tiles are not affected by variations in temperature, nor by ordinary plant conditions. They are impervious to water and fireproof. Tiles, not being subjected to a process of burning, are not warped.

Load Tests.

Under tests, "Bonanza" Tile placed on supports, 4-foot centers, have shown a carrying capacity up to 350 pounds per square foot of evenly distributed load before destruction.

No tiles are shipped or placed on roof unless they are at least 30 days old.

Dimensions and Weights.

Thickness of tile	⅞ inch
Size of tile	26 x 52 inches
Surface exposed to weather	24 x 48 inches
Number of tiles per square of roof (100 sq. ft.)	12½
Weight of single tile	107 lbs.
Weight per square of roof	1325 lbs.
Weight per square foot	13¼ lbs.

Prices.

We erect "Bonanza" Tile with our own experienced roofers. We shall be glad to quote on receipt of drawings and all necessary information.

Type of Buildings Covered.

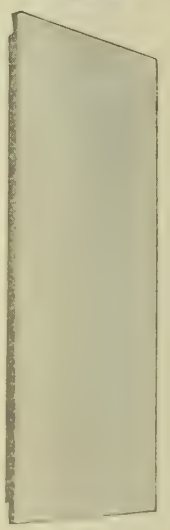
"Bonanza" Cement Tile-Roofing is especially adapted for industrial buildings, such as manufacturing plants, foundries, warehouses, machine-shops, blacksmith and forge shops, steam and electric power plants, railroad buildings, train sheds, etc.

Flat Tile.

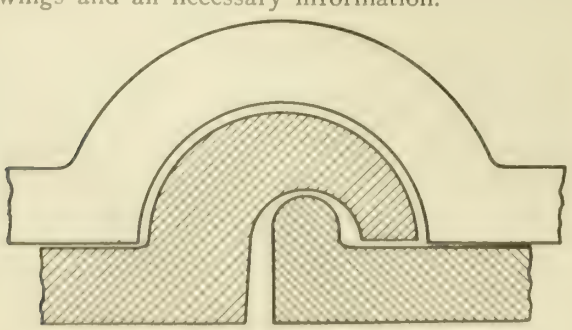
For flat roofs we offer our 1½-inch Flat Tile laid on I-beams, five-foot centers; a light fireproof construction. See illustration.

Details.

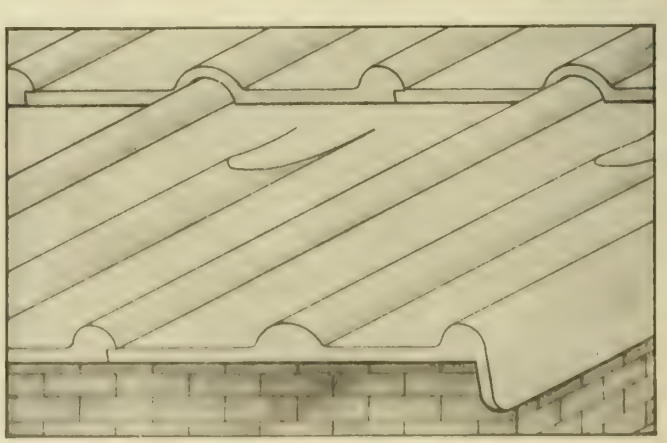
On application, our Engineering Department will gladly furnish details and general drawings covering the use of "Bonanza" Tile. Write for fully illustrated catalogue.



FLAT TILE



SECTION THROUGH SIDE ROLL



METHOD OF LAYING TILE

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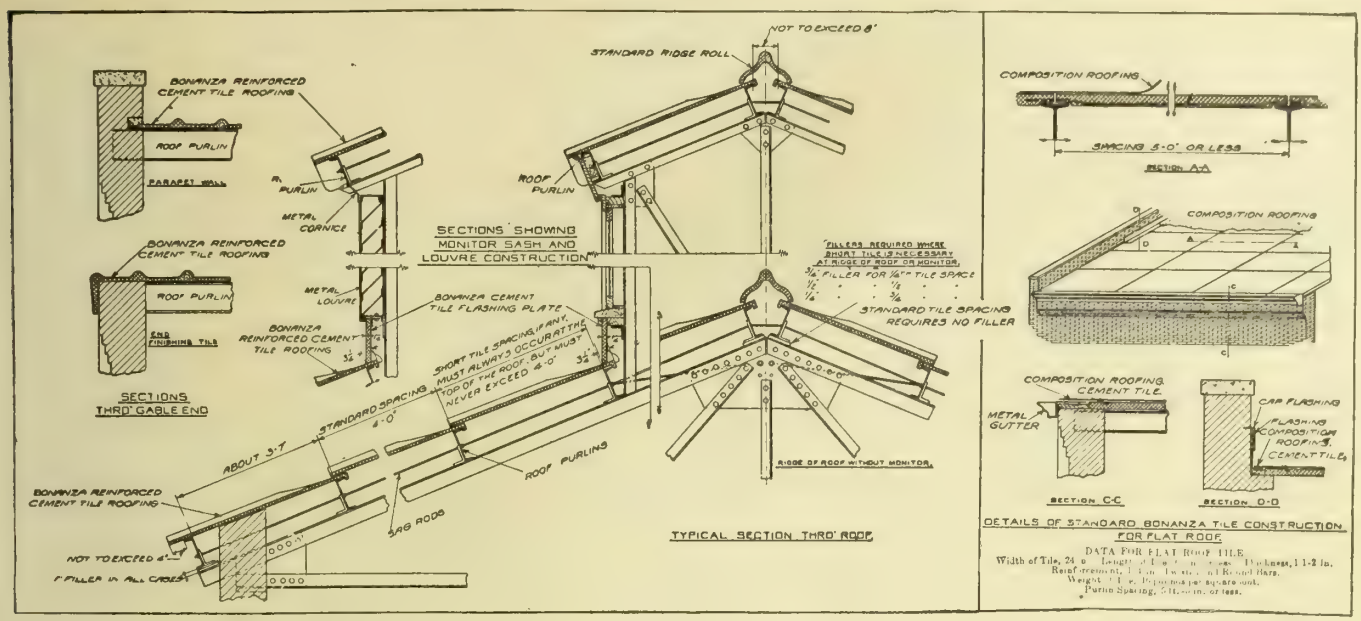

DETAILS OF ROOF CONSTRUCTION

Specifications.

Roof Design—Tiles are laid on steel purlins spaced 4 feet apart. This is the standard spacing, which, if required, can be varied from 3 feet 10 inches to 4 feet 8 inches.

Roof Pitch—The least permissible slope of roof is one fifth pitch, by which is meant that the rise of roof is equal to one fifth of the span.

Roof Purlins—The roof purlins must in all cases be channels or I-beams. The use of trussed angle purlins is not to be allowed, for the reason that they are not stiff enough laterally.

Sag Rods—All purlins must be straight and held in alignment by the use of sag rods. One line of sag rods is to be used for bays up to 16 feet span; for larger spans two lines are used.

The eave purlin course must be raised 1 inch by means of a plate of that thickness between channel and truss, in order to give to the last tile the same slope as that possessed by the other tiles. A similar arrangement holds good for first purlin at roof apex where short tile are used.

Should the pitch length of roof not allow the use of standard tile length throughout, the short course is placed as a ridge course and can be spaced 20, 24, 28, 32, or 36 inches.

References.

A partial list of installations of "Bonanza" Reinforced Cement Tile Roofing:

Entire Plants

Chas. Boldt Co., Huntington, W. Va.
Clark Brothers Co., Olean, N. Y.
Crescent Portland Cement Co., Wampum, Pa.
Benzol Products Co., Marcus Hook, Pa.
Detroit Steel Products Co., Detroit, Mich.
Damascus Bronze Co., Pittsburgh, Pa.
Didier-March Co., Bethlehem, Pa.
Didier-March Co., Keasbey, N. J.
Four States Coal & Coke Co., Worthington, W. Va.
Hancock Mfg. Co., Sandusky, O.
Johnetta Foundry & Machine Co., Marianna, Pa.
Nelson Valve Co., Philadelphia, Pa.
Owens Bottle Mach. Co., Toledo, O.
Pulaski Mining Co., Pulaski, Va.
Ross Gear & Tool Co., Lafayette, Ind.
T. H. Symington Co., Rochester, N. Y.
Simonds Mfg. Co., Lockport, N. Y.
Somerville Iron Works, Somerville, N. J.
Toledo Glass Co., Toledo, O.
Union Switch & Signal Co., Swissvale, Pa.
Best Mfg. Co., Pittsburgh, Pa.
Erie Engine Works, Erie, Pa.
Walden Knife Co., Walden, N. Y.
Pittsburgh Crucible Steel Co., Midland, Pa
Syracuse Crucible Steel Co., Syracuse, N. Y.
U. S. Government, all shop bldgs., Balboa, Panama Canal Zone

Machine Shops

Adamson Mach. Co., Akron, O.
N. Y. Air Brake Co., Watertown, N. Y.
Newark Tube & Metal Co., Newark, N. J.
Star Drilling Mach. Co., Akron, O.
Wm. Wharton, Jr., & Co., Easton, Pa.
United Engineering & Foundry Co., Youngstown, O.
Goodwin Car Co., Chicago, Ill.
Palmer Motor Car Co., Ecorse, Mich.

Foundries

Atlantic Foundry Co., Akron, O.
American Steel Foundries, Pittsburgh, and Chester, Pa.
Frontier Iron Works, Buffalo, N. Y.
Barlow Foundry Co., Newark, N. J.
Pittsburg Valve & Fittings Co., Barberton, O.
Strong Steel Foundry Co., Buffalo, N. Y.
Warren Foundry & Machine Co., Phillipsburg, N. J.

Blacksmith and Forge Shops

Blakeslee Forging Co., Plantsville, Conn.
American Vanadium Co., Bridgeville, Pa.
American Fork & Hoe Co., Ashtabula, O.
Baldwin Locomotive Co., Eddystone, Pa.
James H. Mann Axe Co., Lewistown, Pa.
W. B. Pollock Company, Youngstown, O.
Treadwell Engineering Co., Easton, Pa.
Link Belt Co., Indianapolis, Ind.

Steam and Electric Power Plants

Parish & Bingham Co., Cleveland, O.
Chattanooga Gas Co., Chattanooga, Tenn.
Edison Electric Illuminating Co., Cumberland, Md.
Firth Sterling Steel Co., Washington, D. C.
Keystone Coal & Coke Co., Greensburg, Pa.
Lewistown & Reedville E. R. Co., Lewistown, Pa.
Falls Rubber Co., Cuyahoga Falls, O.
Ohio Steel Foundries, Lima, O.
Ohio Box Board Co., Rittman, O.
Southern Power Co. (10 plants), Charlotte, N. C.
Tide Water Pipe Co., 18 Pumping Stations
United Coal Mining Co., Buckner, Ill.

Miscellaneous Manufacturing Buildings

Algoma Central R. R. Co., Sault Ste. Marie, Ont.
Alpha Portland Cement Co., Easton, Pa., Manheim, W. Va., Alsen, N. Y.
Atlantic Refining Co., Pittsburgh, Pa., and Franklin, Pa.
Bethlehem Steel Co., So. Bethlehem, Pa.
Busch-Sulzer Bros. & Diesel Eng. Co., St. Louis, Mo.
Elyria Iron & Steel Co., Cleveland, O.
U. S. Cast Iron Pipe Co., Bessemer, Ala.; Addystone, O.
Cochrane Chemical Co., Boston, Mass.
Crucible Steel Co., Harrison, N. J.
Ford Motor Co., Detroit, Mich., and Walkerville, Ont.
General Chemical Co., New York, N. Y.
General Electric Co., Schenectady, N. Y.
E. W. Bliss Co., Brooklyn, N. Y.
Ingersoll-Rand Co., Easton, Pa.
Mohawk Gas Co., Schenectady, N. Y.
Chandler Motor Car Co., Cleveland, O.
Transue & Williams Co., Alliance, O.
Mond Nickel Co., Victoria Mines, Ont.
Harlan & Hollingsworth Corp., Wilmington, Del.
Pennick & Ford Can Co., New Orleans, La.
Pennsylvania Lines, Columbus, O., Indianapolis, Ind., Conway, Pa.
D & C and B & C Docks, Cleveland, O.
Solvay Process Co., Detroit, Mich., and Syracuse, N. Y.
Thatcher Mfg. Co., Elmira, N. Y.
Crane Valve Co., Bridgeport, Conn.
Anheuser-Busch Co., St. Louis, Mo.
Detroit and Windsor Ferry, Bois Blanc Isle, Ont.
Belmont Iron Works, Eddystone, Pa.
Lafayette College, Easton, Pa.
U. S. Navy, Newport, R. I.
Otis Elevator Co., Harrison, N. J.

FEDERAL CEMENT TILE CO.

Westminster Building
CHICAGO, ILL.

WORKS
HAMMOND, IND.

Products.

"Federal" Reinforced Cement Slabs, for Roofs, Gutters, Walls, Floors, etc.

Also Hollow Tiles, with one-inch non-conducting air space, are furnished for Pitched Roofs in standard lengths, and for flat surfaces in lengths spanning up to ten feet in the clear.

"Federal" Reinforced Cement Slabs.

Impervious to severest elements. Not affected by heat, cold, fire or water; strengthen with time. Laid directly on steel purlins, making a fireproof construction. All joints interlock and overlap. Require no painting, repairing, or other maintenance; and, once in place, will last as long as the structure.

"Federal" Slab Data for Standard Pitched Roofs

Covers 24 x 48 inches
Over-all length, 52 inches
12½ Tile per square (100 sq. ft.)
16 lbs. weight per sq. ft.
Thickness, 1 inch
Reinforcement Metal
Purlin Spacing, 4 ft. 0 in.
Least allowable slope, 1/5 pitch
Safe carrying load, 100 lbs. per sq. ft.
Breaking load, 300 lbs. per sq. ft.

Cost.

"Federal" slabs make the best and cheapest roof on the market, because they are indestructible and everlasting; no expense for maintenance; cut the rates if fire insurance is carried; save steel in the building frame; eliminate wood sheathing, also repairs and renewals.

Estimates.

Estimates made from plans for roofs laid complete and guaranteed.

Co-operative Service.

Our engineers are structural experts and will assist our patrons in detailing steel work to carry "Federal" slabs, making no charge for this service.

Details.

Details and half-tones in large scale, also catalogue, on application.

References.

"Federal" Tiles cover a large variety of structures, as shown by the following partial list of contracts:

Boiler, Engine and Electric Power-Houses

United States Steel Corporation, six plants
International Harvester Co., five plants
Elgin, Joliet & Eastern Ry., Joliet, Ill., and Gary, Ind.
American Maize Products Co., Roby, Ind.
Federal Furnace Co., South Chicago, Ill.
Studebaker Corp., South Bend, Ind., and Detroit, Mich.
Wisconsin Steel Co., South Chicago, Ill.
Pullman Co., Pullman, Ill.
Calumet Steel Co., Chicago Heights, Ill.
Springfield Metallic Casket Co., Springfield, Ohio
Wickwire Steel Co., Buffalo, N. Y.
Iroquois Iron Co., Chicago, Ill.
J. T. Ryerson & Son, Chicago, Ill.
Illinois Brick Co., Chicago, Ill.
Sioux Falls Light & Power Co., Sioux Falls, S. D.
City of Fremont, Neb.

Foundries, Blacksmith and Forge Shops

United States Steel Corporation, Gary, Ind.; Joliet, Ill.
Industrial Works, Bay City, Mich.
National Brake & Electric Co., Milwaukee, Wis.
Forster, Waterbury & Co., Franklin Park, Ill.
American Brake Shoe & Foundry Co., Chicago, Ill.
Advance Rumely Co., LaPorte, Ind.; Battle Creek, Mich.
Crane Co., Chicago, Ill.
American Seating Co., Grand Rapids, Mich.
National Tool Co., Cleveland, Ohio
Deere & Co., Moline, Ill.
International Harvester Co., five plants
National Malleable Castings Co., Chicago, Ill.
Union Drop Forge Co., Chicago, Ill.
American Steel Foundries Co., Indiana Harbor, Ind.; Granite City, Ill.

Railroad Buildings

New Kansas City Station and Train Sheds
Illinois Central Railroad, Memphis, Tenn.
Elgin, Joliet & Eastern Ry., Joliet, Ill.; Gary, Ind.
Pennsylvania Railroad, Chicago, Ill.; Indianapolis, Ind.
Chicago & Northwestern R. R. Co., three plants
Kansas City Southern Railway Co., Port Arthur, Tex.
Chicago Great Western R. R., Stockton, Ill.
Baltimore & Ohio R. R., Chicago, Ill.
Grand Trunk System, Chicago, Ill.

Automobile Plants

Ford Motor Co., Detroit and Dearborn, Mich.
General Motors, Flint and Detroit, Mich.
Willys-Overland Company, Toledo, Ohio
Studebaker Corporation, Detroit, Mich.
Maxwell Motor Co., Detroit, Mich.
Packard Motor Car Co., Detroit, Mich.
Hudson Motor Car Co., Detroit, Mich.
Haynes Automobile Co., Kokomo, Ind.
Dodge Bros., Detroit, Mich.

Implement Plants

International Harvester Co., five plants
Deere & Co., Moline, Ill.
Oliver Chilled Plow Works, South Bend, Ind.
Emerson-Brantingham Co., Rockford, Ill.
Advance Rumely Co., LaPorte, Ind.; Battle Creek, Mich.
Studebaker Corp., South Bend, Ind.; Detroit, Mich.
Mandt Wagon Co., Stoughton, Wis.
J. I. Case Plow Works, Racine, Wis.
Western Wheeled Scraper Co., Aurora, Ill.
Austin Manufacturing Co., Harvey, Ill.

Auditoriums and Theaters

Orpheum Theater, Detroit, Mich.
High School, Harvey, Ill.
Franklin Theater, Saginaw, Mich.
Regent Theater, Detroit, Mich.
Globe Theater, Kansas City, Mo.
Michigan State College Auditorium, Ypsilanti, Mich.
Juneau Theater, Milwaukee, Wis.

Coke, Gas and Oil Plants

United States Steel Corporation, various plants
Solvay Process Co., Detroit, Mich.
Milwaukee Coke & Gas Co., Milwaukee, Wis.
Citizens Gas Co., Kankakee, Ill.
Citizens Gas Co., Indianapolis, Ind.
Texas Co., Texas City, Tex.
Coal Products Manufacturing Co., Joliet, Ill.
Gulf Refining Co., Port Arthur, Tex.
Standard Oil Co., Tulsa, Okla.
International Harvester Co., various plants

Machine Shops

United States Steel Corporation, various plants
Durand Steel Locker Co., Chicago Heights, Ill.
Thatcher Mfg. Co., Streator, Ill.
City of Chicago, various buildings
John Mohr & Son, Chicago, Ill.
Great Western Smelting & Refining Co., Chicago, Ill.

Paper Mills

Nekoosa-Edwards Paper Co., Port Edwards, Wis.
Kimberly-Clark Co., Kimberly, Wis.
Henry Weis, Quincy, Ill.
Marathon Paper Mills Co., Wausau, Wis.
Weis Manufacturing Co., Monroe, Mich.

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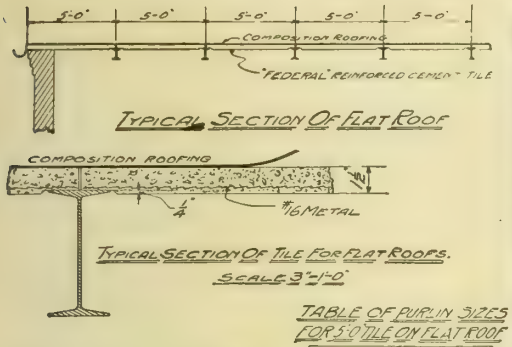


TYPICAL SECTION OF FLAT ROOF

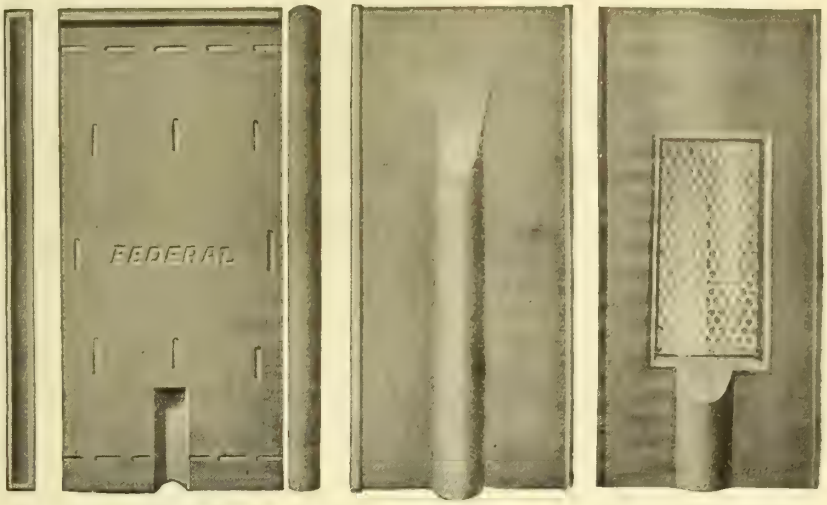
TYPICAL SECTION OF TILE FOR FLAT ROOFS.
SCALE 3"=1'-0"

DATA FOR FLAT SLAB ROOF

Width of tile 24"
Length of standard tile 60"
Special lengths to order
Weight per square foot, = 19 lbs.
Thickness 1⅝"
Reinforcement-Metal, No. 10
Safe carrying load 100 lbs. per sq. ft.

TABLE OF PURLIN SIZES FOR 5'-0 TILE ON FLAT ROOF

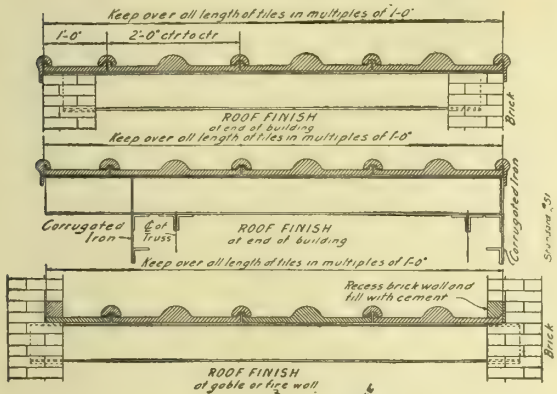
DISTANCE ℄ TO ℄ OF TRUSSES	SIZE OF PURLIN REQUIRED
24 — 0"	8" I 18#
22 — 0"	8" I 18#
20 — 0"	7" I 15#
18 — 0"	7" I 15#
16 — 0"	6" I 12¼#
14 — 0"	6" I 12¼#
12 — 0"	5" I 9½#
10 — 0"	4" I 7½#

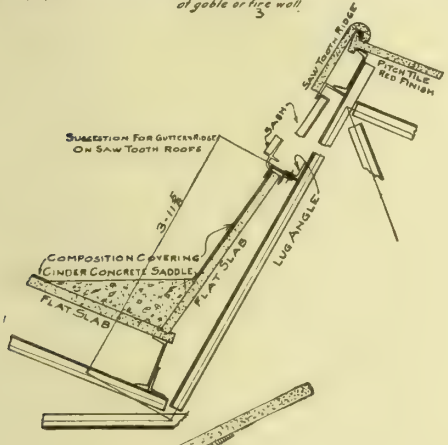


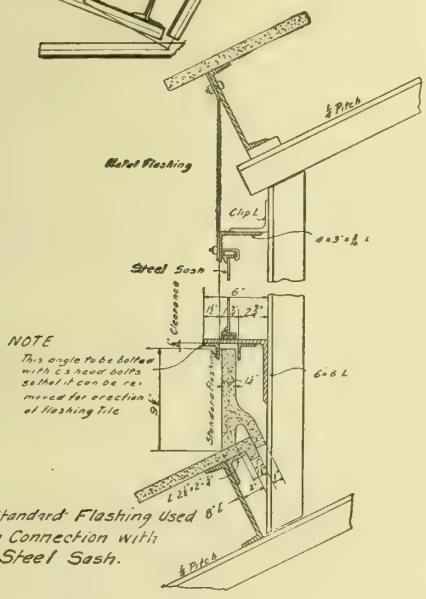
Back Front

"FEDERAL" SLAB

SLAB WITH WIRE GLASS



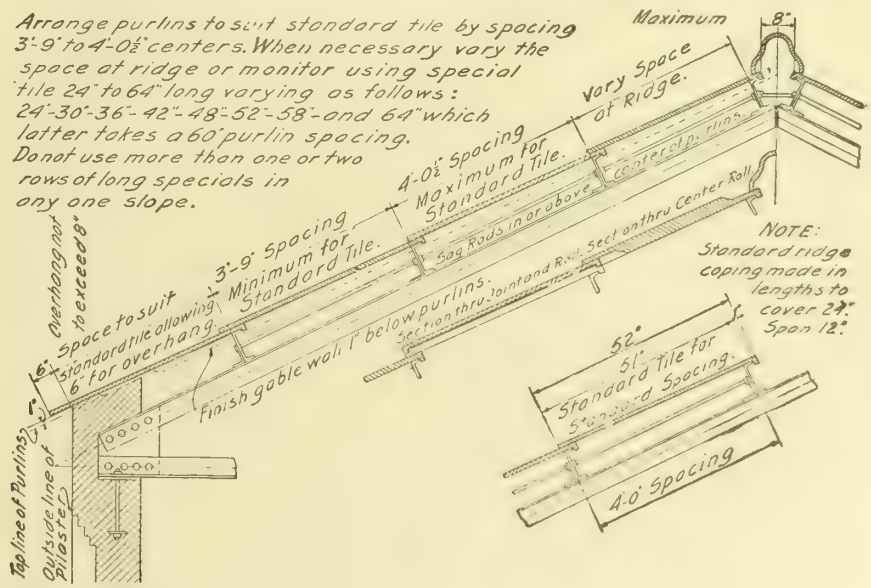




Standard Flashing Used 6"L In Connection with Steel Sash.

FACTORY WHERE "FEDERAL" REINFORCED SLABS ARE MADE

Main buildings, 100 by 400 ft. "Federal" Slabs cover roofs. "Federal" Glass Tile light factories. Strictly fireproof; no fire insurance required or carried



DETAILS OF ROOF CONSTRUCTION

C. S. GARRETT & SON CORP.

Manufacturers of Building, Roofing and Insulating Papers
Contractors and Engineers for Waterproofing

TELEPHONE—Bell, Market 971
Keystone, Main 499

20 and 22 South Marshall Street
PHILADELPHIA, PA.

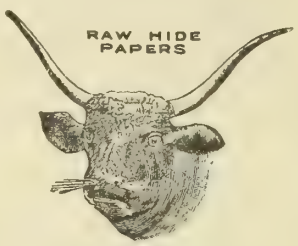
BRANCH OFFICE
103 Park Avenue
NEW YORK, N. Y.

Products and Services.

Building and Insulating Papers; "Raw Hide" Waterproof Papers; Deadening Felts; Tarred and Composition Roofing Felts; Marley Rubber Roofing; Rosin Sized Sheathing; Damp Resister and Plaster Bond; Asphalt Coating Cement; Waterproofing Paste.

Asphalt Mastic Floors.

Waterproofing Engineers and Contractors.



TRADE-MARK

Asphalt Mastic Floors.

Asphalt Mastic Floors for inside or outside work are unequalled as a *waterproof* and *wearproof surface.* Noiseless, dustless and sanitary.

Especially recommended in half inch or three quarter inch for flat roofs where a perpetual roof is desired.

"Raw Hide" Waterproof Paper.

Not how cheap, but how *good.*

"Best"—For ice houses, cold storage, refrigerator car insulation, "Raw Hide" has no equal. Especially adapted for all high-class dwellings.

Prices—No. 210, $12.00 per 1,000 square feet; weight, 200 pounds.

Nos. 200 and 205, $10.00 per 1,000 square feet; weight, 125 pounds.

Red Rope Papers.

An all-manila rope fiber sheathing paper, especially adapted for strictly first-class work. Furnished in six different weights.

List price, $4.00, $5.00, $6.00, $7.00, and $12.00 per 1,000 square feet.

Largely used for refrigerating cars, ice and cold storage houses, on top of concrete floors where overlaid with wood or tile to prevent stain or chemical action from cement.

Perfect insulation is guaranteed wherever used.

Tarred Roofing Felt.

"Niagara Special" Tarred Roofing Felt used in the "Garrett Specification," put up in rolls 32 inches wide, 60 pounds to 400 square feet, when used with Straight-Run Gibraltar Pitch, will make good a ten years' guarantee by the roofer who uses it.

Prices furnished on application.

Co-operation.

All of the above Insulating, Sheathing and Waterproof Papers are made under our own supervision; and after an experience extending over forty years.

"C. S. G." Wool Deadening Felt.

Made of a wool fiber, and very tough and elastic, will always remain "springy" as well as agreeable and noiseless; will not flatten out and become dead.

Weights: No. 18, 1 pound to square yard; No. 19, 1½ pounds to square yard; No. 20, 2 pounds to square yard.

Waterproofing Department.

We are thoroughly equipped to contract for and install Waterproofing anywhere in the United States.

Our Waterproofing by the "C. S. G." Membrane Methods is the most successful in use.

We submit plans and specifications and do the work or sell the materials as desired, using asphalt or straight-run coal tar pitch as conditions require.

"C. S. G." Damp Resister.

Our "C. S. G." Damp Resister and Plaster Bond No. 383, applied to inside of outside walls, removes the necessity for furring and makes a solid and damp-proof plastered wall.

"C. S. G." Asphalt Coating Cement.

Our "C. S. G." Asphalt Coating Cement No. 407A, applied to outside cellar walls in one or two coats, is sufficient to arrest dampness where no water pressure is present.

Waterproofing Paste.

Our Waterproofing Paste No. 377, used in the Integral Method, is effectual either in concrete or cement coat.

Specifications for Gravel Roofing.

Lay full four (4) thicknesses of "Niagara" Tarred Felt, breaking joints and allowing 1 inch lap at each joint. Quantity of felt paper to be not less than 75 pounds to square. Coat or mop each thickness of felt over at least ⅞ of surface with heavy coat of Gibraltar Straight-Run Coal Tar Pitch. After above felt is properly laid and coated between thicknesses, then mop entire surface with heavy coating of Gibraltar Straight-Run Coal Tar Pitch, and apply heated slag or gravel ¼ to ⅝ inch in size.

Slag to be hot enough to bed in pitch, but not hot enough to burn the wool fiber in the felt paper.

Quantity of Gibraltar Pitch used in above roof to be not less than 120 pounds to square.

If applying a steep roof, use tin caps and nails between layers of felt, to fasten to roof boards.

If applying roof on mill or other building where damage may be caused from dropping pitch, first apply one thickness of "Niagara" Felt, then lay roof as per specifications.

Where applying a roof over concrete surface, first use a priming coat of Pyramid or other reliable waterproofing paint; over this mop a coat of Gibraltar Pitch and then apply the roof as above.

C. B. HEWITT & BROS.

Building, Roofing and Insulating Papers

TELEPHONE, 3720 BEEKMAN

48 Beekman Street

NEW YORK, N. Y.

Products.

BUILDING, INSULATING, and ROOFING PAPERS for building purposes as follows:

"VENETIA" RED-ROSIN SIZED SHEATHING and INSULATING PAPER, "OAKLAND" SHEATHING and INSULATING PAPER, U. S. FIBRE PLASTER BOARD, "OLD HICK" FIBROUS RED-ROPE PAPER, "BLACK HAWK" BLACK WATERPROOFING PAPER, "RED HAWK" RED-ROPE WATERPROOF ROOFING PAPER, and "NO NOISE" DEADENING FELT.

Description.

We give below condensed description of our various grades, which we guarantee to be manufactured of the best materials for each peculiar adaptation and to be of unexcelled lasting qualities.

"Venetia" Red-Rosin Sized Sheathing and Insulating Paper.

A superior grade of Red-Rosin Sized Heavy Sheathing, especially made of rag stock. We recommend this sheathing for use in high-class work. 36" rolls, 500 sq. ft. each, 8 sq. ft. to one pound. Also carried in medium weight.

A paper especially adapted for Cold Storage, Ice Houses, and other insulating purposes, etc. It is flexible and will not break or crack when applied on angles or corners, and is also sufficiently waterproof without being coated or saturated. 36" rolls, 500 sq. ft. each, 8 sq. ft. to one pound.

"Oakland" Sheathing and Insulating Paper.

A strong medium-priced paper, superior to the ordinary grades of Red-Rosin Sized Sheathing. 36" rolls, 500 sq. ft. each, 20 sq. ft. to the pound.

U. S. Fibre Plaster Board.

The best paper substitute for Ceilings, Walls, etc. It can be painted, kalsomined or varnished, and is not injuriously affected by dampness or salt air. 36" rolls, 500 sq. ft. each. Particularly adapted for cottages or camps in country or at seashore.

"Old Hick" Fibrous Red Rope.

A very strong and durable paper that is made from the best rope stock; a desirable paper for sheathing and insulating purposes, where an extra strong moist-proof paper is required. Made in four thicknesses and put up in rolls containing 500 and 1,000 sq. ft. each.

"Black Hawk" Waterproof.

A thoroughly waterproof Building Paper used under slate, shingles, or clapboards, and put up in 36" rolls of 500 sq. ft. each, in one, two and three ply.

"Red Hawk" Red-Rope Waterproof Roofing.

A strong, durable, waterproof paper for roofing, sheathing, or insulating purposes. Especially adapted for poultry houses, sheds, and all buildings where an economical roof is required. Better and cheaper than tar paper. 36" rolls, 500 sq. ft. each. Nails and caps included for applying.

"No Noise" Deafening Felt.

A felt made of wool stock that is soft and elastic, and used especially for deafening between floors and partitions. It will prevent dampness and add greatly to the warmth of buildings. It is largely used in public buildings, schoolhouses, and dwellings. It is also used for carpet lining. 36" rolls, 450 sq. ft. each; 1, 1½, and 2 lbs. to the yard.

Samples and Prices.

Samples and prices promptly furnished upon application.

THE MASTIC WALL BOARD & ROOFING CO.

Manufacturers of Wall Boards and Sheathing

300 Este Avenue
CINCINNATI, OHIO

Products.

BISHOPRIC STUCCO BOARD and BISHOPRIC SHEATHING.

Bishopric Stucco Board.

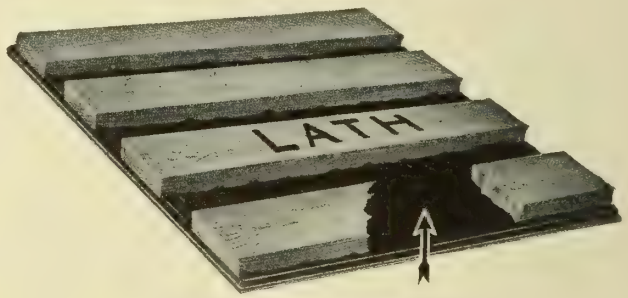
This is a background for stucco-, cement-, or plaster-finished buildings. It is made of creosoted, dovetailed lath on a background of heavy fibre-board. There is not a piece of metal about it, to rust and break away from the fastenings. Every piece of material is time-resisting and proof against water, weather and vermin. The finished construction is a rigid, permanent background, that holds the stucco cement or plaster in the dovetailed grip, *without cracking or peeling,* as long as the house lasts.

BISHOPRIC BOARD

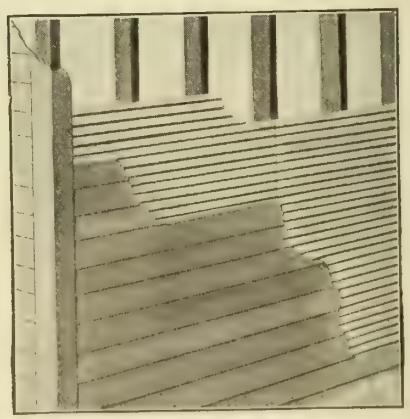
VIEW SHOWING BISHOPRIC BOARD APPLIED TO BUILDING

Bishopric Sheathing.

The arrow (see illustration) points to the asphalt mastic in which the laths are imbedded. Bishopric Sheathing is nailed to the outside of studding, laths and asphalt exposed as shown in the accompanying illustration. Over this weatherboards are nailed, or cement is applied. Bishopric Sheathing is used as a foundation for ready roofing. It is applied to rafters, smooth side up. When it is used under flooring, either side may be up, though it is preferable to have the lath side up, since it leaves dead-air space between the laths and the flooring.



BISHOPRIC SHEATHING BOARD



VIEW SHOWING BISHOPRIC SHEATHING UNDER WEATHER BOARD FINISH

Further Information.

Samples, catalogues, etc., of Bishopric Board and Bishopric Sheathing are sent on request. Our free book, "Built on the Wisdom of Ages," illustrates homes, apartments, factories and public buildings constructed with Bishopric Board, and gives letters from architects, builders and users. It also tells some interesting results of scientific tests.

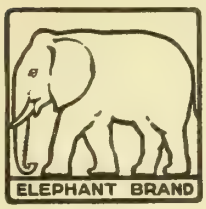
NEWTON PAPER COMPANY

Manufacturers of Building Paper

HOLYOKE, MASS.

Products.

ELEPHANT BRAND SHEATHING; ELEPHANT BRAND DEADENING FELT; DUPLEX PLASTER BOARD SHEATHING; GOLD MEDAL CORRUGATED CARPET LINING; SPECIAL HEAVY WRAPPING, INSULATING and PACKING PAPERS.



TRADE-MARK

Elephant Brand Sheathing Paper.

A heavy wool fiber paper for general building purposes. Rosin-sized, moistureproof, strong, serviceable, lasting. Manufactured since 1880.

For Doors and Windows—Especially adaptable for fitting around door and window frames. It is pliable, strong, and does not tear easily.

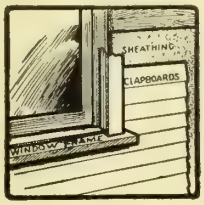
Weatherproof—It is made to protect the house from the elements; sufficiently moistureproof to carry away the moisture from an ordinary shower, even if there should be a small leak.

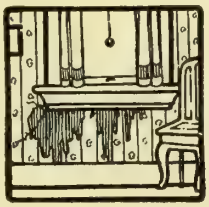
Time Saving—It saves much time on account of its being tough and easily handled.

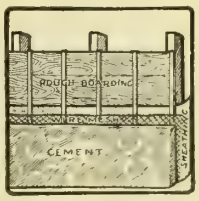
For Stucco Work—Will hold its form while cement is wet. Keeps the moisture from warping the boarding.

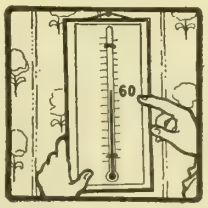
For Warmth and Economy—Our papers keep the house warm, make a more satisfactory job, and save money.

Damp-Resisting—Test them, in comparison with any other building paper. Throw a small piece in a basin of water and judge for yourself the effect of the elements.





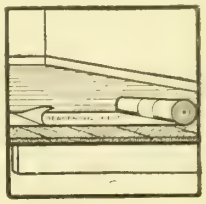




HANDLING AND USEFULNESS OF ELEPHANT BRAND SHEATHING PAPER

Deadening Felt.

For use between the first and second floor boards. Similar to sheathing paper, but not sized or calendered so heavily. It is therefore thicker and absorbs sound or moisture more readily. Takes coating or roofing preparations. A simple solution of silicate of soda mopped on the paper will make it adhere to either wood, cement, or metal, and will make it proof against fire and insects.


DEADENING FELT

Duplex Plaster Board.

A utility paper of unequaled merit, combining cheapness, durability, cleanliness, and resistance to cold and moisture.

Used as a substitute for plaster in camps, attics, or summer cottages, it makes warm rooms, and looks well. It may be kalsomined, covered with wall paper, or left as applied.

A PRACTICAL TEST FOR ALL SHEATHING PAPER

Used for lining under shingles, clapboards, and stucco work, it keeps out dampness and cold.

Two colors, red and blue. Rolls of five hundred square feet, weighing sixty pounds. Widths, thirty-six and forty-eight inches.

Medal Brand Corrugated Carpet Lining Felt.

An absolute necessity where noise is unavoidable, on floors or stairs. A heavy corrugated lining paper made of wool fiber. The best for over thirty-five years.

Twenty-five and fifty yard rolls, thirty-six inches wide, weighing one pound to the yard.

For Walls and Floors—Architects and builders also specify Medal Brand where a soundproof, heatproof and coldproof material is needed for sheathing walls, and between floors.

CARPET LINING FELT

UNION FIBRE COMPANY

Sound-Deadening, Sheathing, and Insulating Materials

SALES OFFICE
650 RAILWAY EXCHANGE BUILDING
CHICAGO, ILL.

GENERAL OFFICE
WINONA, MINN.

FACTORIES
WINONA, MINN.
YORKTOWN, IND.

AGENTS IN ALL CITIES. WRITE FOR NAME OF LOCAL FIRM

Products.

Manufacturers of LINOFELT, Quilt Insulation and Sheathing; WATERPROOF LITH BOARD, Cold Storage Insulation; UNION CORK BOARD; FIBROFELT, Felt Insulation Board; and UNION LITH BRINE PIPE COVERING.

Facilities.

All of these products are manufactured in one of the largest exclusive insulation factories in the world. Prompt shipments are assured, because of large stocks.

Linofelt.

Linofelt is made of pure flax fibres (unbleached linen thread) stitched between two sheets of extra strong Kraft paper, waterproof paper, or asbestos paper, according to specifications.

Linofelt is furnished in two general styles:

The first for sheathing houses, like building paper, and for laying under floors or in partitions to deaden the passage of sound. This style is known as Retted and Natural Linofelt, and is generally furnished in 36-inch rolls 66⅔ feet long; also in 48-inch, 32-inch and 16-inch widths to fit exactly over 16-inch center studdings (Fig. 1).

The other style, called Frost-Proof Linofelt, to distinguish it from sheathing Linofelt, is furnished in sizes to fit between studdings, with a 2-inch paper lap on each side to be fastened to the studdings by nailing a lath over it, as shown in Fig. 3. It is cheaper, more efficient, more easily applied than back-plaster. By actual test, Linofelt ¼ inch thick is better for excluding cold, heat and sound than 38 sheets of building paper. It is also furnished in ½-inch thicknesses, when specified; its efficiency increasing proportionately.

Test—Heat transmission of Linofelt, of inch thickness, is 4.55 B. T. U. per square foot each degree difference for 24 hours.

Lith Board, Waterproof and Fireproof Cold Storage Insulation.

Lith Board is a combination of flax fibre, rock fibre wool and a waterproofing compound containing within a unit volume the greatest possible number of extremely small air-spaces. The chemists of this Company have recently, by an improvement in the process of treating the fibre and with a new waterproofing, augmented the strength and insulating qualities of Lith. It has absolutely no capillary attraction; is clean and sanitary; can be sawed like lumber, and is used extensively throughout the world. Lith is furnished in boards, 18 by 48 inches from ½ inch to 3 inches in thickness. Guaranteed equal in efficiency to any other insulation of equal thickness, made. Write for report on comparative tests made by Prof. Gebhardt of Armour Institute.

Test—Heat transmission of one inch thickness of Lith is 5.96 B. T. U. per square foot each degree difference for 24 hours.

Union Cork Board.

Union Cork Board contains two ingredients: pure natural cork granules (95 per cent, by volume), and a specially prepared asphaltum, making it an ideal cold-storage floor insulation. Union Cork Board is furnished in boards 16⅝″ by 34⅝″ from ½ inch to 3 inches in thickness.

Test—Heat transmission of one inch thickness of Union Cork Board is 6.82 B. T. U. per square foot each degree difference for 24 hours.

Fibrofelt Specially Light Weight Insulation.

Fibrofelt is a board form of insulation, regularly put up in sheets 3 feet by 8 feet, in ¼″ to 1″ thicknesses; but furnished, also, in sizes cut for studdings, when specified.

Test—Heat transmission of Fibrofelt, one inch in thickness is 5.4 B. T. U. per square foot each degree difference for 24 hours.

Union Lith Brine-Pipe Covering.

Union Lith Brine-Pipe Covering is being used extensively where a perfect regular, heavy, or ice-water covering is demanded.

Samples, Prices and Catalogues.

We will cheerfully furnish samples, prices and catalogues showing our various materials and the methods recommended by us for application, on request. Correspondence solicited.

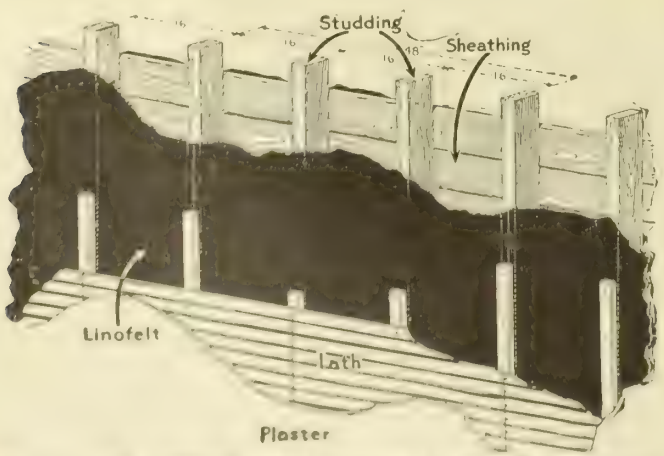


FIG. 1. NEW METHOD OF APPLYING LINOFELT 48 INCHES WIDE

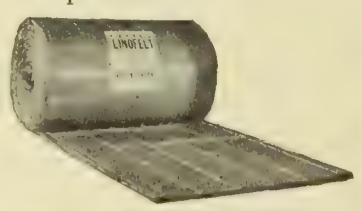


FIG. 2. A ROLL OF RETTED LINOFELT

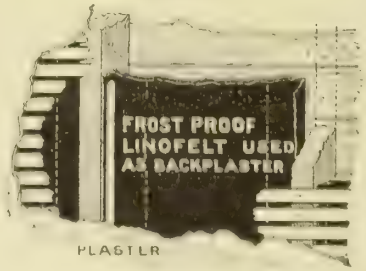


FIG. 3. FROST-PROOF LINOFELT USED AS A BACK-PLASTER

FIG. 4. METHOD OF APPLYING LINOFELT TO OUTSIDE OF HOUSE

UNITED STATES MINERAL WOOL CO.

TELEPHONE CONNECTION

280 Madison Avenue
NEW YORK, N. Y.

FACTORY: STANHOPE, N. J.
(R. R. Station, Netcong, N. J.)

Product.

Mineral Wool, a Non-combustible Insulator and Sound-Deadener.

Character of Mineral Wool.

A mineral substance, made by converting melted scoria into a fibrous state. It holds from 92 to 96 per cent of air in suspension, which is more than any other non-combustible substance.

Uses.

Mineral Wool is used for lining walls, floors, roofs and ceilings, as shown, to some extent, in the accompanying illustration. It is cheap and easily applied.

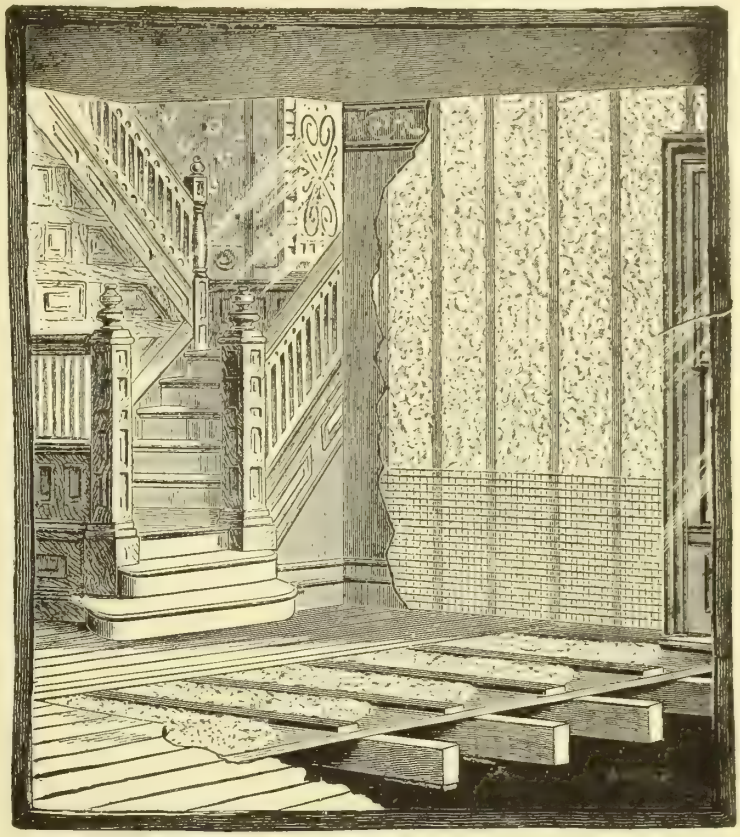
A house lined with Mineral Wool is warm in winter, cool in summer and is thoroughly deafened. The lining is verminproof, checks the spread of fire and keeps out dampness.

How to Estimate.

To find the quantity of Ordinary Mineral Wool required to fill the outside walls the full thickness of studding:

Rule—One pound per square foot for each inch in thickness.

Take the entire distance around the building on a horizontal line and multiply by the height of the studding, which will give the square feet of outside surface. Deduct, ordinarily, one third to one half for space occupied by doors, windows, chimneys, studding, bracing, etc. Multiply the remainder by the thickness of the studding; the result will be the number of pounds of Mineral Wool required to fill the space.



VIEW SHOWING SOME APPLICATIONS OF MINERAL WOOL

Grades and Cost.

The Ordinary grade of Mineral Wool (the quality invariably used in building construction) weighs about 1 pound per square foot, 1 inch thick, or 12 pounds per cubic foot. It costs $20.00 per ton at factory. Within a radius of 200 miles from New York, N. Y., $5.00 per ton will usually cover freight charges. A laborer can apply from ½ to ¾ of a ton a day. The Selected grade of Mineral Wool, which is manufactured for special purposes, is rarely used in buildings.

Package.

The material is packed in three-bushel burlap bags, for which a charge of 12 cents each is made; if returned in good condition, within thirty days, and free of all freight charges, we credit them at price charged.

How to Specify.

"Insulation of Mineral Wool (U. S. Mineral Wool Co., 140 Cedar Street, New York) shall be provided for ..... For floors, it shall be [4 inches] thick and set upon boards placed between beams on cleats. For walls, it shall fill the spaces between studs and be placed in position as the lathing is being proceeded with. For roofs, it shall fill the space between rafters from eaves to [collar beams]. The Wool shall be pressed compactly but lightly."

Samples.

Samples will be gladly supplied, on application.

A PARTIAL LIST OF INSTALLATIONS

BUILDING	LOCATION	ARCHITECT
Schults Bread Co.	Jamaica, L. I.	H. C. Sweeney
Ward Baking Company's Plants	New York and Brooklyn	C. B. Comstock
Jno. D. Rockefeller, Jr., Estate	Pocantico Hills, N. Y.	Delano & Aldrich
Baker House	Glen Cove, L. I.	Walker & Gillette
The Hebrew Sheltering Guardian Society	Hawthorne, N. Y.	H. A. Jacobs
Paul J. Challen	Matteawan, N. Y.	Jackson & Chambers
Veryl Preston	Hohokus, N. J.	Warren & Wetmore
John Gillespie	Morristown, N. J.	Albro & Lindeberg
Estate of Henry H. Wood	Mill Neck, L. I.	A. & F. E. Ware
E. C. Potter, Jr.	Hewletts, L. I.	H. O. Chapman
John W. Castles	Morristown, N. J.	W. Eyre
Dr. Ernest Fahnestock	Red Bank, N. J.	Albro & Lindeberg
E. T. Holmes	Greenwich, Conn.	Carrère & Hastings

THE CLASON ARCHITECTURAL METAL WORKS

Roofing and Sheet Metal Contractors

PROVIDENCE, R. I.

Products.

Architectural Sheet Metal Work and Roofings; also Gutters, Conductors, Hollow Metal Windows, Skylights and Ventilators.

Wire Snow Guards, for Slated, Tiled, Shingled, and Metal roofs, are a specialty product with this company.

Special Service.

We are particularly well equipped to handle roofing, skylight, and sheet metal work on buildings of character; and varied experience, in connection with large residences, institutions, public buildings, etc., has developed a permanent working force trained to the careful interpretation of architects' designs and specifications.

We have had exceptionally successful and extensive experience in the laying of graduated and shaded slate roofs, as well as in the design and erection of skylights and other forms of roofing.

Snow Guards.

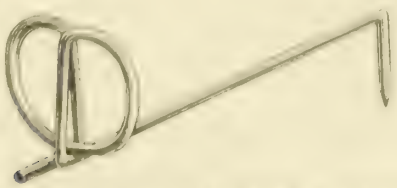
There are many buildings so situated that the use of snow guards is essential to personal safety; there are more cases where the use of snow guards could protect the surrounding roofing and sheet metal work against costly damages.

Sliding snow and ice often injure roofings, and puncture or tear away gutters, etc. The use of our snow guards forestalls these dangers, as they hold the ice and snow where they form. They are a cheap and unobtrusive preventive against damage.

Description.

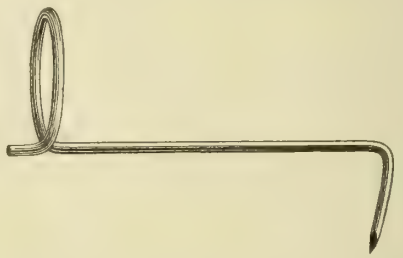
Three general designs of snow guards are manufactured: The "Clason," the "H-B," and the "H-B Special."

"Clason"—The "Clason" Snow Guard for new roofs has been our standard guard for years, and we claim it without hesitation to be the strongest snow guard made. Note from the cut that the "butterfly" loops brace and strengthen each other, while the brace extending below the loops gives additional strength. Although the "Clason" is higher in price than the "H-B" Guard, it has consistently been the best seller.



"CLASON" SNOW GUARD FOR NEW ROOFS

"H-B"—The "H-B" Snow Guard for new roofs, as may be seen in the illustration, is made with a single loop and extension brace. It is made of the same gauge of wire as the "Clason," but is sold at a lower price because less wire and labor is required in its manufacture. It is a strong service-giving guard.



"H-B" SNOW GUARD FOR NEW ROOFS

Materials.

These Snow Guards are made from either pure copper or galvanized steel wire, especially selected for ductility and stiffness. Please note carefully that copper-plated or copper-covered steel wire is *not* used. Pure copper guards last as long as the roof.

Number Per Square.

The following table gives the approximate number of snow guards which may be safely specified:

Roof Pitch	Number Per Square
One quarter	50
One third	75
One half	150

This table must be varied to suit conditions. Towers, steep roofs, and large sized slate may require more snow guards than indicated in the above.

How to Specify.

Apply to all pitched roofs "Clason" [or "H-B"] Snow Guards, as made by the Clason Architectural Metal Works, Providence, R. I. The guards to be made from Pure Copper [or Galvanized Steel] Wire. (Here specify the number required per square, dependent upon the pitch of the roof and the size of the roofing material.)

Installation.

In applying the "Clason" and "H-B" Guards to new roofs, the eaves course should be laid with close joints, as usual, but the next course should be laid with the joints slightly open to receive the shank of the guard. After lining for the third course, place the guards in the joints, with the loop just below the lap of the course, and drive the prong into roof boards; then lay the course, which will leave only the loop exposed. Care should be taken to have the shank well sunk into the joints, so that slate of following course will lie perfectly flat and not bear upon the guard.

CORNELL IRON WORKS

Manufacturers of Rolling Steel Shutters and Doors

TELEPHONES:
CHELSEA { 279
550

26th Street and 11th Avenue
NEW YORK, N. Y.

Products.

ROLLING STEEL SHUTTERS and DOORS, HAND, CHAIN and MOTOR OPERATED, for Residences, Office Buildings, Garages, Wharves and Piers, Warehouses, Elevator Shafts, Store Fronts and Buildings of all kinds.

Description.

Material consists of deep, corrugated, strong and stiff continuous sheets of flexible open-hearth steel. Edges reinforced with malleable shields to take up wear in the side guides. Construction of steel throughout.

Operation.

There are three typical methods of operation:

Self-coiling type, standard for openings up to one hundred square feet. Push up and pull down by hand. The quickest acting construction possible.

Hand chain and gearing. Standard for openings of over one hundred square feet. Shaft revolved by endless hand chain acting through single or compound gears.

Automatic closing, controlled by fusible link melting at 150 degrees Fahr.

Motor, worm and bevel gear drive are also used in special cases.

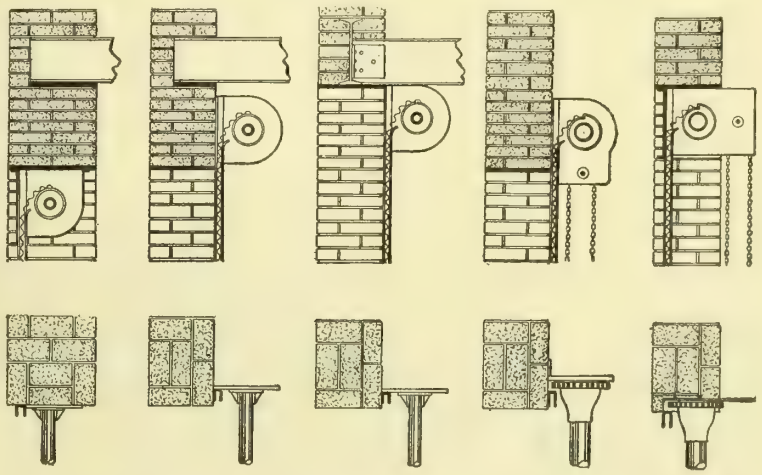
Advantages.

Our doors present to smoke and flame a continuous sheet of deep corrugated steel. By use of a special die the rigidity of the sheets is increased about twenty-six times; all parts are reached by the painter's brush, no points or slats to invite corrosion. Repairs, due to accidents, can be made with great convenience.

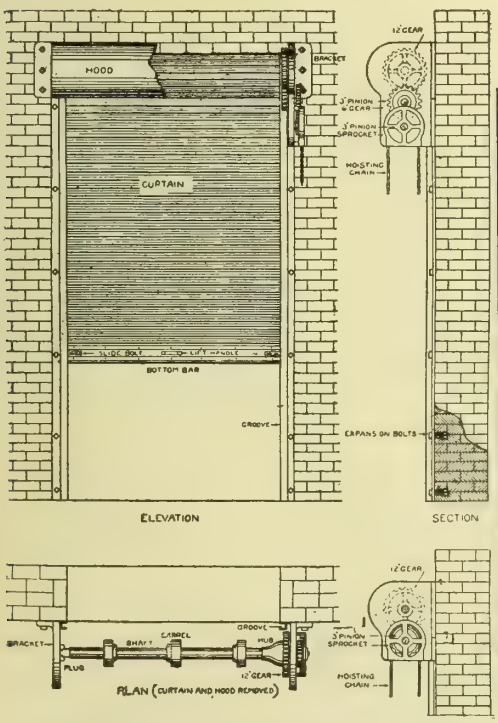
Installations of forty years and more speak for the wearing qualities of our shutters.

DIAMETER OF COIL FOR VARYING HEIGHTS, WHEN ROLLED UP

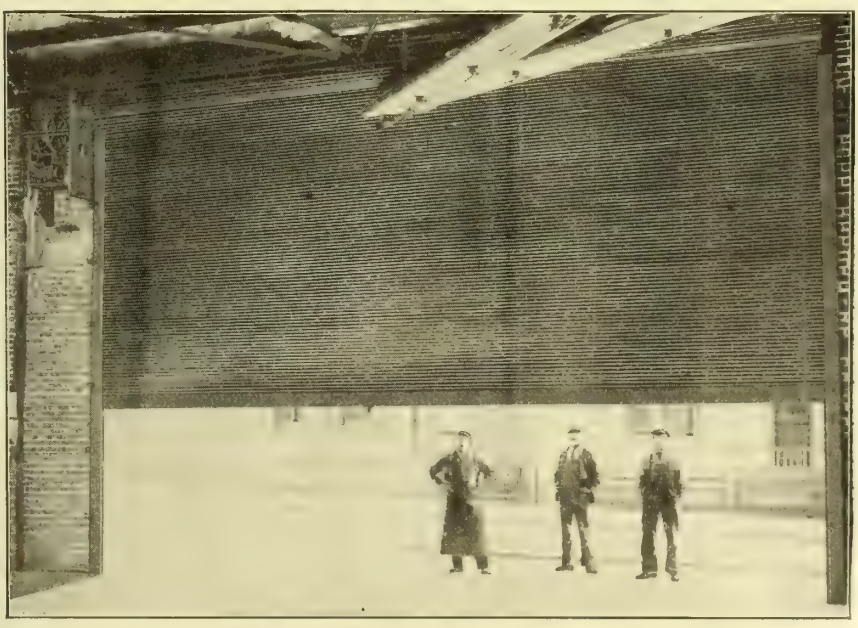
Height of Opening, Feet	8	10	12	14	16	18	20	22	24
Diameter of Coil, Inches	11½	12	13	15	15½	16	16½	17	17½



SECTIONS AND PLANS SHOWING VARIOUS LOCATIONS OF ROLLING SHUTTERS AND DOORS, WITH RELATION TO LINTELS AND JAMBS



DETAILS OF CONSTRUCTION OF CORNELL ROLLING STEEL DOORS



CORNELL ROLLING STEEL DOOR

29 feet wide by 20 feet high, motor driven. Used in Car Barns, Pottsville, Pa.

GEORGE W. BROWNYARD CO., INC.

Manufacturers of Fireproof Doors and Windows

MAIN OFFICE AND FACTORY

Winton Road, North
ROCHESTER, N. Y.

BRANCH OFFICES

NEW YORK, N. Y. CLEVELAND, OHIO BUFFALO, N. Y. SYRACUSE, N. Y. UTICA, N. Y. NORFOLK, VA.

Products.

METAL COVERED DOORS, WINDOWS and MOULDINGS; UNDERWRITERS' STANDARD LABELED HOLLOW METAL WINDOWS; UNDERWRITERS' STANDARD LABELED TIN-CLAD FIRE DOORS and SHUTTERS; PRESSED STEEL COMBINATION STAIR RISERS and TREADS, and COLUMN GUARDS; HOLLOW STEEL DOORS and JAMBS; COPPER and BRONZE STORE FRONT CONSTRUCTION; AUTOMATIC STAGE SKYLIGHTS.

Construction.

Covering—Approved Metal Covered Doors, Sash and Trim are made in kalamein iron, copper, bronze, or other metal specified.

EXTERIOR VIEW OF KALAMEIN WINDOWS IN SCHOOL BUILDING

Wood—All wood cores are non-resinous and thoroughly kiln dried.

Panels—Doors are not limited to any one panel arrangement or moulding design, and therefore can be made to match particular woodwork.

Finish—Plain, primed, or finished in baked or air-dried enamel in imitation wood grain.

Automatic Stage Skylights.

Automatic Stage Skylights are made in any metal specified and are especially adapted for use in theaters. They are positive in action and are much more dependable than the gravity type.

KALAMEIN DOORS AND VESTIBULE

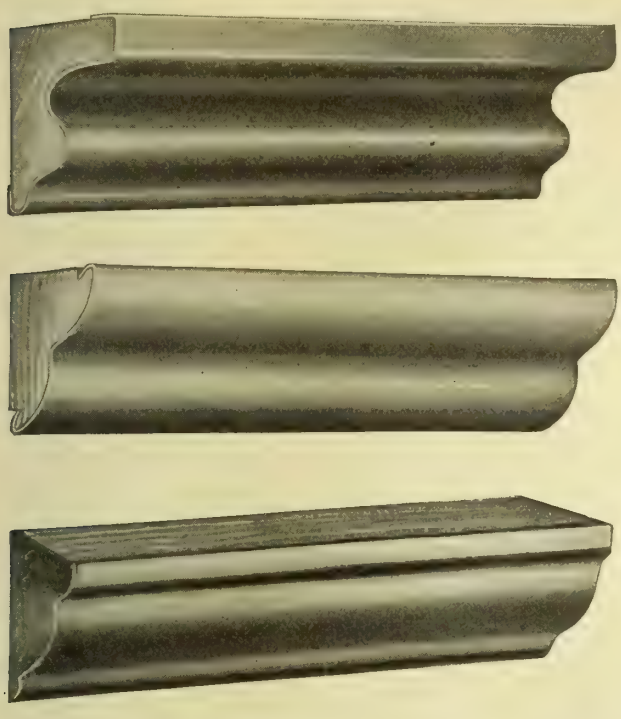
KALAMEIN DOOR AND PARTITION WORK

Continued on next page

Mouldings.

A large stock of metal covered moulding is carried in various designs for immediate shipment.

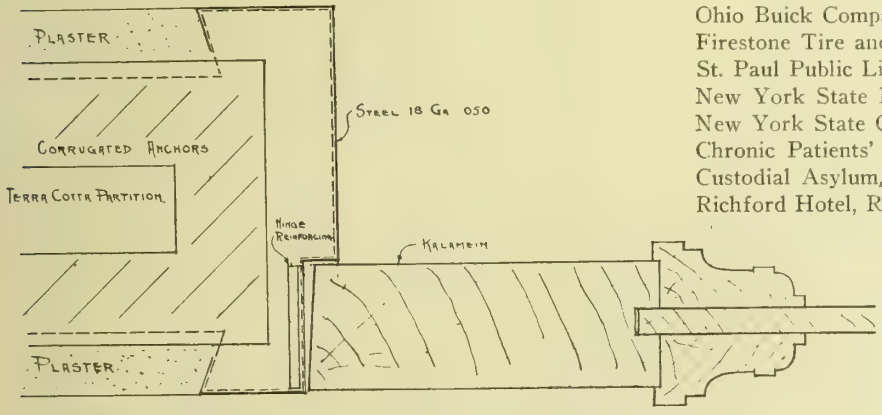
Finish can be furnished in aluminum, brass, bronze, copper (plain or oxidized), German silver and steel (any finish).



EXAMPLES OF BROWNYARD STANDARD METAL COVERED MOULDING

Hollow Steel Door Jambs.

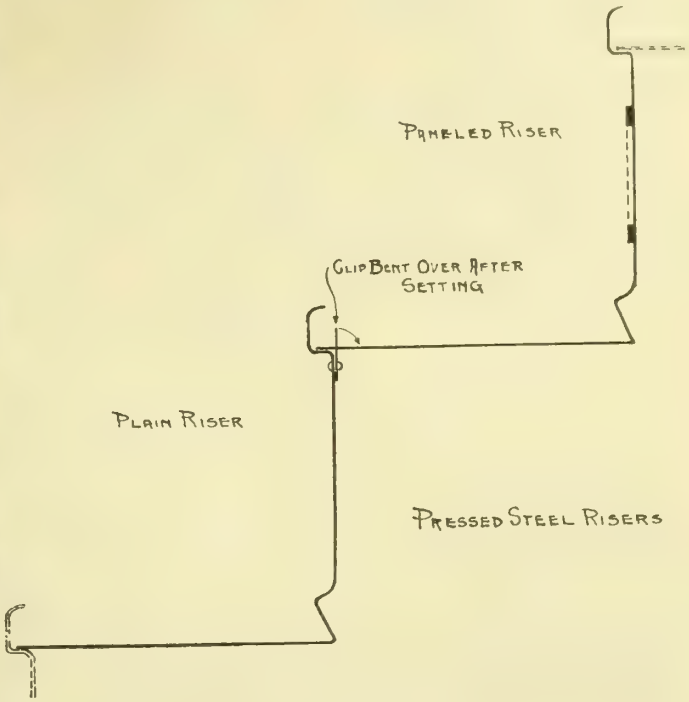
This type of jamb is now being used in many instances in place of kalamein covered wood jambs. In this way the trim can be omitted, by plastering directly up to the jambs. Also wood bucks need not be used.



SECTION THROUGH STEEL JAMB AND KALAMEIN IRON COVERED DOOR

Pressed Steel Combination Stair Risers and Treads.

These risers and treads have proved to be economical in cost and easy of installation. When filled with concrete, terrazzo or other material, they form a complete fireproof stair. Plain or paneled riser can be furnished if desired.



DETAILS OF PRESSED STEEL STAIR RISERS AND TREADS

Estimates.

Requests for estimates should contain number of items required, the size of the masonry opening and kind of glass, as well as the paneling and type of jambs.

Installations.

Remington Arms and Ammunition Company, Bridgeport, Conn., and Ilion, N. Y.
Ohio Buick Company, Cleveland, Ohio
Firestone Tire and Rubber Company, Akron, Ohio
St. Paul Public Library, St. Paul, Minn.
New York State Education Building, Albany, N. Y.
New York State Capitol, Albany, N. Y.
Chronic Patients' Hospital, Binghamton, N. Y.
Custodial Asylum, Newark, N. J.
Richford Hotel, Rochester, N. Y.
Brewster-Gordon Warehouse, Rochester, N. Y.
Iola Sanitarium, Rochester, N. Y.
Rochester Public Schools, Rochester, N. Y.
St. Mary's Church, Akron, Ohio
Gilmore Office Building, Springfield, Mass.
Juvenile Detention Home, Cleveland, Ohio
Strand Theater, Syracuse, N. Y.

COBURN TROLLEY TRACK MFG. CO.

Standard Metal Covered Fire-Doors and Shutters

HOLYOKE, MASS.

WAREROOMS

NEW YORK, 90 West Street — PHILADELPHIA, 422 Commerce Street — BOSTON, 180 High Street — CHICAGO, 65 East Lake Street

Products.

National Standard Two- and Three-Ply, Double and Single Lock Joint Metal Covered Fire-Doors and Shutters, and Hardware; Kalamein Iron or Copper Covered Panel Doors and Trim for general interior use; Kalamein Iron or Copper Covered Elevator Doors; House, Barn, and Garage Door Hangers and Track.

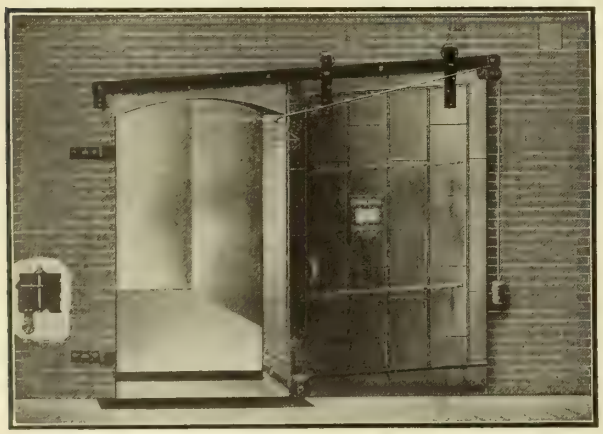
Also, Swing Fire-Door Iron Jamb Frames; Fire Trap-Door Fusible Link Fixtures; Rolling Ladders for high shelving, and Overhead-Track Conveying Systems.

Coburn Fire-Doors and Shutters.

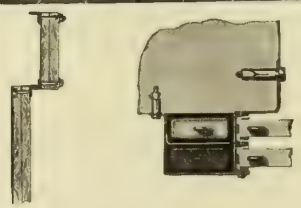
Coburn fire-doors and shutters, as well as the hardware, are manufactured, labeled and inspected under the supervision of the Underwriters' Laboratories, Inc. They are carefully constructed in strict compliance with the building department requirements of all large cities, and have stood the test both as to appearance and as to service in many important buildings throughout the United States.

The sliding doors hang and operate freely. Swing doors should be arranged to open to an angle of not more than one hundred and ten degrees from opening, and should preferably be adjusted to open to an angle of not more than ninety degrees. By so doing, there is less danger of the doors being obstructed when closing.

Shutters can be fitted with an operating mechanism, which gives full control of their simultaneous operation from any single interior or exterior point.

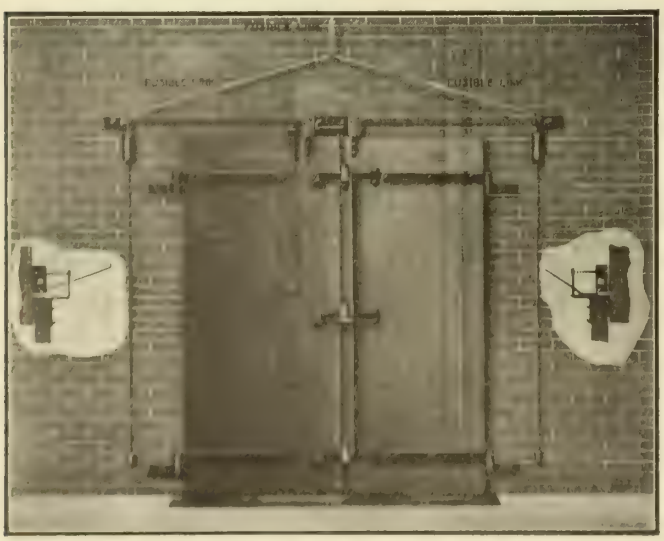


NATIONAL STYLE "A" INCLINE SLIDE FIRE-DOOR



STYLE "I" ELEVATOR DOOR
Double Vertical Slide

COBURN METAL COVERED PANEL DOOR AND TRIM



STYLE "SN" DOUBLE SWING OVERLAP FIRE DOOR

Well Side — Entrance Side
METAL COVERED PANEL ELEVATOR DOORS

Continued on next page

LIST PRICES OF COBURN APPROVED DOORS AND SHUTTERS

Not Including Hardware

Three-ply doors, 2½ ins. thick, with National Standard double lock joint tinning, using 14 x 20 ins. I. C. 113-lb. plates per sq. ft..... $0.70

Three-ply doors, 2½ ins. thick, with Commercial single lock joints, using 14 x 20 ins. I. C. 108-lb. plates per sq. ft..... .60

Two-ply shutters, 1¾ ins. thick, with National Standard double lock joint tinning, using 14 x 20 ins. I. C. 113-lb. plates per sq. ft..... $.60

Two-ply doors and shutters, 1¾ ins. thick, with Commercial single lock joints, using 14 x 20 ins. I. C. 108-lb. plates per sq. ft..... .50

DATA NO. 100 HANGERS

No.	Size Opening Ft.	Size Opening Ins.	Weight, Lbs.	List
Single Doors				
1	2	6	15	$3.00
2	3	0	17½	3.00
3	3	6	20	3.50
4	4	0	22½	4.00
5	4	6	25	4.25
6	5	0	27½	4.50
7	5	6	30	4.50
8	6	0	32½	4.50
8½	6	6	35	4.75
9	7	0	37½	5.00
9½	7	6	40	5.25
10	8	0	42½	5.50
Double Doors				
11	4	0	24½	5.50
12	4	6	27	5.75
13	5	0	29½	6.00
14	5	6	32	6.00
15	6	0	34½	6.00
16	6	6	37	6.25
17	7	0	39½	6.50
17½	7	6	42	6.75
18	8	0	44½	7.00
18½	8	6	47	7.25
19	9	0	49½	7.50
19½	9	6	52	7.75
20	10	0	55	8.00

Hangers only, for single doors, 2½ lbs., per set..... $1.50

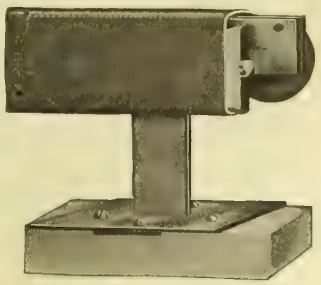
Hangers only, for double doors, 4¼ lbs., per set..... $3.00

Application of No. 100 Hangers

Allow from top of door to underside of heading timber, 6 ins.

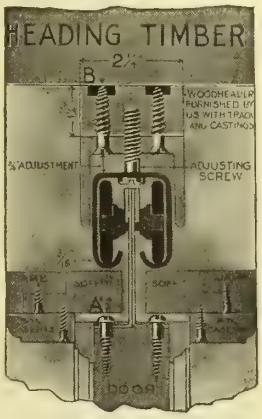
Allow for pocket space at least 1 in. in excess of thickness of door.

For length of pocket space required, double the width of opening and add 6 ins. for the two end lugs.



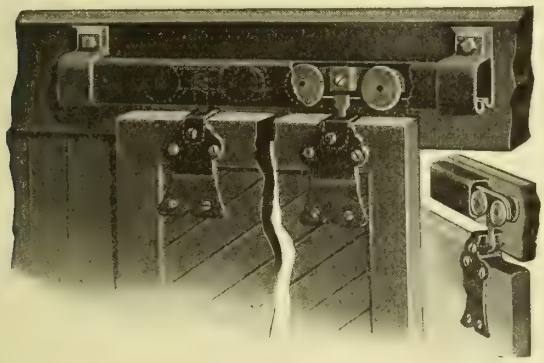
NO. 100. HOUSE DOOR HANGER

Self-lubricating bearings, double fiber trolleys. Packed in sets with stops, guides and screws. Track adjustable on wood headers



SECTIONAL DETAIL

Showing application of No. 100 House Door Hangers, Tracks, etc.



BARN DOOR HANGER NO. 120

Roller Bearings, Iron Trolleys, Lateral Adjustment. Used with No. 1 Trolley Track

Price-List

Hangers (without Track Brackets), per pair..... $2.50
Hangers (with 3 Side Wall Brackets), per set..... 3.10
No. 1 Track, per foot..... .20
Side Wall Brackets, each..... .20
Side Wall Center Stop Bracket, each..... .35

Weights

No. 120 Hangers, per pair..... 8 lbs.
No. 120 Hangers, per set..... 14 lbs.
No. 122 Hangers, per pair..... 9 lbs.
No. 122 Hangers, per set..... 15 lbs.
No. 1 Track (any length up to 10 ft.), per foot..... 1½ lbs
Side Wall Brackets, each..... 1½ lbs.

Distance from top of Door to top of Bracket, 5¼ ins.
Bolt hole in Bracket, 4⅝ ins.; top of Ceiling Bracket, 4¼ ins.
Suitable for Doors weighing 300 lbs.
No. 120 for Doors 1¾ to 2¼ ins. thick.
No. 122 for Doors 2¼ to 3 ins. thick.

DATA NO. 220 HOUSE DOOR HANGERS

No.	Size Opening Ft.	Size Opening Ins.	Weight, Lbs.	List
Single Doors				
1E	2	6	23	$ 5.25
2E	3	0	26½	5.25
3E	3	6	30	5.75
4E	4	0	33½	6.25
5E	4	6	37	6.50
6E	5	0	41½	6.75
7E	5	6	44	6.75
8E	6	0	47½	6.75
8½E	6	6	51	7.00
9E	7	0	54½	7.25
9½E	7	6	58	7.50
10E	8	0	61½	7.75
Double Doors				
11E	4	0	39	8.00
12E	4	6	42½	8.25
13E	5	0	46	8.50
14E	5	6	49½	8.50
15E	6	0	53	8.50
16E	6	6	56½	8.75
17E	7	0	60	9.00
17½E	7	6	63½	9.25
18E	8	0	67	9.50
18½E	8	6	70½	9.75
19E	9	0	74	10.00
20E	10	0	81	10.50

Hangers only, for single doors, 5½ lbs., per set..... $2.00

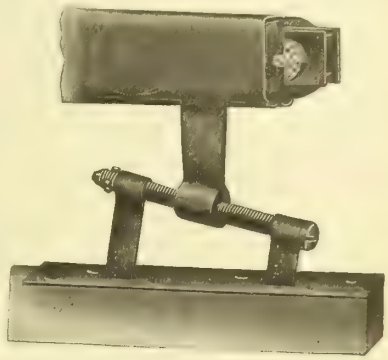
Hangers only, for double doors, 11 lbs., per set..... $4.00

Application of No. 220 Hangers

Allow from top of door to underside of heading timber, 8¾ ins.

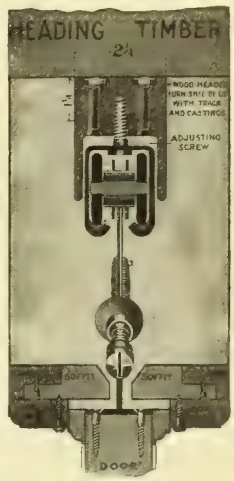
Allow for pocket space at least 1 in. in excess of thickness of door.

For length of pocket space, double the width of opening and add 6 ins. for the two end lugs.



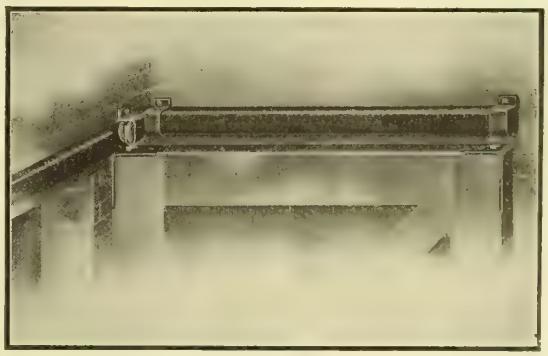
NO. 220. HOUSE DOOR HANGER

Roller bearing, double iron trolley. Adjustable pendant, wood lined adjustable track. A perfectly noiseless hanger. Wheels run on hard maple



SECTIONAL DETAIL

Showing application of No. 220 House Door Hangers, Track, etc.



GARAGE DOOR HANGER NO. 195

Roller-Bearing Carriers with Single Trolley. Corner Door Hangers

	Price-List		Weight.
No. 195-A.	Hangers (for No. 1 Track), per pair	$4.00	3 lbs.
	Track No. 1, per foot	.20	
	No. 1 Track Brackets, Side Wall, each	.20	
No. 195-B.	Hangers (for No. 2½ Track), per pair	5.00	5 lbs.
	Track No. 2½, per foot	.30	
	No. 2½ Track Brackets, Side Wall, each	.35	
No. 195-C.	Hangers (for Nos. 3 or 4 Track), per pair	6.00	12 lbs.
	Track No. 4, per foot	.50	
	No. 4 Track Brackets, Side Wall, each	.80	

Track on wall at right angles to opening projects into wall far enough to allow door to close tightly against wall.

Swivel Carriers, for hanging a door that will slide on a wall at a right angle to the door opening. Something novel and practical. Easily applied and operated.

THE EDWARDS MANUFACTURING COMPANY

INCORPORATED 1901

Rolling Doors

CINCINNATI, OHIO

LESTER G. WILSON, Consulting Engineer and Patentee

BRANCH OFFICES AND WAREHOUSES

NEW YORK, N. Y., 81-83 Fulton Street
DALLAS, TEX., 1635-37-39 Pacific Avenue
PITTSBURGH, PA., 1501 Oliver Building
SAN FRANCISCO, CAL., 315-319 Monadnock Building

Products.

Rolling Steel Doors and Shutters.

For Metal Ceilings, General Roofing Tile, Skylights, Ventilators, etc., see our name in General Index.

Rolling Steel Doors.

Doors have been designed by this Company's engineer, and successfully constructed for doorways of all sizes up to 40 feet in width, and for openings over 100 feet in height.

Rolling Shutters.

Shutters have been designed for windows and skylights. This Company is prepared to manufacture the combination complete, and with wire glass if desired. The rolling shutters are often operated in groups and sometimes by electric motors.

Special Drawings.

This organization will gladly prepare details and specifications for *all* types of doors and shutters, and so assist owner, architect or engineer to select the best and most economical installation.

Uses.

Specify Edwards Rolling Doors and Shutters for:

R. R. Shops
R. R. Roundhouses
R. R. Freight Sheds
Express Buildings
Steamship Docks
Grain Elevators
Telephone Exchanges
Jails
Banks
Libraries
Armories
Gun Sheds
Post Offices
Garages
Car Houses
Warehouses
Factories
Elevators
Craneways
Power Plants
Boiler Fronts
Transformers
Subways
Store Fronts
Stairways, etc.
Residences during closed seasons
Federal, County and Municipal Buildings
Office Buildings, Rear and Court Windows
Dampers for Heating and Ventilating Systems
Rolling Partitions for Churches and Schools
Cotton Mills, Compresses and Warehouses

Standard Applications.

There are a great variety, because almost every building presents different conditions. A few are illustrated below.

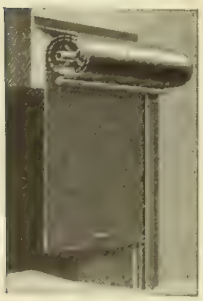


Fig. 1

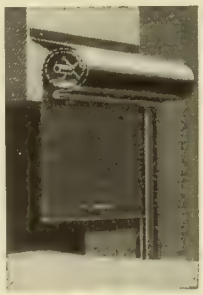


Fig. 2

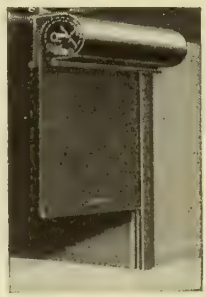


Fig. 3

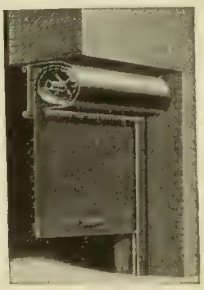


Fig. 4

Fig. 5

INSIDE AND OUTSIDE HANDLE-OPERATED ROLLING STEEL DOORS, SHOWING VARIOUS METHODS OF APPLYING

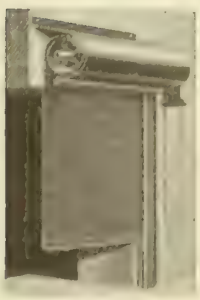


Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

HEAVY ROLLING STEEL DOORS, CHAIN GEAR OPERATED, SHOWING VARIOUS METHODS OF APPLYING

Continued on next page

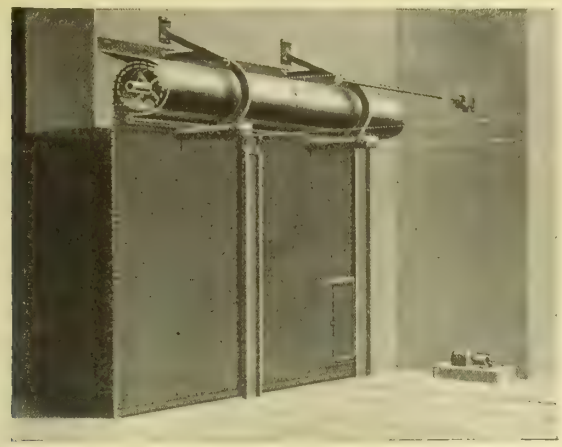


FIG. 11. MOTOR-OPERATED ROLLING STEEL DOOR INSTALLED IN CAR HOUSE

Equipment.

All Edwards rolling doors may be equipped, if so ordered, with:

(1) Patented Trolley Bridges, for car houses.

(2) Patented Wicket Doors, hinged to either side.

(3) Patented "Spring Release" Mechanism, to cause door to close automatically in case of fire.

(4) Patented "No-Key" Padlock, either for hasp on bottom bar, or for operating chain.

(5) Patented electric motor operation or other special gearing.

(6) A combination of both. For example, to open and close car house doors in groups of two or more; to open and close craneway doors simultaneously in groups (such as designed by our engineer for The Panama Canal); double chain or crank gearing to operate door from both inside and outside of building.

(7) Hinged or removable post, to swing up out of the way, or to be removed to a corner.

(8) Hoods, D-shaped or ornamental; necessary when doors coil outside.

How to Specify.

Edwards Rolling Doors of *Interlocking Steel Slat,* style [22, 20, 18, 16, or 14] U. S. gauge, bright [or galvanized], painted, and equipped with grooves and counterbalancing springs, enclosed and protected by hollow shafts. The coils to be covered by galvanized D-shaped hoods; all as arranged in Figures 1 to 11 (selected from opposite page). Fastened as shown on Architect's detail No. ..... to wood, steel, concrete or brick. To be erected by the manufacturer [or by the general contractor].

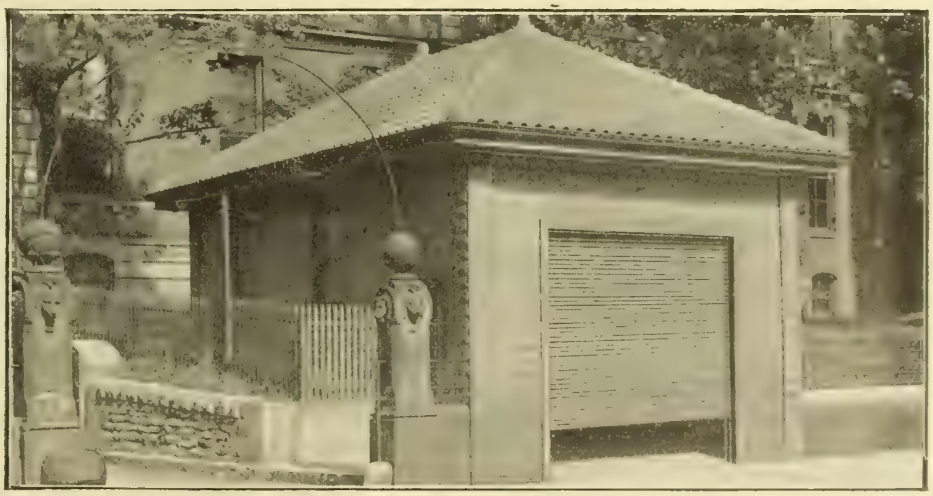
Edwards Rolling Doors of *Corrugated Steel Sheets,* locked together without rivets, black [or galvanized], painted and equipped with grooves, counterbalancing springs enclosed and protected by hollow shafts, also galvanized D-shaped hoods to cover the coils; all as arranged in Figures 1 to 11 (selected from opposite page). Fastened as shown on Architect's detail No. ..... to wood, steel, concrete or brick. To be erected by the manufacturer [or by the general contractor].

Section of Interlocking Slat

Rolling Slat Doors (LESTER G. WILSON, Patentee)

DETAIL AND INSTALLATION OF INTERLOCKING SLAT ROLLING STEEL DOOR
Proof against Burglars, Riots, Fire and Weather

Section of Corrugated Sheet



Rolling Corrugated Doors, Cincinnati, Ohio.

DETAIL AND INSTALLATION OF CORRUGATED SHEET ROLLING STEEL DOOR
Proof against Burglars, Riots, Fire and Weather

HOWELL, FIELD & GODDARD, INC.

MANUFACTURERS OF

Metal Covered Doors, Windows and Interior Finish, Steel Bucks and Trim

OFFICE AND FACTORY

Review Avenue. Young and Gilbert Streets

LONG ISLAND CITY, N. Y.

Telephones: Office and Factory, 1901 and 1902 Hunters Point

Products.

Metal Covered Doors, Windows and Interior Finish of any metal desired.

Underwriters' Tin Covered Fire-Doors.

Steel Bucks, Jambs and Trim combined.

Sanitary Steel Hospital Bucks.

Austral Type Windows.

Also, Champion Metal Weather Strips, manufactured and installed under Patent License agreement, for which see General Index.

Information and Service Department.

Architects and owners with problems regarding Underwriter or Insurance requirements in connection with fireproof doors and windows, or as to where and how you should install fireproof doors and windows, may write us and we will be pleased to furnish specifications and details covering requirements.

To facilitate the manufacture and sale of these products, and to assist architects in selecting and specifying the material best suited to their requirements, we have given distinguishing trade-names to the different types of doors manufactured by us.

Simplex Door.

A composite door with stiles and rails of sound dry white pine, covered with kalamein iron drawn smoothly over the wood core. The panels are of 12-gauge steel, securely rabbeted into stiles, the joints between metal covering of stiles and rails being locked together by our own patented method.

Matchless Door.

This door is similar in every way to the Simplex, except panels are made with two sheets of metal securely glued to a composition board panel ¼-inch thick.

Top Notch Door.

This high-class 24-gauge steel covered door is designed to give a high degree of fire protection and heat-retarding efficiency. When enameled and grained, it will equal in every way the appearance and wearing quality of all-steel doors. This type of door is as solid and soundproof as a wood door. The Top Notch will be furnished with Underwriters' Label, if desired.

Standwell Door (Patent applied for).

The Standwell door is the result of consistent evolution, and a desire on the part of this company to produce a door which would be an efficient fire stop, covering all the requirements of the National Board of Fire Underwriters, and at the same time eliminate the necessity of an architect or owner purchasing a cheaper product with relatively no merit as a fire retardant.

It is a known fact that metal covered doors of mortised and tenoned or lag screwed construction, when hung to metal covered jambs, are useful as a fire retardant for only a very limited time. With these facts before us, our engineers have perfected the Standwell door—a door which has withstood the maximum tests of the Underwriters' Laboratories, and which, by our standardized shop methods, can be produced of a guaranteed uniform quality.

The Standwell doors are all made by the same method whether labeled or not, the only additional expense incurred by the labeled door being the cost of the label and inspection. Our construction is a radical change from the old methods. The metal coverings of the rails and stiles are joined to the panel metal by welding, making them as one piece. The joints between stiles and rails are locked by our own patented method, which makes the strongest joint it is possible to produce. All joints are finished flush and smooth. All mouldings are of drawn steel. All metal used has been selected by our engineers as most suited (including the gauge) to produce the best results.

Doors are guaranteed free from waves and buckles or other defects. When enameled and grained, their beauty cannot be excelled. Write for stock list.

Acme Bucks.

Combined buck and jamb, covered on all sides with kalamein iron, add to the fireproof qualities of a building and avoid the necessity of rough bucks and plaster grounds, making a distinct saving. See Figs. 1, 2 and 3 on following page.

All-Steel Combined Bucks, Jambs and Trim.

Bucks of this type, as shown in Figs. 4, 5 and 6 cannot be excelled for beauty, strength and durability or economy. They are easily installed at the building, and eliminate the necessity of using rough bucks, separate jambs and plaster grounds. Write for full-sized

Sweet's Catalogue

Continued on next page

details and further information regarding modern fireproof doorways.

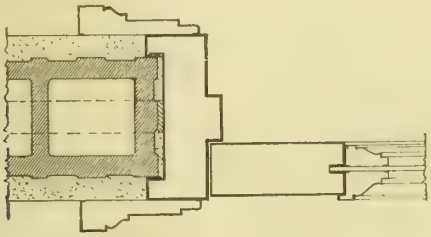


Fig. 1. ACME BUCK AND SIMPLEX DOOR

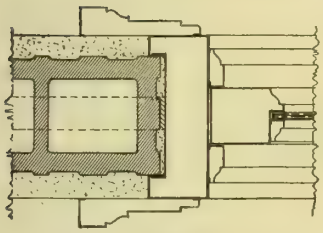


Fig. 2. ACME BUCK AND SASH

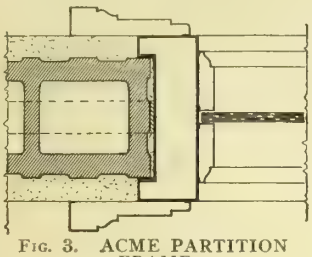


Fig. 3. ACME PARTITION FRAME

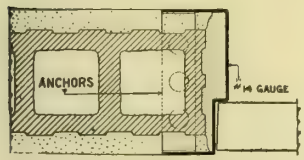


Fig. 4. SANITARY HOSPITAL BUCK

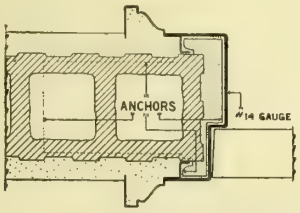


Fig. 5. MOULDED STEEL BUCKS WITH ADJUSTABLF SLIP ANCHORS

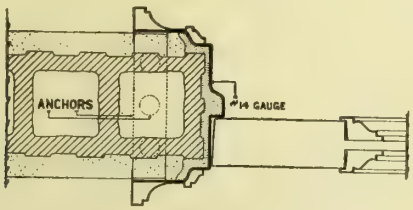


Fig. 6. SPECIAL MOULDED STEEL BUCKS

Suggestions for Selecting Metal Covered Doors.

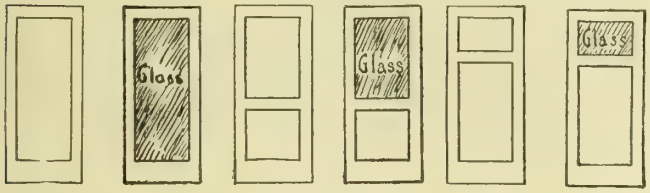
The different types of doors are made in designs as follows:

Simplex, Nos. 1, 2, 3, 4, 5 and 6.
Matchless, Nos. 1, 2, 3, 4, 5 and 6.
Top Notch, Nos. 1 and 3.
Standwell, Nos. 1, 2, 3, 4, 5 and 6.
Miscellaneous kalamein doors, Nos. 1 to 12 inclusive.

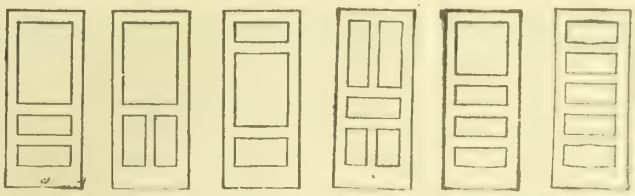
In selecting designs for fireproof doors it is well to remember that the most expensive door is the one with the most panels.

Underwriters' Labels.

Panel doors for vertical shaft openings of both our



No. 1 No. 2 No. 3 No. 4 No. 5 No. 6
TYPICAL DESIGNS FOR METAL COVERED DOORS



No. 7 No. 8 No. 9 No. 10 No. 11 No. 12
TYPICAL DESIGNS FOR METAL COVERED DOORS

Top Notch and Standwell types will be labeled for single doors up to 48 inches wide, and for pairs up to 72 inches wide.

Glass opening doors for corridor and room partitions of our Standwell type will be labeled without limitation in size, and with or without wire glass panels. Glass not to exceed 36 inches in either dimension.

Glass opening doors for fire-escapes of our Standwell and Top Notch types will be labeled for single doors 48 inches wide, and for pairs 72 inches wide. Each light of wire glass not to exceed 720 square inches exposed surface.

Glass opening doors cannot be labeled by any manufacturer for use in vertical shaft openings.

Doors can be labeled regardless of frame; but in order to obtain the maximum insurance credit, doors must be hung in a manner approved by the local Underwriters having jurisdiction.

Standwell or Top Notch labeled doors, when hung to steel bucks, as shown in Figs. 4, 5, and 6, or to channel or angle iron frames, as approved by the Underwriters, when equipped with approved hardware, will procure the lowest insurance rate obtainable.

Austral Type Metal Covered Windows.

Austral type metal covered windows, as manufactured by Howell, Field & Goddard, Inc., offer exceptional values for architects and owners desiring a high class product which is truly weatherproof. We guarantee this window against an air leakage of over 25 cubic feet per minute under a wind velocity of 75 miles per hour. The ventilating feature cannot be excelled. There are no complicated fixtures to get out of order.

Fig. 7. Ventilation without draft Fig. 8. Top sash reversed for cleaning
AUSTRAL TYPE METAL COVERED WINDOWS

THE KINNEAR MANUFACTURING COMPANY

Steel Rolling Doors, Shutters and Partitions

COLUMBUS, OHIO

BRANCH OFFICES

BOSTON, MASS., 85 Water Street
PHILADELPHIA, PA., 1011 Chestnut Street
SAN FRANCISCO, CAL., 517 Rialto Building
CHICAGO, ILL., 1312 Corn Exchange Bank Building
CLEVELAND, OHIO, 409 Union Building
DETROIT, MICH., 709 Ford Building

AGENCIES

CINCINNATI, OHIO
DENVER, COLO.
INDIANAPOLIS, IND.
ST. LOUIS, MO.
LOS ANGELES, CAL.
NEW ORLEANS, LA.
ATLANTA, GA.
NEW YORK, N. Y.
PITTSBURGH, PA.
SEATTLE, WASH.
MONTREAL, CANADA
VANCOUVER, B. C.
MEMPHIS, TENN.

Products.

STEEL ROLLING DOORS and SHUTTERS; WOOD ROLLING DOORS and PARTITIONS; BI-FOLDING DOORS; SLIDING FIRE-DOORS; FIRE-DOOR HARDWARE.

Improved Construction.

We are constantly making improvements. A department is devoted exclusively to development and designing. The following pages illustrate but few of the many constructions we are prepared to furnish. We invite correspondence relative to special or unusual requirements.

Installation.

Any good mechanic can erect our material. Blueprints and instructions accompany every shipment, showing the application and the method of erection.

Catalogues.

Catalogues, illustrating numerous doors and shutters not shown herein, will be sent on request.

Fire Protection.

Our Steel Rolling Doors and Shutters are built entirely of steel. They are one of the best types of fire retardants for the protection of window exposures on alleys and light courts, for elevator shaft openings and in many similar situations for buildings of all classes. For protection of fire-wall openings we recommend our sliding door or our steel rolling door. We are prepared to supply specially constructed doors sold under the trade-names of "Abacus" and "Ajax." They are included in the approved list issued by the National Board of Fire Underwriters and are inspected and labeled under the supervision of the Underwriters' Laboratories, Incorporated.

MARSHALL FIELD DEPARTMENT STORE, CHICAGO, ILL.

Showing application of Kinnear Steel Rolling Doors to fire walls. Operation of these doors is effected from either side of partition, by means of [illegible] motion is transmitted to shutter barrel through vertical shaft and suitable reduction gear. All mechanism concealed in the jambs. Doors are also arranged to close automatically, and speed of descending curtain is governed

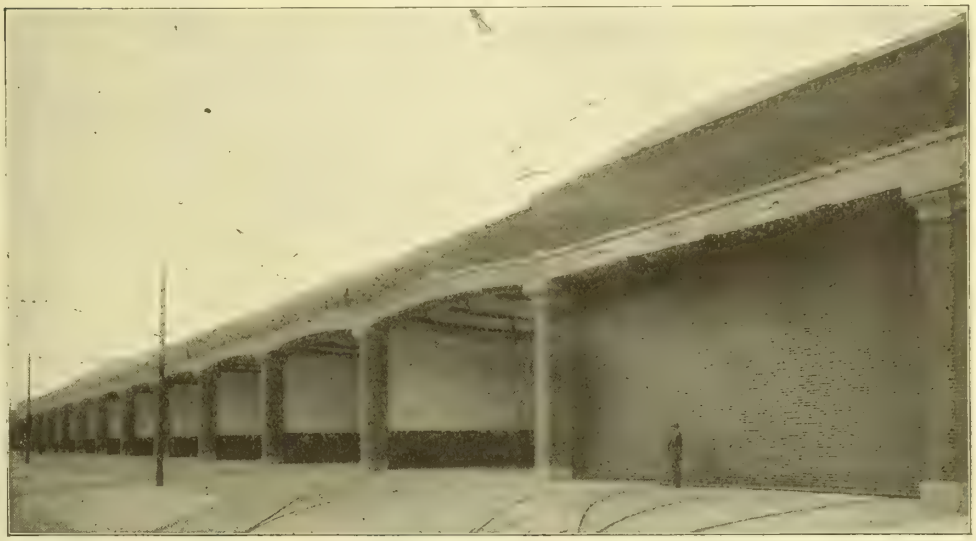
Continued on next page

Illustrations of Kinnear Steel Rolling Doors.

First illustration shows doors on a shipping platform. The compactness of steel rolling doors admits of placing openings in close arrangement, which greatly facilitates the handling of merchandise.

Reid-Murdoch & Co. Building, Chicago, Ill.

Second illustration shows the utility of the rolling door. The entire front of the building is available for the entrance of cars. With fire walls extending the length of the building, and openings closed by steel rolling doors, each unit becomes an independent fire section. The closed door covers a three track opening 35 feet 3 inches wide by 19 feet 9 inches high.



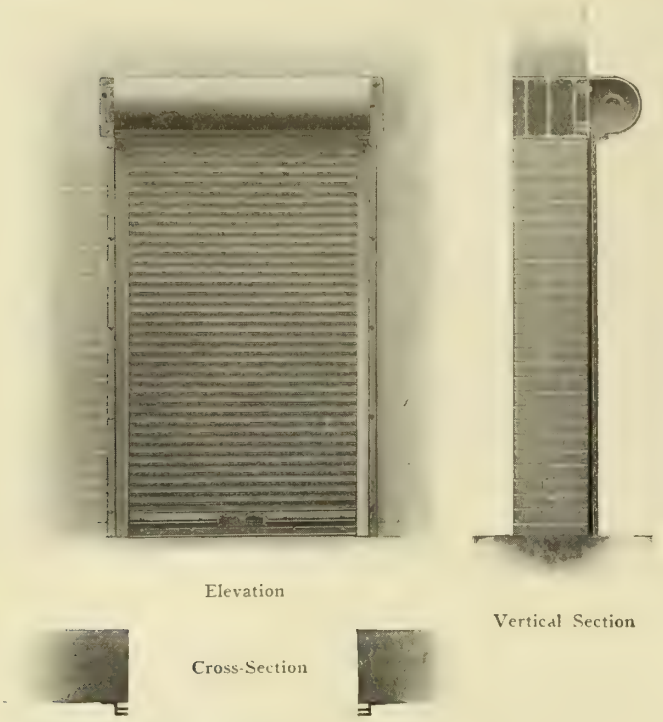
Philadelphia Rapid Transit Company Car Sheds

The last illustration shows doors to wagon concourse. These doors are arranged to operate manually and close automatically in event of fire in close proximity.

Curtis Publishing Company Building, Philadelphia, Pa.

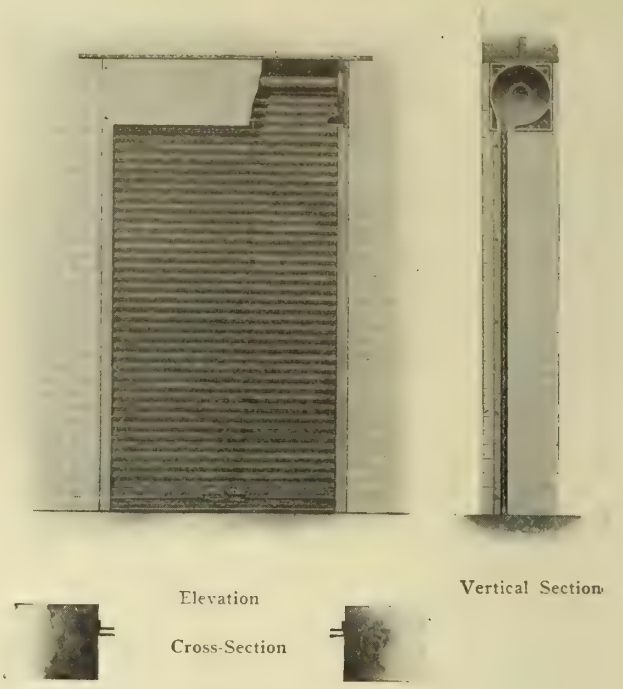
THREE INSTALLATIONS KINNEAR STEEL ROLLING DOORS

Continued on next page



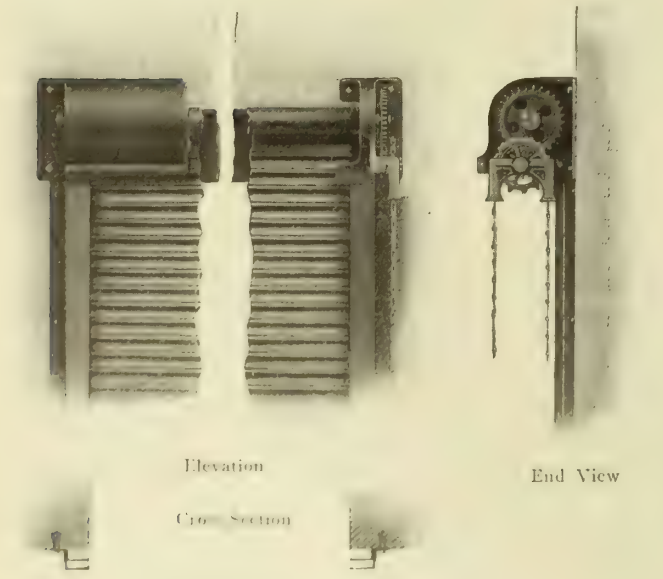
CONSTRUCTION NO. F. M. 10

Doors overlap the opening at sides and top. Coil and grooves are placed on face of wall, door is counterbalanced by springs and operated by means of handle in bottom bar



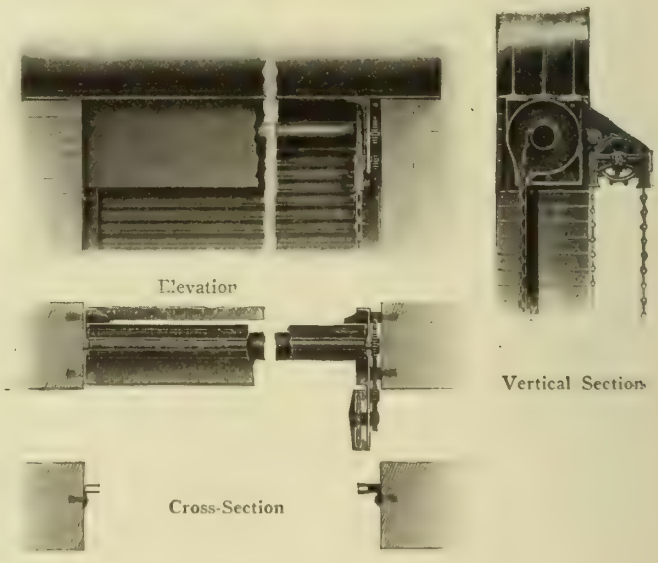
CONSTRUCTION NO. B. M. 10

Grooves and coil are placed between jambs. The door is counterbalanced by springs and operated by means of handle placed in bottom bar. Coil is enclosed in a plain galvanized hood. For special requirements this can be ornamented as desired



CONSTRUCTION NO. F. H. 20

Grooves and coil are placed on face of wall. Door is counterbalanced by springs and operated by means of endless chain, sprocket, and gear. When used as a fire-door it can, if required, be equipped with an automatic closing device. Special designs will be furnished on application



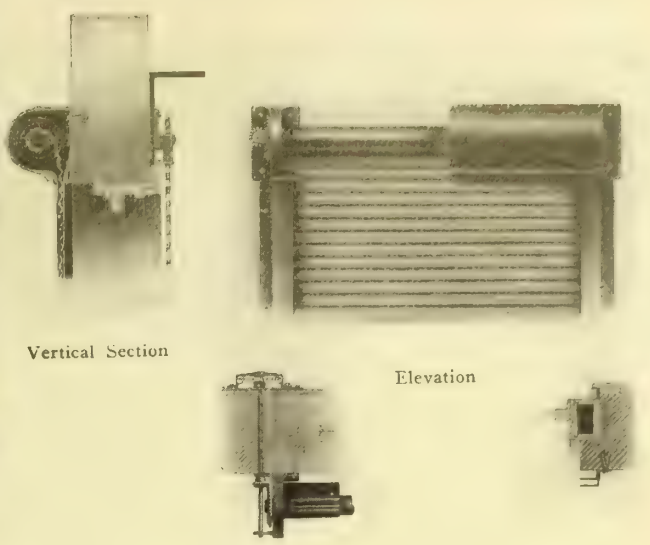
CONSTRUCTION NO. B. H. 20

Coil and grooves are placed between jambs. Door is counterbalanced by springs and operated by endless chain and gear. Coil enclosed in plain galvanized hood. Modifications of this design can be furnished

Continued on next page

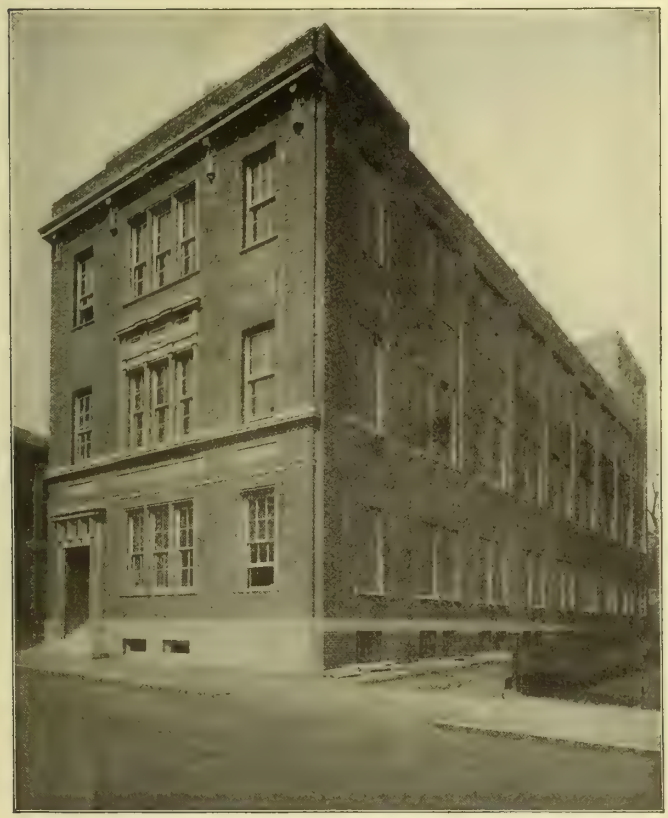
CONSTRUCTION NO. B. H. 40

Applicable to new buildings. It is neat and compact; coil is concealed over window-frame; shutter travels in grooves on outside. Casing covering coil-box should be removable to give access. Curtain is counterbalanced by springs and operated by chain and gear from inside.



CONSTRUCTION NO. F. H. 60

Coil and grooves are placed on outside face of wall. Shutter is counterbalanced by springs and operated from the interior by means of endless chain, sprocket and gear with connecting-rod extended through wall. Can be used advantageously for arched openings.



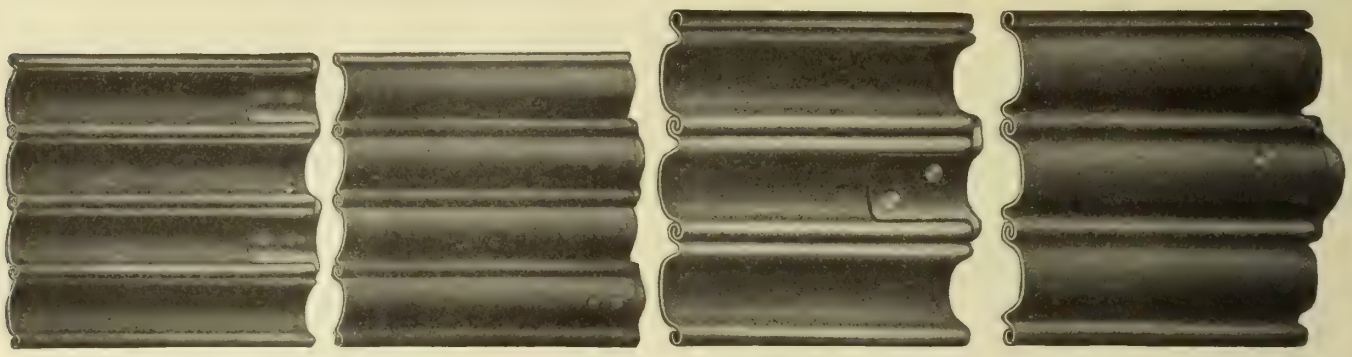
SOUTHERN NEW ENGLAND TELEPHONE EXCHANGE, WATERBURY, CONN.

The shutters on this building are of special design. The coils are concealed in reveals over the head of the window frame

BRESSMER BUILDING

This was exposed to a very severe fire. It was protected by Kinnear Shutters, and suffered no damage. The seriousness of the situation is shown by the destruction of the burnt building

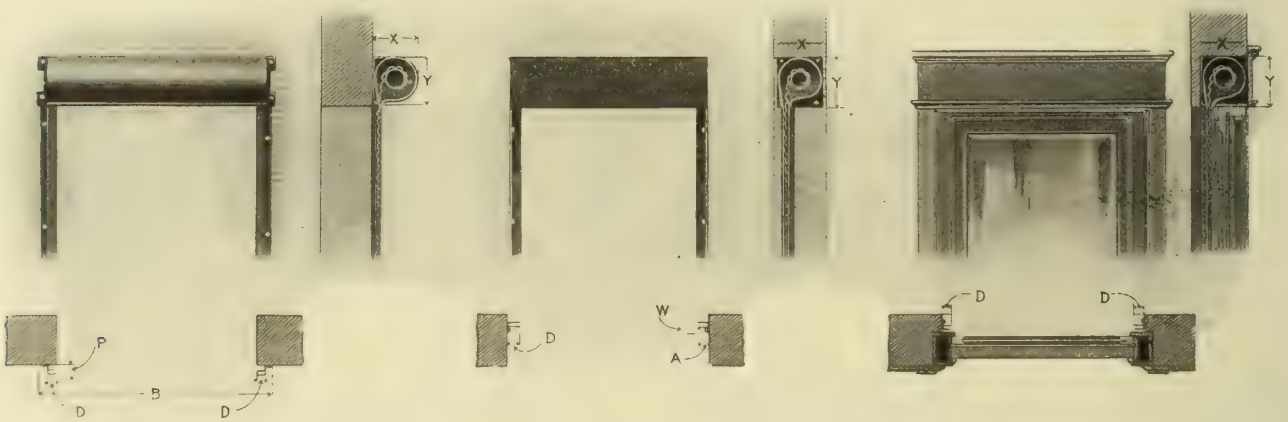
Continued on next page



Slat No. 2 Slat No. 4

CONCAVE AND CONVEX SIDES OF THE INTERLOCKING STEEL SLATS

"Kinnear" Steel Rolling Doors and Shutters are composed of slats illustrated above. The concaved and convexed sides are shown and the method of interlocking. Note that either side of the interlocking joint sheds water. The malleable end-locks reinforce edges and prevent longitudinal separation. They also provide an excellent wearing surface in the guides.



PROJECTIONS

Above are indicated the salient dimensions of the more ordinary construction of usual sizes of "Kinnear" Steel Rolling Shutters. Cut to the left shows shutter placed on face of wall. Central view shows shutter placed between jambs, and that to the right shows curtain with concealed coil. Following dimensions are for shutters of height and width indicated:

SCHEDULE OF PROJECTIONS

Height	Width 3′ 0″ to 6′ 0″ Groove Depth "D" 2″					Width 6′ 0″ to 10′ 0″ Groove Depth "D" 2½″					Width 10′ 0″ to 15′ 0″ Groove Depth "D" 3″					Width 15′ 0″ to 20′ 0″ Groove Depth "D" 3½″				
	X	Y	P	A	W	X	Y	P	A	W	X	Y	P	A	W	X	Y	P	A	W
Ft. In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
6 0	12¾	14	2½		3	13½	15	2½		3½										
8 0	13½	15	2½		3	13½	15	2½		3½										
10 0	14¼	16	2½		3	14¼	16	2½		3½										
12 0	14¼	16	2½		3															
6 0	9½	11	2½	3½	3	10½	12	2½	4	3½	12¾	14	2½	5	4	12¾	14	2½	7	4½
8 0	10½	12	2½	3½	3	11¼	13	2½	4	3½	12¾	14	2½	5	4	12¾	14	2½	7	4½
10 0	11¾	13½	2½	3½	3	11¾	13½	2½	4	3½	12¾	14	2½	5	4	15¼	17	3½	7	4½
12 0	12¾	14	2½	4	3	13½	15	2½	4½	3½	13½	15	2½	6½	4	15¼	17	3½	7	4½
14 0	14¼	16	2½	4	3	14¼	16	2½	4½	3½	15¼	17	3½	6½	4	16¼	18	4	7	4½
16 0	15¼	17	3½	4	3	15¼	17	3½	4½	3½	16¼	18	4	6½	4	16¼	18	4	7	4½
18 0	15¼	17	3½	4	3	15¼	17	3½	4½	3½	16¼	18	4	6½	4	16¼	18	4	7	4½

Schedule is for No. 2 slats. Sizes above division line apply to shutters operated by handle in bottom of curtain. Those below division line apply to shutters operated by endless chain or crank and bevel gear.

Dimension "P" applies only to face of wall constructions. Dimensions "W" and "D" only to between jamb constructions. Dimension "A" applies only to the chain hoist side of hoist operated shutters placed between jambs. Dimension "B" should always be at least 8″ wider than width of door opening for moderate-sized shutters and for very large shutters it should be 10″ or 12″, and more if possible.

We do not recommend manually operated construction for curtains of larger area than approximately 100 square feet; chain hoist should be used on larger sizes. Wherever desirable the automatic device may be combined with manually operated construction.

Regarding any further details and unusual sizes or special constructions we suggest direct correspondence.

Continued on next page

UNDERWRITERS' LABELS

Fire-Doors, Shutters and Hardware inspected and labeled, under the supervision of the Underwriters' Laboratories, Inc.

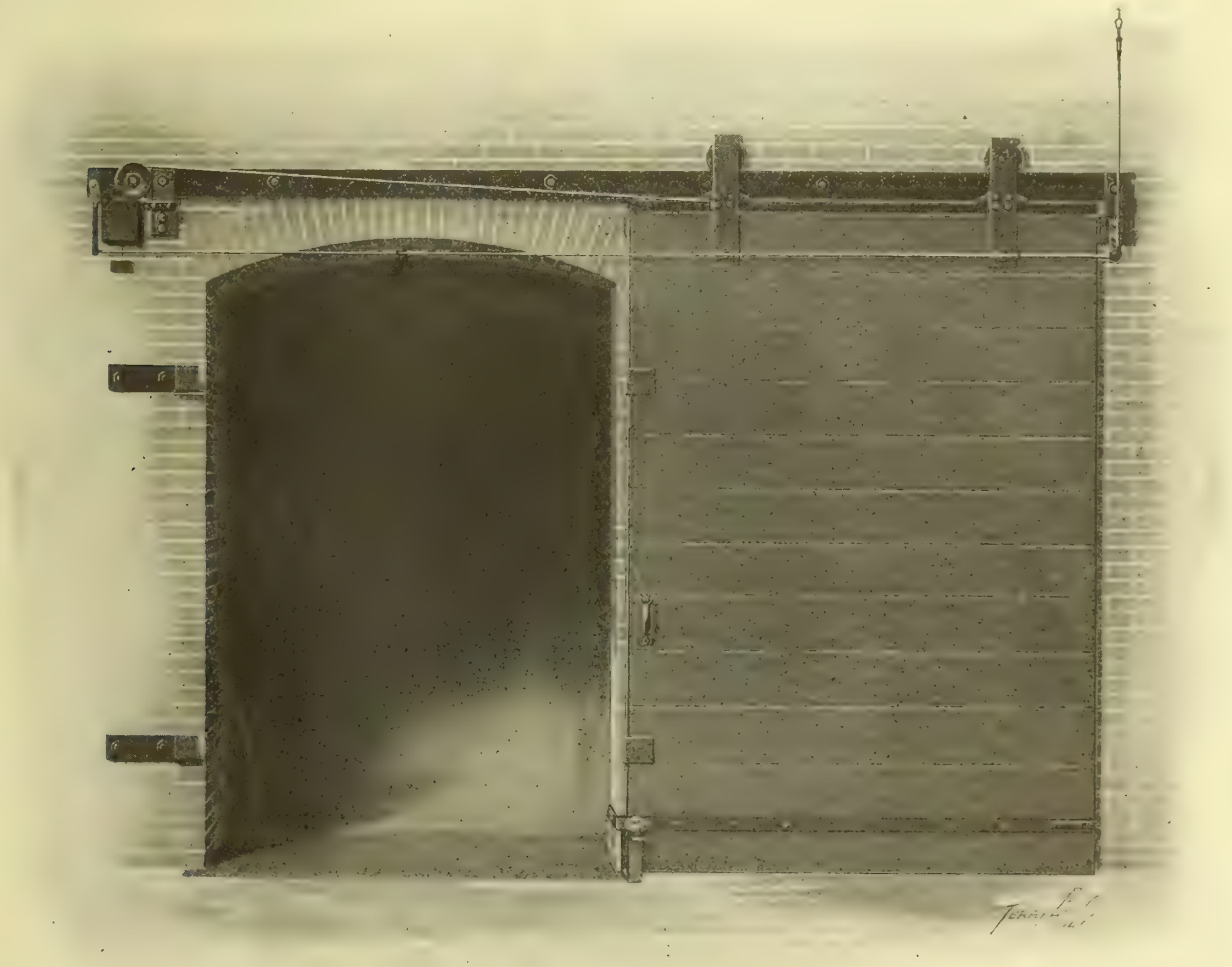
The "Ajax" Fire-Door.

The "Ajax" Door is a new departure. It is structurally strong and filled with non-combustible material which does not produce smoke or gas when highly heated. The correctness of principles involved in the construction have been thoroughly demonstrated by repeated tests. It has been subjected to fire of two hours' duration, maximum temperature 2550 degrees, followed by the application of a stream of water, the door remaining intact and capable of further resistance. As a fire retardant it is absolutely superior to a three-ply tin-covered fire-door, generally recognized as standard. In appearance it is a decided improvement.

The door is prepared to receive the hardware, which is specially designed for it.

We can supply other arrangements of this door.

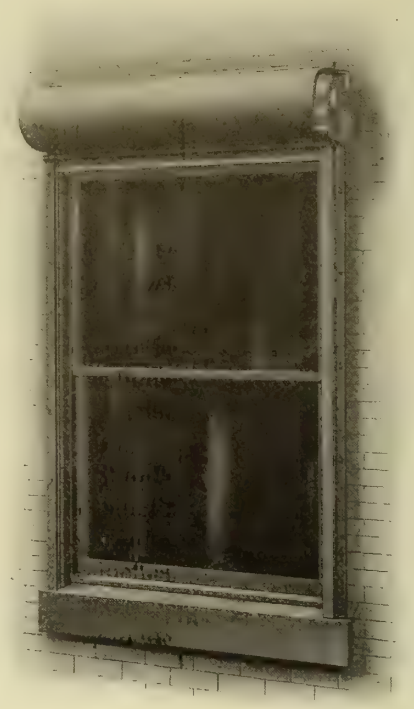
Our Fire-Doors and Shutters and Hardware are inspected and labeled under the supervision of the Underwriters' Laboratories, Inc.



"AJAX" SLIDING FIRE-DOOR EQUIPPED WITH AUTOMATIC CLOSING DEVICE

Continued on next page

"Abacus" No. 1



"Abacus" No. 4

FIRE-DOORS AND SHUTTERS CONSTRUCTED UNDER THE SUPERVISION OF UNDERWRITERS' LABORATORIES, INC.

"Abacus" No. 1.

For stair and elevator openings not exceeding eight feet wide by nine feet high.

The door is installed on face of wall overlapping opening at sides and top. Manually operated by means of handle in bottom bar, and automatically closed by fusing either of the two links at a temperature of approximately 160° Fahr.

The coil requires a space of 18" above opening. The clearances of 6½" are required at the sides for grooves and operating mechanism.

"Abacus" No. 2.

For Elevator Openings not exceeding eight feet wide by nine feet high.

Full particulars upon request.

"Abacus" No. 3.

For Fire Wall Openings not exceeding eighty square feet.

Full particulars upon request.

"Abacus" No. 4.

For the protection of exterior openings not exceeding ten feet wide by ten feet high.

The shutter is installed on face of wall overlapping opening at sides and top. This shutter is distinctly automatic in its action, normally open, and closed only by releasing device actuated by fusible link. The design of releasing device admits of testing out without fusing the link, and the shutter can be recoiled simply by lifting on the handle on the bottom bar.

"Abacus" Types.

The "Abacus" Doors and Shutters are specially designed for fire protection. Details of construction have been carefully developed. The following are some of the important features:

(1) An auxiliary or inner hood, which is automatically dropped and closes the space between the barrel and outer hood, thereby preventing the passage of flame over the barrel.

(2) Special end locks, closing the concaved ends of slats and preventing the passage of flame around the edge of the curtain.

(3) Fusible washers employed in the construction of grooves which melt and allow the members composing the groove to expand without cramping.

(4) Non-corrosive metal used for bearings and contact points of the automatic release.

(5) Single line contact bearings in releasing levers.

(6) Provision is made for expansion of parts for all temperatures up to 2000 degrees.

(7) Disposition of fusible links, insuring prompt closing.

(8) The enclosure of automatic release, protecting it from the weather.

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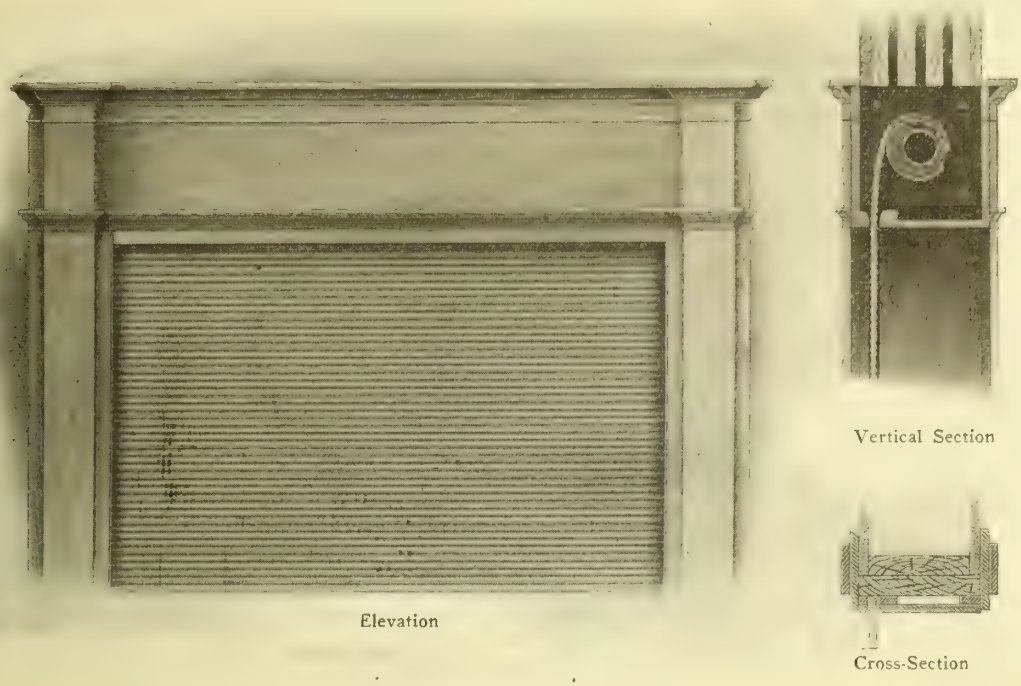


CONSTRUCTION NO. W. B. M.

Construction No. W. B. M.

The illustration shows the application of Wood Rolling Door or Partition to interior openings. It is extensively employed in schools and churches. It is readily adaptable to architectural treatment.

Casing and finish can be arranged to harmonize with the surroundings.

Door is counterbalanced by springs, several methods of operation being employed, depending on the size and weight of the door.

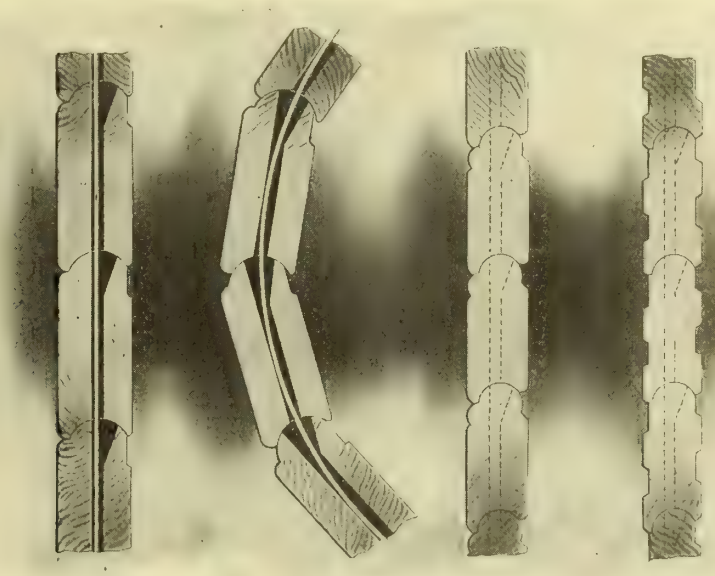
For small doors a handle is fitted in the bottom bar; for large partitions an endless chain or crank and gear can be used.

Wood Slats.

The views show sections of Wood Slats of which doors and partitions are composed. They are strung on phosphor bronze ribbons. The method of flexing does not bend or indent the ribbon at the joint nor does it require a wide bottom bar with take-up springs. Slats are made of long-leaf yellow pine, plain oak, quarter-sawed oak, and birch. In ordering specify and send sample of finish desired. Slat No. 27 is used for exterior work; Nos. 26 and 24 for interior work.

Grooves and Casings.

Grooves and Casings, to harmonize with surrounding architecture, are not furnished with the curtain. They should be included in the general carpenter work.



No. 27 No. 27 No. 26 No. 24

SECTIONS OF WOOD SLATS

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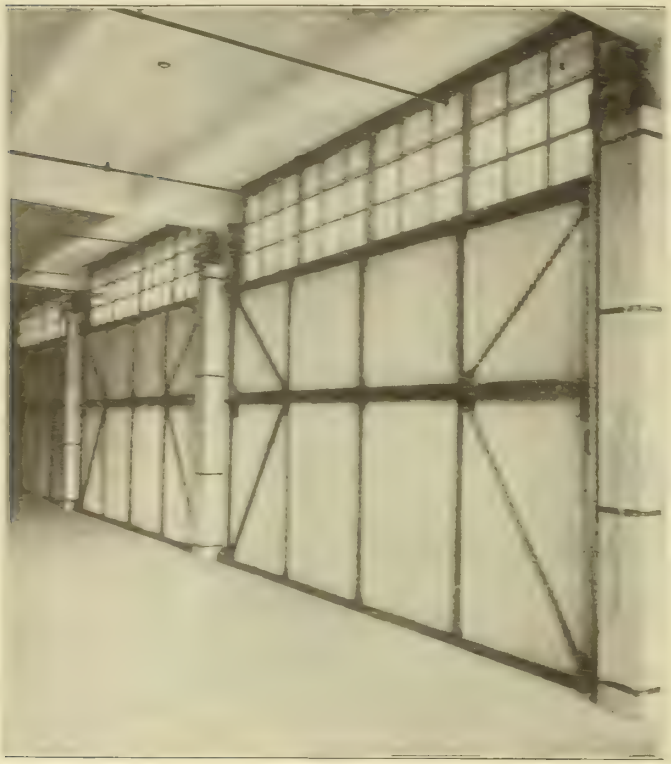


Closed

Open

BI-FOLDING DOOR STEEL

Bi-Folding Door.

This door comprises two sections hinged together and supported at the center by radial arms pivotally connected to wall brackets; at the bottom chains are attached which communicate with the counterbalance weight.

The bottom of door is fitted with rollers, which travel in guides attached to wall and transmit the thrust; the door is evenly counterbalanced and operates with ease and rapidity by means of an endless chain, sprocket and gear.

Material and Construction.

The door is constructed of wood, flat or corrugated steel. When specified, it is pierced by lights of plain or wire glass fixed in wood or metal frames.

The hardware and framing members are properly proportioned to the size of door and have ample strength to prevent excessive deflection of the sections when the door is raised.

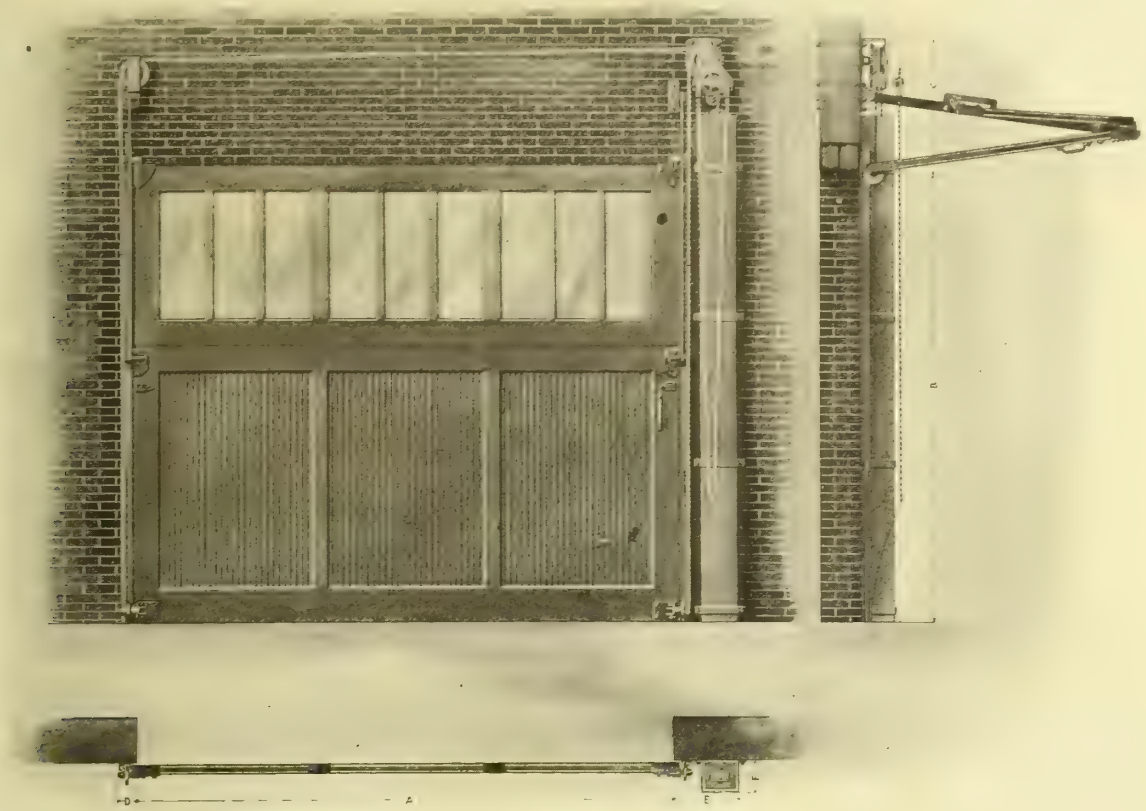
The structural design and liberal use of material give both strength and durability.

Adaptability.

This type of door is suitable for Depots, Freight Houses, Docks, Warehouses and Shops. It is especially well adapted to situations which necessitate providing for lighting the interior.

Installation.

Blue-prints and instructions are sent with each shipment, explaining method pursued in erecting. This is not difficult and can be accomplished by any good mechanic.



BI-FOLDING DOOR
Elevation, and Sectional Views

TABLE FOR DETERMINING THE CLEARANCE "C," USING 8" X 9" COUNTERWEIGHT

B—Height of opening in feet	A—Width of opening in feet										
	6	7	8	9	10	11	12	13	14	15	16
6	2′4″	2′4″	2′5″	2′6″	2′7″	2′8″	2′9″	2′10″	2′10″	3′0″	3′1″
7	2′4″	2′5″	2′5″	2′6″	2′8″	2′9″	2′10″	2′11″	2′11″	3′0″	3′1″
8	2′5″	2′6″	2′6″	2′7″	2′9″	2′10″	2′10″	2′11″	3′0″	3′1″	3′2″
9	2′6″	2′6″	2′6″	2′8″	2′9″	2′10″	2′11″	3′0″	3′0″	3′2″	3′2″
10	2′6″	2′7″	2′7″	2′9″	2′10″	2′11″	3′0″	3′0″	3′1″	3′2″	3′3″
11	2′7″	2′7″	2′9″	2′9″	2′10″	2′11″	3′0″	3′1″	3′1″	3′3″	3′3″
12	2′7″	2′8″	2′9″	2′10″	2′11″	3′0″	3′1″	3′2″	3′2″	3′3″	3′4″
13	2′8″	2′9″	2′10″	2′10″	3′0″	3′1″	3′1″	3′2″	3′3″	3′4″	3′5″
14	2′9″	2′10″	2′11″	2′11″	3′0″	3′1″	3′2″	3′3″	3′4″	3′5″	3′5″
15	2′9″	2′10″	2′11″	3′0″	3′1″	3′1″	3′2″	3′4″	3′4″	3′5″	3′6″
16	2′10″	2′11″	3′0″	3′1″	3′1″	3′2″	3′3″	3′4″	3′5″	3′6″	3′7″

Clearance "D" 6″. Clearance "E," 18″. Clearance "F," 10″.

EXAMPLE—Required "C" for door 12′ wide by 10′ high. See intersection of column 12 and line 10, the dimension is 3′ 0″. This may be reduced by cutting out the floor under counterweight, permitting it to extend below floor level.

Where clearances at top and sides are not available for regular equipment, it is advisable to request information, accompanying the same with details of openings. We will be pleased to furnish drawings showing special attachments applicable to the conditions.

POWELL EVANS, PRESIDENT

MERCHANT & EVANS CO.

OFFICES AND WAREHOUSES
PHILADELPHIA
NEW YORK
BALTIMORE
WHEELING
CLEVELAND
CHICAGO
KANSAS CITY

ESTABLISHED 50 YEARS
(1866-1916)

SOLE MANUFACTURERS OF

"Evans" Almetl Fire-Doors and Shutters

PHILADELPHIA, PA.

WORKS
PHILADELPHIA
WHEELING
CHICAGO

Products.

"Evans" Almetl Fire-Doors and Shutters (Patent Pending). Fully approved by the Underwriters' Laboratories, Inc., and generally accepted by State and City fire control bureaus.

For Ventilators and Metal Roofing Products, see our name in General Index.

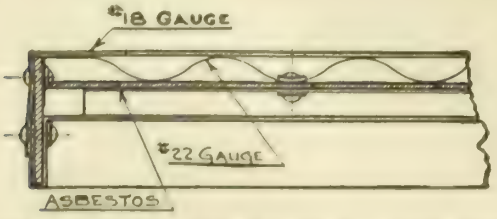
Service.

Approximately one hundred and fifty responsible and experienced contracting and erecting "Licensees" in the principal cities.

Complete installations to meet the requirements of the Inspection Bureaus throughout the United States.

Description.

"Evans" Almetl Fire-Door is made with a double panel of standard 2½-inch corrugated No. 22-gauge galvanized steel, interlined with ⅛-inch asbestos, in a rigid frame of continuous $\frac{3}{16}$ by 2½-inch bar iron. Frame bound in a cover of No. 18-gauge galvanized steel, forming a heavy box for the panel and taking the abuse on the edge of door. Provision is made for expansion and contraction without distorting. The large heavy cross-laid corrugations give extreme strength, while omission of the heavy wood core gives one third lighter weight than ordinary doors. The numerous air spaces in the corrugations, supplementing the thick asbestos, give maximum resistance to heat. Thoroughly tested in actual service up to eight-foot by ten-foot openings.



HORIZONTAL CROSS-SECTION "EVANS" ALMETL FIRE DOOR
Showing the heavy No. 18 gauge border which prevents damage

Insert in Catalogue

TRADE-MARK

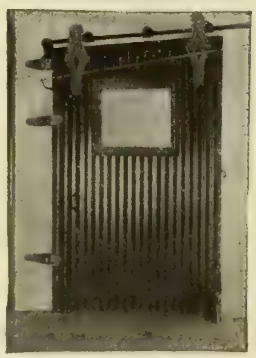
Types.

The "Evans" Almetl Fire-Doors are made in the following types:

Single Sliding
Double Sliding
Single Swinging
Double Swinging
Vertical Sliding

Suitable for square or arch top openings not exceeding eighty square feet.

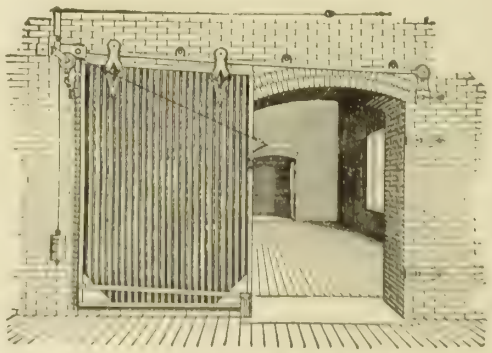
We also make doors to order for larger openings than eighty square feet, or to meet many special conditions.



Special Type, Single Sliding wired glass panel

Typical installation, Swinging Type

"EVANS" ALMETL FIRE-DOORS



"EVANS" ALMETL FIRE-DOOR
Typical installation Single Sliding Type

Continued on next page

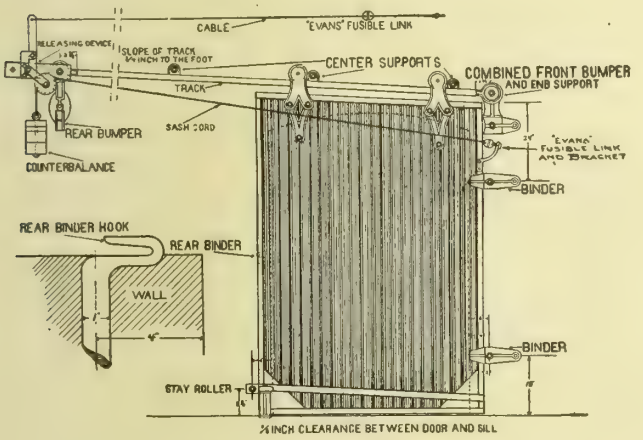
Hardware.

We furnish "approved" and labeled hardware, made of either malleable iron or wrought iron, of the following styles:

Round Track
Flat Track
Level (Straight) Track
Drop Bracket Track
Single Swinging
Double Swinging
Vertical Sliding
Horizontal Sliding

Characteristics.

The "Evans" Almetl Fire-Door is offered as a marked improvement on the standard tin-clad door now in general use. In its tests at the Underwriters' Laboratories, Inc., by the National Board of Fire Underwriters, it demonstrated its superiority in many respects.

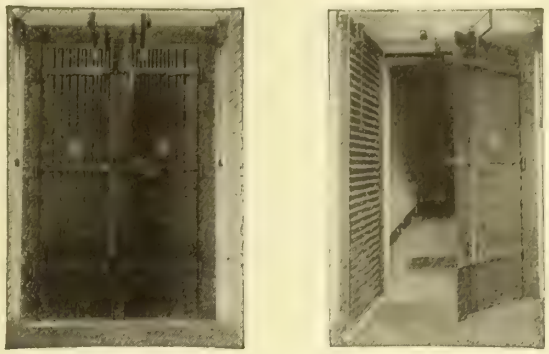


"EVANS" ALMETL FIRE-DOOR
Detail showing erection of sliding type

It is of rigid, all-steel, indestructible construction. No wood to rot; no tin to rust; no seams to open; no thin covering to bruise. No maintenance cost.

This door is designed and is suitable for daily continuous use. Under working conditions of exacting character, the "Evans" door has not become loose or failed or deteriorated. This has been accomplished, for the first time, by making the door an exceptionally strong, rigid, riveted steel structure.

Send for our illustrated catalogue containing prices and views of the "Evans" door installed and giving unequaled daily continuous service and absolute fire protection for which it is responsible.



Closed Open
"EVANS" ALMETL FIRE-DOORS, STANDARD TYPE
DOUBLE SWINGING

These doors can be secured and erected at any point in the United States through our approximately one hundred and fifty exclusive erecting representatives.

Insurance Rebate.

Reduction in insurance rates is granted for an approved installation of this type of door.

To Architects.

A copy of "Evans" Almetl Fire-Door Chart (copyrighted) will be sent free, upon request. This is a valuable list, covering sizes, prices and illustrations.

Our Engineering Department is always at the service of architects.

"EVANS" ALMETL SLIDING FIRE-DOOR
View of door installed in a factory building, also view in background of tin-clad fire-door. (Note superior appearance of the "Evans" product)

Other Products.

Other of our products used in building and manufacturing are Tin and Terne Plate; Sheet Steel; Galvanized Iron; "Star" Ventilators; Roofing; Tile and Metal Shingles; Brass and Copper in all forms; Babbitt Metal and Solder.

Use "Merchant's" Standard Fire-Door Tin, if wood core doors are demanded.

NEWARK CORNICE AND SKYLIGHT WORKS

Manufacturers of Sheet Metal Work

9-15 Seventeenth Avenue

NEWARK, N. J.

TELEPHONE
NEWARK, WAVERLY 3461

AGENTS FOR MERCHANT & EVANS CO. "ALMETL" FIRE-DOORS

Products.

High-grade SHEET METAL WORK, including KALAMEIN DOORS, SASH, TRIM and MOULDINGS; HOLLOW METAL WINDOWS; UNDERWRITERS' FIRE-DOORS; PUTTYLESS SKYLIGHTS.

Also, METAL COVERED PARTITIONS, METAL STORE FRONTS, ORNAMENTAL MARQUISE, CORNICES, ROOFS, VENTILATORS, and other types of ARCHITECTURAL SHEET METAL WORK.

Quality and Underwriters' Indorsement.

In the construction of its products this organization has adopted highest standards of construction, which are as a rule, and especially when so required, entirely in accordance with the requirements of the National Board of Fire Underwriters.

Service and Facilities.

This organization is prepared to install any of its products in any part of the United States when size of contract warrants. The grade of work solicited demands the employment of only highly skilled workers and a shop equipment of latest and most efficient machinery and tools.

The service department invites consultation during and after the preparation of plans and will gladly send suggestive working drawings, detail sheets of mouldings, and any other information required.

Kalamein Work.

The following suggested specifications will indicate the methods practised by this concern in the manufacture of its kalamein work. Contracts of any size or difficulty can be handled by its efficient force. Hardware will be applied or made provision for. Fire-doors—swinging, sliding, or hung—can be equipped with any type of control.

Specifications for Kalamein Work.

Material—All woodwork used in the manufacture of door and window frames, jambs, doors, sash and trim to be of seasoned clear kiln-dried white pine. Stiles more than 6 inches wide must be built up of strips and glued together.

All metal to be of 16-ounce copper [or commercial bronze, low brass, No. 28 kalamein iron or galvanized iron].

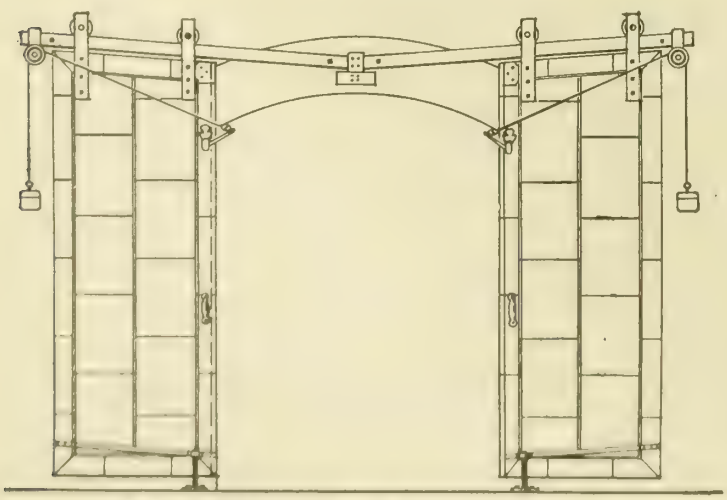
Covering—All woodwork must be covered by machine, except on panels (whether of wood or asbestos), metal must be glued on. All metal must fit closely to wood cores, the surfaces to be straight and true without blisters, cracks or rough edges; edges to be straight and true; mouldings to be as per details, with sharp, square corners, showing true lines. Special care must be taken in assembling to avoid bench marks as much as possible and to get a true fit at the miters, cut ends at miters to be covered with same metal as used for mouldings.

Assembling—All members of doors, sash, etc., must be mortised and tenoned and put together with hardwood wedges, or doweled with hardwood dowels and special gluing process.

All trim, where practical, shall be mitered and put together at shop, all joints and miters thoroughly brazed and each cleated with metal clips. Trims and mouldings, wherever possible, must be back-screwed, thus avoiding defacing surface by nails or screws.

Exterior Work—On all work exposed to weather, joints of metal covering must be underlaid with a strip of metal, same as covering, and after assembling all joints must be properly brazed; and all joints where water, snow, or sleet has a chance to lodge or that are subjected to steam or moisture to any extent, must be completely filled with solder and brazed so that no moisture can gain entrance to cores.

Cleaning—After kalamein work is erected all surfaces of copper, commercial bronze or low brass must be thoroughly cleaned of solder or other foreign matter and a coat of lacquer applied. Galvanized or kalamein iron surfaces must be painted with one (1) heavy coat of Sherwin-Williams paint, known as galvanized iron primer, or other paint equally approved. Before painting is done, however, metal must be thoroughly cleaned with benzine and bran, of grease or other foreign matters to prepare surface for a good adhesion of paint to surface.



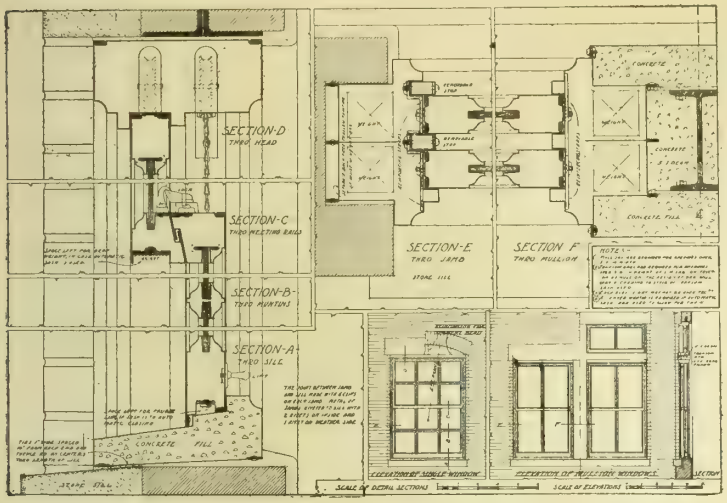
SLIDING FIRE DOORS ON INCLINED TRACKS
Used when there is not enough room to slide a single door in one direction

MAIN ENTRANCE, WEST SIDE TRUST CO. BUILDING, NEWARK, N. J.
CROW, LEWIS & WICKENHOEFER, Architects

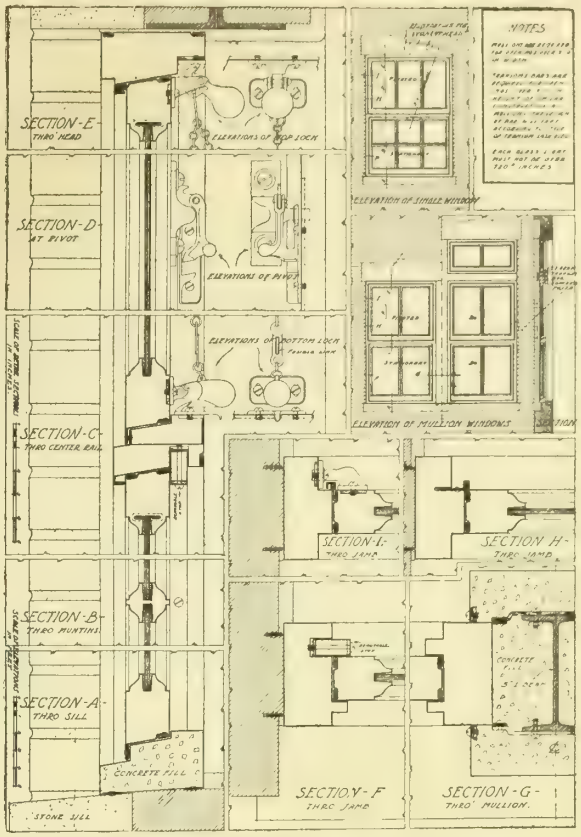
SEE CATALOGUE

Continued on next page

Applying Hardware—Special care must be taken to apply hardware; it must be done by men experienced in kalamein work. Metal work must be cut to allow a clinch around butts or any other hardware where it is necessary to let same into finished work, so that no wood may be exposed and no moisture have a chance to penetrate to wood core.



DETAILS OF HOLLOW METAL DOUBLE-HUNG WINDOW
Examined and Labeled by Underwriters' Laboratories, Inc.



DETAILS OF HOLLOW METAL WINDOW; UPPER SASH PIVOTING, LOWER SASH STATIONARY
Examined and Labeled by Underwriters' Laboratories, Inc.

Windows.

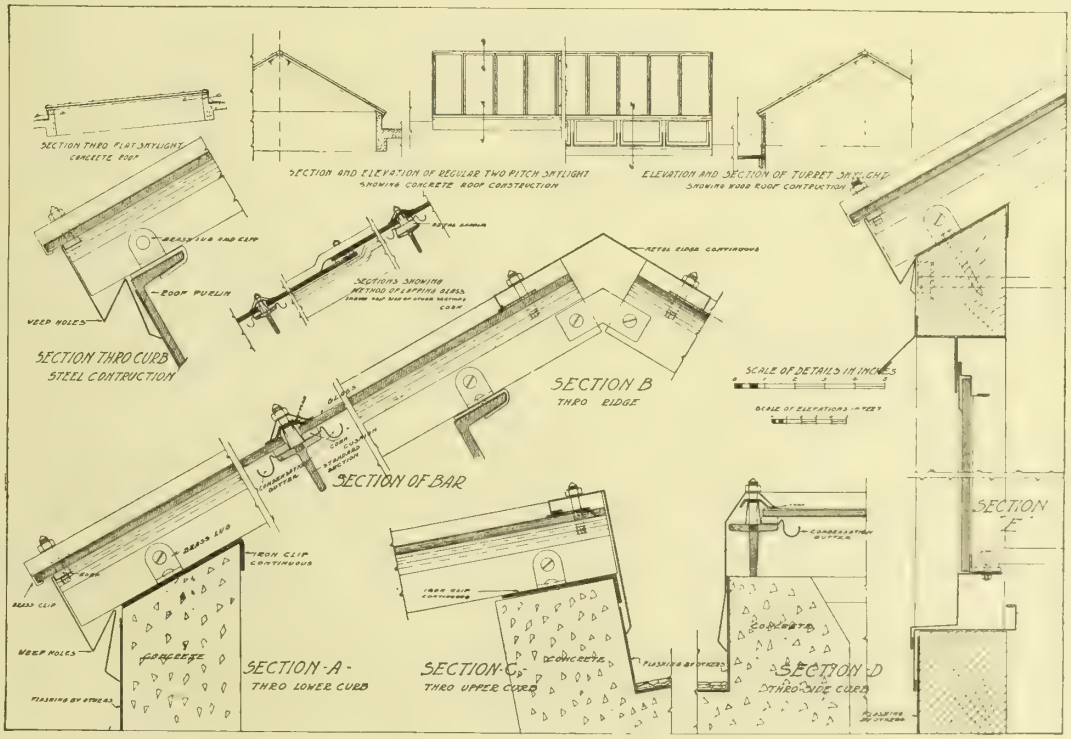
The accompanying cuts illustrate two types of windows made by this Company. They have stood the test of severe service and have been found eminently successful. Pivoting sash are, when desired, supplied with fusing link control, so sash can close automatically in case of fire.

Puttyless Skylights.

The accompanying details of a Puttyless Skylight show the direct and scientific basis of the system. Briefly, it is a simple application of a spring bronze clip construction to structural steel spanning members. This clip construction, with its specially prepared cork cushions (see illustration), provides a firm yet flexible hold for the glass. It has sufficient give to allow for any vibration or expansion and contraction the construction may be subjected to, and thus reduces the danger of glass breakage to a minimum, and provides an economical construction which is permanently storm- and dust-proof.

This system is adaptable to any form of skylight construction with no intermediate supports up to eight-foot spans. It requires practically no attention once it is installed.

For specially large openings, calculations for necessary intermediate supports will be made by this company, when desired.



DETAILS, SHOWING CONSTRUCTION AND APPLICATION OF PUTTYLESS SKYLIGHT

J. EDWARD OGDEN COMPANY

MANUFACTURERS OF

Doors for Pier Sheds, Freight Houses and Industrial Buildings

TELEPHONE, Rector 4655

147-149 Cedar Street
NEW YORK, N. Y.

WORKS
BAYONNE, N. J.

CANADIAN AGENCY
MONTREAL, QUE., Bacon Brothers, 377 St. Paul Street

Products.

This company furnishes and installs, when desired, Mechanically Operated Doors for Pier Sheds and Industrial Buildings, the principal types being known as Ogden Single-Section Doors, Ogden Two-Section Doors, Ogden Multi-Section Doors, Ogden Canopy Doors, and Ogden Crane Runway Doors. The Door Sections are made of Wood, Steel, Concrete or any other material, and may be covered with Sheet Metal, to make them fireproof; and they may be fitted with sash.

Industrial Door Operating Mechanisms and Metal Covered Fireproof Doors for Warehouses, Office Buildings, etc.

Co-operative Service.

This Company is more particularly interested in the door hardware, or mechanical parts of the various types shown; but will supply door sections, casings, sills, etc., and will, when necessary, take charge of construction.

Blue-prints, advice, and valuable information furnished to engineers and architects regarding these doors and mechanism; and special designs to meet particular conditions and requirements will be supplied.

Installation.

If the operating mechanisms alone are furnished, this company is prepared to make detailed drawings of and offer every assistance in designing the door sections, so that no difficulty may be experienced in having them conform to the mechanisms. The counterweights may be obtained from us, or purchased locally. A competent foreman will be supplied, at a reasonable charge, to superintend the erection when this company does not erect.

Fire Protection.

Ogden Door-operating mechanisms can be used with any design of door, and it is therefore possible for an engineer or architect to incorporate any degree of fireproofing or architectural detail.

Operation.

Practically all Ogden Doors are operated by a side chain and are so counterweighted that one man can with little effort raise or lower them.

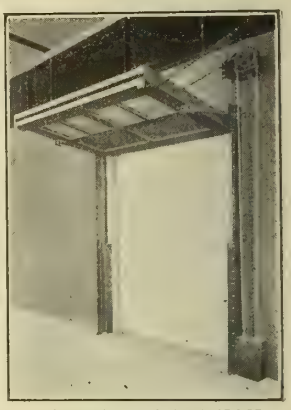
Any of the doors can be furnished with either motor, pneumatic, or hydraulic drive, and can be arranged for remote control if desired.

Ogden Two-Section Doors (Patented).

These doors are especially adapted for use in pier shed and freight house door openings where it is desirable that merchandise may be piled close up against the door, but still permit its operation.

The lower half slides vertically over the upper half, as will be noted in the illustrations; then the two sections together swing inward and upward, to a horizontal position above the level of the door-header.

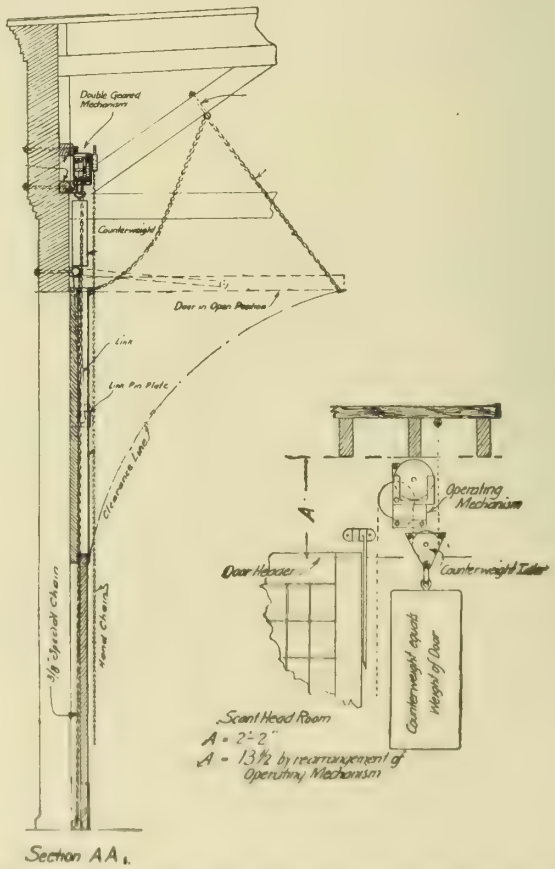
When only the lower section is raised, ample opening is provided for the passage of men and small freight. Opening both sections permits the passing of the largest freight.



OGDEN TWO-SECTION DOOR
Showing door opened

These doors can be used in masonry or steel frame buildings, and the mechanism takes the smallest possible head-room; we have used as little as seven inches.

The doors are counterweighted so that they are easily operated by one man and will stay wherever left.



SECTION OF OGDEN TWO-SECTION DOOR AND DETAILS OF COUNTERWEIGHT ARRANGEMENT FOR SCANT HEADROOM

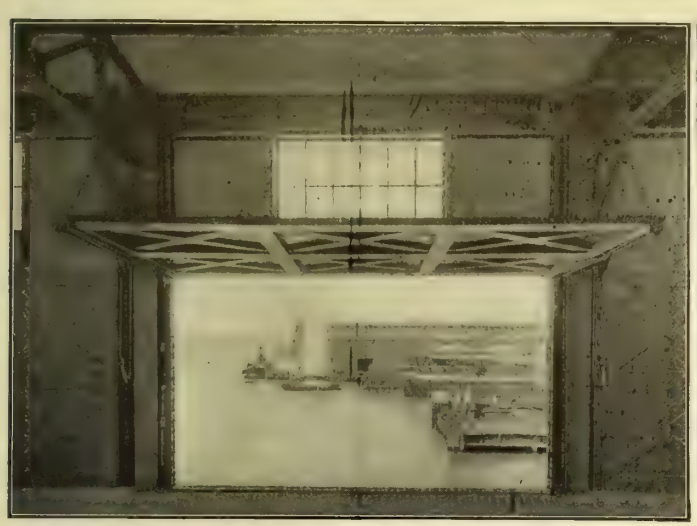
Continued on next page

Ogden Single-Section Doors (Patented).

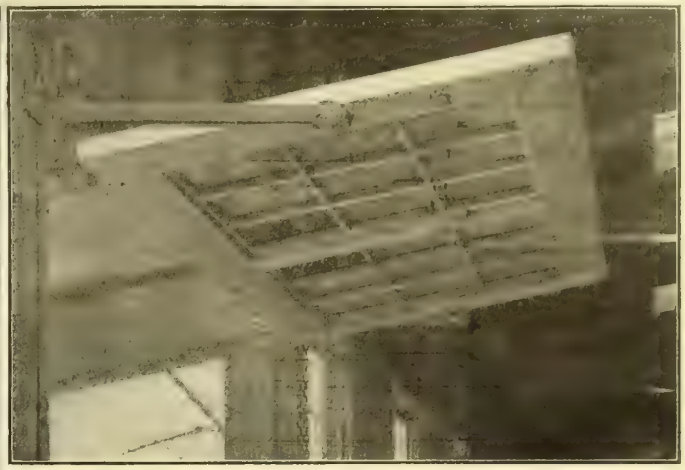
This door operates on same general principle as the two-section type, and is generally preferred where openings are comparatively small. Consists of single solid shutter hung on pivots near the middle of each edge and on chains attached to the bottom. Geared driving mechanism permits the pocket wheels to be revolved; and consequent pull on chains causes lower edge of door to rise and upper edge to swing inward until door assumes a horizontal position just above door-header.

Ogden Canopy Doors (Patented).

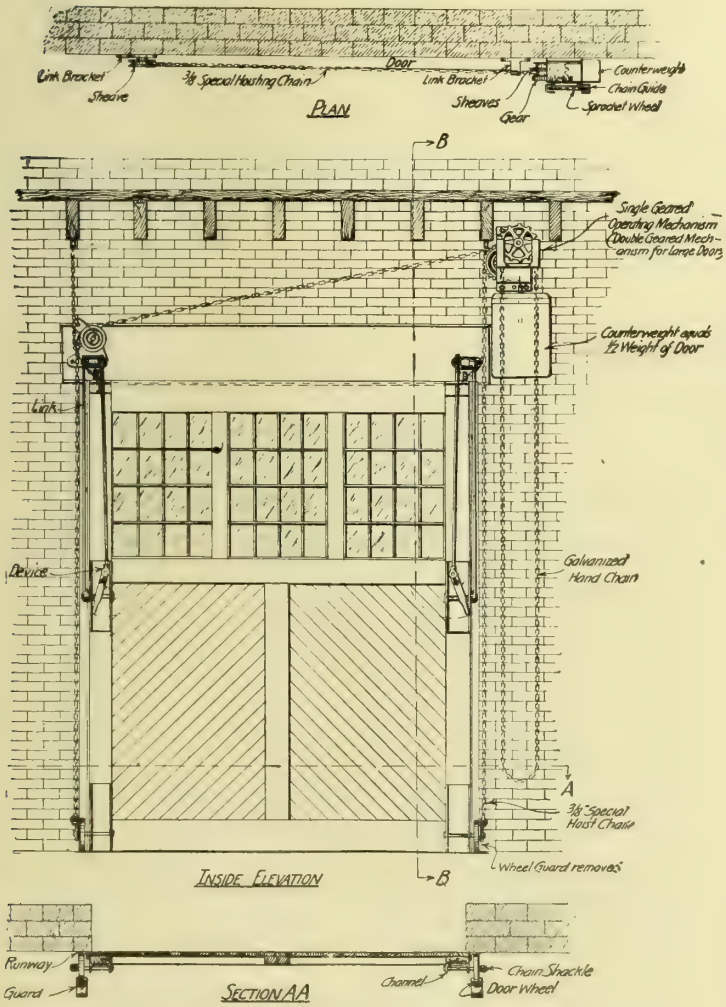
The Canopy Door is a modification of the Single-Section door; and when opened, the lower half of the door projects outside the building so as to form a canopy. The lifting chains are attached near the center of the door, and the links are pivoted about three quarters up the door. This type of door is usually built with the lower half unpaneled on the outside, so as to shed water when opened. It is particularly adapted to shipping rooms and similar locations, where material is handled from wagons.



SINGLE-SECTION DOOR ARRANGED FOR STEEL SHED CONSTRUCTION AND AMPLE HEAD-ROOM
Counterweights placed inside columns



OGDEN CANOPY DOOR



SINGLE-SECTION DOOR ARRANGED FOR MASONRY CONSTRUCTION

Ogden Multiple-Section Doors (Patented).

Ogden Multiple-Section Doors are offered for locations where there is but little available ceiling space. They are built in either three, four or five equal sections, which are connected by links, so as to fold nearly flat when the door is opened. The pivots are staggered from the vertical, so that the sections break out automatically, the operator having nothing to do except pull on the hand chain. Because the door sections are equal, the folded door has a minimum projection into the building, and hence, minimum interference with ceiling lights, sprinklers or traveling cranes.

Where Installed.

The following are a few of the important Harbor Improvements where Ogden Doors have been specified and used:

New York, N. Y.	Chelsea Piers
New York, N. Y.	Pier No. 42, North River
New York, N. Y.	Pier No. 7, East River
Hoboken, N. J.	Pier No. 1, Hamburg-American Line
Philadelphia, Pa.	Vine Street Pier
Philadelphia, Pa.	Dock Street Pier
Boston, Mass.	Commonwealth Pier No. 5
Baltimore, Md.	Commercial and Recreation Pier
Providence, R. I.	State Pier No. 1
Seattle, Wash.	Port of Seattle Public Docks
Los Angeles, Cal.	Dock 1, Shed 1, San Pedro
Montreal, P. Q.	Transit Sheds 24 and 25
Panama Canal	Pier No. 7, Cristobal
Panama Canal	Pier No. 18, Balboa
Philadelphia, Pa.	Piers 38 and 40, South Wharves
Brooklyn, N. Y.	35th Street Pier

Also freight houses and other buildings for nearly all the important Eastern Railroads.

THE PEELLE COMPANY

Manufacturers of Elevator and Warehouse Fireproof Doors

Stewart Avenue, Harrison Place and Ingraham Street
On Long Island Railroad
BROOKLYN, NEW YORK CITY, N. Y.

TELEPHONES: STAGG { 366 / 367

BRANCHES

BOSTON, 18 Tremont Street—Telephone, Main 1350
PHILADELPHIA, 34 South 16th Street—Telephone (Bell), Spruce 4689
CLEVELAND, 720 Caxton Building—Telephone, Main 2158
CHICAGO, 133 Washington Street—Telephone, Franklyn 68

AGENTS

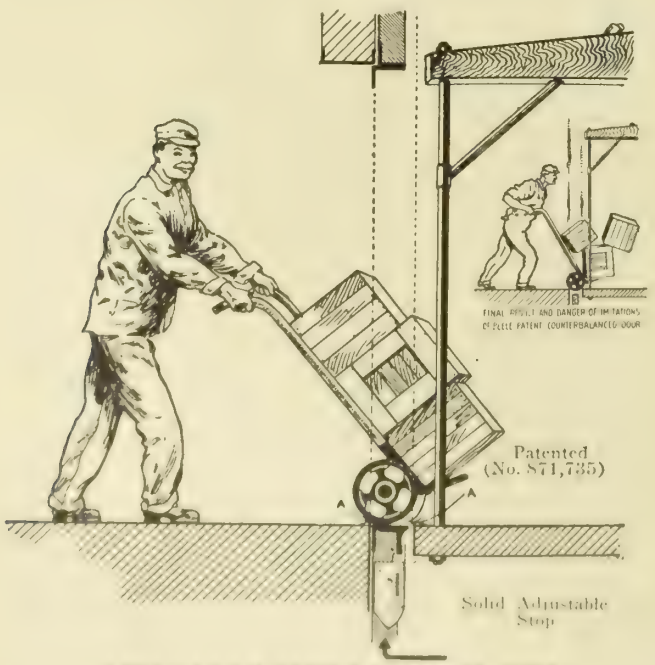
BUFFALO, N. Y., MACHWIRTH BROS. Co., 201-9 Oak Street
CINCINNATI, OHIO, J. H. SHIELDS, 231-233 Sycamore Street
COLUMBUS, OHIO, B. M. FREEMAN Co., Columbus Savings & Trust Building
DENVER, COLO., PEERLESS IRON & WIRE WORKS, 438 Larimer Street
EL PASO, TEXAS, THORNE MFG. & DISTRIBUTING Co.
INDIANAPOLIS, IND., R. S. PEELLE, 302 Maple Road Blvd.
LOS ANGELES, CAL., THE WATERHOUSE Co., 331 East Fourth Street
MEMPHIS, TENN., FLOWER & BUSH, Germania Bank Building
MONTREAL, CAN., JAMES WALKER HARDWARE COMPANY
NEW ORLEANS, LA., DE VAN AGENCY, 219 Carondelet Street
OMAHA, NEB., KIMBALL BROS. Co., 9th Street and 11th Avenue
PITTSBURGH, PA., JAS. R. PITCAIRN, 804 Penn Avenue
PORTLAND, ORE., P. L. CHERRY Co., INC.
ST. LOUIS, MO., F. A. CAMMANN BUILDERS SERVICE Co., 927-8 Century Building
SALT LAKE CITY, UTAH, MANUFACTURERS' SPECIALTIES Co., 418 Boston Building
SAN FRANCISCO, CAL., THE WATERHOUSE Co., 595 Market Street
SEATTLE, WASH., D. E. FRYER & Co., Lumber Exchange
WILKES-BARRE, PA., H. E. DECKER COMPANY, 44 North Main Street
WINNIPEG, CAN., EDELEN-KILVERT COMPANY, 304 Tribune Building

Products.

"PEELLE" COUNTERBALANCE TRUCKABLE FIREPROOF ELEVATOR DOOR.
"PEELLE" TEL-CO-DOR.
"PEELLE" CANOPY FOLDING DOOR.
"PEELLE" SAFETY AUTOMATIC and INTERLOCKING DOOR OPERATING DEVICES.
Also, "PEELLE" SELF-CLOSING FIREPROOF DUMBWAITER DOORS.

Services.

Our engineers are prepared to assist clients in the selecting of proper and most economical equipment to suit special conditions and requirements.



"PEELLE" TRUCKABLE ELEVATOR DOOR

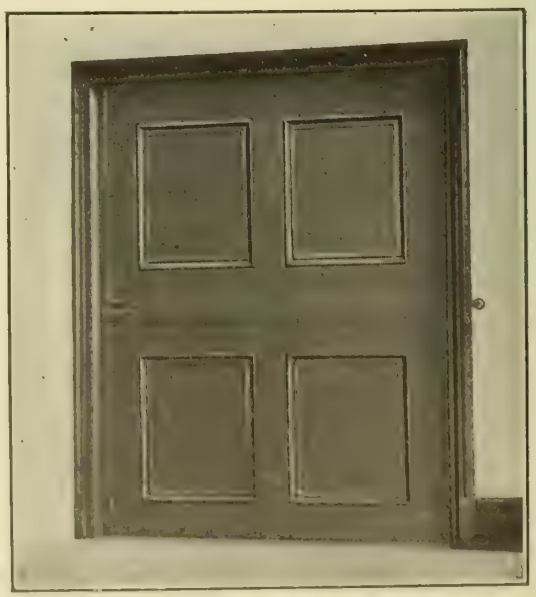
Made special Truckable type which folds back door, when open, to [illegible] out. This is the only over-counterbalanced door that fills gap between car and building sill. Strictly and patently flush with building sill. "Peelle" Counterbalanced Elevator Door has reinforced angular hanging and supporting devices at center or at more frequent intervals, according to size of door and amount of counterbalance it is to be subjected to. Running chains are not used in the support of "Peelle" Doors, which gives "The Peelle" patented truckable feature has been introduced, and never elsewhere because of its [illegible]

"Peelle" Counterbalance Truckable Door (Patented).

Manufactured exclusively by this Company, this door is constructed under the direct supervision of the Underwriters' Laboratories and bears their label, and is highly approved by the Building Departments and State Labor Bureaus.

Opens up and down from the center, and as each part has to travel only half the opening, the clear opening is given instantly. The two halves balance one another, and are operated by heavy flexible chains running over double radial ball-bearing pulleys, making their operation very easy.

"Peelle" Doors can have any type of panels, either wood, metal-covered, or all-metal, as specified. The panels are set and bolted into rigid angle- and tee-iron frames. The upper edge of the lower panel is reinforced so that when the "Peelle" Door is open, it presents a solid sill between the building floor and the elevator car (see illustration).



"PEELLE" DOORS IN THE GIMBEL BROS. DEPARTMENT STORE, NEW YORK, N. Y.
With kalamein built in dummy panels
"Peelle" doors can be furnished in materials and finish to harmonize with any surroundings, and with or without wire glass panels

Continued on next page

Safety.

"Peelle" Doors were awarded the Gold Medal at the International Exposition of Safety, 1913-1914.

They can be furnished with automatic closing devices, or safety electro mechanical interlocks, which prevent the car being started until the operator first closes the door.

"Peelle" Doors completely close the opening, shutting off all through draughts and preventing spread of fire. The "Peelle" Door has no protruding angles over which to trip and stumble.

Economy.

These doors are extremely simple in construction and operation. They do away with the troublesome elevator gates, and swinging or folding doors—distinct advantages in favor of the "Peelle" Door.

The speed possible in the operation of these doors increases tremendously the efficiency of the elevator system.

"Peelle" Doors occupy no valuable floor space, because they operate between the car and the wall, the space that is usually taken up by the elevator gate.

Operation.

"Peele" Doors are convenient, as they can be operated easily by one hand without stepping off the car platform. The "Peelle" Doors have no counterweights, which double the operating weight, increase friction and necessitate unusual effort in operation. The shaft is also not littered up with weight boxes.

They can be opened only from the shaft side, which makes them accident-proof. They can be arranged to open with key from the floor side, when so specified.

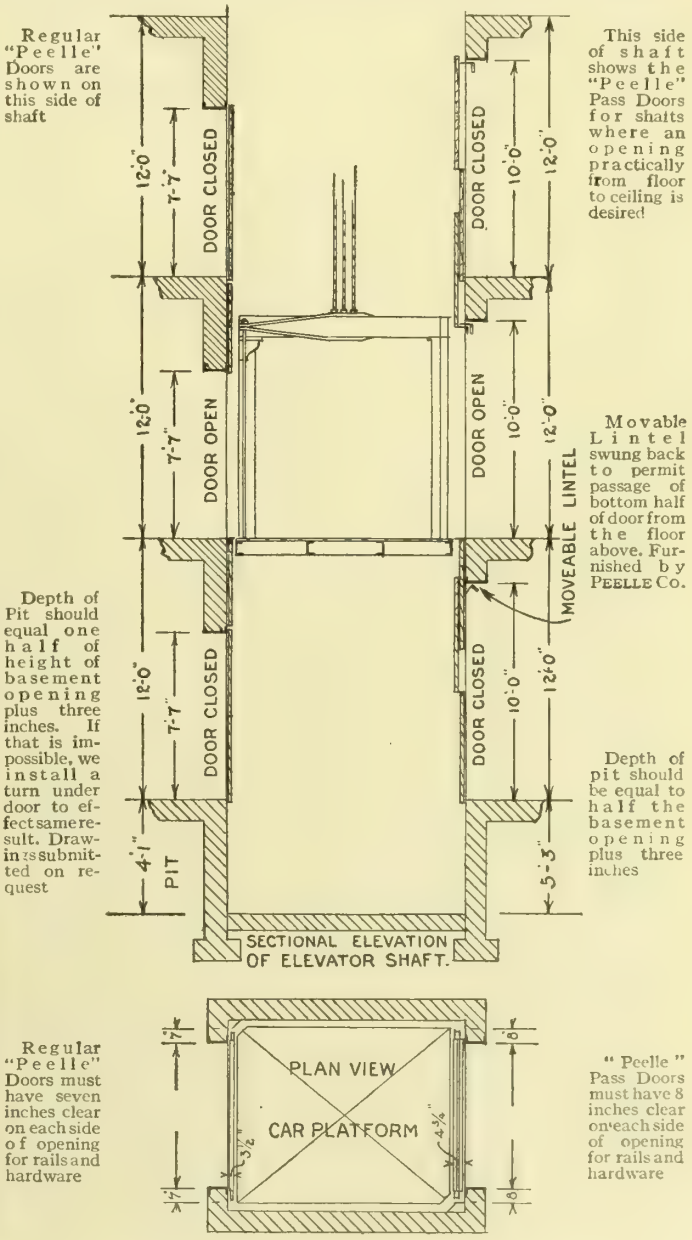
"Peelle" Pass Door Construction.

When it is desired for garage elevators, etc., that the height of the openings be practically from floor to ceiling, the "Peelle" Pass Door can be used. (See adjoining detail.)

This is a most effective solution for the fire and general safety problem in connection with garage and warehouse elevator openings. Practically every prominent garage in New York City, and other cities, is equipped with "Peelle" Pass Elevator Doors. Call on us for further information.

A FEW OF THE 1000 "PEELLE" DOORS INSTALLED IN THE BUSH TERMINAL BUILDING

The "Peelle" door is also made with corrugated steel panels when cheaper construction is desired. The cheaper doors also bear the Underwriters' Label



PLAN AND ELEVATION OF "PEELLE" DOORS

Left half indicates Regular Door; right half "Peelle" Pass Door

Door closed Door partly open

"PEELLE" PASS DOORS IN NORTH MOORE STREET GARAGE, 56-62 NORTH MOORE STREET, NEW YORK

Give entire height of opening; easy to operate; no counterweights

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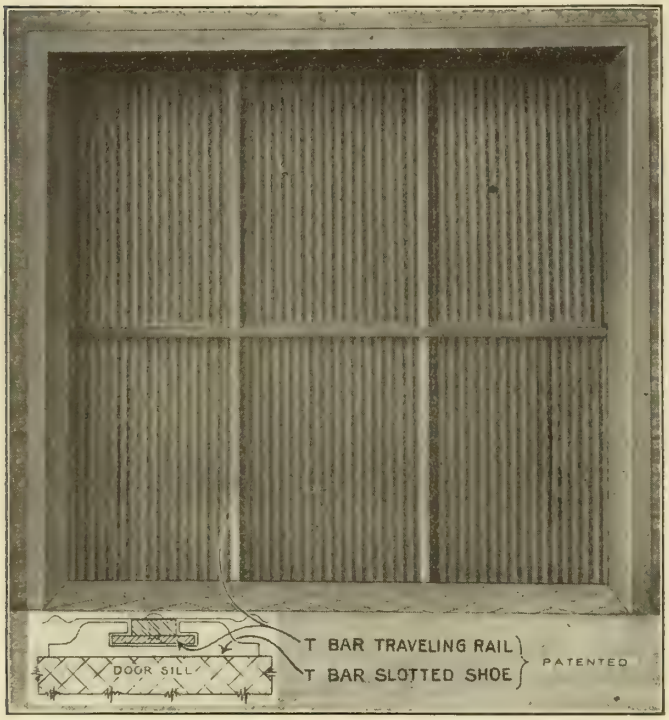


"PEELLE" CORRUGATED STEEL COUNTERBALANCE TRUCKABLE DOOR (PATENTED), AS IN SPARRY LOFT BUILDING, BROOKLYN, N. Y.

Showing No. 20 gauge corrugated steel panels

Note dovetail feature shown in detail, one of the many important features used on "Peelle" Doors only. "Peelle" T-bar traveling rails, operating in the "Peelle" binder shoes, fastened at sill and lintel, hold door securely to wall when same is open, closed or partly open, and prevent buckling through rough treatment. These T-rails are spaced 3' 0" apart

"Peelle" antifriction binder shoes, in addition to guiding T-bar traveling rails, assist, when the door is open, in supporting trucking feature

Installation Data, Peelle Doors.

For ideal construction, channel iron jambs should be provided. In case of hollow tile construction, channel jambs should run from floor to ceiling. THE PEELLE COMPANY does not furnish jambs, sills, stationary lintels or trim.

NOTE—*Shaft must be flush, with no projecting sills or lintels.*

MEASUREMENTS FOR REGULAR "PEELLE" DOORS

Height of Door Openings	Floor Line to Floor Line	Height of Door Openings	Floor Line to Floor Line
5 ft. 6 in.	8 ft. 10 in.	7 ft. 6 in.	11 ft. 10 in.
6 ft.	9 ft. 7 in.	7 ft. 9 in.	12 ft. 3 in.
6 ft. 3 in.	10 ft.	8 ft.	12 ft. 7 in.
6 ft. 6 in.	10 ft. 4 in.	8 ft. 3 in.	13 ft.
6 ft. 9 in.	10 ft. 9 in.	8 ft. 6 in.	13 ft. 4 in.
7 ft.	11 ft. 1 in.	8 ft. 9 in.	13 ft. 9 in.
7 ft. 3 in.	11 ft. 6 in.		

The above table applies only to the Regular Door. In order to have a high doorway where the ceilings are low, see our special "Peelle" Pass Door, indicated in adjoining illustration.

References.

The following are a few buildings in which the freight elevators are equipped with "Peelle" Doors. The asterisk (*) prefix denotes that they are the largest or highest buildings of their kind in the world:

*Bush Terminal Buildings, Brooklyn, N. Y.
*Austin Nichols Grocery Warehouse, Brooklyn, N. Y.
*Robert Gair Concrete Buildings, Brooklyn, N. Y.
*Woolworth Office Building, New York, N. Y.
*McAlpin Hotel, New York, N. Y.
*Herald Square Loft Building, New York, N. Y.
*Equitable Office Building, New York, N. Y.
*Auerbach Candy Warehouse, New York, N. Y.
John Wanamaker Department Store, New York, N. Y.
Hill Publishing Co., New York, N. Y.
Albemarle Building, New York, N. Y.
Murray Hill Investing Building, New York, N. Y.
Burton Bros. Warehouse, New York, N. Y.
Frith Building, New York, N. Y.
Finck Building, New York, N. Y.
Mail Service and Loft Building, New York, N. Y.
Lord & Taylor Department Store, New York, N. Y.
*Warner Corset Factories, Bridgeport, Conn.
Standard Oil Co., numerous cities
Ford Motor Building, numerous cities
General Electric Co. Factories, numerous cities
American Can Co. Factories, numerous cities
Otis Elevator Co., numerous cities
American Ever Ready Co. Building, Long Island City, N. Y.
*Loose-Wiles Biscuit Building, Long Island City, N. Y.
Great Atlantic & Pacific Tea Co. Buildings, Jersey City, N. J.
Hyatt Roller Bearing Co. Buildings, Harrison, N. J.
U. S. Post Office, Denver, Colo.
Osgood Bradley Building, Worcester, Mass.
Sturtevant Merrick Building, Springfield, Mass.
American Cigar Co., Hartford, Conn.
Shartenberg Robinson Building, New Haven, Conn.
Winchester Repeating Arms Co., New Haven, Conn.
United States Tire Co., New York, N. Y., and Boston, Mass.
Boston Terminal & Refrigerating Co., East Boston, Mass.
Snead-Power Building, Louisville, Ky.
United Grocery Warehouse, Jacksonville, Fla.
A. Booth & Co., St. Paul, Minn.
Canadian Pacific Railroad Station, Toronto and Montreal, Can.
Strawbridge & Clothier, Philadelphia, Pa.
Smaltz Building, Philadelphia, Pa.
Electric Storage Battery Co., Philadelphia, Pa.
Victor Talking Machine Co., Camden, N. J.
Baltimore Tobacco Warehouse, Baltimore, Md.
Joseph Bancroft & Sons Co., Wilmington, Del.
Southern Railway Freight House, Atlanta, Ga.
Krippendorf-Dittman Shoe Factory, Cincinnati, Ohio
Union Storage Warehouse, Dayton, Ohio
Dennis Kelly Wholesale Grocery, Columbus, Ohio
Scott Brothers Co., Cleveland, Ohio
Huron Road Fireproof Building, Cleveland, Ohio
Standard Mfg. Co., Erie, Pa.
Sears, Roebuck Warehouse, Seattle, Wash. and Chicago, Ill.
Stripling Department Store, Fort Worth, Tex.
B., R. & P. Railroad Warehouse, Rochester, N. Y.
Eastman Kodak Co., Rochester, N. Y.
Kaufman & Bauer Department Store, Pittsburgh, Pa.
J. N. Adam Co. Buildings, Buffalo, N. Y.
Robinson-Locke Building, Toledo, Ohio
All Buildings of Denny Estate, Pittsburgh, Pa.
Kahn Tailoring Co., Indianapolis, Ind.
Miller-Parrott Baking Co., Terre Haute, Ind.
*Bingham Hardware Co., Cleveland, Ohio
Federal Warehouse, Peoria, Ill.
Pacific Coast Shredded Wheat Co., San Francisco, Cal.

HOBOKEN TERMINALS, EQUIPPED WITH "PEELLE" METAL COVERED DOORS
Largest and Highest Loft Buildings in New Jersey
[illegible] Architect TURNER CONSTRUCTION Co., Contractors

Continued on next page

Door Open

Door Closed

"PEELLE" TEL-CO-DOR INSTALLED IN AMERICAN GAS ACCUMULATOR CO. BUILDING, ELIZABETH, N. J.

"Peelle" Tel-Co-Dor.

This door is adaptable for protecting openings for exterior doorways in freight and warehouses, for openings in fire wall, and can also be used, when specially required, for small freight elevator openings in shafts, where it is impossible for the doors to slide up and down.

The Tel-Co-Dor has steel corrugated panels, reinforced with "Peelle" patented T-bar traveling rails and T-bar binder shoes, and is made in two sections, with the two-speed operating device (patent applied for), making each panel telescope the other. It is constructed of corrugated iron frames and requires a four-inch space for installation. This door is very light and durable, is approved by the Mutual Insurance Companies, and is labeled by the National Board of Fire Underwriters. Working details will be sent promptly on request.

"Peelle" Canopy Folding Door.

This door is operated by the "Peelle" Endless Chain System, setting in motion the "Peelle" Compound Gear Hoist and turning the main shaft, to which large 14-inch drums are keyed. These drums wind up the cable attached to either side of the door and cause it to lift evenly without binding. The counterweights are guarded and every detail is carefully executed.

"PEELLE" CANOPY FOLDING DOOR (PATENTED)
Viewed from inside. Showing rigid and simple construction, economy of space and convenience of operation

"PEELLE" CANOPY FOLDING DOOR (OUTSIDE)
As installed in Dillman's Garage. Can be made with any type of panels desired. A very desirable exterior garage and warehouse door

RELIANCE FIREPROOF DOOR CO.

MANUFACTURERS OF

Fire Retardant Specialties of Metal Covered Woodwork

OFFICE AND FACTORY

TELEPHONE, GREENPOINT, { 2211 / 2212

West Street, Greenpoint Avenue and Milton Street

BROOKLYN, N. Y.

Products.

METAL COVERED DOORS, WINDOWS and INTERIOR FINISH, in BRONZE, COPPER, SEMPERMERUS, KALAMEIN and GALVANIZED IRON; FURNITURE STEEL, drawn over WHITE PINE and HARDWOOD CORES.

Metals Used.

Bronze from 20 to 26 gauge; copper from 14 to 20 ounces to the square foot; sempermerus, kalamein and galvanized iron, 22 to 28 gauge; furniture steel, 12 to 22 gauge.

Underwriter Kalamein Doors.

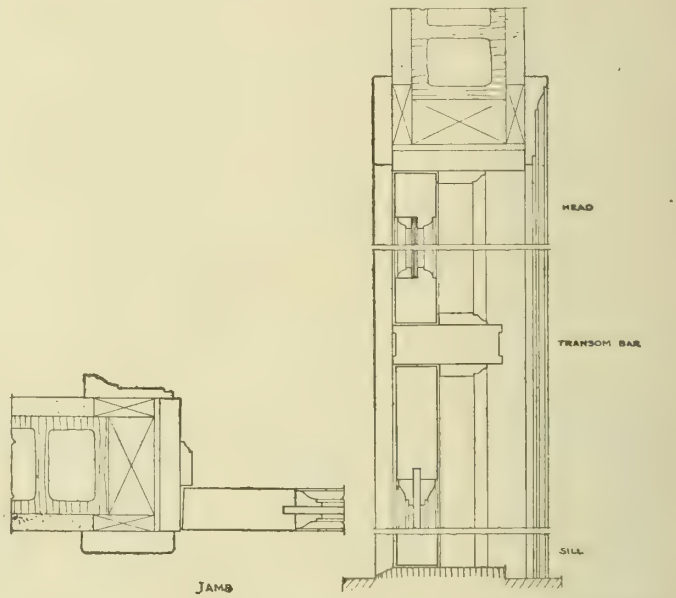
Our Underwriter Kalamein Doors, for elevator shafts, stairways, corridor and partitions, fire-escapes and fire tower openings, when installed in accordance with the following specifications and details (Figs. 1, 2 and 3) will procure a minimum insurance rate for the building and contents.

Specifications.

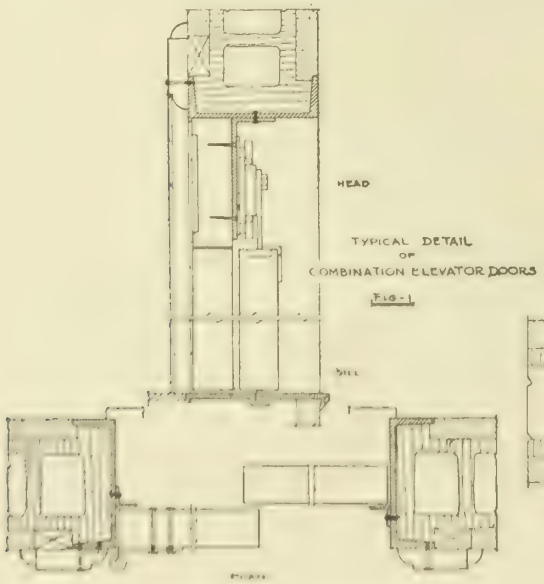
Stair and Elevator Doors—Labeled for single doors up to 48 inches wide and in pairs up to 72 inches wide; made with solid panels hung in channel iron of 12-gauge steel frames with 5-inch by 5-inch surface butts, mortise cylinder locks with ¾-inch throw bolt; stair doors should be made self-closing, either by coil spring or door check, the latter preferable as shown by Fig. 2; combination slide and swing elevator doors shown by Fig. 1.

Fire-Escape and Tower Doors—Labeled for the same size openings as stair and elevator doors, and can be constructed to receive wire-glass, not exceeding five square feet, hung in the same manner as stair doors, shown by Fig. 3.

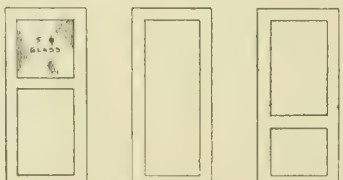
Corridor and Partition Doors—Constructed to receive eight square feet of wire-glass and bearing the Underwriters' label, may be hung to metal covered jambs when stair and elevator doors are labeled.



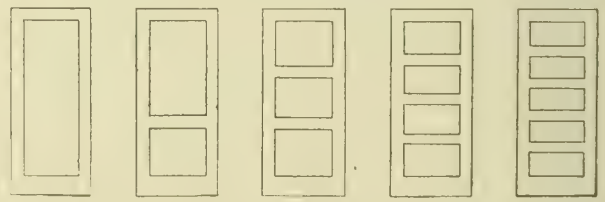
DETAIL OF METAL COVERED DOOR JAMBS AND TRANSOM, WITH WOOD BUCKS



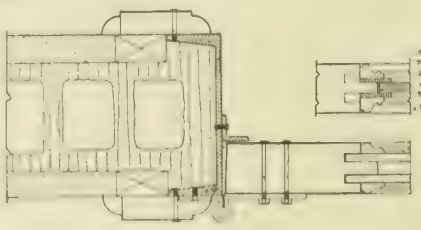
DETAIL OF COMBINATION ELEVATOR DOORS



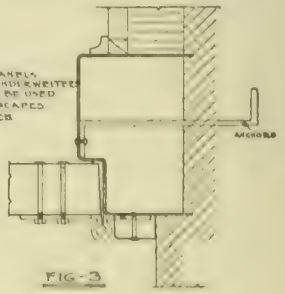
FIRE-ESCAPE AND TOWER DOOR



TYPICAL ELEVATIONS OF UNDERWRITERS' LABELED DOORS FOR STAIRS AND ELEVATOR ENCLOSURES



TYPICAL DETAIL OF UNDERWRITERS' LABELED STAIR, OFFICE PARTITION AND CORRIDOR DOORS



TYPICAL DETAIL OF FIRE ESCAPE AND FIRE TOWER DOORS

Sweet's Catalogue

Continued on next page

Double-Hung and Casement Kalamein Windows.

Our Double-Hung and Casement Kalamein Windows, with integral weather-strips, shown in Figs. 4 and 5, have proved to be the most weather-tight window manufactured, besides being the most easy and noiseless in operation.

Prices.

Prices furnished upon receipt of schedule covering the following data (unless plans and specifications are furnished to us):

Doors—size and style of each.
Jambs—width and thickness required.
Casing—moulded or flat; stating width, and whether one or both sides of opening.

Facilities.

Our manufacturing plant, containing 40,000 square feet floor working space and equipped with improved wood and metal working machines, many of which have been specially designed and built, essential to the requirements of producing high-class metal covered woodwork, is prepared and in a position to produce superior work in our line, and we can promptly execute orders of any size. None too large.

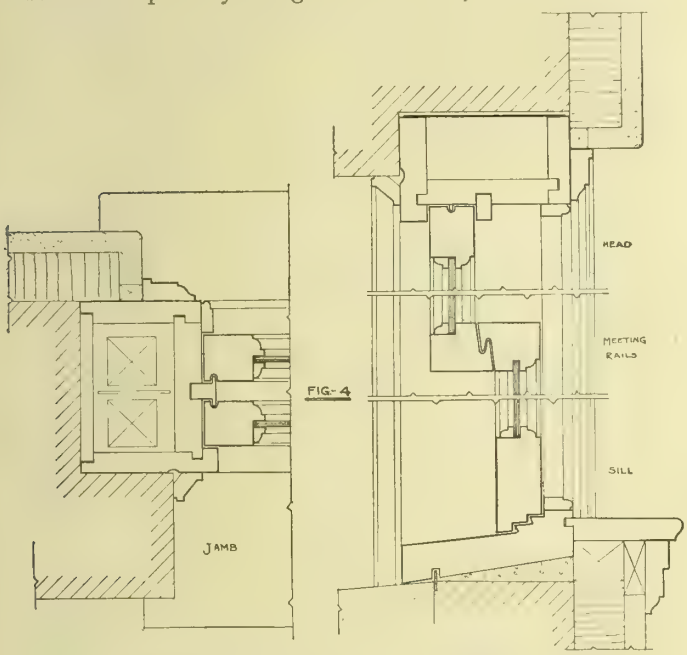
Catalogue.

On request we will be pleased to send you our 1915 Catalogue, which contains a partial list of our past performances and a more complete outline of our details of doors, windows, trim and mouldings.

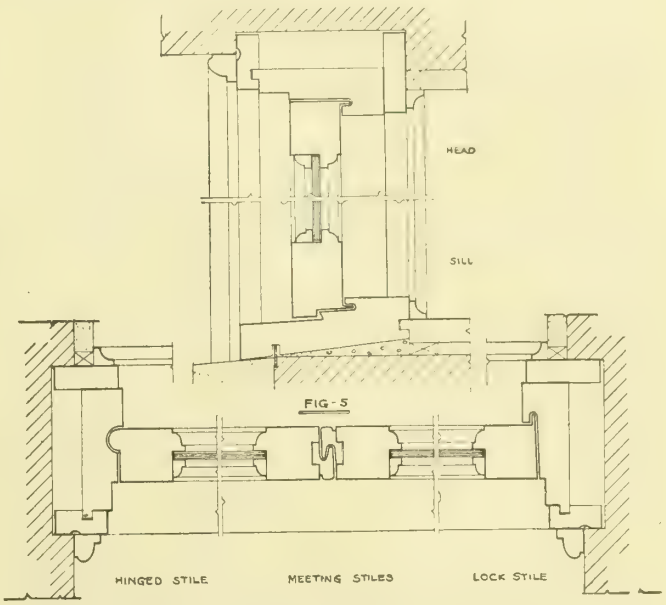
Representatives.

We are represented by Agencies in Boston, for New England States; in Philadelphia, for Eastern Pennsylvania, Delaware, and part of New Jersey; in Washington, for Southern States, comprising District of Columbia, Maryland, Virginia, West Virginia, North and South Carolina, Georgia, Tennessee and Florida; in Cincinnati, for Western Pennsylvania and Ohio.

The names and addresses of Agents may be obtained on application to our office.



TYPICAL DETAIL OF DOUBLE-HUNG WINDOWS, SHOWING INTEGRAL WEATHER-STRIPPING



TYPICAL DETAIL OF CASEMENT WINDOWS, SHOWING INTEGRAL WEATHER-STRIPPING

References.

The following is a partial list of past performances.

NAME	LOCATION	ARCHITECT
Biltmore Hotel	New York, N. Y.	Warren & Wetmore
42nd Street Building	New York, N. Y.	Buchman & Fox
Johnson-Kahn Building	New York, N. Y.	Schwartz & Gross
Victoria Building	New York, N. Y.	Schwartz & Gross
Ward Bakery	Buffalo, N. Y.	C. B. Comstock
Copley Plaza Hotel	Boston, Mass.	J. Hardenburgh
City Hall Annex	Boston, Mass.	E. P. T. Graham
Boston Insurance Building	Boston, Mass.	Peabody & Stearns
Worcester Telephone Building	Worcester, Mass.	Densmore & LeClear
Harvard Dormitories	Cambridge, Mass.	Shepley, Rutan & Coolidge
Widener Building	Philadelphia, Pa.	Horace Trumbauer
Webb Warehouse	Philadelphia, Pa.	
Gazette Times Building	Pittsburgh, Pa.	Lee & Piper
Schoettle Building	Philadelphia, Pa.	Day & Klauder
Arcade Building	Philadelphia, Pa.	
Manchester Insurance Building	Manchester, N. H.	Edward L. Tilton
Raleigh Hotel	Washington, D. C.	
Commerce Building	Washington, D. C.	Milburn, Heister & Co.
Chronicle Building	Augusta, Ga.	W. L. Stoddard
Fidelity Trust Building	Baltimore, Md.	Baldwin & Pennington
Greenbrier Hotel	White Sulphur Springs, W. Va.	Steiner
Virginia Power Station	Richmond, Va.	A. C. Bossom
Municipal Building	Waterbury, Conn.	Cass Gilbert
Ames Building	Cleveland, Ohio	Starrett & Van Vleck
Holsten National Bank	Knoxville, Tenn.	

RICHMOND SAFETY GATE CO.

MANUFACTURERS OF

Fire Doors, Shutters, etc.

RICHMOND, IND.

BRANCH OFFICES

ATLANTA, GA., 1202 Candler Building
BALTIMORE, MD., 321 Equitable Building
BOSTON, MASS., 4 Post Office Square
BROOKLYN, N. Y., 309 MacDonough Street
CHICAGO, ILL., 615 Cambridge Building
CINCINNATI, OHIO, Merchants' Building
CLEVELAND, OHIO, 1900 Euclid Building
COLUMBUS, OHIO, Lynn and Ludlow Streets
DENVER, COLO., 1534 Blake Street
DETROIT, MICH., 175 Larned Street, West
GRAND RAPIDS, MICH., Builders and Traders Exchange
INDIANAPOLIS, IND., 502 Chamber of Commerce Building
KANSAS CITY, MO., 209 Hall Building
PHILADELPHIA, PA., 1414 South Penn Square
PITTSBURGH, PA., 550 Century Building
SAN FRANCISCO, CAL., 199 First Street
ST. LOUIS, MO., 448 Pierce Building
SEATTLE, WASH., 411 Globe Building

Products.

STANDARD TIN-CLAD DOORS and SHUTTERS; UNDERWRITERS' IRON FIRE DOORS; HARDWARE for FIRE DOORS; HORIZONTAL FOLDING DOORS; HORIZONTAL TROLLEY DOORS; COUNTERBALANCED ELEVATOR DOORS; VERTICAL TELESCOPING ELEVATOR DOORS; ELEVATOR and STAIRWAY GRAVITY-CLOSING DOORS.

For Elevator Safety Gates, Angle Frames and Light Structural Work, Sash Ventilating Apparatus, etc., see our name in General Index.

Approval.

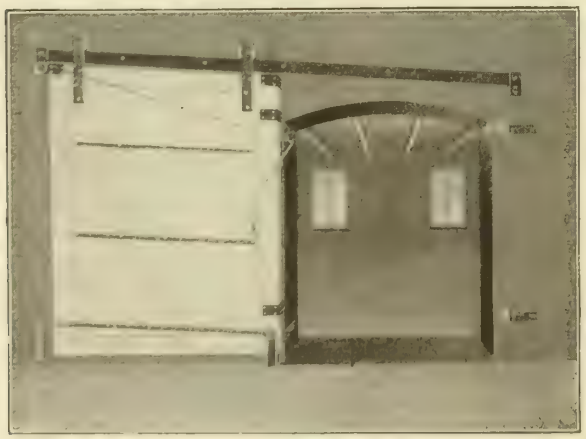
Richmond Fire Doors and Fixtures are made in accordance with the latest rules and requirements of the Insurance Authorities. Several types of Doors and Fixtures are labeled under the supervision of the Underwriters' Laboratories, Inc. Our Fire Doors and Fixtures are sold with the guarantee that they will be fully approved by local and State Inspection Bureaus.

Installation.

We sell Fire Doors with or without hardware either f.o.b. cars Richmond or installed complete, at the option of purchaser. When we do not erect we can, if desired, furnish a competent foreman at a reasonable charge, to superintend the erection. With all f.o.b. shipments, complete blue-prints and instructions are furnished, showing method of setting up doors and the application of hardware.

Special Construction.

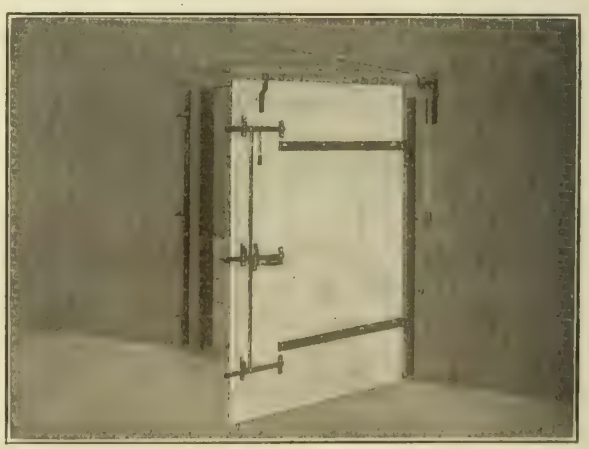
The various types of Fire Doors herewith shown represent but a portion of our line. Fire Doors in almost any combination or construction desired can be furnished. Doors and Fixtures of special construction can be supplied to meet unusual and special conditions. Our engineering department may be relied upon to assist in working out difficult problems and to prepare and submit drawings with valuable suggestions.



NO. 200 SLIDING DOORS AND FIXTURES

Sliding Doors and Fixtures.

The type of Fixtures herewith illustrated is in many respects the simplest yet most reliable on the market. The door is counterbalanced and held in any desired position. The automatic closing device may be modified to comply with local insurance requirements. Doors and hardware are regularly inspected and labeled under the direction of the Underwriters' Laboratories, Inc.



NO. 120 SINGLE SWING DOOR AND FIXTURES

Swing Doors and Fixtures.

Doors and Fixtures of this type are recommended when sliding doors cannot be used. Automatic closing attachment should be used on all doors used frequently; the device shown is positive in action and thoroughly reliable. Doors and hardware are regularly inspected under the direction of the Underwriters' Laboratories, Inc.

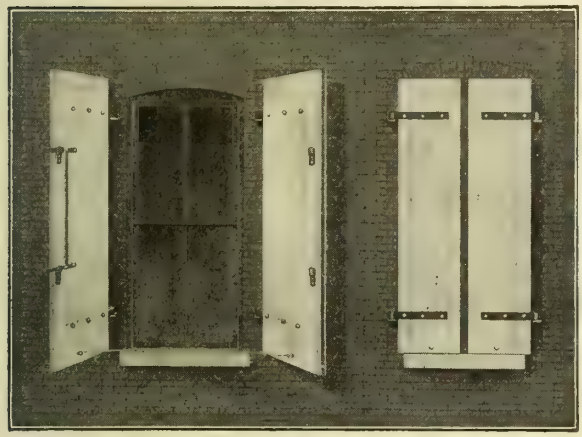
Continued on next page

Standard Fire Shutters

Standard Fire Shutters form a first-class protection for window openings exposed to a fire from an adjoining building. They are constructed the same as Standard Fire Doors but are two-ply, whereas fire doors are usually three-ply.

In addition to the type shown below, sliding shutters or any special construction can be furnished.

Fire Shutters are regularly inspected under the direction of the Underwriters' Laboratories, Inc.

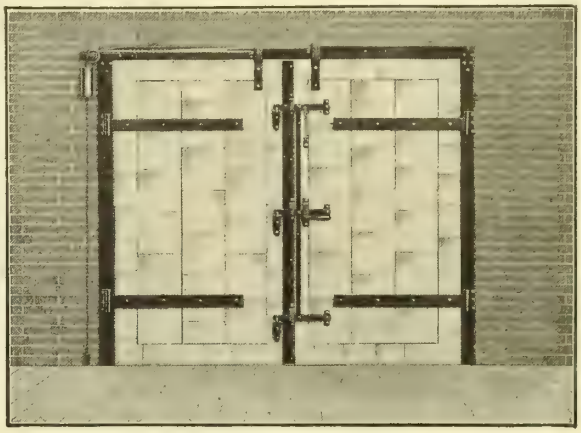


NO. 100 SWING SHUTTERS AND FIXTURES

Double Swing Doors and Fixtures.

This arrangement is recommended for the protection of openings into elevator hatchways. The illustration shows doors in combination with an angle-iron frame. Channel frames can also be furnished or the doors can be arranged to lap the wall at top and both sides.

Doors and hardware are regularly inspected under the direction of the Underwriters' Laboratories, Inc.



NO. 130 DOUBLE SWING DOOR AND SHUTTERS

Sliding Iron Doors and Fixtures.

Iron doors are extensively used for the protection of elevator, division wall or exterior openings. They are constructed of flat steel sheets any gauge from No. 14 to No. 7 with angle frames suitably stiffened with horizontal braces. Doors of this type are commonly furnished with angle or channel iron wall frames, also all fixtures complete ready to install.

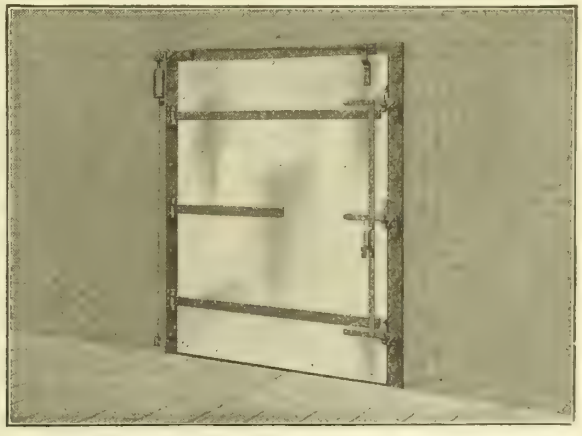
NO. 310 SLIDING IRON DOORS AND FIXTURES

Swinging Iron Doors and Shutters.

Swinging Iron Doors, single or in pairs, also Iron Fire Shutters can be supplied. The closing devices herewith shown were especially designed for doors of this type, but can be modified if necessary to comply with local insurance requirements.

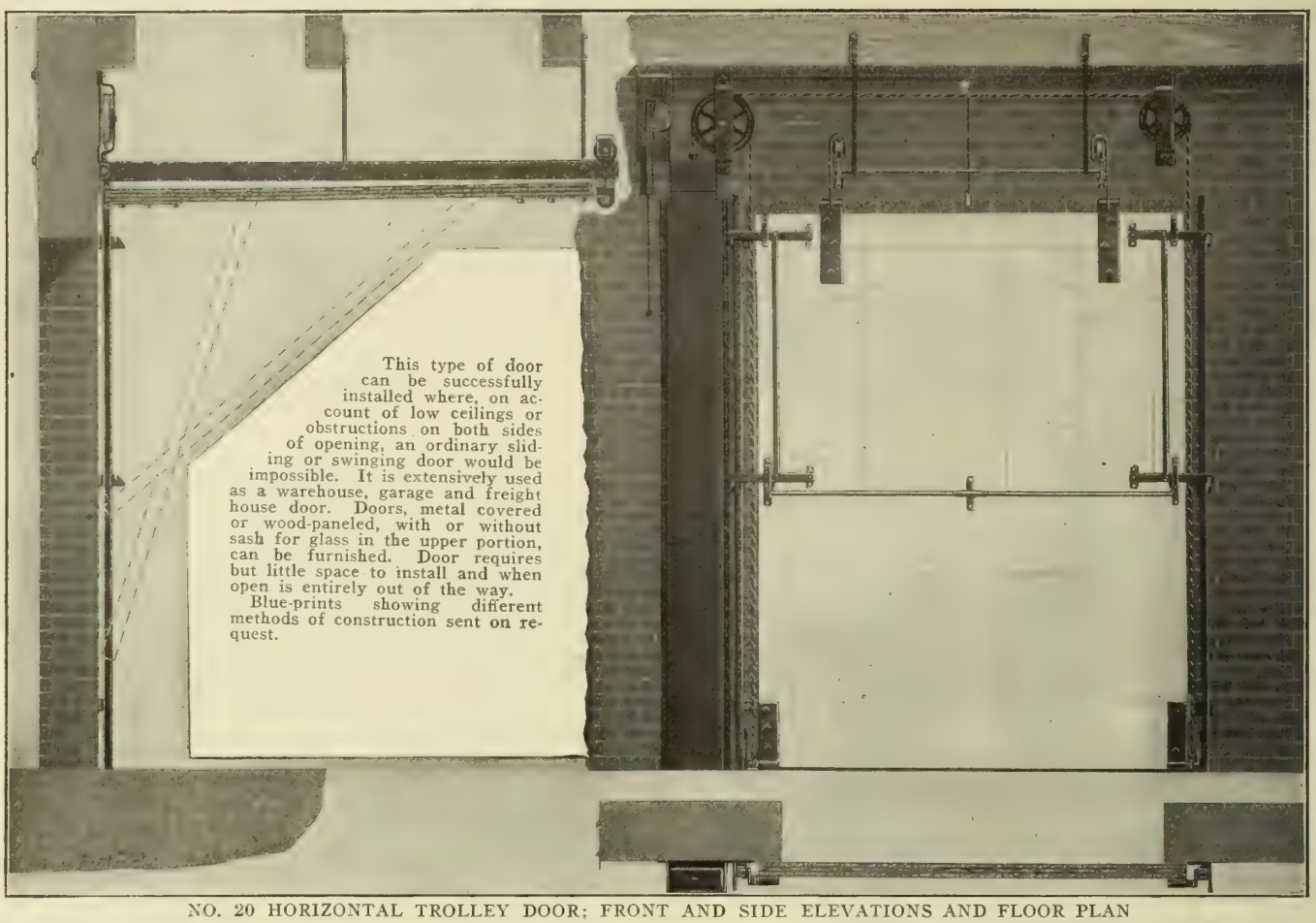
Steel Doors form a first-class protection and are practically indestructible.

Detail blue-prints showing our various types of doors furnished on request.



NO. 420 SWINGING IRON DOORS AND FIXTURES

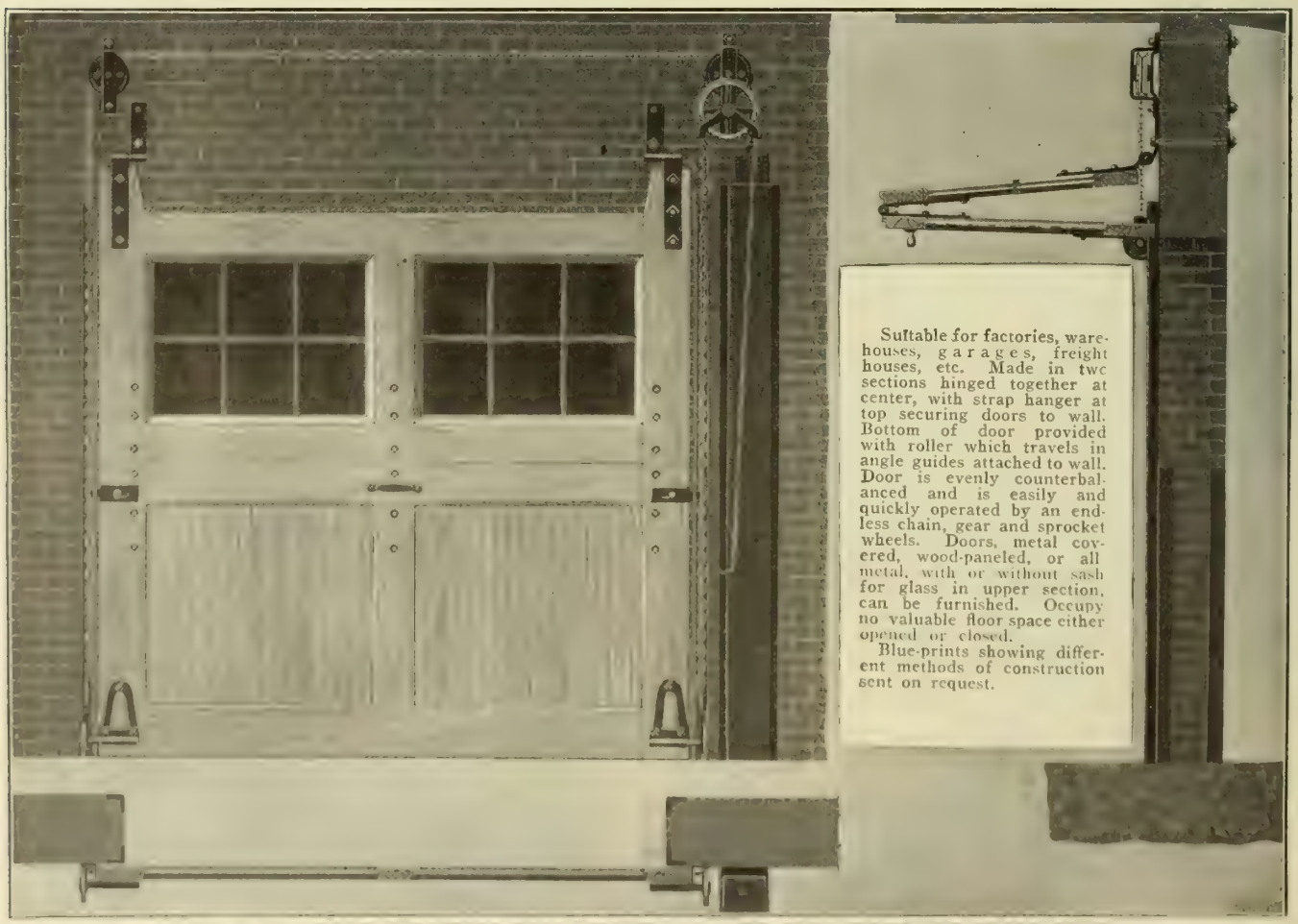
Continued on next page



This type of door can be successfully installed where, on account of low ceilings or obstructions on both sides of opening, an ordinary sliding or swinging door would be impossible. It is extensively used as a warehouse, garage and freight house door. Doors, metal covered or wood-paneled, with or without sash for glass in the upper portion, can be furnished. Door requires but little space to install and when open is entirely out of the way.

Blue-prints showing different methods of construction sent on request.

NO. 20 HORIZONTAL TROLLEY DOOR; FRONT AND SIDE ELEVATIONS AND FLOOR PLAN



Suitable for factories, warehouses, garages, freight houses, etc. Made in two sections hinged together at center, with strap hanger at top securing doors to wall. Bottom of door provided with roller which travels in angle guides attached to wall. Door is evenly counterbalanced and is easily and quickly operated by an endless chain, gear and sprocket wheels. Doors, metal covered, wood-paneled, or all metal, with or without sash for glass in upper section, can be furnished. Occupy no valuable floor space either opened or closed.

Blue-prints showing different methods of construction sent on request.

NO. 10 HORIZONTAL FOLDING DOOR, FRONT AND SIDE ELEVATIONS AND FLOOR PLAN

Continued on next page

Counterbalanced Elevator Doors.

Counterbalanced Doors are mounted on the inside of the elevator hatchway and are made in two sections dividing in the center. The doors slide in guides made of heavy angles which are fastened to the wall by means of through bolts. Each section of door is made of corrugated iron surrounded by and riveted to heavy angle frames, stiffened with one or more vertical braces. Roller-bearing malleable iron sheaves over which the connecting chains operate, are riveted to the angle guides.

When doors are closed they lock automatically by means of a double latch with suitable stops riveted to guides at each side of door.

Counterbalanced Doors are designed for manual operation from the car, but, when desired, a self-closing attachment is provided by means of which the doors close promptly when the elevator leaves a floor level.

To successfully install doors of this type a space of three and one quarter inches between edge of car and inside of enclosure is required. The distance from floor to floor must be one half greater than the height of opening, plus eight inches. The return on both sides of opening must be not less than six and one half inches.

Richmond Counterbalanced Doors are inspected and labeled under the direction of the Underwriters' Laboratories, Inc. Catalogue and detail blue-prints sent on request.

Telescoping Elevator Doors.

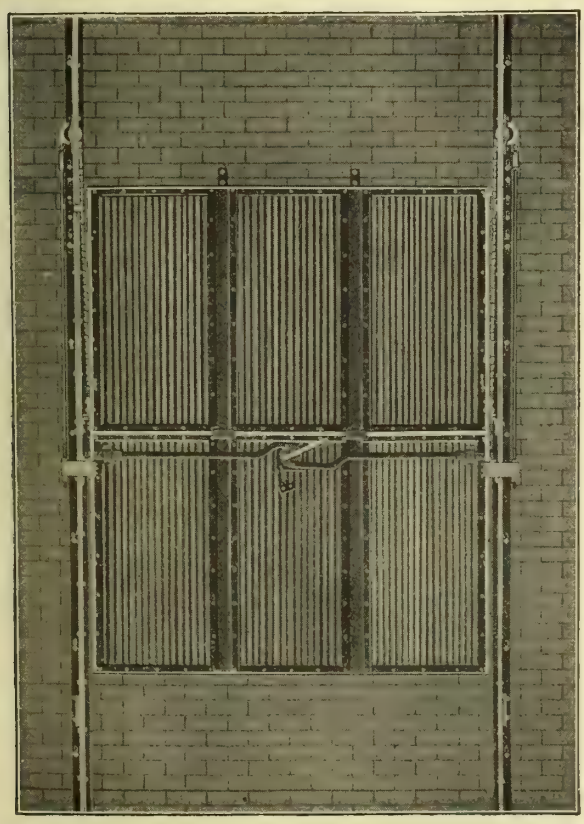
Vertical Telescoping Doors can be used for the protection of any vertical opening but are especially adapted for the protection of elevator hatchway openings. The doors are made in two sections, both sections sliding vertically. The arrangement of pulleys is such that the lower section maintains a speed ratio of two to one as compared with the upper section.

Doors proper are usually made of corrugated sheets surrounded by, and riveted to, angle-iron frames. Doors made of flat sheets or wood-paneled door can also be furnished. The doors slide on double angle tracks bolted to walls, and are supported by chains or cables operating over roller-bearing sheaves fastened to the track and upper section of door.

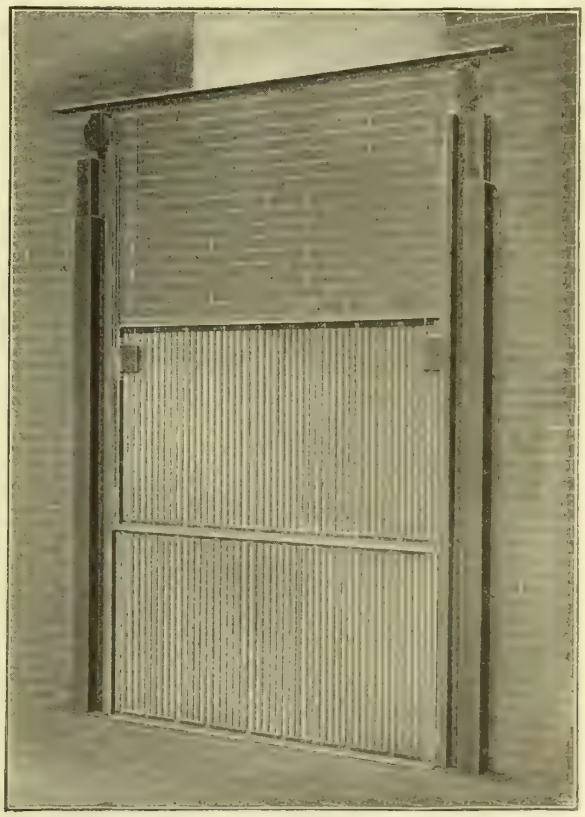
To install doors with angle frames, a space of four inches is required between edge of elevator car and inside of enclosure. The distance from floor to floor must be one half greater than the height of opening, plus six inches. A return of not less than eleven inches should be allowed, measuring from edge of jamb to inside of enclosure.

Telescoping Doors are furnished and installed subject to the inspection and approval of local and State Inspection Boards.

Catalogue and detail blue-prints on request.



NO. 350 COUNTERBALANCED ELEVATOR DOORS



NO. 360 TELESCOPING ELEVATOR DOORS

GUARANTY IRON AND WIRE CO.

Fire-Doors, Ornamental and Miscellaneous Iron

GENERAL OFFICE AND WORKS
2847-2851 West Lake Street
CHICAGO, ILL.

Products.

ELEVATOR DOORS.

Also, MEAKER DOORS, IRON FIRE-DOORS, FOLDING DOORS, HOLLOW-METAL DOORS, TIN-CLAD DOORS, IRON SHUTTERS, ROLLING SHUTTERS, SLIDE-UP DOORS, PASSENGER ELEVATOR DOORS, WAREHOUSE DOORS, FIRE-WALL DOORS, FIREPROOF STAIRS, WIRE ENCLOSURES, ELEVATOR ENCLOSURES and ELEVATOR CABS.

Quality.

The numerous features and advantages of our Counterbalanced Elevator Door immediately appeal to both architect and owner.

It is labeled by the National Board of Fire Underwriters, carrying with it a full rating of insurance.

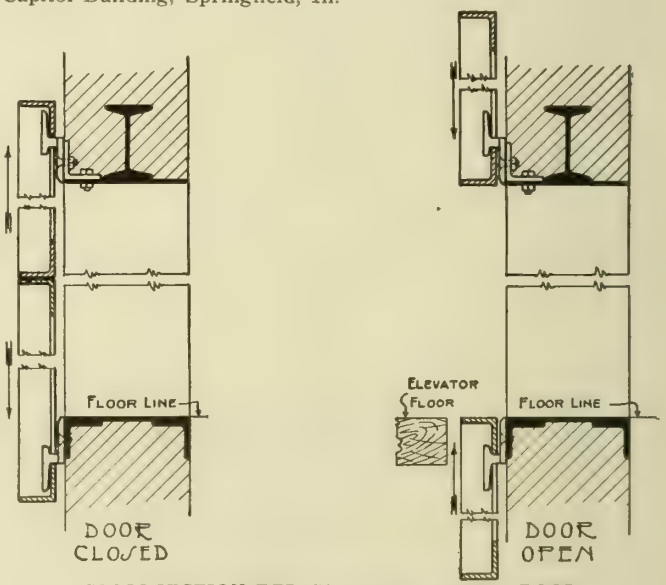
A special feature of this door is the trucking device, which permits a truck of any size or load to pass over without disturbing the door in the least.

All work is first inspected at our shop and then sent to the job to be put up in a first class manner. The illustrations below will give an idea of the lightness and durability of this door.

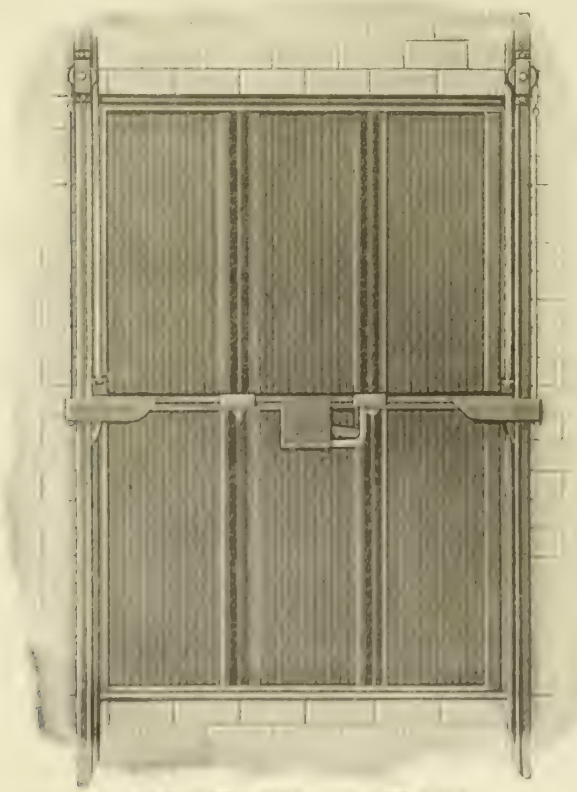
References.

Following is a partial list of buildings where our work has been installed:

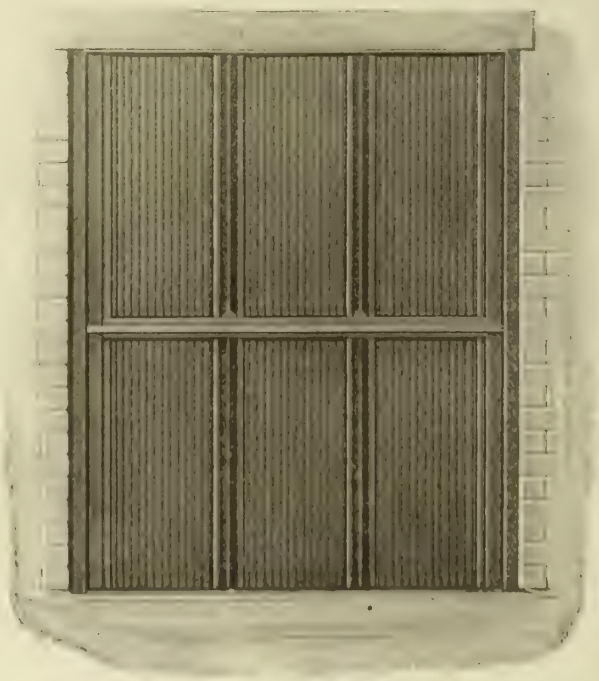
Harrison and State Building, Chicago, Ill.
Three Arts Building, Chicago, Ill.
Rosenthal Building, Chicago, Ill.
North Side Boys Club, Chicago, Ill.
Art Craft Building, Chicago, Ill.
Wroe Building, Chicago, Ill.
Marshall Field Garage, Chicago, Ill.
Chicago Tribune Color Press Building, Chicago, Ill.
South Shore Country Club, Chicago, Ill.
Bauer & Black Building, Chicago, Ill.
Armour Garage and Gymnasium, Chicago, Ill.
Capitol Building, Madison, Wis.
Daylight Building, Chicago, Ill.
Winston Building, Chicago, Ill.
U. S. Post Office, Wichita, Kan.
Beloit Y. M. C. A. Building, Beloit, Wis.
Great Southern Life Building, Louisville, Ky.
Marks Building, Madison, Wis.
C. W. Sherwood, Regina, Saskatchewan, Canada
Home for the Aged, Minneapolis, Minn.
Reading Hotel, Reading, Pa.
Clay Pool Hotel, Indianapolis, Ind.
American Trust & Savings Bank, Cedar Rapids, Iowa
Capitol Building, Springfield, Ill.



CROSS-SECTION DETAILS OF ELEVATOR DOOR



ELEVATOR DOOR—SHAFT SIDE



ELEVATOR DOOR—FLOOR SIDE

INTERIOR METAL MANUFACTURING CO.

Hollow Metal Doors and Interior Trim

EXECUTIVE OFFICES AND FACTORIES

JAMESTOWN, N. Y.

BRANCH OFFICES AND AGENCIES

NEW YORK, N. Y., Frederick J. Liomin, Distr. Mgr., 149 Broadway (Singer Building)

WASHINGTON, D. C., Thomas A. Bright, Distr. Mgr., 407 Commercial National Bank Building

CINCINNATI, OHIO, Builders' Metal Products Co., Merchants' Building

PITTSBURGH, PA., Lyman-Beeman Co., 703 First National Bank Building

SALES OFFICES IN FIFTY PRINCIPAL CITIES

Products and Services.

Hollow Metal Underwriters' Labeled Fireproof Doors; Sanitary Metal Door Frames; Interior Metal Trim (to meet all conditions); Elevator Doors and Enclosures; Metal Partitions and Wainscoting; Borrowed Lights; and Cold-Drawn Mouldings, in Steel, Brass, Bronze or Copper.

Also, Bronze Entrance Doors, Metal Bank Counter Fronts, Bronze Mausoleum Doors, etc.

Contracts are solicited in any part of the United States and Canada, and products will either be furnished f.o.b. factory, or erected complete at the building. Large or small contracts are assured equally prompt handling.

Facilities and Co-operation.

This organization, with its modern factory buildings, its up-to-date machinery and its large force of skilled workers under constant expert supervision, is prepared to fabricate a line of products of the highest character, to meet any requirements and in accordance with architects' drawings or its own designs.

Architects and builders are invited to freely consult the Engineering Department regarding construction possibilities and relative costs. Suggestive drawings and specifications, adapted to suit special conditions, as well as standard detail sheets will be gladly furnished.

While the range of moulding dies on hand is very extensive, special dies can be promptly made to details when necessary.

Official Indorsement.

"Interior" doors as well as other products of this company are constructed in conformance with the requirements of the National Board of Fire Underwriters and will be so labeled when desired.

"Interior" Hollow Metal Doors, Casings, etc.

Metals—The steel used is first-grade metal furniture stock or open-hearth sheet steel, full pickled, full cold-rolled, re-annealed, patent leveled, re-squared and oiled. All bronze used is first-grade, composed of 90 per cent copper and 10 per cent alloy.

Door Construction—"Interior" doors are designed for maximum strength and minimum weight (See Fig. 1). No. 18-gauge sheet metal is used and this is reinforced with channel and angle members at all intersections. Stiles and rails are welded together by the homogeneous process, rendering all joints invisible. Asbestos lining is used in all panels, and either cork or asbestos in rails and stiles. All parts where hardware is to be applied are properly reinforced. The results of the detailed care exercised in the selection of materials and in the construction are doors which experience has shown capable of withstanding severest fire and service tests.

Door Casings and Jambs—These are constructed of No. 18-gauge metal and the mitered corner joints are welded so they are invisible and permanently inseparable. Side and head jambs are shipped knocked down, providing for their proper adjustment to the rough openings in the building. The simple method of installing the casings is explained and illustrated under "Patent Buck Construction."

Hardware—Hanging stiles of doors and adjacent jambs are reinforced and cut to receive hardware from templates furnished by hardware contractor; and hardware itself is later applied by this company, when supplied.

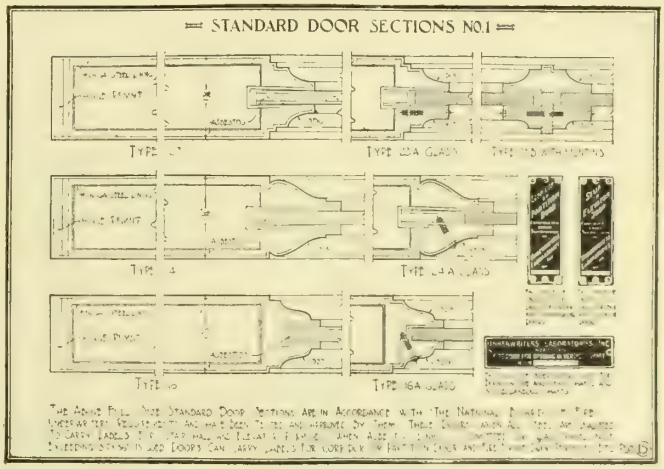


Fig. 1. SECTIONAL DETAILS SHOWING TYPICAL DOOR CONSTRUCTION

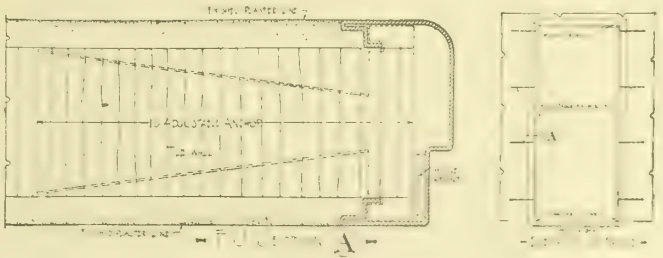


Fig. 2. ELEVATION AND SECTIONAL DETAIL OF SANITARY METAL DOOR FRAME

Continued on next page

Patent Buck Construction.

Fig. 3 shows the simple and efficient arrangement devised by this company for the installation of door casings, as well as other interior metal trim. Anchor locks are laid in the wall, on approximately 12-inch centers, so that, after the jamb has been applied with screws as indicated, the casings can be clamped into place over the anchor locks, making a neat and permanently rigid finish. This system can be used in connection with any type of wall construction.

Any other types of buck construction can be used with "Interior" products, and will be provided for, as specified.

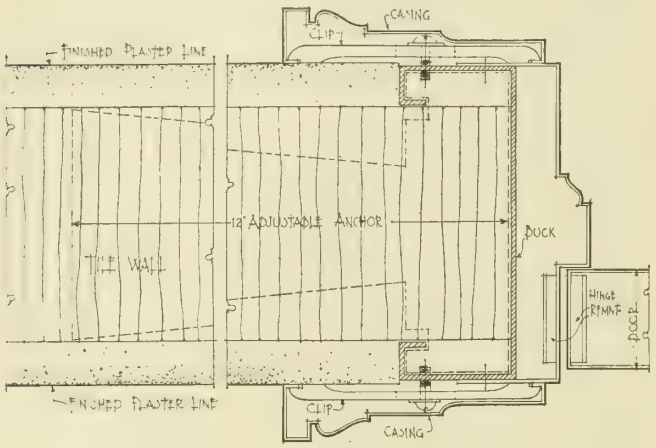


FIG. 3. STANDARD DOOR FRAME APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS

Sanitary Metal Door Frame.

No. 2 illustrates a combination jamb and buck construction that is particularly adapted to hospital use and other locations where sanitary trim is an essential requirement. The frame can be adapted to any thickness of wall and is made in gauges from No. 16 to No. 11, according to conditions to be met.

FIG. 4. EXAMPLE OF "INTERIOR" ELEVATOR DOOR INSTALLATION

Elevator Doors and Enclosures.

For fire-protection of elevator shafts in office buildings, apartment houses, etc., hollow metal elevator enclosures, fitted with any style of elevator door equipped with any standard lock or safety device, are constructed to meet all requirements of design or construction. Panels in doors may be either metal or wire-glass; the former, however, being recognized by the Underwriters as more effectively fireproof.

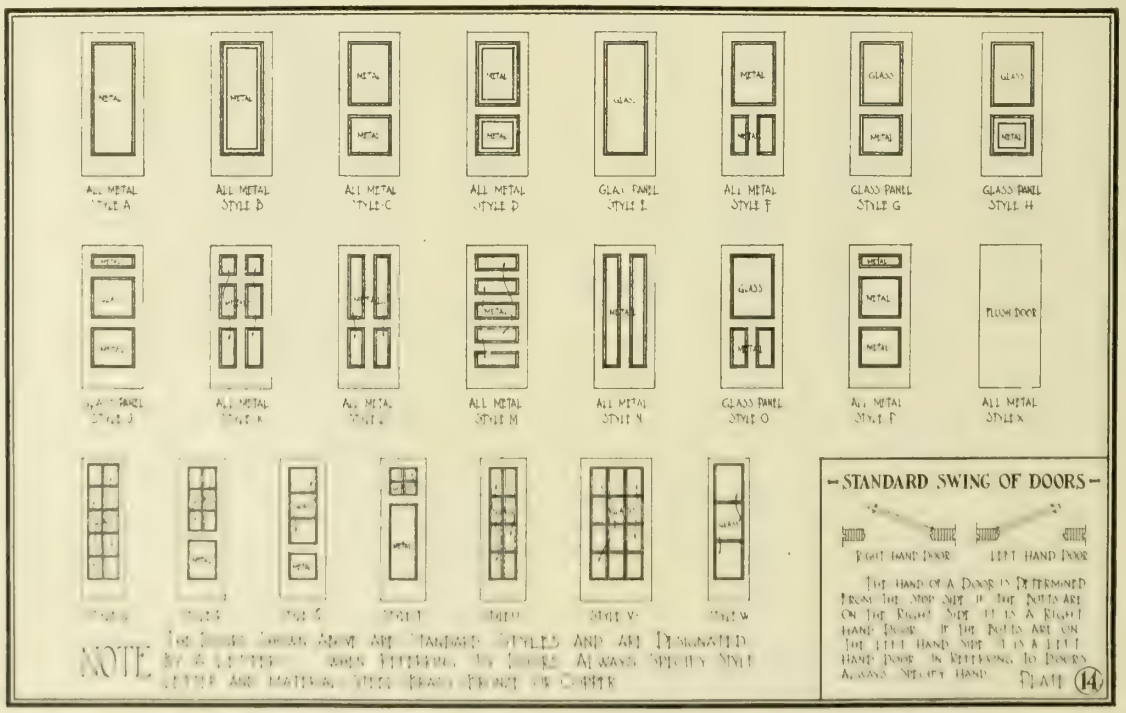


FIG. 5. STANDARD STYLES OF "INTERIOR" HOLLOW METAL DOORS
(Sample sheet from our Engineering Manual)

Continued on next page

Partitions and Wainscoting.

Metal partitions are constructed to meet any requirements, with or without glass panels. The construction is similar to that of the doors. Installations of wainscoting are effected by means of the patented anchor locks (as described under "Patent Buck Construction," on preceding page), making their taking down and re-erecting easy and inexpensive.

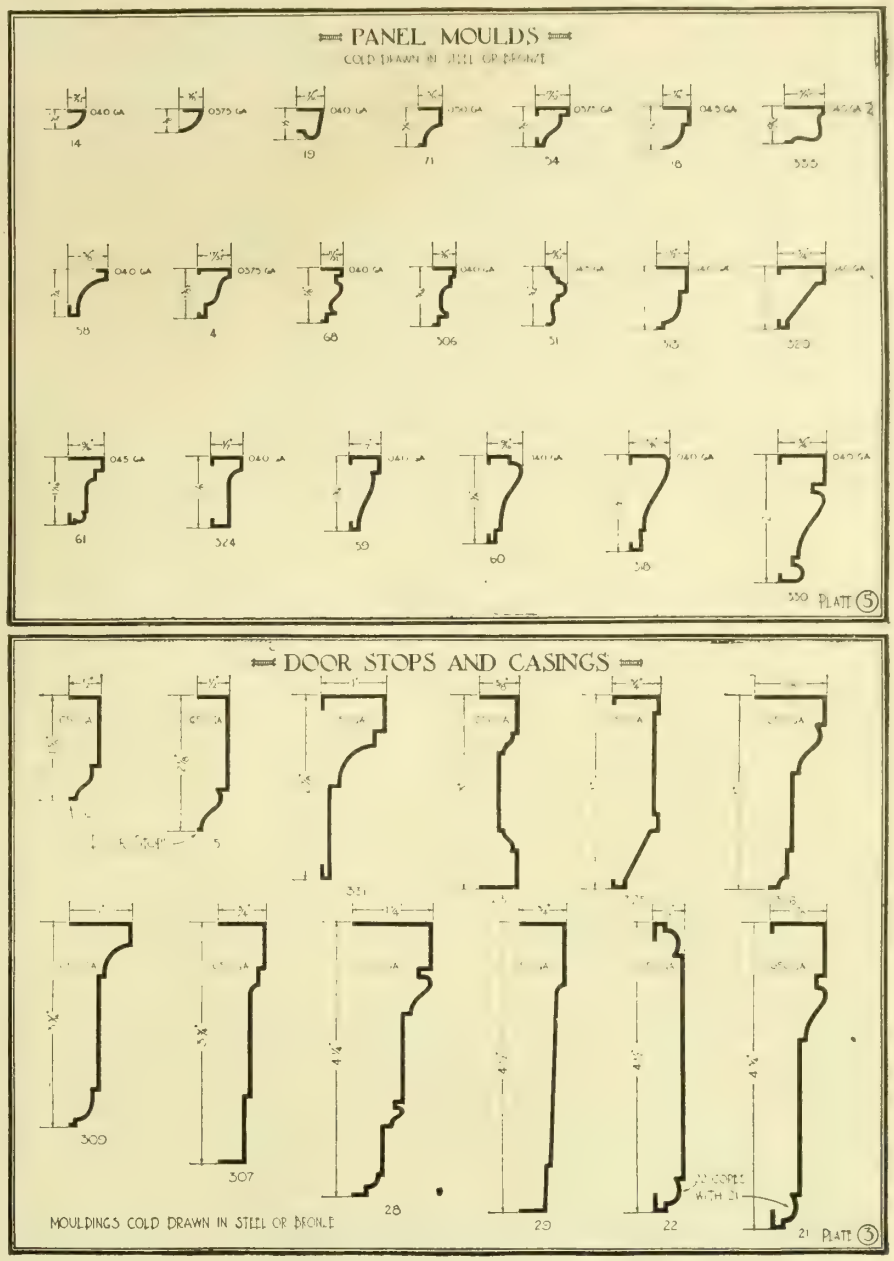
Cold-Drawn Metal Mouldings.

These mouldings (see Figs. 6 and 7) are made in brass, bronze and copper and in a large range of designs. Profiles are precise in curves and sharp in bends, and the surfaces are smooth and true. Their strength and lightness adapts them to every variety of architectural use. Drawn in lengths up to 40 feet; usual shipping lengths, however, are from 10 to 20 feet.

Finishes.

This subject has been given special expert study; only experienced artisans are entrusted with the work. Beside the usual enameled finishes in flat tones or in imitation of various hardwoods, this company is prepared to furnish highly artistic and permanently non-corroding surfaces, in metallic lustre.

Before assembling and finishing, all metal products are treated with benzine to remove foreign substances; after which (in the case of the enameled finishes) a metallic paint is applied on the inner as well as the outer sides. The assembled pieces then receive from seven to ten coats of enamel, each baked on at high temperature, resulting in a hard, yet elastic, and durable finish.



FIGS. 6 AND 7. A FEW EXAMPLES OF THE LARGE VARIETY OF STOCK "INTERIOR" COLD-DRAWN METAL MOULDINGS
(Sample sheets from our Engineering Manual)

Data Required for Estimating.

In estimating, the following data will be necessary:
(1) Design (styles of doors, borrowed lights, etc.).
(2) General dimensions, especially those of openings.
(3) Type of buck construction.
(4) Contemplated thickness and nature of walls or partitions.
(5) Casings on one or both sides of wall.
(6) Finish.
(7) Date of delivery in building.

Guarantee.

The INTERIOR METAL MANUFACTURING Co. guarantees all materials and workmanship entering into the manufacture of their product to be of the highest quality and durability.

Engineering Manual.

An Engineering Manual of "Interior" Hollow Metal Construction, a few plates from which are shown here, and which illustrates all stock mouldings and many recommended types of constructions, will be sent, on request, to architects and others requiring same.

References.

Among the many buildings in which "Interior" metal products may be seen are the following:

Bonwit-Teller (New Building), Fifth Avenue and 37th Street, New York, Howell & Stokes, Architects, Cauldwell-Wingate Co., Contractors
Lord & Taylor, Fifth Avenue and 39th Street, New York, Starrett & Van Vleck, Architects, E. Brooks & Co., Contractors
New Municipal Building, Wilmington, Del., Palmer, Hornbostel & Jones, Architects
New County Building, Wilmington, Del., Palmer, Hornbostel & Jones, Architects
May Company, Cleveland, Ohio, D. H. Burnham Co., Architect, James Black Co., Contractors
H. C. Frick's Residence, Fifth Avenue, New York, Carrère & Hastings, Architects
H. L. Pratt's Residence, Glen Cove, L. I., N. Y., James Brite, Architect, C. T. Wills Co., Contractors
Du Pont Hotel, Wilmington, Del., Wm. Fenn, Jr., Architect, Manufacturers' Contracting Co., Contractors
Statler Hotel, Cleveland, Ohio, Geo. B. Post & Sons, Architects, James L. Stuart, Contractor
Glen Falls Insurance Co., Administration Building, Glen Falls, N. Y., Geo. B. Post & Sons, Architects, F. T. Nesbit Co., Contractors

GEO. W. JOHNSON MFG. CO.

MANUFACTURERS OF

Standard Underwriters' Labeled Automatic Fire-Doors

1210-1212 South Eighth Street
ST. LOUIS, MO.

209-211 West 17th Street
KANSAS CITY, MO.

Products.

Steel Rolling Doors and Shutters; Counterbalanced Truck Over Elevated Doors.

Also, Automatic Tin-Clad Sliding Fire-Doors, Tin-Clad Hinged Fire-Doors and Shutters, Dufold Doors, Boiler Plate Doors and Shutters, Wood Rolling Partitions, Iron Stairs and Fire-Escapes.

Steel Coil Doors.

Steel Coil doors provide protection for openings of any size; occupy the minimum amount of space and have a smooth finished appearance from either side of the wall.

Our doors are made of flexible corrugated steel, galvanized. The corrugations are short and deep, giving the maximum resistive power against wind pressure.

No. 100, Push Up—Spring counterbalanced, operated by hand. For nominal openings.

No. 100A.—Spring counterbalanced, automatic closing. For nominal openings.

No. 110, Chain Hoist—Spring counterbalanced, operated by means of endless chain. For large openings. This type is fitted with roller bearings when desired.

NO. 110 STEEL COIL DOOR INSTALLED ON TRACK OPENING

Special Features.

Our automatic attachments with two fuse links, one placed at the ceiling line, are superior to the old style attachments with link only at the opening. Experience has demonstrated that ceiling link released doors where fire occurred, and in many cases the link at the opening was still intact when fire was extinguished.

Elevator Truck Over Doors.

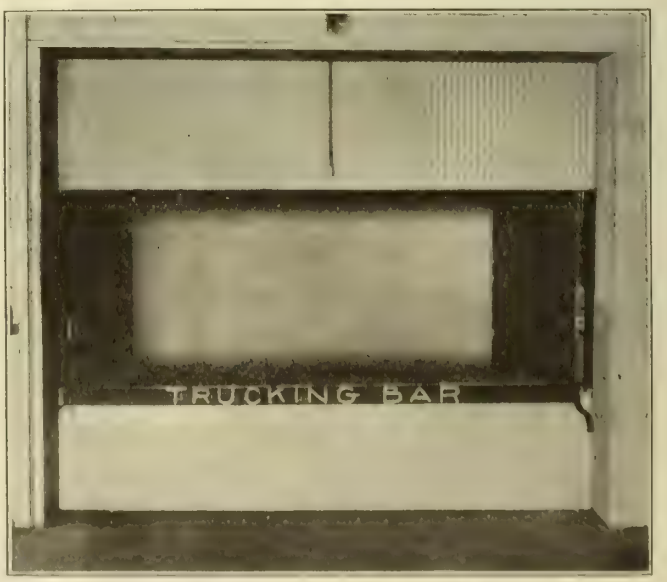
The most practical freight elevator door on the market. Serves the purpose of a fire-door and elevator safety gate combined, cutting off draft at each floor.

Our patented trucking bar is pivoted and conforms to location of elevator platform. If same is below sill level, this bar automatically adjusts itself to the proper angle, giving a smooth surface for trucks, even with small wheels, to pass over without jar or damage to contents.

Another important feature is the interlocking guides, which prevent danger of heavily loaded trucks striking door from room side when closed and forcing same out of guides. Such accidents have occurred when doors were equipped with only plain guides, resulting in contents of truck falling into shaft.

Doors are substantially made and are durable. No weights or springs are required, as one door counterbalances the other with simple and perfect mechanical operation. Doors work easily, and can be equipped with safety attachments.

Write for more particulars and details.



ELEVATOR TRUCK OVER DOOR

THE KINNEAR & GAGER MANUFACTURING CO.

Hollow-Metal and Metal-Covered Doors, and Metal Ceilings

Mt. Vernon Avenue, 6th to 7th Streets

COLUMBUS, OHIO

EASTERN OFFICE AND WAREROOMS: BOSTON, MASS., 125 Broad Street

Products.

HOLLOW-METAL DOORS, UNDERWRITERS' APPROVED and LABELED.

KALAMEIN DOORS, All Types, in Fireproof Construction.

METAL CEILINGS and SIDEWALLS, in great variety, including "QUAD LOCK" JOINT CONSTRUCTED METAL CEILINGS.

Also DRAWN METAL COVERED MOULDINGS, METAL TILING and METAL SHINGLES.

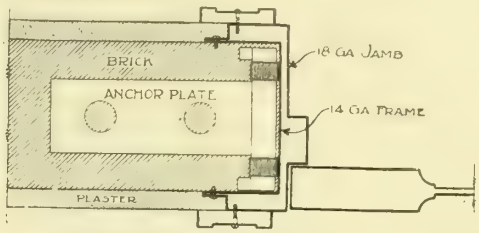
Doors.

Hollow-Metal Doors—All seams are welded and made invisible; while the stiles, rails, and panels are insulated throughout with asbestos, thus assuring each door being an efficient fire retardant and at the same time preventing all metallic sound.

Kalamein Doors—Panels and rails are stamped in separate pieces of metal, and all joints throughout are *lock-seamed* and blind nailed, thus securing the covering to the core in a manner that allows for the expansion and contraction of the metal.

Catalogues and Estimates.

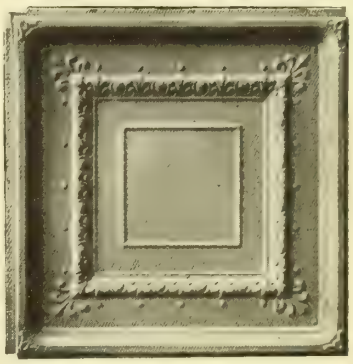
Catalogues upon request. Estimates furnished promptly.



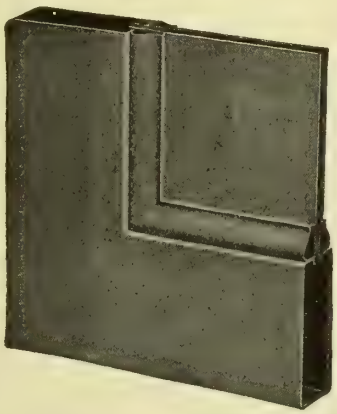
SECTION THROUGH DOOR JAMB SHOWING APPROVED BUCK, JAMB AND CASING CONSTRUCTION FOR HOLLOW-METAL DOORS

Metal Ceilings.

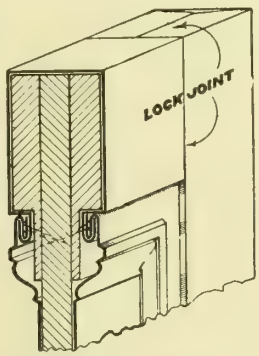
A large variety of designs from which to select Ceilings, Wainscoting and Metal Tiling is kept on hand. Architects' special designs executed from Black Steel Sheets, painted; also from Copper and Galvanized Steel.



CEILING PANEL NO. 43 "QUAD LOCK"

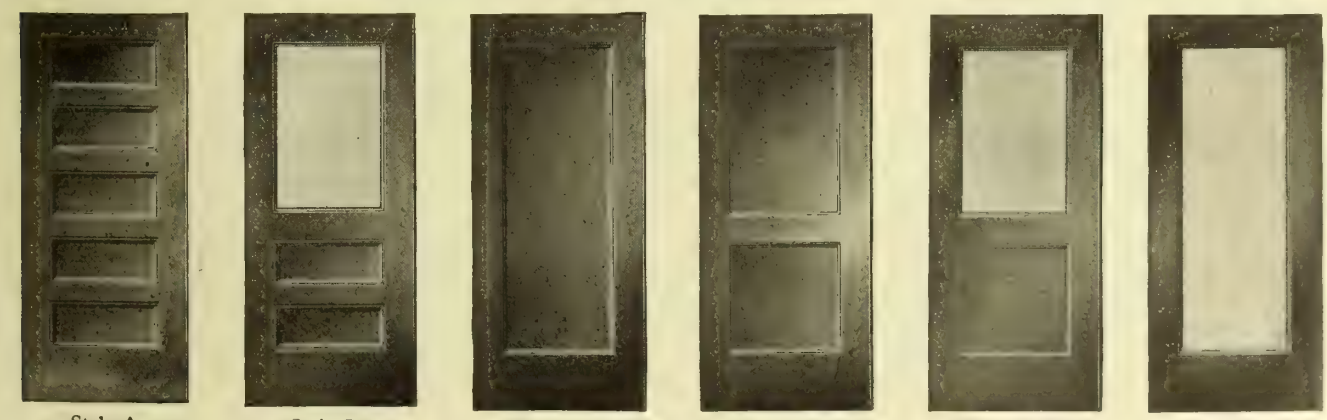


DETAIL OF CONSTRUCTION FOR HOLLOW-METAL DOORS



DETAIL OF CONSTRUCTION FOR METAL-COVERED DOORS (Patented Feb. 4, 1908)

SECTION, SHOWING "QUAD LOCK" CONSTRUCTION



Style A Style B Style C Style D Style E Style F

STYLES OF METAL-COVERED AND HOLLOW-METAL DOORS

SAINO FIRE DOOR & SHUTTER CO.

ESTABLISHED 1899

186 Diamond Street
BROOKLYN, N. Y.

MEMPHIS, TENN.

2025 Elston Avenue
CHICAGO, ILL.

LICENSED FACTORIES: SAN FRANCISCO, CAL. OSHAWA, CAN.

REPRESENTED IN THE FOLLOWING CITIES

BALTIMORE, MD.
CLEVELAND, OHIO
CINCINNATI, OHIO
CHATTANOOGA, TENN.
DETROIT, MICH.
DALLAS, TEX.
EVANSVILLE, IND.
GRAND RAPIDS, MICH.
HANOVER, PA.
KANSAS CITY, MO.
KNOXVILLE, TENN.
LOS ANGELES, CAL.
WASHINGTON, D. C.
LITTLE ROCK, ARK.
NASHVILLE, TENN.
OMAHA, NEB.
PHILADELPHIA, PA.
PITTSBURGH, PA.
PORTLAND, ORE.
OSHAWA, CAN.
SAN FRANCISCO, CAL.
ST. LOUIS, MO.
SYRACUSE, N. Y.
ST. PAUL, MINN.
TOLEDO, OHIO
TRENTON, N. J.

Products and Services.

SAINO ALL-METAL FIRE DOORS, and SHUTTERS; COUNTERBALANCE ELEVATOR DOORS; COMPOUND SLIDE-UP, and JACK KNIFE DOORS, STAIR and ELEVATOR DOORS; COMBINATION FIRE REFRIGERATOR DOORS; ROLLING STEEL SHUTTERS; KALAMEIN DOORS; STEEL SAFE CABINETS; FIRE-DOOR HARDWARE.

Contractors for LIGHT STRUCTURAL WORK.

Saino SHEET METAL FIRE DOOR

TRADE-MARK

Underwriters' Approval.

Saino Fire Doors and Shutters are approved and labeled by the National Board of Fire Underwriters for maximum sized openings.

Insurance Credits.

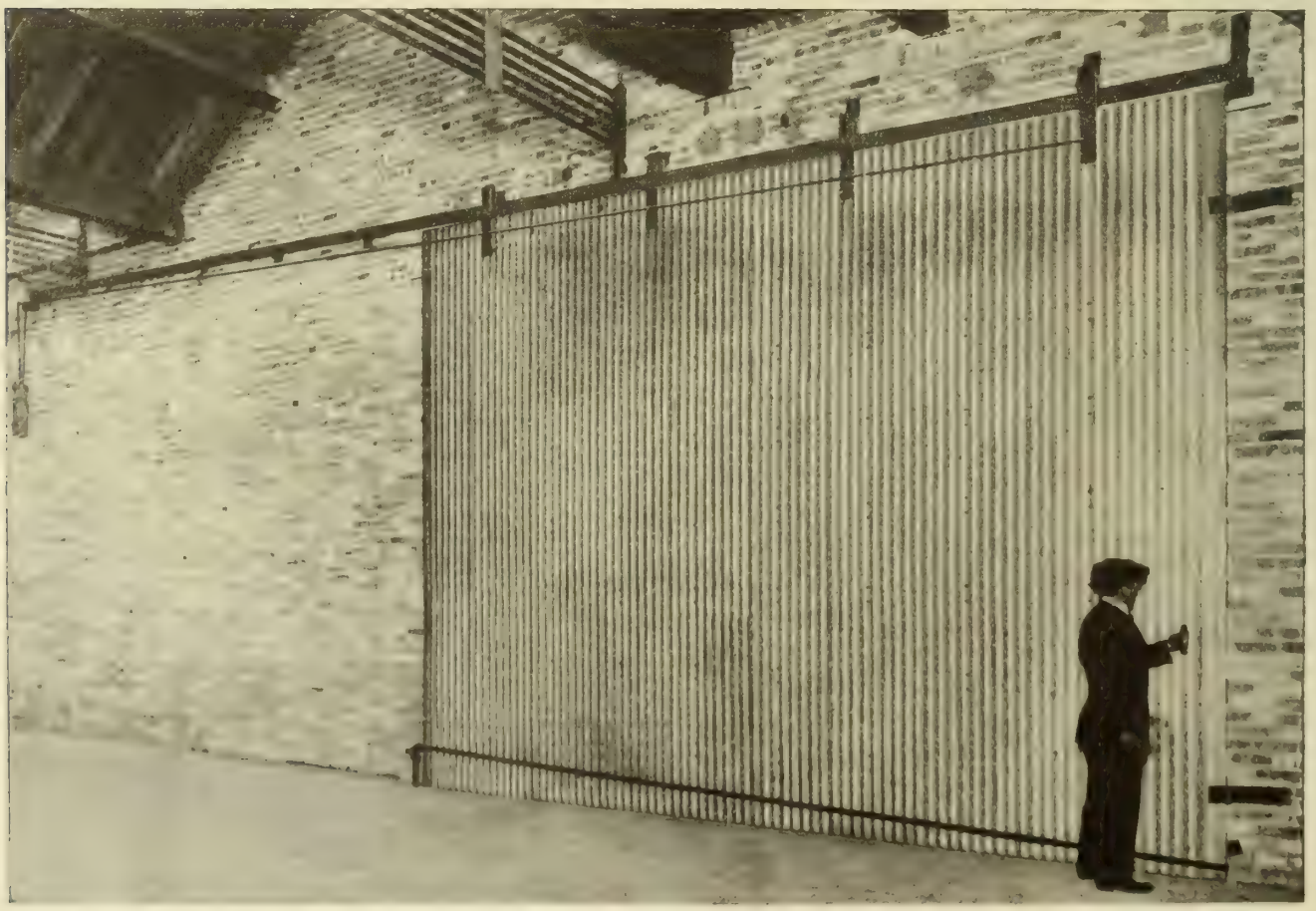
Saino Fire Doors receive double credit in insurance rates in Illinois (including Chicago) over labeled tin-clad fire doors and No. 12 iron fire doors. This evidences Saino superiority.

Construction.

Saino Fire Doors are two walls of cross-laid No. 22 United States gauge corrugated galvanized steel, with air chambers and asbestos between. Patented telescopic channels and joints provide for expansion and contraction.

Advantages.

Saino doors outlast buildings in which they are installed. In seventeen years' experience we have never replaced a door destroyed by fire, rust or rot. Saino doors are absolutely non-combustible, and all structural parts are visible. They are about half the weight of



LARGE SAINO SLIDING AUTOMATIC FIRE DOOR INSTALLED IN WM. SCHUKRAFT BUILDING, CHICAGO, ILL.
Saino Doors can be made in any size

Continued on next page

standard tin-clad doors, and the average cost is no more erected. They save the enormous rust and dry rot cost common to other fire doors and shutters.

REFERENCES

NEW YORK STATE
American Can Co., New York
American Mfg. Co., Brooklyn
American Cotton Oil Co., New York
Anchor Knitting Mills, Whitesboro
American Thread Agency, New York
Equitable Building, New York
New York Telephone Co., New York
Universal Film Co., New York
Warner Sugar Refining Co., New York
Union Seed & Fertilizer Co., New York
New York Wall Paper Co., Utica

CHICAGO, ILL.
Chicago Telephone Co.
Huch Leather Co.
International Harvester Co.
Sears, Roebuck & Co.
Western Electric Co.
Wm. Schukraft & Son

PHILADELPHIA, PA. (AND CAMDEN, N. J.)
Victor Talking Machine Co.
Pennsylvania Railroad Co.
Barrett Mfg. Co.
McAndrews & Forbes
Municipal Repair Shop
Welsbach Light Co.
Lucas Paint Co. (Lucaston, N. J.)
Farr & Bailey

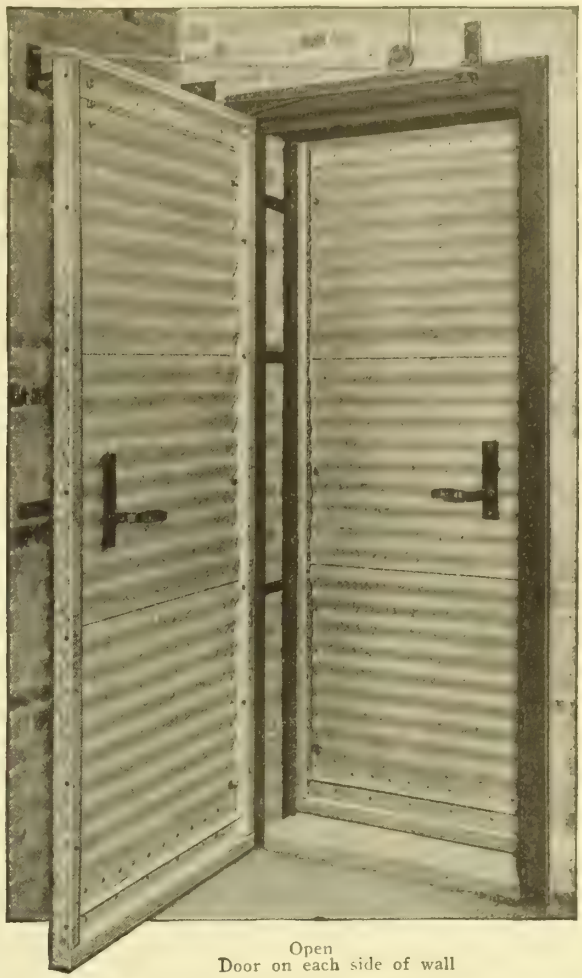
PITTSBURGH, PA.
Grant Telephone Station

ST. LOUIS, MO.
Cupples Station Property
St. Louis Compress Co.
Ford Motor Co.
Smith-Davis Mfg. Co.
Banner Buggy Co.
Western Coffee & Spice Co.
Pfeiffer Chemical Co.
Nugents Dry Goods Co.
Century Building
St. Louis Ref. & Cold Storage Co.
German Theatre
E. St. Louis Cotton Oil Co.
Geller, Ward & Hasner Hdw. Co.
Hesse Envelope Co.

SAN FRANCISCO, CAL.
Rapp Building
Alpine Evaporated Cream Co.

OTHER INSTALLATIONS
Atlantic Coast Line Railway, Savannah, Ga.
Virginia-Carolina Chemical Co., Various Plants
Memphis Terminal Station, Memphis, Tenn.
Consolidated Gas & Electric Co., Memphis, Tenn.
Memphis Telephone Companies, Memphis, Tenn.
River & Rail Warehouse, Memphis, Tenn.
Memphis Street Railway Co., Memphis, Tenn.
Southern Cotton Oil Co., Various Plants
Memphis Bag Co.
Planters Oil Co.
Sears, Roebuck & Co., Dallas, Tex.
John Sealy Hospital, Galveston, Tex.

Closed



Open
Door on each side of wall

SAINO AUTOMATIC HINGED FIRE DOOR

Closed, inside of Elevator Shaft

Open, outside of Elevator Shaft

SAINO ELEVATOR DOOR

Catalogues and Details.

We are specialists in All-Metal Fire Door manufacture. Complete catalogues on request.

THE SOLAR METAL PRODUCTS CO., INC.

Hollow Metal Products

470 East Starr Avenue

COLUMBUS, OHIO

Products.

Hollow Metal Doors and Trim, Combination-Hollow Metal Jambs, Sanitary Hospital Jambs, Hollow Metal Partitions and Smoke Screens; All Types of Drawn Moulds.

Doors and Trim.

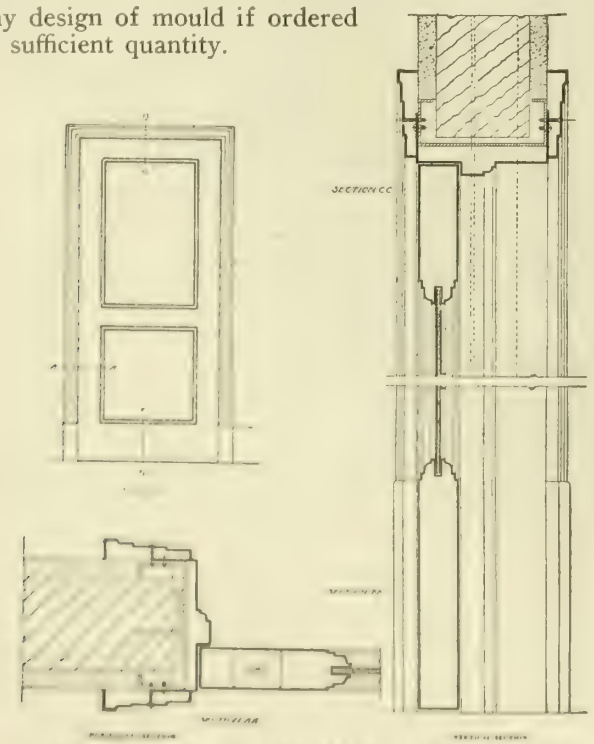
Stiles and rails are made from No. 18-gauge open-hearth, patent leveled, cold-rolled furniture stock. Our patented panel construction is very flexible, and permits of variations in panel moulds. Door structure is completely reinforced with continuous, specially drawn metal key which binds the stiles into accurate position and affords a permanent fastening for moulds without the use of screws. All members interlock at points of intersection, and are acetylene gas welded, making same a continuous homogenous piece of metal.

Panels—Panels are built up of two sheets cold-rolled patent leveled furniture stock, No. 20-gauge, reinforced with ¼-inch sheet asbestos filler.

Reasonable variations in door thickness can be supplied without change of construction. Cork filler in stiles is provided as sound deadener.

Frames and Trim—We supply our regular frames to mount either wood or metal bucks, where provided and set by others; but will supply metal bucks with anchors as part of door opening, if desired. Reasonable adjustments are provided for on all frames.

Metal Trim—All classes of metal moulds can be supplied from our stock dies. Special dies will be made for any design of mould if ordered in sufficient quantity.



TYPICAL DETAIL METAL DOOR, JAMB AND TRIM

Finish—All materials will be enamelled or grained in natural wood imitations, when specified, as we have a large building specially constructed with every modern facility for turning out the highest possible class of work.

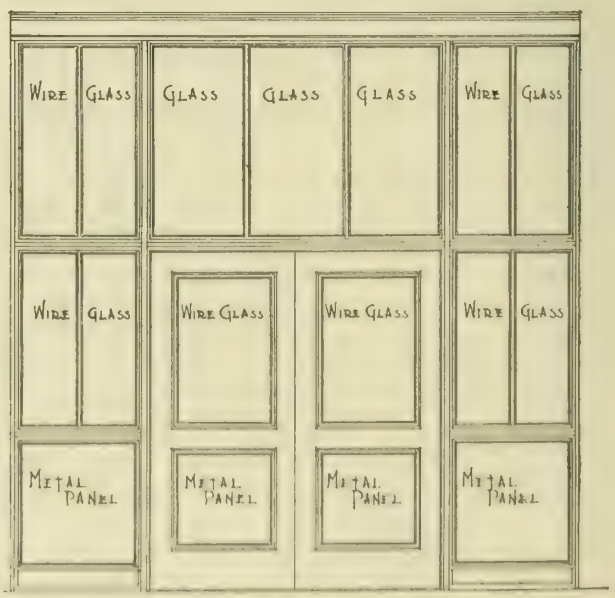
Underwriters' Labels—Our doors have been tested and approved; they are sold with an unqualified guarantee, to meet Underwriters' requirements, and will bear the Label of Inspection where specified.

Combination Jambs.

This special type of door jamb was developed to meet a need in construction where tile walls are used, and combines the features of both frame and trim, providing plaster bond on each side of wall. This type of frame is especially adapted to apartment houses and schools.

Hollow Metal Partitions.

We make a complete line of hollow metal partitions and smoke screens for use in offices, schoolhouses, factories, and in all classes of construction. Same are built up of units in combination with doors, and are flexible enough to meet any conditions. These partitions are constructed of drawn steel. The members all coped, lugged and gas welded; all members being constructed of No. 18-gauge metal. Panels are built up of two sheets No. 20-gauge furniture steel, reinforced with asbestos fillers. Designs provide for door high or ceiling high partitions; either with or without removable glazing bar. Special steel reinforcing channels are figured and furnished as a part of all partitions.



— ELEVATION No. 4 —
HOLLOW METAL PARTITION
Ceiling high, with removable glazing bar

THORP FIRE PROOF DOOR CO.

"Thorp-Richardson" Doors and Finish; Bronze and Copper Entrances

1600-1616 Central Avenue

MINNEAPOLIS, MINN.

REPRESENTATIVES IN FIFTY PRINCIPAL CITIES

Products.

Manufacturers of "THORP-RICHARDSON" FIREPROOF DOORS and FINISH for all classes of Fireproof Buildings, Public and Private; also, BRONZE and COPPER ENTRANCES.

In General.

The THORP FIRE PROOF DOOR COMPANY is the pioneer in this line of work, and all effort and energy are devoted to this work alone. The Thorp Finish has been developed to the point where the architect can safely specify for any purpose.

Thorp Doors make each room, floor or apartment a separate fireproof unit. Stairways and elevator shafts are also guarded by the Thorp Finish, and if consistently used, there can be no spread of fire beyond the rooms or unit in which the fire originates.

Construction.

Thorp Doors are made on the basis of the underwriters' standard: A three-ply built-up pine core, asbestos-lined and metal-covered. By special processes all metal is locked or welded, and the two sheets are locked together on all *four* edges of the door. No dependence is placed on a mortise-and-tenon joint or lag screws to hold the door or parts together, and the metal covering on each side is so made as to be one sheet.

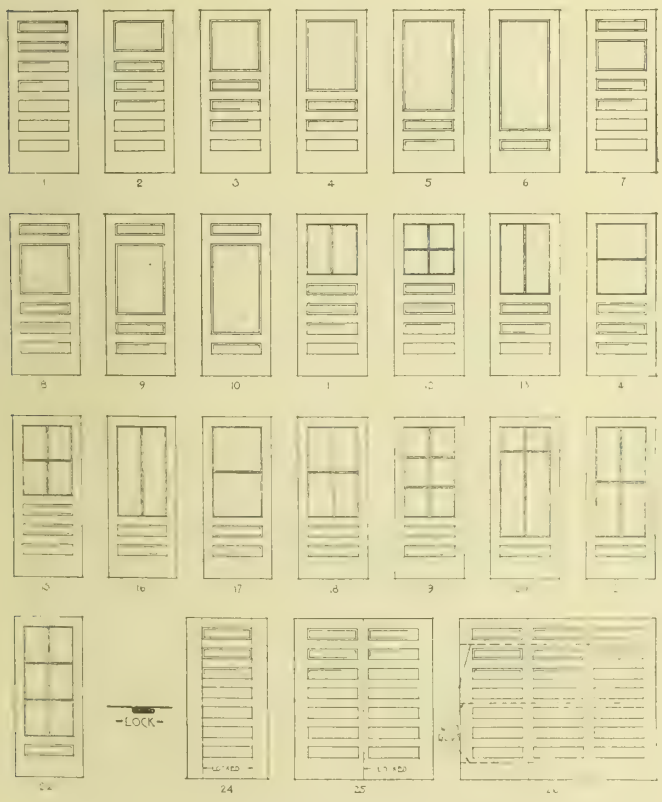
Thorp Standard Detail Doors are covered with single sheets of twenty-four gauge metal, panels sunk by hydraulic pressure with single sheet to each side.

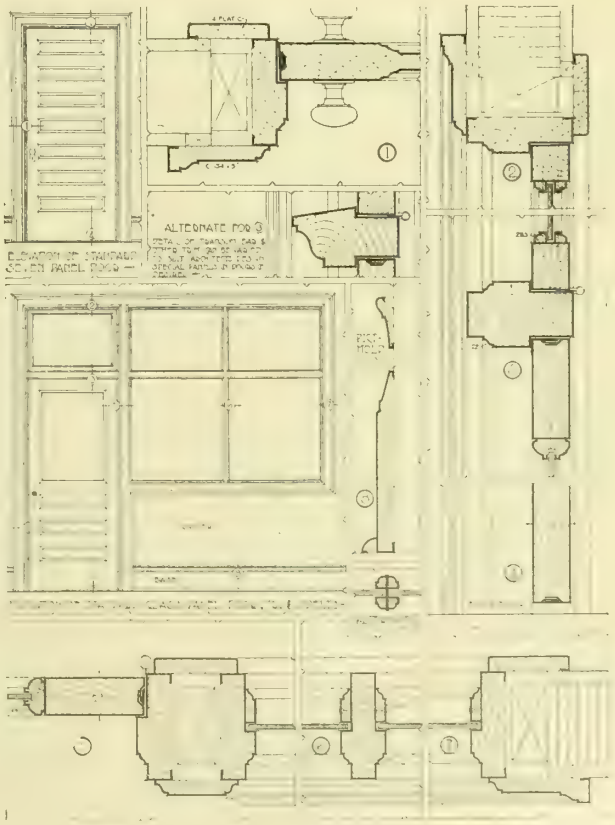
Thorp Special Detail Doors, to the architect's design, are made of twenty-four or twenty gauge metal, with mouldings as an integral part of stiles; rails and panels assembled with flush welded joints.

Any of the natural wood finishes are carefully followed as to grain and shade; or the white enamel for hospitals. A very popular finish is our standard old copper duplex plate on special steel.

Entrance Doors.

Thorp Doors in bronze and copper make the most handsome, durable and economical entrances. Either eighteen-gauge or eighteen-ounce metal is used, and the entrances may be as elaborate and ornamental as desired.





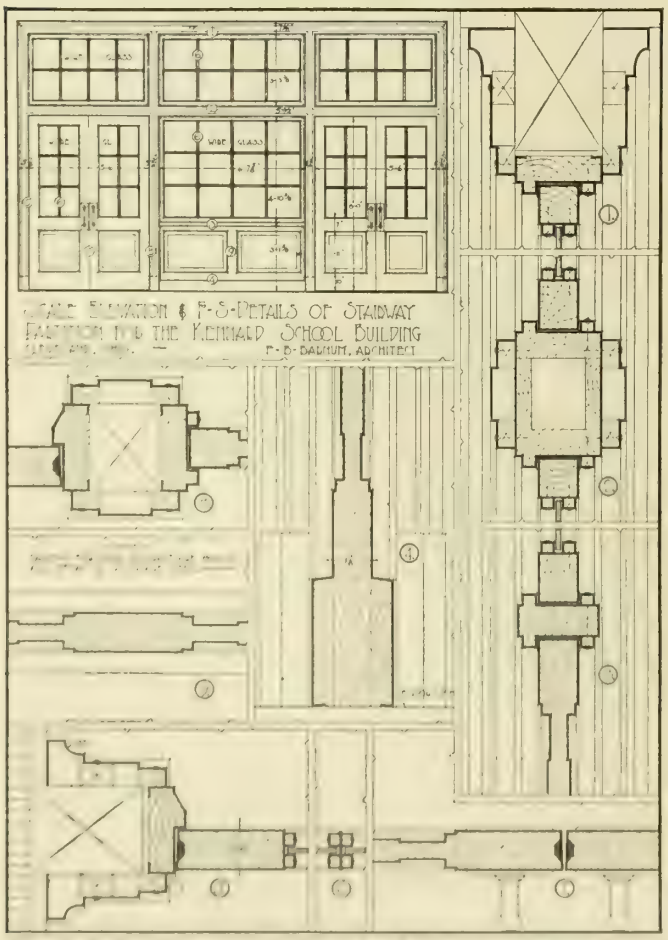
DETAILS OF THORP STANDARD DETAIL DOORS; GLASS PANELS, TRANSOMS, SIDE LIGHTS

Thorp Detail Doors made to any design

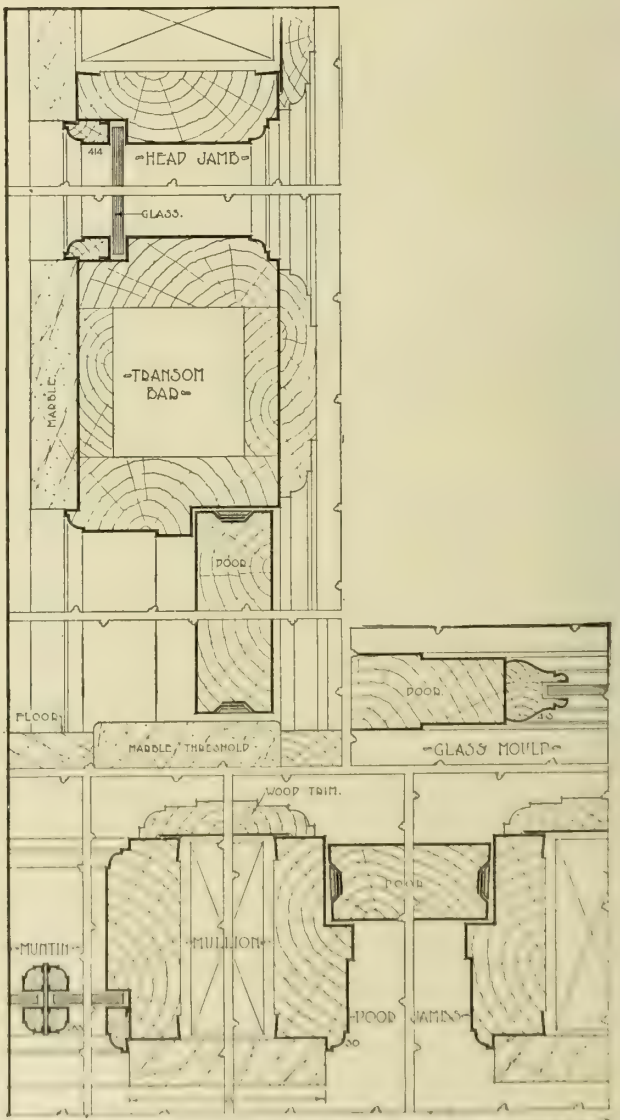
Continued on next page

JEFFERSON COUNTY SAVINGS BANK, BIRMINGHAM, ALA.
Wm. C. Weston, Architect

A CORRIDOR IN JEFFERSON COUNTY SAVINGS BANK, SHOWING DOORS



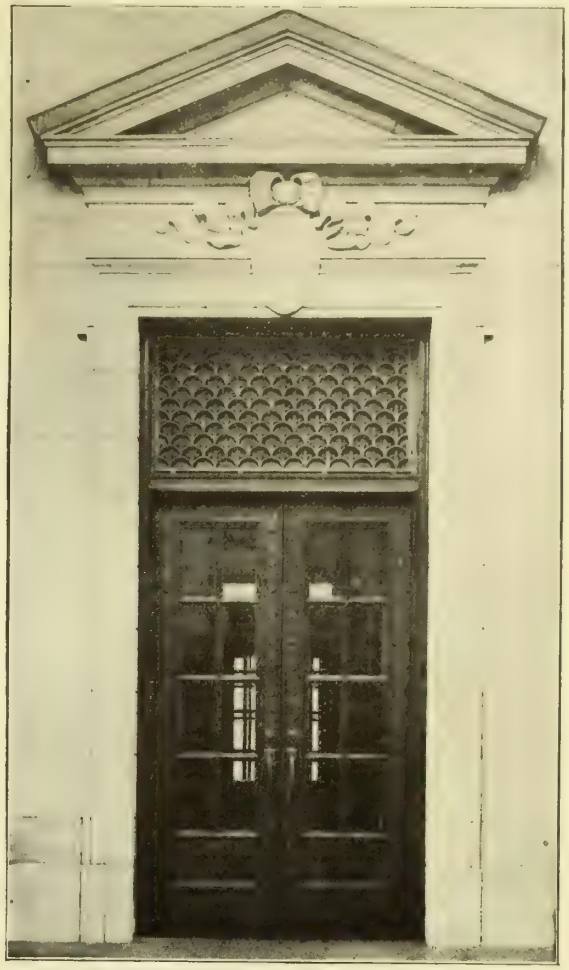
SCALE ELEVATION AND DETAILS OF STAIRWAY PARTITION FOR THE KENNARD SCHOOL BUILDING, CLEVELAND, OHIO



DETAILS OF CORRIDOR DOORS AND PARTITIONS, JEFFERSON COUNTY SAVINGS BANK

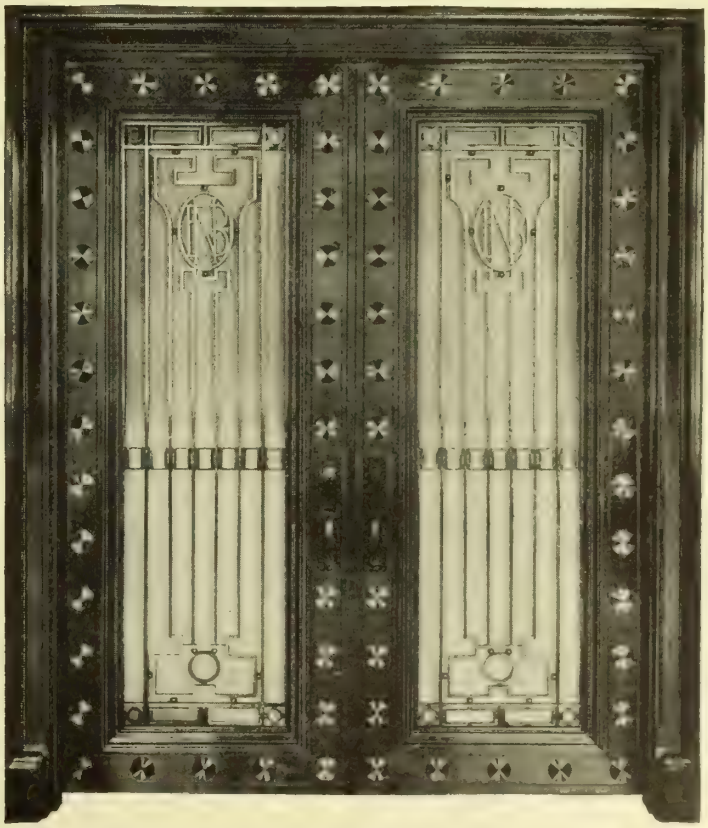
Continued on next page

GERMAN-AMERICAN NATIONAL BANK, PEKIN, ILL.
HEWITT & EMERSON, Architects



GATEWAY, PARK BUILDING, MINNEAPOLIS, MINN.
HEWITT & BROWN, Architects

ENTRANCE, U. S. POST OFFICE, FRANKFORT, IND.



BRONZE ENTRANCE, EXCHANGE NATIONAL BANK,
LITTLE ROCK, ARK.
CHAS. L. THOMPSON, Architect

VARIETY MANUFACTURING COMPANY

Manufacturers of All Kinds of Fireproof Doors

Sacramento and Carroll Avenues

CHICAGO, ILL.

AGENTS, UNITED STATES

BIRMINGHAM, ALA.	INDIANAPOLIS, IND.	LOS ANGELES, CAL.	NEW ORLEANS, LA.	PITTSBURGH, PA.
BUFFALO, N. Y.	DALLAS, TEX.	NEW YORK, N. Y.	SPOKANE, WASH.	PORTLAND, ORE.
CINCINNATI, OHIO	DENVER, COLO.	NORFOLK, VA.	TACOMA, WASH.	ST. LOUIS, MO.
DETROIT, MICH.	CLEVELAND, OHIO	OMAHA, NEB.	SEATTLE, WASH.	SAN FRANCISCO, CAL.
	KANSAS CITY, MO.		SIOUX CITY, IOWA	

AGENTS, CANADA

CALGARY, ALBERTA	WINNIPEG, MAN.	VANCOUVER, B. C.	MONTREAL, QUE.

Products.

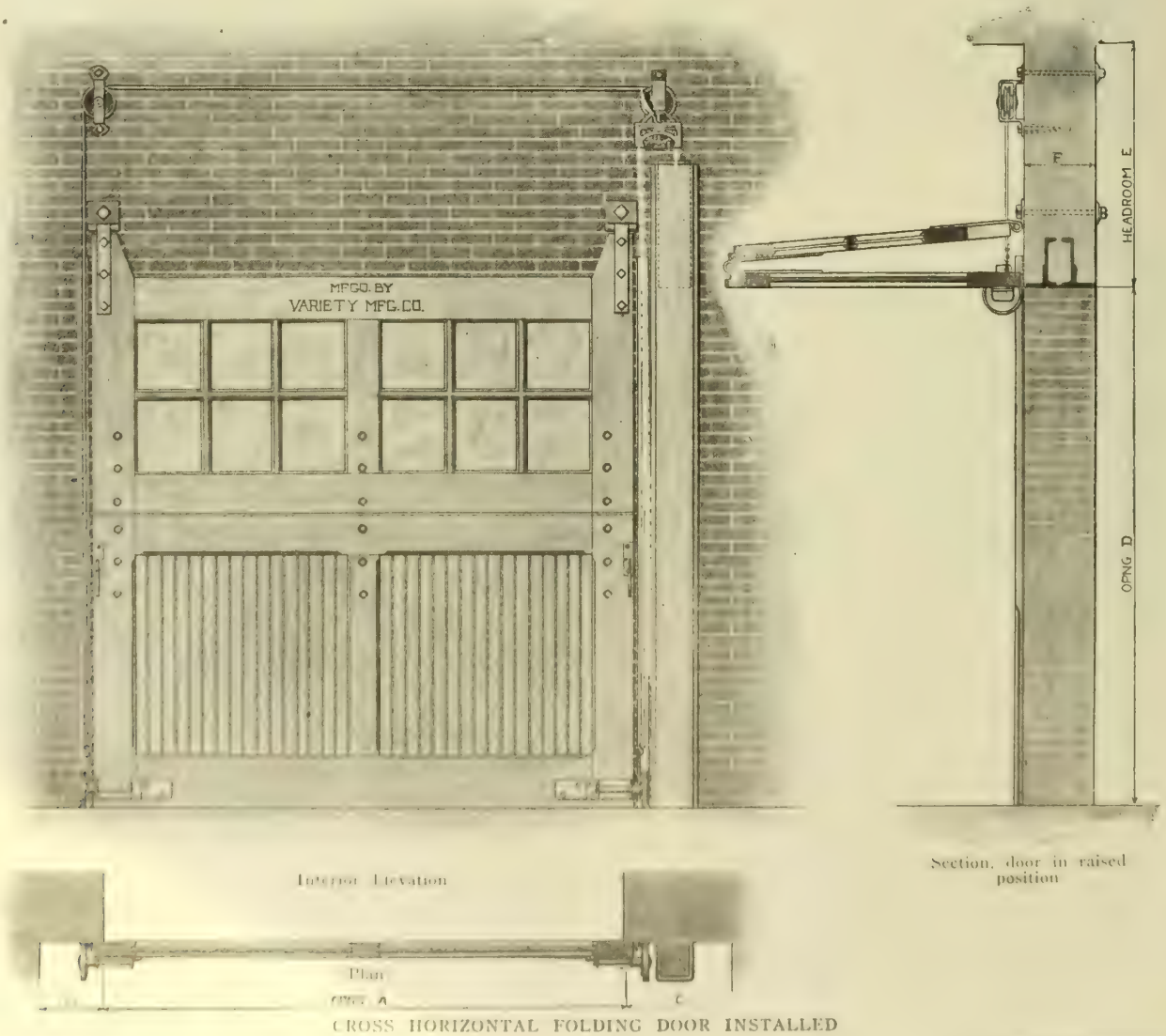
CROSS HORIZONTAL FOLDING DOORS.
VAMANCO FREIGHT ELEVATOR DOORS.
VARCLAD FREIGHT ELEVATOR DOORS.
STEEL ROLLING DOORS and SHUTTERS.
UNDERWRITERS' IRON FIRE-DOORS.
SEMI-ART METAL DOORS and FRAMES.
TIN-CLAD FIRE DOORS (All Kinds).
HARDWARE FOR ALL FIRE-DOORS.
BLACKSMITH and WROUGHT IRON WORK.
Contractors for LIGHT STRUCTURAL WORK.

For Art Metal Doors and Frames see our name in General Index.

Cross Horizontal Folding Doors.

For use in garages, railway and freight houses, car shops, warehouses, docks, power plants, etc.

Advantages — Simple; easily operated. Made of any material or combination of materials. No limit to size or weight. Glass, installed in upper panel, takes place of transom. Entire mechanism in full view. Can be repaired by any mechanic. Cost of maintenance practically nothing. Occupy no valuable space, either opened or closed. (Illustrated below and on following page.)



CROSS HORIZONTAL FOLDING DOOR INSTALLED

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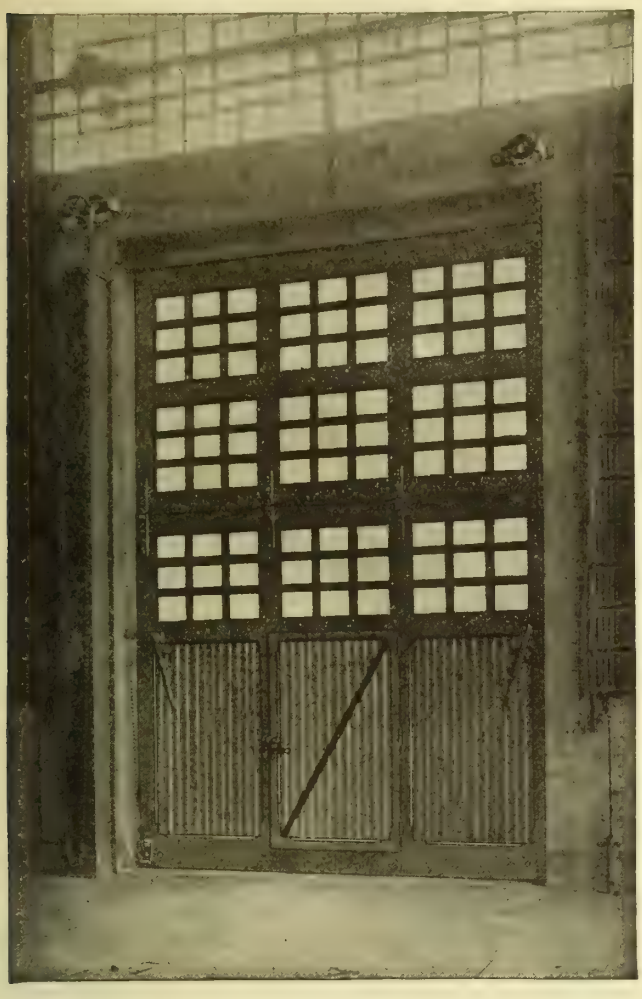
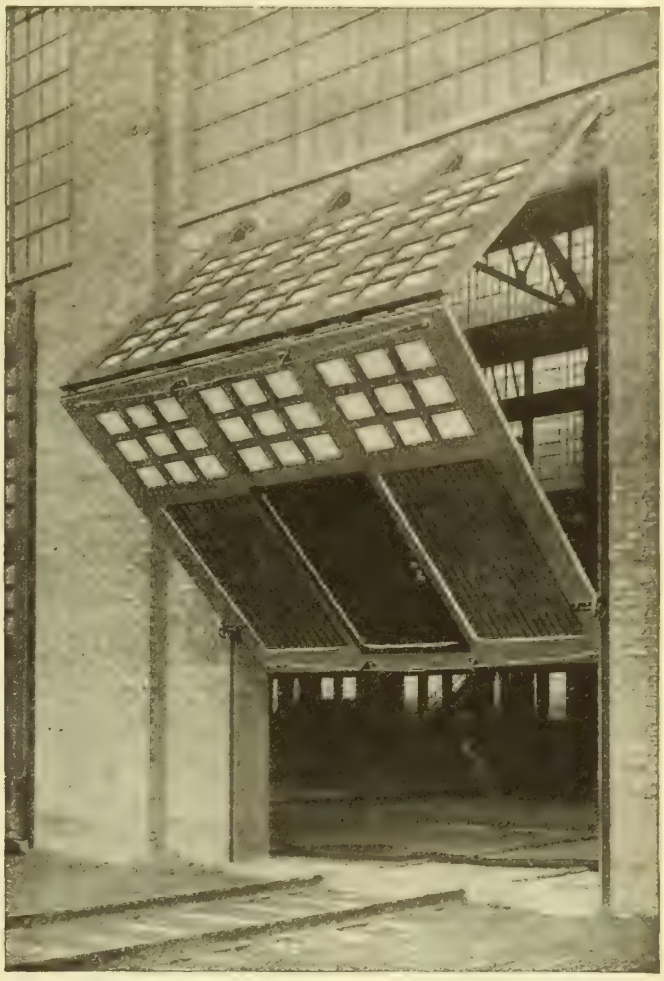


Interior View



Exterior View

ONE OF 31 CROSS HORIZONTAL FOLDING DOORS, CHICAGO & NORTHWESTERN R. R. SHOPS, CHICAGO, ILL.
Doors are 14 ft. wide by 18 ft. high. Canopy Type: Door on outside and operated by chain hoist on inside of building. Glass panels in upper half and part of lower half. Also wicket door

HEADROOM REQUIRED FOR INSTALLATION CROSS HORIZONTAL FOLDING DOOR

	Opening Height, D								
Opg. Width, A	8′	10′	12′	14′	16′	18′	20′	22′	24′
	No. 2		No. 3				No. 4		
8′	33″	38″	31″	36″	39″	42″	36″	38″	40″
10′	38″	34″	37″	42″	45″	39″	41″	42″	46″
12′	31″	37″	42″	48″	40″	44″	46″	48″	53″
14′	36″	42″	37″	41″	44″	48″	53″	55″	57″
16′	39″	36″	40″	44″	48″	52″	56″	60″	63″
18′	34″	39″	43″	48″	52″	56″	60″	65″	69″
20′	36″	41″	46″	50″	55″	60″	65″	70″	74″
22′	38″	44″	49″	54″	61″	65″	69″	75″	80″
24′	40″	46″	51″	57″	63″	69″	74″	80″	86″

Sideroom B=6″, C=18″

References.

National Biscuit Co., New York
N. Y. Central Freight House, Utica
Locomobile Co. of America, Bridgeport
Pennsylvania R. R. Co. Piers, Jersey City
Monon Freight House, Louisville
Deere & Webber Warehouse, Minneapolis
Chicago, Milwaukee & St. Paul Freight House, Minneapolis
Scully Steel and Iron Co., Chicago
Chicago, Rock Island & Pacific Freight House, Chicago
Chicago, Milwaukee & St. Paul Freight House, Chicago
Pennsylvania R. R. Freight House, Chicago

THREE DOORS INSTALLED IN GARAGE
Two partially open, other closed. Doors operated manually. Note economy of space and convenience of operation

Continued on next page

Steel Rolling Doors and Shutters.

Our Steel Rolling Doors and Shutters are made entirely of steel. They are composed of steel interlocking slats that coil above opening, being counterbalanced by springs. Ends of slats travel up and down in grooves bolted at each side of opening.

Installation—Doors are placed to coil above the opening or under the lintel. They require 3 inches to 5 inches side-room and 15 inches headroom for openings 12 feet 0 inches high or less, and 1 inch headroom additional per foot of height above this.

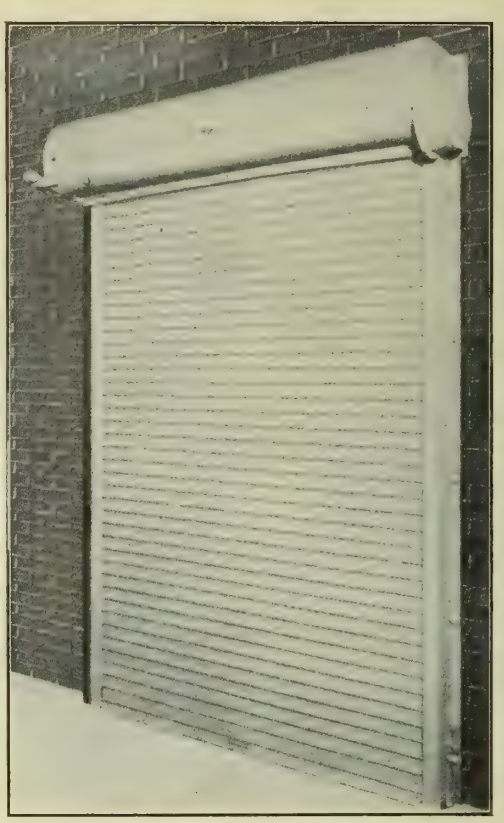
Operation—Doors may be operated by hoist, gearing, or simply by hand, to suit any conditions. If used as fire-doors they can be equipped with automatic closing device, when specified.

Advantages—These doors are classed among the best fire-retardants for window, door, partition, elevator-shaft, and fire-wall openings. They are neat in appearance, occupy very little room, and if properly cared for will last for years. Doors are easily erected. Blue-prints and instructions are sent with each shipment.

Approval—Our doors and shutters are included in the approved list issued by the National Board of Fire Underwriters, and are regularly inspected and labeled by the Underwriters' Laboratories, Inc.

Illustrations—The illustrations, here and on following page, show only a few of our many installations and constructions. We shall be pleased to furnish information for special requirements.

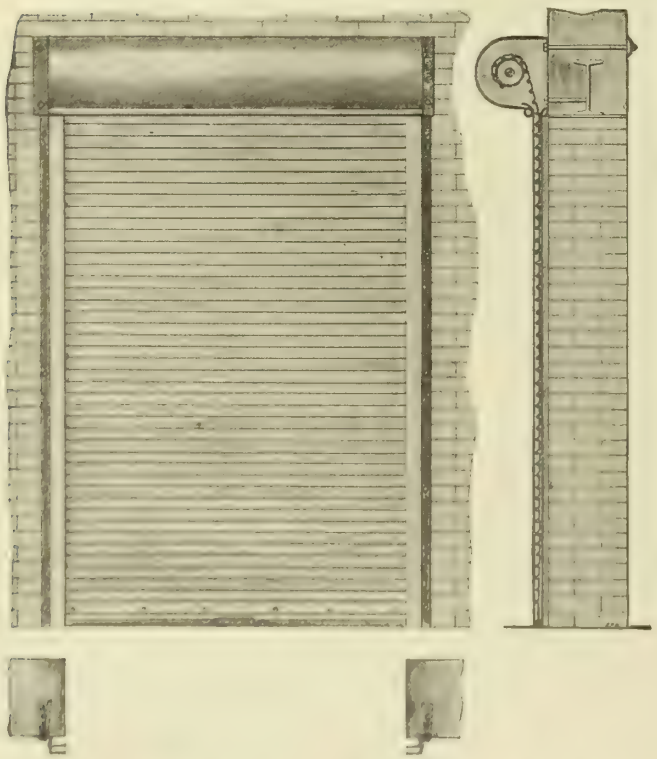
Catalogue—Sent on request.



NO. 25 DOOR MOUNTED ON FACE OF WALL, COILING ABOVE OPENING, MANUAL OPERATION

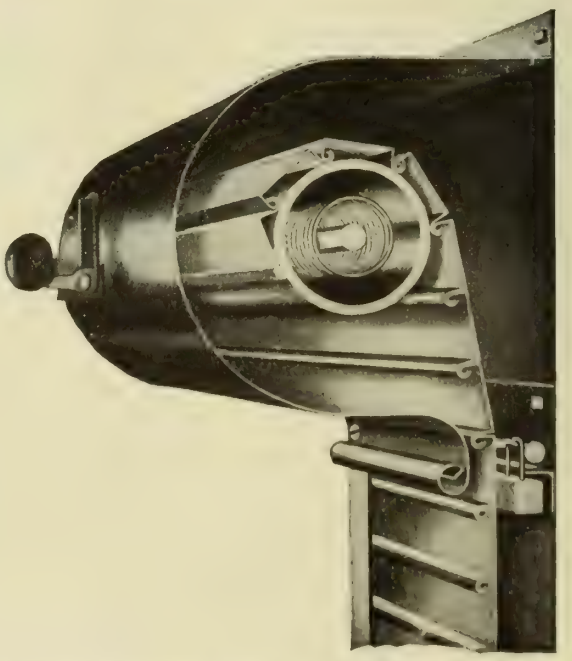
Equipped with Fuse 4-inch Automatic Closing Device

UNDERWRITERS' LABEL



NO. 20 REGULAR CONSTRUCTION FIRE DOOR FOR LARGE OPENINGS, DOOR MOUNTED ON FACE OF WALL, COILING ABOVE OPENING

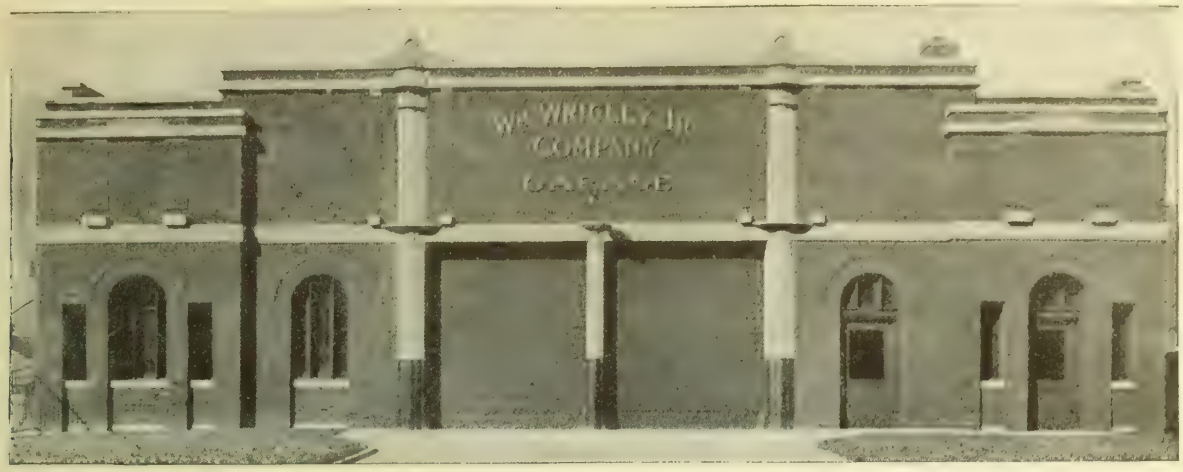
Easily operated by chain hoist, which may be installed at either side



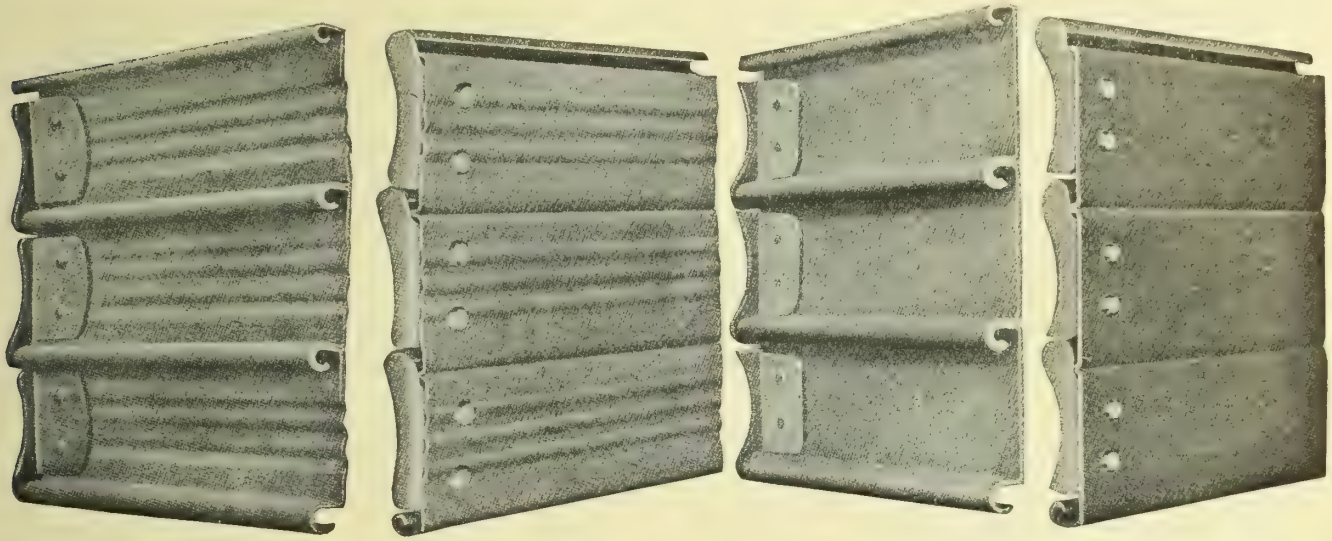
DETAILS OF STEEL ROLLING DOORS FOR ELEVATOR SHAFTS, ETC.

Constructed to meet the requirements of National Board of Fire Underwriters

Continued on next page



STEEL ROLLING DOORS IN GARAGE OF WM. WRIGLEY, JR., CO., CHICAGO, ILL.



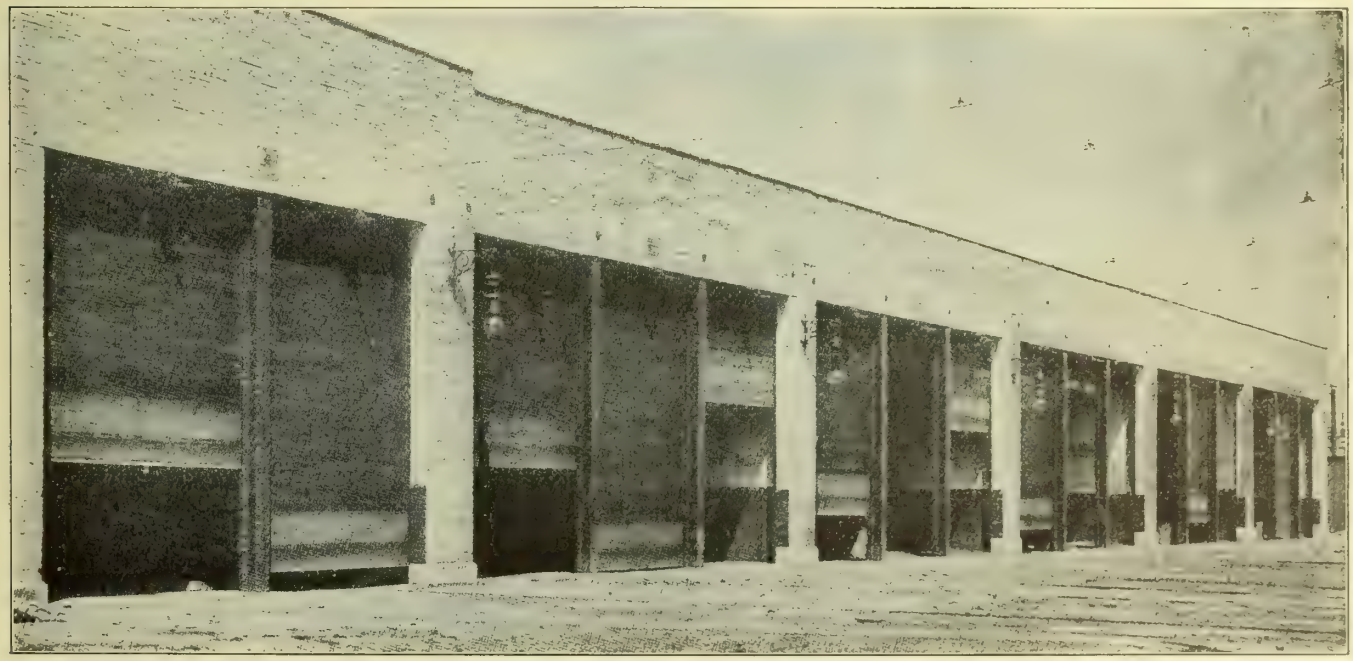
FLANGED SIDE OF NO. 2 INTERLOCKING SLAT

SMOOTH SIDE OF NO. 2 INTERLOCKING SLAT

NO. 4 INTERLOCKING SLAT FOR FIRE WALL OPENINGS

The above slats are rolled channel-shaped, affording greatest strength with least material; and have a close, tight joint that is practically smoke-, fire- and weather-proof. Ends of slats are reinforced with end lock, which prevents longitudinal separation, takes the wear, and reduces friction in grooves. Note that either side of slat sheds water.

No. 2 slats are constructed of No. 20- or 22-gauge steel, either galvanized or black; and No. 4, a much heavier slat, of No. 16- or 18-gauge steel.



LINE OF ROLLING DOORS ON STREET RAILWAY BARN
Total, 24 doors, each 11′ 0″ wide by 18′ 0″ high

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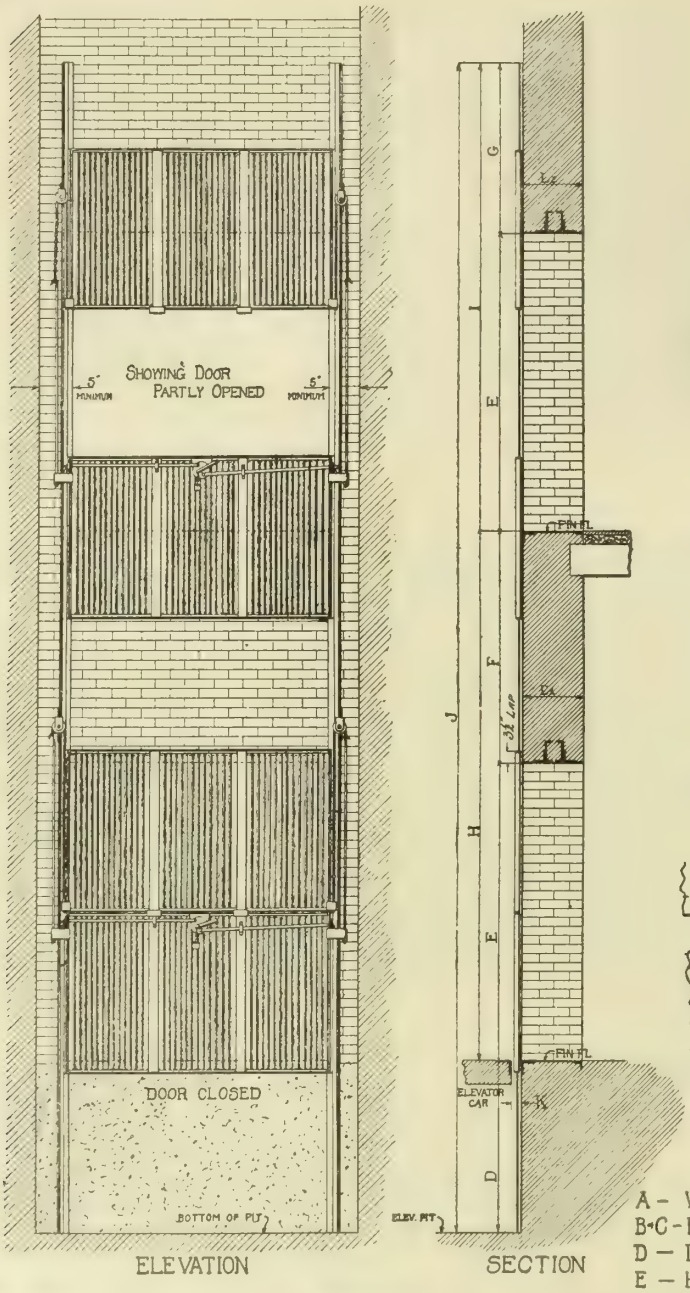
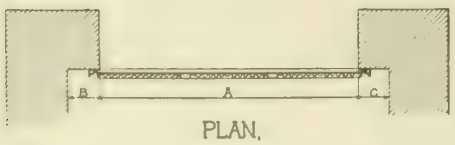
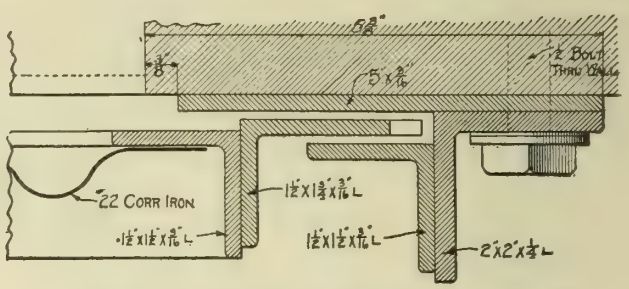
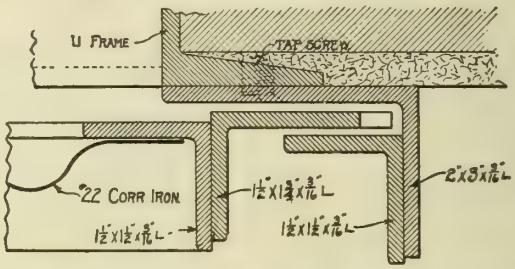


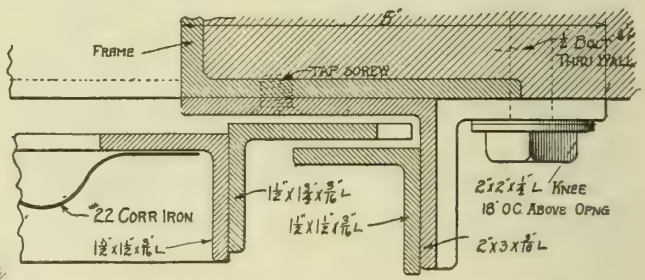




SECTION THRU GUIDE FOR BRICK WALL



SECTION THRU GUIDE FOR CHANNEL FRAMES THAT RUN FROM FLOOR TO CEILING



SECTION THRU GUIDE FOR ANGLE FRAME THAT RUNS AROUND OPNG. ONLY

÷NOTICE÷

INFORMATION TO BE GIVEN WHEN ORDERING.

A – Width Of Opng
B-C – Distance From Edge Of Jamb To Wall 5 Is Minimum
D – Depth Of Pit Which Must Be ½ Dim E Plus 8"
E – Height Of Opng
F – Distance From Bottom Of Lintel To Fin Fl Above Which Must Equal ½ Dim E Plus 8"
G – Distance From Bottom Of Lintel To Top Of Guide Which Must Equal ½ Dim E Plus 4"
H – Distance From Floor To Floor
I – Length Of Guide On Top Floor – Equal To E Plus G
J – Total Length Of Guide
K – Distance Between Car And Wall Must Not Be Less Than 3"
L1-L2 – Thickness Of Walls At Each Floor Beginning At Bottom

13

DETAIL OF VAMANCO DOOR FOR FREIGHT ELEVATOR SHAFTS

The distance between floors must be 1½ times height of opening plus 11 inches.

A—Width of opening between jambs
B—Height of opening from finished floor to under side of lintel
C—Distance finished floor line to finished floor line
D—Thickness and construction of wall
E—Distance from jamb line to inside of shaft wall
F—Distance from top of opening to finished line of floor above. State kind of partition
G—Distance between edge of car platform and face of shaft. Sill must project at least 4 inches from the wall
Note—Measurement I must be 11 inches greater than one half of measurement B for each floor

Information with Orders.

The above information must be furnished when ordering these doors, to avoid mistakes and delays.

As these doors are erected on walls constructed of various material, it is advisable to communicate with us before the walls are erected, if possible, so that we can furnish details, showing what provisions should be made to insure a first-class and proper installation of these doors.

Specifications.

Specifications should read as follows: "Elevator openings to be equipped with the 'Vamanco Door' as manufactured by the Variety Manufacturing Company and are to bear the labels of the National Board of Underwriters."

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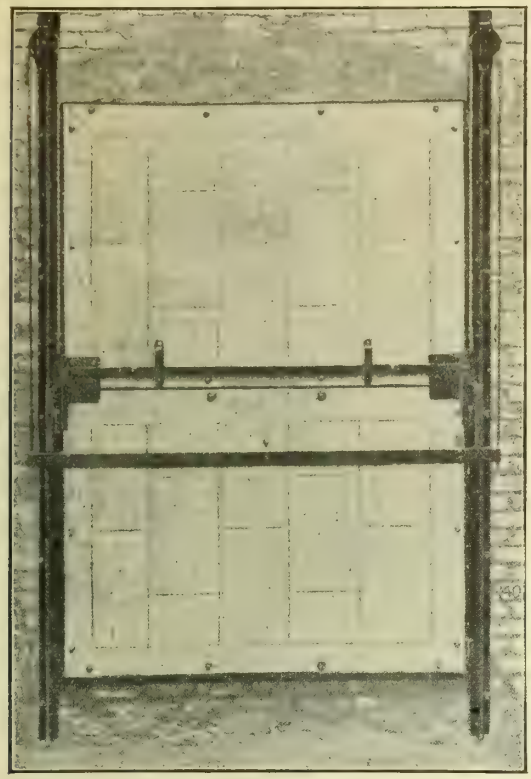


VARCLAD DOOR IN CLOSED POSITION, SHAFT SIDE
Latch is placed on upper panel, and worked entirely by gravity

Vamanco and Varclad Elevator Doors.

Vamanco Counterbalanced Doors (Patented) are *all-steel fire-doors* for freight elevator shafts.

Varclad Elevator Doors are Counterbalanced *tin-clad fire-doors* for freight elevator shafts.

They are approved and labeled by the Underwriters' Laboratories of the National Board of Fire Underwriters.

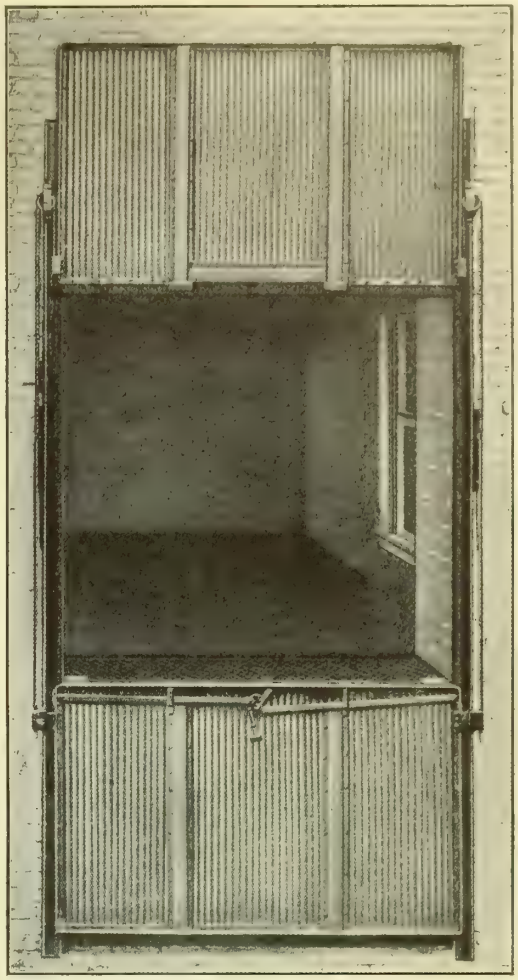
THIS LABEL OF UNDERWRITERS' LABORATORIES IS PLACED ON ALL VAMANCO AND VARCLAD DOORS

General Description.

Construction—Door is mounted in guides secured to inner face of wall of elevator shaft, and operates up and down in small space between elevator car and wall. Made in two parts, or panels, connected with steel chains which travel over ball-bearing sheaves housed in steel brackets that are bolted to guides. Each panel of Vamanco Door is corrugated sheet steel, riveted to an angle frame, the frame being reinforced with special shaped vertical channels. Each panel of Varclad Door is wood, tin-clad, mounted in a frame of steel angles.

FLOOR HEIGHTS REQUIRED FOR VAMANCO ELEVATOR DOORS

Height of Door Opening		Distance Floor to Floor		Height of Door Opening		Distance Floor to Floor	
Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
5	0	8	2	7	3	11	6½
5	3	8	6½	7	6	11	11
5	6	8	11	7	9	12	3½
5	9	9	3½	8	0	12	8
6	0	9	8	8	3	13	0½
6	3	10	0½	8	6	13	5
6	6	10	5	8	9	13	9½
6	9	10	9½	9	0	14	2
7	0	11	2				



VAMANCO DOOR IN OPEN POSITION, SHAFT SIDE
Top of lower panel is flush with door sill, affording smooth surface for trucking. Trucking angles shown at each corner resting on sill

Guides—Of heavy steel angles mounted on face of wall inside shaft, one at each side of opening, secured by through bolts.

Latch—Latch is placed on inside of door, and automatically engages catches on guides when door is closed. Door cannot be opened from floor side.

Operation—Operation is manual from elevator *car only*. In opening, top panel moves up and lower panel down. Weight of one panel is counterbalanced by the other, eliminating springs or counterweights. *Slight friction* of moving parts is the *only resistance* to be overcome in operating.

Automatic Closing Device—This door can be equipped with an automatic device that will close the door as car leaves floor. This will keep shaft closed at all times, regardless of elevator operator, thus protecting shaft against fire and guarding against injury to persons on the floor side.

Trucking Device—Engages sill when door is open, and spans the small space between the elevator car floor and sill.

Advantages of Vamanco and Varclad Doors—Obtain lowest insurance rate. Simply constructed; easily operated; erection or repairs done by any good mechanic. Not expensive. Have no springs or counterweights. Occupy but small space in shaft. A safety gate and fireproof door combined. Automatic feature insures closed shaft at all times. Absolutely fireproof.

Catalogue—Send for our Vamanco Catalogue "B" and Varclad Catalogue "C," which fully describe these doors.

VICTOR MANUFACTURING CO.

ESTABLISHED 1883

Fire-Doors and Shutters

NEWBURYPORT, MASS.

BALTIMORE (MD.) REPRESENTATIVE, Fred H. Jackson, 7 Clay Street

Products.

Tin-Clad Fire-Doors, Shutters and their Hardware; Sliding, Swinging, Vertical and Trap Door Heat-Closing Devices; Heavy Roller Bushed Hangers, Door Frames, Mill Door Latches, Hinges, Weighted Top Bolts, Fusible Links, etc.

Multiple Link Devices for Sliding and Swinging Doors.

Our patented device for sliding doors is far ahead of all others, as there is no rope to overhaul when device operates.

When either link melts, the rope is entirely freed from the door, thus obviating any danger of fouling.

MULTIPLE LINK DEVICE FOR SLIDING DOOR
Patented

Doors and Shutters (National Standard).

Made of two or three thicknesses $\frac{13}{16}$-inch matched pine and covered with tin National Board of Fire Underwriters' double-locked method, approved by them and bearing their label.

Sliding Fire-Door Hardware.

Bar track fire-door hardware, originated and patented by us, bearing the Underwriters' label, furnished for incline and level track horizontal sliding doors. Suitable for all conditions.

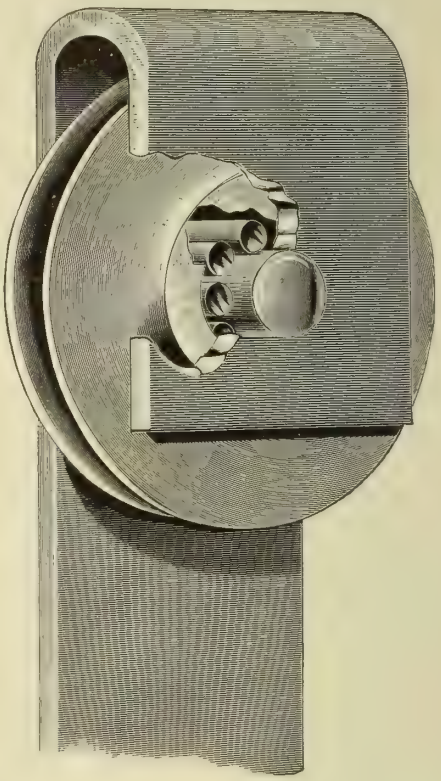
Difficult situations given especial attention.

All material made exactly to conform with specifications.

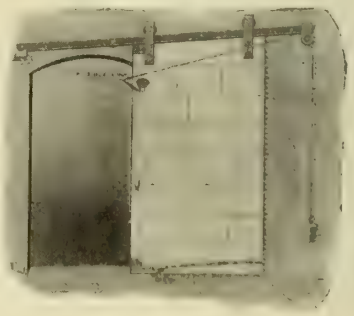
Everything complete, in readiness to erect furnished.

No stock goods that will not exactly suit the conditions.

We are the originators of bar track Sliding Fire-Door Hardware, now the standard of the National Board of Fire Underwriters.



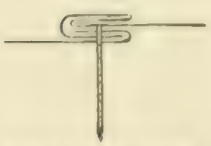
HEAVY ROLLER-BUSHED FIRE-DOOR HANGER
Malleable Iron Wheel



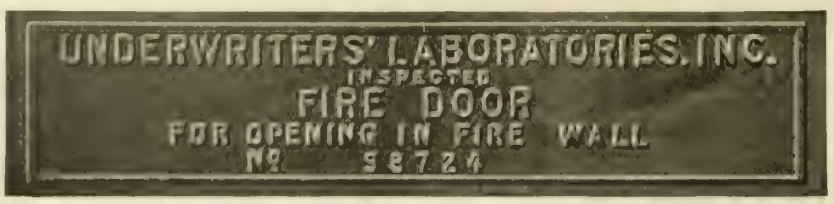
VICTOR FIRE-DOOR
Incline Track, Single Link Pattern

Swinging Fire-Door Hardware.

Heat-closing devices, heavy latches, hinges and weighted top bolts (no springs), and all necessary attaching bolts for both single and pairs of doors. Automatic devices to attach *outside* of openings, furnished when desired.



FINISHED SLAM
Showing Double Lock



INSPECTION LABEL

LABORATORIES' HARDWARE LABEL

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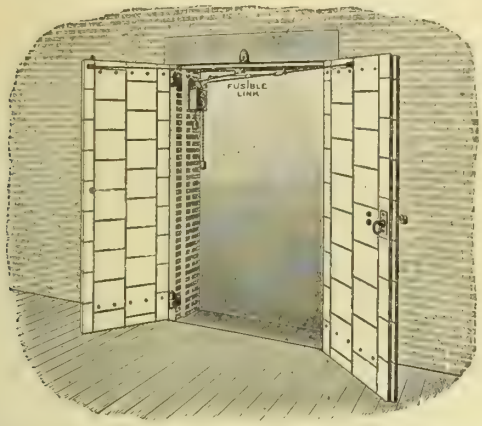
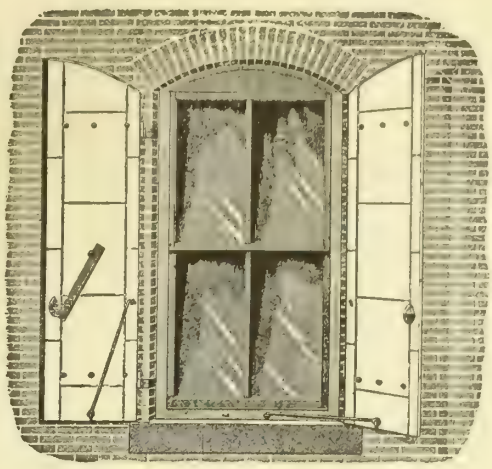


LINK DEVICE FOR SWINGING DOOR (PATENTED)



LOCKING BAR (PATENTED)

Door Frames

Angle and channel iron frames of all kinds made according to specifications.

Vertical Fire-Door Hardware.

For doors sliding up and down. Strong, simple and durable. Weights run easily over roller-bushed pulleys.

Shutter Hardware

Consisting of bar, hooks, hinges, and all necessary attaching bolts.

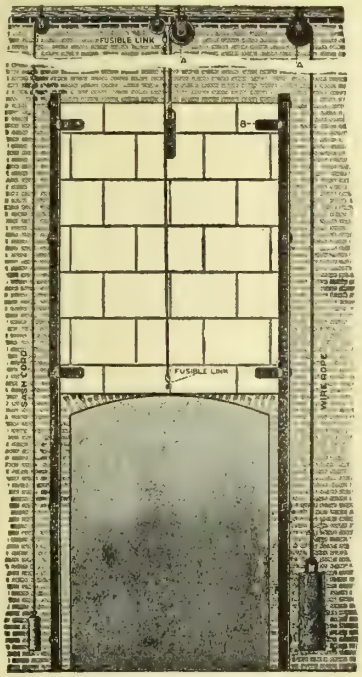
Fusible Links.

Fusing at 160 and 287 degrees. Each one tested as to strength, being subjected to the drop of a 150-pound weight. Fusible alloy is of our own make and thoroughly tested before using.

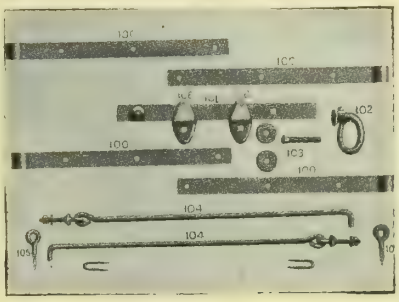
Catalogues, Etc.

Catalogues and blue-prints upon application.

Full directions furnished with goods, showing clearly how to erect them.



DEVICE FOR VERTICAL FIRE-DOOR



SHUTTER HARDWARE

FUSIBLE LINK

REFERENCES

General Electric Co., Lynn, Mass.
International Silver Co., Meriden, Conn.
International Paper Co., New York, N. Y.
Larkin Co., Buffalo, N. Y.
North Packing & Provision Co., Boston, Mass.
The Stanley Works, New Britain, Conn.
Union Metallic Cartridge Co., Bridgeport, Conn.
West Virginia Pulp & Paper Co., New York, N. Y.
Wood Worsted Mill, Lawrence, Mass.
Stanley Rule & Level Co., New Britain, Conn.
Waltham Watch Co., Waltham, Mass.
Winchester Repeating Arms Co., New Haven, Conn.
A. C. Lawrence Leather Co., Boston, Mass.
E. W. Pitman Co., Lawrence, Mass.
W. N. Pike & Sons, Lawrence, Mass.
Kelly Bros., Haverhill, Mass.
Lewis A. Miller, Meriden, Conn.
Wiley & Foss, Fitchburg, Mass.
Griffiths & Pierce, Inc., Utica, N. Y.
Fiske-Carter Construction Co., Worcester, Mass.
John P. Squire & Co., Boston, Mass.
Shredded Wheat Co., Niagara Falls, N. Y.
Fleischmann Mfg. Co., Peekskill, N. Y.
John W. Ferguson Co., Paterson, N. J.
Salmond Bros. Co., Arlington, N. J.
James L. Parsons, Washington, D. C.
Pitman & Brown Co., Salem, Mass.
H. Wales Lines Co., Meriden, Conn.
Aberthaw Construction Co., Boston, Mass.
Hershey Chocolate Co., Hershey, Pa.
McElwain Shoe Co., Manchester, N. H.
James Ackroyd & Sons, Albany, N. Y.
Houston Cotton Oil Mill, Houston, Tex.
Torrington Building Co., Torrington, Conn.
L. E. Locke, Lawrence, Mass.
Scovill Mfg. Co., Waterbury, Conn.
T. C. Thompson & Bros., Charlotte, N. C.
Gallivan Building Co., Greenville, S. C.
J. W. Bishop Co., Boston and Worcester, Mass.
Flynt Building & Construction Co., Palmer, Mass.
Chas. T. Main, Boston, Mass.
Densmore & LeClear, Boston, Mass.
French & Hubbard, Boston, Mass.
F. W. Dean, Boston, Mass.
Lockwood, Greene & Co., Boston, Mass.
Haven & Crosby Co., Boston, Mass.
Monks & Johnson, Boston, Mass.
Cutting, Carleton & Cutting, Worcester, Mass.
C. R. Makepeace & Co., Providence, R. I.
Westinghouse Church Kerr & Co., New York, N. Y.
Stone & Webster Engineering Corp., Boston, Mass.
I. W. Jones, Milton, N. H.
Fletcher-Thompson, Inc., Bridgeport, Conn.
Winchester Repeating Arms Co., New Haven, Conn.
Saxonville Mills, Saxonville, Mass.
Masonic Temple, Salem, Mass.
Naumkeag Mills, Salem, Mass.
Salem Gas & Electric Co., Salem, Mass.
U. S. Cartridge Co., Lowell, Mass.
Monadnock Mills, Lawrence, Mass.
Groton Leatherboard Co., West Groton, Mass.
American Tobacco Co., New York, N. Y.
American Woolen Co., Boston, Mass.
American Thread Co., New York, N. Y.
Boston & Maine R. R., Boston, Mass.
Baltimore Bridge Co., Baltimore, Md.
Colgate & Co., Jersey City, N. J.

ESTABLISHED 1876 INCORPORATED 1903 REINCORPORATED 1914

THE J. G. WILSON CORPORATION

SUCCESSORS TO THE JAS. G. WILSON MFG. CO.

Manufacturers of Rolling Doors and Shutters in Steel, Wood, Bronze

TELEPHONE, BRYANT 7693
CABLE, "LYDIAN, NEW YORK"

8 West Fortieth Street
NEW YORK, N. Y.

FACTORY ADDRESS
MAIL AND TELEGRAPH: NORFOLK, VA.

BRANCH OFFICES

CHICAGO, ILL., H. B. DODGE & CO., McCORMACK Building
PHILADELPHIA, PA., L. H. MYRICK, Heed Building
PITTSBURGH, PA., H. H. CHARLES, BESSEMER Building
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AGENCIES

ATLANTA, GA.
BUFFALO, N. Y.
CINCINNATI, OHIO
DENVER, COLO.
DETROIT, MICH.
FORT WORTH, TEXAS
HOUSTON, TEXAS
LOS ANGELES, CAL.
MINNEAPOLIS, MINN.
NEW ORLEANS, LA.
OKLAHOMA CITY, OKLA.
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ST. LOUIS, MO.
SALT LAKE CITY, UTAH
SAN ANTONIO, TEXAS
SAN FRANCISCO, CAL.
SEATTLE, WASH.
SPOKANE, WASH.
CALGARY, CAN.
LONDON, ENG.
MONTREAL, CAN.
VICTORIA, CAN.
WELLINGTON, N. Z.

Products.

"WILSON" STEEL ROLLING DOORS and SHUTTERS, Corrugated Steel and Interlocking Slat Types; "SALAMANDER" ROLLING SHUTTERS; WOOD ROLLING DOORS; SWING SLIDING DOORS; ROLLING FIRE-DOORS for ELEVATOR and STAIRCASE OPENINGS, and DOORS for GARAGES.

For Wood Rolling Partitions, Rolling Blinds, Venetian Awning Blinds, Inside Venetian Blinds, and Hygienic Wardrobes, see our name in General Index.

Experience and Co-operative Service.

The standards of construction of "Wilson" products have been progressively developed during a period of nearly forty years of manufacturing experience. This fact, together with the high records of service which can be shown for "Wilson" doors and shutters, offers effective assurance of their superiority.

While it is hoped that the data provided herewith will effectually assist in the full study of any door and window problem, and in making all necessary provisions for installation of the specified products, the experience and mass of scientific data in possession of this Company are also gladly put at the disposal of users of this book.

In special problems, in which the most desirable choice of door or shutter, or its proper method of application is not explained, further details and drawings will be gladly sent, on receipt of particulars of requirements and sketch indicating conditions to be met.

"Wilson" Steel Rolling Doors and Shutters.

Double Edge Corrugated Steel Type—This door (Fig. 1) is simple, strong, durable and efficient, and will stand a great deal of hard, rough service. It is built of a heavy corrugated steel, is free from crevices for secret corrosion, and is easily repaired or painted by any ordinary mechanic. It retains its shape under intense heat, and can be fitted with a fuse-link release device for automatic closing in case of fire.

This construction is adapted for doors and shutters up to 150 square feet, and is especially recommended for freight and warehouse service. (For details, see second and third pages following.)

Interlocking Slat Type—Interlocking slat doors and shutters are made in two styles, Style 1 (Fig. 2) for usual openings or openings exposed to high winds, and Style 2 (Fig. 3) for extra large openings. They are neat in appearance and efficient in operation, and provide an effective fire-retardant construction.

This construction is adapted for doors and shutters up to 200 square feet for Style 1 and 300 square feet for Style 2. (For details, see second and fourth pages following.)

Fire-Doors for Exterior Openings—These (Fig. 4) are of the corrugated or interlocking slat types, counterbalanced by means of helical springs, mounted on face of wall, overlapping at sides and top, manually operated in one of three ways: by a handle on the bottom bar, a chain gear, or a bevel gear actuated by a crank which provides means of operation from either side.

This construction is adapted for door and shutter, for openings up to 100 square feet. For limited sizes of corrugated types in connection with Underwriters labeled installations, see second page following. (For details, see second and fifth pages following.)

Elevator and Staircase Opening Fire-Door—This is a spring counterbalanced interlocking slat door (Fig. 7) mounted on the face of the wall and overlap-

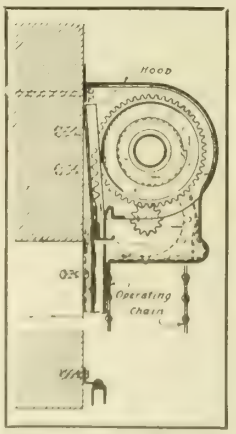


FIG. 1. WILSON CORRUGATED STEEL ROLLING DOOR
Operated usually by chain gear (bevel gear, if preferred) when larger than 10 x 12 feet; otherwise spring balanced

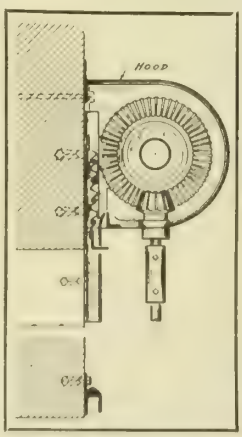


FIG. 2. Style No. 1 (without anchor device) for usual openings

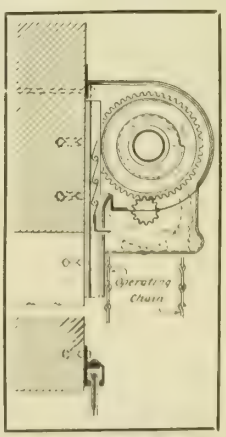


FIG. 3. Style No. 2 (with anchor device) for extra large openings

INTERLOCKING SLAT STEEL ROLLING DOORS
Operated usually by chain gear (bevel gear, if preferred) when larger than 10 x 12 feet; otherwise spring balanced

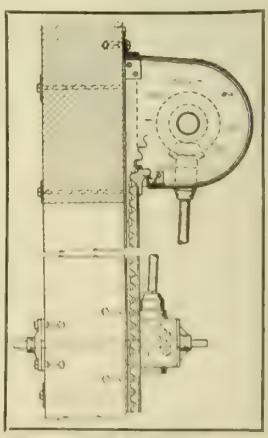


FIG. 4. FIRE DOOR FOR EXTERIOR OPENINGS
This is the Corrugated Type. Interlocking Slat Type is not labeled by the Underwriters for this service. Spring balanced. Operated by chain gear or bevel gear (as above)

Continued on next page

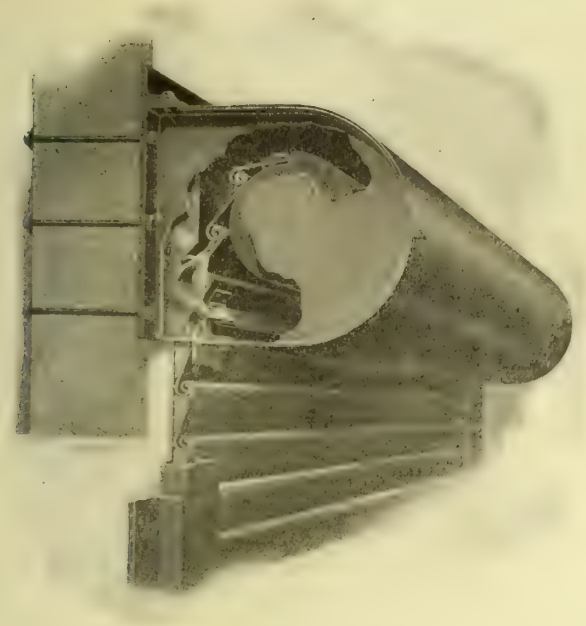


FIG. 5. DETAIL ILLUSTRATION OF STEEL ROLLING DOOR OR SHUTTER FOR ELEVATOR SHAFTS, ETC.

Constructed especially to meet the requirements of the National Board of Fire Underwriters

Shutter hung upon steel shafts supported by cast-iron brackets bolted to face of wall of shaft. It contains a helical spring of sufficient strength to counterbalance shutter, which is required to be self-coiling and to operate automatically by fusible link device

ping at sides and at top. It is manually operated by a handle placed at bottom bar of curtain, and will close automatically, in case of fire, through a releasing device, actuated by a fusible link (Fig. 5). Adapted for openings of sizes indicated on following page, under heading " Official Indorsement." (For details, see next and fourth pages following.)

Fire-Doors for Vertical Shafts, Fire Walls, Corridors or Room Partitions—Single door, spring counterbalanced, for openings not exceeding 8 feet wide by 10 feet high, installed in vertical shafts, corridors or room partitions (Fig. 8). Double doors, spring counterbalanced, for openings not exceeding 8 feet by 10 feet or 10 feet by 8 feet high, installed on fire walls, mounted on face of wall, overlapping at sides and top. Manually operated by handles placed on bottom bar of curtain. Automatically closed by releasing device, actuated by fusible link. Provided with baffle-plate for closing opening between curtain and bottom angle of hood.

For limited sizes for Underwriters' labeled installations, see " Official Indorsement," on next page. (For details, see next and fourth pages following.)

" Wilson " Wood Rolling Doors and Shutters.

These doors (Fig. 9) are made of wood slats fitted together with rule joints, edge to edge, and threaded upon bands of bronze metal running from top to bottom about 18 inches apart. Each band is riveted to the top slat and attached at the bottom to a strong spiral spring anchor of phosphor bronze concealed in the baseboard or bottom bar. The spring keeps the slats firmly fitted together. Will withstand any amount of hard wear.

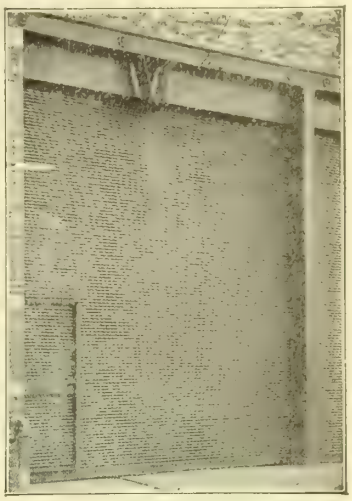


FIG. 6. WICKET DOORS

A small wicket door can be placed in any of our Rolling Shutters. Maximum size, 2′ x 5′

Openings to admit light can be provided in the doors, when required, in the shape of wire-glass panels. (For details, see next and fifth pages following.)

"Wilson" Salamander Patent Rolling Shutters.

This rolling shutter (Fig. 10) is guaranteed to be thoroughly fireproof and superior as a heat-retardant to any shutters on the market. Is made of wood slats of various thicknesses covered with bronze metal or steel, and has a padding of asbestos between the wood and the metal covering.

This construction is especially recommended for store fronts, and for openings up to 200 square feet. (For details, see next and fifth pages following.)

"Wilson" Sliding Swing Doors.

These doors (Fig. 11) are made of wood in various thicknesses, with or without light panels, and are covered with metal when so desired. They are very easily operated by hand or chain gear, and are fitted with automatic closing device and self-acting bolts, when desired.

This construction is especially recommended for exterior openings and for openings up to 150 square feet. (For details, see next and sixth pages following.)

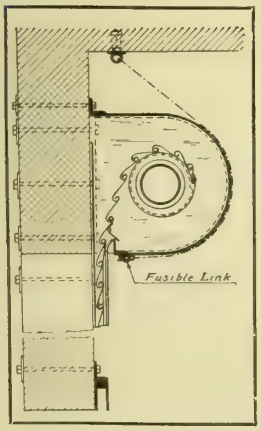


FIG. 7. ELEVATOR AND STAIRCASE OPENING FIRE-DOORS
Operated by hand

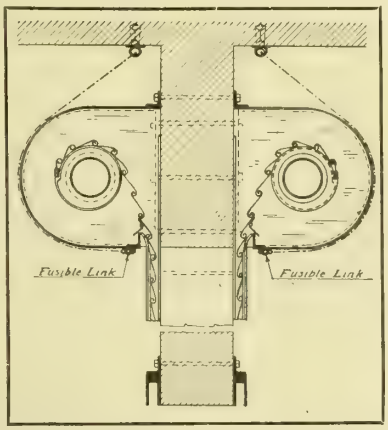


FIG. 8. FIRE WALL DOOR FOR VERTICAL SHAFTS, FIRE WALLS, CORRIDORS OR ROOM PARTITIONS
Spring counterbalanced to close automatically in case of fire, and operated by hand

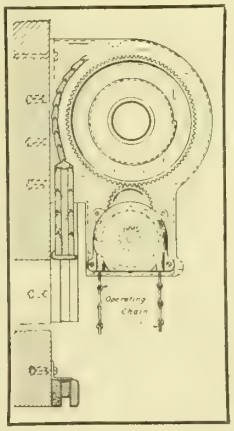


FIG. 9. WOOD SLAT ROLLING DOOR
Counterbalanced by helical springs and operated by chain gear, except small sizes, which are spring balanced

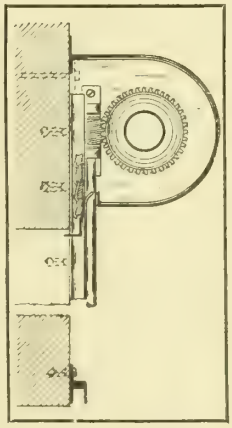


FIG. 10. SALAMANDER PATENT ROLLING SHUTTER
Spring counterbalanced and operated by chain, worm or bevel gear, except small sizes

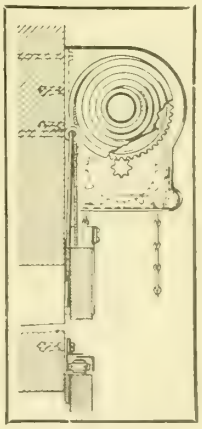


FIG. 11. SLIDING SWING DOOR
Counterbalanced by helical springs and operated by hand or chain gear

Continued on next page

Official Indorsement.

"Wilson" Rolling Steel Fire-Doors are indorsed and labeled by the National Board of Fire Underwriters, Inc., for the following services:

Openings in Fire-Walls—For openings not exceeding 80 square feet; doors on both sides of wall; doors mounted on face of wall, only; construction, "Wilson" Interlocking Slat, Arrangement No. 1.

Openings in Vertical Shafts (Stairway and Elevator Openings)—For openings not exceeding 8 feet by 10 feet; construction, "Wilson" Interlocking Slat No. 2, Arrangement No. 1.

Door Openings in Corridor and Room Partitions—Openings not exceeding 8 feet wide by 10 feet high; construction, "Wilson" Interlocking Slat, Arrangement No. 1.

Openings in Exterior Walls—Openings not to exceed 10 feet in width and 10 feet in height; construction, "Wilson" Galvanized Corrugated Steel, self-coiling.

Installation, etc.

Most "Wilson" work can be installed by workmen of ordinary skill in the various building trades. Drawings and full directions for fitting are furnished with each shipment. This Company naturally, however, prefers to install its own work and then to assume full responsibility for it.

Doors and shutters of any form of operation can be fitted with motors to work by electricity, and can also be equipped with worm gear mechanism for operation singly or in groups.

Small size doors and shutters can be made self-coiling; that is, to operate without gear of any kind.

"Wilson" Standards.

The J. G. Wilson Corporation, in developing the "Wilson" rolling doors and shutters to withstand the most exacting use, have evolved standards of manufacture upon which the "Wilson" reputation for indestructibility, and ease in operation, rests. These products are guaranteed, and the following descriptions are submitted as *standards of manufacture*, the compliance with which will secure best results and provide equable conditions in estimating.

Note—The following descriptions are not intended as specifications to be used by the architect, but merely as indications of what is meant by each type of door. Thus he will be able to use the specification form at the bottom of the next column; and without going into details, name the types of doors he desires, the pages on which they are detailed and the "Plan" of construction (see sixth page following) which he prefers.

CORRUGATED STEEL ROLLING DOORS

Doors—Wilson's Corrugated Galvanized Sheets, No. 23 U. S. gauge (before galvanized) "Self-Coiling" (for doors 8 feet by 8 feet or less), Chain-Geared (for doors larger than 8 feet by 8 feet), Hoods (necessary if shutter coils outdoors, otherwise optional).

Sheets—To be best O. H. hot galvanized steel with deep corrugations so that the shutter will coil in reasonably small space, and without danger of cracking. Edges of sheets to be reinforced and protected by malleable iron shields.

Springs—Of flat band or helical wire type, so selected as to counterbalance the shutter at all positions.

Gearing—Where necessary, to be of cast-iron type with malleable iron journals and galvanized hand chain. Extra large doors to be equipped with ball bearings.

Hoods—To be constructed of No. 24 U. S. gauge galvanized sheets with as few joints as possible, reinforced where necessary, with steel angles.

INTERLOCKING STEEL ROLLING DOORS

Doors—Wilson's Interlocking No. 1, or Wilson's Interlocking No. 2, Galvanized Slats; No. 22 or 20 U. S. gauge for No. 1, No. 22, 20, 18 or 16 U. S. gauge for No. 2, "Self-Coiling" (for about 6 feet by 8 feet or less), Chain-Geared (for about 6 feet by 8 feet or greater), Hoods (necessary if shutter coils outdoors, otherwise optional).

Slats—To be of cold-rolled steel, electro-galvanized and formed into an S-shaped section. Ends of slats to be reinforced and protected by malleable iron shields.

Springs—To be of helical wire type contained in steel pipe shafts so selected as to counterbalance the shutter at all positions.

Gearing—Where necessary to be of cast-iron type with malleable iron journals and galvanized hand chain. Extra large doors to be equipped with ball bearings.

Hoods—Of No. 24 gauge galvanized sheets with as few joints as possible, reinforced where necessary with steel angles.

UNDERWRITER APPROVED AND LABELED STEEL ROLLING DOORS

For Services Indicated under "Official Indorsement."

Interlocking Slat Type—Construction, Underwriter Labeled Arrangement No. 1, self-coiling; mounted on face of wall; counterbalanced by helical spring in shaft; manually operated; automatic closing through fusible link and spring release; provided with interval baffle-plate; steel hood; cast-iron brackets. Interlocking slat curtain to extend into grooves 1½ inches for openings 6 feet or less in width and 2 inches for openings 6 to 8 feet in width, and to be provided with end locks to take up wear, maintain tightness in joints between slats, prevent lateral motion and act as fire-stops. Slats of best O. H. galvanized steel, No. 16 U. S. gauge for openings in fire walls, No. 20 U. S. gauge steel for openings in vertical shafts (stairway and elevator openings) and for corridor and room partitions. Bottom bar provided with sliding locking bolts.

Corrugated Steel Type—Galvanized corrugated sheet steel, No. 23 U. S. gauge (before galvanizing); mounted on face of wall; self-coiling; counterbalanced by helical spring in shaft; manually operated; automatic closing through fusible link and spring release; provided with fire-stops and steel hood; cast-iron brackets; bottom bar provided with sliding locking bolts.

WOOD ROLLING DOORS AND SHUTTERS

Made of rule joint slats about 1⅛ inches thick, strung on bronze bands which are fitted with bronze anchor springs, located on bottom bar to accommodate swelling or shrinkage of wood slats. Operated by means of chain gear, when applied to large openings, and by handles on bottom bar, on small openings. Counterbalanced by helical springs operated by means of spur gear or chain. Ratio of gearing designed to insure quick and easy operation. No hoods required when doors are applied inside of building.

SALAMANDER ROLLING DOORS

Constructed of bronze or steel sheathed slats with an asbestos padding between wood slats and the metal sheathing. Slats are connected or joined together by means of continuous hinges running from top to bottom, spaced on about 12-inch centers, each slat being individually riveted to the hinges. Doors counterbalanced by helical springs, operated by means of chain, worm or bevel gear to suit conditions; motor operation, if desired.

SLIDING SWING DOORS

Constructed of heavy wood frames, either paneled or filled with glass. Fitted with small wicket door when desired. When used for fire protection they are covered with sheet metal and fitted with fusible links for closing automatically. Doors are counterbalanced by helical springs, operated by means of handles or chain gearing.

Suggested Specification Form.

The various openings in this building so marked or indicated (or described by list to be given) are to be furnished and completely equipped with rolling steel doors [or shutters] of the types called for. Upon openings not in excess of size sanctioned by the National Board of Fire Underwriters all such products shall bear the label of the Underwriters' Laboratories, Inc., and any other size shall be in all essentials similar to those bearing labels, except that the manufacturers' standard for increase in size shall be followed and the type used shall conform to best practice for the size required. The doors (or shutters) shall be made in conformity with the detailed drawings shown on pages ..... of Sweet's Architectural Catalogue, 1916 Edition, Plan*—Construction, including all guides, anchor device, supports, bolts, hoods, hardware, etc., complete, the doors (or shutters) with the exception of the finished painting (shop coat only applied by maker), to be erected and left in complete and satisfactory working order by the manufacturer of the doors, who shall arrange with the various other contractors to follow the detail blue-prints to be furnished by the manufacturer, and to build in all bolts or other parts furnished by him.

Openings (describe them) shall be automatic closing in case of fire.

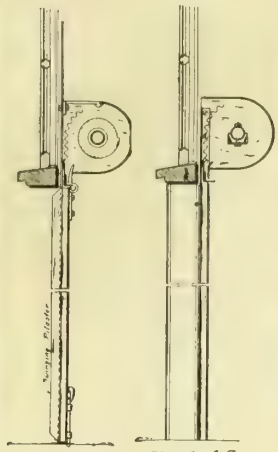
To openings (describe them) the slats of doors [or shutters] shall be full galvanized, and left unpainted, all guides and hood, etc., to be painted.

Notes—Painting specifications should provide for finished painting of all parts throughout. As per details shown on following pages, no structural iron for support or openings or any jambs or sills are provided with manufacturers' equipment, and when same are desired should be elsewhere specified as to metal, installation, painting, etc.

* See sixth page following for full range of "Plans" of Construction for "Wilson" Doors and Shutters.

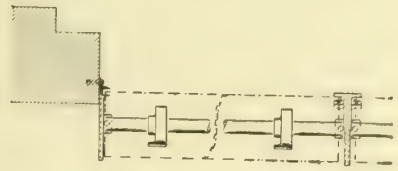
Continued on next page

Northern Pacific R. R. Shed at Seattle, Wash.
Showing "Wilson" Self-Coiling Corrugated Rolling Doors. The bays are 19 feet wide, divided in center by hinged pilasters

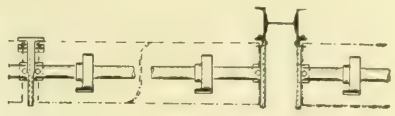


Vertical Section at Jamb

Vertical Section at Center Pilaster

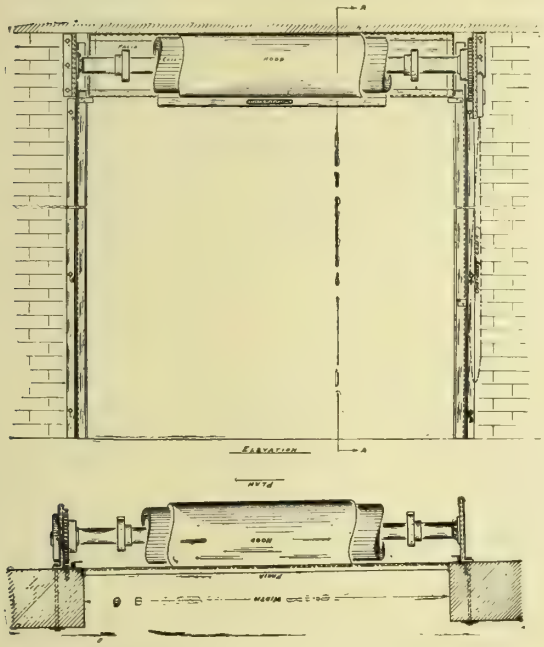


Plan at Jamb

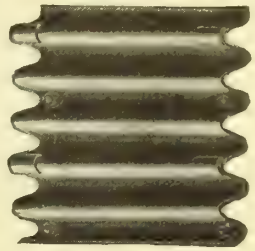


Plan at Center Pilaster

Details Showing Construction of Adjoining Northern Pacific R. R. Shed Installation

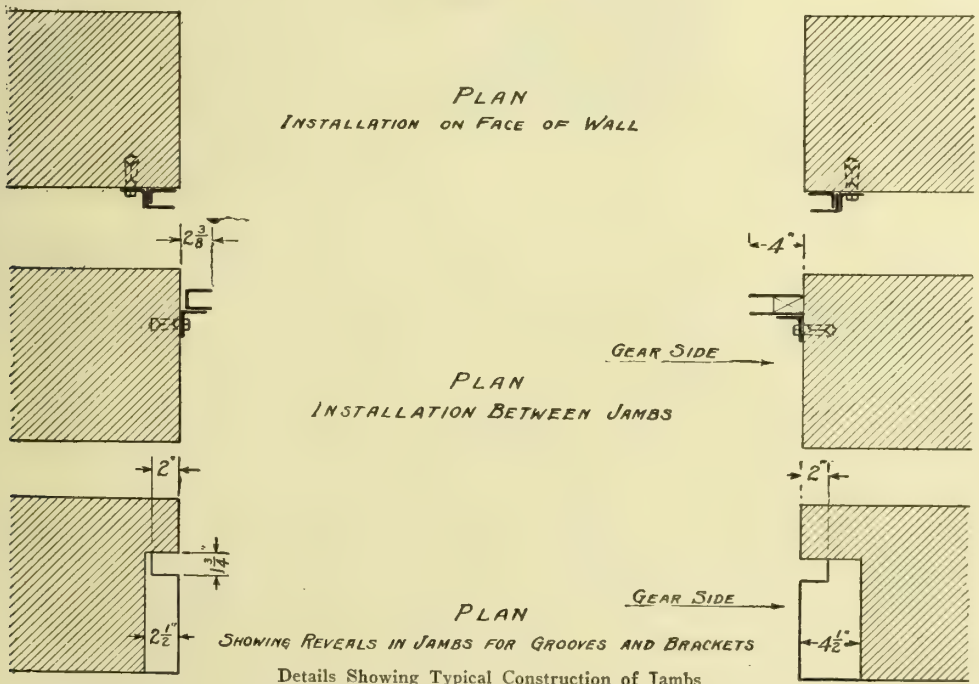


Plan, Elevation and Vertical Sections of "Wilson" Corrugated Rolling Doors, Chain Geared. This type is made also self-coiling or bevel geared

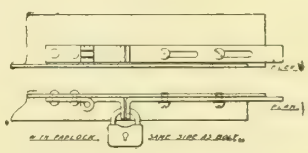


"Wilson" Double Edged Corrugated Steel Rolling Door Detail

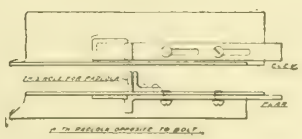
For Inside or Outside of Shutter No Padlock



Details Showing Typical Construction of Jambs



With Padlock Same Side as Bolt



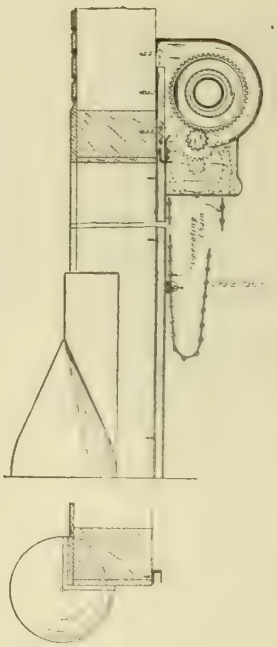
With Padlock Opposite to Bolt
Details of Locking Device

PLATE I. TYPICAL INSTALLATION AND DETAILS SHOWING CONSTRUCTION OF "WILSON" CORRUGATED STEEL ROLLING DOORS AND SHUTTERS

See fifth page following for Dimension Data and full range of "Plans" of Construction for "Wilson" Doors and Shutters

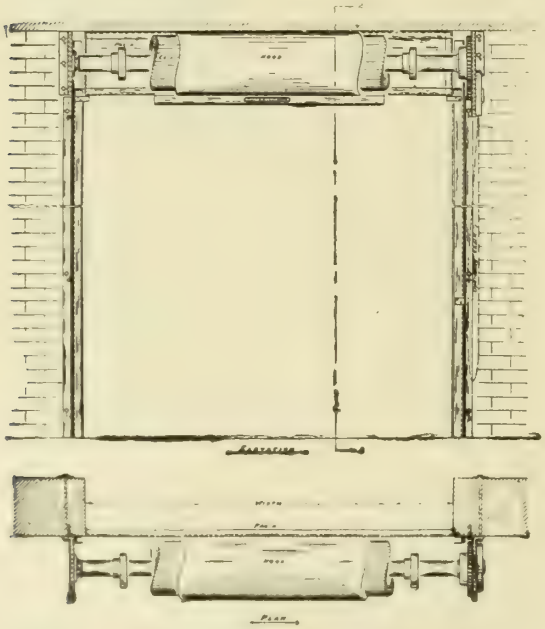
Continued on next page

Detail of Installation of "Wilson" Interlocking Slat Rolling Steel Doors at Fort Ethan Allen, Vt.
Gun sheds equipped with forty doors, operated by chain gear



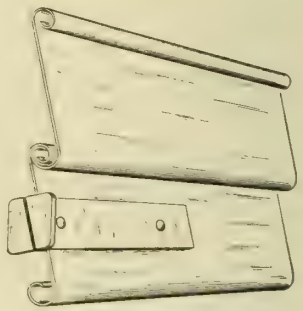
Vertical Section and Plan
Adjoining Installation

Interlocking Slat, Style No. 1
Size of slat, 2½ inches wide

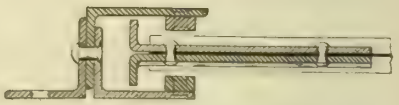


Typical Elevation and Plan of Interlocking Slat Rolling Steel Door Installation

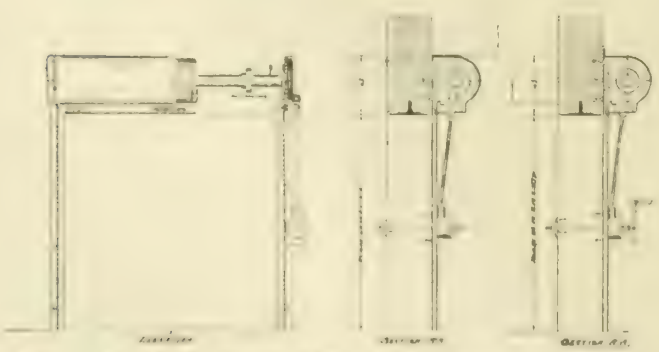
Interlocking Slat, Style No. 2
Size of slat, 3 inches wide



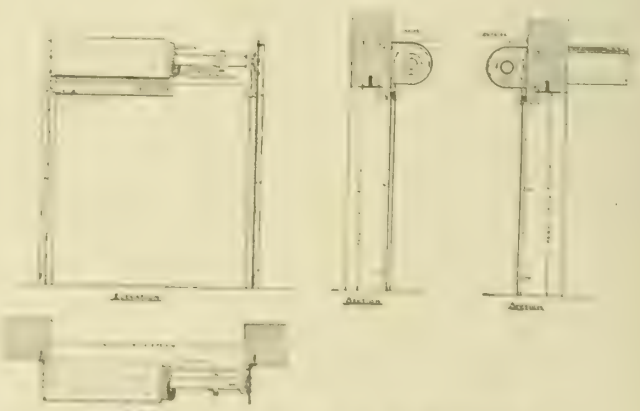
Anchor on Slat No. 2



Plan of Groove and Anchor
Details Showing New Anchor Device on Interlocking Slat No. 2



Garage Door Application of "Wilson" Interlocking Slat Rolling Steel Door
Raised, guided and operated by a crank which provides means of operation from inside only



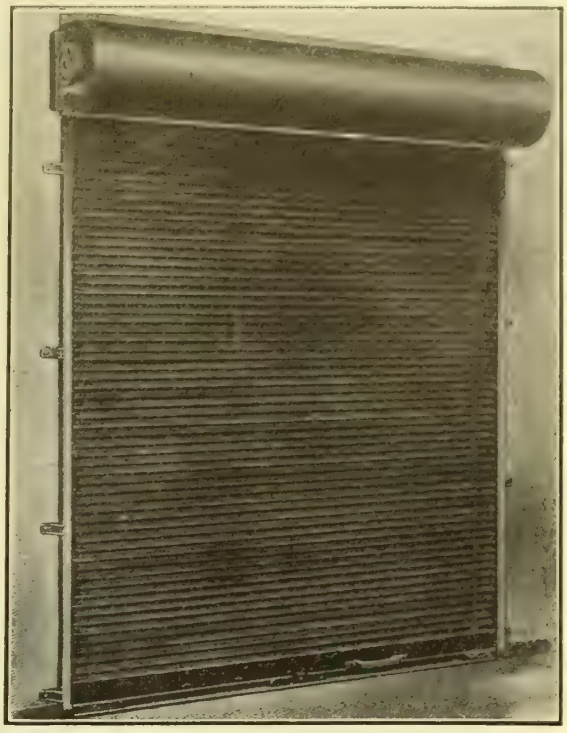
Self-Coiling Rolling Steel Door for Garage Openings

PLATE B. TYPICAL INSTALLATION AND DETAILS SHOWING CONSTRUCTION OF "WILSON" INTERLOCKING SLAT ROLLING STEEL DOOR

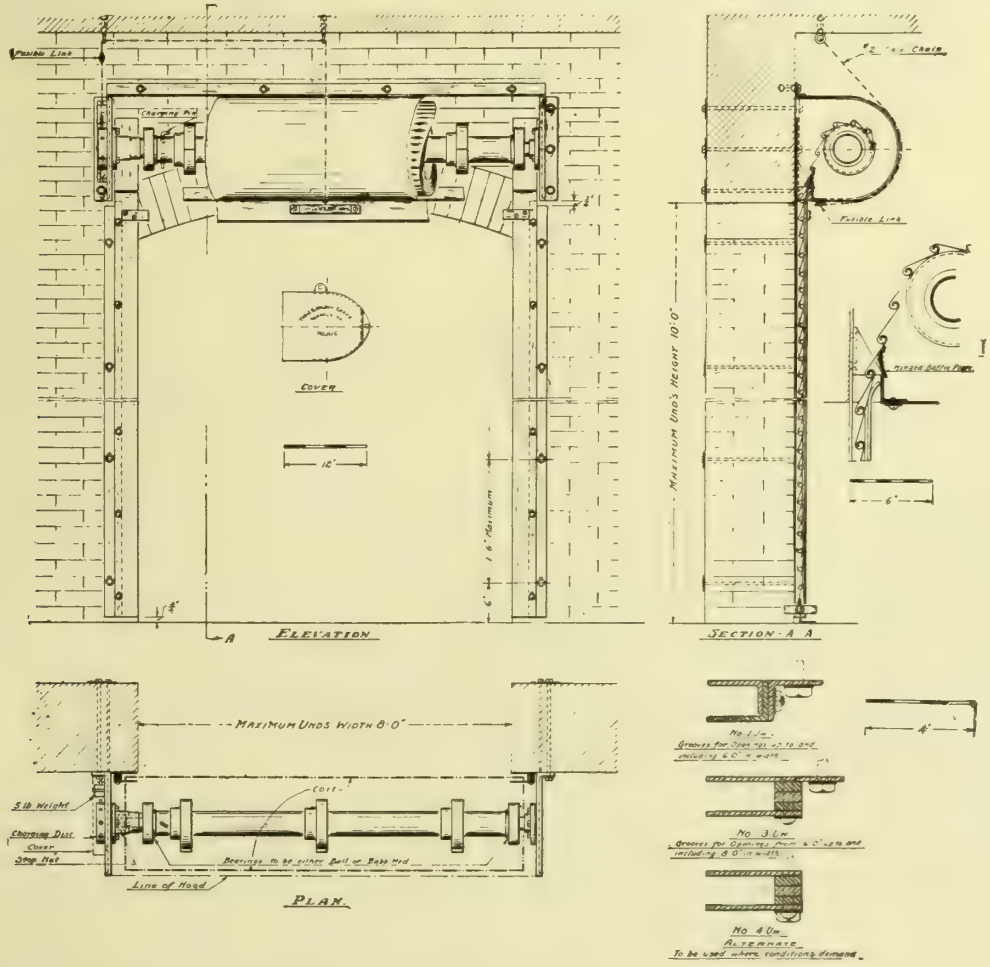
See fourth page following for Descriptive Data and full range of "Plans" of Construction for "Wilson" Doors and Shutters

Continued on next page

Installation, in Harris Building, of "Wilson" Interlocking Slat Rolling Fire-Door, Arrangement No. 1, Labeled by Underwriters



"Wilson" Rolling Corrugated Steel Fire-Door, Self-Coiling
Installed in elevator openings of Irish Estate Buildings, Pittsburgh, Pa. Spring balanced and equipped with fusible link, to close door at temperature of about 150 degrees heat. Can be raised and lowered by hand without interference with automatic spring release device

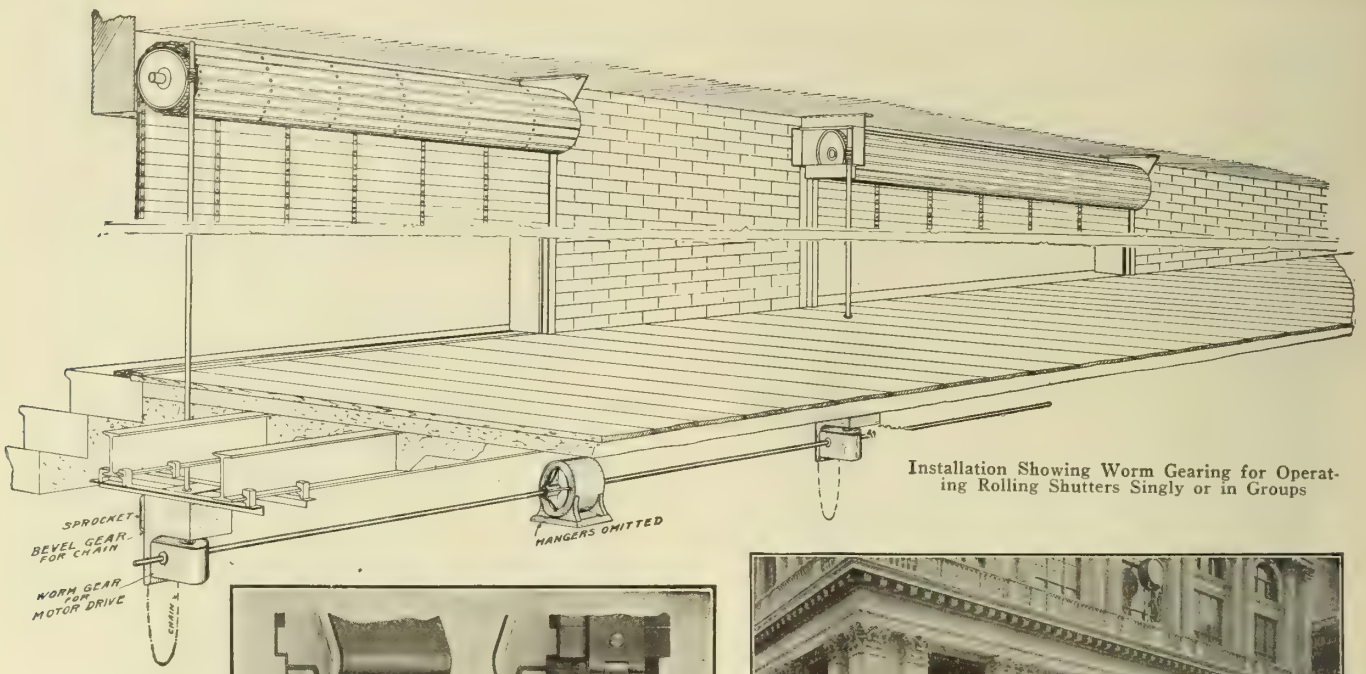


Plan, Elevation and Sectional Details of "Wilson" Rolling Interlocking Slat Fire-Door Arrangement No. 1, Self-Coiling, equipped with fusible link. Furnished also with chain gear or bevel gear, as required

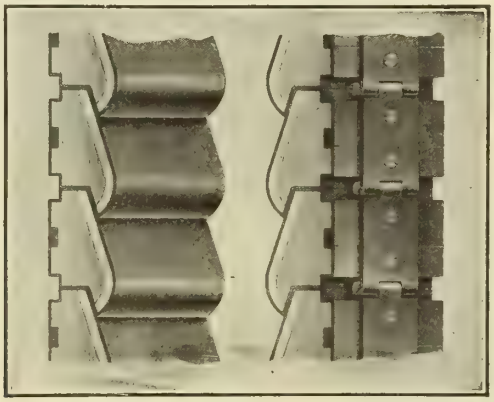
PLATE III. TYPICAL INSTALLATION AND DETAILS SHOWING CONSTRUCTION OF "WILSON" ROLLING STEEL FIRE-DOORS

These doors are especially manufactured to meet the requirements of the National Board of Fire Underwriters, and will be so labeled when openings do not exceed maximum dimensions fixed by the underwriters

Continued on next page



Installation Showing Worm Gearing for Operating Rolling Shutters Singly or in Groups



Sectional Details of "Wilson" Patent Salamander Rolling Shutter

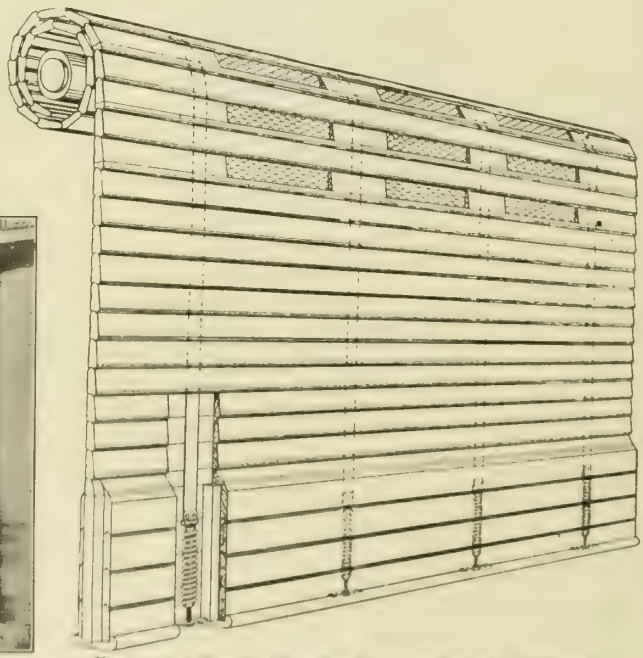
Tiffany Building, New York

Fitted with "Wilson" Salamander Rolling Shutters in Bronze. These shutters weigh half a ton each, and are operated, in groups of five, by an electric motor. This represents the highest type of fire protection

PLATE IV. TYPICAL INSTALLATION AND DETAILS, SHOWING CONSTRUCTION OF "WILSON" PATENT SALAMANDER ROLLING SHUTTER

See second page following for Dimension Data and full range of "Plans" of Construction for Doors and Shutters

Typical Wood Rolling Door Installation



Perspective Detail, Showing Construction of "Wilson" Patented Wood Rolling Door

Sec. through Bands

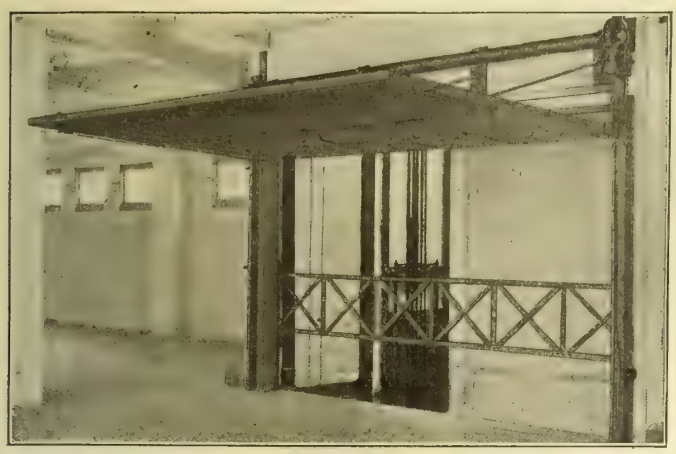
Sec. through Glass Panels

PLATE V. TYPICAL INSTALLATION AND DETAILS, SHOWING CONSTRUCTION OF "WILSON" WOOD SLAT ROLLING DOORS

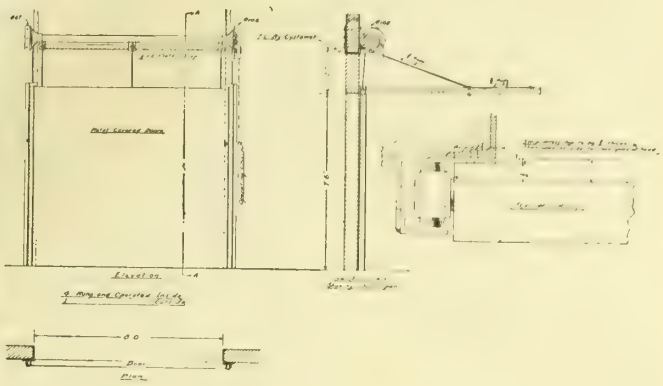
Door of installation shown weighs about 900 pounds and is operated by a pull, on an endless chain, of 25 pounds. Thirty seconds time required for raising. These doors are fitted with wicket door and wire glass panels only when specified

See second page following for Dimension Data and full range of "Plans" of Construction for Doors and Shutters

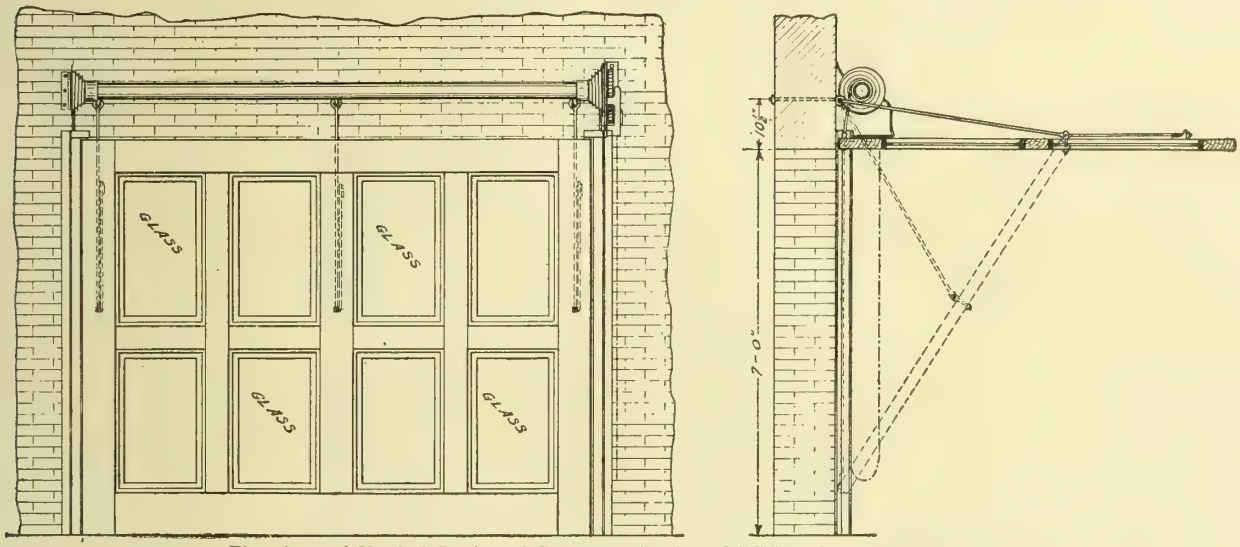
Continued on next page



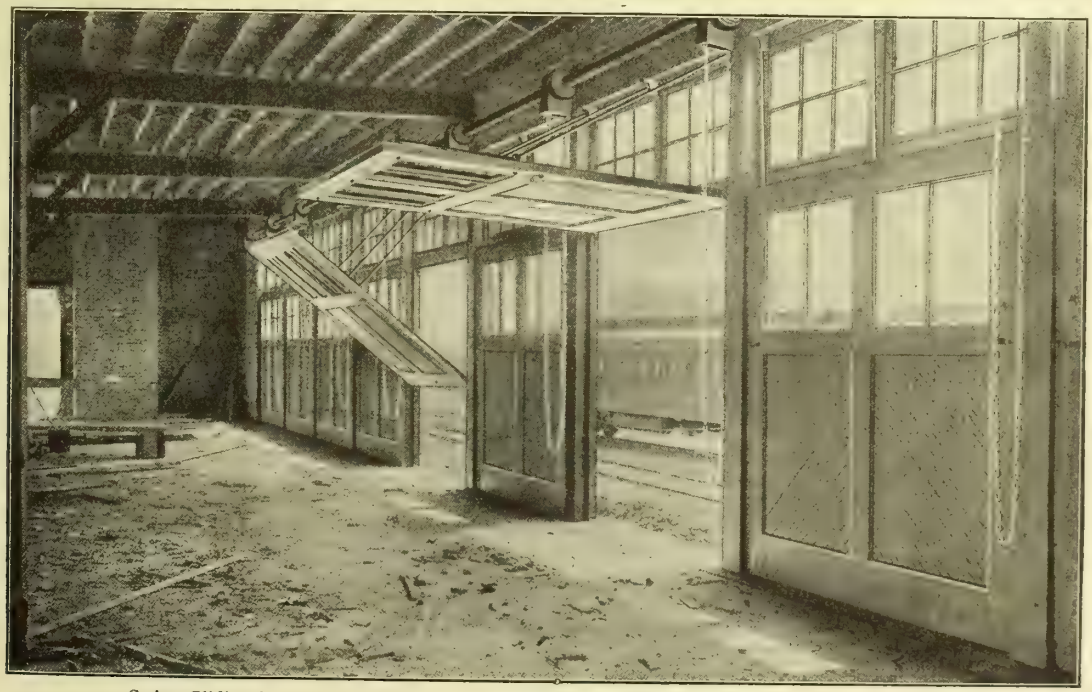
Swing Sliding Doors, Duquesne Freight Sheds, Pennsylvania Railroad, Pittsburg, Pa.
Fireproof and automatic action with fusible link attachment



Details of Construction of Adjoining Installation



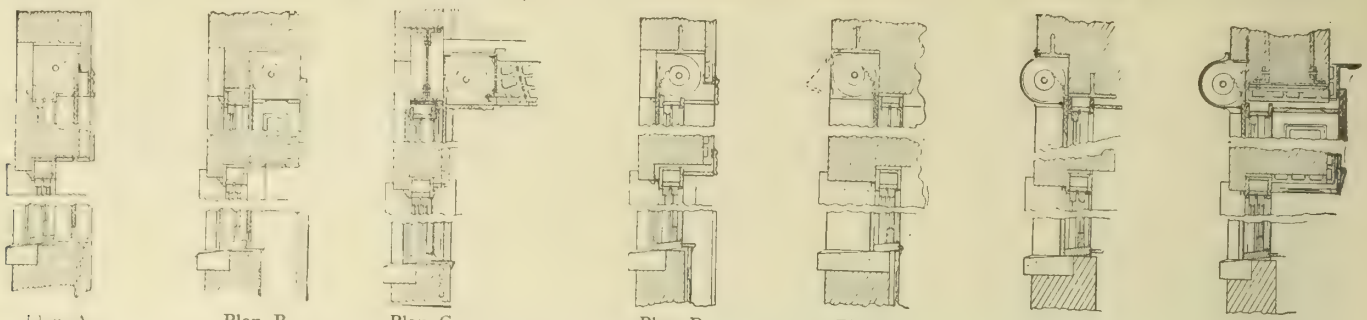
Elevation and Vertical Section of Garage Application of "Wilson" Swing Sliding Door
These doors can be opened and closed from either side, provision for this being made in various ways; i.e., one, by furnishing chain for outside operation or for both inside and outside; two, by bevel gear passing through wall for operation on either side
Necessary locking arrangements are provided



Swing Sliding Doors in Freight Shed of Chicago & North Western R. R. Co., Madison, Wis.

PLATE VI. TYPICAL INSTALLATIONS AND DETAILS, SHOWING CONSTRUCTION OF "WILSON" SWING SLIDING DOORS
These doors are highly indorsed for Warehouse, Dock, Garage and other Industrial Building Applications. For other recommendations for Garage Doors, see third page preceding

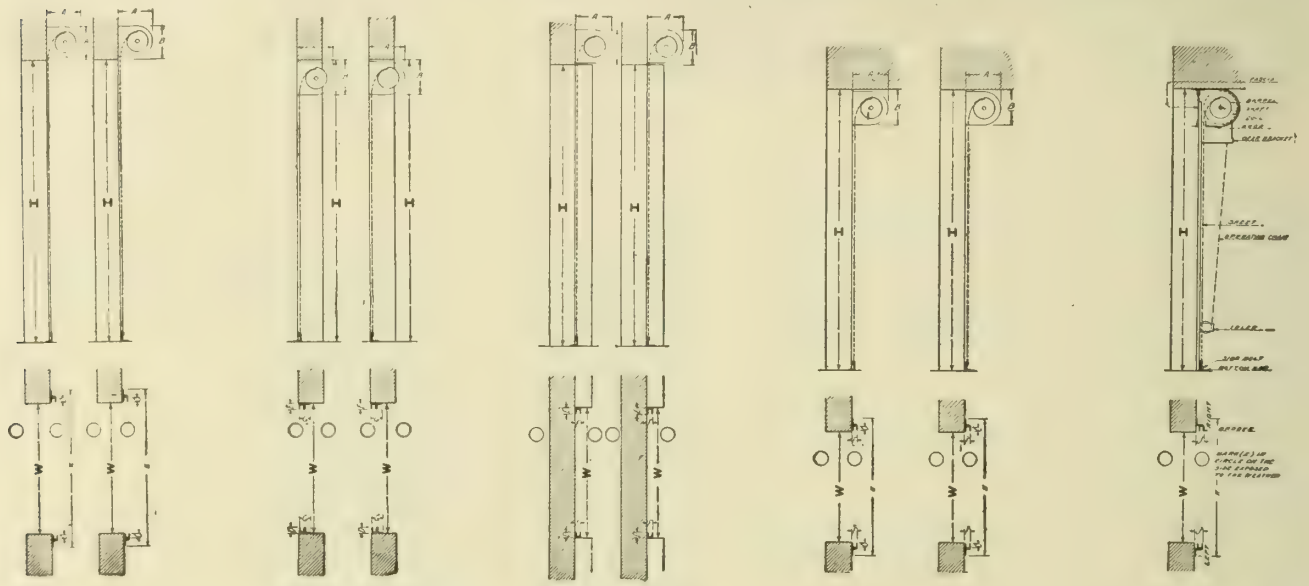
Continued on next page



Plan A Plan B Plan C Plan D Plan E Plan F Plan G

DETAILS, SHOWING VARIOUS METHODS OF INSTALLING ROLLING SHUTTERS IN WINDOWS

In ordering specify "Plan" Letter and state whether shutters are to be fastened to wood, brick, stone, concrete or iron construction



No. 1 No. 1A No. 2 No. 2A No. 12 No. 12A No. 21 No. 21A

DIAGRAMS SHOWING METHODS OF APPLYING ROLLING DOORS

NOTE—The only difference between "Plan" Nos. 1 and 1A, "Plan" Nos. 2 and 2A, etc., is in the direction the heavy angle bar at bottom of door faces. State preference in this respect when ordering; also dimensions W and H, and whether the parts are to be fastened to wood, brick, stone, concrete, or iron construction.

SECTIONAL DETAIL SHOWING ELEMENTS OF "WILSON" ROLLING DOORS AND SHUTTERS

STANDARD DIMENSIONS IN INCHES OF VARIOUS SIZES "WILSON" ROLLING DOORS AND SHUTTERS*

Height Ft.	Width 3′-0″ to 6′-0″ Operated Direct By Hand							Width 3′-0″ to 6′-0″ Operated by Gear							Width 6′-0″ to 10′-0″ Operated Direct By Hand							Width 6′-0″ to 10′-0″ Operated by Gear						
	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Corrugated Rolling Steel Doors																												
6	13	15½	1¼	1½	1½	1½	3								13	15½	1¼	1½	1½	1½	3							
8	14	16½	1½	1½	1½	1½	3								14	16½	1½	1½	1½	1½	3							
10	15	17½	1½	1½	1½	1½	3								15	17½	1½	1½	1½	1½	3	15	17½	1½	2	3½	1½	3½
12	17	19½	1½	1½	1½	1½	3	17	19½	1¼	2	3½	1½	3½	17	19½	1¼	2	3½	1½	3½	17	19½	1¼	2	3½	1½	3½
14	18	20½	1¼	1½	1½	1½	3	18	20½	1½	2	3½	1½	3½	18	20½	1½	2	3½	1½	3½	18	20½	1½	2	3½	1½	3½
16								20	22½	1½	2	3½	1½	3½	20	22½	1½	2	4	1½	3½	20	22½	1½	2	4	1½	3½
18								21	23½	1½	2	3½	1½	3½	21	23½	1½	2	4	1½	3½	21	23½	1½	2	4	1½	3½
Interlocking Slat No. 1 Rolling Steel Doors																												
6	13	15½	1½	2¼	2¼	1½	3¼								13	15½	1½	2¼	2¼	1½	3¼							
8	14	16½	1½	2¼	2¼	1½	3¼								14	16½	1½	2¼	2¼	1½	3¼							
10	15	17½	1½	2¼	2¼	1½	3¼								15	17½	1½	2¼	2¼	1½	3¼	15	17½	1½	2¾	4	1½	3¾
12	18	20½	1½	2¼	2¼	1½	3¼	18	20½	1½	2¾	4	1½	3¾	18	20½	1½	2¼	2¼	1½	3¼	18	20½	1½	2¾	4	1½	3¾
14	20	22½	1½	2¼	2¼	1½	3¼	20	22½	1½	2¾	4½	1½	3¾								20	22½	1½	2¾	4½	1½	3¾
16								22	24½	1½	2¾	4½	1½	3¾								22	24½	1½	2¾	4½	1½	3¾
18								23	25½	1½	2¾	4½	1½	3¾								23	25½	1½	2¾	4½	1½	3¾
Interlocking Slat No. 2 Rolling Steel Doors																												
6	12	14½	1½	1½	1½	1½	3								12	14½	1½	2¼	2¼	1½	3							
8	13	15½	1½	1½	1½	1½	3								13	15½	1½	2¼	2¼	1½	3							
10	14	16½	1½	1½	1½	1½	3								14	16½	1½	2¼	2¼	1½	3	14	16½	1½	2	3½	1½	3½
12	16	18½	1½	1½	1½	1½	3	16	18½	1½	2	3½	1½	3½	16	18½	1½	2	3½	1½	3½	16	18½	1½	2	3½	1½	3½
14	17	19½	1½	1½	1½	1½	3	17	19½	1½	2	3½	1½	3½	17	19½	1½	2	3½	1½	3½	17	19½	1½	2	3½	1½	3½
16								20	22½	1½	2	4	1½	3½	20	22½	1½	2	4	1½	3½	20	22½	1½	2	4	1½	3½
18								21	23½	1½	2	4	1½	3½	21	23½	1½	2	4	1½	3½	21	23½	1½	2	4	1½	3½
Rolling Wood Doors																												
6	15	23	1¼	2¼	2¼	4	4½								15	23	1¼	2¼	2¼	4	4½							
8	16	24	1¼	2¼	2¼	4	4½								16	24	1¼	2¼	2¼	4	4½							
10	17	25	1¼	2¼	2¼	4	4½								17	25	1¼	2¼	2¼	4	4½	17	25	1¼	2¼	4	4	4½
12	18	26	1¼	2¼	2¼	4	4½	18	26	1¼	2¼	4	4	4½	18	26	1¼	2¼	2¼	4	4½	18	26	1¼	2¼	4	4	4½
14	19	27	1¼	2¼	2¼	4	4½								19	27	1¼	2¼	4	4	4½	19	27	1¼	2¼	4	4	4½
16															22	30	1¼	2¼	4	4	4½	22	30	1¼	2¼	4	4	4½
18															23	31	1¼	2¼	4	4	4½	23	31	1¼	2¼	4	4	4½
Salamander Rolling Doors																												
6	13	15½	1½	2¼	2¼	1½	3½								13	15½	1½	2¼	2¼	1½	3½							
8	14	16½	1½	2¼	2¼	1½	3½								14	16½	1½	2¼	2¼	1½	3½							
10	15	17½	1½	2¼	2¼	1½	3½								15	17½	1½	2¼	2¼	1½	3½	15	17½	1½	2¼	6	4	4½
12	18	20½	1½	2¼	2¼	1½	3½	18	20½	1½	2¼	6	4	4½	18	20½	1½	2¼	2¼	1½	3½	18	20½	1½	2¼	6	4	4½
14	20	22½	1½	2¼	2¼	1½	3½	20	22½	1½	2¼	6	4	4½								20	22½	1½	2¼	6	4	4½
16								22	24½	1½	2¼	6	4	4½								22	24½	1½	2¼	6	4	4½
18								23	25½	1½	2¼	6	4	4½								23	25½	1½	2¼	6	4	4½

Height Ft.	Width 6′-0″ to 10′-0″ Operated Direct By Hand							Width 6′-0″ to 10′-0″ Operated by Gear							Width 10′-0″ to 15′-0″ Operated Direct By Hand							Width 10′-0″ to 15′-0″ Operated by Gear							Width 15′-0″ to 20′-0″ Operated by Gear						
	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Corrugated Rolling Steel Doors																																				
6															13	15½	1¼	2¼	2¼	2⅜	3								14	16½	2	3	4½	2⅜	3½
8															14	16½	1½	2¼	2¼	2⅜	3								15	17½	2	3	4½	2⅜	3½
10															15	17½	1¼	2¼	2¼	2⅜	3	15	17½	1½	2⅝	4	2⅜	3½	16	18½	2½	3½	5	2⅜	3½
12																						17	19½	1½	2⅝	4	2⅜	3½	18	20½	2½	3½	5	2⅜	3½
14																						18	20½	1½	2⅝	4	2⅜	3½	19	21½	2½	3½	5	2⅜	3½
16																						20	22½	1½	2⅝	4½	2⅜	3½	20	22½	2½	3½	5	2⅜	3½
18																						21	23½	1½	2⅝	4½	2⅜	3½	21	23½	2½	3½	5	2⅜	3½
Interlocking Slat No. 1 Rolling Steel Doors																																				
6															13	15½	1½	2¼	2¼	1½	3¼								14	16½	2	3	4½	1½	3¼
8															14	16½	1½	2¼	2¼	1½	3¼								15	17½	2	3	4½	1½	3¼
10															15	17½	1½	2¼	2¼	1½	3¼	15	17½	1½	2¾	4	1½	3¾	16	18½	2½	3½	5	1½	3¾
12																						18	20½	1½	2¾	4	1½	3¾	18	20½	2½	3½	5	1½	3¾
14																						20	22½	1½	2¾	4½	1½	3¾	20	22½	2½	3½	5	1½	3¾
16																						22	24½	1½	2¾	4½	1½	3¾	22	24½	2½	3½	5	1½	3¾
18																						23	25½	1½	2¾	4½	1½	3¾	23	25½	2½	3½	5	1½	3¾
Interlocking Slat No. 2 Rolling Steel Doors																																				
6															12	14½	1½	2¼	2¼	1½	3								13	15½	2	3	4½	1½	3½
8															13	15½	1½	2¼	2¼	1½	3								14	16½	2	3	4½	1½	3½
10															14	16½	1½	2¼	2¼	1½	3	14	16½	1½	2¾	4	1½	3½	15	17½	2½	3½	5	1½	3½
12																						16	18½	1½	2¾	4	1½	3½	17	19½	2½	3½	5	1½	3½
14																						17	19½	1½	2¾	4	1½	3½	18	20½	2½	3½	5	1½	3½
16																						20	22½	1½	2¾	4½	1½	3½	20	22½	2½	3½	5	1½	3½
18																						21	23½	1½	2¾	4½	1½	3½	21	23½	2½	3½	5	1½	3½
Rolling Wood Doors																																				
6															15	23	1¼	2¼	2¼	4	4½															
8															16	24	1¼	2¼	2¼	4	4½															
10															17	25	1¼	2¼	2¼	4	4½	17	25	1¼	2¼	4	4	4½								
12															18	26	1¼	2¼	2¼	4	4½	18	26	1¼	2¼	4	4	4½								
14																						19	27	1¼	2¼	4	4	4½								
16																						22	30	1¼	2¼	4	4	4½								
18																						23	31	1¼	2¼	4	4	4½								
Salamander Rolling Doors																																				
6															13	15½	1½	2¼	2¼	1½	3½								13	15½	1½	2¼	6	4	4½
8															14	16½	1½	2¼	2¼	1½	3½								14	16½	1½	2¼	6	4	4½
10															15	17½	1½	2¼	2¼	1½	3½	15	17½	1½	2¼	6	4	4½	15	17½	1½	2¼	6	4	4½
12																						18	20½	1½	2¼	6	4	4½	18	20½	1½	2¼	6	4	4½
14																						20	22½	1½	2¼	6	4	4½	20	22½	1½	2¼	6	4	4½
16																						22	24½	1½	2¼	6	4	4½	22	24½	1½	2¼	6	4	4½
18																						23	25½	1½	2¼	6	4	4½	23	25½	1½	2¼	6	4	4½

* Dimensions given in this table are recommended standard sizes, subject to modification.

Continued on next page

Brief List of Representative "Wilson" Installations.

"Wilson" Corrugated Rolling Steel Shutters

United States Government, Balboa, Panama
Corporation of Accrington, Liverpool, England
Public Hall, LaPaz, Bolivia
Sunlight Wharf, Lever Brothers Soap Works, London, England
Piers Nos. 9 and 35, San Francisco, California
Crucible Steel Company of America, Harrison, N. J.
Scoville Manufacturing Company, Waterbury, Conn.
Baltimore & Ohio Railroad Co., Pier 21, New York, N. Y.
Yasukawa Electrical Machinery Mfg. Co., Japan
State Hospital for the Insane, Columbia, S. C.
Seaboard Air Line Railway Co., Portsmouth, Va.
Ford Motor Company, Washington, D. C.
British Admiralty, Devonport Dock Yards, London, England
The Young & Vann Supply Company, Birmingham, Ala.
United States Government, Pontoon Shed, West Point, N. Y.
Louisville & Nashville Railroad Co., Lewisburg, Tenn.
Clover Leaf Milling Company, Buffalo, N. Y.
Southern Railway Co., Spartansburg, S. C.
Philadelphia & Reading Railroad Co., Philadelphia, Pa.
Grand Trunk Railroad Co., Wind Mill Point, Montreal, Canada
American Ship Building Company, Cleveland, Ohio
United Railways of Havana, Cuba
Rockwood Sprinkler Company, Worcester, Mass.
Great Atlantic & Pacific Tea Company, Jersey City, N.J.
Colgate & Company, Jersey City, N. J.
National Sugar Refining Company, Yonkers, N. Y.
Automobile Club of America, New York, N. Y.
R. J. Reynolds Tobacco Company, Richmond, Va.
Imperial Tobacco Company, Richmond, Va.
Delaware, Lackawanna & Western Railroad Co., Hoboken, N. J.
Seattle Port Commission, Seattle, Wash.
Export Leaf Tobacco Company, Greenville, N. C.
Equitable Assurance Company, New York, N. Y.
Panama Railroad Co., Panama
Columbia Railway, Gas & Electric Co., Columbia, S. C.
Empire State Dairy Company, Brooklyn, N. Y.
Bethlehem Steel Company, South Bethlehem, Pa.
Atlantic Coast Line Railroad Co., Waycross, Ga.
Port Commission, Astoria, Ore.
Endicott Johnson Company, Lestershire, N. Y.
Western Sugar Refining Company, San Francisco, Cal.
International Harvester Company of New Jersey, Chicago, Ill.
Western Maryland Railroad Co., Baltimore, Md.
Freedom Oil Company, Pittsburgh, Pa.
Robert Gair Company, Brooklyn, N. Y.
American Iron & Steel Manufacturing Company, Lebanon, Pa.
Wichita Mill & Elevator Company, Wichita Falls, Tex.
New York State Railways, Rochester, N. Y.
National Lead Company, Port Richmond, N. Y.
Port of Havana Docks Co., Havana, Cuba
Toronto Railways Co., Toronto, Can.
Baer-Kaufmann Co., Pittsburgh, Pa.
Northern Pacific Railway Co., Seattle, Wash.
Norfolk & Southern Railway Co., Charlotte, N. C.
Pacific States Telephone Co., Portland, Ore.
Manate Sugar Company, Santiago, Cuba
Goodrich Rubber Company, Detroit, Mich.
General Electric Company, Schenectady, N. Y.
Eastman Kodak Co., Rochester, N. Y.
International Railways of Central America, Puerto Barrios, Guatemala
Fisher-Body Company, Detroit, Mich.
Dominion Tire Company, Berlin, Ontario, Can.
Northland Rubber Company, Buffalo, N. Y.
Logan-Gregg Company, Pittsburgh, Pa.
Department of Railways and Canals, Halifax, N. S.
Chattanooga Warehouse & Cold Storage Co., Chattanooga, Tenn.
Western Electric Company, Denver, Col.
Carnegie Steel Company, Baltimore, Md.
Delaware & Hudson Railroad Co., Green Island, N. Y.
Ontario Land Company, Philadelphia, Pa.
Carolina Terminal Company, Charleston, S. C.

"Wilson" Wood Rolling Doors

Lever Brothers Soap Works, Brussels, Belgium
Oregon-Washington Railroad & Navigation Co., Pilot Rock, Ore.
Baltimore & Ohio Railroad Co., Chicago, Ill.
Chicago, Rock Island & Pacific Railroad Co., Chicago, Ill.
Chicago, Burlington & Quincy Railroad Co., Beardstown, Ill.
Pennsylvania Railroad Co., Morrisville, Pa.
Baltimore & Ohio Railroad Co., Garrett, Ind.
Baltimore & Ohio Railroad Co., Cumberland, Md.
Canadian Pacific Railway, Schrieber, Can.
Pennsylvania Railroad Co., Olean, N. Y.
Mexican Railway, Vera Cruz, Mexico
New York, New Haven & Hartford Railroad Co., New Haven, Conn.
Oregon & Washington Railway Co., Argo, Wash.
Chicago, Rock Island & Pacific Railroad Co., Biddle, Ark.
Long Island Railroad Co., Morris Park, N. Y.
Pennsylvania Railroad Co., Pittsburgh, Pa.
Boston & Albany Railroad Co., Worcester, Mass.
Express Building, Union Station, Washington, D. C.

"Wilson" Swing Sliding Doors

New York Central & Hudson River Railroad Co., Weehawken, N. J.
Revillon Brothers Warehouse, Edmonton, Alta, Can.
Industrial Building, Baltimore, Md.
F. N. Burt Company, Ltd., Buffalo, N. Y.
Chicago, Burlington & Quincy Railroad Co., Galesburg, Ill.

"Wilson" Salamander Doors

B. Altman & Company, New York, N. Y.
Tiffany & Company, Inc., New York, N. Y.
Morgan Library, New York, N. Y.

THE ZAHNER METAL SASH & DOOR COMPANY

SUCCESSORS TO MONARCH METAL MANUFACTURING CO. OF KANSAS CITY, MO.

CANTON, OHIO

BRANCH OFFICES

NEW YORK, N. Y. BOSTON, MASS.

AGENTS IN ALL THE PRINCIPAL CITIES OF THE UNITED STATES

Products.

Manufacturers of Fireproof Doors in Steel, Bronze and Copper, Hollow Construction; Zahner Standard Jamb; Gunn's Sanitary Jamb; Gunn's Solid Metal Plaster Ground; Casings and Interior Trim, Office Partitions, Elevator Doors, Elevator and Stair Enclosures; Cold-Rolled Steel, Bronze and Copper Mouldings of stock and special design; Picture Mouldings, Chair Rail and Baseboard; Double-Hung Steel Windows—all approved by the National Board of Underwriters.

Construction of Fireproof Doors.

No bolts, rivets or screws are used. The stiles and rails are cold-pressed from No. 18-gauge patent level furniture steel, then cut to lengths, and ends are accurately squared. The reinforcing steel channel strip is then welded into the stiles, the sound-deadening cork compound inserted, and the panel holder and mould clinch welded into both stiles and rails.

Panels are made of two sheets of No. 18-gauge steel placed ¼ inch apart, the space between being filled with solid asbestos. Panels are inserted into the panel holder, and then stiles and rails are permanently welded together, the door being completed by springing the panel mouldings into place.

Zahner Bronze Doors differ slightly in construction from the Steel Doors, and details will be furnished on request.

Advantages.

Since no bolts, rivets or screws are used, and all joints are welded, the Zahner Fireproof Door becomes one solid piece of steel which will not warp, bend or disintegrate in the presence of heat. The cork and asbestos fillers positively deaden vibration and render the door entirely sound-proof.

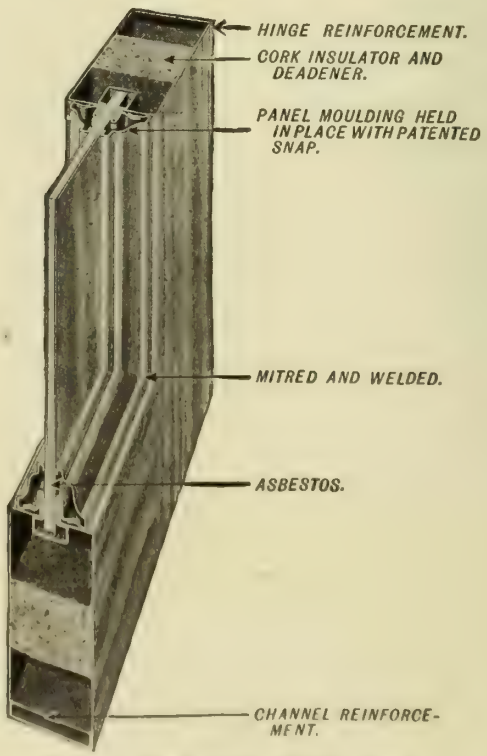
Zahner doors are the only hollow metal doors which permit the use of glass panels without alteration of the standard construction of the door, and the only metal doors in which the panel arrangement, or design, is practically unlimited.

Zahner Bronze Doors have the same massive effect and practically the same finish; the same durability as the cast-bronze type, and cost very much less.

Finish.

Zahner doors are finished in an absolutely correct imitation of any wood, including the difficult Circassian Walnut and Mahogany. These finishes consist of five priming and two finishing coats, each separately baked on and rubbed down. We have a special metallic finish in plain colors which we strongly recommend for doors to be used in theaters and other public places where they are subjected to heavy traffic.

It is practically impossible for an uninformed person to tell whether a Zahner door is wood or steel.



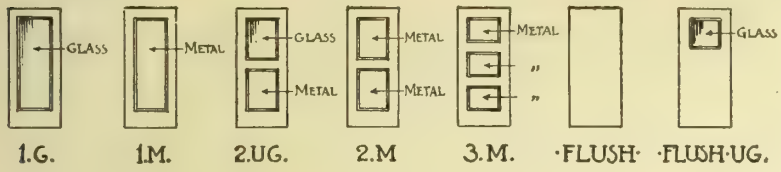
DETAIL OF ZAHNER STEEL DOOR

WEB CATALOGUE

Continued on next page

Styles.

We manufacture all types of doors. Panels may be arranged in any number or size, either of steel or glass. We specialize on a flush panel door with sanitary jambs, which offers the best fireproof and sanitary construction now on the market, for use in hospitals, schools, and hotels.



A FEW OF ZAHNER'S DESIGNS

Hardware.

Hardware is not included in our quotations except upon request, but is applied free of charge if delivered to us f.o.b. our factory. Hardware of any kind or style can be attached to our doors. Templates or samples of same must be in the factory before work can be started on an order.

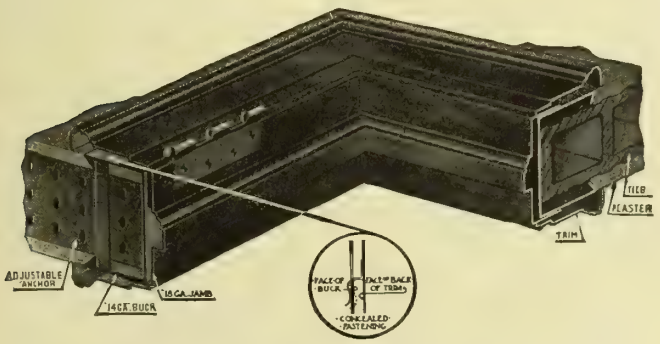
Jambs and Casings.

Zahner standard jamb construction consists of three distinct units; viz., a one-piece No. 14-gauge, double-annealed steel buck with anchors, the No. 18-gauge cold-drawn steel jamb proper, and the No. 18-gauge cold-drawn trim moulding. The buck is delivered in one piece with corners welded, and is set up in the door opening and the wall built into it, so that the buck is practically part of the partition itself. The bucks are furnished with special anchors, so that they can be set several inches below finished floor, thus assuring a solid anchorage to the floor construction.

When the building is so far advanced that no work is being done which would mar the finished door, the jamb proper is applied *over* the buck and attached thereto by means of machine screws, the heads of which are afterwards hidden by the trim.

No screws are used to fasten the trim moulding. Instead, our patent concealed fastener is employed, the trim moulding being simply sprung into place, making a positive, permanent lock, and resulting in a neat, clean appearance impossible to secure when screws are used.

Ample reinforcements are provided for butts and lock strike plate.



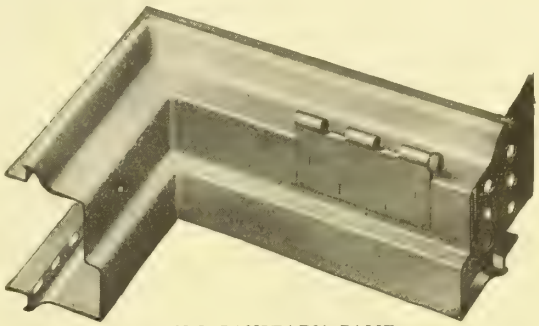
DETAILS OF ZAHNER STANDARD JAMB

Trim corners are accurately mitered and process is welded. When desired, the jamb can be applied to wood buck or channel iron frames furnished by others, and trim attached with screws or our special concealed fastening device.

Gunn Sanitary Jamb.

The best jamb ever devised for use in hospitals, infirmaries, hotels, schools and other buildings in which sanitary conditions are imperative. It is constructed of one piece of steel, and has no crevices in which dirt can lodge and bacteria thrive.

This jamb eliminates bucks and lintels, and makes a perfect bond without cracking.



GUNN SANITARY JAMB

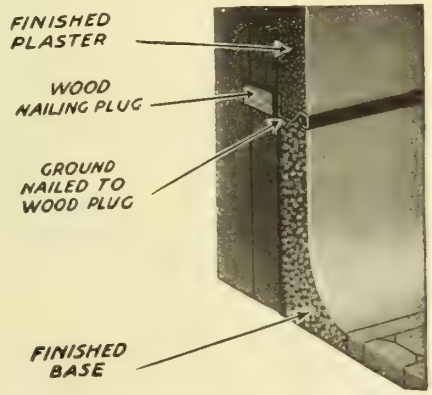
Gunn Solid Metal Plaster Ground.

The two materials used for wall finish and base respectively differ widely in chemical composition, and contact between them leads to chemical reactions which in time destroy the entire wall finish.

This plaster ground is made from a solid piece of cold-drawn steel, and, through its patented shape, insures a perfect plaster clinch without the use of openings of any kind.

Perfect separation is obtained with the Gunn Ground, yet there is a permanent union between the plaster and the base, due to the key formed by the shape of the ground above and below.

When secured in position by nailing to wood plugs inserted into the wall construction, and the wall is finished, the Gunn plaster ground becomes a permanent part of the building. It is absolutely rigid—will not kink, break or sag.



GUNN SOLID METAL PLASTER GROUND

Continued on next page

Mouldings—Interior Trim.

A choice can be had of a wide range of designs in solid drawn steel, bronze and copper mouldings for Picture Mouldings, Chair Rails, Baseboards and other Interior Trim. Loose leaf catalogue illustrating over 250 stock designs will be mailed on request. Special quotations on special designs requiring special dies.

Zahner Double-Hung Steel Windows.

Positively weatherproof, and will not bind, stick or rattle under any conditions.

Highest grade, most efficient double-hung window ever designed.

The different members used in the construction of the Zahner Window (with the exception of the jambs, head and sill) are of solid rolled steel. The jambs, head and sill are constructed of No. 14-gauge patent leveled furniture steel. All joints are process welded.

The head has double contact and double interlock steel to steel. Should any wind get through the first contact it would be trapped in the pocket formed between the contacts. Has the only interlocking meeting rail ever made, and therefore the only perfectly weatherproof meeting rail. This construction gives three positive contact points throughout the entire length of the rail.

Unlike any other meeting rail construction it is not necessary to cut the rail to admit hardware, so that full strength is always maintained and weathering qualities are not destroyed.

The exclusive Zahner adjustable parting strip is made of bronze and affords two even and positive contact points, which absolutely prevent binding and insure smooth, easy action always. This parting strip is adjustable by means of covered set screws, which set the stop of the runner guide tightly against the sash runner, totally eliminating any possible rattling and making an absolute weathering.

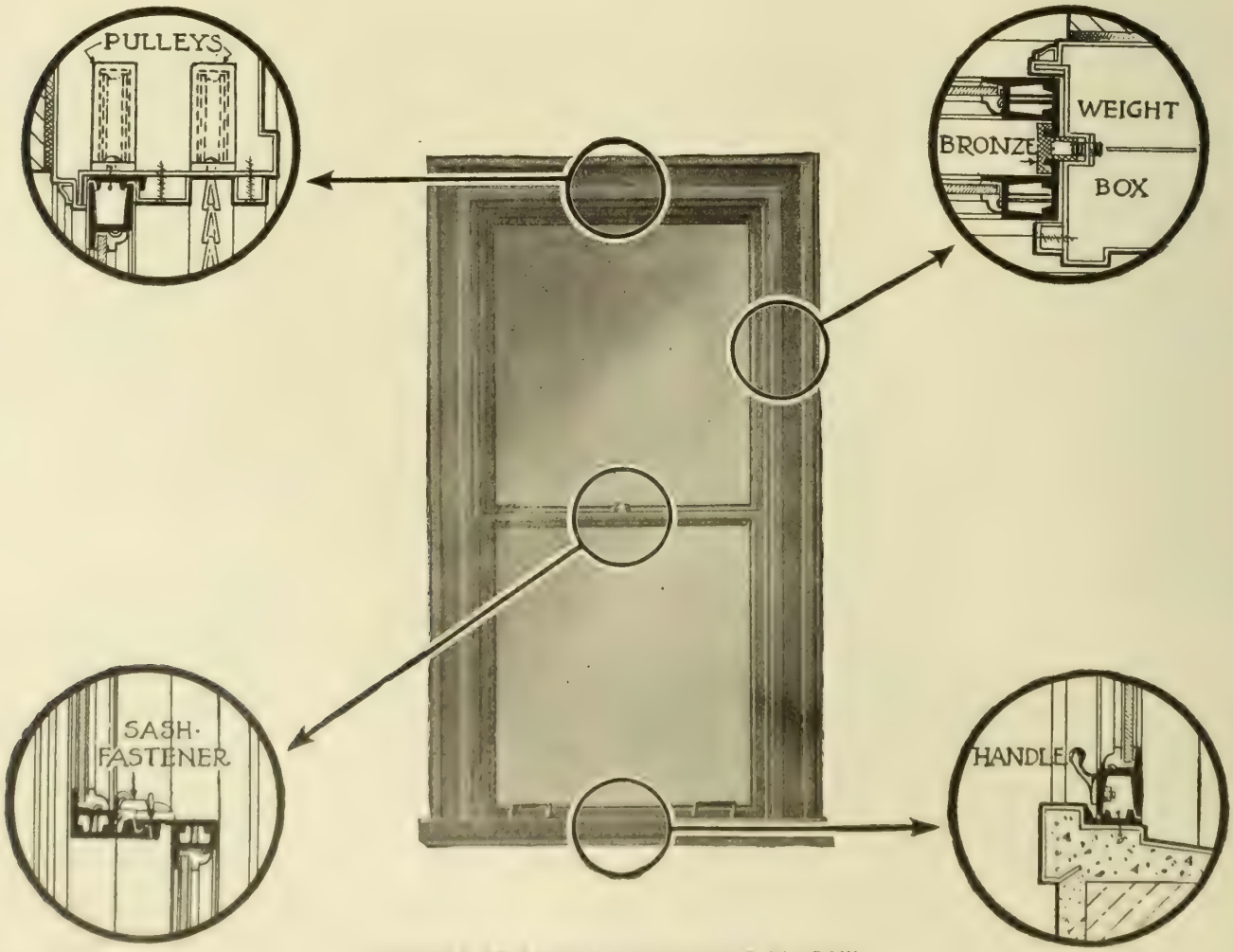
The sill is provided with two contact points similar to those at the head, with a corresponding pocket to serve as an air trap. There is absolutely no chance for drafts or rain to enter.

A specimen installation is the two and a quarter million dollar Oklahoma State Capitol, in which all exterior openings are equipped with Zahner Double-Hung Steel Windows.

Samples of all Zahner Products can be seen in the offices of our representatives.

Information.

Detail drawings and descriptive matter, or any other specific information concerning our products, will be furnished on request.



DETAILS OF ZAHNER DOUBLE HUNG WINDOW

Continued on next page

Zahner Steel Portable Partitions.

Rapidity of erection and removal and simplicity of construction are the distinguishing features of these partitions, and they give the maximum of fire-resistance.

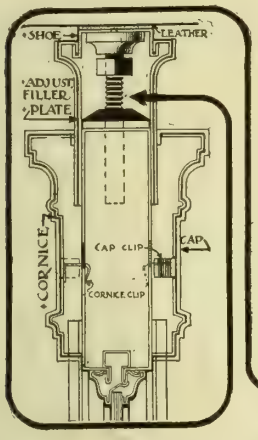
Apart from the anchoring devices, the construction is similar to that employed in making Zahner hollow steel doors, which fact guarantees their durability and appearance.

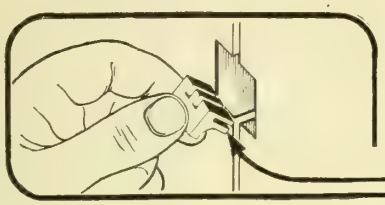
The construction, as shown below, is such that these partitions can be erected or removed quicker than any other partitions on the market, and their use leaves floors, walls and ceilings absolutely without defacement. Nails and screws are eliminated.

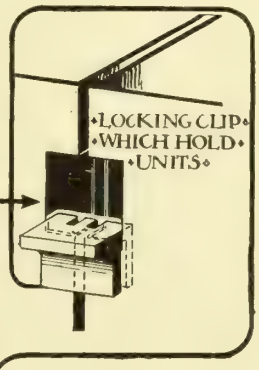
The top and bottom respectively of each upright is provided with a ½-inch special machine bolt working in a threaded plate attached to the main upright member. The outer ends of the bolts work against shoes which are faced with leather to prevent marking of the floor and ceiling.

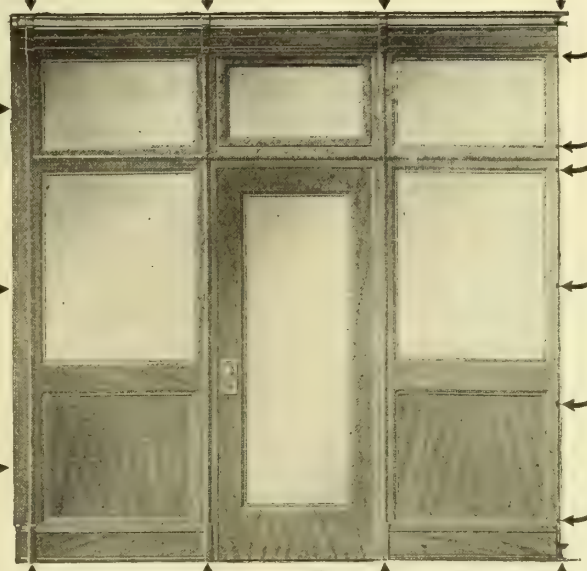
The level of the partition is first established by the end wall connections. This level is maintained throughout the partition, and the whole is securely anchored in place by means of these adjustable bolts in the uprights.

In the sketch in the center are shown three units assembled. The level has been established by the upright against the side wall on the left and the upright securely anchored. The first unit is then attached to the end upright by means of the clips, shown in the two illustrations on the upper right. These clips are spaced center to center, and secure the units perfectly. The door unit with glass transom is next attached and adjusted, and so on. Any inequalities in the distance from the floor to the bottom of the upright, due to adjustment, are compensated by the sliding base. At the top this is taken care of by a filler plate.

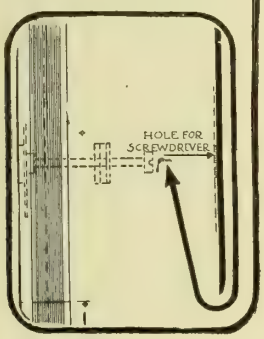


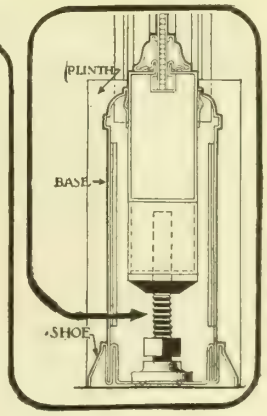






The end uprights of each partition are provided with machine screws, as shown in the detail drawing. When the upright is set up against the side wall and the level has been established (as described further on), the screws are adjusted by means of a screw-driver through the hole indicated for that purpose. The screws do not come in contact with the wall; they work inside of the upright. This adjustment equalizes any unevenness in the uprights. The screw-driver holes are covered by our concealed-fastener capping mould.





DETAILS OF ZAHNER STEEL PORTABLE PARTITIONS

Furnished in any combination of glass and steel panels and in any finish.

Metallic finish recommended as most suitable for this work.

Partition held rigid by anchoring devices and steel construction.

Cornice, sliding base and concealed-fastener capping mouldings highly finished, equal to any hardwood finish.

Unit-connecting clips are machined from solid steel blanks and hold the sections securely together. The small hole left just above the clip is used for the insertion of the fastening snaps of our patented capping mould.

Complete descriptive matter, with drawings, will be furnished on request.

THE RIESTER & THESMACHER COMPANY

"R & T" Fireproof Windows and Doors
Sheet Metal and Fireproof Specialists

1512-1526 West Twenty-Fifth Street
CLEVELAND, OHIO

Products.

We manufacture the "R & T" Fireproof Windows and Doors; Fireproof Metal Windows of all types; Standard Tin Clad Doors; Hollow Steel Doors; Corridor Partitions; Metal Trim; Skylights; Cornices and Sheet Metal Construction in Tin, Copper and Iron, for all Architectural and Building Purposes.

Also, Spun Metal Parts for Cornices, etc.

Underwriters' Approved Construction.

"R & T" Fireproof Windows and Doors are made under the supervision of the Underwriters' Laboratories and bear their label. This label guarantees, *first,* that the product to which it is attached is constructed to comply with the standard requirements of the National Board of Fireproof Underwriters; *second,* that it has been submitted to the severest test by the Laboratories and passed as satisfactory; *third,* that every labeled "R & T" Door or Window installed in any part of the country is equal in every respect to those which withstood the test of the Underwriters' Laboratories.

Every door and window bearing this label is separately inspected and compared with the original specifications by the Underwriters' inspectors in our plant before shipment. These inspectors then notify the Underwriters' representatives in the territory in which the window is to be installed.

NEW MUNICIPAL HIGH-PRESSURE PUMPING STATION, CLEVELAND
Main Entrance, Windows, Doors, Metal Ceiling and Ventilating Systems are all of "R. & T" Fireproof Construction

Types of Doors and Windows.

In addition to all standard types, we are equipped to build special types of fireproof doors and windows to meet special requirements (see paragraph headed "Estimates").

Hollow Metal Doors—Construction.

These are constructed of No. 18 cold-rolled steel, patent leveled. The interior surface is protected by a heavy coat of paint before assembling. The frame-members are held together by an interlocking joint which is electrically welded without screws or bolts, making the frame practically one piece of metal. The styles are so reinforced as to be almost indestructible.

"R & T" FIREPROOF DOOR
Grained Finish

Fireproof Windows.

No. 22-gauge galvanized iron is used for the frame and No. 24-gauge for the sash. Every window is built exactly to dimensions and is rigid, solid and tight enough to suit the most exacting and yet work easily. (See also cross-section). Our patented "Sure-Shot" pivoted top and bottom lock of our design is a feature of special value. Wire glass is furnished in all styles approved by the Underwriters, and is inspected by our own examiners before shipment. Hammered, ribbed, polished or maze glass is furnished as specified.

"R & T" FIREPROOF VESTIBULE
As installed throughout National Electric Lamp Association Buildings, Nela Park, Cleveland

Continued on next page

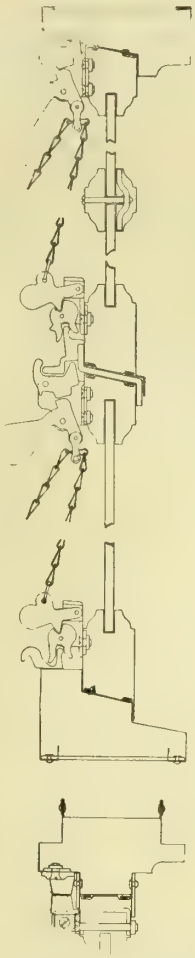
Installation.

"R & T" Windows and Doors can be installed by any contractor without previous experience. Where desired and the contract is large enough to warrant it, we are glad to figure on the installation as well.

Finish.

"R & T" Doors, after assembling, are thoroughly cleaned before enameling. Each door is given six or eight coats of enamel, baked on. If desired, this is then grained to match any sample of interior finish.

"R & T" Windows are made with a moulding on the outside to enhance the appearance of the building. Where specified, they are grained to match any finish desired, or given a baked-on enamel in any color. All windows are shipped with a priming coat of paint on the outside and inside, whether specified or not.



CROSS-SECTION SHOWING WEATHERPROOF CONSTRUCTION OF PIVOTED SASH AND "SURE-SHOT" LOCK

Hardware.

The purchaser of "R & T" Doors is allowed to select the style and make of hardware. To insure quick delivery, samples or templates of hardware desired must be delivered to us with the order, as we fit and provide reinforcements for all hardware before finishing. Specify that machine screws of suitable size be furnished.

Estimates.

To give estimates of cost, we need the type of windows or doors wanted, the number of openings, kind of glass wanted, and blue-prints or drawings, giving us the dimensions and styles of openings. In place of the blue-prints or drawings, you can send the following measurements:

Doors—Height of opening from floor to lintel or arch; height of lintel, width of opening; thickness of wall; headroom above opening.

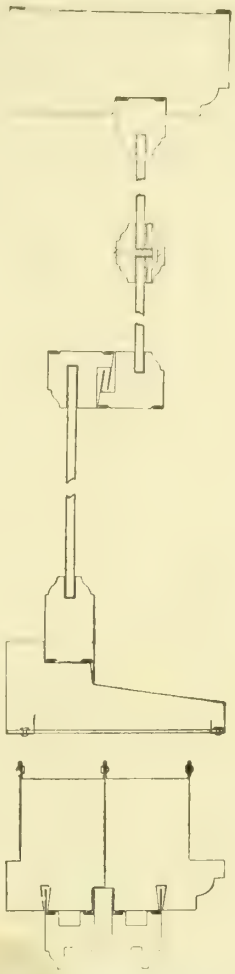
Windows—Width of opening between walls; height of opening between sill and lintel or arch; rise of arch; thickness of wall.

Facilities.

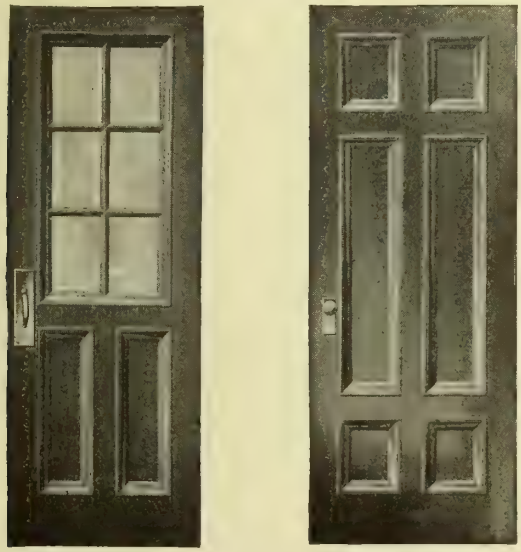
Backed by two large plants with a total of 100,000 feet of floor space and a large and efficient force of draughtsmen and metal workers, we can fill orders of any size promptly, and practically guarantee date of delivery. Every co-operation is offered architects, contractors and owners.

Catalogues and References.

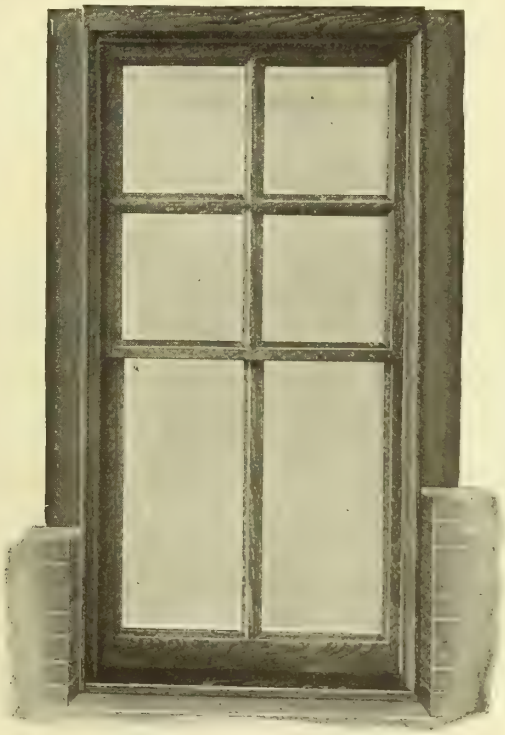
We offer two brief but comprehensive catalogues containing full working drawings and all necessary data on "R & T" Fireproof Doors and "R & T" Fireproof Windows respectively. We are always glad to furnish, at your request, full references from past customers as to quality and service. Correspondence on all sheet-metal questions solicited.



CROSS-SECTION SHOWING WEATHERPROOF CONSTRUCTION OF DOUBLE-HUNG AND COUNTER-BALANCING SASH



TWO TYPES OF "R & T" FIREPROOF DOORS



STANDARD DOUBLE-HUNG METAL WINDOW

DAHLSTROM METALLIC DOOR COMPANY

CABLE ADDRESS:
"DAHLSTROM, JAMESTOWN"

EXECUTIVE OFFICES AND FACTORIES
JAMESTOWN, N. Y.

BRANCH OFFICES OR REPRESENTATIVES IN PRINCIPAL CITIES

Products.

Manufacturers of HOLLOW METAL DOORS and all parts of BUILDING TRIM in STEEL, IRON, BRASS or BRONZE, including everything required for the *completion* of the Interior Fireproofing of the better classes of buildings, in any design according to Architects' details.

COLD-DRAWN METAL MOULDINGS and PRESSED SHAPES for ORNAMENTAL IRON WORK, BANK FIXTURES, COUNTER SCREENS, ELEVATOR and STAIR HALL ENCLOSURES, SPECIAL WORK, etc.

TRADE-MARK

Experience and Facilities.

Pioneers of and Leaders in the Hollow Metal Fireproof Door and Trim Industry.

Operating the largest plant in the world devoted exclusively to the manufacture of products enumerated above with ample space for the employment of over a thousand men, our facilities are unequaled and abundant for all current demands.

Service and Co-operation.

Architects are invited to make use of the Dahlstrom Service. It is our desire to render such service and assist architects and owners in planning and arranging for the use of hollow metal doors and trim, especially where necessary to conform with Underwriters' requirements. The aim of this service is:

First—To obtain the most economical combination of artistic design with practical construction.

Second—To supply complete information regarding approved methods and best practice of the art, including full details and clear specifications covering each division of work.

Third—To furnish promptly a detailed estimate of cost of the contemplated work, based on accurate records of production costs in the various departments, eliminating guesswork.

Fourth—To submit for approval before fabrication, complete working details, each sheet showing the construction, assembling, marking, and detailed measurements of every part of the work, also showing the hardware selected to be fitted, and the class of finish desired for the work shown.

Fifth—To execute promptly in an efficient manner all orders to the satisfaction of the customer, and to insure delivery of work at the time required.

Sixth—When desired, the installation of the work in the building will be included in the contract. The work will then be carefully fitted and adjusted in place under the supervision of an experienced foreman, insuring satisfaction.

As Dahlstrom products are factory-finished and the different parts fitted and ready for assembling when delivered to the building, the work of installation will take a comparatively short time, and should not be undertaken until the rubbish is cleaned out. Time will be saved in the end, and there will be less danger of damage to finished work.

Seventh—Our interest in the hollow metal work furnished by us does not cease on completion of the contract. We are ready at any time to render further service, or to advise regarding the proper care and adjustment of the work.

DAHLSTROM HOLLOW METAL DOORS AND TRIM, MASTEN PARK HIGH SCHOOL, BUFFALO, N. Y.
LEISWEIS & JOHNSON, Architects

Specifications.

The complete specifications of hollow metal work consist of twenty-five or more subdivisions. By indicating the class of work under consideration, an architect will receive on request, complete specifications covering the different parts, including finish. We are also ready to offer suggestions for specifications covering any special features desired.

The following condensed specification may be used when a short form is sufficient:

SPECIFICATIONS OF DAHLSTROM HOLLOW METAL DOORS AND TRIM

Construction—Provide fireproof doors, partition sash, interior trim to exterior windows, metal partitions, picture moulding and other metal trim as indicated on drawings. All work shall be of hollow steel construction as built by the DAHLSTROM METALLIC DOOR COMPANY, with standard mouldings of design selected by architect, all to be of best quality cold-rolled, open-hearth steel plates.

Insulation—Panels to be doubled and insulated with suitable material between, making a resilient filling that is a non-conductor of heat; insert and properly fasten in the hollow stiles strips of cork of suitable width, for the purpose of reducing the metallic ring.

Paneling—Make proper formation of panels as per details by applying moulded cross rails securely welded to stiles by the oxy-acetylene process. All joints to be made entirely invisible.

Reinforcing—Doors and trim to be reinforced for all hardware as required, and at all vital points, to obtain perfect alignment and rigidity.

Sash Doors—Doors with glass panels shall be constructed in an approved manner of No. 18-gauge steel, and provided with detachable glass stop frames.

Jambs and Casings—All doors and sash to have cold-drawn steel jambs and casings of design as approved by architect. All miters to be process welded, to insure invisible and homogeneous joints.

Transoms, Stops, Etc.—Provide hollow steel sash, transom bars and stops for all sash and fanlight openings indicated on

Continued on next page

plans. Picture moulding, chair-rail and other trim to be of approved design.

Partitions—All partitions, shown on drawings to be of steel, shall be constructed in an approved manner, of No. 18-gauge metal, with all panels, doors, transoms or fanlights, sash and trim in accordance with design shown or approved by the architect.

Hardware—Hardware, glass and glazing not included in this contract. This contractor shall reinforce for all hardware, and apply such parts as will not interfere with the safe shipment of material (This contractor to apply all hardware in case he installs the work in building.) All hardware and templates of same as required shall be delivered to this contractor f. o. b. his factory.

Bucks—Bucks for all openings, whether wood or steel, shall be furnished and erected by others, but this contractor shall supply drawings for all bucks, and guarantee the accuracy of his details.

Details—Contractor for this work shall furnish all necessary drawings illustrating in detail its construction, and shall receive architect's O. K. before fabricating.

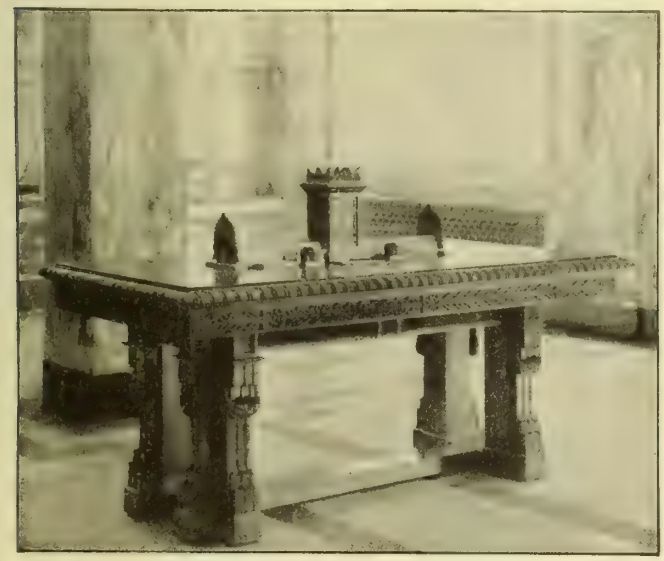
Samples—The contractor for this work shall furnish if requested such full-size models as may be required, to be used as standard for finish, design and construction of work under this contract.

Inspection—This contractor shall notify the architect at the time material is ready for inspection, or as he may designate, before material leaves the factory, and shall facilitate in every way inspection by the architect or his authorized representative.

Finish—After the work is made up, the metal is to be thoroughly cleaned from rust, grease or other impurities before enamel coating is applied. It shall then be coated at least six times, each coat to be baked in proper heat, insuring lasting qualities. Enamel is to be of any plain color, or stippled, or grained to match adjoining metal or woodwork, as selected by the architect. Graining is to be protected by two coats of varnish; the last coat to be rubbed to an eggshell gloss finish at factory, before shipment is made.

Bronze Work.

The Dahlstrom bronze doors and trim are made from heavy gauge cold-rolled bronze plates (not less than No. 14-gauge for stiles and rails of doors), and all construction plates and reinforcements within the doors are of hard brass. Architects' designs are carefully followed and all details executed in an artistic manner. Specifications and illustrations of standard designs furnished on request.

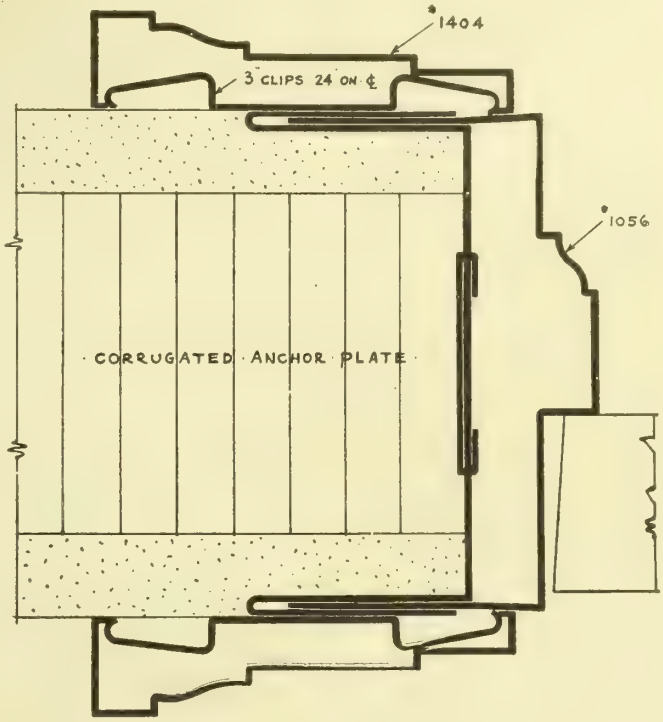


BRONZE CHECK DESK, OFFICE OF CINCINNATI AND SUBURBAN BELL TELEPHONE BUILDING, CINCINNATI, OHIO
HAKE & KUCK, Architects, Cincinnati, Ohio

Developments.

Among the many new improvements recently adopted the following may be of particular interest:

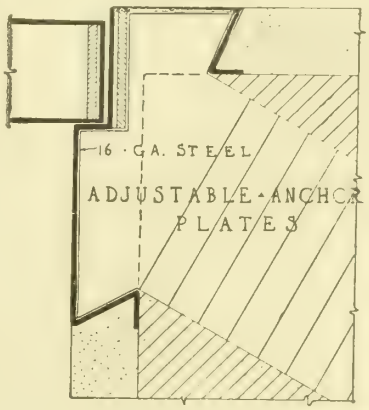
Finished, heavy metal unit frames, eliminating the use of separate bucks; simplified construction of metal partitions; three-point gravity lock and closing device, with or without panic bar attachment; oxy-acetylene seam welding, also electric butt and spot welding; concealed fastenings of casings and other trim; also the use of ingot rust-resisting iron plates for all work exposed to the elements, thus insuring longer life to such work.



DETAILS OF CONCEALED FASTENING OF TRIM
By this simplified and efficient method, casings or other trim are held rigidly in place without visible screws

Unit Frames.

The combination metal buck and jamb unit frames recently developed are economical and especially suited for hospital and school buildings. They are made of No. 13- or No. 16-gauge cold-rolled steel plates in standard or special forms, with anchor plates provided for securing to the partitions. Extended flanges serve as finish, and no casings are required, but can be used if desired. The corners are welded by the oxy-acetylene process, making rigid and tight joints that cannot open up.



SECTION OF SPECIAL UNIT FRAME

Hardware.

To facilitate quick delivery and avoid undue delay, we have obtained hundreds of samples of standardized hardware from different manufacturers, so that we can meet all ordinary demands for samples. Just let us know your selection, and we are almost sure to have a suitable model in our sample room from which your work can be fitted and time saved.

Continued on next page

Underwriters' Approval of Dahlstrom Doors.

The Dahlstrom doors have been tested and approved by the National Board of Fire Underwriters of Chicago, and by the British Fire Prevention Committee of London, England. The Building Departments of the larger cities in the United States have also given our work their approval.

Underwriters' Rules.

Fireproof doors are divided into three general classes, as follows:

(1) Doors for Stairs and Elevator or other vertical shafts through the building. Doors in this class must not exceed 48 inches in width for single and 72 inches for double doors and must be all metal. No wire glass can be used, and doors are to be equipped with approved three-point locks, checks and steel butts.

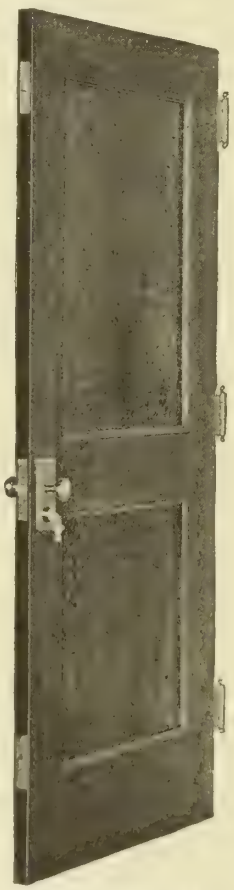
(2) Corridor and Partition Doors are not limited in size and wire glass panels can be used but must not exceed 9 square feet in area nor 48 inches in either dimension.

(3) Fire-Escape Doors and doors for openings in exterior walls, are limited to 48 x 96 inches for single and 72 x 96 inches for double doors. Wire glass panels are limited to 720 square inches in area and 48 inches in either dimension.

All glass must have a bearing of at least 5/8 inch, in grooves not less than 3/4 inch deep.

Three-Point Lock.

One of the requirements of the Board of Fire Underwriters is that swinging fire-doors must be locked at not less than three points, to prevent the doors from warping away from the frames in case of fire, which would allow the flames to pass through. The multiple gravity latch now perfected by us is another Dahlstrom product of unusual merit, entirely contained within the hollow metal door; knobs and escutcheons may be made to match other hardware, and the cylinders can be master-keyed by special arrangement, to the same system as the other locks in the building. This locking device is approved by the Underwriters' Laboratories, and a booklet with full description will be sent on request.



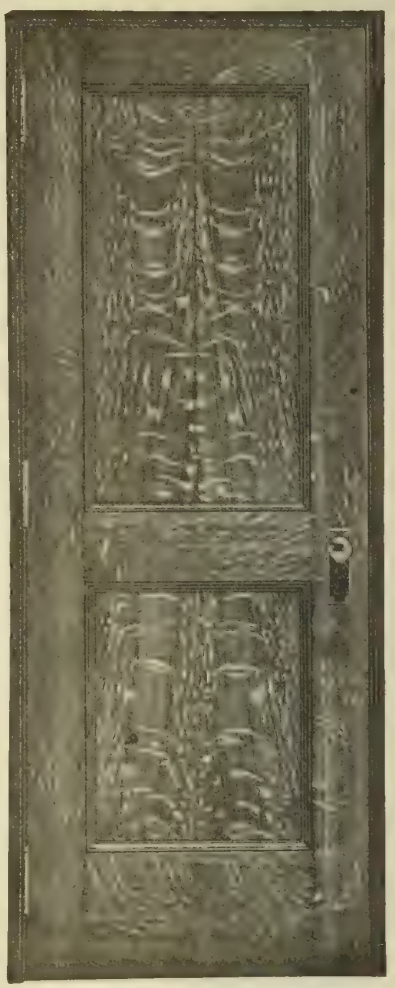
SWINGING FIRE DOOR WITH DAHLSTROM THREE-POINT LOCK

Panic Bar and Checking Device.

An improved panic bar can be furnished in connection with the three-point locking device; also a checking device, for use on automatically closing double doors, to prevent the service door from closing until the opposite door is in place in the opening. Both of these devices are Dahlstrom developments.

Finish.

The elegant finish for which the Dahlstrom products are noted is the result of the most careful selection of the ingredients used in the enamel, the chemical properties of which have been carefully tested for fine and lasting qualities. This chemical perfection of ingredients, together with expert workmanship and careful baking of each coat of the enamel, insures a durable, elastic finish that is satisfactory in every way. We reproduce in a perfect manner natural wood or metallic finishes in any color; and our plain color finishes can be made to harmonize with any decorative scheme desired.



STEEL DOOR FINISHED IN QUARTERED OAK

Classification of Finishes.

In order to make it clearly understood that the kind of finish called for will affect the prices for the goods, we append herewith a list of our standard classifications. The number after the class designation indicates the relative ratio of cost of different finishes; for instance, if class A costs $1.00, class B will cost $1.50, etc.

FINISHES CLASSIFIED

Class "A" 100%—Plain Colors, such as No. 10 Dark Green, No. 11 Dark Olive, No. 15 Maroon, No. 17 Chocolate, No. 19 Black, No. 30 Sea Green, No. 33 Dark Brown.

Class "B" 150%—Plain Colors such as No. 13 White, No. 18 Light Gray, also Cream, Light Blue and any light color except Carmine.

Class "C" 166 2/3%—Stippled Enamel such as No. 24 Copper Verde Antique, No. 26 Bronze Verde Antique, No. 28 Light Olive, No. 29 Slate, No. 32 Dark Tan.

Class "D" 190%—Grained Finishes such as No. 1 Light Mahogany, No. 2 Tuna Mahogany, No. 3 Dark Mahogany, No. 8 Dark Birch, and Cherry.

Class "E" 316 2/3%—Grained Finishes such as No. 4 Medium Oak, No. 5 Light Oak, No. 6 Dark Oak, No. 7 Circassian Walnut, No. 9 Light Ash, No. 31 Dark Circassian Walnut, Pine and Straight Oak.

Class "F" 350%—Stippled Bronzed such as No. 21 Light Bronzed, No. 22 Slate, No. 23 Copper Bronzed.

Class "G" 500%—Grained Finishes such as Fumed Oak, Silver Oak, Crotch Mahogany, Bird's-eye Maple, Australian Mahogany, Marble, Teak, also Rough Stippled and Dull Black.

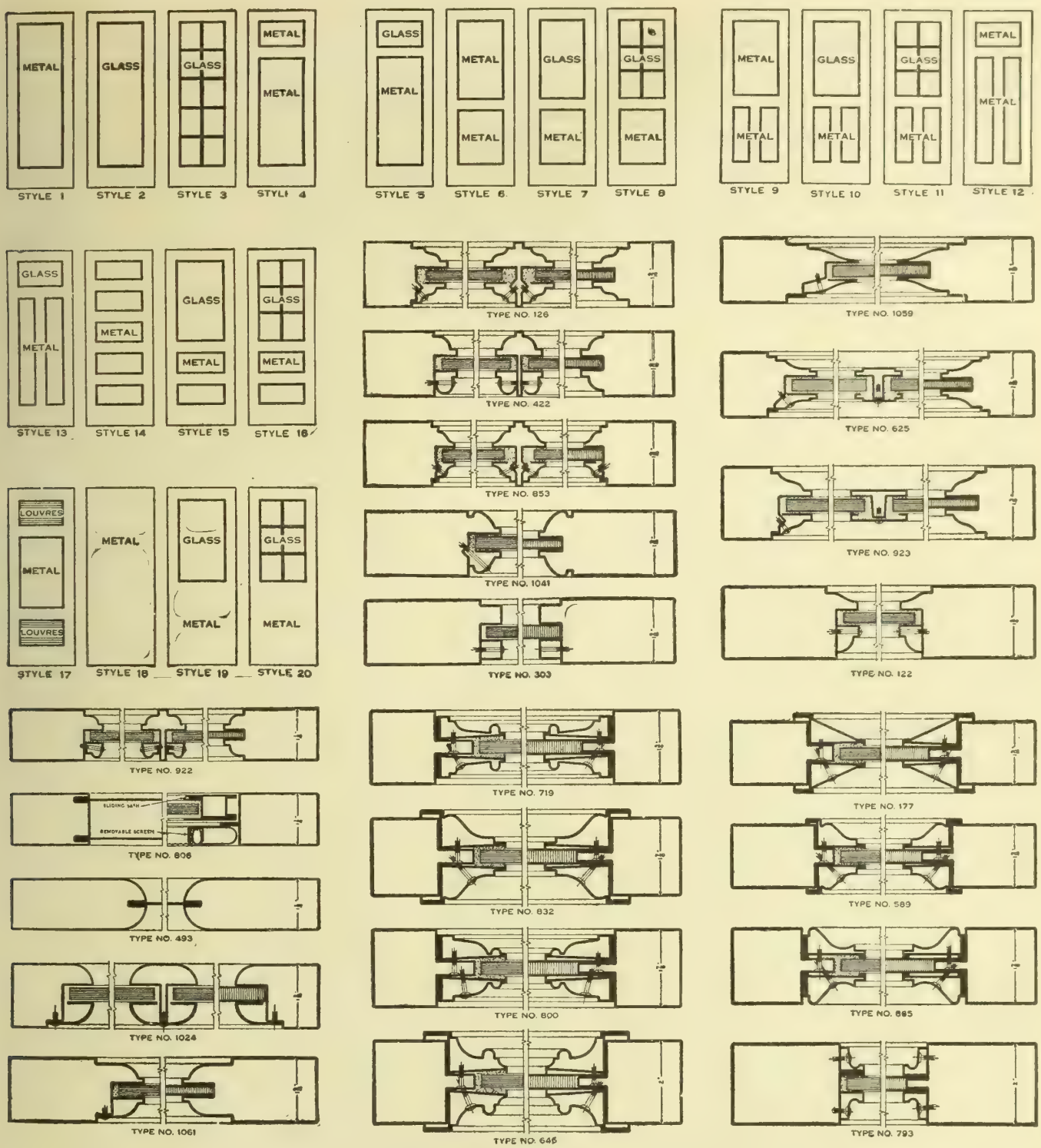
Slight variations of all shades are permissible.

Mouldings and Shapes.

The special features and advantages of the Dahlstrom line of cold-drawn metal mouldings and shapes are now so well known as to need no further comment. The collection is so large that it is impracticable to show same here, but a request will bring an indexed catalogue, or samples with full information.

Sweet's Catalogue

Continued on next page



TYPES OF DAHLSTROM HOLLOW METAL DOORS

Styles and Types of Doors.

The illustrations above show a number of general styles of doors, as well as standard and special types of panel mouldings, which have been numbered for ready reference. In ordering doors it is only necessary to specify the style of doors and type, thus: Style 5, type 126, in addition to the size of opening, width of jamb, and whether casings or staff mouldings are wanted for one or both sides.

Specimen Work.

There are hundreds of buildings of different classes in all parts of the country where our work has been used. On request, stating the class of building you are interested in, we shall be pleased to send a list of such buildings within your easy reach, where our work can be inspected.

Portfolio of Details.

Our Architectural Portfolio, which is free to any practising architect, covers a wide field of methods used. See that you have it in your library, handy for ready reference. It represents the result of the best thought on this subject.

VARIETY MANUFACTURING COMPANY

Manufacturers of Art Metal Doors

Sacramento and Carroll Avenues

CHICAGO, ILL.

AGENTS, UNITED STATES

BIRMINGHAM, ALA.	INDIANAPOLIS, IND.	LOS ANGELES, CAL.	NEW ORLEANS, LA.	PITTSBURGH, PA.
BUFFALO, N. Y.	DALLAS, TEX.	NEW YORK, N. Y.	SPOKANE, WASH.	PORTLAND, ORE.
CINCINNATI, OHIO	DENVER, COLO.	NORFOLK, VA.	TACOMA, WASH.	ST. LOUIS, MO.
DETROIT, MICH.	CLEVELAND, OHIO	OMAHA, NEB.	SEATTLE, WASH.	SAN FRANCISCO, CAL.
	KANSAS CITY, MO.		SIOUX CITY, IOWA	

AGENTS, CANADA

CALGARY, ALBERTA	WINNIPEG, MAN.	VANCOUVER, B. C.	MONTREAL, QUE.

Products.

ART METAL DOORS, KALAMEIN DOORS.

For Fireproof Doors of all kinds see our name in General Index.

Art Metal Fireproof Doors and Trim.

We manufacture Art Metal Fireproof Doors and Trim for office buildings, theaters, hotels, hospitals, public buildings, stores, residences, etc.

Construction—Doors, Frames and Trim are made of No. 20 furniture steel. All parts of door are interlocking, which gives a rigid strong structure without bolts or screws. Frames are adjustable in or out, and when placed in brick or tile walls have adjustable anchors for easy erection. Trim and panel mouldings are made in large number of styles and shapes.

Advantages—These doors obtain lowest insurance rate; are sanitary, fireproof, and everlasting; can be finished to imitate any wood or other material; have interlocking joints, obviating screws, bolts and rivets; and are no more expensive than high-class wood doors.

Approval—Doors, Frames, Trim and Hardware have been approved by the Underwriters' Laboratories of the National Board of Fire Underwriters after thorough examination and tests. They are regularly inspected and labeled at our factory for openings in stair and elevator shafts, corridors, partitions and exterior walls.

Information Desired—In writing for estimates or placing orders, please state:

(1) *Finished* thickness and wall construction.
(2) Swing of doors, by sketch.
(3) Net opening size; if threshold, give height.
(4) Style number.
(5) Hardware desired; also, locks.
(6) Finish desired, with sample, if necessary.

VARIETY ART METAL FIREPROOF DOOR, FINISHED IN CIRCASSIAN WALNUT
With polished wire glass panel. Approved by Underwriters' Laboratories for corridor and partition openings

VARIETY ART METAL FIREPROOF DOOR, FINISHED IN OAK, WITH ASBESTOS FILLED STEEL PANELS, RAILS AND STILES
Equipped with three-point latch and standard frame
Approved by Underwriters' Laboratories for stair and elevator openings

Switch Contacts

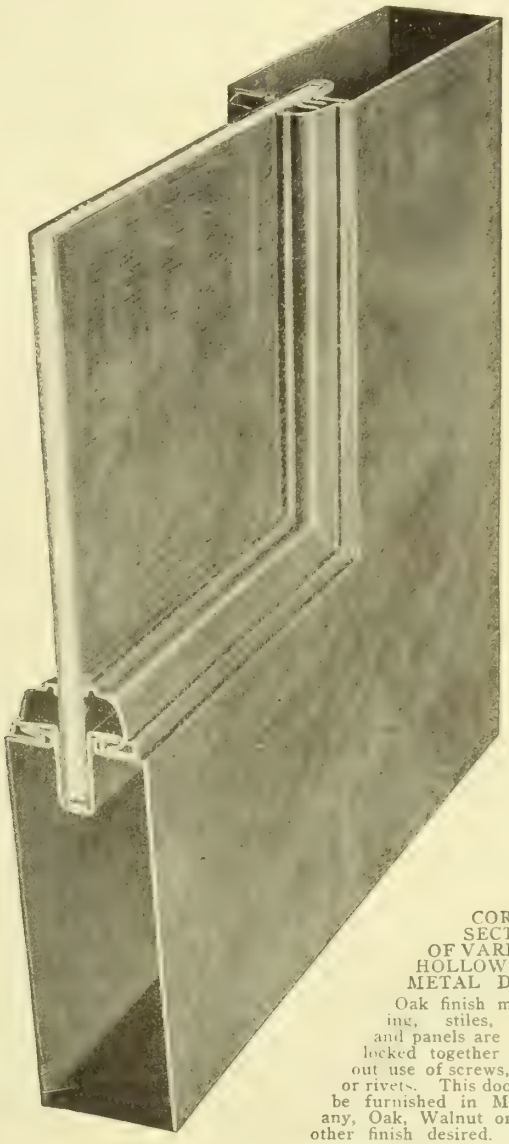
Continued on next page

All Metal Style No. 1 Glass Panel Style No. 2 | All Metal Style No. 3 | All Metal Style No. 4 | All Metal Style No. 5 | All Metal Style No. 6 Glass Panel Style No. 7 | All Metal Style No. 8 With Glass Style No. 9 | All Metal Style No. 10 Glass Panel Style No. 11 | All Metal Style No. 12 Glass Panel Style No. 13 | Glass Upper Panel Style No. 14

EXAMPLES OF VARIOUS STYLES VARIETY ART METAL FIREPROOF DOORS

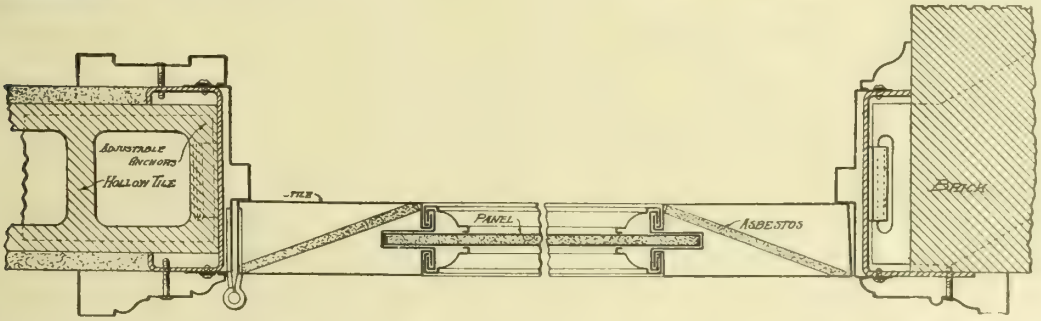
CORNER SECTION OF VARIETY KALAMEIN ART DOOR

This door can be furnished in Mahogany, Oak, Walnut or any other finish desired.



CORNER SECTION OF VARIETY HOLLOW ART METAL DOOR

Oak finish moulding, stiles, rails and panels are interlocked together without use of screws, bolts or rivets. This door can be furnished in Mahogany, Oak, Walnut or any other finish desired.



PLAN SECTION VARIETY FIREPROOF DOOR, INSTALLED IN TILE OR BRICK OPENING

ART METAL FIRE PROOF DOOR AND TRIM CO.

INCORPORATED

Manufacturers of Hollow Metal Fireproof Doors and Trim

TELEPHONE, CALUMET 4608

2724-2736 Wentworth Avenue
CHICAGO, ILL.

Products.

We are manufacturers of ART METAL FIREPROOF DOORS and FRAMES for all purposes; CORRIDOR SASH and PARTITIONS. Also, METAL TRIM and DRAWN-METAL MOULDINGS.

Construction.

The Doors, Frames and Trim are made of No. 18-gauge Furniture Iron.

Frames, when required for Brick or Tile openings, are fitted with our one-piece Adjustable Sliding Anchor.

Trim, also Panel Mould for Doors, can be made in special design.

All doors are filled with Asbestos Board.

Official Approval.

The Doors, Frames, Ties, Trim and Hardware have been tested, approved and accepted by the National Board of Fire Underwriters for openings in Stair Halls, Elevator Corridors or Fire-Escape Exit Doors, and are inspected and labeled before leaving factory.

Finish.

Doors, Frames and Trim can be furnished in Paint Finish, Baked Enamel, Imitation Oak, Mahogany, or any wood required.

Prices.

Quotations will be furnished on receipt of plans and specifications, or schedules.

Details Furnished.

Details for special construction will be furnished on application.

ART METAL FIREPROOF DOOR

References.

Following is a partial list of buildings in which representative installations of our work have been made:

BUILDING	LOCATION	ARCHITECT	CONTRACTOR
Cook County Hospital	Chicago	Paul Gerhardt	J. Griffiths & Son Co.
Chicago Lying-In Hospital	Chicago	Schmidt, Garden & Martin	
Oak Forest Infirmary	Oak Forest, Ill.	R. E. Schmidt	J. W. Snyder & Co.
Metropolitan Hospital	Chicago	Wm. C. Miller	United Ornamental Iron Works
Lytton Building	Chicago	Marshall & Fox	J. Griffiths & Son Co.
Chas. A. Stevens	Chicago	D. H. Burnham & Co.	Geo. A. Fuller Co.
Chicago Telephone Co.	Chicago	Holabird & Roche	Jas. Black Co.
[illegible] Dearborn Hotel	Chicago	Holabird & Roche	
Sherman House	Chicago	Holabird & Roche	J. Griffiths & Son Co.
Madison Terminal Building	Chicago	Holabird & Roche	Jas. Shedden & Co.
Boston Store	Chicago	Holabird & Roche	J. Griffiths & Son Co.
Monroe Building	Chicago	Holabird & Roche	Geo. A. Fuller Co.
Otis Building	Chicago	Holabird & Roche	Geo. A. Fuller Co.
Mandel Brothers	Chicago	Holabird & Roche	J. Griffiths & Son Co.
A. M. Rothschild	Chicago	Holabird & Roche	J. Griffiths & Son Co.
National Biscuit Co.	Chicago	Jas. R. Torrence	J. Griffiths & Son Co.
Sears-Roebuck Co.	Chicago	Geo. C. Nimmons	S. Sollitt Co.
Dickerson Seed Co.	Chicago		J. Roosatz
[illegible] Building	Boston	Parker, Thomas & Rice	Jas. Black Co.
[illegible] Hotel	Chicago	Z. T. & C. G. Davis	J. W. Snyder Co.

THE ATCHISON REVOLVING DOOR CO.

MAIN OFFICE AND FACTORY

INDEPENDENCE, KANS.

AGENCIES IN PRINCIPAL CITIES OF UNITED STATES AND CANADA

If you do not find our name in your Telephone or City Directory, write Main Office, which will put you in touch with a Representative at once

Products.

The ATCHISON REVOLVING DOOR, "CURVED WING" and STRAIGHT WING, complete with Enclosures (or "Vestibules"), and Connections; WINGS only for Marble Enclosures; SAFETY-EXIT DOOR.

Materials.

All Cabinet Woods; Bronze or Steel, Nos. 10-12 gauge on steel frames, Nos. 16-24 gauge on wood cores; Copper, 16-20 ounces on wood only; Enclosure work, also, in ornamental cast Bronze and Iron, guaranteed equal to the best work of specialists in those lines.

Metal Wings.

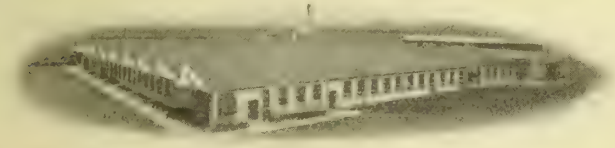
For Metal Wings, wood-core construction is strongly urged instead of steel frames, because of (1) greater stiffness; (2) lower cost; (3) greater fire resistance; (4) lighter weight. Heavy wings are slow to start and stop, and all-metal wings cannot be made stiff and free from twisting without objectionable weight. As for fireproofness, an all-metal door will twist and warp under heat much sooner than a wood core completely encased with heavy metal.

Wood Doors.

All doors are veneered, so cheap soft woods make no saving, but can be furnished.

Facilities.

Our plant is the largest revolving door factory in the world. It is of the saw tooth roof, concrete, motor-drive type; and by reason of our central location and favorable manufacturing conditions, we can more than offset freight to any part of the United States.



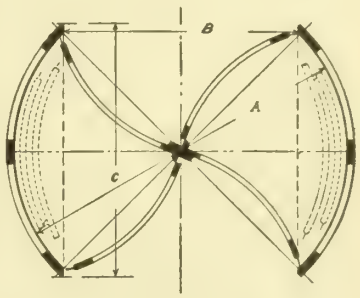
PLANT OF THE ATCHISON REVOLVING DOOR CO.
1½ Acres under Roof

Patents.

The "Curved Wing" and other Atchison features are protected by recent patents. Buyers need fear no infringement suits. Our principles and construction details are radically different and new. We guarantee against loss or damage through patent litigation.

The "Curved Wing" Type.

All other features are secondary, compared with the value of revolving doors for *passing traffic without admitting cold, rain, wind or dust.* The "Curved Wing" *increases* this *revolving value,* and the advantage of *any* revolving door over even a *single* swing door, to say nothing of the usual *two* sets of entrance doors. "Curved Wings" are made in any style or type.



NO. 164. "CURVED-WING" DOOR FLOOR PLAN

DIMENSION TABLE

A	B	C
6′ 0″	4′ 2½″	4′ 7½″
6′ 6″	4′ 6¾″	4′ 11¾″
7′ 0″	4′ 11″	5′ 4″
7′ 6″	5′ 3¼″	5′ 8¼″
8′ 0″	5′ 7½″	6′ 0½″

Note folded position of wings

Advantages.

It is more than a fourth easier to pass through a "Curved Wing" door because the user, naturally pushing against the outer stile, thereby advances the center of the "Curved Wing" ahead, by the depth of the segment, or six to eight inches. This additional stepping space, *in front where needed,* allows a natural, easy step, without bumping knees, stubbing toes or leaning forward, as against the familiar short, choppy, pacing step necessary with the straight wing. The "Curved Wing" is handsomer, either revolving or folded, and leads unfamiliar users through the right direction.

Folding.

Floor plans show, in dot lines, the position into which wings fold for summer use or passing large objects (without lifting or shoving) in less than thirty seconds. They return to revolving position still quicker. When folded, either straight or "Curved Wings" lie entirely back of chord line of side wall, as much out of the way as if removed entirely. They need never be taken out for the summer, but can be left in place, ready for instant use in variable weather, yet take up none of the entrance space. Because of this, Atchison doors are not made for taking enclosures down in summer. There are no ceiling slots or floor casters, and the pairs of wings swing aside as easily as doors on ordinary floor hinges.

NO. 168. DOOR OF U. S. POST OFFICE, GREENSBURG, PA.

Continued on next page

Screen Doors.

Light D. A. Screen or Fly Doors may be hung directly to side walls, with removable hanging strips, without interference, a feature found only in the Atchison door and often adopted. (See Drawing No. 165.)

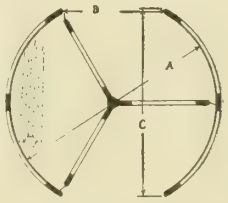
Non-Folding Type C Doors.

If a free-folding door is not needed, and expense is an object, we furnish a non-folding type door in which wings fold up lengthwise, but not aside in pairs, at a greatly reduced price. Very few of these are used, the folding feature paying well for the additional cost.

Size.

Four-Wing Doors should not be smaller than 6 feet inside diameter; but if conditions demand a smaller door, down to 5 feet 6 inches, the "Curved Wing" is best. The standard and best diameter is 7 feet. For hotels, a door 7 feet 6 inches or 8 feet diameter gives more room for luggage. Inside height should be 7 to 8 feet.

Three-Wing Doors can be furnished as small as 4 feet 6 inches diameter, but should not be used except where space will not permit a 6-foot diameter 4-wing door. They are only practicable for limited traffic, or toilet rooms, etc. Wings fold as shown; or can furnish non-folding, with one wing hinged.



NO. 166. 3-WING DOOR FLOOR PLAN

DIMENSION TABLE

A	B	C
4′ 6″	2′ 2½″	4′ 2″
5′ 0″	2′ 5½″	4′ 7″
5′ 6″	2′ 8½″	4′ 2″

Glass Height.

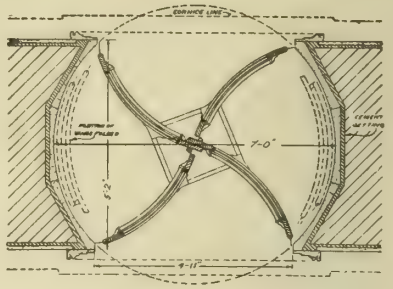
Glass should not be lower than 18 inches from floor, to allow drop-arms to clear, and *should* be 24 inches, to give a higher bracing point and reduce racking strains.

Locking.

The Wings lock (by the folding pivots) in a diagonal position, at four points, top and bottom and each side, secure against entrance or twisting (not possible with ceiling-lock systems). Wings also fasten at top only, lengthwise and crosswise, and with all wings touching side walls. Lock cylinders may be applied, master-keyed if desired.

"Flush" Veneered Walls.

By the use of an improved core, we can now furnish, at no extra cost, solid side walls in 5-ply "flush" veneered work, similar to the expensive "hospital" or "slab" doors. Vertical veneers, selected for figure, give an effect far superior to the old-style, cheap-looking vertical strip enclosure wall. (See Illustration No. 222.)



NO. 16. EXAMPLE OF MARBLE ENCLOSURE

Marble Enclosures.

Atchison Wings are the easiest to install in marble enclosures because they need no ceiling slot, and ceiling slabs can be in two pieces, ⅞ to 3 inches thick, supported by the overhead channel. (See also Drawing No. 15 below.)

Motor Drive.

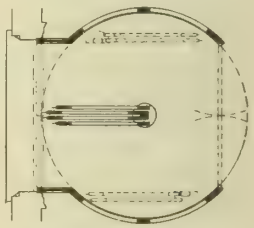
Due to stationary overhead bearing, motor drive of the Atchison door wings is most practicable and simple. All mechanism is mounted on the bearing channel. Three speeds. Continuous operation, or push-button or floor mat control. One quarter horse-power required. Uses any current, power or lighting circuit. Friction clutch drive safe and fool-proof; allows stopping either motor or door without interference or injury.

Flush Bronze Tee.

Glass and panels in side walls are set in the Atchison flush bronze Tee, covering the joint, and making a better finish than plain angles. Also used in our "sector-panel" ceiling; very durable and handsome. (See Illustration No. 168.)

"Safety-Exit" or "Collapsible" Type NT Doors.

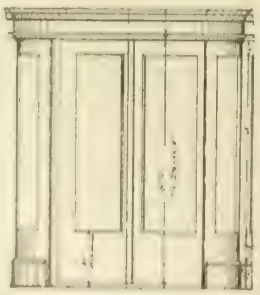
In certain places this type door is desirable. But the demand for it is excessive and artificial, due possibly to efforts of competitors claiming to have patent monopolies on *any* so-called "collapsible" door. Such claims are erroneous, but based in any event only on the use of the "automatic self-releasing braces." (Such braces have proved inefficient and unreliable, and are discarded in the Atchison type NT Safety-Exit Door.) In certain cities "collapsible" doors are required, needlessly, we believe, and where the revolving door is the *only* exit to



NO. 165. FLOOR PLAN TYPE NT SAFETY-EXIT DOOR Showing Screen Doors

NO. 169. SECTION THROUGH TYPICAL CEILING Showing Connection at Transom Bar

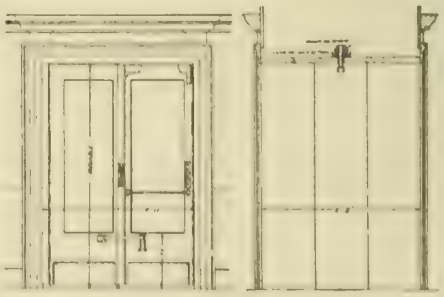
No. 7



No. 91

No. 95

ELEVATION DESIGNS



No. 15

MARBLE ENCLOSURE

Continued on next page

a *public assemblage* building, it should be collapsible. In practically all other places, standard type doors will handle traffic even under panic conditions as fast as it develops, and are cheaper, simpler (and to that extent more durable) and in every way equal to the "collapsible" door for *use*.

Having given this sincere opinion on the *necessity* for collapsible doors, we will now state that the Atchison type NT or Safety-Exit Door (patent applied for) is guaranteed non-infringing, and show below wherein it avoids defects and claims advantages.

The "Trammel" Hanger.

While retaining *every* feature of the Standard door, folding, locking, pivoting, etc., the NT door uses an absolutely new principle for hanging the wings, the "trammel" hanger or hinge (see No. 228). Perfectly simple, it is "all in sight" in the cuts, has no concealed parts or springs, yet is fool-proof, absolutely non-sagging, and achieves the folding of wings exactly as required. (See Illustration No. 224 showing people seeking exit on both sides, and No. 225 showing position of wings after they have passed through.)

Center post halves are fastened together with a new positive, unbreakable "bolt-lock." Whole construction is "clean."

The "Push-Bar" Release Cable-Brace.

Another *big* advantage of the Atchison Type NT Safety-Exit Door over any "collapsible" door requiring "automatic" braces with springs. The NT brace is *positively* connected and *non-releasing* under *any amount* of *wind pressure* or the ordinary "jars" of use, therefore eliminates the *inopportune collapsing* unavoidable with a spring-controlled "automatic" brace. Revolving doors are put in to keep the opening "*Closed,* although always open," and *must not* collapse under high-wind pressure or in ordinary use. Type NT doors *cannot* so collapse.

Equally, a "collapsible" door *must* collapse under the sole condition for which it is put in, namely to give exit to a panic-stricken crowd without revolving. The *Type NT does this,* by releasing the proper cable-brace upon *intentional manual pressure* upon the *inner end* of the push-bar (or bars), marked "8" in Illustration No. 220. Pressure is never applied at that point in ordinary use, consequently the releasing mechanism and action are adjusted delicately enough to insure *positive* release in emergency. The releasing principle is the same as in the well-known Exit Latches for swing doors, and attention is also called to it by a small "Push" sign placed at the inner end of bars. (Positive release is not possible, in practice, with spring-controlled automatic braces having sliding contacts or other moving parts subject to corrosion. Tests on record have proven this.)

The "Tightener Lever."

Made possible solely by the positive connection, type NT doors include one brace with the Atchison toggle-action "Tightener Lever" (patent applied for). See Illustration No. 228. When connecting the braces, the lever is thrown out, giving slack for easy connecting. Closing it pulls all braces up "snapping tight," eliminating loose braces and breakage of cables due to jerking of wings. (Such tension is impossible with spring-controlled "automatic" braces, since it would pull them open.) All braces are adjustable for length.

Tests.

Doors of the NT type have been in use for several years, and the largest door we have made of any type is an NT in use in a department store, standing up under heavy traffic.

The hardest and most novel test given the NT door, or any other door, was made on the "Booster Train" door, from which these illustrations were afterwards made. It travelled over 3,000 miles in a railway exhibit car, the first revolving door ever installed in a moving coach, and *did not receive or need a single adjustment* throughout the entire trip.

Specifications.

"Furnish and install, where shown, Atchison 'Curved [or Straight] Wing' standard folding [or Safety-Exit Type NT] revolving doors, with mechanism to permit folding wings aside in pairs to lie entirely within curvature of enclosure walls, without projection at any point, as made by The Atchison Revolving Door Co., Independence, Kans. Hardware to be solid cast bronze [or brass], plain heavy design, polished [or brushed] finish. Glazing to be American polished plate."

If Collapsible Doors are needed, specify—

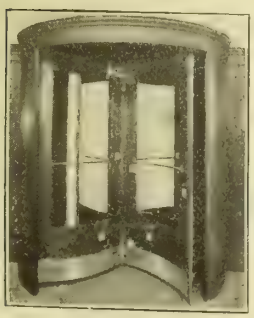
"'Wings' and mechanism to be the Atchison Type NT Safety-Exit with 'trammel' hangers and push-bar release cable-brace and tightener, permitting egress under panic conditions without revolving."

Estimates.

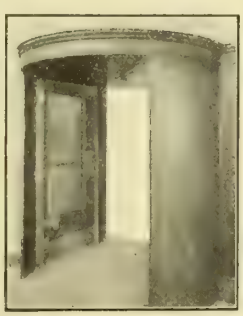
Quotations and Special Designs furnished by our representatives or main office, according to conditions, which do not admit stock prices, although figured on a uniform base.

References.

In the past, we have used space to show imposing buildings using the Atchison door. Believing this defeats the purpose of "Sweet's," we here confine our pages to information, leaving the hundreds of Atchison doors over the country to do the rest of our talking. Complete data in Catalogue B, sent on request.



No. 220



No. 222

No. 224

No. 225

No. 228

TYPE NT SAFETY-EXIT DOORS

FEDERAL SASH & DOOR CO.

Manufacturers of Revolving Doors, Etc.

OFFICE AND FACTORY
1724 Wabash Avenue
KANSAS CITY, MO.

Products.

The Federal "All-Year" Revolving Door.

Also, Cabinets, Stairs, Mantels, Frames, Mouldings, Fibreboard, Store and Bank Fixtures, Wood and Metal Specialties.

Federal "All-Year" Revolving Door.

This is a revolving stormproof door designed for constant use, summer and winter.

Material and Construction.

This door is supplied in any kind of hardwood, substantially and artistically built, and handsomely finished to match the finish of your room.

It is really a revolving door, not a turnstile. Three or four people may pass through each side at one time.

The wings of this door are under automatic control, and are always standing in position to render maximum service.

The door can be easily and quickly converted from a storm door into an every day balanced door, as shown in Fig. 2.

Advantages.

The "All-Year" Revolving Door may be easily locked at night from either inside or outside.

It is panic-proof and can handle large crowds. It is giving satisfactory service in large department stores.

Absolutely stormproof, it will not revolve under wind pressure.

Fire wardens have approved this door as an absolutely safe exit for buildings.

Its use saves changing doors twice a year.

Sizes.

Made in standard sizes, 5 feet, 5 feet 6 inches and 6 feet in diameter. Special sizes can be supplied, if desired.

Installation.

Any present four-wing enclosure may be fitted with the "All-Year" Revolving Door, which will give better results in a six foot enclosure than the ordinary four-wing door will give in an eight-foot opening.

This door can be successfully used in an opening too small for a four-wing door. It can be operated satisfactorily in a forty-inch store door opening.

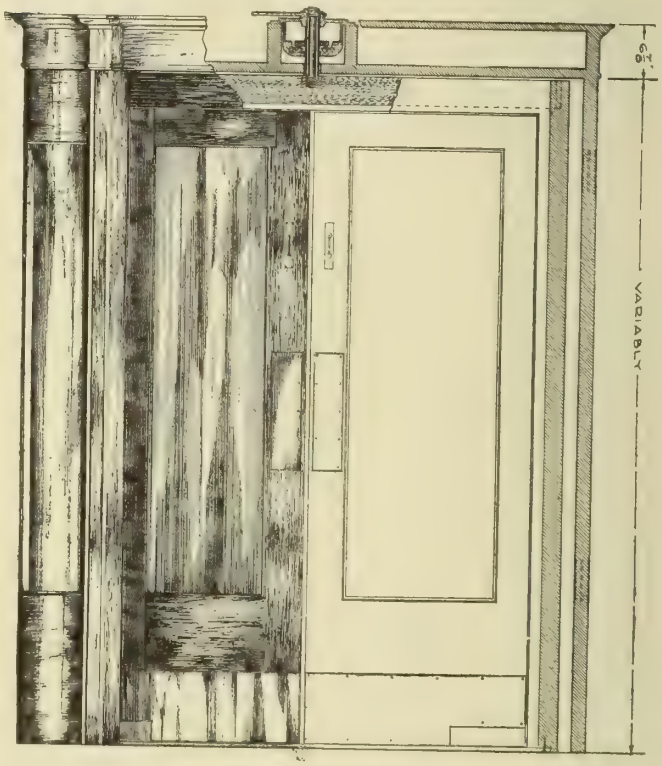


Fig. 1. Elevation

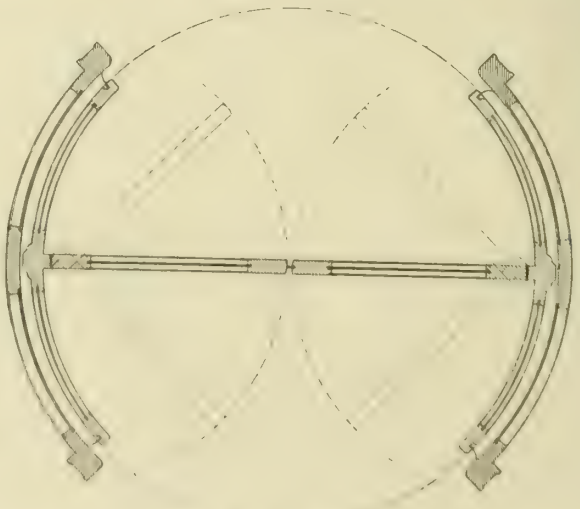


Fig. 2 Plan

FEDERAL "ALL-YEAR" REVOLVING DOOR

REVOLVING DOOR & FIXTURE CO.

1328 Broadway
NEW YORK, N. Y.

TELEPHONE, GREELEY 4404

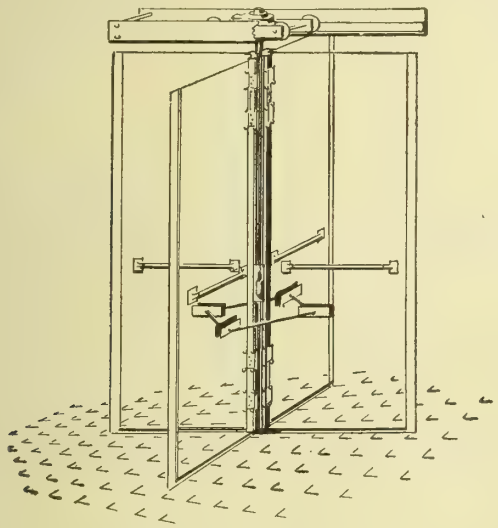
WALTER S. ELY, GENERAL MANAGER

Products and Services.

REVOLVING DOOR FIXTURES; COMPLETED REVOLVING DOORS, Wind-proof or Semiwind-proof; SELF-RELEASING REVOLVING DOORS; MOTOR-DRIVEN REVOLVING DOOR INSTALLATIONS. Specialists in MECHANICAL ARTS as applied to REVOLVING DOORS.

Self-Releasing Doors.

Revolving Doors so arranged as to be self-releasing in case of panic, and so constructed that they will not blow open when in ordinary use, thereby preventing inconvenience; at the same time, mechanically arranged so that the action is positive under all atmospheric conditions, thus assuring proper working at all times.



DETAIL MECHANICAL PARTS

To Order Only.

As all installations require their own particular proportions and treatments, no matter how simple, we manufacture each Revolving Door to order.

Method.

We manufacture Revolving Door Fixtures for trade, or contract the completed Revolving Door. We furnish 3-, 4-, 5- and 6-wing Revolving Doors, together with many accessories forming part of their construction.

Facilities.

Our President and General Manager has had sixteen years' experience in developing and installing Revolving Doors, and with his thorough understanding of the building trade and of mechanical engineering, we are able to offer to the trade prompt and intelligent service, furnishing the most simple fixtures or the more elaborate grades, plain or ornamental.

Patents.

We manufacture under our own exclusive patents, all *of recent date;* this allows us to offer improvements long needed in Revolving Door Construction. Old patents have little value other than to be used as a means of creating wrong impressions in the minds of the trade, and obtaining profits on antiquated ideas.

Specifications.

Architects should use the following specifications, whether specifying any particular make of Revolving Doors or the makes of more than one manufacturer. Any Revolving Door not properly set would not conform to this specification.

Revolving Doors—Place at the main entrance on ..... street and side entrance on ..... street Revolving Doors as shown. These doors are to be set with the entire inner surface of the circular walls in a distance equal to the radius from a perpendicular axis, setting the ceiling exactly level, and the revolving wings hung with the axis perpendicular. The Revolving Door enclosure and wings to be made of ..... to match the finish in main corridor. Kickplates to be placed on each side of each wing 16 gauge by ..... inches high. Handrail and push-plates to be of standard design (or special) and all applied fixtures to be of solid bronze metal to match other hardware. Glass both bent and flat to be polished plate and all working parts to be adjusted properly at completion, leaving the door finished complete in a satisfactory manner.

General.

Revolving Doors should be made 7 to 8 feet high only. Specify in marble Specifications, marble bases under circular walls and floor designs. Folding gates, straight and circular sliding doors are practical to use on street side of Revolving Doors, to close off entrance on building line. Best results are obtained by sending preliminary sketches for suggestions. Specifications for bronze constructions and metal-covered wood doors will be furnished on request.

Merit.

Our Revolving Wings fold and move to one side of the opening, requiring thirty seconds to do so. Our Revolving Wings will not spin, projecting hand-rails allowing ample room to grip same. All parts subject to wear easily replaced. Highest grade of rubber weather-strips. No adjustments to be tampered with. Simple to understand.

SIZES AND CAPACITIES

Types of Revolving Doors	A (Degrees)	B (Degrees)	Diameters	Capacity per Hour in Both Directions
Three-Wing Wind-proof	124	56	4′—6″ to 5′—10″	200 to 400 people
Three-Wing Semiwind-proof	100	80	4′—6″ to 5′—10″	400 to 800 people
Four-Wing Wind-proof	94	86	6′—0″ to 8′— 0″	800 to 2000 people
Five-Wing Wind-proof	76	104	8′—2″ to 9′— 0″	2000 to 3000 people
Six-Wing Wind-proof	64	116	9′—2″ to 10′— 0″	3000 to 5000 people

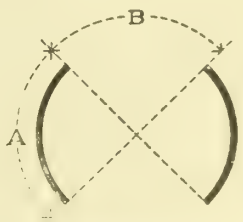


DIAGRAM OF CIRCULAR WALLS

NOTE—The capacity given for a Three-Wing Wind-proof Revolving Door must be in consecutive order, not clustered; this not applying to other types.

VAN KANNEL REVOLVING DOOR COMPANY

MAIN OFFICE
250 West 54th Street
NEW YORK, N. Y.

TELEPHONE
CIRCLE, 1876, 1877 AND 1878

BOSTON	PHILADELPHIA	DETROIT	INDIANAPOLIS	OMAHA
SYRACUSE, N. Y.	WASHINGTON, D. C.	CLEVELAND	CHICAGO	SEATTLE
PITTSBURGH	ATLANTA	COLUMBUS, OHIO	ST. LOUIS	SAN FRANCISCO
DENVER	NORFOLK, VA.	CINCINNATI	ST. PAUL	FORT WORTH, TEX.
BUFFALO	NEW ORLEANS	LOUISVILLE	KANSAS CITY, MO.	TORONTO

Products.

We manufacture the VAN KANNEL STANDARD STYLE C REVOLVING DOOR; VAN KANNEL AUTOMATIC, COLLAPSIBLE, PANIC-PROOF REVOLVING DOOR; VAN KANNEL 3-WING REVOLVING DOOR; VAN KANNEL 6-WING REVOLVING DOOR.

Also, VAN KANNEL REVOLVING PANTRY WINDOW (Patented).

Automatic Collapsible Panic-Proof Type.

This type of door, the basic patent of which is dated 1906, is rapidly superseding the style C door, owing to its feature of absolute safety at all times and under all conditions, and is to be recommended for use in all cases. Its safety feature lies in the fact that the revolving wings are so arranged that by the application of a pressure slightly more than is necessary to revolve the door, to any part of the revolving structure, the revolving wings will instantly and automatically collapse and fold outward.

Specification.

"Provide and install, where shown on drawings, revolving doors of the 'automatic, collapsible, panic-proof' type, manufactured by the VAN KANNEL REVOLVING DOOR COMPANY. The revolving wings to be hung independent of each other on a central shaft, and held in a radial position by means of flexible bronze cables, and be so arranged that by the application of unusual pressure to any part or parts of any two of the revolving wings, the wings will automatically collapse and fold flat on each other in an outward position. The revolving wings to be hung from a self-oiling ball bearing located above the ceiling in a removable carriage, and be so arranged that they may be released from the central position by one operation and moved to one side of the opening. All hardware to be solid bronze. Glazing to be American polished plate. The revolving door contractor to furnish the revolving wings, circular walls, ceiling and cornice."

Original Patentee.

This Company is the pioneer manufacturer, and original patentee of Revolving Doors; their patents cover every practical improvement and substantial feature. Architects may spare their clients expense and embarrassment from patent litigation by specifying Van Kannel Doors.

Materials.

Materials used are any kind of hard wood, bronze or steel on a steel frame or wood core covered with copper or bronze, in 24, 20, or 16 gauge.

Stock Designs.

We carry on hand several stock designs, in plain and quartered oak, birch and mahogany, on which we can quote practically immediate delivery. We illustrate herewith four of these designs.

3-Wing Revolving Door.

The 3-wing revolving door (see illustration foot of following page) is especially adapted for entrances that are too small to accommodate a 4-wing door of at

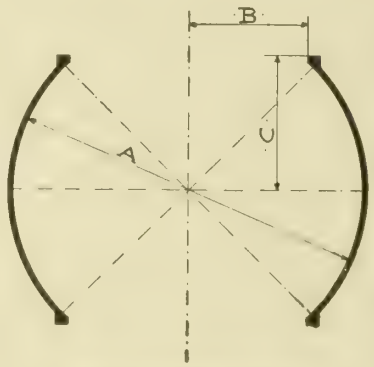
No. 1192-1

No. 1192-2

No. 1192-3

No. 1192-4

VAN KANNEL REVOLVING DOOR COMPANY'S STOCK DESIGNS



DIMENSION DIAGRAM

DIMENSION TABLE

A	B	C
6′ 0″	24½″	28¼″
6′ 6″	26⅝″	30½″
7′ 0″	28¾″	32½″
7′ 6″	30¾″	34⅝″
8′ 0″	32⅞″	36¾″

Continued on next page

least 6′ 0″ diameter. Also being used, to a great extent, in entrances to toilet rooms in schools, institutions and public buildings, and we have installed 34 of these doors for the new Prudential Building, Newark, N. J. Approximately 5′ 0″ diameter.

6-Wing Revolving Door.

The 6-wing revolving door (see illustration foot of page) was designed particularly for entrances that are too large for one 4-wing door and not large enough for two. It will accommodate 50 per cent more people than the standard 4-wing door—especially adapted for department store entrance use. Approximately 10′ 0″ diameter.

Hinged-Wall Construction.

The Hinged-Wall Construction (Fig. J 309) may be used wherever greater exit space is desired. The hinged sections flex back automatically, and when used in connection with the automatic, collapsible revolving wings represent the most perfect type of revolving door.

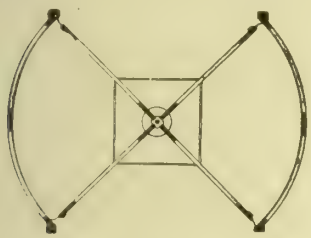


Fig. J 301. Wings in Revolving Position

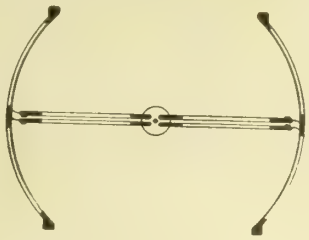


Fig. J 304. Wings in Locked Position

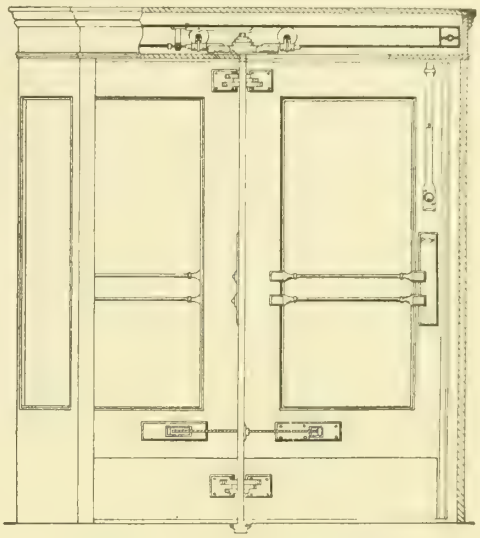


Fig. J 307. Elevation and Section

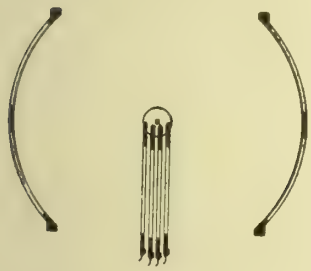


Fig. J 302. Wings in Collapsed Position

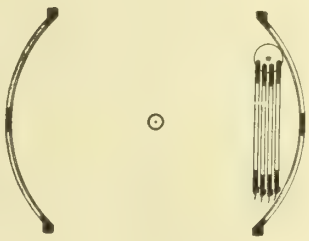


Fig. J 305. Special Collapsed Position

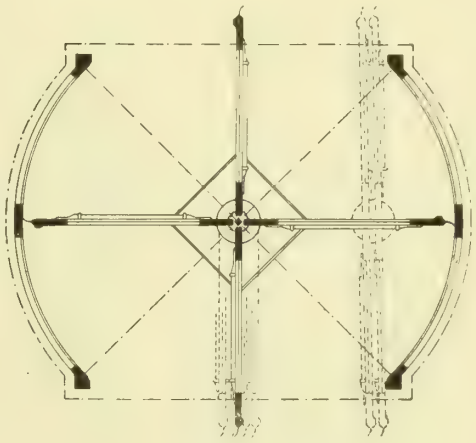


Fig. J 308. Plan

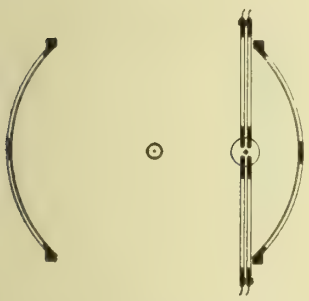


Fig. J 303. Wings Folded and Moved Aside

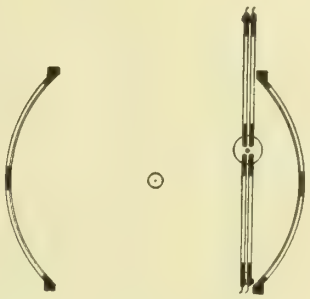
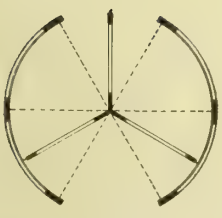
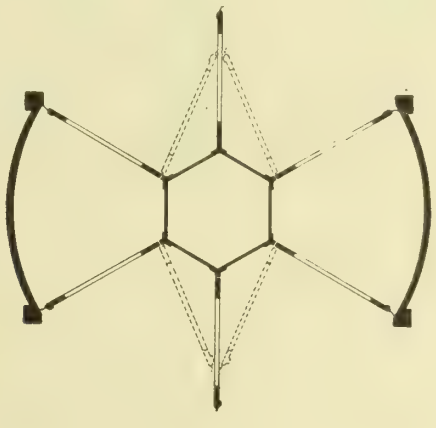


Fig. J 306. Special Folded Position

VAN KANNEL AUTOMATIC, COLLAPSIBLE, PANIC-PROOF REVOLVING DOOR



VAN KANNEL 3-WING REVOLVING DOOR



VAN KANNEL 6-WING REVOLVING DOOR

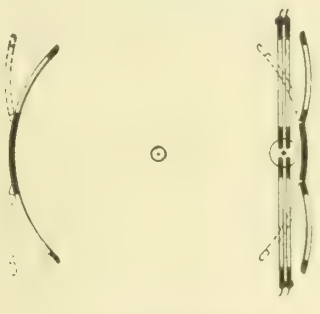


Fig. J 309. HINGED-WALL CONSTRUCTION

AMERICAN COMPOUND DOOR COMPANY

Manufacturers of Flush Veneered Doors

Twenty-First and Morgan Streets
CHICAGO, ILL.

SALES OFFICES IN PRINCIPAL CITIES

Products.

FLUSH VENEERED DOORS, FLUSH PANELS, FRONT and VESTIBULE DOORS.

Doors, Only Product.

We do not make furniture nor interior trim, but just doors, and only the highest class of doors. All made by thoroughly competent union mechanics. We also make one- and two-panel doors according to architects' detail and specifications.

Flush Veneered Doors.

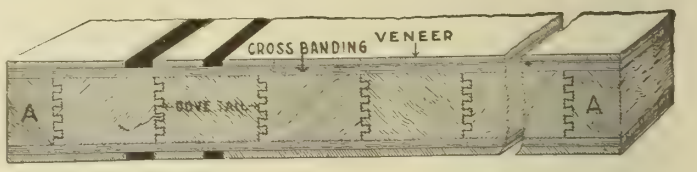
Our Flush Veneered Doors have passed the experimental stage. Actual and extended use has demonstrated that they are the perfect door. They are double-veneered on each side and have the following points of advantage over the old-style doors:

(1) Their beauty.
(2) They are strictly sanitary.
(3) Their method of construction prevents them from shrinking and swelling.
(4) There are no joints to open.
(5) They are practically sound-proof, which makes them valuable for communicating doors in hotels, and for corridor doors for all public buildings and apartment houses.
(6) An elegant polished finish can be put on these doors at very little expense.
(7) They are burglar-proof.

Will They Stand?

Absolutely, and better than any other veneered door made. They are cross-banded, which binds the veneers together and prevents shrinking, swelling, or warping.

They have been manufactured for ten years.



CROSS-SECTION SHOWING CONSTRUCTION OF FLUSH VENEERED INLAID DOORS

Kinds of Veneer.

All of the kinds of wood here enumerated are carried in veneer stock:

Birch, mahogany, vermilion, plain oak, quartered oak, elm, walnut, whitewood, basswood, white maple, curly maple, gum and ash. We would suggest selection from some of these. The brown ash finishes to look very much like cypress. Basswood answers the place very well for white pine.

How Thick Should Doors Be Made?

Doors 2 ft. 8 in. and under in width may be made 1⅜ inches thick; over 2 ft. 8 in., they should be made 1¾ inches thick. Toilet doors may be 1 inch or 1⅛ inches.

Prices and Estimates.

The prices are about the same as for ordinary veneered doors. Send for net price-list. Estimates are cheerfully and promptly submitted.

Guarantee.

To new customers who have not used the doors, we will give a guarantee bond to replace at our own expense any door which proves defective within one year.

References.

The following are a few of the thousands of buildings in which the "A. C. Flush Doors" are installed, giving number of doors, location and name of architect:

'325 Post Graduate Hospital, New York, McKim, Mead & White
150 Sloane Maternity Hospital, New York, Crow, Lewis & Wickenhoefer
307 Flower Hospital, New York, Delano & Aldrich
159 Knapp Memorial Eye Hospital, New York, Crow, Lewis & Wickenhoefer
211 Mountainside Hospital, Orange, N. Y., York & Sawyer
137 Misericordia Hospital, New York, I. E. Ditmars
171 Flushing Hospital, Flushing, L. I., J. P. Benson
678 St. Anthony Hospital, Woodhaven, L. I., I. E. Ditmars
125 Dormitory Buildings, Bedford Hills, N. Y., F. B. & A. Ware
205 Dormitory Buildings, Bedford Hills, N. Y., Louis F. Pilcher
177 Troy Hospital, Troy, N. Y., M. L. & H. G. Emery
254 Railroad Y. M. C. A., New York, Warren & Wetmore
490 Nurses' Home and Hospital, Albany, N. Y., Fuller & [illegible]
229 Children's Hospital, Brooklyn, N. Y., Frank J. Helmle
306 St. Anthony Girls' Home, New York, Valentine & Kissam
129 School, Mechanicsville, N. Y., John Simpson
174 Infirmary Building, Concord, N. H.
115 Nurses' Home and German Hospital, Brooklyn, N. Y., Carl L. Otto
238 Gymnasium and Club Building, New York, Hill & Stout
375 St. John's Hospital, Cleveland, Ohio
231 Russell Sage Foundation Building, New York, Grosvenor Atterbury
265 Western Union Telegraph Building, New York,
110 Y. M. C. A. Building, Brooklyn, N. Y., Jackson, Rosenkranz & Waterbury
146 Public School No. 9, Paterson, N. J., Wm. T. Fanning
360 Long Island College Hospital, Brooklyn, N. Y., John Higginson
1200 Forum Building, Sacramento, Cal., R. A. Herold
1300 Fort Dearborn Hotel, Chicago, Ill., Holabird & Roche
2000 City Hospital, Cincinnati, Ohio, Samuel Hannaford & Sons
600 Presbyterian Hospital, Chicago, Ill.
350 West Side Hospital, Chicago, Ill.
600 Moody Bible Institute, Chicago, Ill., H. B. Wheelock
250 St. Mary's of Nazareth Hospital, Chicago, Ill., H. J. Schlachs
700 St. Anthony's Annex, San Antonio, Tex.
950 Oregon Hotel, Portland, Ore.
1300 Adolphus Hotel, Dallas, Tex.
3000 Shively Sanitary Tenements, New York, N. Y.
1020 Sisters of Providence Hospital, Seattle, Wash.
1500 St. Louis Insane Asylum, St. Louis, Mo.
800 Anthony Hotel, Fort Wayne, Ind.
425 St. Mary's College, St. Mary's, Ind.

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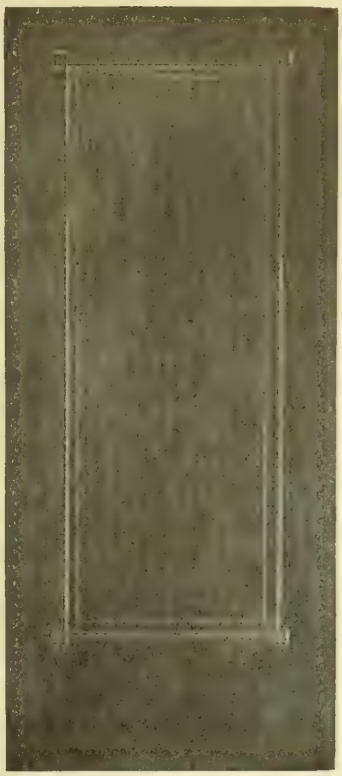
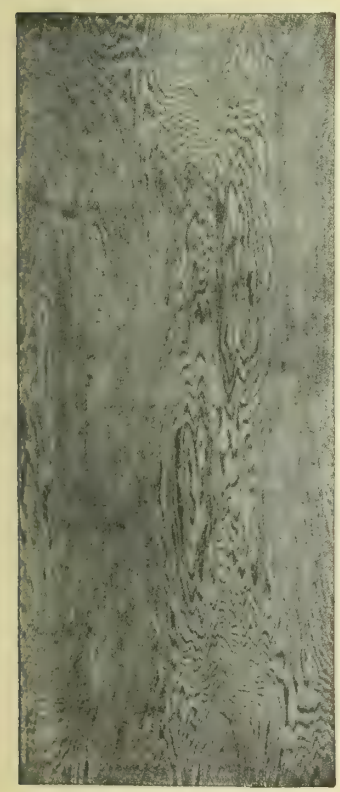
A.C. Office Door Style "C," inlaid with ebony and holly



A.C. Door Style "A," inlaid with ebony and holly

A.C. Hotel or Hospital Door

A.C. Hotel or Hospital Door with inlaid room number



A.C. Door Style "X," plain flush veneer

A.C. Door Style "B," inlaid with ebony and holly

A.C. Outside Door Style 140

A.C. Outside Door Style 150

VARIOUS DESIGNS OF AMERICAN COMPOUND DOOR COMPANY'S DOORS, FURNISHED IN ANY VENEER DESIRED

Suggested Specifications.

All doors shall be Flush Veneered Doors, manufactured by the AMERICAN COMPOUND DOOR COMPANY, Chicago, Ill., under the following specifications:

The cores shall be built up of strips of thoroughly kiln-dried pine lumber, dovetailed and glued together. They shall then be surfaced to an even thickness and covered with cross binding ⅛ inch thick, on each side, and thoroughly dried and brought to an even surface before applying the face veneers. The face veneers shall be of wood corresponding to the finish in the different rooms. Stain and fill the doors to the desired color and give them one coat of shellac at the factory.

Bond—A bond must be filed guaranteeing that no defects caused by inferior material or workmanship shall appear for a period of one year, and that in case defects appear this bond shall provide for repairing or replacing doors without expense to the owner.

CARNAHAN MANUFACTURING COMPANY

Special Veneered Doors and Mill Work to Detail

LOOGOOTEE, IND.

Products.

VENEERED DOORS, SPECIAL MILL WORK and FINE INTERIOR TRIM in all WOODS.

Standard Veneered Doors.

The facilities and equipment for the manufacture of standard veneered doors and hardwood interior trim are the result of twenty-one years' experience in the exclusive manufacture and marketing of this product, with the entire country as our field. On interior trim we use the new cork process, which is of a higher class than hand rubbing, and does not raise the grain nearly so badly.

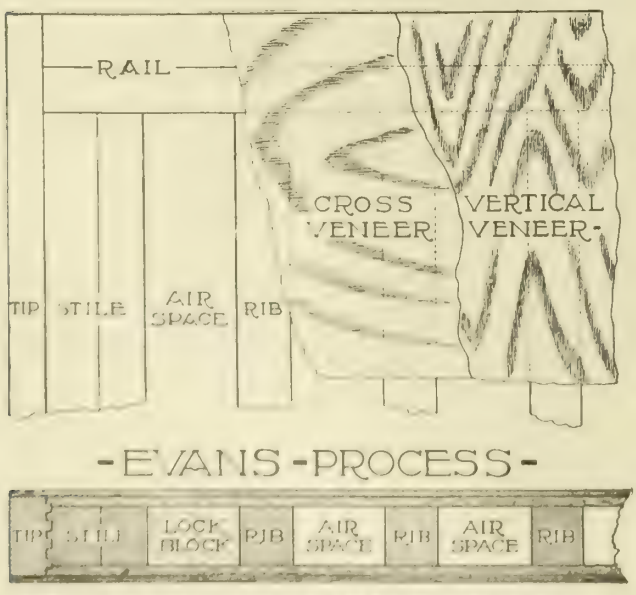
Veneers.

Veneers should be thick enough to retard moisture, but not thick enough to have a tendency to pull loose. The best thickness of veneers for doors is one eighth of an inch. The pulling strain of a quarter inch veneer compared to an eighth of an inch veneers is the comparison of their cubes, which is seven times greater. We do not use veneers thicker than one eighth inch on flush doors.

All material is kiln-dried and then shrunk by special appliance for the same reason a tailor shrinks cloth.

Veneered work is put together under powerful hydraulic pressure regulated according to the nature of the wood. The glue is forced into the pores and isolated, as it were, in air-tight cells, leaving no glue between the layers of wood to carry moisture by attraction. The glue fibers extend from the pores of one piece to the pores of the other like so many little wires.

Core Wood—Poplar and chestnut, being free from the rosin often found in pine, are considered the best for core woods and are used exclusively in our doors.



DETAIL OF CONSTRUCTION EVANS PROCESS HOLLOW SANITARY DOOR

Covered by United States and Canadian Patents

Evans Process Flush Door.

The Evans Process Flush Door (patented) is a hollow sanitary door, constructed with a frame of core wood the size of the door, into which a series of vertical ribs are placed, with air spaces between. Over this frame is glued a three sixteenths inch cross-band, with a strip or tip of hard wood along the edges covering the glue joint between the core and the cross-banding, thus avoiding the exposure of any end wood.

The face veneer, consisting of a sheet of one eighth inch veneer, is then applied, completely covering the surface of the door.

Guarantee—We guarantee the Evans Process door for a period of one year against warping, twisting, or defective workmanship or material.

Advantages.

The Evans Process door has advantages. The air spaces allow the ribs to expand and contract without exerting special strain on the glue joints or distorting the door.

It therefore does not shrink nor swell in length or breadth.

It stays straight, and does not warp nor twist.

It is light in weight; one man can hang a door of thirty square feet and save three cents per square foot in cost of helper.

It is easy to open and close.

It is light on the hinges and children's fingers.

It is heat and cold retarding.

It is as sound-proof as a hollow partition.

Sizes.

We can manufacture the Evans Process in any size, thickness or kind of wood. For general use we recommend the one and three quarter inches thick, as it is only one half pound per square foot heavier than one and three eighth inches thick, and gives more dead air space to break up the sound waves.

Facilities.

Location is just half way between Cincinnati and St. Louis on the B. & O. S. W. R. R., in the heart of a district where beech, birch, maple, gum and Indiana oak are native woods.

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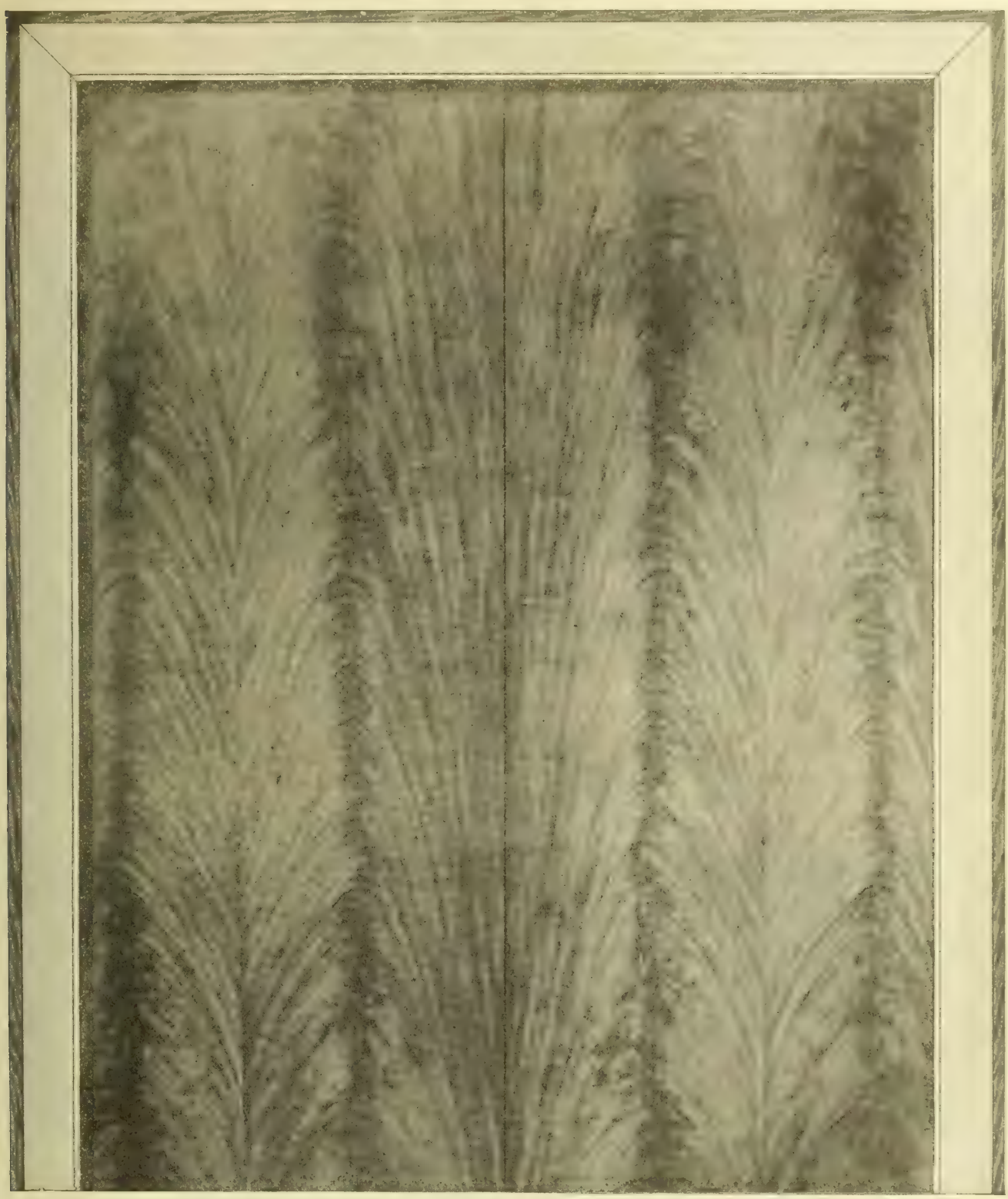

A PAIR OF CROTCH MAHOGANY HOLLOW SANITARY DOORS IN RESIDENCE OF E. R. BERNSTEIN, SHREVEPORT, LA.

Native and foreign woods and veneers for mill work and door manufacture always in stock. Full equipment for special mill work.

Estimates made from plans and work done to special details.

References.

As our work goes to every state in the Union, we can refer to many high-class jobs in the way of hotels, hospitals, court houses, office buildings and residences. Financially we refer to any commercial agency.

MORGAN COMPANY

MANUFACTURERS OF

Hardwood Doors and Woodwork of All Kinds

OSHKOSH, WIS.

BRANCH OFFICES AND PLANTS

BALTIMORE, MD. CHICAGO, ILL.

SALES OFFICES

DETROIT, MICH., 309 Palmer Building NEW YORK, N. Y., Morgan Co., 6 East 39th Street

DISTRIBUTORS

CHICAGO, ILL., Morgan Sash and Door Co. BALTIMORE, MD., Morgan Millwork Co.

Products.

"Morgan" Doors: Front and Interior, Veneered, Flush or Sanitary, in both hard wood and soft wood.

Also, Interior Woodwork, and Cabinet Work of any description, in accordance with Architects' specifications and details: Stairwork; Colonnades and Mouldings; Grilles; Dressers; Kitchen Dressers; Medicine Cabinets; Shelves; Corner Beads; Base Corners.

Exterior Woodwork: Windows and Sash; Window and Door Frames; Gable Ornaments; Store Fronts; Columns, Spindles and Rails.

Plants and Facilities.

Morgan Doors are manufactured and distributed at the above mentioned cities. Each one of these plants is equipped with the most modern lumber-manufacturing and door-making machinery. Many of the machines are original with this Company and are built to meet the requirements of the building trades at the present time, and are in harmony with their own ideas gained from long experience in all kinds of millwork manufacture.

The products of the Morgan Company are for sale by Dealers in Doors, Sash, Lumber, Blinds, Stairwork, Interior Finish, and other Millwork, throughout the country. The method of distribution permits shipments anywhere with dispatch.

Guarantee.

Every *Morgan* door is guaranteed to be absolutely perfect in every respect. This guarantee means that should any defect be discovered, a Morgan door will, anywhere, be immediately replaced by a new one free of all charge.

Morgan Hardwood Veneered Doors.

Made of hardwood, they are light, strong, durable, weather- and wear-proof, retaining at same time all the beauties of the hardwood grain.

The raw material comes from *Morgan* forests, is cut in *Morgan* mills and is manufactured from beginning to end under the personal supervision of the firm in their own factory.

Every piece of wood going into the door is made absolutely dry, then kept in rooms heated to a high degree of temperature so that no moisture can re-enter the pores. This is the first step towards construction.

The name "Morgan" is stamped on every door.

SECTIONAL VIEW OF MORGAN DOOR

Construction.

After the thorough drying process, the cores or foundations are built up of narrow strips of pine, with edges of hardwood glued together with best of veneer glue, brought together by powerful hydraulic pressure and kept in pressure retainers for many hours, so as to make a perfect and durable joint. Then, cores are planed to even thickness, face or surface veneers are applied and again cores are subjected to tremendous hydraulic pressure. Grain of core or center piece is always placed at right angles to grain of veneer, thus increasing the strength and preventing swelling, shrinking or checking.

Veneers.

The best grained and best quality only of rotary cut and sawed veneers are used. Plain Oak, Brown Ash and Birch contain rotary cut figures; while Mahoganies and Quartered Oaks are selected for colors as

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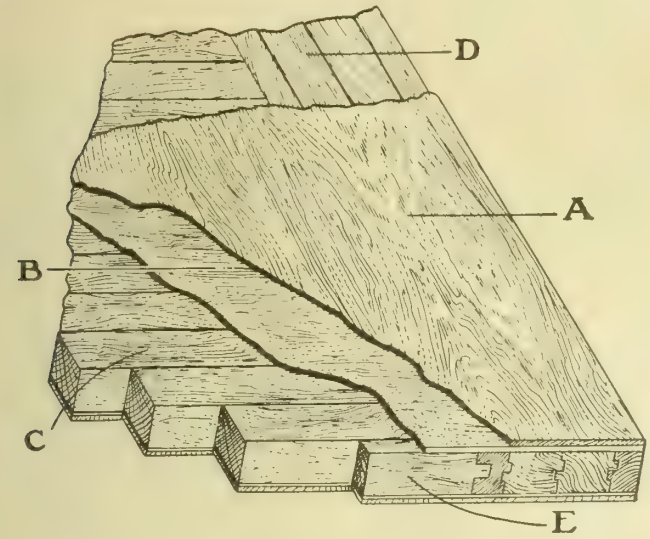
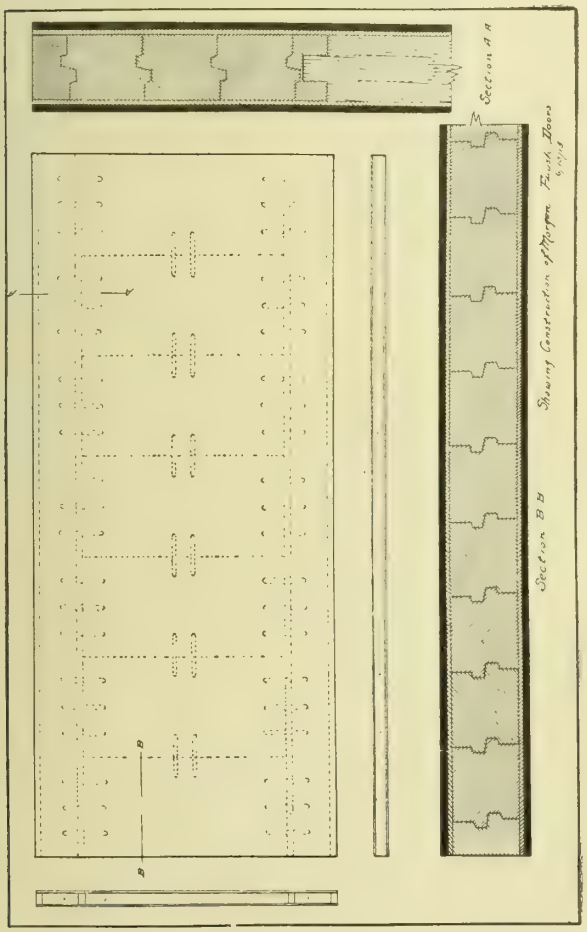
well as figures. The mahogany stain on Wisconsin Birch escapes detection by experts.



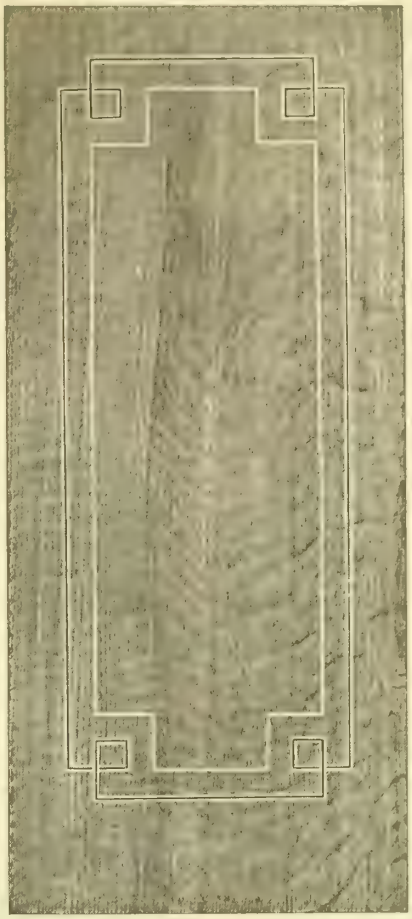
DETAIL OF CONSTRUCTION MORGAN DOOR

"A" ⅛ inch face veneer
"B" Cross banding veneers
"C" Solid rail construction with glued joints
"D" Stile construction with glued joints
"E" Edge strips to match veneers



SKETCH SHOWING CONSTRUCTION OF MORGAN FLUSH OR SANITARY DOORS

Note—Fifty-four dowels in each core



M-115. MORGAN FLUSH OR SANITARY DOOR

Design of Inlay I-1

Design shows quarter sawed White Oak and flitch sawed veneers. The exquisite graining is result of careful selecting and sawing. Built in different woods. Can be stained and finished in different shades

Construction Morgan Flush or Sanitary Doors.

The core or foundation of the door is built up of thoroughly kiln-dried pine, Morgan dowel construction being used. Stiles and top rail are six inches; bottom rail twelve inches. This frame or foundation part of the door forms a perfect flush door in itself.

The frame is re-dried and then planed and sanded to an even thickness.

The cross banding is next put on, and the face veneers placed upon it. The cross banding and veneers are glued to the core in hydraulic presses of three hundred tons capacity, a uniform pressure being maintained on all doors irrespective of size.

Morgan Company have always had special methods for building doors, and these methods show to advantage in their doors with inlay. The strips of inlay are so placed as to permit hand-smoothing of the entire surface at one time, thereby eliminating all imperfect joints.

Every door made by the Company is guaranteed to be perfect.

ESTABLISHED 1865 INCORPORATED 1901

THE R. McMILLEN COMPANY

Makers of "Max-Royal" Hardwood Veneered Doors

OSHKOSH, WIS.

BRANCH OFFICES

CHICAGO, ILL. NEW YORK, N. Y. WASHINGTON, D. C.

Products.

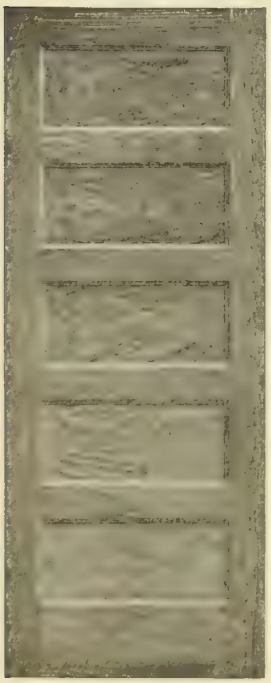
"Max-Royal" Veneered Doors; White Pine Doors and Sash; Interior Finish.

We sell to dealers only.

MAX-ROYAL TRADE-MARK

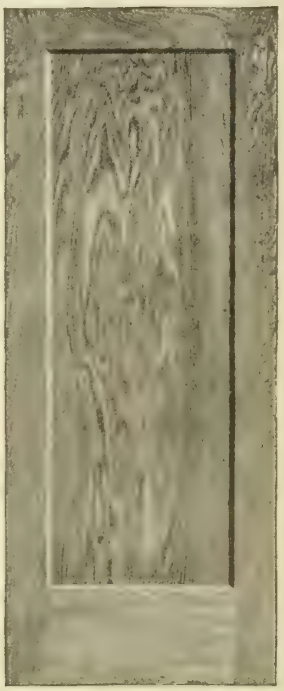
Facilities.

Our factory possesses the most up-to-date facilities, and the capacity is one thousand doors per day.

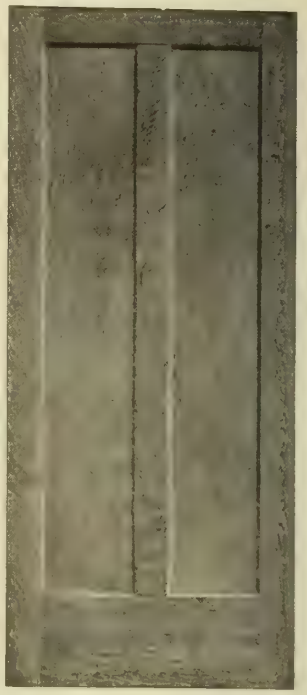


No. 150 Oak

No. 152 Birch

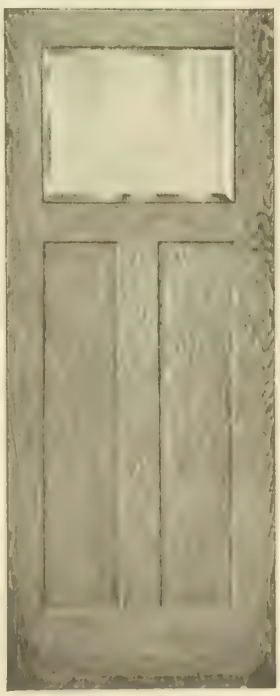


No. 153X Oak



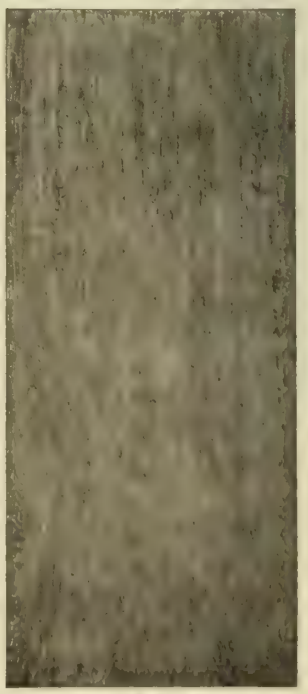
No. 153¼ Birch

No. 311 Oak



No. 311½ Oak

No. 372 Oak



No. 185 Red Birch

A FEW REPRESENTATIVE DESIGNS OF "MAX ROYAL" DOORS

If interested send for Catalogue No. 30, showing complete line

THE McCABE HANGER MFG. CO.

425-427 West 25th Street
NEW YORK, N. Y.

Products.

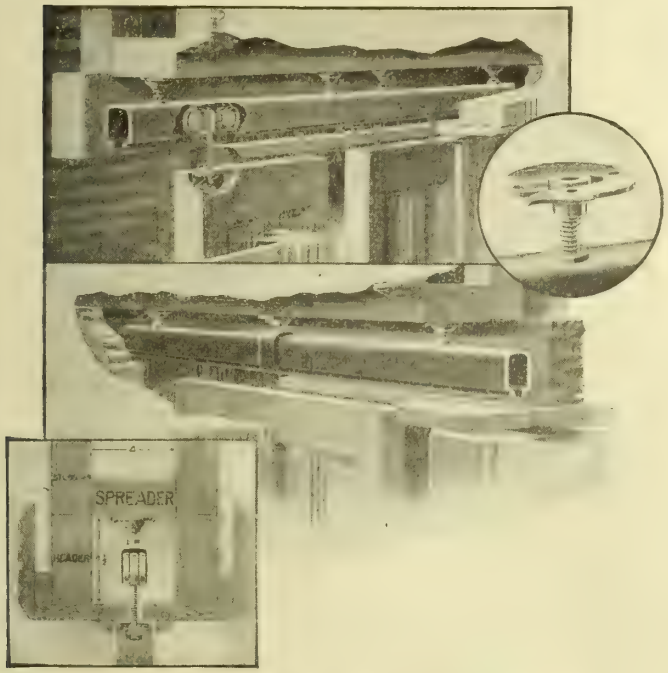
All Types of Sliding Door Hangers, including Parlor Door Hangers, Accordion Folding Door and Folding Partition Hangers, Elevator Door and Barn Door Hangers; Combination Floor Guide and Weather-Strips.

Also, Vertical Bar Elevator Door Locks, Overhead Conveying Devices, Expansion Bolts, etc.

Parlor Door Hangers.

"McCabe No. 10"—This is a simple, durable and noiseless device. Track is made of No. 13-gauge cold-drawn steel, and carriages have drop-forged frames and ball-bearing fibre wheels. Track and carriages are adjustable, so that any inequalities of the spreader or the door may be remedied.

The accompanying illustration shows method of installing. Headroom required, 4½ inches.

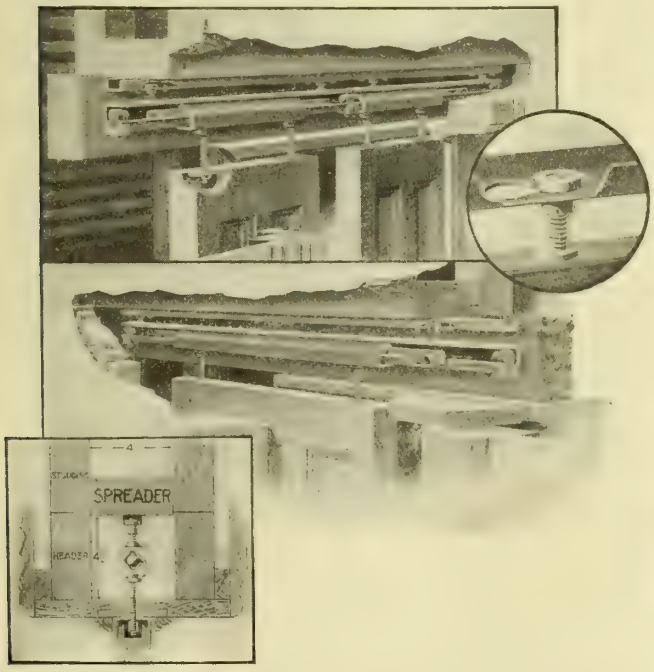


"McCABE NO. 10" PARLOR DOOR HANGER

"McCabe No. 5"—Shown in the accompanying illustration is the latest improvement in ball-bearing hangers for interior sliding doors. Wheels are entirely eliminated, the doors sliding on ¾-inch polished steel balls. Friction and wear are therefore reduced to the minimum, and the operation of the doors is accompanied with least sound.

The channel header is punched in four places to receive the lifting nuts, which (by unfastening the one at the left) permit the track to be drawn out of the pocket, adjustment made, and the track then readily replaced. By turning the bolt which screws into the door, vertical adjustment, up or down, may be made.

How to Specify—All interior sliding doors shall be hung with "McCabe No. 5" Parlor Door Hangers.



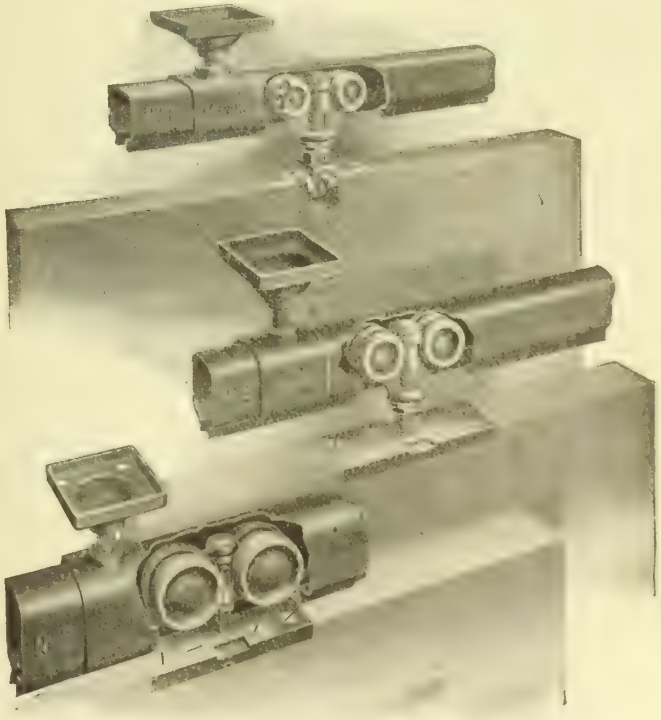
"McCABE NO. 5" BALL-BEARING PARLOR DOOR HANGER

Accordion or Folding Door Hangers for Accordion or Folding Partitions.

Track is made of No. 13-gauge cold-drawn steel, and swiveled carriages have drop-forged frames and ball-bearing wheels.

One carriage only is used on each alternate door, placed in the exact center of the door as shown.

If possible, doors should not exceed three feet in width, or one hundred pounds in weight; as a carriage is used on each alternate door only, and when the doors are folded back, the entire weight is concen-



ACCORDION OR FOLDING DOOR HANGER
Ball-Bearing Swiveled Carriage

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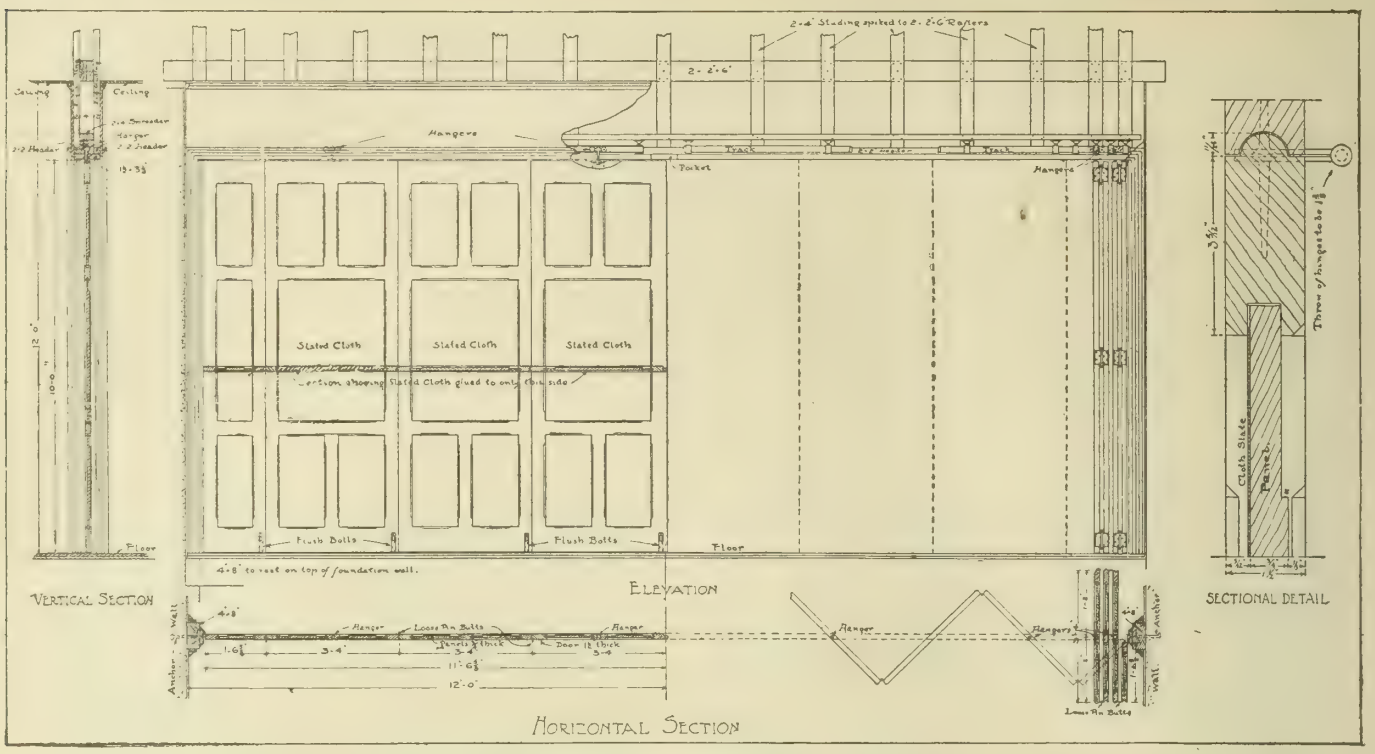


STANDARD DETAILS OF ACCORDION DOORS AS HUNG WITH McCABE HANGERS

trated on a few inches of track. Any number of doors may be placed in an opening, commencing with a half door hinged to the jamb at either side, as per above illustration. This half door must be exactly one half the width of the full doors, less the throw of the hinge.

How to Specify—Folding Doors and Partitions shall be equipped with "McCabe" Accordion Door Hangers.

NOTE—For 1½-inch or 1⅜-inch doors, specify Track No. 1 and Carriage No. 71;

For 1¾-inch doors, specify Track No. 2 and Carriage No. 72;

For 2-inch to 2½-inch doors, specify Track No. 3 and Carriage No. 73.

Barn Door Hangers.

The "McCabe" No. 60 and No. 3 Barn Door Hangers are the best hangers on the market for barns, garages, warehouses, piers, and like structures. Track is made of No. 12-gauge cold-drawn steel, and the carriages are equipped with ball-bearing steel wheels, all parts thoroughly hardened to insure long wear. Apron No. 19 allows for both vertical and horizontal adjustment of the door.

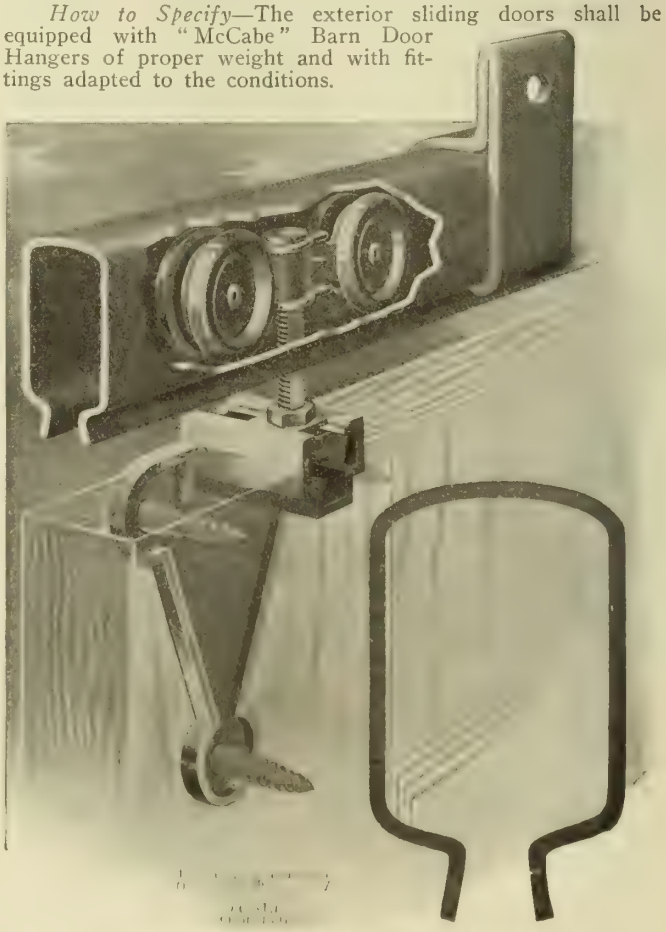
No. 3 Track, with brackets spaced every two feet, will carry doors weighing from 500 to 700 pounds; and No. 4 Track, similarly supported, will carry doors weighing from 800 to 1000 pounds. For heavier doors, use more brackets and double-tree carriages.

The following table may be used to determine the weights of the doors for the purpose of selecting a hanger of the proper strength, and determining the structural member by which the track is supported. Use full thickness of door, regardless of paneling.

TABLE OF DOOR WEIGHTS

Material	Weight in pounds of each square foot of Door for various thicknesses									
	1-inch	1⅛-inch	1¼-inch	1⅜-inch	1½-inch	2¾-inch	2⅞-inch	3-inch	3½-inch	
White Pine	2 66	3 12	3 64	4 16	4 68	4 95	5 47	6 25	7 29	
Oak and Ash	4 000	6 00	7 00	8 00	9 00	9 50	10 50	12 00	14 00	
	3 417	5 13	6 01	6 85	7 69	8 12	8 97	10 25	11 96	
	4 33	6 50	7 58	8 66	9 75	10 29	11 37	13 00	15 16	
	8 00	9 33	10 66	12 00	13 66	14 00	16 00	18 66		
Whitewood	2 417	3 63	4 23	4 83	5 44	5 74	6 34	7 23	8 46	

How to Specify—The exterior sliding doors shall be equipped with "McCabe" Barn Door Hangers of proper weight and with fittings adapted to the conditions.



"McCABE" NO. 3 BARN DOOR HANGER

Brackets.

The following illustration shows the various forms of brackets used for hanging track to the structural member of door opening. Dimensions are given, so that due allowance may be made on full-size de-

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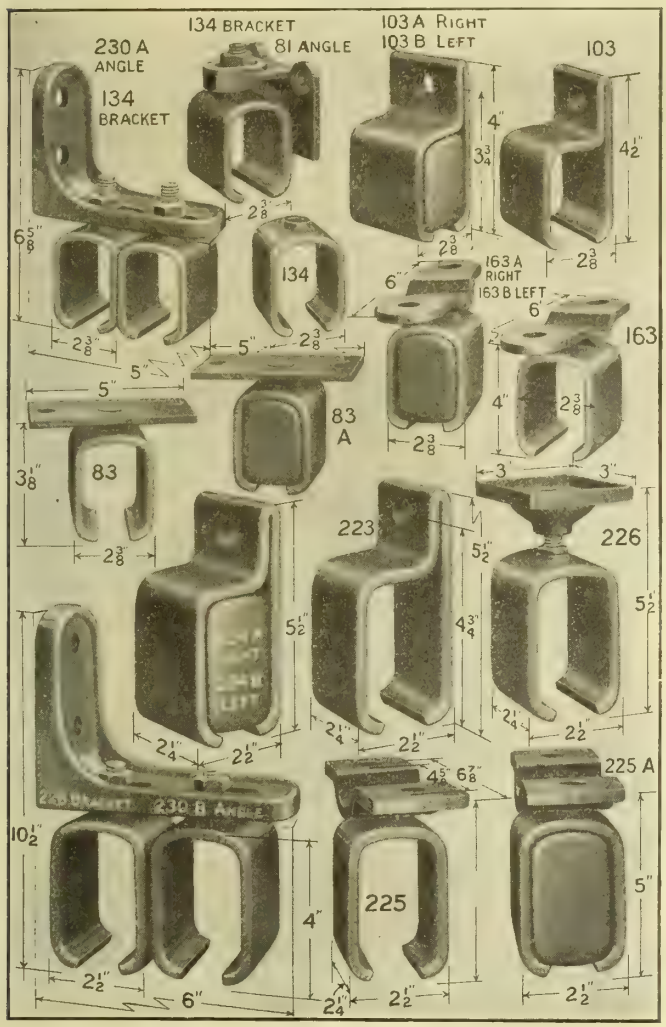
tails. The six fittings in the lower half of illustration are for No. 4 track, the rest for No. 3 track.



BRACKETS FOR NOS. 3 AND 4 TRACK

Floor Guide.

The accompanying illustration shows the "McCabe" Floor Guide and Weather-Strip for use with exterior sliding doors when the floor is of concrete.

How to Specify—Fit the sliding doors with the "McCabe" Floor Guide and Weather-Strip.

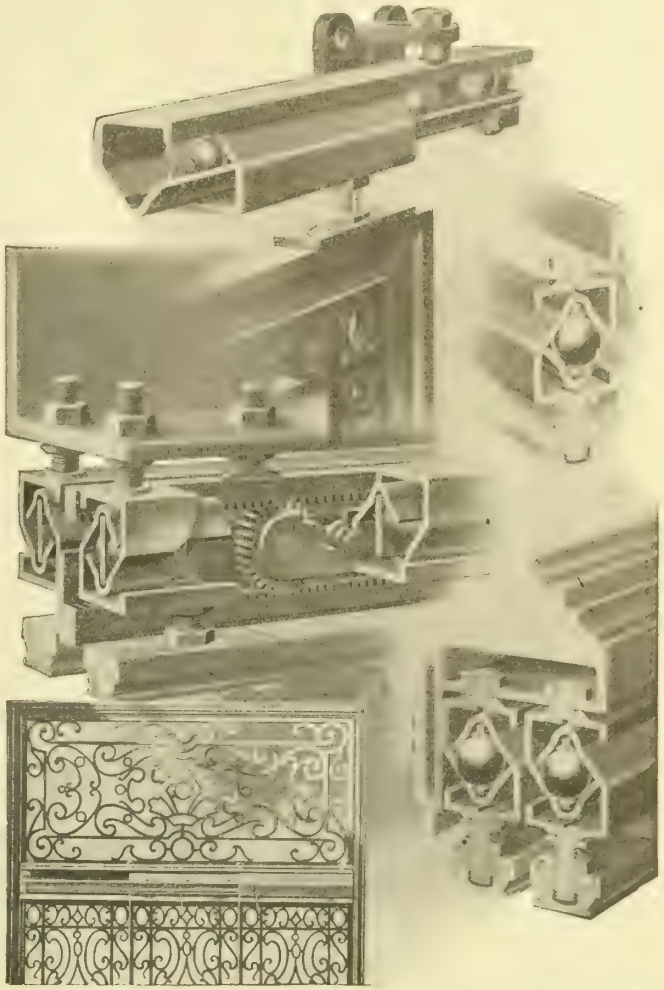
FLOOR GUIDE AND WEATHER-STRIP

"McCabe No. 5" Elevator Door Hanger.

Track is made of No. 10-gauge cold-rolled steel; a smooth rolling surface for the bearings, and of sufficient thickness and strength to ensure long and efficient service. The length of the track is equal to the full travel of the doors, and the weight is therefore always evenly distributed.

Bearings consist of ¾-inch hardened steel balls, spaced 3 inches apart. These are the largest size balls used in elevator door hangers, and they are spaced close together, an ordinary 3-foot door requiring 17 balls. Friction and noise are reduced to a minimum, and quiet, easy-running doors are the result. Doors may be adjusted laterally or vertically without difficulty.

How to Specify—Equip elevator doors with "McCabe No. 5" Elevator Door Hangers and "McCabe" Vertical Bar Locks.



"McCABE NO. 5" ELEVATOR DOOR HANGER FOR SINGLE AND TWO-SPEED DOORS

Catalogues, etc.

Complete catalogue and details of any of our products will be gladly furnished on application.

A FEW BUILDINGS EQUIPPED WITH "McCABE NO. 5" ELEVATOR DOOR HANGERS

BUILDING AND LOCATION	ARCHITECT
Merchants' Natl. Bank, St. Paul, Minn.	Jarvis Hunt
Union Station, Dallas, Texas.	Jarvis Hunt
Chemistry Building, Illinois State University.	Jas. B. Dibelka
Westminster Courthouse, New Westminster, B. C.	Gardiner & Mercer
Methodist Hospital, Los Angeles, Cal.	W. S. Garrett
Y. M. C. A., Atlanta, Ga.	Shattuck & Hussey
Y. M. C. A., Springfield, Mass.	Shattuck & Hussey
French Lick Springs Hotel, French Lick Springs, Ind.	D. A. Bohlen & Son
Union Central Bldg., Cincinnati, Ohio	Cass Gilbert and Garber & Woodward
Harris Emery Department Store, Des Moines, Iowa.	Proudfoot, Bird & Rawson
Proctor's Theatre, Newark, N. J.	Arland W. Johnson

ALLITH-PROUTY COMPANY

SUCCESSOR TO ALLITH MFG. CO., CHICAGO, ILL., AND T. C. PROUTY CO., LTD., ALBION, MICH.

Manufacturers of Door Hangers, Fire-Door Hardware, etc.

GENERAL OFFICES AND FACTORY

DANVILLE, ILL.

BRANCH OFFICES AND WAREHOUSES

NEW YORK, N. Y., 244 Water Street
PHILADELPHIA, PA., 521 Commerce Street
BOSTON, MASS., 136 Pearl Street
CHICAGO, ILL., 164 No. Wabash Avenue
SAN FRANCISCO, CAL., 787-793 Brannan Street
LOS ANGELES, CAL., 229 South Los Angeles Street

Products.

Door Hangers, Spring Hinges and Fire-Door Hardware.

Also, Store Ladders, Overhead Carriers and Hardware Specialties.

Door Hangers.

This Company makes various styles and grades of door hangers to meet all conditions, and here illustrates some of the best and most popular numbers. Although flat and trolley track hangers are manufactured, the round or tubular track style, originated by them, is recommended particularly, and has proved in many respects more satisfactory than any other.

Great care is exercised in the selection of suitable steels and metals to meet the requirements of finish, strength and durability, and castings are almost altogether malleable iron, thoroughly annealed and practically non-breakable.

Finish.

The standard finish on door hangers and kindred lines is baked black japan, but electro-galvanized is furnished if desired. Floor hinges and finishing hardware are electroplated in the various hardware finishes.

Sizes.

These two pages simply show some of the more important products. All illustrations, except the two showing Fire and Parallel Door Equipment, are about one eighth actual size. The Barn Door Hanger, No. 2, for instance, is twelve inches long; and the No. 7 Warehouse Door Hanger, twenty-seven inches long.

Where Sold.

Allith-Prouty products are sold everywhere by the hardware trade, who will furnish catalogues, detailed drawings, specific information and estimates on request.

Specification.

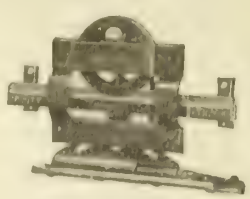
Simple and adequate specifications are as follows:

Hang all sliding doors on proper "Allith" or "Prouty" door hangers and track.

Hang all double-acting doors on proper "Prouty" floor hinge.

Equip all fire-doors and shutters with proper "Allith" hardware, acceptable to the insurance inspection bureau in charge.

The No. 5 Cushion Track House Door Hanger.

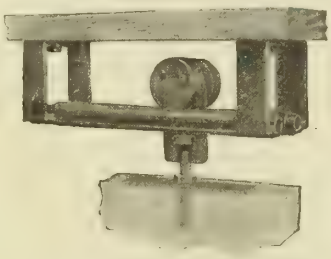


"PROUTY" NO. 5 HOUSE DOOR HANGER AND CUSHION TRACK

Easy and noiseless in operation, positive in adjustment and durably constructed. The track is made of hard maple with a felt cushion mounted in a noiseless metal casing. This is the most popular of their extensive line of house door hangers.

Swivel Hangers.

For accordion doors and doors sliding at right angles, such as are frequently required in garages, schools and churches, a line of both single and double truck swivel hangers is manufactured.

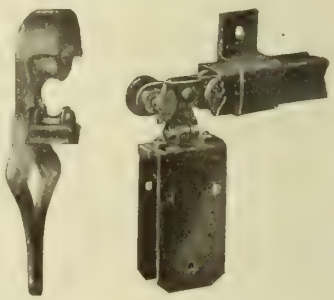


NO. 19 SWIVEL HANGER WITH NO. 11F TRACK

NO. 79 TROLLEY SWIVEL HANGER

Barn Door Hangers.

Their line of barn door hangers embraces styles and sizes to meet all conditions. The three shown are the best of their kinds. The Nos. 2 and 61 are particularly desirable for inside doors and the No. 1010 for doors hung out in the weather.



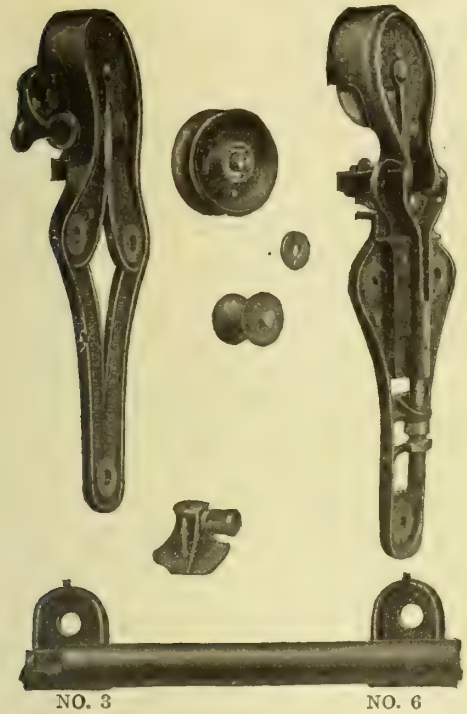
NO. 2 NO. 61
BARN DOOR HANGERS

NO. 1010. ROUND-TREAD WATERSHED DOOR HANGER

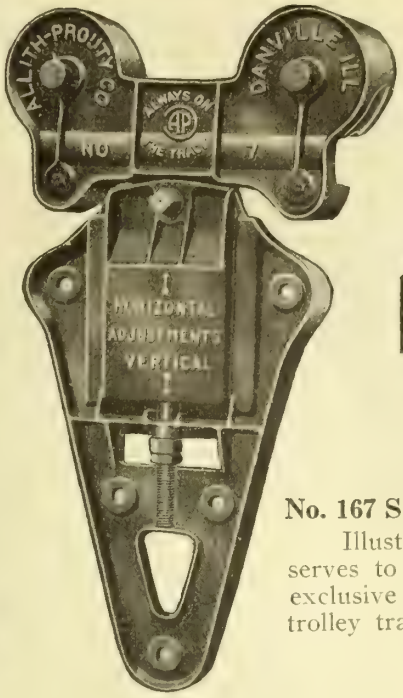
Heavy Door Hangers.

For heavier doors the Nos. 3, 4, 6 and 7 Hangers are recommended with single or parallel track as the requirements demand. The Nos. 3 and 6 Hangers are also approved for fire-door use. (See following page.)

Continued on next page

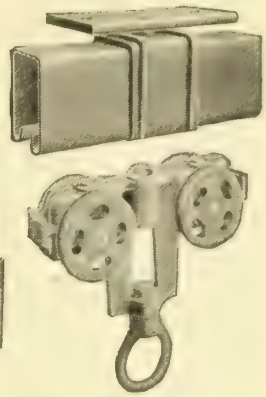


NO. 3 NO. 6
FIRE AND WAREHOUSE DOOR HANGERS
With top wheel, washer, lower wheel, end bracket, and track with center brackets



NO. 7 WAREHOUSE DOOR HANGER

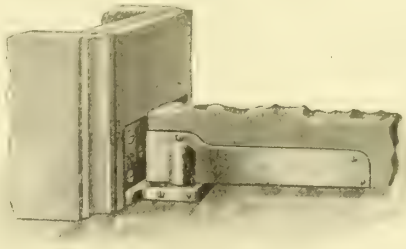
NO. 1
WAREHOUSE
DOOR HANGER



NO. 167
SWIVEL OVERHEAD
CARRIER

No. 167 Swivel Overhead Carrier.

Illustrates their swivel pedestal carrier and serves to call attention to their extensive and exclusive equipment furnished in round and trolley track styles to meet various conditions.



NO. 3300J FLOOR HINGE WITH JAMB PLATE

"Prouty" Floor Hinge.

Made in two sizes: No. 3300 for doors 1⅛ to 2 inches thick, and No. 3800 for doors 2 to 3 inches thick. This hinge is ball bearing, adjustable in both spring tension and door alignment, and superior in many respects to all others. Furnished with floor or jamb plates as desired.

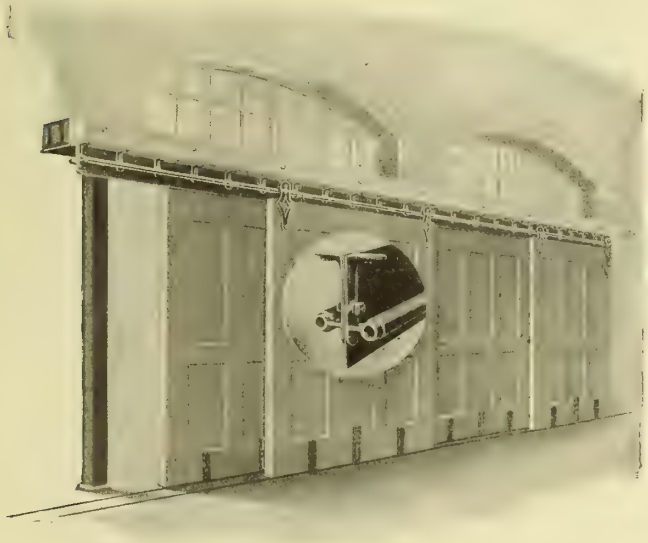
NO. 3800 FLOOR HINGE WITH SIDE PLATES REMOVED

Parallel Door Equipment.

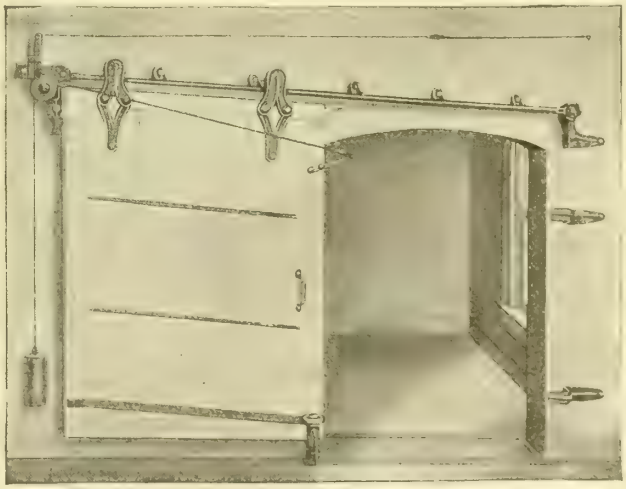
Their parallel door equipment is the only absolutely stormproof arrangement for continuous, parallel sliding doors. It insures perfect movement of the doors and permits an opening at any place desired. Made in different sizes to accommodate doors of different weights.

Fire-Door and Shutter Hardware.

A complete line of fire-door and shutter hardware is manufactured for both sliding and swinging doors and shutters. Style No. 500 illustrated is one of their several styles. The sliding fire-door hardware is easy and simple to install; strong, efficient and durable. Regularly inspected and labeled under the supervision of the Underwriters' Laboratories, Inc., under direction of the National Board of Fire Underwriters.



GENERAL VIEW AND DETAIL OF PARALLEL DOOR EQUIPMENT
No. 3 Hanger with 33P Track



"ALLITH" SLIDING FIRE-DOOR HARDWARE
Inclined Track, Style No. 500, Automatic Closing Device

ESTABLISHED 1876

BOMMER BROTHERS

Spring Hinges

Classon and Willoughby Avenues

TELEPHONE, 7600 PROSPECT

BROOKLYN, N. Y.

Products.

SPRING BUTT HINGES; FLOOR SPRING HINGES; PIVOT HINGES; SPRING HINGES for Lavatory Doors; BOLTS, STRIKES, LATCHES, etc., used in connection therewith; HOSPITAL DOOR SPRING HINGES.

Quality.

Standard for 40 years, and steadily improved, retaining superiority over all others.

Prices.

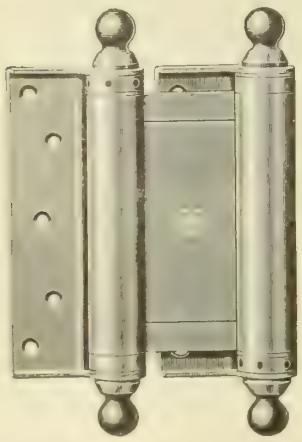
Prices are guaranteed to be no higher than those for goods of corresponding type.

Specifications.

Architects in specifying our product should use the word "Bommer," and in addition thereto, if possible, the number of the article and finish. Hardware dealers and lock manufacturers can include them in their contracts.

Catalogues.

Complete catalogue of our line forwarded upon application. For projects requiring special spring hinges we solicit details of construction.



DOUBLE ACTION BOMMER HINGE

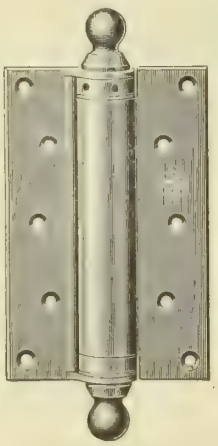
TRADE MARK THE BOMMER SPRING HINGE

Reg. U. S. Pat. Office

"BOMMER"

Reg. U. S. Pat. Office

TRADE-MARKS



SINGLE ACTION BOMMER HINGE

Requirements.

Always use the largest size hinge which the thickness of the door will permit.

Size of hinge required	For doors not exceeding the following combinations of width and thickness			Thickness of hanging strip
3 inch	[illegible]	or	1 " x 2' 0"	½ inch
[illegible]	[illegible]	or	1¼ " x 2' 0"	⅝ inch
5 inch	1 [illegible]	or	1½ " x 2' 3"	⅝ inch
6 inch	1¼ " x 2' 9"	or	1¾ " x 2' 3"	¾ inch
7 inch	1 [illegible]	or	2 " x 2' 6"	⅞ inch
8 inch	1 [illegible]	or	2¼ " x 2' 6"	1 inch
10 [illegible]	1 [illegible]	or	2½ " x 2' 9"	1⅛ inch
12 [illegible]	2¼ " x 3' 3"	or	[illegible]	1¼ inch

Bommer Spring Butt Hinges.

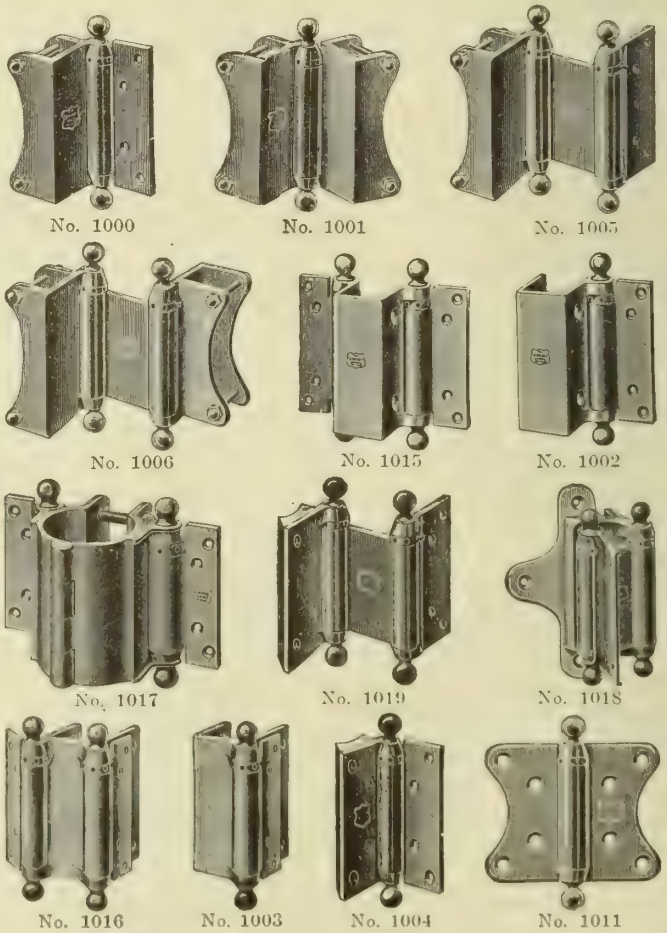
Bommer Double Acting Spring Butt Hinges are the only faultless and technically correct double acting spring butt hinges. They have the weight supporting bearings located so as to entirely relieve both adjustable spring holders from supporting the weight of the door, enabling both coil springs to respond freely and evenly in the barrels of the hinge when the door is opened in either direction, increasing durability and decreasing the breakage of the springs. By this construction the durability of the hinge becomes practically unlimited and unequal wear of the barrel-ends is eliminated.

Bommer Spring Hinges exclusively have an efficient lubricating system, by which all bearings as well as the springs and the inner surface of barrels may be lubricated, permitting abatement of disturbing noises

Bommer Spring Butt Hinges are made of wrought steel, bronze and brass, in all finishes. They all have steel bearings throughout.

Bommer Lavatory Spring Hinges.

The following illustrations show a complete line of box-flanged spring hinges for clamping lavatory doors on to marble or slate partitions, being also suitable for public comfort stations, bath-houses, and hospital work. Made of brass nickel-plated or bronze highly polished, adaptable to all conditions met with in such work.



BOMMER LAVATORY SPRING HINGES

In most styles illustrated the box flanges are adjustable ⅛ inch each way, but the thickness of both marble and door must be stated when specifying. Regularly made to close the door, but the single action can be furnished with reverse springs to hold it open if so ordered. The flanges are 4 inches in length.

Blanks for Lavatory Hinges.

For extra light and narrow lavatory doors, if close economy is essential, blanks can be furnished for use

Continued on next page

in connection with single-acting lavatory spring hinges shown on preceding page.

Strikes for Lavatory Doors.

Adjustable strikes, having rubber bumper (Style 1051) to clamp to the marble, for use with lavatory spring hinges in connection with any style of bolt or latch, can be furnished. Style 1070 is for fastening to face of door; style 1072 for fastening to edge of door.

NO. 1051 NO. 1070 NO. 1072

Bommer Door Holder.

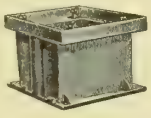
Is the best, easiest to apply, and most effective device for holding open doors of public or office buildings and residences. A light pressure of the foot will either throw or retract the bolt. The rubber tip prevents marring of floor. Will reach 1½ inches from door to floor. Furnished in wrought steel or bronze metal in all finishes.

DOOR HOLDER

Bommer Floor Mortise Spring Hinges.

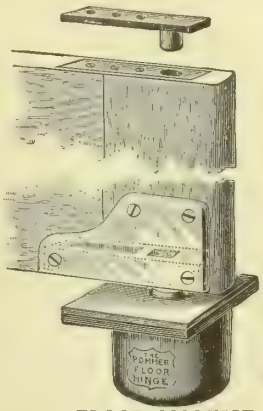
The Bommer Floor Mortise Spring Hinge supports the weight of the door on tool steel ball bearings set upon a raised centerpost, giving an easy movement to the door. The ball bearings are protected from water and dirt. Only the best oil-tempered steel springs are used. These hinges can be furnished with an invisible socket bar and adjustable top pivot instead of side plates if preferred.

No hanging strip is required. The back edge of the door is slightly rounded. The tension of the spring is adjustable. These floor hinges are double - acting, but by using a stop-head they work equally well single-acting.



CAST-IRON BOX

Suitable for setting all sizes of Floor Mortise Hinges and Pivots into Tile or Cement Floors



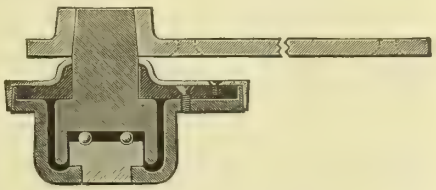
FLOOR MORTISE SPRING HINGE

REQUIREMENTS, MORTISE TYPE

Thickness of Door	Use Size	Dimensions of Top Plate	Depth of Cup	Distance from Center of Spindle to Door Casing
⅞ to 1½ in.	2	3¾ x 5⅛ in.	3 in.	1⅝ in.
1⅜ to 2 in.	4	3⅞ x 5⅝ in.	3½ in.	1¾ in.
2 to 2½ in.	6	4½ x 6½ in.	3¾ in.	2 in.
2½ to 3½ in.	8	4½ x 6½ in.	3¾ in.	2 in.

Bommer Ball-Bearing Pivots Without Springs.

These pivots can be used to hang doors either double or single action. They are durable, noiseless, work smoothly and permit the heaviest doors to be used with but slight exertion.



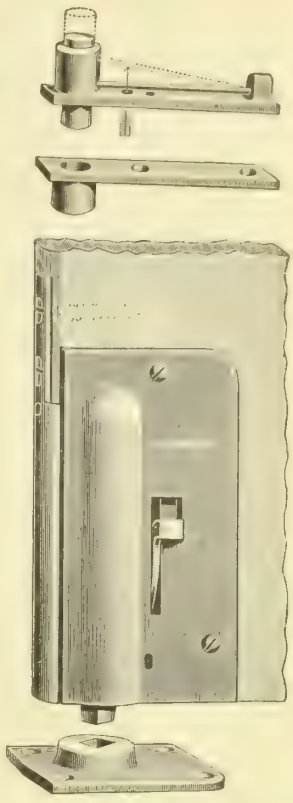
BALL-BEARING PIVOT

REQUIREMENTS, PIVOTS

Thickness of Door	Use Size	Dimensions of Top Plate	Depth of Cup	Distance from Center of Pivot to Door Casing
¾ to 1¼ in.	26	1 x 4 in.	1⅛ in.	⅝ in.
1¼ to 2½ in.	27	4 x 3¼ in.	1⅝ in.	1½ in.
2 to 4 in.	28	5½ x 5¼ in.	3¼ in.	2¼ in.

Bommer Vertical Double Release Floor Surface Spring Hinge.

Permits door to stand open at any angle by pressing down either side pedal with the foot. The spring tension automatically reëngages itself when door is closed. The spring power can also be entirely released whenever desired. The pintle has a square shank resting in a corresponding socket in the floor plate which is fastened to the floor surface, obviating cutting holes. The weight of the door is carried on hardened steel ball bearings located in the upper part of the hinge away from water, dust and dirt. All moving parts can be lubricated through a hole in the side plate. The top pivot has a spring actuated plunger which permits the door to be taken down quickly and easily without removing the screws. For tile or concrete floor, special right angle floor plate can be furnished.



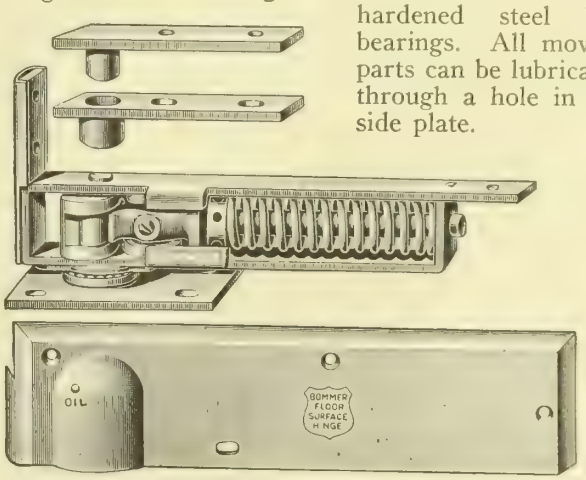
VERTICAL FLOOR SURFACE SPRING HINGE

REQUIREMENTS, VERTICAL TYPE

Thickness of Door	Use Size	Dimension of Floor Plate	Distance from Center of Spindle to Door Casing
1⅛ to 1½ in.	20	2¾ x 3⅞ in.	1¼ in.
1½ to 2 in.	22	3 x 3½ in.	1½ in.
1¾ to 2¾ in.	24	3½ x 4⅜ in.	2 in.

Bommer Horizontal Holdback Floor Surface Spring Hinge.

Will hold the door open when swung back 90 degrees. The spring-power can also be entirely released whenever desired; it has an efficient alignment feature; the tension of the spring is adjustable. The floor plate is screwed to the floor surface, obviating cutting holes. The weight of the door is carried on hardened steel ball bearings. All moving parts can be lubricated through a hole in the side plate.



HORIZONTAL FLOOR SURFACE SPRING HINGE

REQUIREMENTS, HORIZONTAL TYPE

Thickness of Door	Use Size	Dimension of Floor Plate	Distance from Center of Spindle to Door Casing
1⅛ to 1¾ in.	18	2¾ x 3½ in.	1½ in.
2 to 2½ in.	19	4 x 5 in.	2¼ in.

CHICAGO SPRING BUTT COMPANY

Spring Hinges

GENERAL OFFICES AND WORKS
334-340 Union Park Court
CHICAGO, ILL.

EASTERN OFFICE AND WAREHOUSE
81-81½ Walker Street
NEW YORK, N. Y.

Products.

Manufacturers of a complete line of PATENT SPRING HINGES, including "CHICAGO" SPRING and SPRINGLESS BUTT-HINGES; "TRIPLEX" SPRING BUTT-HINGES; "CHICAGO" "RELAX," "PREMIER" and "AJAX" SPRING PIVOT-HINGES; "TRIPLEX" LAVATORY SPRING HINGES.

"CHICAGO" FIRE-STATION SPRING HINGES and CHECKING DOOR HOLDERS; "CHICAGO" GARAGE SPRING HINGES and DOOR BOLTS; LAVATORY DOOR BOLTS, LATCHES and STOPS; "TRIPLEX" WIDE-SWEEP GATE SPRING BUTT-HINGES; "CHICAGO" GATE SPRING PIVOT-HINGES.

Superior Quality.

Our Spring Hinges are of recognized superiority, have distinctive advantages and are guaranteed in every respect. We solicit specifications embodying suggestions for spring hinges of special construction.

Ordering.

In specifying, designate article by number, size, and finish. Hardware dealers are in possession of lists, prices, and complete data pertaining to our products. Made in standard sizes and all standard finishes. Any special finishes can be furnished promptly.

Prices.

Prices are comparative with those of standard grades and quality. Quotations on special goods and finishes supplied on request.

"Chicago" Double-Acting Spring Butt-Hinges, No. 1½.

"Chicago" Spring Hinges are constructed in a most substantial manner. The spring power, effected by both a torsion and leverage principle, produces a positive action as well as an easy movement of the door. General construction and mechanical action of this hinge produce best results obtainable in operating doors subject to excessive and violent use.

No. 1
"CHICAGO" SPRING BUTT-HINGE

FOR DOORS THICKNESS

⅞	to	1	inch
1⅛	"	1¼	"
1⅜	"	1½	"
1¾	"	2	"
2¼	"	2½	"
2¾	"	3½	"

No. 3½
"CHICAGO" SPRINGLESS BUTT-HINGE

"Chicago" Double-Acting Springless Butt-Hinges, No. 3½.

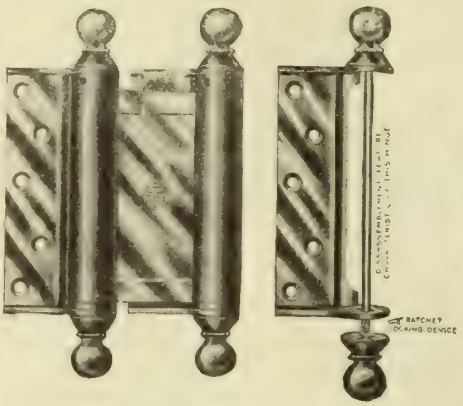
"Chicago" Springless Butt-Hinges can be employed advantageously in combination with a spring hinge where doors are light or narrow. This combination not advisable on outside doors subject to draughts, where pair of spring hinges should be used.

"Triplex" Spring Butt-Hinges, Double-Acting, No. 2001; Single-Acting, No. 2002.

The Chicago "Triplex" Spring Hinge is constructed on scientific and practical principles. The body is made of one integral piece, giving a maximum of strength and rigidity. The broad steel bearings, hardened lug bushings and disassemblement feature are characteristic of this product. Springs are made of the best tempered steel wire, in ample proportions for the most excessive requirements.

Single-Acting Hinges can be furnished with reverse springs to throw door open when released. These hinges also supplied with a wide sweep to clear a hand rail on office gates.

Registered U. S. Pat. Office



No. 2001
"TRIPLEX" DOUBLE-ACTING SPRING BUTT-HINGE

No. 2002
"TRIPLEX" SINGLE-ACTING SPRING BUTT-HINGE

DIMENSIONS

Size of Hinge	Door	Hanging Strip	Doors			
Length of Flange	Thickness	Depth	Thickness	Width	Thickness	Width
3 in.	¾ to 1 in.	⅝ in.	¾ in. x 2 ft. 3 in.	to 1 in. x 2 ft. 0 in.		
4 "	⅞ " 1¼ "	⅝ "	⅞ " " 2 " 6 "	" 1¼ " " 2 " 0 "		
5 "	1⅛ " 1½ "	⅝ "	1⅛ " " 2 " 6 "	" 1½ " " 2 " 3 "		
6 "	1¼ " 1¾ "	¾ "	1¼ " " 2 " 9 "	" 1¾ " " 2 " 3 "		
7 "	1⅜ " 2 "	⅞ "	1⅜ " " 2 " 9 "	" 2 " " 2 " 6 "		
8 "	1½ " 2¼ "	1 "	1½ " " 3 " 0 "	" 2¼ " " 2 " 6 "		
10 "	1¾ " 2½ "	1⅛ "	1¾ " " 3 " 0 "	" 2½ " " 2 " 9 "		
10 "	2¼ " 2¾ "	1⅛ "	2¼ " " 3 " 0 "	" 2¾ " " 2 " 6 "		
12 "	2¼ " 3 "	1¼ "	2¼ " " 3 " 3 "	" 3 " " 3 " 0 "		

Chicago "Relax" Spring Pivot-Hinges.

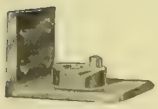
Chicago "Relax" Spring Pivot-Hinge (Type 6000) is adapted for highest class requirements. It is applied to surface of floor, thereby avoiding cutting into

Continued on next page

same or possible interference with girders or iron beams. The tension is adjustable. The spring action is readily released, allowing door to be placed open at any desired position; a great convenience, and eliminates the tendency of springs to lose their power as a result of remaining fixed at high tension when doors are held open by door holders.

Weight of door is carried on ball bearings located in the top of hinge, being protected from dirt and moisture. Adjustable top-pivot furnished with this hinge permits door to be fitted closely to top casing and to be taken down readily without removing any screws. No hanging strip required. Jamb edge of door is slightly rounded. For tile or concrete floors specify concrete floor plates.

No. 6000
CHICAGO "RELAX" SPRING PIVOT-HINGE



CONCRETE FLOOR PLATE

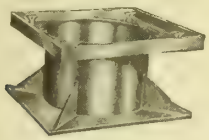
DIMENSIONS

For Doors, Thickness	Floor Plate Width	Floor Plate Length	Pintle Center to Door Casing
1⅛ to 1½"	2¾	3½"	1⅜"
1½ to 2"	3¼	3¾"	1½"
1¾ to 2¾"	3¾	4½"	2⅛"

"Chicago" Spring Pivot-Hinges.

Spring Pivot-Hinge (Type 5000) is very substantial in construction. The tension is adjustable. Easy action and minimum of wear produced by broad ball bearing, which distributes weight and friction over large area. Can be furnished with an invisible shoe and adjustable top-pivot in place of regular shoe and side plates. In tile or concrete floors concrete floor boxes should be imbedded, in which hinge is held by machine screws. No hanging strip required. Jamb edge of door is slightly rounded.

No. 5000
"CHICAGO" SPRING PIVOT-HINGE



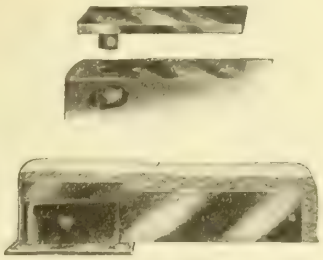
CONCRETE FLOOR BOX

DIMENSIONS

For Doors, Thickness	Top Cover Width	Top Cover Length	Box Depth Over All	Pintle Center to Door Casing
⅞ to 1½"	4"	4½"	2⅞"	1¾"
1⅜ to 2"	4⅜"	5"	3⅜"	1⅞"
2 to 2½"	4¾"	6"	3⅜"	2⅛"
2½ to 3½"	4¾"	6"	3⅜"	2⅛"

Chicago "Premier" Spring Pivot-Hinges.

Spring Pivot-Hinge (Type 4000) is applied to surface of floor. Mechanical action eliminates any tendency of wear in bearings. Action of spring is compression; spring is made of best tempered steel flat wire; tension is readily adjusted. With this hinge, door will remain open if swung beyond ninety degrees. No hanging strip required. Jamb edge of door is slightly rounded. For tile or concrete floors specify concrete floor plates.



No. 4000
CHICAGO "PREMIER" SPRING PIVOT-HINGE

DIMENSIONS

For Doors, Thickness	Floor Plate Width	Floor Plate Length	Pintle Center to Door Casing
1⅛ to 1¾"	3	x 4"	1½"
1¾ to 2¾"	3¾	x 5"	1⅞"

"Triplex" Lavatory Spring Hinges.

Chicago "Triplex" Lavatory Spring Hinges, as illustrated, are made in bronze, brass or nickeline metal for marble thickness as specified. The flanges are 4 inches. Nos. 2242, 2244, 2246, and 1247 have adjustable box flanges, adjustable ⅛ inch over and under the following sizes by which they are specified: 1 inch, 1¼ inch, 1½ inch, 1¾ inch and 2 inches.

Single-Acting Lavatory Hinges can be used in combination with a springless hinge, where doors are very narrow or light weight, as shown by articles No. 2244 and No. 2444. Where doors swing out and occupancy indicator is not desired, a checking springless hinge, No. 2246 or No. 2446, can be used, which holds door ajar when not bolted shut. Where doors swing in, hinges can be furnished with reverse springs to hold door open.

No. 2242

No. 2241

No. 2442

No. 1247F

No. 2244

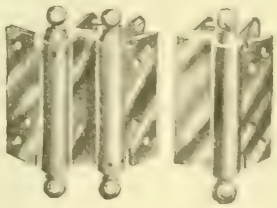
No. 2246

No. 2444

No. 2446

No. 2842

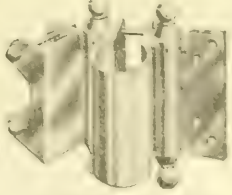
No. 2642



No. 2542 No. 2742

No. 1242

No. 1244



Nos. 2342A and 2342

CHICAGO "TRIPLEX" LAVATORY SPRING HINGES, STOPS AND BOLTS

GRANT PULLEY AND HARDWARE CO.

The "Diamond" Tubular Ball-Bearing Door Hanger, Manufactured by Diamond Door Hanger Co., Inc.

Architects Building, 101 Park Avenue
NEW YORK, N. Y.
TELEPHONE CONNECTION

AGENTS IN ALL THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Products.

"DIAMOND" TUBULAR BALL-BEARING SLIDING DOOR HANGERS and BAR LOCKS for Elevator Enclosure Doors; also, for Parlor, Barn, Fire, or other Doors, where strong, durable, smooth-running hangers are required.

Description.

The "Diamond" Hanger is simple in construction, consisting of a tubular track, groove bar and separator, with balls placed equal distances apart assembled and held in place in such a manner that there are no weak parts to wear out or get out of order. Best materials and workmanship.

Advantages.

(1) Requires less space than other hangers.

(2) Is easily installed and quickly adjusted.

(3) Dirt or dust cannot lodge in track.

(4) The load can be equally distributed over the entire width of door.

(5) Is the only hanger in which the balls turn only on their tangent points.

(6) Prices are no higher than for other high-class hangers.

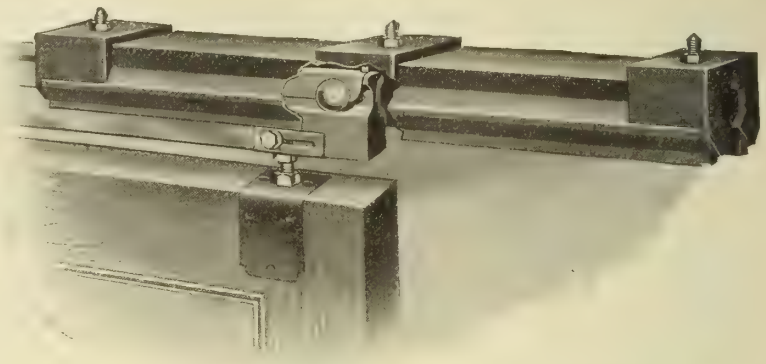
(7) It is the only tubular ball-bearing door hanger that the balls, when in place, hold the carrying bar without any lost motion.

(8) Under all conditions these hangers move with absolute accuracy, making them the best for use with automatic or semi-automatic operating devices.

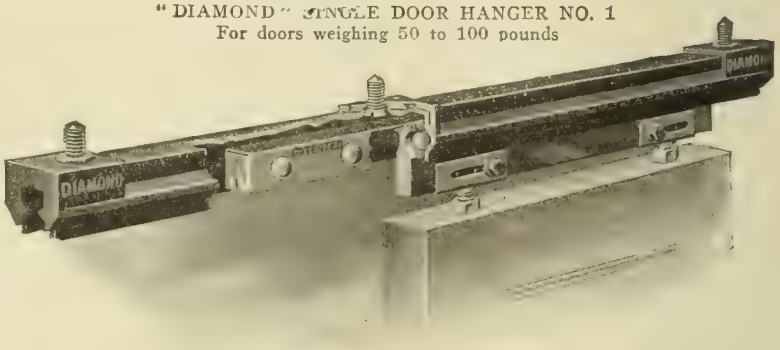
The advantages above enumerated make the "Diamond" hangers without question the best on the market. Try them and you will use no others.

References.

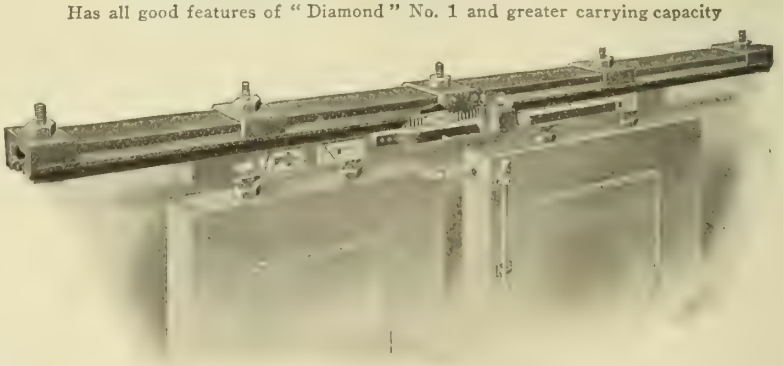
A list of important buildings in which the "Diamond" Hanger is used will be sent on application.



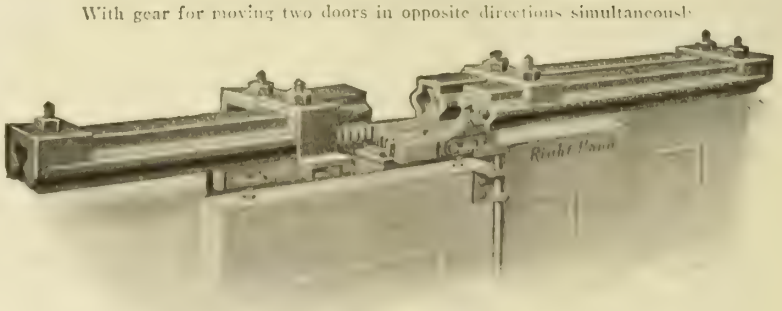
"DIAMOND" SINGLE DOOR HANGER NO. 1
For doors weighing 50 to 100 pounds



"DIAMOND" SINGLE DOOR HANGER NO. 2
Has all good features of "Diamond" No. 1 and greater carrying capacity



DOUBLE HANGERS, NO. 3
With gear for moving two doors in opposite directions simultaneously



TWO SPEED HANGER, NO. 4
For moving two doors in same direction, one traveling at double speed of other

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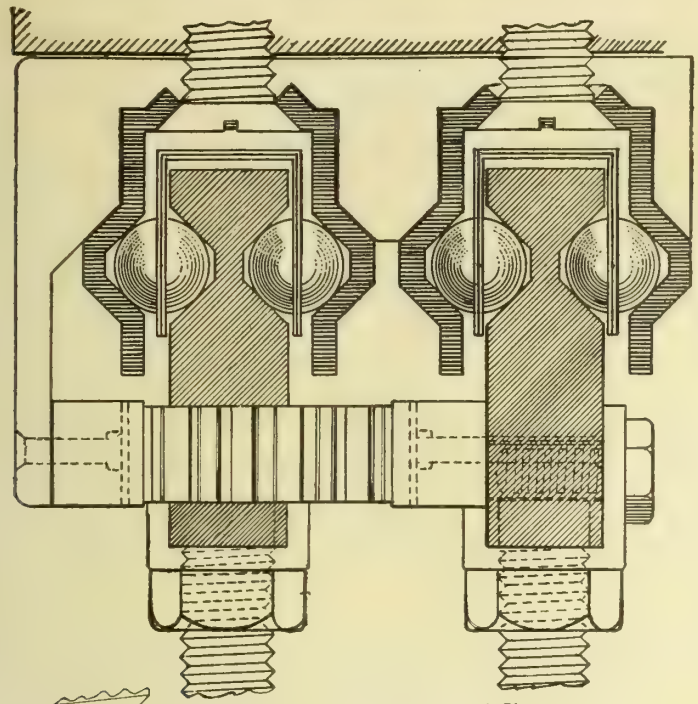
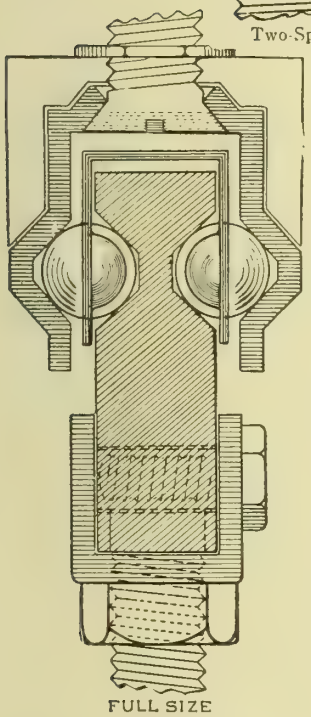
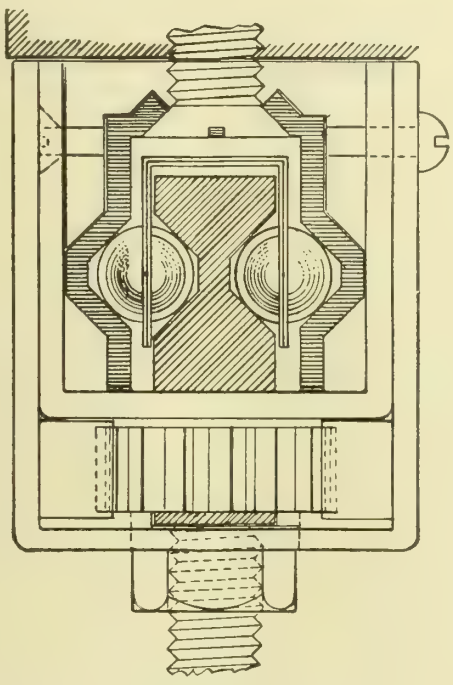


Two-Speed Hanger No. 4. Full Size



Single Hangers Nos. 1 and 2



Double Hanger No. 3

FULL-SIZE CROSS-SECTIONS OF HANGERS

Note small sectional space required

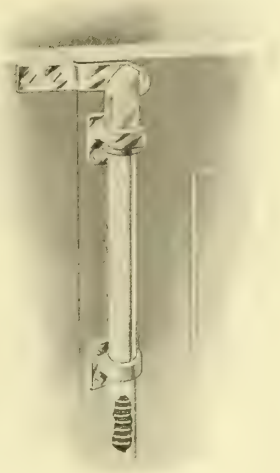
Hangers Nos. 1 and 2 show cross-section Single Hanger, full size
Hanger No. 3 shows cross-section Double Hanger, full size
Hanger No. 4 shows cross-section 2-Speed Hanger, full size, with rack and pinion
Our Hanger No. 5 is the same as No. 4, without rack and pinion

Ordering.

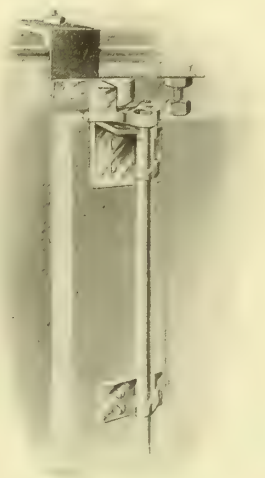
In ordering, state actual width, thickness and approximate weight of door; how much they lap at center and jambs, and whether of wood, kalamein or steel; also, whether they open to right or left (taken from inside the elevator).

"Diamond" Bar Locks.

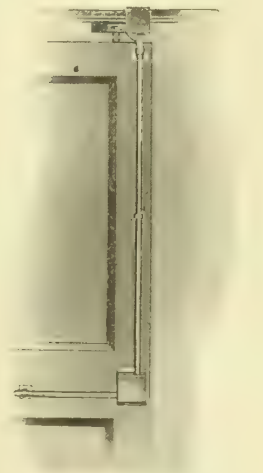
These Bar Locks are of best workmanship and materials, and have proved their efficiency through service under various and exacting conditions.



"DIAMOND" BAR LOCK NO. 2



"DIAMOND" BAR LOCK NO. 3



"DIAMOND" BAR LOCK NO. 4

Bar Lock No. 2 shows Drop Lock applied to doors opening in opposite directions
Bar Lock No. 3 shows Lever Double-Action Lock applied to single door
Bar Lock No. 4 with Cross Bar to be used where Vertical Lock is out of reach of operator
The same movement of the hand both unlocks and moves the doors

ESTABLISHED 1843

WILLIAM HALL COMPANY

MANUFACTURERS OF

Builders' Colonial Hardware

OFFICE AND SAMPLE ROOMS

8-10 Dock Square

BOSTON, MASS.

FACTORY
WOLLASTON, MASS.

Products.

Thumb Latches in Cast and Wrought Metal; Door, Lodge Room and Small Apartment Knockers; Wrought Iron Hinges; Hinge Plates; Ring Handles, Knobs, Locks, Butts and Escutcheons; Church Door, Casement Window and Door Trims of various designs; Brass and Glass Door Knobs.

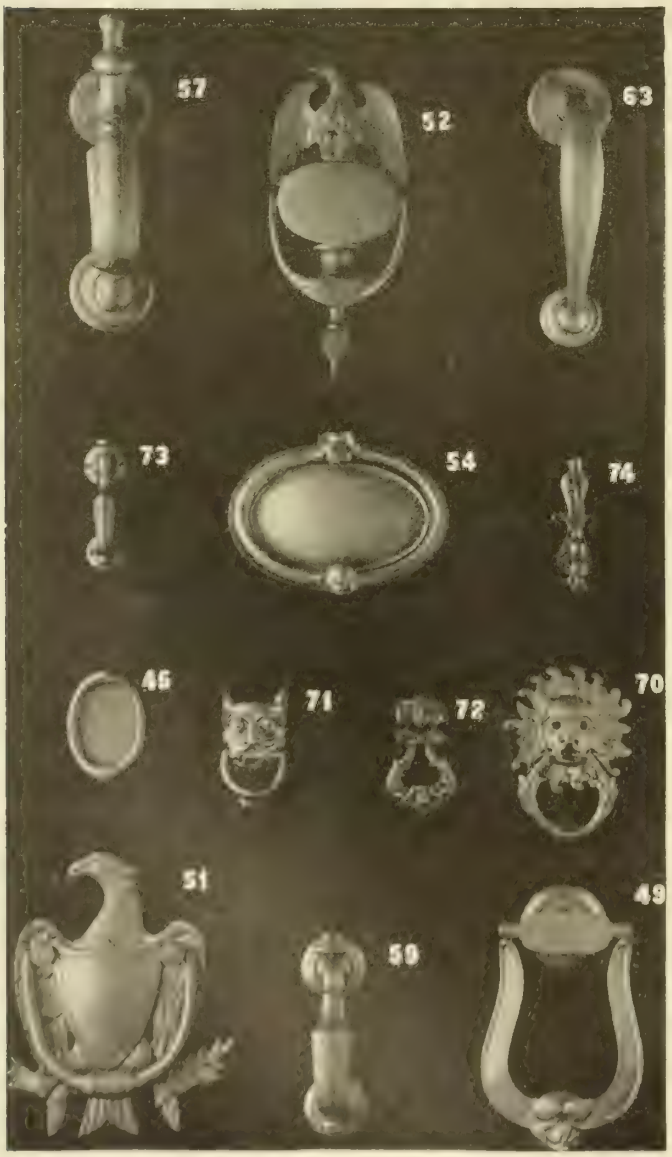
Wrought Iron Fireplace Forks; Sundials; Candlesticks, etc.

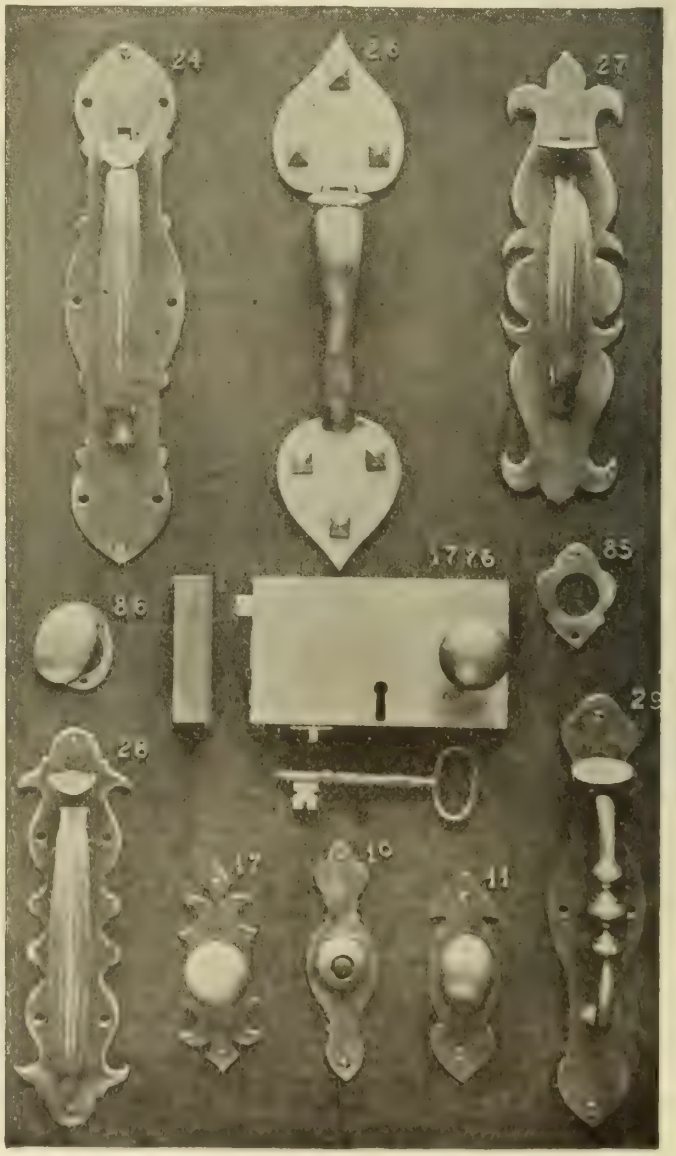
Railway Hardware: Bell-cord Hangers, Register Cord Trimmings, Steam and Electric Car Trimmings, Trolley Wheels, Ears, Bushings and Overhead Material, etc.

Also Jail and Prison Locks; Brass and Bronze Tablets; Brass Railings; Fire-Engine House Door Bolts; General Casting Work; General Machine and Experimental Work.

Designs.

Exact reproductions from old and original patterns, that have real character to them.





ARTISTIC HARDWARE REPRODUCED FROM OLD AND ORIGINAL PATTERNS

Continued on next page

Special Hardware.

We are continually reproducing designs from old specimens that do not appear in our catalogues, and which are matter for correspondence and samples.

Hardware made to fit all conditions and to customer's special designs.

Deliveries.

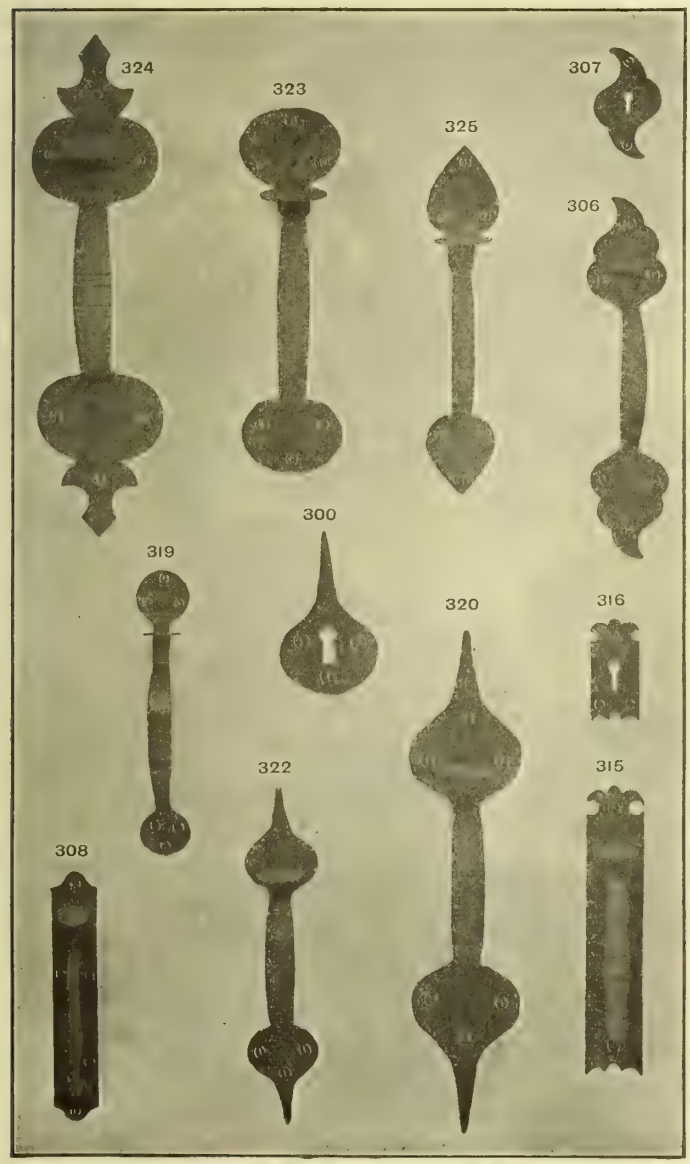
This Company is especially equipped to meet urgent calls for delivery of the regular line, or for specialties to order.

Samples.

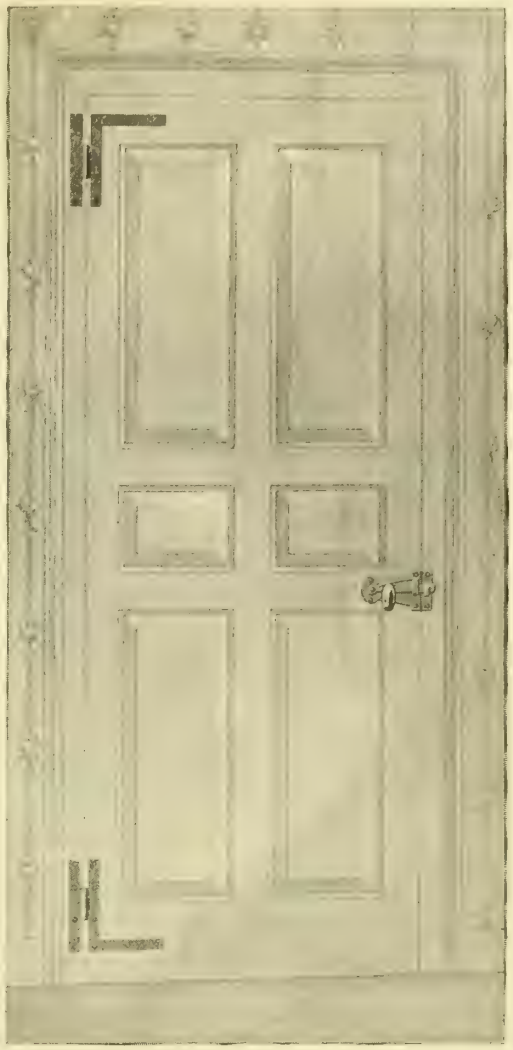
Schedules and Samples submitted at our expense.

Co-operative Service.

As many designs and specialties are not illustrated as yet, we invite architect's personal correspondence,



WROUGHT IRON HARDWARE



DOOR TRIM NO. 1

and an opportunity to submit our samples, etc., for approval.

Catalogues.

Builders' Hardware Catalogue No. 5.
Glass Door Knobs Catalogue No. 4.
Wrought Iron Hardware Lists.
Loose leaf forms showing complete Door, Casement Trims and Specialties, similar to cut shown above.

References.

Archibald W. Brown, Residence, Stony Brook, L. I., Archibald W. Brown, Architect
Julian S. Peabody, Residence, Westbury, L. I., Julian S. Peabody, Architect
Mrs. Charles O. Gates, Residence, Locust Valley, L. I., Miss Theodate Pope, Architect
Public Library, Nutley, N. J., Armstrong & De Gelleke, Architects
Hueblein Tower, Hartford, Conn., Smith & Bassett, Architects
Harry B. Little, Residence, Concord, Mass., Harry B. Little, Architect

LAWSON MANUFACTURING CO.

Manufacturers of "Katz" Door Hinges

215 West Huron Street
CHICAGO, ILL.

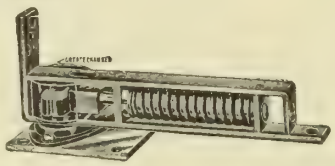
Products

"KATZ" SURFACE FLOOR SPRING HINGES; "KATZ" REINFORCED JAMB HINGES, Single- and Double-Acting; "MATCHLESS" MORTISE SPRING HINGES; "MATCHLESS" BALL-BEARING, SPRINGLESS PIVOT HINGES; "KATZ" LAVATORY SPRING HINGES and BLANKS, Single- and Double-Acting; LAVATORY HINGES, with PIPE PLATES, Single- and Double-Acting; "KATZ" LAVATORY STRIKES, KEEPERS, LATCHES and BOLTS; and LAVATORY PARTS, including DOOR PULLS, HOOK-AND-BUMPERS, and Special SCREWS and NUTS.

Reg. U. S. Pat. Office
TRADE-MARK

Katz Surface Floor Spring Hinges.

These hinges are exceedingly simple in construction and easily attached to the door. They will swing the doors, for which they are specified, with a slow motion, giving one plenty of time to go through. The material used is selected to insure good results and thereby your good will.


"KATZ" SURFACE FLOOR SPRING HINGE

Nos. 500 and 600 Surface Floor Hinges are for doors 1⅛ to 1¾ inches thick and of standard size.

No. 900 Surface Floor Hinge is for doors 1¾ to 2½ inches thick and of standard size.

Patented Features—A positive notched lock at 90 degrees; prevents accidental release and permits the door to be hung against the wall with a close joint.

A centrally located roller journalled on top and bottom in guide-way rollers, making the force of spring compression or release gradual.

A detachable floor plate, allowing the carpenter to screw same to the floor without hindrance from the hinge.

A tapered socket alignment feature, allowing adjustment to the smallest fraction of an inch.

A grease chamber, enclosing and lubricating the working parts.

Katz Invisible Surface Floor Hinges.

No. 700, for doors 1¾ inches thick.

No. 800, for doors 2 to 2½ inches thick.

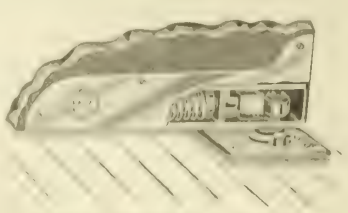
These hinges are simple in construction and easily attached to a door.

The working parts are incased in a metal tube, entirely protecting them.

Spring tension set at factory to swing size of door specified above.

The weight of the door is carried on steel balls which are protected by a dust cap.

The alignment is adjustable.


"KATZ" INVISIBLE SURFACE FLOOR HINGE

No side plates or heel plates are required, the tube part of hinge is inserted into a hole drilled near the lower rear edge of the door and fastened by screws through lower frame piece.

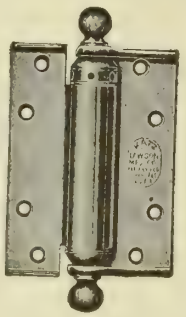
Katz Reinforced Jamb Hinges.

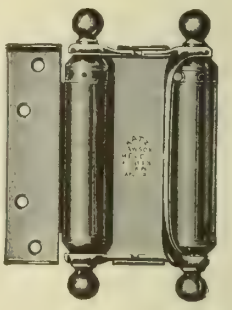
"Katz" Reinforced Jamb Hinges embody practical and mechanical features not contained in other jamb spring hinges. Are made of the best material throughout. The springs are of the very best tempered steel wire.

The center plate with lugs or ears is a solid one-piece metal; both sides of plate are flanged, giving additional strength to those parts which carry the weight of the door, preventing sagging and assuring easy swinging action.

In addition, provision for proper bearings is made by means of steel bushings.

For beauty and excellence of finish, the "Katz" Hinges cannot be excelled.


"KATZ" 3-INCH SINGLE-ACTING HINGE


"KATZ" 3-INCH DOUBLE-ACTING HINGE

DIRECTIONS IN SELECTING CORRECT SIZE OF HINGE TO DOOR

Size of Hinge	Minimum and Maximum Thickness and Width of Door	Thickness of Hanging Strip
3 inch	¾" x 2' 3" or 1 " x 2' 0"	½ inch
4 inch	1 " x 2' 6" or 1¼" x 2' 0"	⅝ inch
5 inch	1⅛" x 2' 6" or 1¼" x 2' 3"	⅝ inch
6 inch	1¼" x 2' 9" or 1¾" x 2' 3"	¾ inch
7 inch	1⅜" x 2' 9" or 2 " x 2' 6"	⅞ inch
8 inch	1½" x 3' 0" or 2¼" x 2' 6"	1 inch
10 inch	1¾" x 3' 0" or 2½" x 2' 9"	1⅛ inch

In selecting hinge required, the width of door is essential; always use the largest size hinge the thickness of door will permit, especially on wide doors, hardwood, plate glass and metal lined doors, also those subject to draft.
Wide doors require larger hinges than narrow doors.

"Katz" Lavatory Spring Hinges and Blanks.

The box flanges for the marble are adjustable for partitions of the following thickness: 1 inch, 1¼ inches, 1½ inches, 1¾ inches, 2 inches, with ⅛ inch allowance over and under above sizes.

These Hinges are made to close door or to hold the door open when so specified.

In ordering, state exact thickness of both the marble and the door.

Prices are for Polished Brass Metal, Bronze or Nickel-plated finishes. Prices for White Metal or other finishes will be furnished on application.

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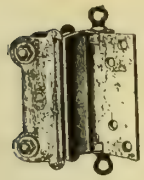
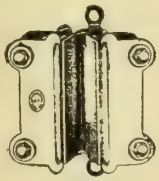
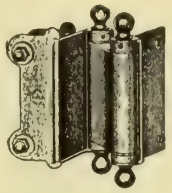


No. 1900
Single-Acting
Hinge with one
box flange.
Per pair, $4.55

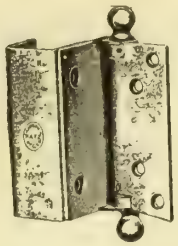


No. 1902
Single-Acting
Hinge with two
box flanges.
Per pair, $6.00

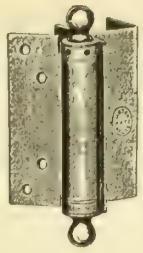


No. 1904
Double-Acting
Hinge with one
box flange.
Per pair, $6.80

No. 1906. Single-
Acting Hinge
For two doors
opening in (right
and left doors)
hung to same par-
tition on one box
flange.
Per pair, $6.90



No. 1907
Single-Acting Hinge
For one door
opening in.
Hung to same partition on one box flange.
Price per pair, $5.50

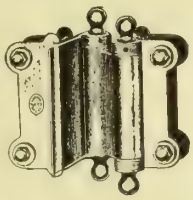


No. 1908
Single-Acting Hinge
For one door
opening out.

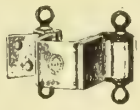
No. 1909. Single-
Acting Hinge
For two doors open-
ing out (right and left)
hung to same partition
on one box flange.
Per pair, $6.90

No. 1910. Hinge
Blank
For use with
Hinge No. 1900
on light and nar-
row doors.
Hinge and Blank
per set, $3.70

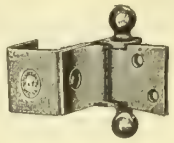
No. 1912. Hinge
Blank
For use with
Hinge No. 1902
on light and nar-
row doors.
Hinge and Blank
per set, $5.05



No. 1905.
Double-Acting Hinge
with two box
flanges.
Per pair, $9.10

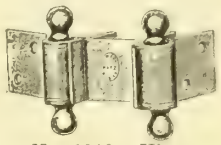


No. 1916. Hinge
Blank
For use with
Hinge No. 1906
on light and nar-
row doors.
Hinge and Blank
per set, $5.50



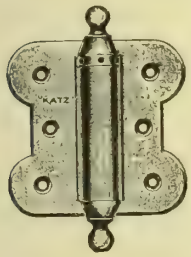
No. 1917. Hinge
Blank
For use with
Hinge No. 1907 on
light and narrow
doors.
Hinge and Blank
per set, $4.45

No. 1918. Hinge
Blank
For use with
Hinge No. 1908 on
light and narrow
doors.
Hinge and Blank
per set, $4.45

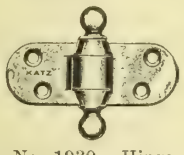


No. 1919. Hinge
Blank
For use with Hinge
No. 1909 on light and
narrow doors.
Hinge and Blank
per set, $5.50

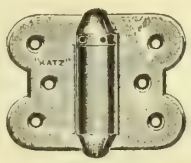
"KATZ" LAVATORY SPRING HINGES AND BLANKS
Polished Brass Metal, Bronze or Nickel-Plated



No. 1920. Surface
Spring Hinge, Sin-
gle-Acting.
Length of flanges,
4 ins.
Per pair, $4.40



No. 1930. Hinge
Blank
For use with
Hinge No. 1920 on
light and narrow
doors.
Hinge and Blank
per set, $3.35



No. 1922. Surface
Spring Hinge, Sin-
gle-Acting.
Length of flange,
3 ins.
Per pair, $3.45

"KATZ" LAVATORY SPRING HINGES AND BLANKS
Polished Brass Metal, Bronze or Nickel-Plated

"Katz" Lavatory Strikes, Bolts and Keepers.

All Strikes for Single-Acting Doors have rubber bumpers. The box flanges are adjustable for marble or slate partitions of the following thickness:

1 inch, 1¼ inches, 1½ inches, 1¾ inches, 2 inches, with ⅛ inch allowance over and under above sizes for variation in marble or slate.

Polished Brass Metal, Bronze or Nickel-Plated.

State exact thickness of marble and door, when ordering.

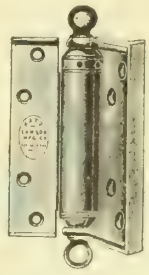
Single- or Double-Acting Hinges with Pipe Plates.

No. 1924 is Single-Acting for right- or left-hand door opening in or out. For doors opening in, springs can be furnished to hold the doors open when so specified, otherwise they are furnished to hold the door closed.

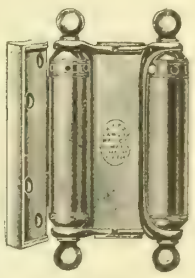
No. 1926 is Double-Acting for one door.

Size of Hinge, 4-inch flanges, for standard pipe 1½, 2, 2½ inches inside diameter. To avoid error, state exact outside diameter of pipe.

Size of machine screws furnished ¾—8-32.



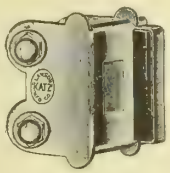
No. 1924.



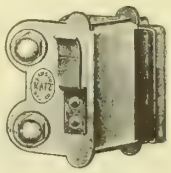
No. 1926.

SINGLE- AND DOUBLE-ACTING HINGES
Per pair, $3.44 Per pair, $5.80

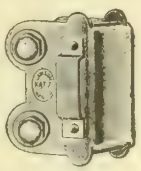
No. 1940. No bolt
hole. For right- or
left-hand doors open-
ing in or out. Price,
each, $.95



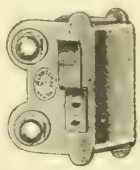
No. 1942. For Mor-
tise Bolt, for right- or
left-hand doors open-
ing in or out. Price
each, $.98



No. 1944. For
Throw Latch, for
right- or left-hand
doors opening in.
Hand must be speci-
fied. Price, each
$1.00

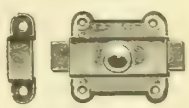


No. 1952.
For Rim Bolt, for
right- or left-hand
double-acting doors.
Price, each, $.98

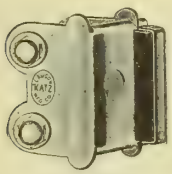


No. 1954. For
Throw Latch, for
right- or left-hand
double-acting doors.
Price, each, $.98

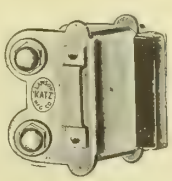
No. 1960
For face of door.
Price, half dozen,
$1.65.



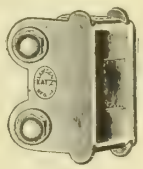
No. 1966. Rim Bolt.
Per doz., without
Keeper, $5.65
Per doz., with Keep-
er, $6.05



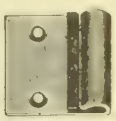
No. 1946.
For Mortise Bolt,
for right- or left-hand
doors opening in or
out.
Price, each, $.98



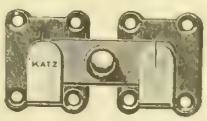
No. 1948.
For Rim Bolt, for
right- or left-hand
doors opening in.
Price, each, $1.00



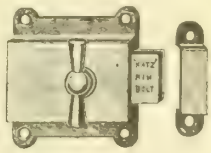
No. 1950. For
Mortise Bolt, for
right- or left-hand
double-acting doors.
Price, each, $.95



No. 1962.
For edge of door or
partition.
Price, half dozen,
$1.65



No. 1964.
Throw Latch.
Per doz., without
Keeper, $11.60
Per doz., with Keep-
er, $15.20



No. 1968. Rim Bolt.
Without Keeper, per
doz., $12.70
With Keeper, per
doz., $13.80

"KATZ" LAVATORY STRIKES AND KEEPERS
Polished Brass Metal, Bronze or Nickel-Plated

RELIANCE BALL BEARING DOOR HANGER CO.

30 East Forty-Second Street

NEW YORK, N. Y.

TELEPHONE, Murray Hill 8108

PLANT
BROOKLYN, N. Y., 280-284 Starr Street

AGENCIES

BOSTON, MASS., The Morss & Whyte Co.
ALBANY, N. Y., Albany Hardware & Iron Co.
BUFFALO AND ROCHESTER, N. Y., Weed & Co.
SYRACUSE, N. Y., Alexander Grant's Sons
PHILADELPHIA, PA., Chas. J. Field's Sons
BALTIMORE, MD., Dufur & Co.
NORFOLK, VA., Norfolk Iron & Wire Works
CHATTANOOGA, TENN., Price-Evans Foundry Co.
MEMPHIS, TENN., De Soto Hardware Co.
ATLANTA, GA., Beck & Gregg Hardware Co.
BIRMINGHAM, ALA., Wimberly & Thomas Hardware Co.
NEW ORLEANS, LA., G, Pitard's Sons
CLEVELAND, OHIO, The W. S. Tyler Co.
DETROIT, MICH., J. E. Bolles Iron & Wire Works
CHICAGO, ILL., F. P. Smith Wire & Iron Works
MILWAUKEE, WIS., Andrew K. Robertson
ST. PAUL, MINN., K. F. Lott & Co.
INDIANAPOLIS, IND., Lilly & Stalnaker
ST. LOUIS, MO., Lasar Mfg. Co.
DES MOINES, IOWA, C. C. Dawson Co.
OMAHA, NEB., C. C. Dawson Co.
SALT LAKE CITY, UTAH, Manufacturers Specialties Co.
DENVER, COLO., Geo. P. Heinz Co.
LOS ANGELES, CAL., B. V. Collins
SAN FRANCISCO, CAL., Sartorius Co.
PORTLAND, ORE., Columbia Wire & Iron Works
SEATTLE AND SPOKANE, WASH., D. E. Fryer & Co.
VANCOUVER, B. C., Wm. N. O'Neil & Co.
WINNIPEG, CALGARY, ALBERTA, CAN., Waite-Fullerton Co., Ltd.
MONTREAL, TORONTO, CAN., Douglas-Milligan Co.

Products.

Ball-Bearing Door Hangers, Ball-Bearing Drawer Slides, and Elevator Door Locks.

Construction of "Reliance" Hangers.

"Reliance" Hangers consist of grooved, solid steel tracks, with solid steel balls running between. The balls are set in carriages and fitted into the grooves so that the action is all direct ball-bearing, with the minimum amount of friction. The hangers are strong, durable, easy running and practically noiseless.

The "Reliance" should not be confused with other so-called ball-bearing hangers which run on wheels or ball-bearing wheels.

It is the cheapest and quickest hanger to install, the difference in cost between it and an inferior article being practically saved in the cost of installation.

Description of Hangers.

Single Hanger "G," designed for light grille doors, for bank work, etc., made on the same principle as regular steel hanger, but of drawn metal instead of solid steel tracks. Width of back plate 2½ inches. From back of back plate to center of bolt for top of door ⅝ inch. Distance from top of door to bottom of back plate 1½ inches.

We also make a drawn metal hanger of heavy material.

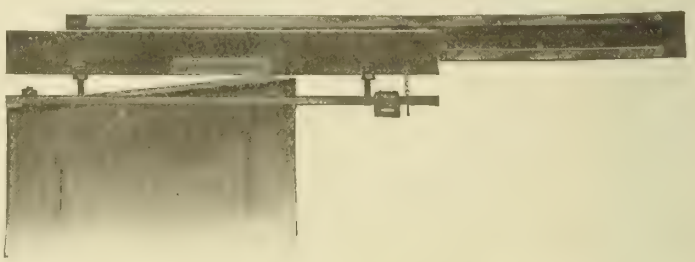
Single Hanger "B" and device to swing both door and panel into hall in order to get full width of the car when it is not practicable to swing the transom bar overhead. Swing transom bar in all cases if possible. Width of back plate 3 to 3¾ inches. From back of back plate to center of bolt ¾ inch.

This swing device can be applied to any of our various styles of hangers and requires ⅝ inch extra room between top of door and bottom of hanger.

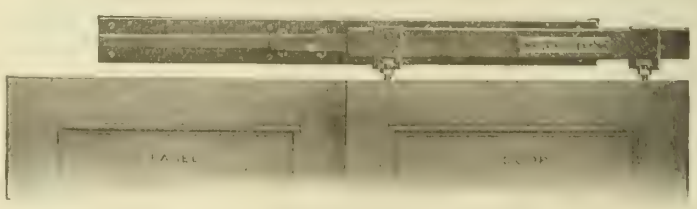
Single Hanger "C" for medium weight doors. Width of back plate 3 inches. From back of back plate to center of bolt for top of door ¾ to 1⅛ inches. From top of door to bottom of back plate 1½ inches.

Single Hanger "D" is made the same as style "B," except for the connections for tops of doors. We furnish the proper straps or bolts necessary, according to the thickness and weight of doors. Width of back plate 3¾ to 4½ inches.

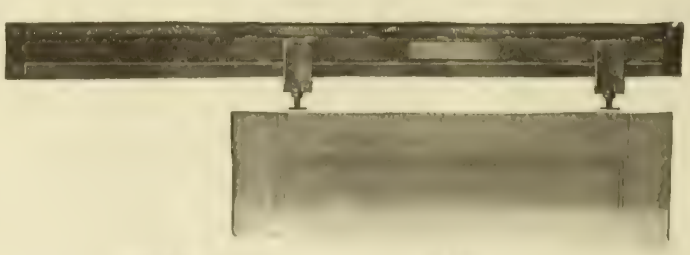
SINGLE HANGER "G," DOOR CLOSED



SINGLE HANGER "B," WITH SWING DEVICE



SINGLE HANGER "C," DOOR CLOSED

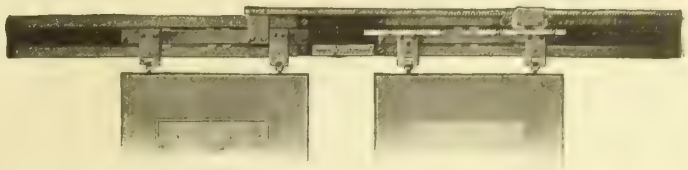


SINGLE HANGER "D," DOOR PARTLY OPEN

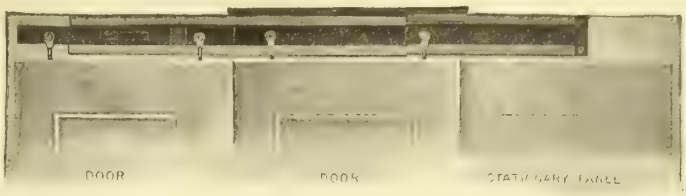
Continued on next page

Double Hanger "H" has double gear opening device for moving two doors in opposite directions at the same time. Allow one inch headroom above back plate for this device. Always made with gear on right unless ordered other hand. Width of back plate 4 to 5½ inches. This can be furnished without racks and gears, if desired, for parlor doors.

Two-Speed Hanger "K" for moving doors in same direction, one traveling at double speed of other. Requires one inch headroom above back plate. Width of back plate 4 to 5½ inches. About ¾ inch required between top of door and bottom of lower track where hanger bolts are used; about 2 inches where hanger straps are used. Where doors are thin, use style "K" No. 4, Fig. 58. We also make three-speed hangers and hangers for folding gates.



DOUBLE HANGER "H," DOORS PARTLY OPEN

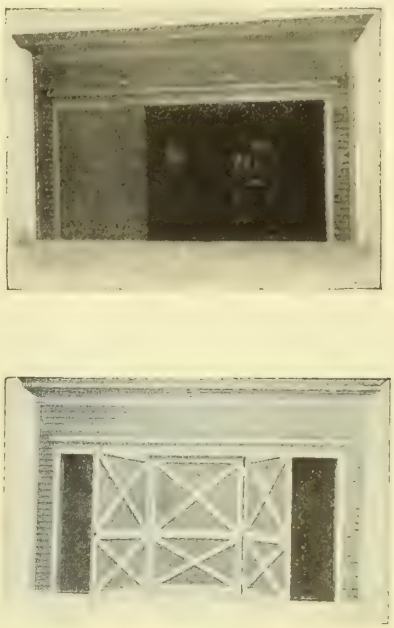


TWO-SPEED HANGER "K," DOORS CLOSED

Garage Hanger "W."

Garage Hanger "W" for three doors, to open up an entire front of garage, doors Nos. 1 and 3 being hinged to and folding up on No. 2, so that all three doors can be moved to either side, as illustrated in front views of garage. Door No. 2 should be about 1 inch wider and 1 inch higher than Nos. 1 and 3. Door No. 3 can be fastened with flush bolts and door No. 1 locked to jamb. Note that doors open out, so that all inside space is utilized. Have floor about ¾ inch higher than outside, forming a stop for bottom of doors and keeping out wind and water. One door should have close hinges, the other longer hinges so doors fold close.

Send for special blue-print of construction details.



GARAGE DOORS EQUIPPED WITH GARAGE HANGER "W"

End Sections of Hangers.

Fig. 51—Single Hanger, showing Hanger Bolts for connecting to top of door where door is over 1¾ inches thick.

Fig. 53—Single Hanger "B." Has angle-iron riveted entire length of center track, with flange turned in. Suitable for doors ¾ to 1¼ inches thick.

Fig. 54—Single Hanger "G."

Fig. 56—Single Hanger "C." Suitable for door 1 to 2 inches thick.

Fig. 57—Double Hanger "H." Device for moving in opposite directions two doors at same time.

Fig. 58—Two-Speed Hanger "K" No. 4. Suitable for doors ⅞ or 1 inch thick, and requires 6¼ inches from top of door to top of opening device.

Fig. 59—Two-Speed Hanger "K" with Hanger Bolts for connecting to top of doors when doors are 1½ inches thick or more. This hanger, made with straps, as shown in Fig. 58, where doors are between 1¼ and 1½ inches in thickness.

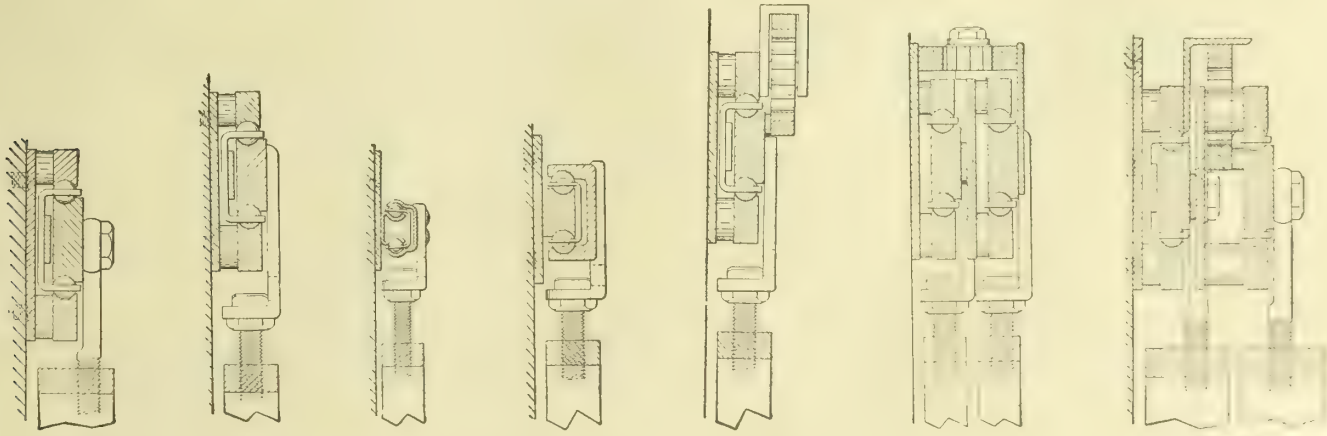


Fig. 51 Fig. 53 Fig. 54 Fig. 56 Fig. 57 Fig. 58 Fig. 59

END SECTIONS OF HANGERS

Continued on next page

Reliance Lock No. 97.

This is a vertical Bar Lock which does not require a spring of any kind. A slight pressure on the handle releases the catch, and upon closing the door the weight of the vertical rod causes the lock to engage.

Reliance Bar Lock.

The "Reliance" Bar Lock, for locking tracks of hanger, is suitable for single or double doors. Rod, catch and connections are of dull finish brass. Lock requires 1⅜ inches from face of door. If desired, lock may be reversed, placing catch on sill. It can be arranged to unlock from hall side, at no extra charge.

The lock is furnished with short bar and knurled handle. Requires 1⅜ inches from face of door. Center of handle 3 feet 6 inches from floor.

This lock can be furnished 5 feet 8 inches over all if desired.

Specifications.

Specify "Reliance" Hangers, with name of opening device, if double doors.

Ordering.

In ordering, state actual width of door (not the opening), thickness and approximate weight, whether of wood, iron or kalamein, as we furnish knees or plates for connecting to wood or kalamein doors.

If double-speed hangers are desired, state which way doors close, looking from inside of elevator car.

Estimates, Etc.

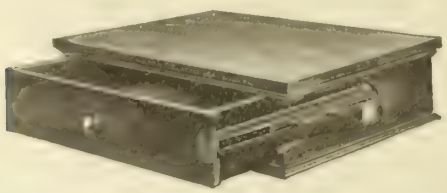
We shall be pleased to furnish estimates to cover unusual conditions. Special information given on request.

References.

List of installations will be furnished on request.

Drawer Slides.

The "Reliance" Ball-Bearing Drawer Slide is the easiest running slide in the world. It absolutely will not catch, and drawers can be operated as easily from either side as from center. Requires side of drawer set in $\frac{11}{16}$ inch. Fasten strip of wood ½-inch thick to each side of drawer, to rest on movable tracks; the other part of slide is fastened to frame.



"RELIANCE" BALL BEARING DRAWER SLIDE. DRAWER PARTLY OPEN

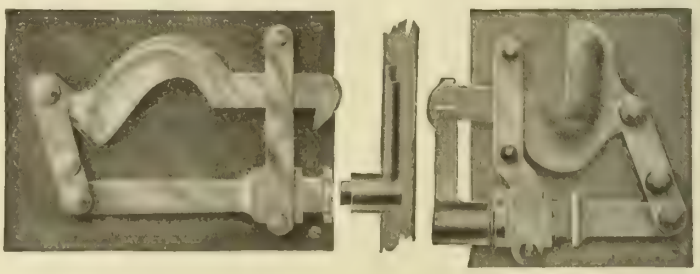
LOCK NO. 97

BAR LOCK

Shows lock with knurled handle mounted on board to show connections

GRAVITY LOCK NO. 3

Unlatched. Has Extension Rod across door. Back Plate 4½" x 5". Thickness of Lock, 1"



GRAVITY LOCK NO. 1

Door open. Shows Right-Hand Lock. Back Plate, 6½" x 4½". Thickness of Lock, ⅞"

GRAVITY LOCK NO. 2

Door closed. Shows Left-Hand Lock. Back Plate, 4½" x 5½". Thickness of Lock, ⅞"

RICHARDS-WILCOX MANUFACTURING COMPANY

INCORPORATED

Manufacturers of Door Hangers and Hardware Specialties

CABLE ADDRESS, "TROLLEY, AURORA"

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DOOR HANGERS and TRACK for Sliding Doors of all kinds, sizes and weights; FIRE-DOOR FIXTURES; OVERHEAD TROLLEY CARRYING SYSTEMS; ELEVATOR DOOR HANGERS, TRACK, DOOR CHECKS and CLOSERS, and HARDWARE SPECIALTIES. "A hanger for any door that slides."

Blue-prints and detailed information on request.

House Door Hangers.

The No. 19 R-W "Hero" Ball-Bearing Hanger, noiseless fibre wheels, meets all ordinary sliding door requirements. Accessible adjustment in both hanger and track.

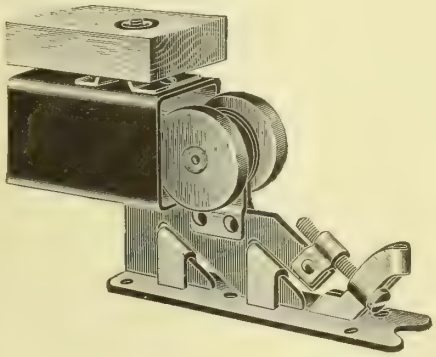

FIG. 1. NO. 19 "HERO" HOUSE DOOR HANGER

R-W "Advance" Hangers.

The No. 221 R-W "Advance" Ball-Bearing Hanger is a noiseless four-wheel hanger. The box-shaped track protects hanger from dirt and falling plaster. Both hanger and track have accessible adjustment.

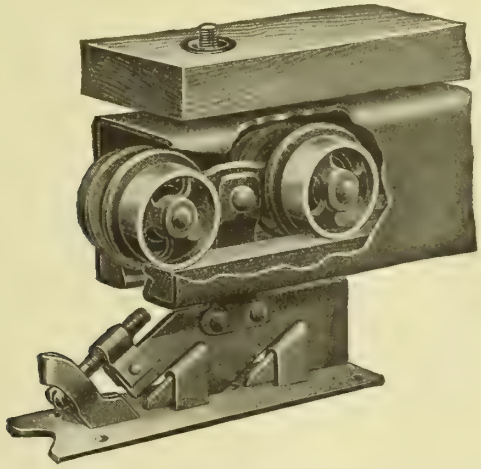

FIG. 2. NO. 221 "ADVANCE" HOUSE DOOR HANGER

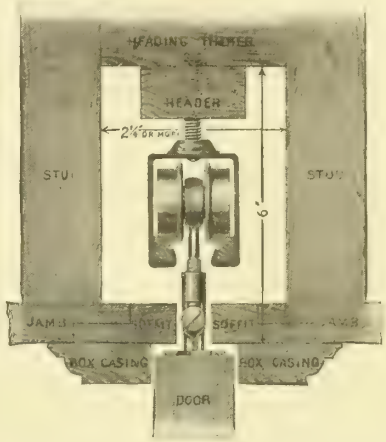

FIG. 3. CROSS-SECTION VIEW SHOWING APPLICATION OF NO. 221 "ADVANCE" PARLOR DOOR HANGER

TABLE SHOWING MEASUREMENTS

Hanger Number	Name	Minimum Width of Wall Pocket, Inches	Top of Door to bottom of heading, timber, Inches
6	R-W Rex	2¼	8½
16	R-W Twin	2¼	6¼
19	R-W Hero	2¼	6¼
R122	R-W Royal	2¼	7¼
W122	R-W LeRoy	2½	8
221	R-W Advance	2¼	6¼

Auditorium Door Hangers.

Number of Hangers Required—Four-wheel hangers, No. 135 R-W Auditorium Door Hangers, are preferable, and, when used, one hanger is applied to each alternate door, beginning with door farthest from half-door. If desirable to install a hanger on each door, No. 137 R-W Auditorium Door Hanger, a two-wheel hanger, can be used.

No. 135 R-W Swivel Auditorium Door Hanger has ball-bearing swivel and vertical screw adjustment.

Directions for Ordering—Track should be as long as opening is wide, less eight inches. Brackets should be spaced 2-foot to 2½-foot centers, according to weight of door. First three brackets over half-door should be spaced 1-foot to 1½-foot centers. At end of opening farthest from hinge-jamb, an 8-inch space should be left between end of track and jamb. Below this point, fit a removable section of soffit to enable carpenter to remove hanger. When doors are folded to both sides, two pieces of track are needed. In center of opening a 1-foot space should be left between ends of track.

Continued on next page

FIG. 4. FLOOR PLAN R-W SWIVEL AUDITORIUM DOOR HANGER

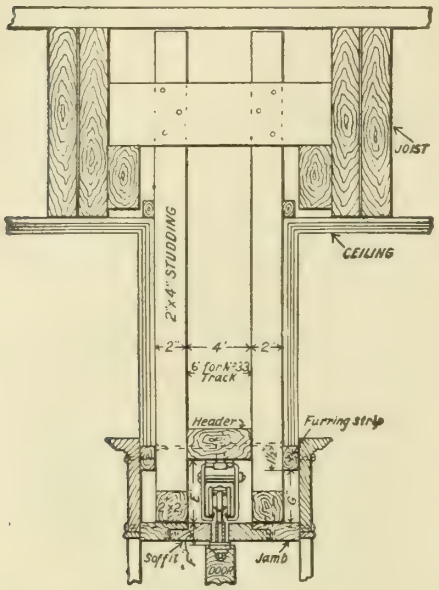

FIG. 5. OVERHEAD CONSTRUCTION DETAILS AUDITORIUM DOOR HANGER

DATA

Hanger Number	Wheels	Bearings	Track Number	Thickness of Doors, Inches	"E" Distance top of soffit to bottom of header, Inches	"F" Distance top of Door to top of Soffit, Inches		"G" Distance top of jamb to bottom of furring strip, Inches
						7" soffit	11" soffit	
135–0	4 metal	Ball	301½	1⅜	31⅞	11⅝	13⅝	31¼
135–01	4 metal	Ball	31	1¾	32¼	11⅝	13⅝	31¼
135–1	4 fibre	Roller	31	2 & 2¼	32¼	11⅝	13⅝	31¼
135–2	4 fibre	Roller	33	2½	31¼	11⅝	13⅝	48¾
335	4 gray iron	Ball	526	1⅜ & 1¾	32¼	11⅝	13⅝	31¼
137–0	2 metal	Ball	301½	1⅜	31¼	11⅝	13⅝	31¼
137–1	2 fibre	Ball	31	1¾	32⅜	11⅜	13⅜	31¼
137–2	2 gray iron	Ball	31	2 & 2¼	32¼	11⅜	13⅜	31¼

Flush Door Hangers.

For closing large openings between rooms—when doors are open are out of the way in pockets, when closed form a real partition. This is accomplished by special arrangement of tracks.

What to Specify—Hangers regular for doors 2½ inches thick, but can be furnished for doors of any thickness. Hangers No. 443, for No. 164 track, or No. 444-1, for No. 75 track, will accommodate doors up to 500 pounds. For heavier doors No. 444-2 Hanger and No. 164 track. Brackets are malleable iron, tapped to receive screws used in attaching casing and soffits. Steel casing and soffits take less space and are neater in appearance than wood. Meeting stiles of doors should be fitted with male and female astragal

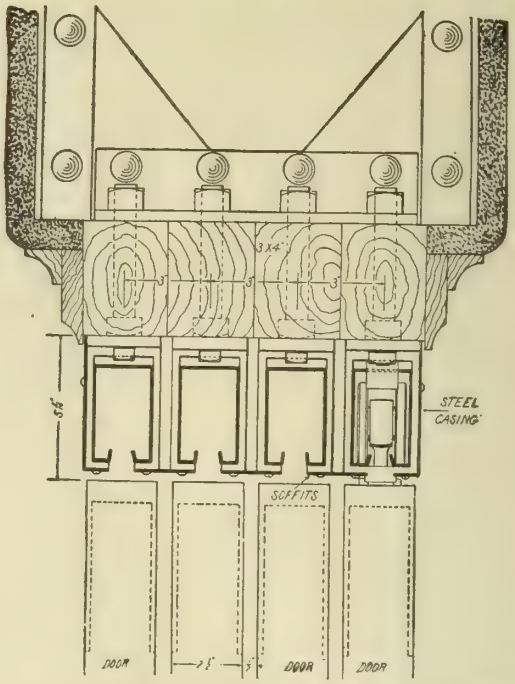

FIG. 6. NO. 443 CROSS-SECTION, FLUSH DOOR HANGER

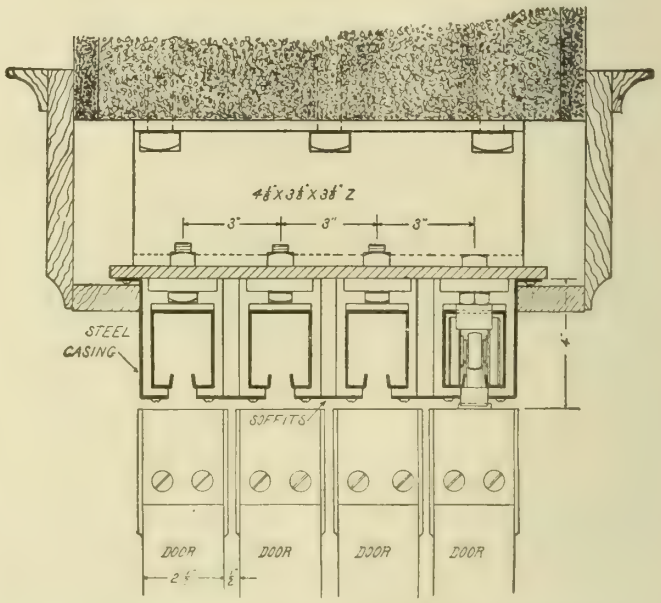

FIG. 7. NO. 444 CROSS-SECTION, FLUSH DOOR HANGER

R-W "Ideal" Elevator Door Hangers.

"Ideal" Track and Hangers—Track is a rectangular-shaped tube made of heavy gauge steel. The shape of the bottom forms two parallel runways for the steel balls upon which the hanger rolls. These balls are kept

FIG. 8. NO. 728-1 R-W "IDEAL" ELEVATOR FIXTURE

Continued on next page

an equal distance apart by a retainer. Length of track equals entire width of opening or run of doors.

The hanger, of heavy gauge steel, accurately fits the balls over which it runs. The hanger is as long as the door is wide, providing a long bearing.

Limit rollers prevent the door from jumping or raising.

No. 727-1 for Single Doors Weighing Up to 300 Pounds—Track furnished with brackets for side wall attachment. Track has lateral and hanger has vertical adjustment. Requires from 4½ to 5¼ inches space above door.

No. 728-1 for Two-Speed Doors, Weighing Up to 200 Pounds—Made with rack and pinion attachment for operating two doors in the same direction, one door moving at twice the speed of the other. Has a 4½-inch wide wall plate to which the complete fixture is assembled. Requires 4¾ to 5½ inches space above doors.

For doors less than 1¼ inches thick, special pendants are required.

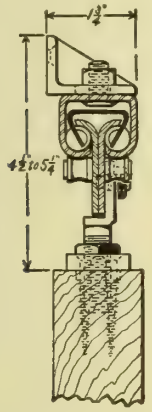

FIG. 9. CROSS-SECTION 727-1 ELEVATOR DOOR HANGER

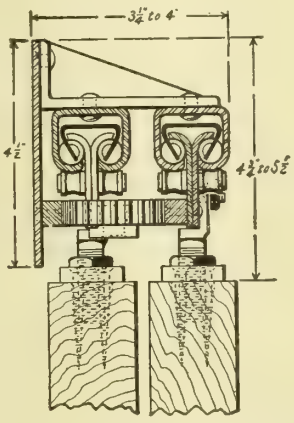

FIG. 10. CROSS-SECTION 728-1 ELEVATOR DOOR HANGER

No. 730 for Doors in Pairs Weighing Up to 300 Pounds—Made with rack and pinion attachment for simultaneously operating both doors in opposite directions. Fixture assembled complete to wall plate 4¼ inches wide. Space required above door, 4¾ to 5½ inches.

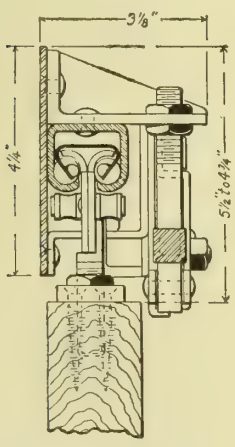

FIG. 11. CROSS-SECTION 730 ELEVATOR DOOR HANGER

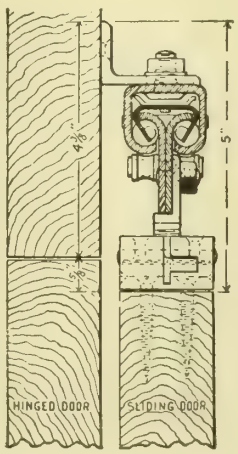

FIG. 12. CROSS-SECTION 723 ELEVATOR DOOR HANGER

No. 723 for Combination Swing and Slide Doors, Weighing Up to 300 Pounds—Used when stationary door is hinged and it is desirable to swing both doors open so as to use the full width of elevator opening, and yet it is not practical to swing the transom bar to which track is attached. It is usually more satisfactory to arrange to swing the transom bar, if possible. Space above top of door required, 5 inches.

Fixtures are reversible and can be used on right- or left-hand doors.

R-W Trolley Hangers for Barns, Warehouses and Factories.

Different sizes are manufactured to suit different sizes and weights of doors. Track brackets can be attached to side or ceiling. Track made in four sizes.

SIZES AND WEIGHTS

Hanger, Lateral Adjustment	Number, Lateral and Vertical Adjustment	Hanger Name	Track Number	Doors, Thickness, Inches	Weight, Lbs.	Bearings	Distance: Top of door to bottom track, Inches	Distance: Bottom of track to center of hole in bracket, Inches
20		R-W Gem	31	1¾ to 2½	300	Roller	1¼	3¾
	*20½-B	R-W Stayrite	31	1¾ to 2½	300	Ball	⅞ min.	
							2¾ max.	3¾
24-1		R-W Superior	31	1¾ to 2	400	Roller	1⅛	3¾
24-2		R-W Superior	31	2¼ to 2¾	400	Roller	1⅛	3¾
	25-1	R-W Peerless	31	1¾ to 2	400	Roller	1¼ min.	
							2½ max.	3¾
	25-2	R-W Peerless	31	2¼ to 2¾			1¼ min.	
							2½ max.	3¾
	*27½B-1	R-W Expansion	31	1¾ to 2	400	Ball	⅞ min.	
							2⅜ max.	3¾
	*27½B-2	R-W Expansion	31	2¼ to 2¾	400	Ball	⅞ min.	
							2⅜ max.	3¾
28-L-1		R-W Acme	32	1¾ to 2	500	Roller	1¼	4¼
28-L-2		R-W Acme	32	2¼ to 2¾	500	Roller	1¼	4¼
	28-V-1	R-W Premium	32	1¾ to 2	500	Roller	1⅝ min.	
							2⅝ max.	4¼
	28-V-2	R-W Premium	32	2¼ to 2¾	500	Roller	1⅝ min.	
							2⅝ max.	4¼
	*28½B-1	R-W Supreme	32	1¾ to 2	500	Ball	⅞ min.	
							2 max.	4¼
	*28½B-2	R-W Supreme	32	2¼ to 2¾	500	Ball	⅞ min.	
							2 max.	4¼
29-L-1		R-W Hercules	232	1¾ to 2	600	Roller	1¼	4⅛
29-L-2		R-W Hercules	232	2¼ to 2¾	600	Roller	1⅛	4⅛
	29-V-1	R-W Economy	232	1¾ to 2	600	Roller	1¾ min.	
							3¾ max.	4⅛
	29-V-2	R-W Economy	232	2¼ to 2¾	600	Roller	1¾ min.	
							3¾ max.	4⅛
	*29½B-1	R-W Nofault	232	1¾ to 2	600	Ball	⅞ min.	
							1¾ max.	4⅛
	*29½B-2	R-W Nofault	232	2¼ to 2¾	600	Ball	⅞ min.	
							1¾ max.	4⅛
120-1		R-W King	33	1¾ to 2	800	Roller	1¼	5
120-2		R-W King	33	2¼ to 3	800	Roller	1¼	5
	121-1	R-W Samson	33	1¾ to 2	800	Roller	1⅛ min.	
							3¾ max.	5
	121-2	R-W Samson	33	2¼ to 3	800	Roller	2⅛ min.	
							3¾ max.	5
	*123½B-1	R-W Victor	33	1¾ to 2	800	Ball	1⅛ min.	
							3¾ max.	5
	*123½B-2	R-W Victor	33	2¼ to 3	800	Ball	1⅛ min.	
							3¾ max.	5
	150-1	R-W Jumbo	33	1¾ to 2	1000	Roller	1⅛ min.	
							3¾ max.	5
	150-2	R-W Jumbo	33	2¼ to 3½	1000	Roller	1⅛ min.	
							3¾ max.	5
	*150½B-1	R-W Overall	33	1¾ to 2	1000	Ball	1⅛ min.	
							3 max.	5
	*150½B-2	R-W Overall	33	2¼ to 3½	1000	Ball	1⅛ min.	
							3 max.	5
	149		145	2¼ to 3½	2500	Ball	1¾ min.	
							3½ max.	6

* These hangers can be furnished with knuckle-joint for curved track. When so specifying, add the word "knuckle-joint."

R-W Garage Door Hangers and Equipment.

The variety of different style hangers and track obtainable in the R-W line makes sliding doors possible in almost any garage.

For all parallel sliding door arrangements, specify the ball-bearing hangers shown in preceding table. For curved trolley track, add the word "knuckle-joint."

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Side wall, ceiling or special bracket furnished as needed.

FIG. 13. FLOOR PLAN, PARALLEL SLIDING DOORS

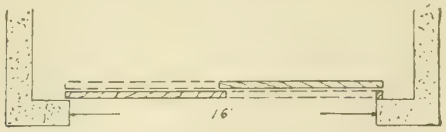

FIG. 14. FLOOR PLAN, PARALLEL SLIDING DOORS

R-W Right-Angle Garage Door Hangers.

The floor plans below show a few possibilities of R-W Right-Angle Door Hangers, where for lack of room right-angle doors are advisable.

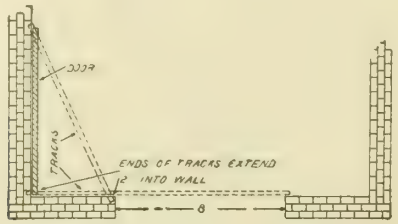

FIG. 15. PLAN RIGHT-ANGLE SLIDING DOOR
Single door style

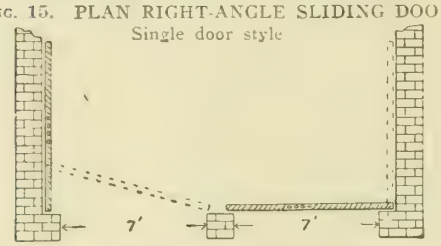

FIG. 16. PLAN RIGHT-ANGLE DOOR
Double door style

SIZES

Hanger Number	For Track No.	Bearings in Hangers	Pendant	Top of Door to bottom of front track		Clearance required above bottom of front track	
				Minimum, Inches	Maximum, Inches	Side Wall Bracket, Inches	Ceiling Bracket, Inches
235-1	31	Roller	Short	1	1¾	7	6
235-11	31	Roller	Long	...	...	7	6
235-7	232	Roller	Short	1⅛	2⅜	9½	7⅞
235-17	232	Roller	Long	...	...	9½	7⅞
235-2	33	Roller	Short	1⅛	2⅜	9½	8¼
235-12	33	Roller	Long	...	...	9½	8¼
235-3	31	Ball	Short	1	1¾	7	6
235-8	232	Roller	Short	1⅛	2⅜	9½	7⅞
235-4	33	Roller	Short	1⅛	2⅜	9½	8¼
235-5	31	Ball	Short	1	1¾	4½	3½
235-	232	Ball	Short	1⅛	2⅜	5⅞	4⅝
235-6	33	Ball	Short	1⅛	2⅜	6	4¾

For doors 1¾ to 2 inches thick, use No. 31 track.
For doors 2¼ to 2½ inches thick, use No. 232 track.
For doors 2¾ to 3 inches thick, use No. 33 track.
For use on double doors, specify for each door one four-wheel hanger with long pendant for outer end of door and one two-wheel hanger for inner end [illegible] center of opening. For single doors, use four-wheel hanger, short pendant on front end.

No. 435 R-W Sliding-Folding Garage Door Hangers.

The floor plans herewith show a few possibilities of this outfit, a fixture that will allow hinge doors to fold and swing inside of building, thus using the minimum of space. Not recommended for doors over 3 feet in width.

Fig. 18 shows the three-door arrangement, an excellent outfit for openings up to 9 feet wide. Provides an entrance door, which can be hinged to the jamb, as

FIG. 17. NO. 435—R-W SLIDING-FOLDING DOOR FOR PUBLIC OR PRIVATE GARAGE
Operated by R-W Stewart Electric Door Opener and Closer

shown, or to the middle door, when it folds back to the side with the other two doors.

Fig. 19 shows the four-door arrangement. This is the outfit more generally used. The doors are hinged together in pairs, and slide and fold right and left. The doors on these outfits will stand at any angle with the wall, depending, however, upon the width of the wall space adjoining the opening. Where wall space is greater than width of doors, they can be made to fold back when open, parallel with the front wall, as shown.

Figs. 20 and 21 show the five-door and six-door arrangement. As shown, this places three doors hinged together on jamb, the third door swinging free and making an ideal entrance door.

Doors so installed occupy less room when open than single swinging doors.

Makes a nice weather-proof and tight job when closed.

It is a heat saver in cold weather, due to the close flush fit.

Doors are stopped in the same manner as a house door.

Doors will not sag under any condition. This is an enduring attainment impossible in side-hung doors.

Permits the use of part or all of the opening at any time.

Prevents warping of doors at top, which is almost unavoidable with a wide-swing door.

FIG. 18. FLOOR PLAN, THREE-DOOR ARRANGEMENT

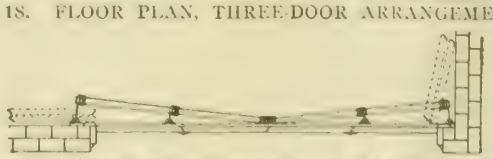

FIG. 19. FLOOR PLAN, FOUR-DOOR ARRANGEMENT

FIG. 20. FLOOR PLAN, FIVE-DOOR ARRANGEMENT

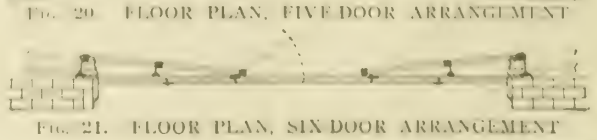

FIG. 21. FLOOR PLAN, SIX-DOOR ARRANGEMENT

SWEET'S CATALOG

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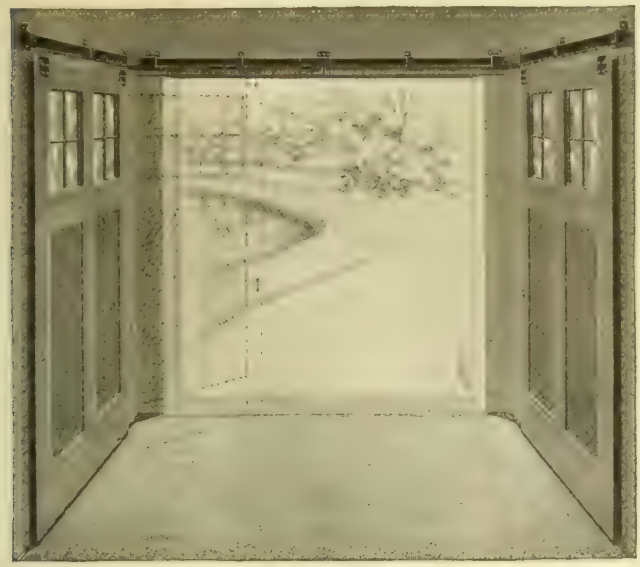


FIG. 22. NO. 635 R-W RECEDING GARAGE DOOR OUTFIT

No. 635 R-W Receding Garage Door Hangers

This outfit uses the same "right-angle" feature that makes the No. 235 R-W Right-Angle Door Outfit so popular.

No special supporting timbers are required, as the track attaches directly to the walls of the garage in all cases. Tracks are connected in the corner by curved corner bracket and are always on same level.

Bottom of door is guided positively and always held securely to the wall by floor guide, which is self-adjusting, and held in contact with floor guide track by light spring pressure. The same number floor guides as hangers used on single and double doors. On hinged doors omit floor guide on center door. Doors when open are always flat against side wall.

Minimum clearance required in turning corner.

Single doors, doors in pairs or several doors hinged together operate perfectly.

Minimum distance from edge of door (not jamb) when closed, to side wall 4 inches.

For single doors, specify two No. 635-1, 2 or 8 hangers; for double doors, specify for each door one No. 635-1, 2 or 7 hanger for outer end and one No. 635-3, 4 or 8 for inner end (where doors meet at center of opening). For doors hinged together, sliding to one side or right and left, specify same as for single doors or double doors respectively, and add one No. 635-1, 2 or 7 hanger for each hinged joint.

SIZES

Hanger Number	For Track No.	Top of Door to bottom of Track		Clearance required above bottom of Track	
		Minimum, Inches	Maximum, Inches	Side Wall Bracket, Inches	Ceiling Bracket, Inches
635-1	31	2	3	4¾	3½
635-3	31	2⅜	3	4¾	3½
635-2	33	3	3¾	6	4¾
635-4	33	3¼	3¾	6	4¾
635-7	232	3	3¾	5⅝	4¾
635-8	232	3¼	3¾	5⅝	4⅜

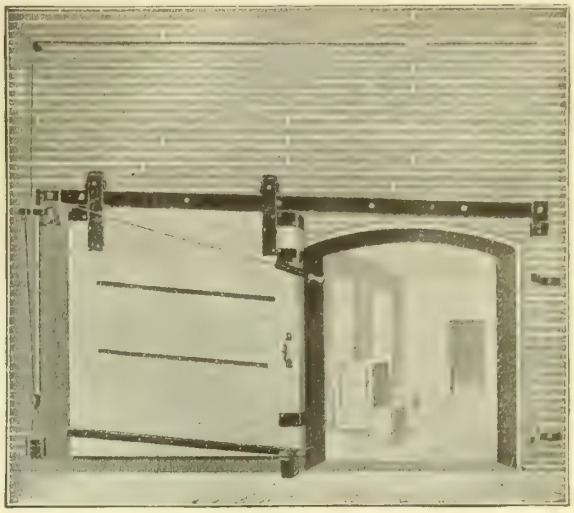


FIG. 23. NO. 102 "MONARCH" FIRE-DOOR FIXTURES

R-W Fire-Door Fixtures.

Our line is complete. The fixtures marked with a * are approved by the Underwriters' Laboratories. We can also furnish hardware to meet special requirements.

For more detailed data ask for Fire-Door Hardware catalogue.

Detail blue-prints sent on request.

SIZES

Type of Door	Fixture Number	Round or Flat Track	Clearance required: Above top of opening, Inches	Clearance required: At side of opening, Where doors slide or swing, Inches	Clearance required: At side of opening, Opposite Side, Inches
Incline Track Sliding Door	102*	Flat	14†	Width of opening plus 22	13½
	201*	Flat	14†	Width of opening plus 19	13½
	645*	Round	12†	Width of opening plus 18	13½
	646*	Round	12†	Width of opening plus 15	13½
Level Track Sliding Door	303	Flat	14†	Width of opening plus 19	19
	304	Flat	9†	Width of opening plus 19	19
Sliding Doors in Pairs	204*	Flat	14†	Width of opening plus 19	
	604*	Round	12†	Width of opening plus 15	
Single Swing Doors	206		9	10	3½
	406*		9	11	3½
	606		none	3½	3½
Swing Doors in Pairs	306		10	10	10
	506*		10	11	11
	706		3½	3½	3½

Type of Door	Fixture Number	Round or Flat Track	Clearance required above top of opening, Inches	Side wall required: Doors under 300 pounds	Side wall required: Over 300 pounds
Vertical Sliding Doors	203	Flat	Height of opening plus 19	15 and 21	21 and 28
	603	Round	Height of opening plus 19	16 and 22	22 and 29

Adjustable hanger can be furnished with Nos. 102, 201, 204, 303, 645, 646 and 604 fixtures, and require three inches more headroom above top of opening than rigid hangers.

* Are approved and labelled by National Board of Fire Underwriters.

† For arched top openings add ¾ inch for each foot of track back of the center of the opening, to the dimension given. For square top opening add ¾ inch for each foot of track back of edge of opening towards which the door slides in closing, to the dimension given.

THE SHELBY SPRING HINGE CO.

SHELBY, OHIO

Products.

"Shelby Chief" Double-Acting Ball-Bearing Surface Floor Hinge, "Shelby" Ball-Bearing Spring Butt Hinges, "Shelby Chief" Floor Hinge and Door Check, Door Holders, Door Bumpers, Push Bars, Door Bolts, Sash Locks, Push Plates, Screen Door Hinges and large line of Builders' Hardware Specialties.

The "Shelby Chief" Surface Floor Hinge.

Double-acting and ball-bearing floor hinge. The pioneer of the floor hinge industry; has been improved from time to time, thoroughly tested, and is absolutely guaranteed to give unequaled satisfaction.

Construction—The frame of this hinge is made from heavy wrought steel, the spring from the best oil tempered spring steel, the floor plates and surface cover plates from steel, real brass or bronze metal, finished to match any builders' hardware finish.

The action: Instant and noiseless; it operates on hardened steel ball-bearings set in tempered cups, mechanically balanced at every point which reduces friction to a minimum and insures maximum strength.

Alignment—Accomplished by means of two corrugated plates placed at the outer end of the spring, with corrugated faces together; the tension of the spring holds the plates in position without bolts.

To align the door, move the plate next spring with a punch in the opposite direction from which you wish to throw the door.

Installation—Fit the door the full size of the opening, then round the back edge to allow the door to swing close to the jamb. Apply the pivot socket to the top of the door, and pivot part to the top jamb; cut out the back lower corner of the door the size of the hinge; mortise the attaching plate in door at bottom. Insert lug on top of hinge in hole in attaching plate; shove hinge forward and put in front screws; put door in place and fasten floor plate to sill, and apply side plates.

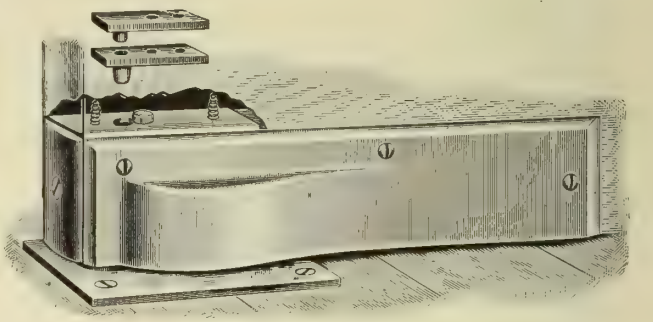


Fig. 1. Application

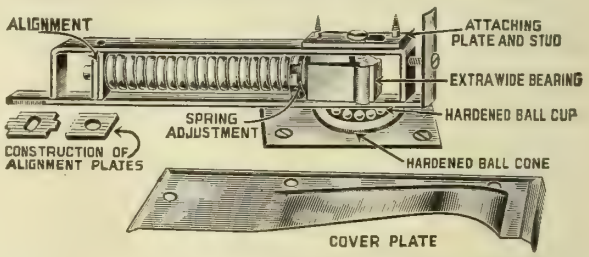


Fig. 2. Side Plate Removed, Showing Working Parts of Hinge

"SHELBY CHIEF" DOUBLE-ACTING, BALL-BEARING FLOOR HINGE

"Shelby Chief" Floor Hinge with Jamb Plate.

This style hinge is used where it is desired to hang the door to the jamb rather than have the hinge rest on the floor; also, where iron beams, concrete or tile floors are used (Fig. 3).

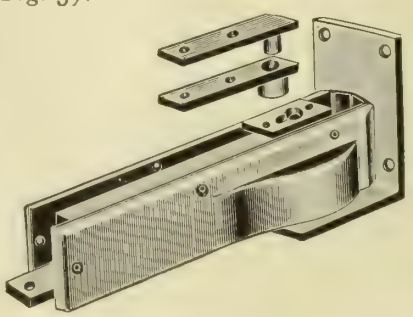


Fig. 3. "SHELBY CHIEF" FLOOR HINGE WITH JAMB PLATE

PRICES AND FINISHES "SHELBY CHIEF" DOUBLE-ACTING BALL-BEARING FLOOR HINGE

Finish — Planished Steel	No.	Thickness of Door 1¾ to 2"	No.	Thickness of Door 1⅞ to 1¾"	No.	Thickness of Door 2¼ to 3"	Finish — Steel Polished	No.	Thickness of Door 1⅜ to 1¾"	No.	Thickness of Door 1¾ to 2"	No	Thickness of Door 2¼ to 3"	Finish — Bronze or Brass Metal	No.	Thickness of Door 1⅜ to 1¾"	No.	Thickness of Door 1¾ to 2"	No.	Thickness of Door 2¼ to 3"
Japanned Dead Black		$2 80	4	$3.50	6	$4 10	Bronze Plated	62	$4 55	64	$4 90	66	$7 50	Bronze, High Polish	122	$7.00	124	$8.40	126	$11.60
Bronze Plated	1	3 50	14	4.20	16	6 80	Brass Plated	72	4 55	74	4.90	76	7 50	Brass, High Polish	132	7.00	134	8.40	136	11.60
Dull Brass Plated	11	3 75	17	4.55	19	7.35	Nickel-Plated	82	4 55	84	4.90	86	7.50	Antique, Copper Finish	142	7.70	144	9.10	146	12 25
Antique Brass Plated	21	3 75	23	4.55	25	7.35	Antique, Copper Plated	92	4 80	94	5.25	96	8 00	Dull Brass Finish	152	7.70	154	9 10	156	12.25
Brass Plated	22	3 50	24	4 20	26	6 80	Dull Brass Plated	102	4 80	104	5.25	106	8 00	Antique, Brass Finish	153	7.70	155	9 10	157	12 25
Sand Blast Antique Copper	33	4 [illegible]	34	4 [illegible]	36	7 [illegible]	Antique, Brass Plated	111	4 80	113	5.25	115	8.00	Nickel Finish	162	7.70	164	9 10	166	12.25
Antique Copper Plated	42	3 75	44	4 55	46	7.35	Sand Blast Antique Brass	112	4 80	114	5.25	116	8 00	Oxidized Silver Finish	172	11 20	174	12.60	176	16.00
Imitation Bronze Paint	53	3 75	54	4 55	56	7 35	Verd Antique	117	5 30	119	5.70	121	8 40	Verd Antique	182	8 40	184	9 80	186	13 20

[illegible] price per complete set packed in box with screws

Specify by number. Add L. P. to above numbers when specifying hinges with Lamb Plate

Turn to Catalogue

Continued on next page

"Shelby Chief" Surface Floor Hinge and Door Check.

A practical and economical device for operating and controlling double swinging doors.

It consists of a compact liquid check designed and built to rest on the upper back corner of the door to control the closing speed, also stop it on dead center, and to work in harmony with the well-known "Shelby Chief" Floor Hinge (described on opposite page).

Flip-flapping is impossible where a "Shelby Chief" Hinge and Check is used. It protects children, garments, and property.

The installation is practically the same as the "Chief" Floor Hinge. It is not necessary to cut into the floors, as the working parts of both hinge and check are attached to the door.

Especially desirable where stone or concrete floors are used (Figs. 4 and 5).

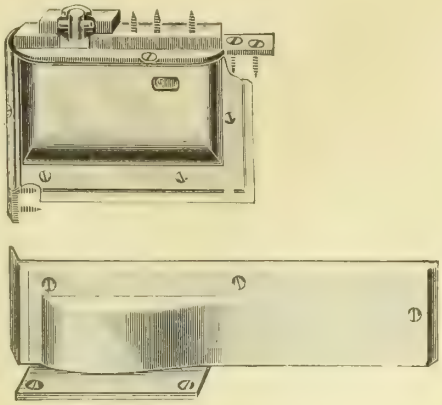


FIG. 4. DOOR CHECK AND FLOOR HINGE

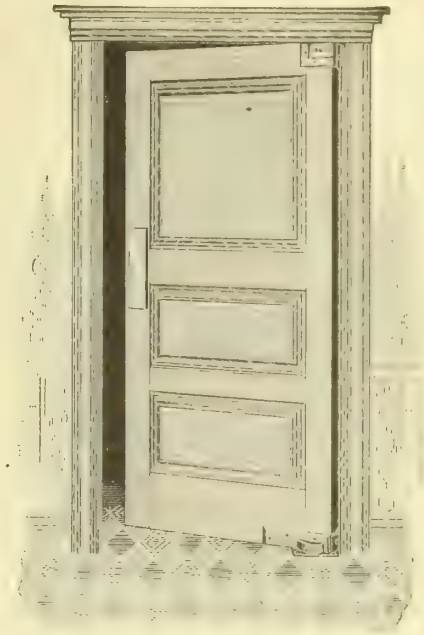


FIG. 5 "SHELBY CHIEF" DOOR CHECK AND FLOOR HINGE IN OPERATION

PRICES AND FINISHES "SHELBY CHIEF" DOOR CHECK AND FLOOR HINGE

These sets can be furnished to the consumer at about 50 per cent off the list

FINISH	No.	Thickness of Door 1⅛ to 1¾"	No.	Thickness of Door 1¾ to 2"	No.	Thickness of Door 2¼ to 3"
Planished Steel						
Japanned Dead Black	4002	$11.80	4004	$13.50	4006	$17.10
Bronze Plated	4012	13.50	4014	15.20	4016	18.80
Dull Brass Plated	4015	13.75	4017	15.55	4019	19.35
Antique, Brass Plated	4021	13.75	4023	15.55	4025	19.35
Brass Plated	4022	13.50	4024	15.20	4026	18.80
Antique, Brass Sand	4031	15.45	4033	16.70	4035	20.45
Antique, Copper Sand	4032	15.45	4034	16.70	4036	20.45
Antique, Copper Plated	4042	13.75	4044	15.55	4046	19.35
Imitat'n Bower-Barff	4052	13.75	4054	15.55	4056	19.35

FINISH	No.	Thickness of Door 1⅛ to 1¾"	No.	Thickness of Door 1¾ to 2"	No.	Thickness of Door 2¼ to 3"
Steel Polished						
Bronze Plated	4062	$15.55	4064	$16.90	4066	$20.50
Brass Plated	4072	15.55	4074	16.90	4076	20.50
Nickel-Plated	4082	15.55	4084	16.90	4086	20.50
Antique, Copper Plated	4092	15.80	4094	17.25	4096	21.00
Dull Brass Plated	4102	15.80	4104	17.25	4106	21.00
Antique, Brass Plated	4111	15.80	4113	17.25	4115	21.00
Sand Blast Antique Brass	4112	16.30	4114	17.75	4116	21.50
Verd Antique	4117	17.30	4119	18.70	4121	22.40

FINISH	No.	Thickness of Door 1⅛ to 1¾"	No.	Thickness of Door 1¾ to 2"	No.	Thickness of Door 2¼ to 3"
Bronze or Brass Metal						
Bronze, High Polish	4122	$19.00	4124	$21.40	4126	$25.60
Brass, High Polish	4132	19.00	4134	21.40	4136	25.60
Antique, Copper Finish	4142	19.70	4144	22.10	4146	26.25
Dull Brass Finish	4152	19.70	4154	22.10	4156	26.25
Antique, Brass Finish	4153	19.70	4155	22.10	4157	26.25
Nickel Finish	4162	19.70	4164	22.10	4166	26.25
Oxidized, Silver Finish	4172	24.70	4174	27.10	4176	31.50
Verd Antique	4182	21.40	4184	23.80	4186	28.20

Specify by number. Affix J. P. to above numbers when specifying sets where hinges with Jamb Plate are to be used

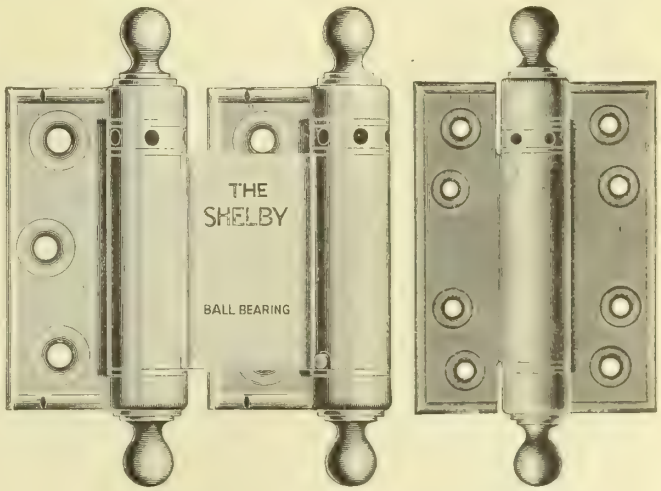
"Shelby" Spring Butts.

These ball-bearing hinges (patented) are made in 3, 4, 5, 6, 7, 8, 10 and 12 inch sizes, double- and single-acting. Made from steel, real bronze or brass metal, finished to match all builders' hardware. Each hinge is fitted with a carpenter's gauge which simplifies the hanging of the door (Figs. 6 and 7).

FIG. 7. "SHELBY" SPRING HINGE
Sectional View

SIZE HINGE TO USE FOR DOORS

6 x 2	ft. x ¾ to 1	in.....	Use size 3 inch
7 x 2	ft. x 1 to 1⅜	in.....	" " 4 "
7 x 2¼	ft. x 1 to 1½	in.....	" " 5 "
7 x 2½	ft. x 1 to 1¾	in.....	" " 6 "
8 x 2½	ft. x 1¼ to 2	in.....	" " 7 "
8 x 3	ft. x 1½ to 2¼	in.....	" " 8 "
9 x 3	ft. x 1¾ to 2½	in.....	" " 10 "
10 x 3	ft. x 2 to 3	in.....	" " 12 "



Double-Acting Single-Acting

FIG. 6. "SHELBY" BALL-BEARING SPRING BUTTS

FRANK F. SMITH METAL WINDOW HARDWARE CO.

Manufacturers of Smith's Improved Panic Exit Locks

NEWARK, N. J.

AGENCIES

BALTIMORE, MD., Henry Keidel & Co., 405 W. German St.
BOSTON, MASS., Walter H. Cutler, 137 Pearl Street
CHICAGO, ILL., John C. Bold, Conway Building
CLEVELAND, OHIO, McWatters Co., 1900 Euclid Building
GRAND RAPIDS, MICH., Michigan Fire Appliance Co.
LOS ANGELES, CAL., C. N. & F. W. Jonas, Equitable Savings Bank Building
MINNEAPOLIS, MINN., T. M. Read, 718 Metropolitan Life Building
NEW ORLEANS, LA., Fred J. Allen, Box 169
NEW YORK, N. Y., Hutchins & Zabriskie, 85 Walker Street
PHILADELPHIA, PA., Brownworth & Co., 1611 Sansom St.
SAN FRANCISCO, CAL., C. N. & F. W. Jonas, Rialto Bldg.
ST. LOUIS, MO., Seidel Mfg. Co., Boatmen's Bank Building

Product.

Smith's Improved Panic Exit Locks, especially adapted to Exit and Entrance Doors in theaters, schools, churches, hotels, factories and public buildings.

TRADE-MARK

Description.

Panic Exit Locks made of solid brass or bronze—devices that are of the best construction, easily applied and always positive in action. A slight touch against any part of cross-bar means instant release of the exit lock, causing the door to be opened outward.

Gravity action is one of the strongest points in favor of Smith's Improved Panic Exit Locks. Gravity is an action that does away with the dependency upon springs which do not give durability, and gravity, as understood, can always be depended upon. Smith's Improved Panic Exit Locks are the original and only real Gravity Exit Locks upon the market. They are patented. This gravity feature is embodied in all style Exit Locks with the vertical rod.

The Gravity Panic Exit Locks latch easily, both top and bottom, sliding into strikes as would a good working car latch. There is no rebounding and the latches will catch on their own accord. Sure safeguard from entry on outside, yet the latches are easily and quickly released from the inside by a slight touch against any part of cross-bar.

Styles.

Gravity Type Exit Locks—There are two sizes of this type of lock. Large locks have vertical rod $\frac{9}{16}$ inch diameter, cross-bar 1 inch; housings $3\frac{5}{8}$ inches high by $2\frac{5}{8}$ inches wide. Small locks have vertical rod $\frac{1}{2}$ inch diameter, cross-bar $\frac{3}{4}$ inch diameter, housings $2\frac{1}{2}$ inches high by 2 inches wide.

Large locks consist of Style 75 (Fig. 1), for single doors or standing leaf of double doors with no outside trim; Style 275 lock (Fig. 2), similar to Style 75 lock, but with locking attachment, allowing door to be opened or locked from outside, but at all times ready to open on the inside; Style 475 lock (Fig. 3), double cross-bar lock; and Style 675 lock, same construction as 475 lock, but with a locking attachment same as on Style 275 lock.

The small locks consist of Style 25, similar to Style 75; Style 225, similar to Style 275; Style 425, similar to Style 475; Style 625, similar to Style 675; and Style 15, which is operated by push-bar instead of cross-bar.

Mortise Types—One-inch diameter cross-bar.

Style 36 (Fig. 4) is for active leaf of double doors. Has open strike and auxiliary deadlocking feature. Outside trim consists of grip and thumb piece with cylinders.

Style 37 lock same as above, but with a knob and escutcheon on the outside.

Styles 38 and 39 locks have an antifriction latch in place of the car latch as used on Styles 36 and 37. Styles 35 and 34 locks have protective strike.

There are also many other types of mortise locks manufactured, too numerous to mention herewith.

Automatic Dogging Device (Fig. 8) is used on Gravity Exit Locks with flush sills. Prevents

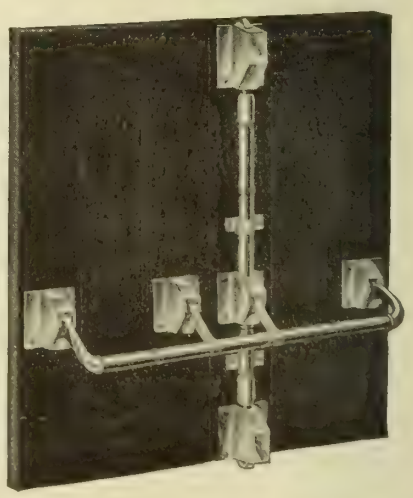


Fig. 3. PANIC EXIT LOCK, STYLE 475

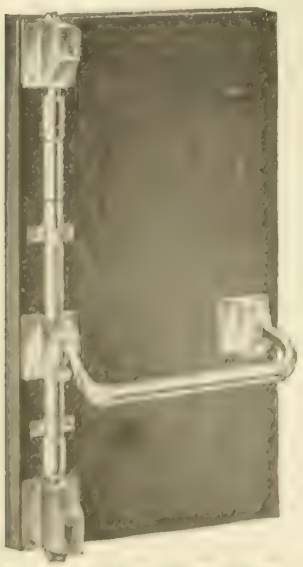


Fig. 1. PANIC EXIT LOCK, STYLE 75

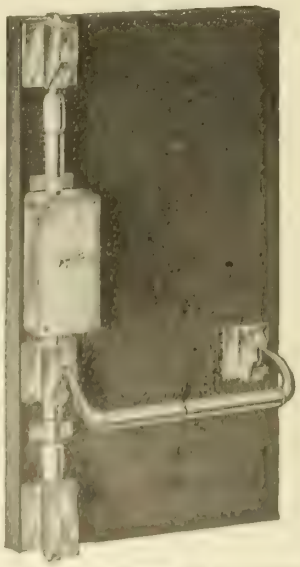


Fig. 2. PANIC EXIT LOCK, STYLE 275

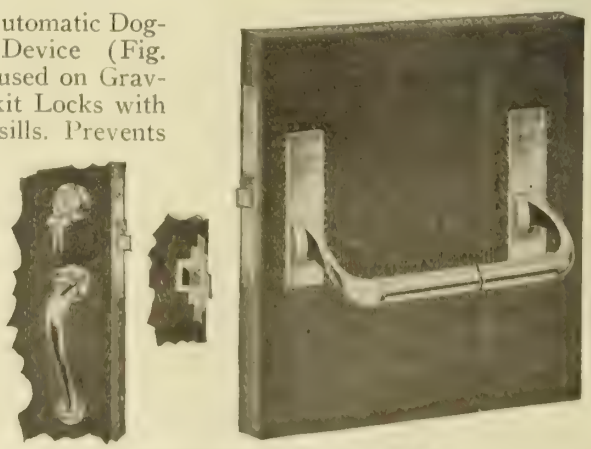


Fig. 4. PANIC EXIT LOCK, STYLE 36

Smith's Catalogue

Continued on next page

the bottom latch from dragging on the floor, for, when door is opened, top and bottom latches are held in a retractive position, but when door closes, these latches are automatically released and thrown back into a locking position.

Permanent Dogging Device holds the latches permanently in a retractive position, allowing the doors to be opened and closed without locking. Operated by key. Furnished at a small additional cost with any Gravity or Mortise Type Exit Locks. Furnished without extra charge with styles 36, 37 and the rim devices.

Specifications.

For Double Entrance Doors—(Group 1) Style 75 (Fig. 1) and Style 36 (Fig. 4, see also Fig. 7).

Standing leaf to be equipped with Smith's Improved Panic Exit Locks, Style 75 (insert number or finish).

Active leaf to be equipped with Smith's Improved Panic Exit Locks, Style 36 (insert number or finish). Furnished with grip and thumb piece, with cylinder on the outside of door. (If knob and escutcheon wanted on outside, insert Style 37 in place of number given above.)

Doors beveled "V" shape; greater opening on the inside, not less than $^3/_{16}$ inch; when closing doors one door will not interfere with the other. An open strike to be furnished with Style 36 Exit Lock to meet with this condition, and if a flush sill, furnish an automatic dogging device with Style 75 Panic Exit Lock.

The permanent dogging feature to be applied on Styles 75 and 36 Panic Exit Locks.

For Double Entrance Doors—(Group 2) Style 75 (Fig. 1), and Style 34.

Standing leaf to be equipped with Smith's Improved Panic Exit Locks, Style 75 (insert number or finish).

Active leaf to be equipped with Smith's Improved Panic Exit Locks, Style 34 (insert number or finish). Furnished with knob and escutcheon, with cylinder on outside of door. (If grip and thumb piece wanted on outside, insert Style 35 in place of style given herewith.)

Style 34 Panic Exit Lock to be furnished with protective strike and doors to have astragals.

Bottom strikes to be furnished to meet conditions, and, if a flush sill, furnish automatic dogging device with Style 75 Exit Lock.

Permanent dogging feature to be equipped on Style 75 Exit Lock.

For Double Entrance Doors—(Group 3) Style 75 (Fig. 1), and Style 275 (Fig. 2).

Standing leaf to be equipped with Smith's Improved Panic Exit Locks, Style 75 (insert number or finish).

Active leaf to be equipped with Smith's Improved Panic Exit Locks, Style 275 (insert number or finish). Furnished with knob, with cylinder on the outside of door.

Bottom strikes to be furnished to meet conditions, and, if flush sill, both style Panic Exit Locks to be furnished with automatic dogging device.

Single Entrance Doors—(Group 4) Style 38.

Equip all single entrance doors with Smith's Improved Panic Exit Locks, Style 38 (insert number or finish). To be furnished with grip and thumb piece with cylinder.

Single Exit Doors—(Group 5) Style 31 (Fig. 5).

Equip all single exit doors with Smith's Improved Panic Exit Locks, Style 31 (insert number or finish).

Single Exit Doors—(Group 6) Style 75 (Fig. 1).

Equip all single exit doors with Smith's Improved Panic Exit Locks, Style 75 (insert number or finish), and, where flush sills, have them applied with the automatic dogging device. (If smaller lock wanted, insert Style 25 in place of Style 75.)

Double Exit Doors for Theatres—(Group 7) Style 475 (Fig. 3).

Equip all double exit doors with Smith's Improved Panic Exit Locks, Style 475 (insert number or finish). (If small size lock wanted, insert Style 425 in place of Style 475.)

PRICE LIST, SOLID BRASS OR BRONZE, WITH BRASS OR BRONZE CROSS BAR

Styles	Polished Brass		Polished Bronze		Dull Brass		Unpolished Brass	
	No.	Price	No.	Price	No.	Price	No.	Price
Steel Rods								
Style 75	7410	$21.00	7411	$21.50	749	$23.00	7410S	$17.50
" 25	2510	12.50	2511	12.80	259	14.00	2510S	10.00
" 275	27410	28 50	27411	29.00	2749	30.50	27410S	25.00
" 225	22510	20 00	22511	20 30	2259	21.50	22510S	17.50
" 475	47410	29 00	47411	29.80	4749	31.50	47410S	24.00
" 425	42510	19 00	42511	19.50	4259	21.00	42510S	15.00
" 675	67410	36 50	67411	37.30	6749	39.00	67410S	31.50
" 15	1510	9.50	1511	9.75	159	10.50	1510S	6.65
Solid Rods								
Style 75	7510	24 00	7511	24.50	759	26.00	7510S	20.50
" 25	2610	15 00	2611	15.30	269	16.50	2610S	12.50
" 275	27510	31 50	27511	32.00	2759	33.50	27510S	28.00
" 475	47510	32.00	47511	32.80	4759	34.50	47510S	27.80
" 675	67510	39.50	67511	40.30	6759	42.00	67510S	35.30
Mortise Locks								
Style 36	3610	22.00	3611	22.25	369	23.00	3610S	21.50
" 35	3510	20.00	3511	20.25	359	21.00	3510S	19.50
" 38	3810	21.50	3811	21.75	389	22.50	3810S	21.00
" 31	3110	10 50	3111	10.75	319	11.25	3110S	10.00
" 431	H3110	12 25	H3111	12.50	H319	13.25	H3110S	11.50
" 232	23210	17.90	23211	18.15	2329	18.65	...	...

All other standard finishes take same prices as a dull brass finish.

Knob and escutcheon on outside, deduct $1.25 from polished brass Styles 36, 35 and 38, specifying numbers 37, 34 and 39, respectively.

Style 232 without cylinder, deduct $1.40 and specify Style 532.

Automatic Dogging Device, $2.00.

Permanent Dogging Device, $1.25, without extra cost on Styles 36, 37, 232 and 532.

Malleable Iron Exit Locks No. 2577M, $7.00.

Indorsement.

Smith's Improved Panic Exit Locks are used on some of the finest and largest theaters, public and school buildings throughout this country. Specified by many architects and approved by a large number of State Boards, City Boards and School Commissions.

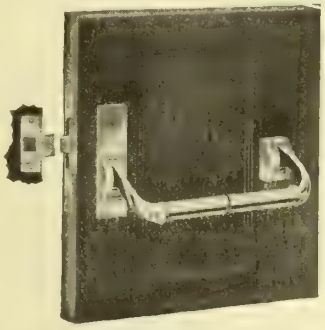


Fig. 5. PANIC EXIT LOCK, STYLE H31

Fig. 6. PANIC EXIT LOCK, STYLE 232

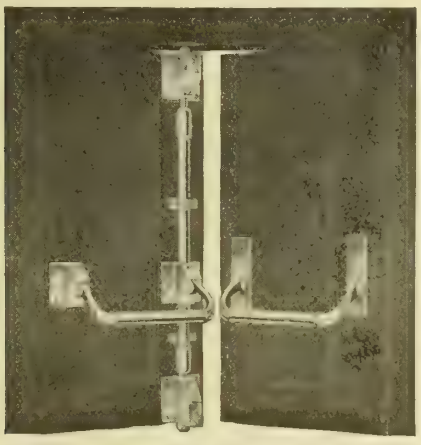


Fig. 7. MAIN ENTRANCE PANIC EXIT LOCKS

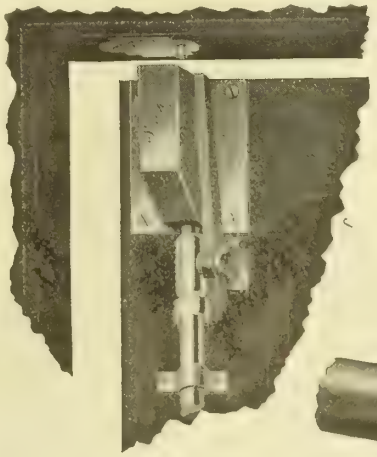


Fig. 8. AUTOMATIC DOGGING DEVICE

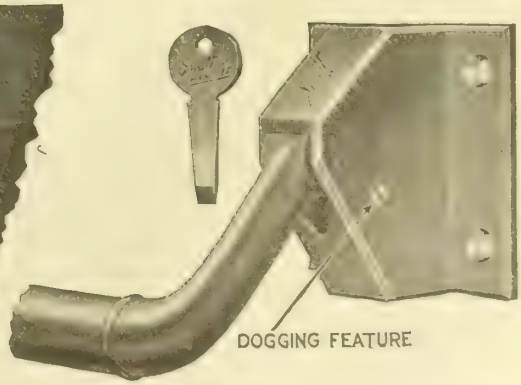


Fig. 9. PERMANENT DOGGING DEVICE

THE STANLEY WORKS

Builders' Hardware

BRANCH FACTORIES
NILES, OHIO
BRIDGEWATER, MASS.

FACTORIES AND WAREHOUSES
NEW BRITAIN, CONN.

WAREHOUSES
NEW YORK, N. Y., 100 Lafayette St
CHICAGO, ILL., 73 East Lake St.

Products.

GARAGE DOOR STAYS and DOOR HINGES, CREMONE CASEMENT BOLTS, with other WROUGHT-STEEL BUILDERS' HARDWARE (Stanley Work), including BALL-BEARING BUTTS and HINGES, BOLTS, STAYS and HOLDERS; "PEERLESS" STORM SASH and SCREEN HANGERS and FASTENERS.

While our principal Product is Wrought-Steel Butts and Hinges, we are prepared to furnish these in solid WROUGHT-BRONZE METAL, with or without Ball-Bearing Washers.

Also, SHELF BRACKETS, HANDLES, LATCHES, BLIND TRIMMINGS, etc.

Territory.

Our goods can be obtained from the leading hardware merchants the world over.

Identification of Stanley Products.

Stanley's Butts are stamped with the Stanley trade-mark (Fig. 1) in the process of manufacture, so there need be no doubt that the hinges specified are actually used. We designate our line of Wrought-Bronze Ball-Bearing Butts as No. 180, and this number is stamped on the back of each hinge, near the top, as shown in Fig. 2. Our standard line of Wrought-Steel plated Butts, No. 239, is highly polished and heavily electroplated. They are well protected against atmospheric influences and are fully equal in appearance to the Wrought-Bronze Butts. The number, 239, is stamped on these butts.

FIG. 1

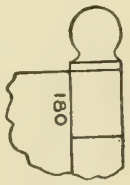


FIG. 2

IDENTIFICATION

Our next grade, No. 241½, is a line of polished and plated butts superior in weight and finish to the best of other makes. "No. 241½" is stamped on these butts, and on all Ball-Bearing Butts of this number we prefix the letters "BB." Sherardized and plated butts are stamped with the letter "Z," as described below.

Finish.

We make these butts in all of the popular finishes, and can reproduce any finish required to match the other hardware. Certain butts are Stanley sherardized before plating. These are stamped with the letter "Z" preceding the number or trade mark. If there is no number, the letter "Z" will occupy the position of 180 in Fig. 2.

Specifications.

Architects, in specifying our goods, should use the word "Stanley"; as, "Stanley Steel Butts," "Stanley Ball-Bearing Hinges," etc., and in addition thereto, if possible, the class number of the article specified.

Ball-Bearing Butts.

Our Ball-Bearing Hinges (Fig. 3) are acknowledged to be the best hinges made for the hanging of doors. Their use eliminates the disagreeable creaking that accompanies ordinary hinges; they do away with the necessity of oiling, and allow the doors to swing smoothly and noiselessly. Doors hung with these hinges will not sag, nor will the hinges wear down under heavy loads—facts that have been conclusively demonstrated by actual tests. The ball bearings are turned from solid steel, and each one will sustain a weight of one thousand pounds without crushing. The washers in which the bearings are incased are so constructed that they can not come apart in use.

We will send a neatly mounted sample Ball-Bearing Butt, on request, to any responsible architect.

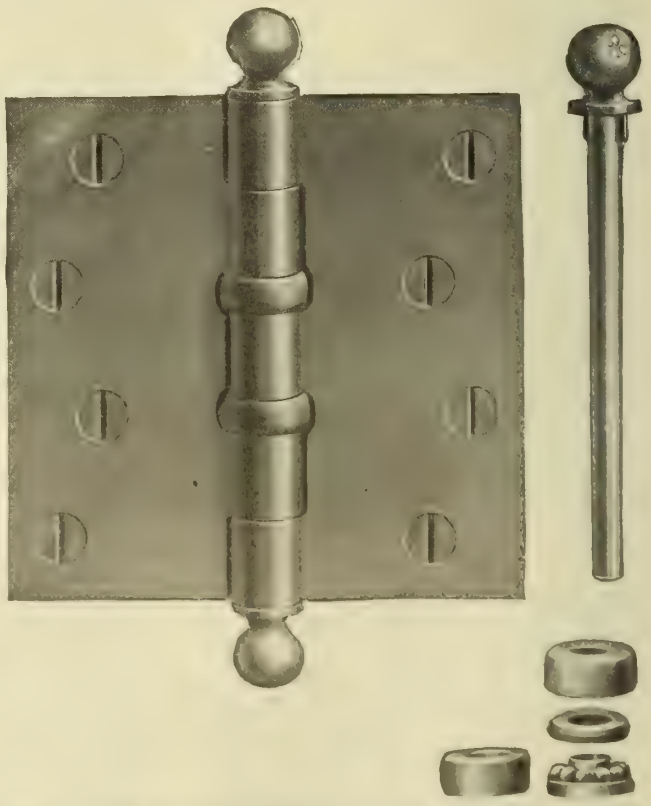


FIG. 3. STANLEY BALL-BEARING BUTT, ALSO ITS NON-RISING PIN AND BALL BEARING WASHER WITH DUSTPROOF BRASS CAP

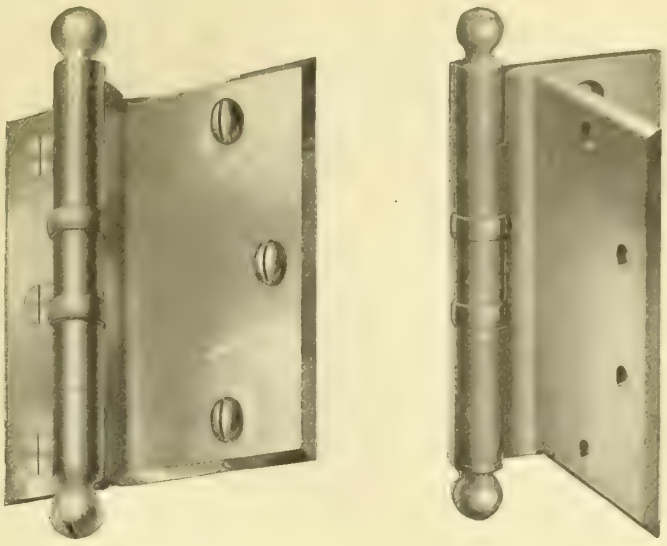
Non-Rising Pins.

All of our Bronze Metal Butts, the No. 239 Butts, and all Ball-Bearing Butts are made with a patented pin that will not rise. This pin slips in and out with perfect freedom, but will not rise under the action of the door. It is the only non-rising pin that is not locked in.

Continued on next page

Butts for Metal Doors.

We produce our lines of Wrought-Steel and Bronze Butts with and without ball bearings, and drilled to a special template for use on metal doors. The screw holes in these butts are accurately spaced, and we furnish a template for drilling the holes in the doors. These butts are known as "Template" Butts, and should be so specified. (Fig. 4). See our 1914 Catalogue, pages 30 to 33 inclusive.



No. BB170 No. BB172

FIG. 4. METAL DOOR BUTTS

Casement Hinges, Nos. 304 and 305 (Eschweiler's Patent), for Windows that Swing In.

Casement windows opening in are coming more and more into use with the increasing number of bungalows and houses with similar architectural features. Their many advantages are recognized by architects and builders, and their use would be even more general were it not for the difficulties that have been experienced in procuring hinges of proper design.

The Eschweiler Casement Hinges manufactured by THE STANLEY WORKS successfully solve these difficulties. Their operation is very simple, the sash being lifted with ordinary sash lifts until it clears the stop on the sill; the hinge comes into action at this point, and the window swings back easily. When closed, the sash drops back into place when it is in line with the edge of the sill stop. These hinges permit the sash to fit closely, so that when closed they are absolutely proof against dust and draft. Angle plates for sill and window included to prevent wear.

The hinges are made in 3½-inch size and all finishes. No. 304 has a finely finished surface; No. 305 is not so highly polished, but is of the same quality as the regular line of Stanley Butts. They are made right- and left-hand, and in ordering it is necessary to state hand wanted (Fig. 6).

FIG. 5. CREMONE BOLT NO. 372

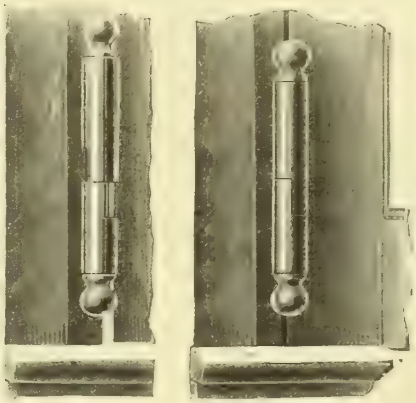


FIG. 6. CASEMENT HINGES FOR WINDOWS SWINGING IN

New Cremone Bolt No. 372.

No. 372 Cremone Bolt has a cast brass egg-shaped handle and plane plates. Packed regularly with two center guides, two end guides, one flat staple and two curved staples. Either angle staples or staples shown in cut will be included when ordered. We carry 3-, 3½-, 4- and 4½-foot rods in stock and can furnish any other length desired (Fig. 5).

Stanley Wrought-Steel Door Holder, No. 456.

Instead of being operated from top, bolt is operated from the side, near floor; this makes operation easier, and gives more firm, positive action and purchase on floor. Has composition rubber tip, self-adjusting to overcome unevenness of floor. The release is made of solid bronze. This bolt will hold doors firmly open.

A choice of five different finishes. (Fig. 8).

Foot Bolts and Holders.

The Stanley No. 356 Foot Bolt is made in three-, six- and ten-inch sizes, and all finishes. The ten-inch has same style and size plate as No. 1055 on next page.

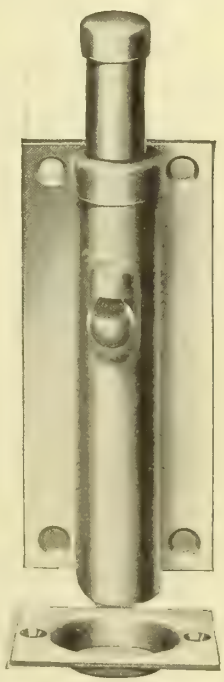


FIG. 7. FOOT BOLT NO. 356— 3 AND 6 IN. STYLE

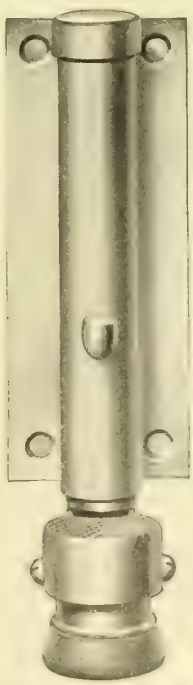


FIG. 8. DOOR HOLDER NO. 456

Continued on next page

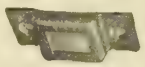
They are packed with rectangular floor plates which have oval shaped holes to take care of any shrinkage in the door. Plates are cupped to guide bolt. Packed one half dozen in a box, with screws to match; 10-inch, one in a box, with screws.

Positive bolt action. Doors of all sizes kept firmly closed (Fig. 7).

Stanley Wrought-Steel Chain Bolts.

Stanley Wrought-Steel ten-inch Chain Bolts are made for heavy garage and warehouse doors, and also for general doors of light weight and smaller sizes.

Furnished in Japan and Plated Finishes. Chains five feet and twenty-four inches long. Two staples furnished with each bolt. Box staple, for use with batten doors, will be included when ordered. These bolts are reversible, so that their use is practical either on the inside or outside of the door.



BOX OR UTILITY STAPLE
Can be located at any point on upper jamb

One indication of quality in this Stanley Bolt is the Stanley sherardized spring. This is as good a protection against rust as it is possible to obtain and exceeds the U. S. Government requirements. Ordinary strains will not break this bolt. Packed one in a box with screws to match.

Other Stanley Bolts are somewhat similar in type, but are made three inches long for use on light doors, closets, cabinets, sheds, etc., and six inches long for full-size doors (Fig. 9).

Fig. 9. WROUGHT STEEL CHAIN BOLT, NO. 1055J

Stanley Garage Door Stay.

The Stanley Garage Door Stay is a strong device, made of one-inch angle-iron, which is fastened on the top of the inside of the door and on the upper part of the door casing. It acts by means of an attached chain which throws the bar off center, allowing it to "fold" upon itself, and thus causing the door to close in its natural way. When extended, it holds the door full open, making a firm, rigid barrier against the wind or other causes which would otherwise slam the door (Fig. 12). It permits closing the doors with one hand from inside the garage (Fig. 13). Weight eight and one half pounds per pair.

Fig. 13. PERSPECTIVE SHOWING APPLICATION OF GARAGE DOOR STAY, NO. 1775

Fig. 10 Inside

Fig. 11 Outside

SHOWING DOUBLE GARAGE DOORS WITH CHAIN BOLT, STAPLES, STAY, ETC.

Stanley Lever Mortise Bolt, No. 385.

Furnished in four sizes: 9-, 12-, 18-, and 24-inch, with strike, guide plate and 1 by 8 screws to match finish.

The lever in this bolt is solid bronze. The plate is highly polished and finished.

Plate, 6½ by 1¼ inches. Rod, ¼ inch diameter.

Strike plate, 1¼ by 2 inches. Bolt, ½ inch square.

Guide-plate, 1⅛ by 2⅜ inches. Bolt has ¾-inch throw.

Length of 12-inch over all, 14½ inches; extended, 15 inches.

Made in all standard finishes, and also in special finishes to order (Fig. 14). Also furnished as a mortise flush bolt and numbered 387.

Fig. 14 LEVER MORTISE BOLT, NO. 385

Fig. 15. NO. 1052 GARAGE CREMONE BOLT

No. 1052 Garage Cremone Bolt.

The bolt proper is of forged half oval steel 1½ inches wide by ⅜ inch thick and may be adjusted by one quarter-inch intervals to six inches beyond nominal sizes of 7, 7½, 8, 8½ and 9 feet. Can be furnished in any other length required. The lever handle is cast bronze seven inches long. Plates are 3¼ inches wide and bolt has 1½-inch throw (Fig. 15).

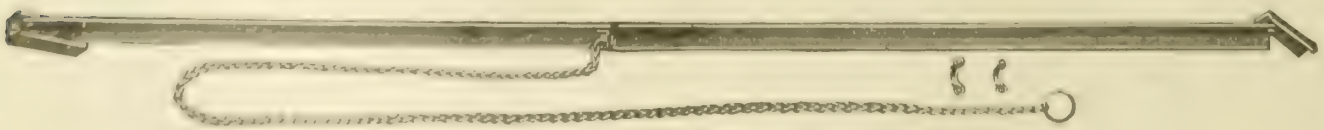


Fig. 12. GARAGE DOOR STAY, NO. 1775
Illustration about one seventh size

Continued on next page

Stanley Garage Hinges, No. 1457.

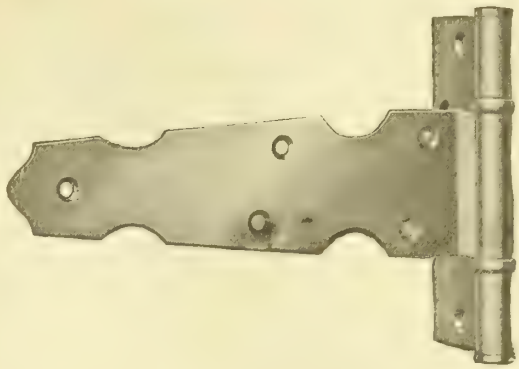
These hinges have been designed especially to meet the requirements of heavy garage doors. They are equipped with Ball-Bearing Washers, which permit the heavy doors to swing easily without binding. The washers are so constructed that a brass cap protects the steel bearings from dust and moisture. This makes oiling unnecessary.

The strap of this hinge is made either 10, 24 or 36 inches long. Its design is attractively ornamental, and adds greatly to the appearance of the garage entrance. The 36-inch hinge is made with $1\frac{1}{16}$-inch offset for wood and numbered 1458; with 2¼-inch offset for brick and concrete, it is numbered 1459 (Fig. 17).

These hinges can be furnished in all finishes: Plain Steel, Japanned, Dead Black Japanned, Copper or Brass Plated, or Stanley Sherardized, the latter being a superior finish which protects against rust and corrosion.

Stanley Garage Hinges permit closing the doors tightly.

No. 1459. About one twelfth size



No. 1457. 24-inch hinge, about one eighth size

FIG. 17. GARAGE DOOR HINGES

"Peerless" Storm Sash and Window Screen Hangers and Fasteners.

"Peerless" Hangers and Fasteners furnish a practical, simple and safe method of hanging storm sash, and full length or half length screens. When once in place, the storm sash or screens can be removed or rehung without ladder, tools, screws, or trouble. Just hook and unhook. These Hangers and Fasteners are made of the best grades of wrought steel, carefully designed and manufactured by the most modern methods.

They are finished in a high-grade Japan, or in the new Stanley Sherardized finish, which is as good a protection against rust as it is possible to obtain, and greatly prolongs the life of the hardware.

As in the case of Stanley's Butts and Hinges, Schroeder's "Peerless" Hangers and Fasteners, manufactured only by THE STANLEY WORKS, are the Standard of the Hardware World. There are many inferior imitations and substitutes on the market, but to obtain the goods of the highest quality and most economical service you should ask for Stanley Numbers 1717, 1719, 1724, 1725, and 1726, in ordering Sash and Screen Hangers and Fasteners (Figs. 16 and 18 to 22).

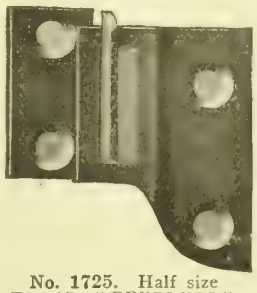
Write for our Circular SCI, fully describing this line.

FIG. 16. NO. 1719 "PEERLESS" STORM SASH FASTENER

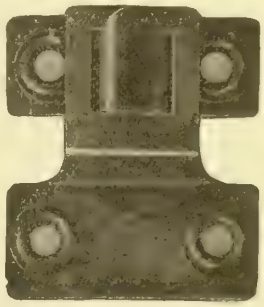
Made in 5- and 10-inch lengths—5-inch for windows four feet high and smaller, and 10-inch for windows over four feet

Catalogue.

We shall be pleased to send a complete catalogue showing our many lines to any responsible architect, on request. Ask for Catalogue SC. It is impossible to do justice, in four pages, to our complete line, which fills a catalogue of 270 pages.



No. 1725. Half size
FIG. 18. "PEERLESS" HANGER FOR HALF-LENGTH SCREENS



No. 1724. Half size
FIG. 19. "PEERLESS" HANGER FOR FULL-LENGTH SCREENS

No. 1717
FIG. 20. "PEERLESS" HANGER

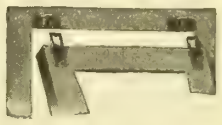


FIG. 21. PERSPECTIVE SHOWING METHOD OF APPLICATION OF "PEERLESS" HANGERS

No. 1719. Window open

No. 1719. Window locked

FIG. 22. PERSPECTIVES SHOWING APPLICATION OF "PEERLESS" STORM SASH FASTENER

STOWELL MANUFACTURING & FOUNDRY CO.

Automatic Fire Door Equipment; Door Hangers

SOUTH MILWAUKEE WIS.

Products.

Manufacturers of the WILBERN AUTOMATIC FIRE DOOR EQUIPMENT; WILBERN ADJUSTABLE FIRE DOOR HANGERS; No. 20A WILBERN AUTOMATIC CLOSING FIXTURES; WILBERN FIRE DOOR TRACK; all FIRE DOOR ACCESSORIES; TIN CLAD DOORS, with Underwriters' Label.

Also, DOOR HANGERS for Warehouse, Factory and Depot Doors; Freight Car Doors; Baggage, Express and Mail Car Doors; Elevator Doors, etc.

Underwriters' Approval.

The Wilbern Fire Door Equipment is regularly inspected and labeled under the supervision and direction of the Underwriters' Laboratories, Inc.

This equipment has successfully withstood the severe tests of laboratories as well as actual fire, particulars of which will be gladly forwarded to architects, intending purchasers and other interested parties on request.

Automatic Feature of Equipment.

The fusible links, when the fire heat reaches a certain degree, collapse, thus releasing the weights. This action permits the doors to close securely.

Wilbern Adjustable Fire Door Hangers.

Either the adjustable or the non-adjustable Wilbern hangers may be used with Wilbern automatic closing fixtures. The superiority of Wilbern fixtures over all others for gravity fire doors lies largely in those hangers which are adjustable. See Figs. 1, 2, and S-7. As fire doors are hung against rough brick walls, it is essential that they be adjustable, that they may remain in perfect working order.

No. 4A (Fig. 1) is a malleable iron hanger with 5-inch roller bushed sheave with machine-turned groove. Axle is 5/8 inch in diameter and will sustain a weight of several tons. Being reinforced with high ribs down the neck of the hanger, where the greatest strain comes in time of fire, it will, therefore, retard fire much longer than other designs.

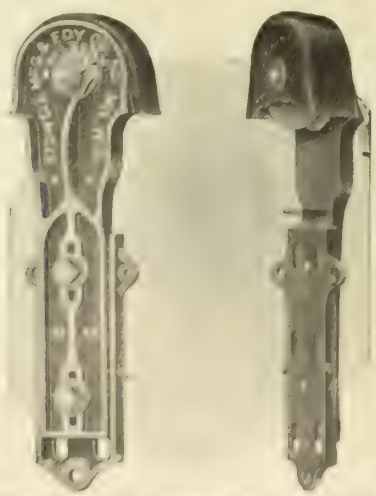


FIG. 1. WILBERN NO. 4A ADJUSTABLE FIRE DOOR HANGERS
Approved by National Board of Fire Underwriters

No. 6 (Fig. 2) is made from 3½- by 3/8-inch steel, and is equipped with 7-inch malleable iron roller bushed sheave having machine-turned groove.

These hangers have both vertical and lateral adjustments, and can not jump the track. Adjustments permit doors to be hung close against wall and tight to floor, precluding possibility or existence of drafts. Also, doors can be occasionally adjusted to conform to varying circumstances, and can be kept in perfect condition, thus saving expense for repairs.

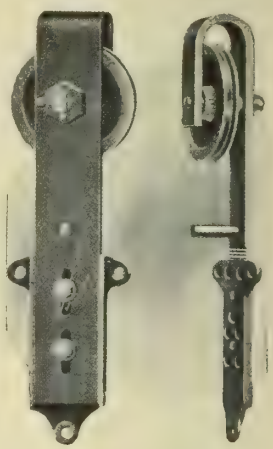


FIG. 2. WILBERN NO. 6 ADJUSTABLE FIRE DOOR HANGERS
Approved by New England Mutuals

Wilbern Automatic Closing Fixtures No. 20A.

A set of these fixtures consists of: Eighteen pounds of weights, two cord links, one link holder, two fusible links, two pair link hooks, one stay roller, one front stop, cord sheave and back stop with release trigger, two binders, two half-oval strips, two flat strips, one flat strip for stay roller, one weight holder, eight bumper shoes, one handle, one wedge, one flush pull, one tackle block, two expansion screw hooks, track brackets, washers for wall bolts, instruction card and sufficient sash cord. Bolts and screws are included, except bolts through the wall.

The No. 20A Wilbern Eastern Style Fixture has but one link, the one on the edge of the door.

Tin Clad Doors.

Door, single or double, must lap opening 4 inches on each side and 4 inches on top, and must be made of three thicknesses of 7/8-inch matched lumber covered

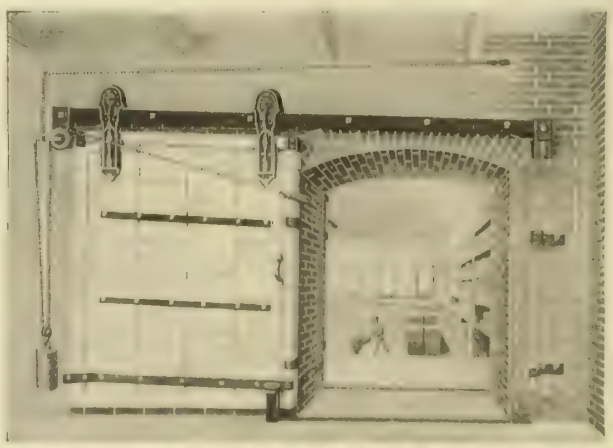


FIG. 3. WILBERN NO. 4A ADJUSTABLE HANGERS, WITH NO. 20A WILBERN FIRE DOOR FIXTURES
Labeled under direction of Underwriters' Laboratories, Inc.

Continued on next page

with tin. Doors require weights at rate of about ½ pound per square foot. This Company also supplies doors tinned per Underwriters' specifications, and bearing their label. (See Fig. 3.)

Double Doors.

Adjustments are especially necessary on double doors which meet in center of opening. (See Fig. 4.) The Wilbern adjustments make it possible to hang double doors on incline tracks so as to prevent a "V"-shaped opening between them, thus thwarting the fire from creeping through.

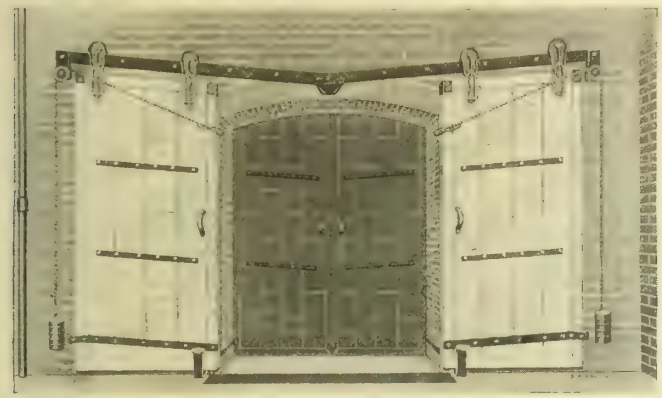


FIG. 4. WILBERN NO. 4A HANGERS, WITH NO. 20A WILBERN AUTOMATIC FIXTURES. DOUBLE DOORS

Round Track.

The Wilbern adjustable hanger is also adapted to round track, as shown in Fig. 5; size No. 5 has 3-inch wheel and runs on track, $1\frac{5}{16}$ inches O. D., No. 14 gauge. Size No. 9 has 5-inch wheel and runs on track, 1½ inches O. D., No. 10 gauge.

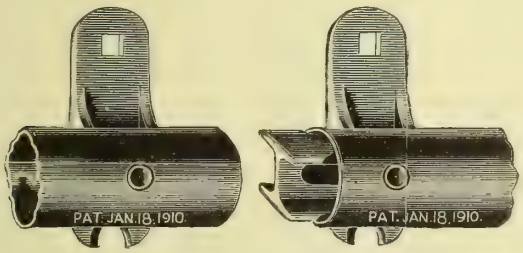


FIG. 5. NO. 5 WILBERN ROUND TRACK

Hangers for Railroad Work.

The Wilbern adjustable hanger is used extensively by railroads for warehouses and freight-houses. The adjustments enable ordinary workmen to correct doors which give trouble through any exterior cause, thus reducing repair account and avoiding expense of sawing bottoms of doors or resetting hangers.

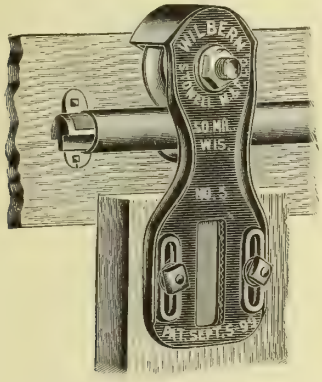


FIG. 6. NO. 5 WILBERN HANGER FOR ROUND TRACK

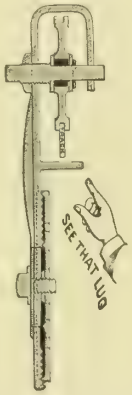


FIG. S-7. SECTIONAL VIEW OF WILBERN ADJUSTABLE DOOR HANGER

Blue-Prints.

Send for blue-prints of Wilbern Parallel Door Equipment for large freight-houses and dock sheds. The Canadian Government adopted this type for five miles of dock sheds along St. Lawrence River.

Wilbern Special Features.

(1) The owner can keep his doors in constant repair without expense.

(2) The contractor can install doors perfectly in far less time than is required with common hangers.

(3) The architect always wishes to give his clients the most substantial and trustworthy material at lowest ultimate cost.

(4) The underwriter and his inspectors can insist that imperfectly working doors be corrected in their presence, by immediate adjustment.

LIST PRICES FOR HANGERS, TRACK AND FIXTURES SEPARATELY

No. 4A	Wilbern Adjustable Fire Door Hangers, weight, 40 lbs. per pair	$7.00
No. 6	Wilbern Fire Door Hangers, Adjustable, weight, 35 lbs. per pair	7.00
No. 20A	Wilbern Non-Adjustable Fire Door Hangers, per pair	4.10
No. 20A	Wilbern Automatic Closing Fixtures, per set	12.00
No. 20A	Wilbern Automatic Closing Fixtures, Eastern Style, One Link.	11.00
Wilbern Fire Door Track (3½" x ⅜"), with Brackets, per foot		.40
Extra Weights, per pound		.07
	Discount, 40 per cent.	
No. 5	Wilbern Adjustable Round Track Hangers, weight, boxed, 105 lbs. per doz., per doz. pairs	19.20
No. 5	Wilbern Round Track, weight 110 lbs. per 100 ft., per 100 ft.	14.00
No. 9	Wilbern Adjustable Round Track Hangers, weight, 30 lbs. per pair	5.00
No. 9	Wilbern Round Track, per 100 ft.	25.00
	Subject to discount.	

LIST PRICES PER OPENING FOR COMPLETE EQUIPMENT

Width of Opening	No. 4A Wilbern Adjustable Hangers No. 20A Wilbern Fixtures	No. 20A Wilbern Non-Adjust. Hangers No. 20A Wilbern Fixtures	No. 4A or No. 6 Wilbern Adjustable Hangers No. 20A Wilbern Fixtures, Eastern Style	No. 20A Wilbern Non-Adjustable Hangers No. 20A Wilbern Fixtures, Eastern Style
2′ 6″	$21.70	$18.70	$20.70	$17.35
3′ 0″	22.00	19.00	21.00	17.70
3′ 6″	22.35	19.35	21.35	18.05
4′ 0″	22.70	19.70	21.70	18.40
4′ 6″	23.00	20.00	22.00	18.70
5′ 0″	23.30	20.30	22.30	19.05
5′ 6″	23.65	20.65	22.65	19.40
6′ 0″	24.00	21.00	23.00	19.70
6′ 6″	28.20	23.70	27.20	22.40
7′ 0″	28.50	24.00	27.50	22.70
7′ 6″	28.85	24.35	27.85	23.00
8′ 0″	29.20	24.70	28.20	23.40
8′ 6″	29.50	25.00	28.50	23.70
9′ 0″	29.80	25.30	28.80	24.00
9′ 6″	30.15	25.65	29.15	24.40
10′ 0″	30.50	26.00	29.50	24.70

Openings wider than six feet require three hangers; these are included in above lists.

Discount 40 per cent.

References.

This equipment is to be found in successful operation in plants in almost every State in the Union.

International Harvester Company of America, Chicago, Ill. All plants
Sherwin-Williams Co., Cleveland, Ohio. All plants
Studebaker Corporation, South Bend, Ind.
Eastman Kodak Co., Rochester, N. Y.
J. I. Case Threshing Machine Co., Racine, Wis.
J. Deere Plow Co., Moline, Ill.
John A. Roebling's Sons Co., Trenton, N. J.

RUSSELL & ERWIN MFG. COMPANY

AMERICAN HARDWARE CORPORATION, SUCCESSOR

NEW BRITAIN, CONN.

BRANCHES

SAN FRANCISCO, CAL.
NEW YORK, N. Y., 94-98 Lafayette Street
LONDON, ENG.
CHICAGO, ILL., 73 East Lake Street

Product.

"RUSSWIN" FIRE-EXIT BOLTS (patented), for double and single doors, for instantaneously releasing doors in case of emergency.

"Russwin" Fire-Exit Bolts.

These bolts are designed and built to keep the door closed, permit no unauthorized entry from the outside, and yet allow the door, at all times and under all conditions, to be freely opened from the inside by a slight pressure upon a substantial bronze bar which extends horizontally across its face.

Information.

Full information on other types of Fire-Exit Bolts sent on request.

Inside. Bolt applied — Outside. No trim

Pressure on horizontal bar raises bolt which is suspended by gravity dog, releasing bolt head, and allowing door to open. At point of closing, gravity dog is thrown off by contact with lug on strike, allowing bolt head to fall by gravity, locking gravity dog in engagement with strike.

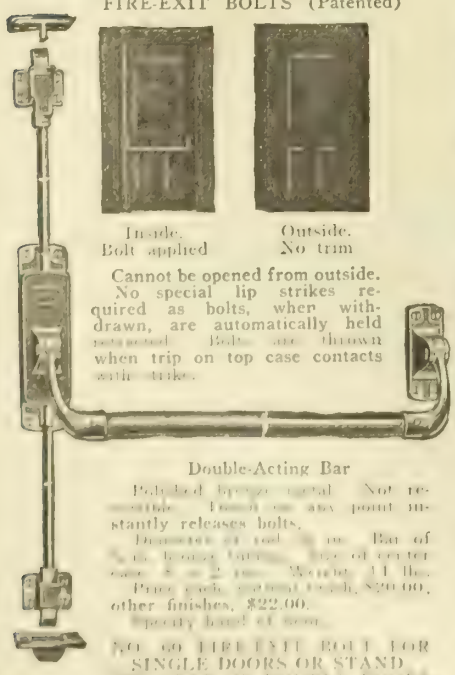
Reversible for right- or left-hand reverse bevel doors.

For stock, standard size, length 8 ft. 6 ins., width 3 ft. Bolts fitted to any height or width (under 8 ft. 6 ins. x 3 ft.) by cutting top rod and horizontal bar. Width of bases, 2¼ ins.; height of bar from floor, 38 ins.; weight of bolt, 10 lbs.

Price: No. 38, brass polished, $17.60; No. 35, brass unpolished, $13.20; No. 25, dead black enameled, $8.00; No. 27, same as No. 25 with polished brass bar, $9.00; No. 26, brass or bronze plated, unpolished, $8.50.

Specify height and width of door between stops, width of stiles and thickness of stop.

COLUMBIA GRAVITY-LOCKING FIRE-EXIT BOLTS (Patented)



Inside. Bolt applied — Outside. No trim

Cannot be opened from outside.

No special lip strikes required as bolts, when withdrawn, are automatically held retracted. Bolts are thrown when trip on top case contacts with strike.

Double-Acting Bar

Polished bronze metal. Not reversible. Touch on bar instantly releases bolts.

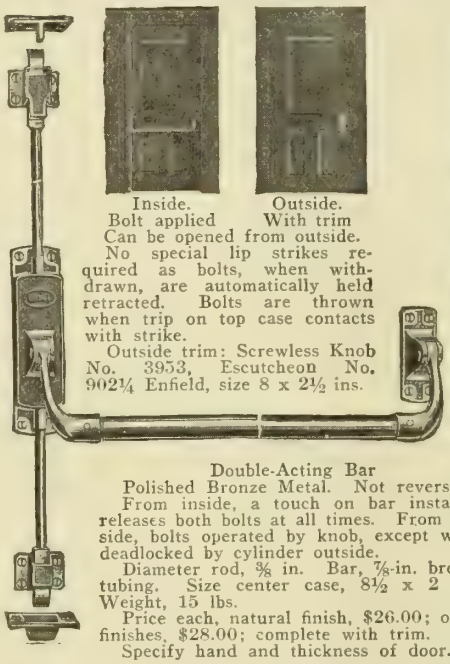
Diameter of rod ⅜ in. Bar of ⅞-in. bronze tubing. Size of center case, 8 x 2 ins. Weight, 11 lbs.

Price each, natural finish, $20.00; other finishes, $22.00.

Specify hand of door.

NO. 60 FIRE-EXIT BOLT FOR SINGLE DOORS OR STANDING LEAF OF DOUBLE DOORS

Top and bottom latching.



Inside. Bolt applied — Outside. With trim

Can be opened from outside.

No special lip strikes required as bolts, when withdrawn, are automatically held retracted. Bolts are thrown when trip on top case contacts with strike.

Outside trim: Screwless Knob No. 3953, Escutcheon No. 902¼ Enfield, size 8 x 2½ ins.

Double-Acting Bar

Polished Bronze Metal. Not reversible.

From inside, a touch on bar instantly releases both bolts at all times. From outside, bolts operated by knob, except when deadlocked by cylinder outside.

Diameter rod, ⅜ in. Bar, ⅞-in. bronze tubing. Size center case, 8½ x 2 ins. Weight, 15 lbs.

Price each, natural finish, $26.00; other finishes, $28.00; complete with trim.

Specify hand and thickness of door.

NO. 65 FIRE-EXIT BOLT FOR SINGLE OR DOUBLE DOORS

With "Russwin" ball-bearing cylinder. Top and bottom latching.

Inside. Bolt applied — Lock No. 9458 — Outside. With trim

Operated from outside by knob.

From inside, touch on bar instantly releases latch bolt at all times. Auxiliary latch bolt safeguards latch bolt against outside manipulation.

Outside trim: Knob No. 3953, Escutcheon No. 902¼ Enfield. 8 x 2½ ins.

Double-Acting Bar

Polished Bronze Metal. Not reversible.

Bar of ⅞-in. bronze tubing. Size of case, 8 x 2 ins. Weight, with lock, 14 lbs.

Price each, natural finish, $25.50; other finishes, $27.00. With outside trim: Knob No. 3386, Escutcheon No. 901 Berkeley, deduct $.70. Without outside trim, deduct $1.70.

Specify hand and thickness of door, and whether for single or double doors.

NO. 67 FIRE-EXIT BOLT FOR SINGLE OR DOUBLE DOORS, OPENING OUT

With "Russwin" cylinder mortise lock. Center latching.

Inside. Bolt applied — Lock No. 3441¼ — Outside. With trim

Operated from outside by knob except when deadlocked by key. From inside, touch on bar instantly releases latch bolt at all times. Auxiliary latch deadlocks latch bolt against outside manipulation.

Outside trim: Knob No. 3951, Escutcheon No. 952 Enfield, size 7½ x 2¼ ins.

Double-Acting Bar

Polished bronze metal. Not reversible.

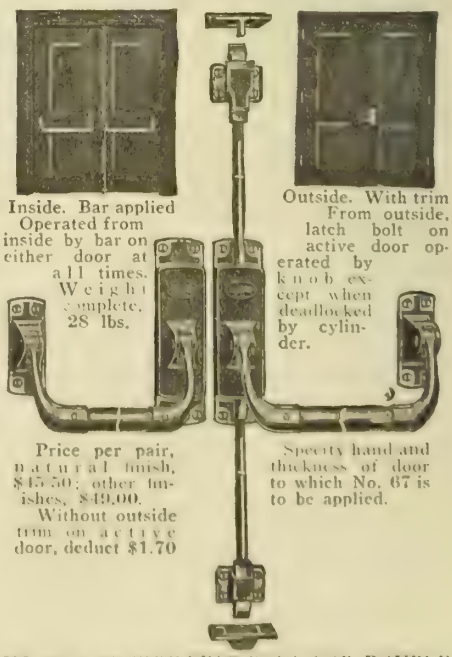
Bar of ⅞-in. bronze tubing. Size of case, 8 x 2 ins. Weight complete, with lock, 12½ lbs.

Price each, natural finish, $20.00; other finishes, $21.50. With outside trim: Knob No. 3386, Escutcheon No. 950 Berkeley, deduct $.60; without outside trim deduct $1.60.

Specify hand and thickness of door.

NO. 68 FIRE-EXIT BOLT FOR SINGLE OR DOUBLE DOORS

With bitted key mortise lock. Center latching.



Inside. Bar applied

Operated from inside by bar on either door at all times. Weight complete, 28 lbs.

Price per pair, natural finish, $45.50; other finishes, $49.00.

Without outside trim on active door, deduct $1.70

Outside. With trim

From outside, latch bolt on active door operated by knob except when deadlocked by cylinder.

Specify hand and thickness of door to which No. 67 is to be applied.

NO. 60 x 67 FIRE-EXIT BOLT FOR DOUBLE DOORS

Active door, center latching. Standing door, top and bottom latching.

VONNEGUT HARDWARE COMPANY

Distributors of Von Duprin Self-Releasing Fire Exit Devices

UNITED STATES FACTORIES — INDIANAPOLIS, IND. — CANADIAN FACTORY

CHICAGO AND NORTH CHICAGO, ILL. — BELLEVILLE, ONT.

BRANCH OFFICES

UNITED STATES OF AMERICA

ATLANTA, GA., Beaullieu & Applewhite, 1317 Third National Bank Building. Telephone, Ivy 1754
BALTIMORE, MD., T. B. & H. S. Hendrickson, 521 Commerce Street, Philadelphia, Pa. Both Telephones
BIRMINGHAM, ALA., Brewer Fire Retardants Co., 1908 Avenue B. Telephone, Main 1943
BOSTON, MASS., Robert J. Gilkie, 73 Tremont Street. Telephone, Haymarket 411
CHICAGO, ILL., John C. Bold, Conway Building. Clark and Washington Streets. Telephone, Franklin 4888
CINCINNATI, OHIO, The Cincinnati Builders Material Co., 316 Johnston Building. Telephone, Main 228
CLEVELAND, OHIO, A. R. Stoeffler, 312 Citizens Building. Telephone, Marlow 1527-W
COLUMBUS, OHIO, R. L. Watson, 407 Bunson Building. Telephone Citizens, 9746; Bell 3298
DENVER, COLO., W. H. Clark, 314 Continental Building. Telephone, York 3571
EL PASO, TEX., C. C. Gaines, 311 First National Bank Building. Telephone, 1881
JACKSONVILLE, FLA., Beaullieu & Applewhite, 510 Bisbee Building. Telephone, 5971
LOS ANGELES, CAL., W. H. Steele, 224 Central Building. Telephones, F-6450; Main 5225
NASHVILLE, TENN., Geo. W. Ruth, 45 Noel Block. Both Telephones, 2604-2605
NEW YORK, N. Y., Grant Pulley and Hardware Company, 3 West Twenty-ninth Street. Telephone, Madison Square 778-779
PEORIA, ILL., H. F. Kircher & Co.
PHILADELPHIA, PA., T. B. & H. S. Hendrickson, 521 Commerce Street. Both Telephones
PORTLAND, ORE., A. J. Capron, 17 Ainsworth Building. Telephone, Main 108
SALT LAKE CITY, UTAH, Harris Bros., 310 Atlas Block. Telephone, Wasatch 4342
SAN FRANCISCO, CAL., A. W. Pike & Company, 711 Mission Street. Telephone, Kearny 4226
ST. LOUIS, MO., W. E. Way, 715 Victoria Building. Telephone, Olive 3777
SEATTLE, WASH., F. T. Crowe & Company, 413 Globe Building
SPOKANE, WASH., F. T. Crowe & Company, 164 S. Madison Street. Telephone, Main 2132-A-3355
TACOMA, WASH., F. T. Crowe & Company, 1005 A Street.
WASHINGTON, D. C., T. B. & H. S. Hendrickson, 521 Commerce St., Philadelphia, Pa. Both Telephones

DOMINION OF CANADA

PROVINCE OF ALBERTA: Winnipeg, Man., Mackenzie Bros., 244 Princess Street
PROVINCE OF SASKATCHEWAN: Winnipeg, Man., Mackenzie Bros., 244 Princess Street
PROVINCE OF MANITOBA: Winnipeg, Man., Mackenzie Bros., 244 Princess Street
MONTREAL AND QUEBEC: Montreal, Builders Specialties Company, 114 Drummond Building. Telephone, U. P. 8027
BRITISH COLUMBIA: Vancouver, B. C., Wm. N. O'Niel & Company, 550 Seymour Street. Telephone, Branch Exchange 4795

FOREIGN

AUSTRALIA: Sydney, N. S. W., F. Lindsay Thompson, 52 Sydney Arcade, King Street
ENGLAND: London, W., England, George Grant & Company, 25 Compayne Gardins
FRANCE: London, W., England, H. G. McMicken, 25 Compayne Gardins
NEW ZEALAND: Sydney, N. S. W., F. Lindsay Thompson, 52 Sydney Arcade, King Street
JAPAN: Tokyo, F. W. Horne Company, 6 and 7 Takiyamacho Kyobashiku

Products.

Von Duprin Self-Releasing Fire Exit Devices.
Von Duprin Automatic Door Holders.
Von Duprin Automatic Locking Casement Window Operators.

Von Duprin
(Registered United States Patent Office, No. 85021)
TRADE-MARK

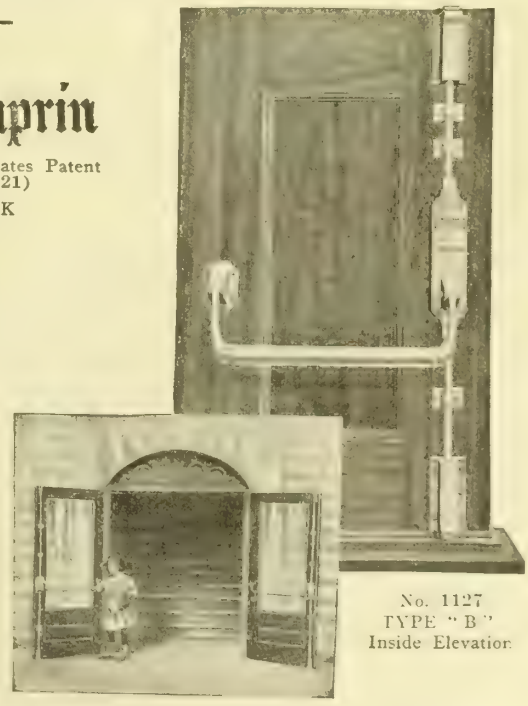
Patents.

Patented in the United States and Canada.

Von Duprin Self-Releasing Fire Exit Devices.

Represent a simple and effective solution to the problem of eliminating the danger of persons being trapped in burning buildings through difficulty in opening the doors.

Principal Features—A substantial brass bar passes across the width of the door, on the inside, about waist high. This bar projects from the door and connects directly with the mechanism of the locking devices. A slight pressure on the bar at any point will instantly release deadlock and latches. During a panic the rush of people will unavoidably press the bar, and thus open the doors to safety. A child can operate it without difficulty. The usual hardware trim is applied to the outside of the door. Made in brass or bronze only.



No. 1127
TYPE "B"
Inside Elevation

SELF-RELEASING FIRE EXIT LATCH NO. B1127
For Standing Door of Double Entrance Doors, or both Doors of Double Exit Doors

Continued on next page

Simple, Strong, Symmetrical, Durable—Parts subject to hard service are made *very extra heavy.* Elementary parts are made uniformly light, in order to avoid the necessity for extra heavy hinges and door checks. Von Duprin devices need no heavier door checks than are ordinarily used with regular locks.

All vertical rods are *solid brass or bronze.*

These devices cannot be blocked by accident or design.

Perhaps not the cheapest, but by far the best, and consequently the cheapest in the end.

Slogan.

" Safe Exit is a Universal Demand."

Approvals.

United States Government (Municipal Department), Snowden Ashford, Architect
United States Government (Treasury Department), Bureau of Printing and Engraving Building
Australian Government, Geo. McRae, Government Architect, N. S. W.
New York Board of Standards (N. Y. City Fire Dept.), Deputy Fire Commissioner
New York Board of Fire Underwriters, New York, N. Y.
New York Bureau of Buildings (Borough of the Bronx), New York, N. Y.
National Board of Fire Underwriters, Chicago, Ill.
Members of International Association of Building and Factory Inspectors

References.

We can furnish a long list of America's largest and most progressive cities, where all old hardware has been removed and Von Duprin devices applied, to entrance doors of all schools throughout the entire city —some having as many as 600 sets of Von Duprin's in use—whose directors will gladly say they have cut hardware maintenance expense to almost nothing.

Competitive Devices.

We make cheaper devices *only for competitive work.* We can say nothing for them except that they are low in price, and are better than any other devices at the same price. We do not illustrate them, for it would only confuse the architect, as we assume that architects using " SWEET'S INDEX " want nothing but highest grade, commendable goods.

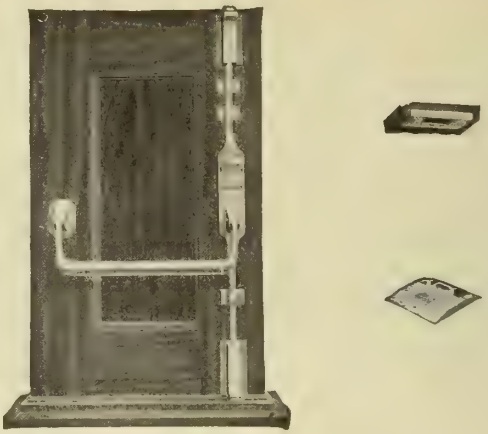
Prices.

Prices are net, f.o.b. cars factory, North Chicago, Ill., or Belleville, Ont.

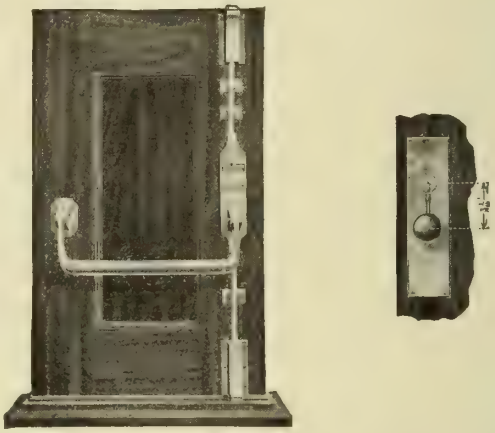
Terms—Two per cent for cash in ten days.

Canadian architects will please note our Canadian list.

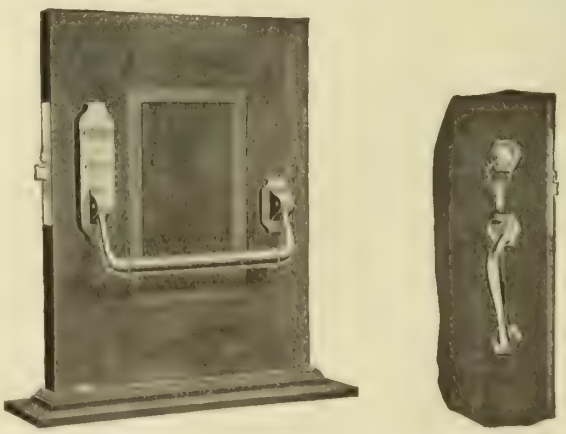
NOTE—For sale by all Hardware Dealers *(insuring legitimate competition)* with whom a special contract is made, with prices alike to all.



NO. B-1127 VON DUPRIN, TYPE " B," SELF-RELEASING FIRE EXIT DEVICE, FOR STANDING DOOR
With Top and Bottom Strikes



NO. B-1123 VON DUPRIN, TYPE " B," SELF-RELEASING FIRE EXIT DEVICE, FOR ACTIVE DOOR
With Knob and Escutcheon (and Top and Bottom Strikes, as B1127)



NO. B-1124 AUXILIARY VON DUPRIN, TYPE "B," SELF RELEASING FIRE EXIT DEVICE, FOR ACTIVE DOOR
With Grip and Thumb Piece, and Open Throat Strike

Continued on next page

Specifications.

NOTE TO ARCHITECTS—To secure *"Von Duprin Service,"* we strongly suggest adopting the following specifications, which gives you the advantage of our newest type of cross bar action, which is "to-or-from" the door; likewise, the new symmetrical vertical type of lock case which eliminates many elementary parts heretofore used, simplifying the working parts, *thereby insuring the highest possible efficiency.*

These Specifications are Particularly Adaptable to Schools and Theaters.

Door Stiles—Door stiles for mortise lock should be 4½ inches or wider.

Astragal—To obtain the feature of "independent-acting" double doors (which is a very important factor in quick release), specify Astragal shown on second page following.

Threshold Strikes—Our No. 1 is standard. We make strikes for all conditions (see second page following for Standard Thresholds by leading Architects).

COMBINATION NO. 1—NO. B-1127 AND B-1123, WITH TWO B-47

For Double Entrance Doors—

Furnish for Standing Door, No. B-1127 Von Duprin, Type "B" (Self-Latching Bolt Heads), Self-Releasing Fire Exit Device.
Furnish for Active Door, No. B-1123 Von Duprin, Type "B," Self-Releasing Fire Exit Device.
Keys to be alike, and master-keyed under ..... [City] Master Key System.
Each device to be equipped with No. B-47 Von Duprin Hook Dogging Device, with pin tumbler lock attachment.
All Strikes to detail.

Price per set, complete, polished brass or bronze..... $65.85
Price per set, complete, standard finishes..... 69.60

COMBINATION NO. 2—NO. B-1127 AND B-1724 AUX., WITH ONE B-47

For Double Entrance Doors—

Furnish for Standing Door, No. B-1127 Von Duprin, Type "B" (Self-Latching Bolt Heads), Self-Releasing Fire Exit Device.
Furnish for Active Door, No. B-1724 Auxiliary Von Duprin, Type "B," Self-Releasing Fire Exit Device, with Grip and Thumb Piece and Cylinder Lock, open throat strike and buffer, with feature of retracting latch and auxiliary bolts to reverse locked position.
Keys to be alike, and master-keyed under ..... [City] Master Key System.
One No. B-47 Von Duprin Hook Dogging Device, with pin tumbler lock attachment, to be used in connection with No. B-1127 Device.
All Strikes to detail.

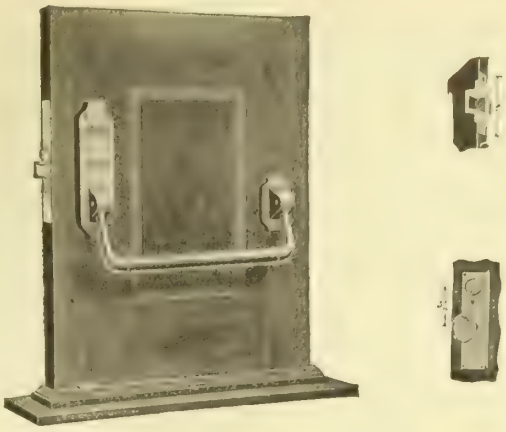
Price per set, complete, polished brass or bronze..... $50.50
Price per set, complete, standard finishes..... 53.50

COMBINATION NO. 3—NO. B-1127 AND B-1722 AUX., WITH ONE B-47

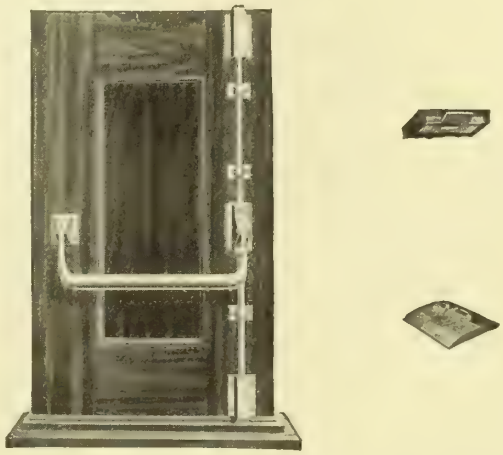
For Double Entrance Doors—

Furnish for Standing Door, No. B-1127 Von Duprin, Type "B" (Self-Latching Bolt Heads), Self-Releasing Fire Exit Device.
Furnish for Active Door, No. B-1722 Auxiliary Von Duprin, Type "B," Self-Releasing Fire Exit Device, with Knob and Escutcheon and Cylinder Lock, open throat strike and buffer, with feature of retracting latch and auxiliary bolts to reverse locked position.
Keys to be alike, and master-keyed under ..... [City] Master Key System.
One B-47 Von Duprin Hook Dogging Device, with pin tumbler lock attachment, to be used in connection with No. B-1127 Device.
All Strikes to detail.

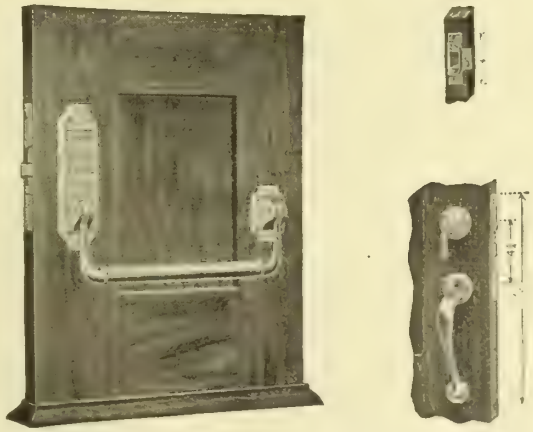
Price per set, complete, polished brass or bronze..... $48.55
Price per set, complete, standard finishes..... 51.55



NO. B-1722 AUXILIARY VON DUPRIN, TYPE "B," SELF-RELEASING FIRE EXIT DEVICE, FOR ACTIVE DOOR
With Knob and Escutcheon, and Open Throat Strike



NO. C-8127 GRAVITY VON DUPRIN, TYPE "C," SELF-RELEASING FIRE EXIT DEVICE, FOR STANDING DOOR
With Top and Bottom Strikes



NO. B-1124 VON DUPRIN, TYPE "B," SELF-RELEASING FIRE EXIT DEVICE, FOR SINGLE DOOR
With Grip and Thumb Piece, and Strike

Continued on next page

COMBINATION No. 4—No. C-8127 GRAVITY AND B-1722 AUX.

For Double Entrance Doors—

Furnish for Standing Door, No. C-8127 Gravity Von Duprin, Type "C" (Self-Latching Bolt Heads), Self-Releasing Fire Exit Device.

Furnish for Active Door, No. B-1722 Auxiliary Von Duprin, Type "B," Self-Releasing Fire Exit Device, with Knob and Escutcheon and Cylinder Lock, open throat strike and buffer, with feature of retracting latch and auxiliary bolts to reverse locked position.

Keys to be alike, and master-keyed under ..... [City] Master Key System.

All Strikes to detail.

Price per set, complete, polished brass or bronze..... $37.90
Price per set, complete, standard finishes..... 40.50

COMBINATION No. 5—No. B-1124

For Single Entrance Doors—

Furnish with No. B-1124 Von Duprin, Type "B," Self-Releasing Fire Exit Device, with Grip and Thumb Piece and Cylinder Lock, with feature of retracting latch bolt to reverse locked position.

Keys to be alike, and master-keyed under ..... [City] Master Key System.

Price complete, polished brass or bronze..... $22.25
Price complete, standard finishes..... 23.55

COMBINATION No. 6—No. B-1122

For Single Entrance Doors—

Furnish with No. B-1122 Von Duprin, Type "B," Self-Releasing Fire Exit Device, with Knob and Escutcheon and Cylinder Lock, with feature of retracting latch bolt to reverse locked position.

Keys to be alike, and master-keyed under ..... [City] Master Key System.

Price complete, polished brass or bronze..... $20.30
Price complete, standard finishes..... 21.60

COMBINATION No. 7—No. B-1124½V

For Single Emergency Exit Doors Adjacent to Entrance Doors (not regularly used as Entrance but for Emergency exit only)—

Furnish No. B-1124½V Von Duprin, Type "B," Self-Releasing Fire Exit Device (no hardware outside), with control for retracting the latch bolt to reverse locked position.

Price complete, polished brass or bronze..... $11.00
Price complete, standard finishes..... 11.50

COMBINATION No. 8—No. B-1127 AND B-1141, WITH ONE B-47

Double Emergency Exit Doors (used only as Emergency Exit, but to be under key control to gain entrance from outside)—

Furnish for Standing Door, No. B-1127 Von Duprin, Type "B" (Self-Latching Bolt Heads), Self-Releasing Fire Exit Device.

Furnish for Active Door, No. B-1141 Von Duprin, Type "B," Self-Releasing Fire Exit Device, with Cylinder Lock (no outside trim).

One No. B-47 Von Duprin Hook Dogging Device, with two-pin tumbler lock attachment, to be used in connection with No. B-1127 Device.

Keys to be alike, and master-keyed under ..... [City] Master Key System.

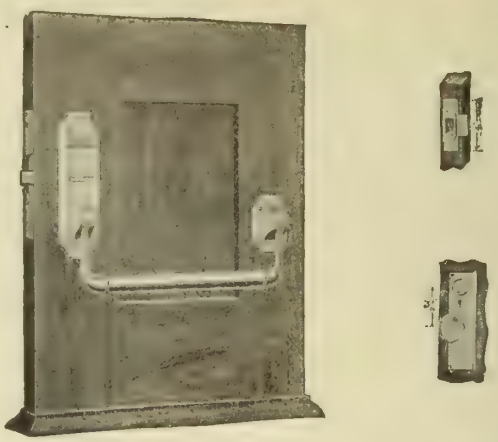
Price per set, complete, polished brass or bronze..... $45.35
Price per set, complete, standard finishes..... 47.65

COMBINATION No. 9—No. B-1124½V

For Single Fire-Escape Doors—

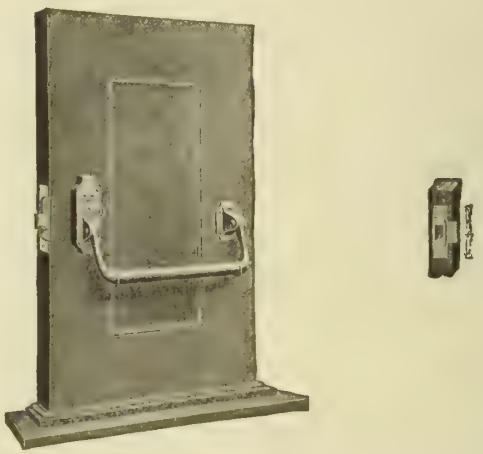
Furnish No. B-1124½V Von Duprin, Type "B," Self-Releasing Fire Exit Device, with control for retracting the latch bolt to reverse locked position.

Price complete, polished brass or bronze..... $11.00
Price complete, standard finishes..... 11.50



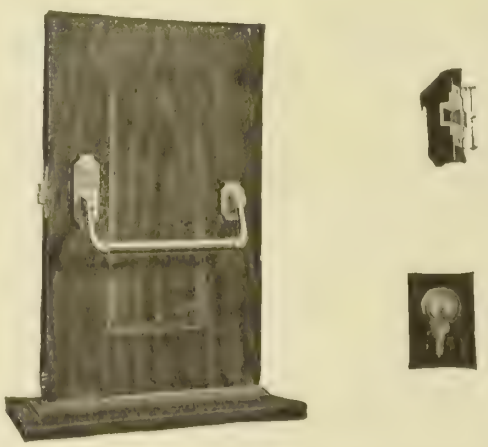
NO. B-1122 VON DUPRIN, TYPE "B," SELF-RELEASING FIRE EXIT DEVICE, FOR SINGLE DOOR

With Knob and Escutcheon, and Strike



NO. B-1124½V VON DUPRIN, TYPE "B," SELF-RELEASING FIRE EXIT DEVICE, FOR SINGLE EXIT DOOR

With Strike



NO. B-1141 VON DUPRIN, TYPE "B," SELF-RELEASING FIRE EXIT DEVICE, FOR ACTIVE DOOR

With Cylinder and Open Throat Strike

Continued on next page

COMBINATION No. 10—No. B-972

For Double Doors (Exit Only) for Theaters—

Furnish No. B-972 Von Duprin, Type "B" (Self-Latching Bolt Heads), Double Arm Self-Releasing Fire Exit Device.

Price complete, polished brass or bronze..... $42.15
Price complete, standard finishes..... 44.60

COMBINATION No. 11—No. B-902

For Double Doors (Exit Only) for Theaters—

Furnish No. B-902 Von Duprin, Type "B" (Dead Bolting Heads), Double Arm Self-Releasing Fire Exit Devices.

Price complete, polished brass or bronze..... $38.50
Price complete, standard finishes..... 40.85

COMBINATION No. 12—No. B-1127

For Double Exit Doors (with overlapping Astragal) for Theaters—

Door having the Astragal, and which opens first, to be provided with No. B-1127 Von Duprin, Type "B" (Self-Latching Bolt Heads), Self-Releasing Fire Exit Device.

Price complete, polished brass or bronze..... $26.75
Price complete, standard finishes..... 28.25

COMBINATION No. 13—No. 8127 GRAVITY

For Double Exit Doors (with overlapping Astragal) for Theaters—

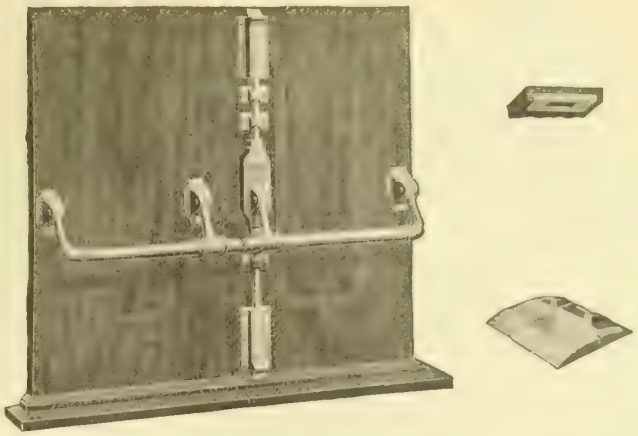
Door having the Astragal, and which opens first, to be provided with No. 8127 Von Duprin, Type "B" (Latch Bolt Heads), Self-Releasing Fire Exit Device.

Price complete, polished brass or bronze..... $17.65
Price complete, standard finishes..... 18.90

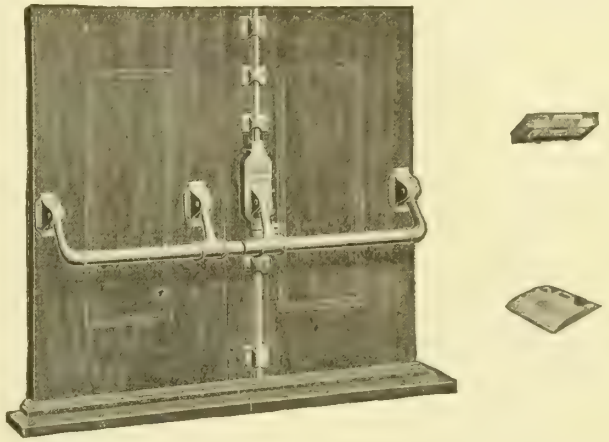
NOTE.—If latch retracting by key is desired for any of the above combinations, add per set 35 cents net.

Catalogue.

Call for Catalogue No. 12A.



NO. B-972 VON DUPRIN, TYPE "B," DOUBLE ARM, SELF-RELEASING FIRE EXIT DEVICE (EXIT ONLY)
With Top and Bottom Strikes



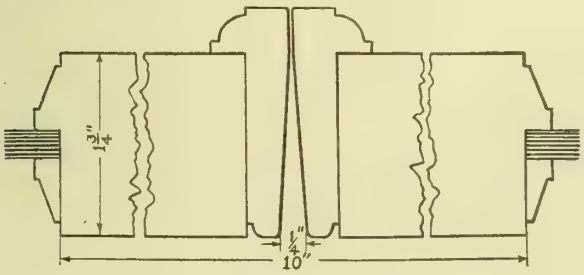
NO. 8127 VON DUPRIN, TYPE "B," DOUBLE ARM, SELF-RELEASING FIRE EXIT DEVICE (EXIT ONLY)
With Top and Bottom Strikes

Von Duprin Astragal.

This Astragal gives free use of both doors, and has been used for years by the most prominent school architects in the United States.

Absolutely satisfactory in all respects.

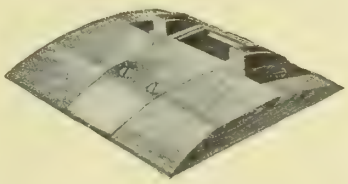
Made by all mills.



VON DUPRIN ASTRAGAL

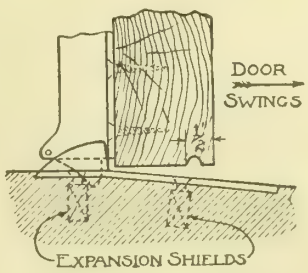
Von Duprin Sill or Threshold Strikes.

No. 1 Bottom Strike, showing threshold. This style strike furnished on all orders, unless otherwise specified.

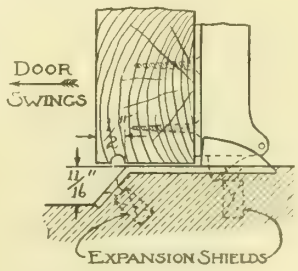


NO. 1 BOTTOM STRIKE

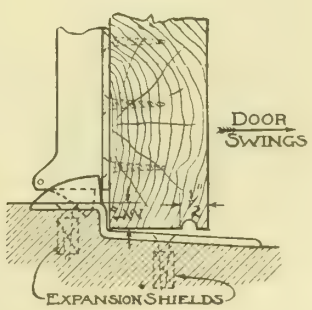
SPECIAL NOTE—A threshold ⅝-in. high (for escape of latch bolt) should be used when devices Nos. 27, 123, 272, 927, 931, 972, 1123, 1127, 1131 are specified, as we do not recommend automatically holding bolts in released position, because of the fragile nature of the component parts necessary to perform the same. If no thresholds are used, specify LR 1127, etc.



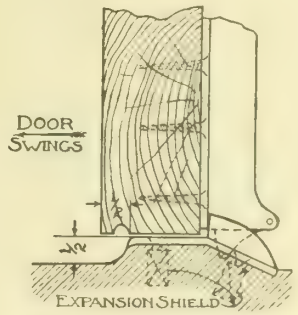
STRIKE NO. 2



STRIKE NO. 3



STRIKE NO. 4



STRIKE NO. 5

WAGNER MANUFACTURING COMPANY

Door Hangers and Hardware Specialties

MAIN OFFICE AND WORKS

CEDAR FALLS, IOWA

Products.

WAGNER DOOR HANGERS, for House, Barn, Garage, Warehouse, Factory, Fire-Doors, Elevators, etc. EVER-TIGHT TROLLEY DOOR TRACKS; FIRE-DOOR FIXTURES; SLIDING DOOR LATCHES; DOOR CATCHES, etc.; STUDDING SOCKETS; COAL CHUTES.

Also, CISTERN COVERS and SCREEN HANGERS.

Description of Hangers.

Hangers are equipped with the Cam Vertical Adjustment, the simplest ever brought out. Requires no notching or cutting of door, and is devoid of numerous parts, such as nuts, bolts, etc. To adjust, loosen the nuts of the strap; take wrench and turn cam until the desired adjustment is had; then tighten the nuts. The edge of the cam bearing against the offset of the strap makes it impossible for anything to shift.

The self-cleaning tracks are made of stiff high carbon steel and guaranteed to stand up and carry any load which they are intended to carry. Long lengths permit brackets to be placed anywhere; all on studding, if desired.

Leader No. 10 is made of 14-gauge, Junior Leader No. 5 of 15-gauge, and Hawkeye Leader No. 25 of 12-gauge. Furnished in 4-, 6-, 8- and 10-foot lengths. Prices on application.

Wagner Leader Door Hangers (Patented).

For doors 1¾ inch thick. Has 2-inch wheels; is flexible; tandem trolley, wide tread, quiet roller-bearing wheels, and is fitted with solid malleable hanger bar with bumper on end (Fig. 1). Used in connection with self-cleaning track (Fig. 2). All styles of brackets are furnished for the different styles of track.

Removable end cap (Fig. 3) makes it possible to use brackets anywhere, either right or left, on ends, or along middle of track.

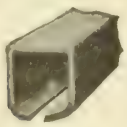


FIG. 2. SELF-CLEANING TRACK
No opportunity for dust or foreign matter to lodge within, as it is carried out with wheels

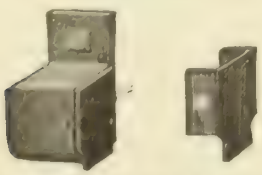


FIG. 3. REMOVABLE END CAP FOR BRACKETS
Hanger can be attached to door, run in end of track, and end cap fitted, all after track is up

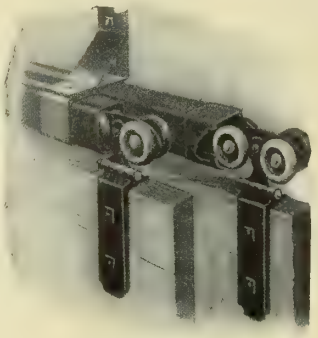
FIG. 1. TANDEM TROLLEY CAM ADJUSTMENT, AND BUMPER ON END OF HANGER BAR

Leader Track No. 10 (Fig. 5) is the one generally used for ordinary doors. Bracket No. 5, or side bracket, is the one generally used for supporting this track.

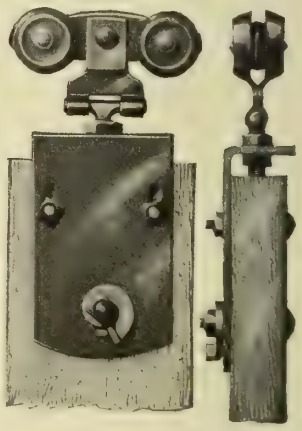
FIG. 4. JUNIOR LEADER TRACK NO. 5
Half size
Weight per foot, 1 2/3 pounds

FIG. 5. LEADER TRACK NO. 10
Half size
Weight per foot, 2 pounds

FIG. 6. HAWKEYE LEADER TRACK NO. 25
Half size
Weight per foot, 3¾ pounds



DOUBLE BRACKET APPLICATION OF WAGNER LEADER HANGER
Doors will pass each other. Accomplished by regular track and No. 6 Double Side Brackets



NO. 1505. LEADER DOOR HANGER
Combines Single Pendant with both Lateral and Vertical Adjustment. Pendant 6 inches long, 4 inches wide, 3/16 inch thick

The Hawkeye Type (Patented)—Designed for heavy Warehouse, Barn and Fire-Doors. Pendant 12 inches long, 4½ inches wide, ¼ inch thick. For doors 2¼ to 3¼ inches thick; 3-inch wheels; is flexible; has tandem trolley, wide tread, quiet roller-bearing wheels; extra heavy malleable hanger bar with bumper on end. Patented Cam Vertical, and a simple Lateral Adjustment. Used in connection with self-cleaning track No. 25 (Fig. 6), and bracket No. 5-H, or any other.

PRICE-LIST OF HANGERS, TRACKS AND BRACKETS

HANGERS		
Numbers	Per Dozen Pairs	Price
1500	Leader Hanger	$22.00
1501, 1502, 1503, 1504	Leader Hanger	24.00
1505	Leader Hanger	26.40
1506	Leader Hanger	32.40
1550	Unit Leader Hanger	17.00
600	Junior Leader Hanger	24.00
5, 10, 15	Junior Leader Elevator Hanger	21.60
700, 710	Hawkeye Leader Hanger	59.60
715	Hawkeye Leader Hanger	
	Pendant 3/16 inch thick	59.60
	Pendant ¼ inch thick	62.40
	Pendant 3/16 inch thick	66.00

TRACKS			BRACKETS		
	Per Foot			Per Dozen	
10	Leader Track	$.19	5-L	Leader Bracket	$1.50
5	Junior Leader Track	.17½	5-J	Junior Leader Bracket	1.50
25	Hawkeye Leader Track	.50	5-H	Hawkeye Leader Bracket	5.28

Continued on next page

Wagner Fire-Door Fixtures.

Of self-closing fusible link type. Hardware is modeled to meet standard requirements of National Board of Fire Underwriters.

These fixtures are made in four types, as follows: No. 10, for inclined track, self-closing, double fusible link type; No. 20, for inclined track, of single fusible link type; No. 30, for level track (used where headroom is not sufficient for inclined track), two sets of weights required, one to drop by reason of fusible link and the other to pull door shut; and No. 50, used for double doors.

WAGNER FIRE-DOOR FIXTURES NO. 30
Mounted on Door

If opening is square, 14-in. headroom is required at edge of opening toward which door closes and ¾-in. more for each foot of track beyond that point for inclined track. If opening is arch the 14 inches is measured from top of arch

PRICE-LIST OF WAGNER FIRE-DOOR FIXTURES

No. 30

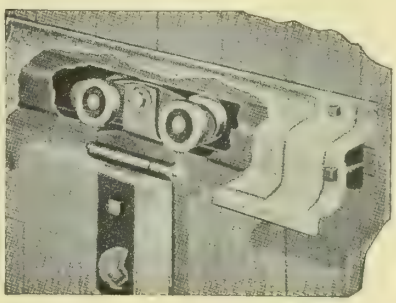
3 feet 0 inches, opening	$19.95	4 feet 6 inches, opening	$21.60
3 feet 6 inches, opening	20.55	5 feet 0 inches, opening	22.15
4 feet 0 inches, opening	21.10	5 feet 6 inches, opening	22.75
6 feet 0 inches, opening			23.40
6 feet 6 inches, opening (3 hangers)			26.10
7 feet 0 inches, opening (3 hangers)			26.65
7 feet 6 inches, opening (3 hangers)			27.20
8 feet 0 inches, opening (3 hangers)			27.80
8 feet 6 inches, opening (3 hangers)			28.40
9 feet 0 inches, opening (3 hangers)			29.05
9 feet 6 inches, opening (3 hangers)			29.70
10 feet 0 inches, opening (3 hangers)			30.30
Fixtures only		Per set	12.00

No. 50—For Double Doors

3 feet opening	$31.40	7 feet opening	$37.40
3½ feet opening	32.10	7½ feet opening	38.10
4 feet opening	32.80	8 feet opening	38.80
4½ feet opening	33.50	8½ feet opening	39.50
5 feet opening	34.20	9 feet opening	40.20
5½ feet opening	34.90	9½ feet opening	40.90
6 feet opening	35.60	10 feet opening	41.60
6½ feet opening	36.70		
No. 50, double fixtures only		Per set	17.50

Wagner Ezy-Fit Trolley Door Track.

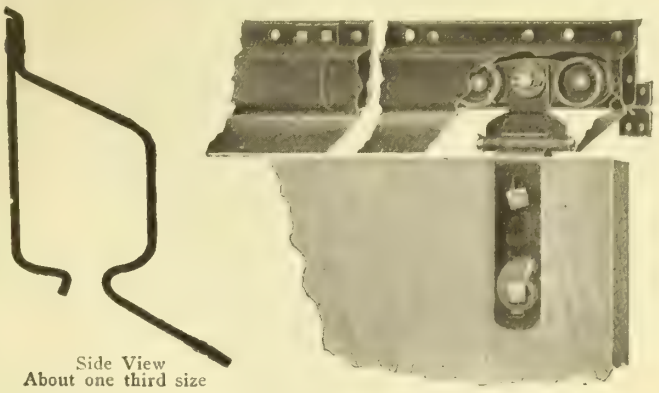
A new self-cleaning, tubular type. Track of high carbon steel; brackets, which come riveted on top of track, of $\frac{3}{16}$- by 1½-inch steel; and galvanized covering, heavily embossed.



WAGNER EZY-FIT TROLLEY DOOR TRACK

Wagner Ever-Tight Trolley Door Track.

This No. 100 is an improved type of track, made of two pieces of steel securely riveted together at top, with one part overlapping the other, forming a continuous bracket that serves to hold track securely.



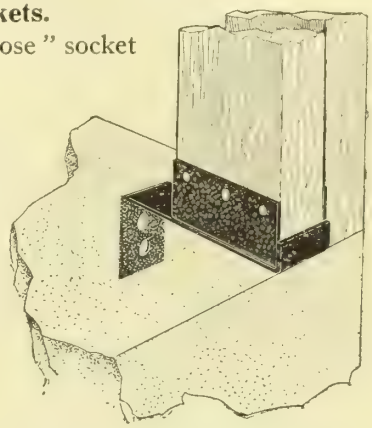
Side View
About one third size

WAGNER EVER-TIGHT TROLLEY DOOR TRACK
(Patent applied for)

Two parts riveted together with ¼-inch rivets every six inches. Track fastened to building by a ⅜-inch lag screw or bolt every 12 inches
Furnished in 4, 6, 8 and 10 ft. lengths
Weight, per foot, 2⅞ lbs. List price, per foot, 28c.

Wagner Studding Sockets.

The only "all-purpose" socket that can be used for corners, intermediate studding, etc.; it takes a 2 by 4 or a 2 by 6 equally well. Sockets made of tough iron, galvanized with high-grade zinc spelter, to resist rust. See accompanying illustration. Write for particulars.

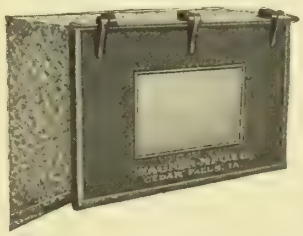


WAGNER NO. 10 STUDDING SOCKET AS USED FOR CORNER

Studding is set in the Wagner Socket 2 inches away from corner, and corner piece then spiked on to studding, bringing it flush with edge, resulting in strong, sturdy corner that will stand any kind of strain

Wagner Coal Chutes.

Wagner Coal Chutes are 18 inches high, 24¾ inches wide, with varying depths of 8, 12 and 18 inches. Weight, about 80 pounds each.



Type "A," Showing Wire-Glass Insert in Front

Type "B" Solid Cast-Iron Front

WAGNER COAL CHUTES

PRICE-LIST, WAGNER COAL CHUTES

		Each			Each
No. 150.	Type A, 8-inch deep.	$11.50	No. 100.	Type B, 8-inch deep.	$10.50
No. 160.	12 " "	12.00	No. 110	12 " "	11.00
No. 170.	18 " "	13.00	No. 120.	18 " "	12.00

Guarantee.

All goods defective in material or workmanship replaced without charge.

AMERICAN STEEL WINDOW COMPANY

Manufacturers of American Solid Steel Windows

McCormick Building
CHICAGO, ILL.

DISTRICT SALES OFFICES

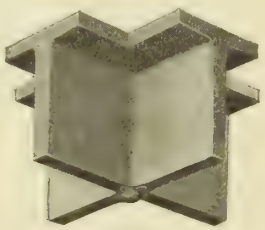
NEW YORK ST. LOUIS CLEVELAND SAN FRANCISCO

Products.

AMERICAN Solid Steel SIDEWALL SASH.
AMERICAN CONTINUOUS MONITOR SASH.
AMERICAN SOLID STEEL DOORS.
AMERICAN UNIT PARTITIONS.

Construction.

Made from special specification open-hearth steel bars of heavy special sections. All cross joints oxy-acetylene welded. Positive action double weathering on all ventilators. 3/8-inch glazing rabbets. Ventilators of all types, with any type or method of operation.



THE AMERICAN JOINT
Oxy-acetylene Welded. All surfaces exposed for inspection and painting

Continuous monitor sash of heavy construction made from stock parts for exceptionally quick shipment.

Doors and partitions are of special sections, with hardware of special design to withstand rough usage under service conditions.

Manufacture and Shipment.

American windows are made from interchangeable standard parts, and users are not limited to any "standard" sizes or ventilation arrangements. Sash of any dimensions or type to fit any opening can be furnished without delay or extra cost.

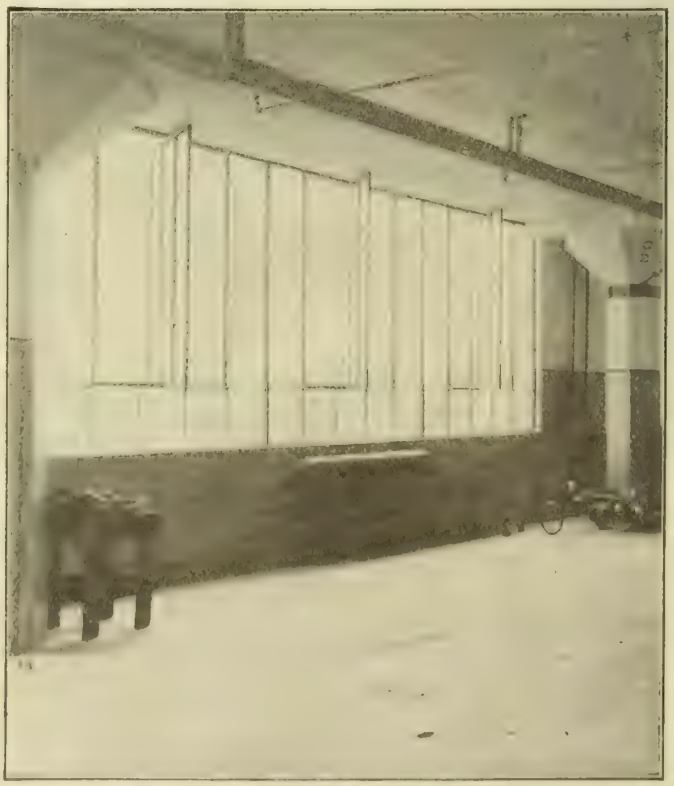
Hardware.

American positive gravity cam latch provides absolutely automatic locking of ventilators when closed, and perfect weathering contact.

American spring catch of heavy construction used without keeper.

All American hardware is of bronze or malleable iron. No stamped or sheet metal parts are used on any part of the American window or its operating devices.

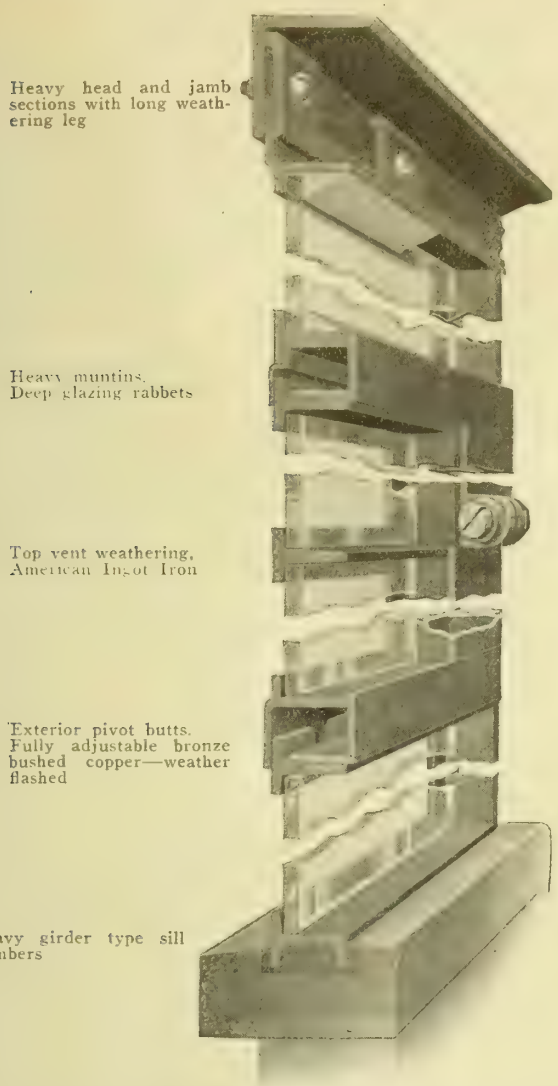
INSTALLATION OF AMERICAN UNIT PARTITIONS AND DOORS



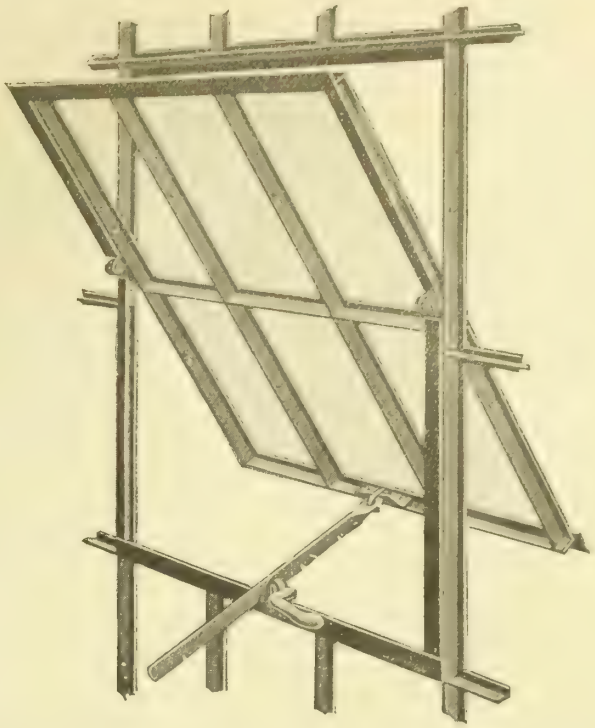
INSTALLATION OF AMERICAN SOLID STEEL WINDOWS

Sweet's Catalogue

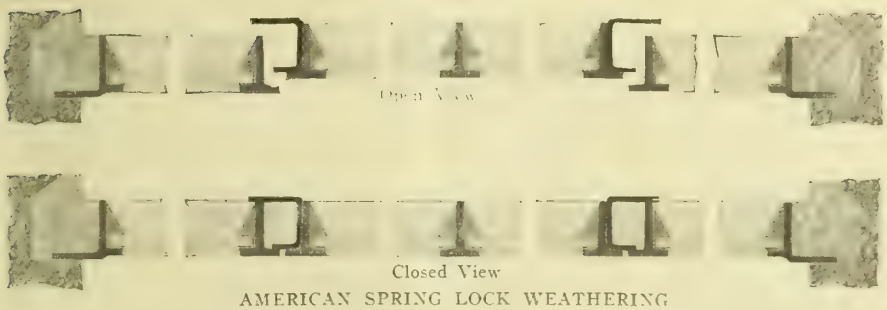
Continued on next page



SECTION VIEW SHOWING CONSTRUCTION OF AMERICAN SOLID STEEL SIDEWALL SASH



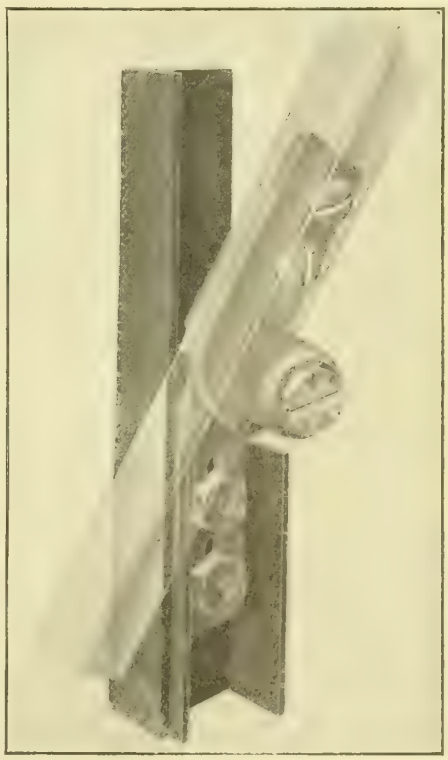
CENTER PIVOTED VENT WITH STAY BAR AND POSITIVE CAM LATCH OPERATION



Closed View

AMERICAN SPRING LOCK WEATHERING

Weathering members of cold-drawn steel forced into close contact by closing vent



EXTERIOR PIVOT BUTT

Adjustment in butt, not in pivot. Copper flashing member covers face joint. Pivot, bronze bushed

THE WILLIAM BAYLEY COMPANY

Steel Sashes For Industrial Buildings

SPRINGFIELD, OHIO

BRANCH SALES OFFICES

NEW YORK, 303 Fifth Avenue
TELEPHONE, MADISON SQUARE 7483

CHICAGO, 30 North Michigan Avenue
TELEPHONE, CENTRAL 2612

BOSTON, Oliver Building
TELEPHONE, FORT HILL 5048

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MINNEAPOLIS, MINN.
KANSAS CITY, MO.
ST. LOUIS, MO.
DAYTON, OHIO
PITTSBURGH, PA.
WASHINGTON, D. C.
CLEVELAND, OHIO
PHILADELPHIA, PA.
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BIRMINGHAM, ALA.
NORFOLK, VA.
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PORTLAND, ORE.
NASHVILLE, TENN.
MONTREAL, QUE., CANADA
GRAND RAPIDS, MICH.

Products.

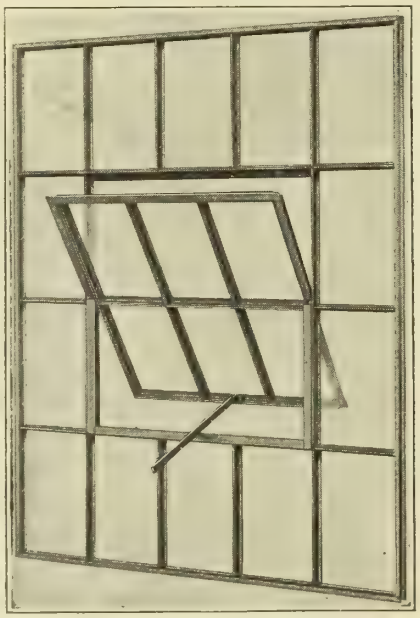
STEEL WINDOW SASHES and OPERATORS.

Bayley-Springfield Standard Side-Wall Windows.

Have many distinctive merits, among which may be mentioned double glazing and fly screening arrangements and perfectly adapted hardware. Most of the latter, including hinges, latch bars, cam latches, spring catches, etc., are made from drop forgings and steel stamping. These windows are made for glass panes 10 by 16 inches; 12 by 18 inches; 14 by 20 inches; 16 by 22 inches; 18 by 24 inches. A number of units may be used together. The maximum unit area is 80 square feet with one dimension 7 feet or less. Each one may have one or more pivoted ventilators of 1, 2, 3, 4, 6, 8, 9 or 10 panes. Maximum vent area 20 square feet. Largest dimension 5 feet. Illustration shows a frequently used form.

More than 7000 important installations have been made. Ask for lists of those near you.

Architects' Specifications—Each bidder must base his proposal upon the use of Bayley-Springfield Steel Windows which are shown on elevation sheet Nos..... and on detail sheet Nos..... Each bidder may, in addition submit an alternate proposal on other solid steel bar windows, but must give the name and address of the maker and submit evidence of the product having proven satisfactory in service.



BAYLEY-SPRINGFIELD SIDE-WALL WINDOW WITH CENTER PIVOTED (CP) VENT

SINGLE PANE TWO VENTILATOR

Bayley-Springfield Standard Interior Partitions.

Correspond in principal details to Bayley-Springfield Standard Side-Wall Windows. Made of same materials and in same way; general dimensions are same; solid plates in lower sections; fitted with suitable doors. Ask for lists of installations.

Architects' Specifications—Principal bars and outer frame must be at least 1½ inch deep. A satisfactory number of intersections must have one bar solid, unpunched and unbent in both outer edges. Process welding alone will not suffice. Each unit must be securely connected to strong uprights. Door frames must be heavy. Doors must be riveted and welded.

Bayley-Springfield Vertically Sliding Windows.

Of steel and have the general advantages of this type, and valuable exclusive constructional superiorities. They combine tightness, easy working, convenience, strength, long life and good appearance.

Frame members have deep flanges insuring strength and providing for suitable and sightly corners.

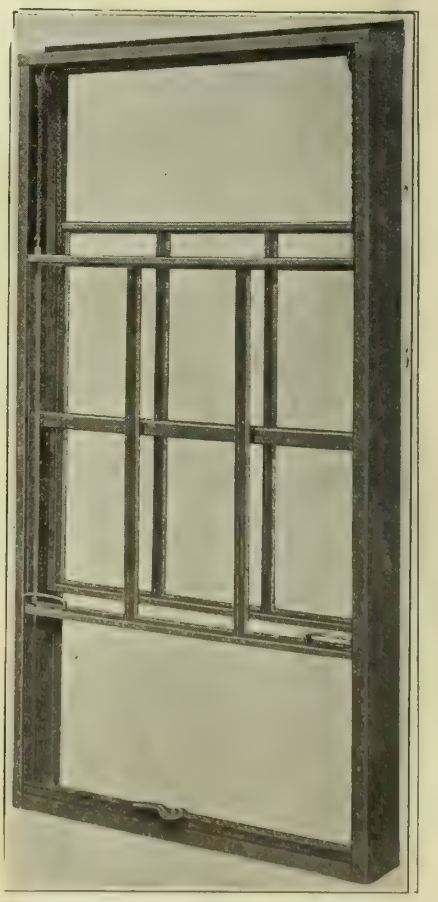
Slides are semi-flexible U sections of generous dimensions.

Contacts (four in number) are flat surface and edge with semi-flexibility to insure weather-tightness without window tightness.

Connections are strong and neat

Sashes are similar to all Bayley-Springfield Sashes. Their corners are welded.

Meeting Rails are of weights sufficient to provide structural necessities and shapes correct to insure water- and wind-tightness.



VERTICALLY SLIDING WINDOW

Continued on next page

Maximum Sizes: Each sash section, width 4½ feet, height 5 feet, area 16 square feet. Total heights, two-piece windows, 10 feet; three-piece windows, 15 feet.

Bayley-Springfield Standard Continuous Balanced Windows.

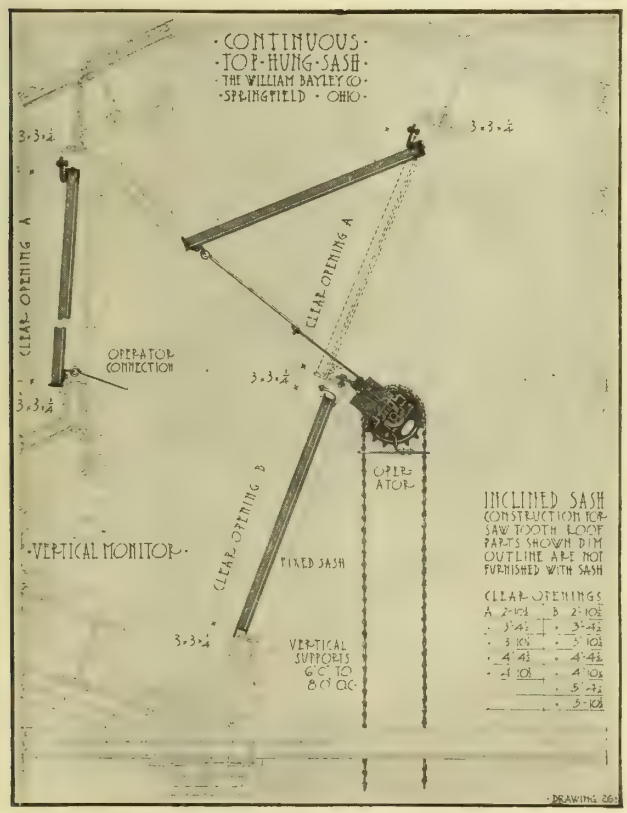
May be easily opened and easily closed for their gravity center moves in a single horizontal plane. Weight of these five men does not close this entirely unsupported window because the center bar on which they stand is no lower when it is closed than when it is open. Window has all the advantages of top-hung and center-pivoted windows, and none of the disadvantages of either.

Architects' Specifications—Must be constructed so that when the bottom moves up the top moves down, permitting the weight center to move horizontally.

BAYLEY-SPRINGFIELD STANDARD CONTINUOUS BALANCED WINDOW

Bayley-Springfield Standard Continuous Top-Hung Windows.

Architects' Specifications—Must have angle horizontals, and tee verticals. Connections must be tenoned through and riveted. Process welding must also be employed. Hinges of ample size and weight and having sidewise adjustment must be securely riveted to the window and arranged to bolt to the structural work.



TYPICAL DETAILS OF CONTINUOUS TOP-HUNG SASH

Bayley-Springfield Operators.

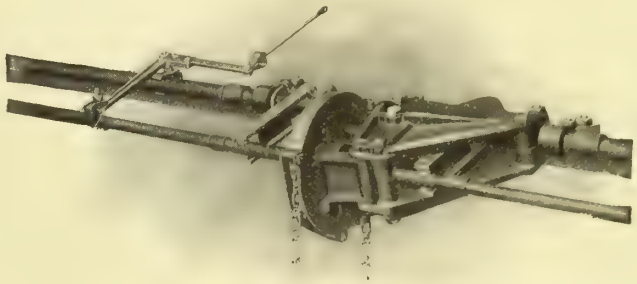
Are made to meet all possible necessities of Bayley-Springfield Windows.

Heavy Duty Operators.

Are made for handling long lines of top-hung windows.

Architects' Specifications—The control mechanism is to include easy and efficient means of moving a horizontal shaft endwise and simple positive means of communicating its motion to the windows.

The preferred mechanism shall consist of a chain wheel with a threaded bronze nut in its center, extending with a machined surface into a machined box; a long threaded part of the horizontal control shaft fitting into this bronze nut; a strong frame secured to the building and supporting by means of swinging arms, the first mentioned movable parts, and arranged so that as the rotating chain wheel moves the threaded screw endwise a motion is provided sidewise corresponding with that of the window opening levers, which are pivotally connected to the horizontal control shaft. Each of these levers, in its connection to the horizontal control shaft, and in its connection to its fulcrum shall have threaded holes working on machined screws. The loose end of each shall be provided with a link connecting it to the window.



BAYLEY-SPRINGFIELD HEAVY DUTY OPERATOR

Moderate Duty Operators.

Are sufficient for all ordinary work including handling reasonably long lines of Bayley-Springfield Balanced Windows. Their horizontal parts including the levers and window connections are the same as in the Heavy Duty, and consequently they are without objectionable torsion. The control is smaller and simpler. Ask for illustrations and descriptive matter.

Lever Operators.

For power-house installations where ventilators are used one above another. Simple, strong, and inexpensive. Not a copy or adaptation of something else, but something new. Ask for illustrations and descriptive matter.

Patents.

Patents have been issued to us on parts of these window sashes and on devices used in their manufacture. Other patents are pending.

Co-operative Service.

Correspondence is solicited with Architects, Engineers, Contractors, Railway and Factory Superintendents, Purchasing Agents, and others interested in the character of building construction to which Bayley-Springfield products are suited. An Engineering Department is maintained to assist prospective builders in the economical use of our products.

Send for booklet of illustrations, drawings, tables, etc.; write for complete information.

ESTABLISHED 1893

A. C. CHESLEY CO.

MANUFACTURERS OF

All-Metallic and Metal Protected Material for Buildings

277 Rider Avenue

TELEPHONE, Melrose 2452 NEW YORK, N. Y.

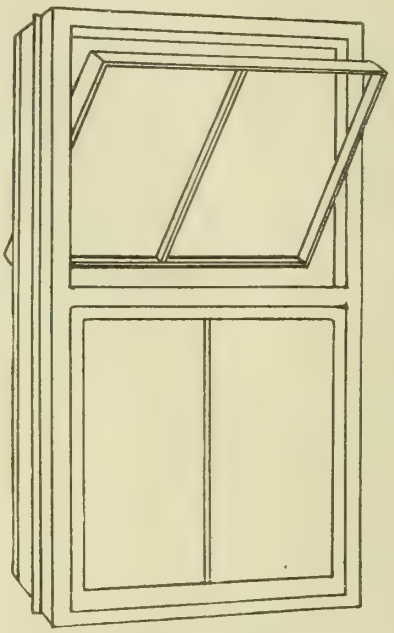
Products.

Manufacturers of and Specialists in Fireproof Hollow Metal Windows; Kalamein or Metal-Clad Wood Doors, Trim, etc., Kalamein or Metal-Clad Wood Partitions; Reinforced All-Metal Jambs and Trim; Standard Tin-Clad Doors; the A. C. Chesley Three-Point Latch and Lock for fireproof doors.

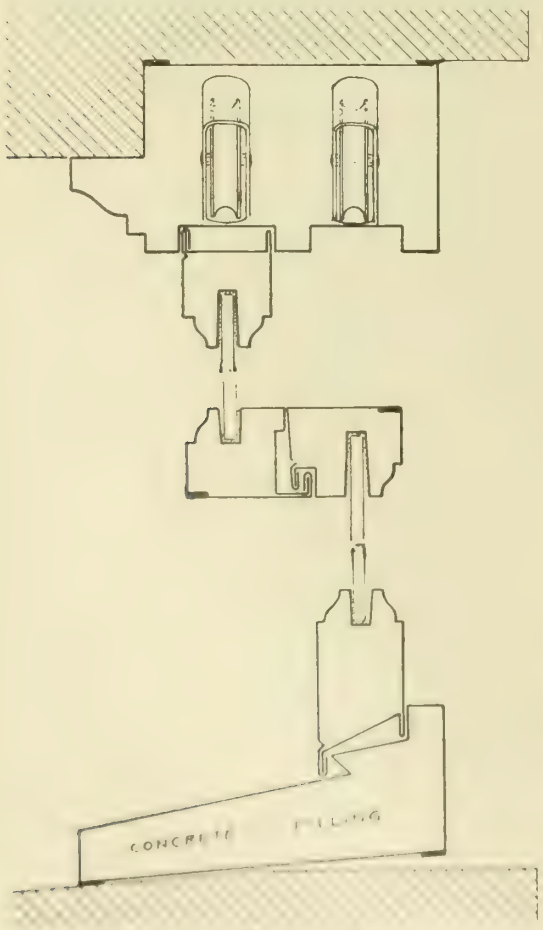
Fireproof Hollow Metal Windows.

The "Chesley" Hollow Metal Window is simple, firm and substantial in construction, assuring neat appearance, easy operation, and a minimum of upkeep. "Chesley" windows are made in all styles of casement arrangement and all sizes, from own or architect's drawings. They are labeled and approved by the Underwriters' Laboratories as positively fire retarding.

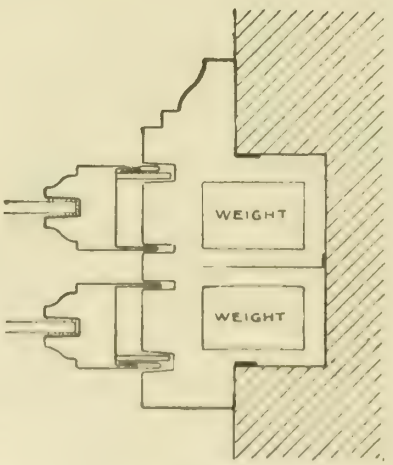
Shipped with or without wire-glass, and with one coat of high-grade metal-protective oxide or iron paint. Blue-print details sent on request.



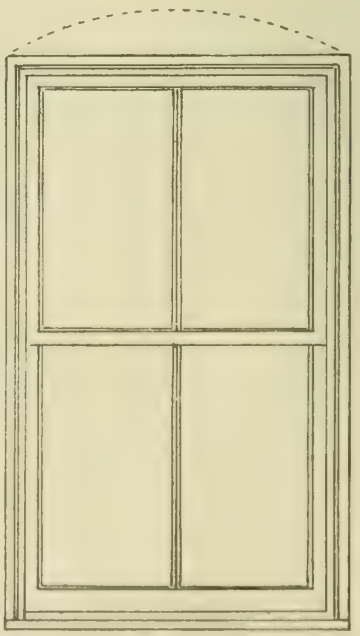
ELEVATION, UNDERWRITERS' STANDARD UPPER PIVOTED LOWER STATIONARY WINDOW



Vertical and Horizontal Sections



Detail



Elevation

DETAILS FIREPROOF ALL-METAL DOUBLE HUNG WINDOWS
Approved by Underwriters

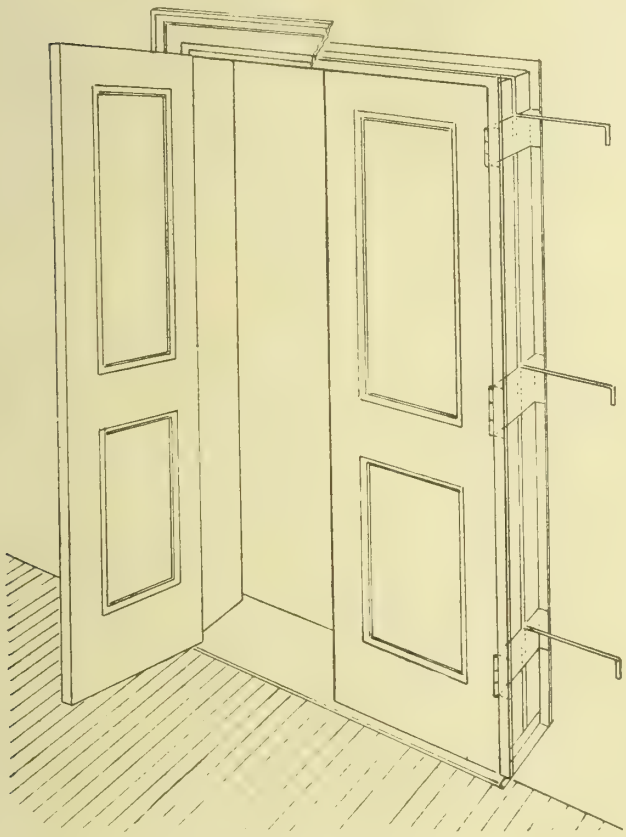
Continued on next page

Kalamein Door and Metallic Frames.

This approved kalamein door used with reinforced metallic frames for all sizes and thicknesses of openings in elevator shafts, stairways and corridors, can not fail to appeal to all builders of fireproof construction, owing to its simplicity of detail, eliminating the necessity of using metal-covered wood bucks, or angle and channel iron supports.

The moulded frame, when built in, is complete, and is provided with spring clamps for securing hollow metallic trim, also reinforced tap plates to secure kalamein or wood-trim to wall.

This arrangement simplifies interior fireproof construction and is especially adapted for brick and concrete walls. The advantages of the system are practicability, economy in cost, and speed of erection.



Perspective, showing Moulded Metal Frame with Wall Anchors for securing hollow metal frame

Insurance.

Approved wall construction combined with "Chesley" doors and frames, will secure the lowest rates of insurance and highest degree of safety from fire.

The A. C. Chesley Three-Point Latch and Lock for Fireproof Doors.

This approved latch and lock invented by us to meet the requirements of the National Board of Fire Underwriters is practical, strong and absolutely dependable, for resisting fire. Can be used on hollow steel, metal-clad wood, standard tin-clad, and every other approved make of fireproof doors.

It is easy to apply; can be installed at any time. It is very moderate in cost, owing to its simplicity.

This latch and lock is operated in the usual manner by ordinary knob and spindle which control it. Can be used on either single or double doors, elevator, stairway, corridor and exit doors, and is especially advantageous for buildings where low rates of insurance are required and where it is desirous to eliminate all fire hazard.

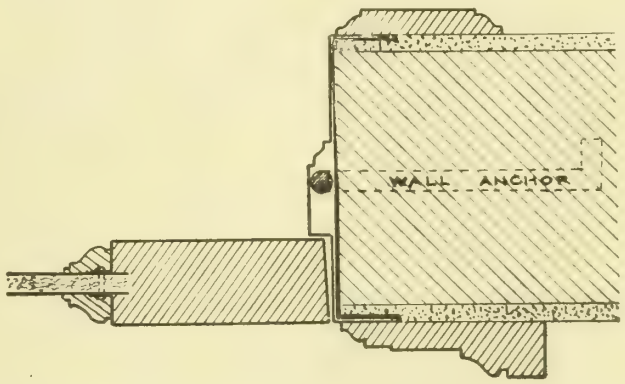
Designers and architects of buildings are invited by us to investigate this latch and lock.

Approval.

Our products are all approved and labeled by the National Board of Fire Underwriters.

Catalogue, etc.

We issue a catalogue and printed price-lists, which will be gladly furnished on application. Send for them.



Sectional Detail of Door Jamb, showing method of anchoring moulded frames

'DETAILS KALAMEIN DOOR

References.

Below are a few of the prominent buildings wherein our material has been installed:

State Capitol, Albany, N. Y.
Emigrant Building, Ellis Island, N. Y.
Columbia College Buildings, New York, N. Y.
Hall of Board of Education, New York, N. Y.
Hall of Board of Education, Brooklyn, N. Y.
Mount Sinai Hospital, New York, N. Y.
St. Luke's Hospital, New York, N. Y.
City Hall, New York, N. Y.
Mount Loretto Convent, Staten Island, N. Y.
Isabella Heimath, New York, N. Y.
Official Buildings, Tokio, Japan.
Government Buildings, Honolulu, Hawaii Islands.

Also many other public buildings in the city of New York and elsewhere; such as public schools, courts, public baths, hospitals, etc.

A few of the prominent architects who can be referred to:

Cass Gilbert, 11 East 24th Street, New York, N. Y.
Ernest Flagg, 109 Broad Street, New York, N. Y.
Buchman & Fox, 42nd Street and Madison Avenue, New York, N. Y.
Chas. Stagmeyer, 128 East 91st Street, New York, N. Y.
Albert E. Davis, 258 East 138th Street, New York, N. Y.
Michael J. Garvin, 3307 Third Avenue, New York, N. Y.
Gillespie & Carol, 1123 Broadway, New York, N. Y.
Maynicke & Frank, 25 East 26th Street, New York, N. Y.
McKim, Mead & White, 101 Park Avenue, New York, N. Y.
J. B. Snook Sons, 261 Broadway, New York, N. Y.
D. Everett Waid, 1 Madison Avenue, New York, N. Y.

CONSOLIDATED SHEET METAL WORKS

Fireproof Windows, Metallic Skylights and Fire Doors
General Sheet Metal Contractors

661-677 Hubbard Street
MILWAUKEE, WIS.

Products.

METAL FIREPROOF WINDOWS, including "BOGENBERGER" APPROVED UNDERWRITERS' WINDOWS; METALLIC SKYLIGHTS; GALVANIZED IRON and COPPER CORNICES, DORMERS, FINIALS, CRESTINGS, VENTILATORS.

Also, FIRE DOORS; METAL, SLATE, and TILE ROOFING.

"Bogenberger" Windows.

"Bogenberger" Windows are made in all the required types, in either galvanized iron or copper, strictly in accordance with the specifications of and approved by the National Board of Fire Underwriters. They are architectural in design, weatherproof, and, in fact, combine safety, economy and efficiency.

Our Laboratory Tests.

These illustrations are true facsimiles of photographs taken before and after the fire tests. All our windows required but one test to convince and satisfy the Chicago Laboratories as to their efficiency as a fire retardant. The temperature attained in these tests was above 1800 degrees. Our windows average 75 per cent glass surface.

Illustrations.

We show herewith a few of the many various types of metal windows we manufacture, as per Underwriters' specifications, with division of lights as they require them.

Official Endorsement.

All our types of windows have been approved by the Underwriters' Laboratories of Chicago.

Other Sheet-Metal Work.

We are always prepared to furnish Skylights, Cornices, Ventilators, etc., adapted for any and all purposes throughout the country.

Utility.

Our products are suitable for all classes of buildings, city or country, and owing to our method of construction can be easily erected by the average mechanic.

Prices.

Quotations will always be the lowest possible for first-class workmanship and materials.

Service.

Service is always right—prompt and guaranteed.

Facilities.

We have not only the necessary factory space, but the best equipment available for manufacturing purposes.

Territory.

We are prepared at all times to install our product in any part of the country.

References.

Upon request innumerable references will be cheerfully given.

Catalogue and Full-Size Blue-Prints.

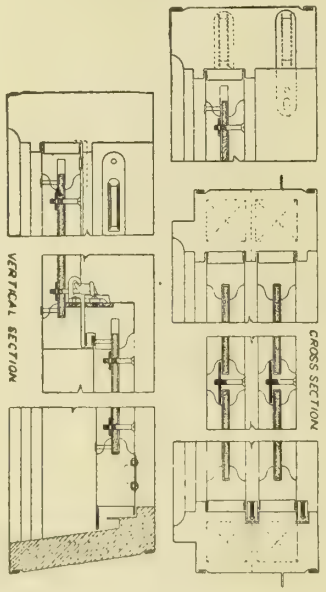
Further information can be obtained by applying for our new illustrated and descriptive catalogue "D" and full-size blue-prints upon request.

Before Test

After Test

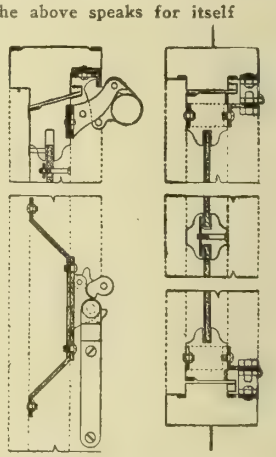
"BOGENBERGER" WINDOW TESTED OVER 1,800 DEGREES TEMPERATURE

No further comment necessary—the above speaks for itself



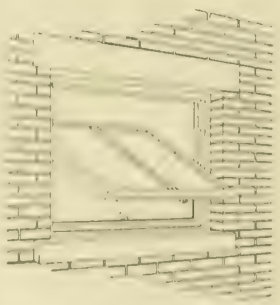
TYPE "B" DOUBLE-HUNG WINDOWS

Made with side or overhead pulleys

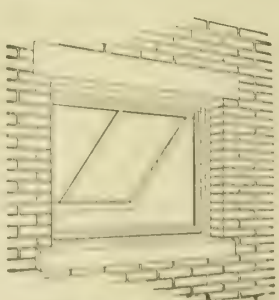


PIVOTED WINDOWS WITH ALL STEEL HARDWARE

Sash can be reversed for cleaning or any other purpose without disengaging any bolts

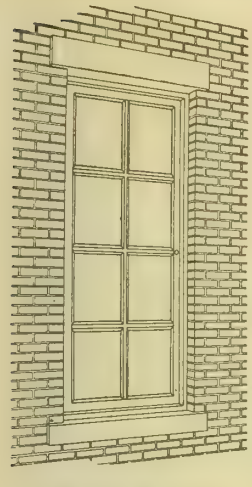


TYPE NO. 1. SINGLE SASH PIVOTED

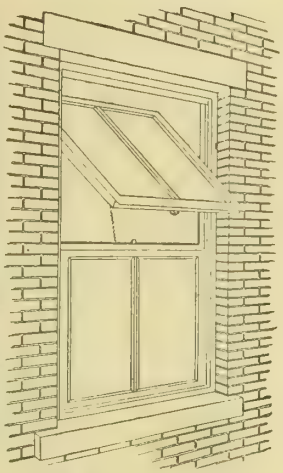


TYPE NO. 20. SINGLE SASH HINGED

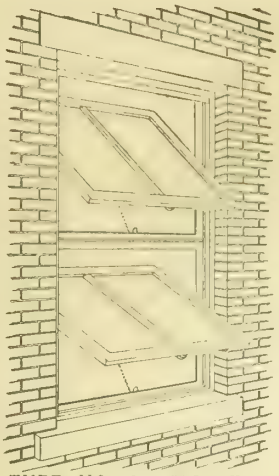
Continued on next page



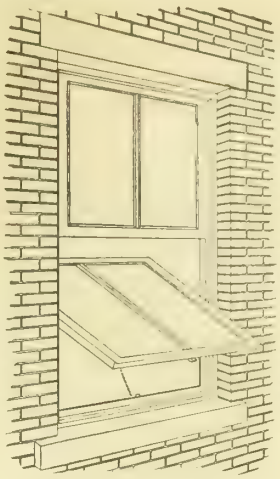
TYPE NO. 30. CASEMENT WINDOW



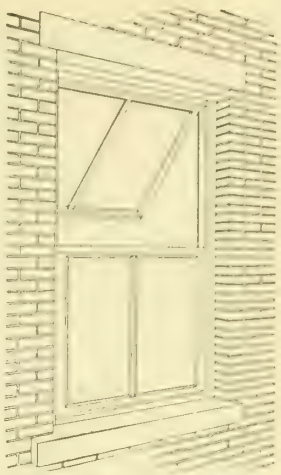
TYPE NO. 2. UPPER SASH PIVOTED; LOWER SASH STATIONARY



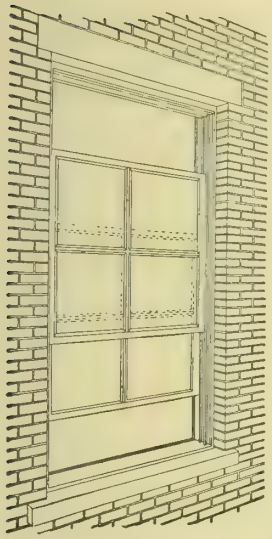
TYPE NO. 3. UPPER AND LOWER SASH PIVOTED



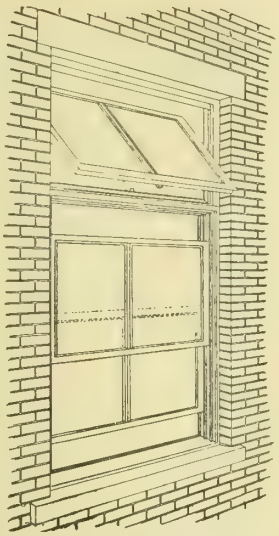
TYPE NO. 9. LOWER SASH PIVOTED; UPPER SASH STATIONARY



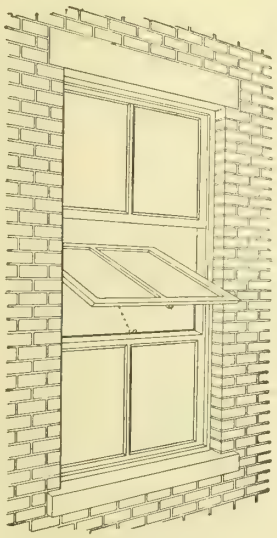
TYPE NO. 10. UPPER SASH HINGED; LOWER STATIONARY



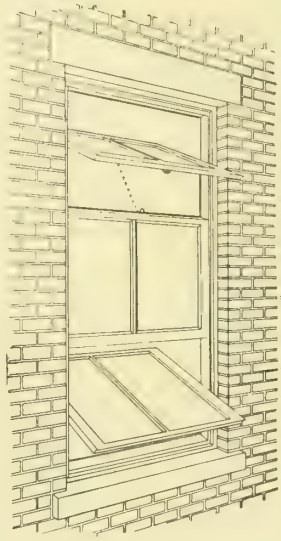
TYPE B. DOUBLE HUNG



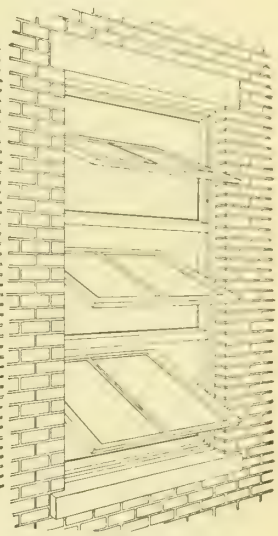
COMBINATION PIVOTED AND TYPE "B," DOUBLE HUNG



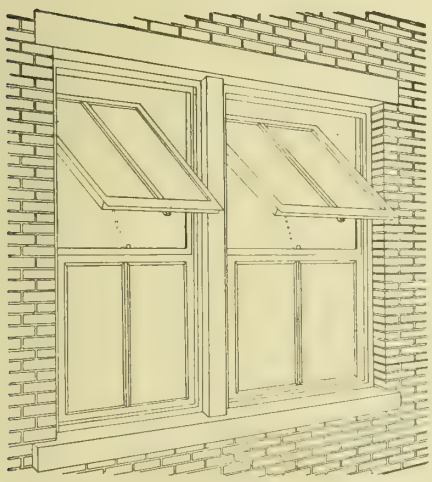
TYPE NO. 4. CENTER SASH PIVOTED; UPPER AND LOWER SASH STATIONARY



TYPE NO. 5. CENTER SASH STATIONARY; UPPER AND LOWER SASH PIVOTED



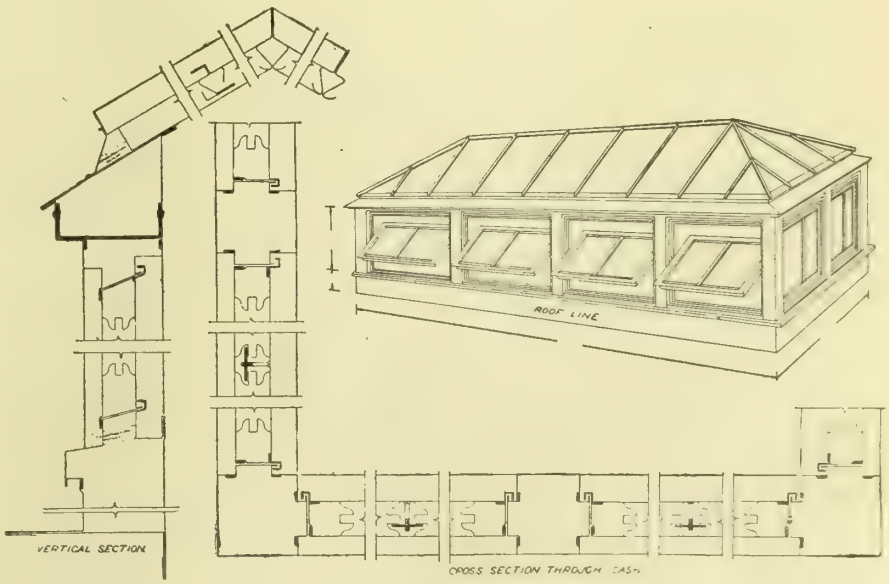
TYPE NO. 6. THREE SASH PIVOTED



TYPE NO. 11. MULLION WINDOW

In either Pivoted, Double Hung, Counterbalanced or Stationary

The above types of windows can be built to any desired width or height. For additional information on Twin and Mullioned Windows, write for Catalogue "D"



FIREPROOF VENTILATING MONITOR, WITH PIVOTED SASH OF OUR OWN DESIGN

Glazed with wire glass, reinforced throughout with angle and bar steel. No wood used. Made in any size with sash that can be operated singly or collectively, to conform with existing conditions. We recommend them specially for engine and boiler houses

CRITTALL CASEMENT WINDOW COMPANY

Manufacturers of "Crittall" Solid Steel Casement Windows

GENERAL OFFICE AND WORKS

DETROIT, MICH.

AGENCIES IN THE FOLLOWING CITIES

BALTIMORE, MD., Wm. A. Marshall, Jr., 121 Mercer Street
BOSTON, MASS., Crittall Casement Window Co., 6 Beacon Street
CHICAGO, ILL., Kaufman & Thomas, 708 People's Gas Building
CINCINNATI, OHIO, A. W. Frank, 237 West Fourth Street
CLEVELAND, OHIO, The Queisser-Bliss Co., Schofield Building
COLUMBUS, OHIO, A. W. Frank, Cincinnati, Ohio
DALLAS, TEX., S. A. Ellsberry, 408 Juanita Building
DAYTON, OHIO, A. W. Frank, Cincinnati, Ohio
DENVER, COLO., Geo. W. Summers & Co., 420 Century Building
DES MOINES, IOWA, Monarch Engineering Co., 211 West Fifth Street
DULUTH, MINN., H. D. Bullard, 603 Palladio
FORT WAYNE, IND., The Fireproofing Co., 720 Schoaff Building
HOUSTON, TEX., Everett, Bradt & Wright, 409 First National Bank Building
INDIANAPOLIS, IND., The Fireproofing Co., 918 Majestic Building
KANSAS CITY, MO., H. Lee Jones, 404 Finance Building
LEXINGTON, KY., E. B. Oldham, 692 McClelland Building
LOS ANGELES, CAL., J. E. Dwan, 1835 South Main Street
LOUISVILLE, KY., Warren Brothers, 306 West Main Street
MEMPHIS, TENN., Noble M. Crawford, Builders Exchange
MILWAUKEE, WIS., Jos. D. McCord, Majestic Building
MINNEAPOLIS, MINN., Henry O. Johnson, 8 North 6th Street
NASHVILLE, TENN., Geo. W. Ruth, Noel Block
NEW YORK, N. Y., Grant Pulley & Hardware Co., 3 West 29th Street
OMAHA, NEB., J. T. Kelley, 307 N. F. & C. Building
PITTSBURGH, PA., Hubert Moore, 807 Farmers Bank Building
PHILADELPHIA, PA., Builders Steel Products Co., 131 South 24th Street
PORTLAND, ORE., A. L. Maeder Co., 914 Lewis Building
SAN FRANCISCO, CAL., Levensaler-Speir Corporation, 259 Monadnock Building
SEATTLE, WASH., Camp-Te Roller, 530 Coleman Building
WILKESBARRE, PA., Gilbert H. Edgar, Miners Bank Building.
SPOKANE, WASH., Ware Bros., 123 Howard Street
ST. LOUIS, MO., Randolph Sales Co., 1601 Chemical Building
SYRACUSE, N. Y., H. L. Waterman, 405 Union Building
TAMPA, FLA., G. M. MacDonough, 406½ De Leon Street
WASHINGTON, D. C., John Herbert Corning, 520 13th Street

SPECIAL GOVERNMENT REPRESENTATIVE, R. V. LaDow, National Metropolitan Bank Building, Washington, D. C.

Product.

"Crittall" Solid Steel Casement Windows (Patented) for Office Buildings, Bank Buildings, Public Buildings, Churches, University Buildings, Clubs, Hospitals and Residences.

CRITTALL PATENTED 50 UNIVERSAL

TRADE-MARK

Description.

Steel—Crittall casements are made from best quality rolled steel sections, free from all imperfections and cleaned of all rust and scale previous to painting.

All sections are solid metal—no built-up sections

DETROIT TRUST CO., DETROIT, MICH.
Albert Kahn, Architect — Ernest Wilby, Associate
An attractive installation of Crittall Casements in cast-iron frames

FAIRBANK SCHOOL, TORONTO, ONT.
Lindsay & Brydon, Architects
Note large percentage of light due to narrow mullions and transom bars

Sweet's Catalogue

Continued on next page

or screwed on strips, which allow interior corrosion, are used.

Weathering—The design of the section is such that double weathering is obtained at all points without the use of screwed on or pressed on fillets or strips.

Finish—The windows are given three coats of baked paint at the factory. Baked enamel is also supplied, when requested; but we do not recommend its use, as it is liable to be chipped in handling and can not be re-surfaced at the building. Baked paint, on the other hand, is flexible and not easily damaged, and allows a finish coat of paint after erection.

Joints—All joints of the casement and frame are mitered and welded solid, and all brackets and plates for hardware are welded to the casement section. No brazing is used for any purpose.

Hardware—All hardware is of our own design and manufacture, being of solid bronze, which is given a statuary bronze finish without the use of chemicals or plating.

NOTE—Plated or chemically colored hardware has proven very unsatisfactory, owing to discoloration and the fact that it wears off in spots.

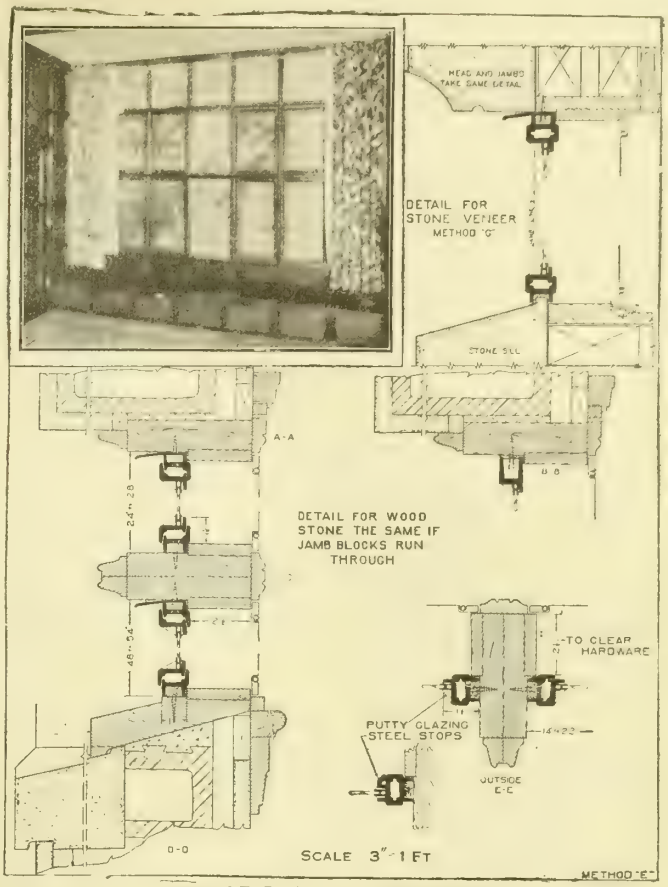
Glass—Glass may be set from either the inside or outside, with putty or with steel glazing stops.

Guarantee.

Crittall Casement Windows are guaranteed wind- and weather-tight under all conditions.

Catalogue.

We will be pleased to send catalogue, and details for arranging screens and draperies, on request. Address Department "S."



SAMPLE PAGE OF CATALOGUE
Showing details of Steel Casements set in Wood Frames or Stone Veneer. Note ⅜-in. rebate

DETROIT ATHLETIC CLUB
ALBERT KAHN, Architect ERNEST WILBY, Associate
Crittall Casements in handsome new home of Detroit Athletic Club

OPERATING ROOM, BRIDGEPORT HOSPITAL
E. L. STEVENS, Architect
Crittall Casement Windows are especially adaptable for operating rooms where narrow sight lines and freedom from projections are primary requisites

DETROIT STEEL PRODUCTS COMPANY

Makers of the Fenestra Products

2250 East Grand Boulevard

DETROIT, MICH.

BRANCH OFFICES AND DISTRIBUTING AGENTS IN PRINCIPAL CITIES

Products.

FENESTRA SOLID STEEL WINDOWS, including:

SIDEWALL SASH "Walls of Daylight" for Modern Factories.

VERTICALLY SLIDING SASH, for factories, offices, schools, hospitals and similar types of buildings.

MONITOR SASH, for sawtooth and other roof construction.

FIRE-ESCAPE SASH, designed especially to open on fire-escapes in office buildings and factories.

HORIZONTALLY SLIDING SASH, for use in roof construction, or on sides of craneways.

INSTITUTIONAL SASH, for asylums, jails, penitentiaries, etc.

DETROIT SOLID STEEL CASEMENTS, especially designed for high-grade office buildings, apartments, hotels, showrooms, libraries, etc.

FENESTRA SOLID STEEL CASEMENTS, designed for high-grade office buildings and factories.

UNDERWRITERS' SASH, approved by the Board of Underwriters. Excessive heat closes them automatically.

FENESTRA OPERATING DEVICE, for use on horizontally pivoted Fenestra Side Wall Sash.

FENESTRA HINGED DOORS, Single and Double.

FENESTRA ROLLING DOORS, Single and Double.

FENESTRA PORTABLE PARTITIONS.

Fenestra
SOLID STEEL WINDOWS

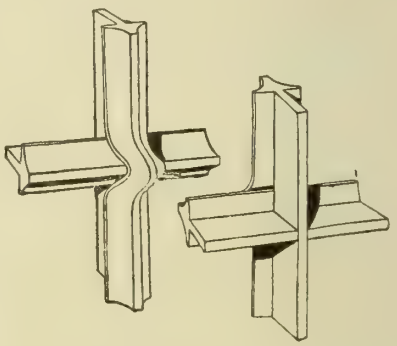
TRADE-MARK
Reg. U. S. Pat. Off.

Advantages.

Fenestra gives a maximum of natural light; perfect ventilation without draft; and absolute weather protection. It is easy of operation; does not stick, warp nor rot; gives protection against fire from within and without; reduces repair cost; heightens the architectural beauty of buildings so equipped, and is easier to glaze than other windows.

Mechanical Construction.

Made of solid rolled-steel bars. Interlocked by patented extra strong Fenestra joints. Ventilators equipped with improved, adjustable, and removable butts. All pivot ends of solid steel bars riveted by pneumatic hammers and drawn tight. Locking wings at intersection hammered down on rigid steel dies. Patented channel section gives ventilators absolute and positive double weathering. Ventilators vertically or horizontally pivoted, or pivoted near top, bottom, or either side.



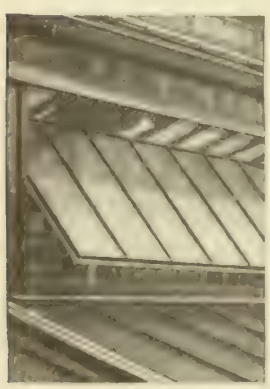
PATENTED FENESTRA JOINT

Adaptability.

Fenestra is adaptable to all types of buildings, in brick, stone, terra cotta, etc.; and is especially recommended for machine-shops, power stations, railway stations, warehouses, car barns, chemical plants, textile mills, libraries, department stores, garages, apartment houses, school buildings, hotels, asylums, penitentiaries, loft buildings, etc.

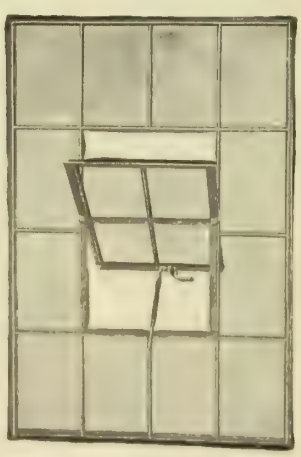
Butts.

The most important feature in the construction of steel sash is the manner in which the ventilated sections are hung to the sash proper. Fenestra sash has an exclusive feature in our external, removable, adjustable butt, riveted securely to vent and sash bars. The butt, itself, is made of solid rolled-steel sections, one mem-



FENESTRA CONTINUOUS CENTER HUNG MONITOR SASH
For sawtooth roof construction

FENESTRA SIDE WALL SASH
With vertically pivoted ventilators



UNIT OF FENESTRA SIDE WALL SASH
Standard horizontally pivoted ventilator

FENESTRA SINGLE SWINGING DOOR AND FENESTRA PARTITIONS

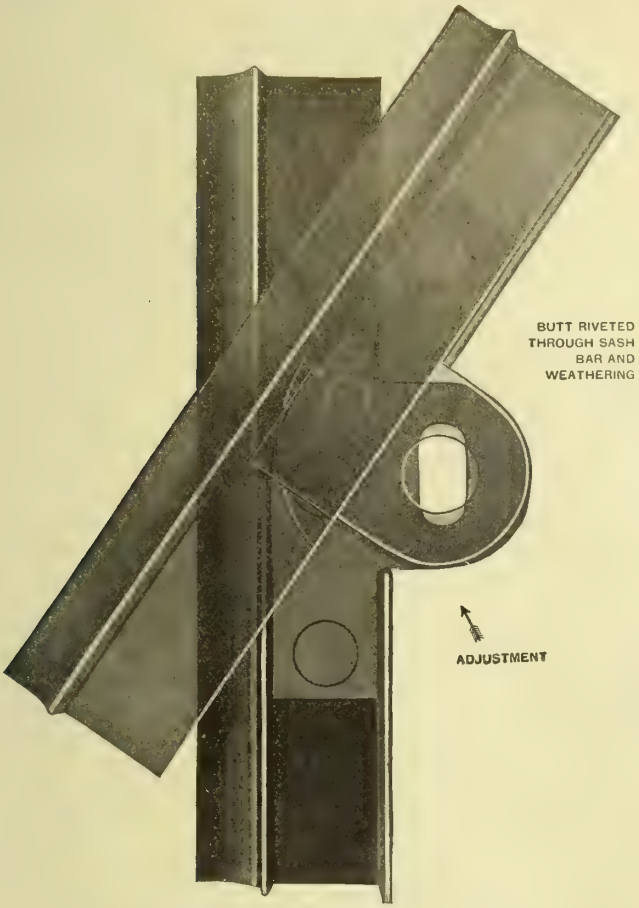
Sweet's Catalogue

Continued on next page

ber having a slotted hole which allows an easy adjustment. The mere loosening of a three eighth inch nut allows the shouldered hinge-pin to slide in the slotted member.

The vent can be entirely removed by unscrewing the nut from the pin. After removing the pin the vent is easily lifted from its position. It can be replaced and adjusted just as easily.

The sectional drawing gives a view through the ventilator bar which is shown at an angle to the vertical sash bar.

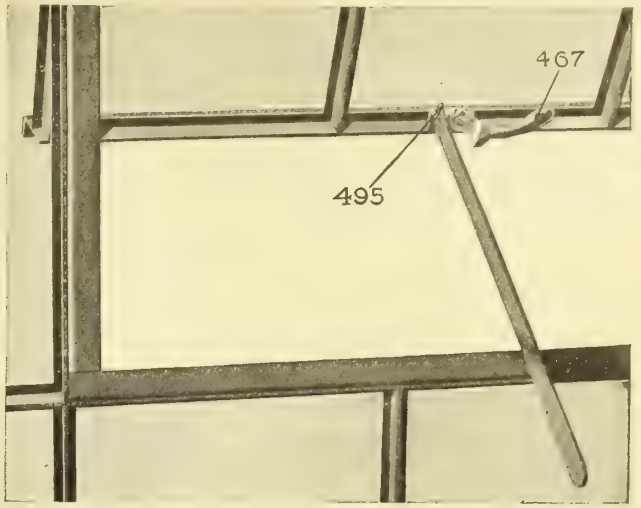


SECTIONAL VIEW OF EXTERNAL ADJUSTABLE BUTT

Fenestra Gravity Cam Latch.

Fenestra sash are exclusively equipped with an automatic camlatch locking device, which is attached to the bottom rail of the ventilator by means of a solid rolled Z bar bracket. This latch automatically and securely locks the ventilator as it closes. The Fenestra cam latch is strong, substantial, and of very pleasing design.

Where ventilators are not within convenient reach from the floor, a spring catch and chain, or a cam latch and chain are used.



FENESTRA GRAVITY CAM LATCH AND STANDARD STAY BAR

Delivery.

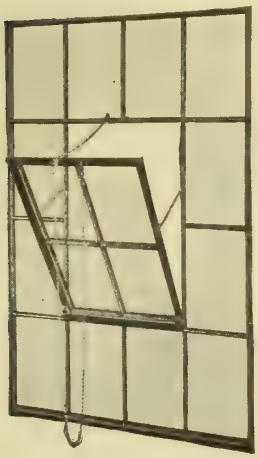
When standard types of Fenestra are purchased, ten days shipments can be secured. Delivery of other types depends somewhat on their design.

Prices.

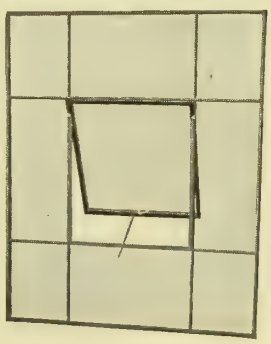
Practically the same price as similar doors, windows, and partitions of wood. Exact prices depend on construction of building and the use of standard sizes. Approximate prices are sent upon request. Estimates are gladly submitted on receipt of plans or rough sketches of openings to be filled.

Literature.

Special literature dealing with the various types of Fenestra will be sent upon request.



UNIT OF "FENESTRA" SIDE WALL SASH
With ventilator pivoted near the bottom
Suitable for screening



FENESTRA CASEMENT
Horizontally pivoted near top

DETROIT CASEMENT
Leaves swinging out

FENESTRA VERTICALLY SLIDING SASH
Counterbalance Type

P. DEISSLER & BRO.

MANUFACTURERS OF

The " Deissler " Improved Pivoted Ventilators and Solid Rolled Steel Casements

ESTABLISHED 1884

249 South Sixth Street
PHILADELPHIA, PA.

Products.

" Deissler " Improved Pivoted Window Ventilators; also Wrought-Iron Sash Side-Hinged Casement Vents, Iron Casement Frames, Skylights, Domes, and all other kinds of Wrought-Iron Work used in the leaded Glass Trade.

" Deissler " Improved Pivoted Ventilators.

These ventilators are made of steel or wrought-iron angles, as desired, and can be used for leaded wire, plate or prism glass. The finish is either painted or galvanized. As may be seen in the illustrations, they pivot on a center iron bar, and are provided with a lock or catch at top and lug at bottom, with strap for adjusting extent of opening. Ventilators located out of convenient reach are adjustable by means of a rope.

The ventilators or casements of wrought steel can be better fitted and be made practically weather-tight; and their general appearance is more satisfactory than that of cast-iron.

" Deissler " Ventilators are simple and substantial in construction, durable, and much easier to handle, install or take out, than the old-style ventilators, admitting of easily repairing or altering windows before or after they are in place.

Types.

Double Angle Iron Ventilators — For Single Glass. As may be seen in the illustrations, these ventilators may be arranged in various combinations to suit requirements.

In ordering, give bar sizes for leaded glass. Give the bar sizes from the outside of angle for plate, wire, ribbed or prism glass.

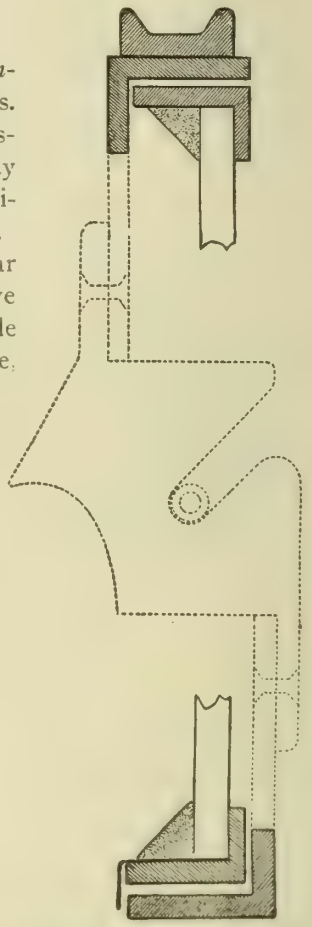


Fig. 2. VERTICAL SECTION, WITH SINGLE GLASS

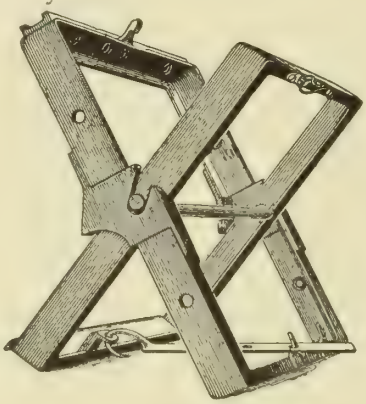


Fig. 1. NO. 1 DOUBLE VENTILATOR FOR SINGLE GLASS
For Bottom of Window
Pat. Sept. 22, 1891, and April 23, 1901
Note—No. 2 for middle of window; No. 3 for top of window

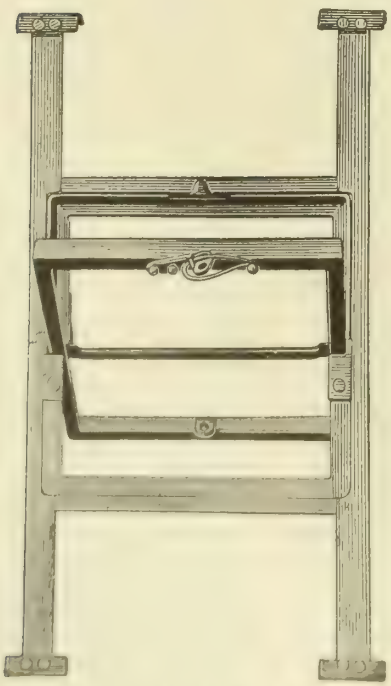


Fig. 3. NO. 9 WEATHER PROOF VENTILATOR
For Bottom Window Sash Only
Pat. Sept. 22, 1891, and April 23, 1901
Note—No. 8 Two Single Ventilators with 1 only at bottom; No. 7 Intermediate Ventilator with 1 only at bottom; No. 6 Bottom Ventilator with T only at top

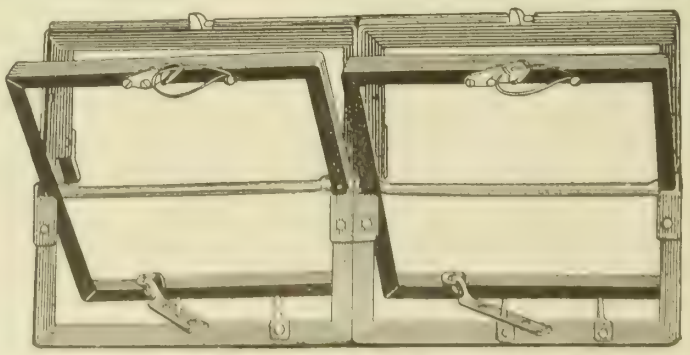


Fig. 4. NO. 4 TWIN VENTILATOR
Pat. Sept. 22, 1891, and April 23, 1901
Note—No. 5 Ventilators grouped vertically. Nos. 1 and 5 apply to sectional views of Nos. 2 and 10

Sheet's Catalogue

Continued on next page

Types—Continued.

Double Double Ventilators—For Storm Glass Outside and Leaded Glass Inside. This type is the same as the Double Angle Iron Ventilator, except that it provides for holding storm glass outside and leaded glass inside.

It may be arranged in various combinations.

Sizes.

Ventilators are all made to order and can be furnished in any sizes desired. 1 x 5/8 in. angle iron is used for outside and 7/8 x 1/2 in. angle iron for inside. If sizes exceed 40 to 48 in., 1 x 1 in. angle iron is used outside, and 3/4 x 3/4 in. angle iron for inside frame. The price per foot is the same.

Prices.

Nos. 1, 2, 3 (Fig. 1) Double Wrought-Iron Ventilators, painted, 30 cents per running foot, net; galvanized, 37½ cents per running foot.

No. 4 (Fig. 3) Twin Ventilator, figured, 4 heights and 2 widths, 30 cents per running foot, net, painted; 37½ cents per running foot, net, galvanized.

Nos. 6, 7, 8 9 (Fig. 4) Border Ventilators, figured from outside of T iron, 30 cents per running foot, net, painted; galvanized, 37½ cents per running foot, net.

Nos. 10, 11, 12 (Fig. 5) Double Double Iron Ventilators, painted, 50 cents per running foot, net; galvanized, 65 cents per running foot, net. This is for 2 in. angle iron. If made of 2½ in. angle, cost per running foot, 10 cents extra.

Nos. 14, 15 16 (Fig. 7) Double Double Border Ventilators, figured from outside of T iron, painted, 50 cents per running foot, net; galvanized, 70 cents per running foot, net.

Nos. 20, 21 Side Hung Casements, made of section of iron, 65 cents per running foot, net.

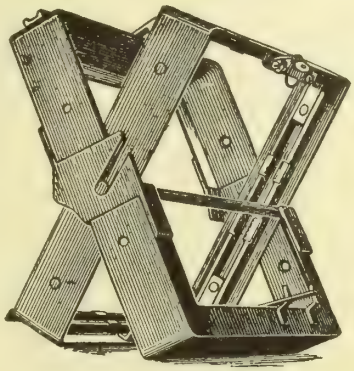


Fig. 5. NO. 10 DOUBLE DOUBLE-BOTTOM VENTILATOR
For storm glass outside and leaded glass inside
Pat. Sept. 22, 1891, and April 23, 1901
Note—No. 11, Intermediate Ventilator; No. 12, Top Ventilator

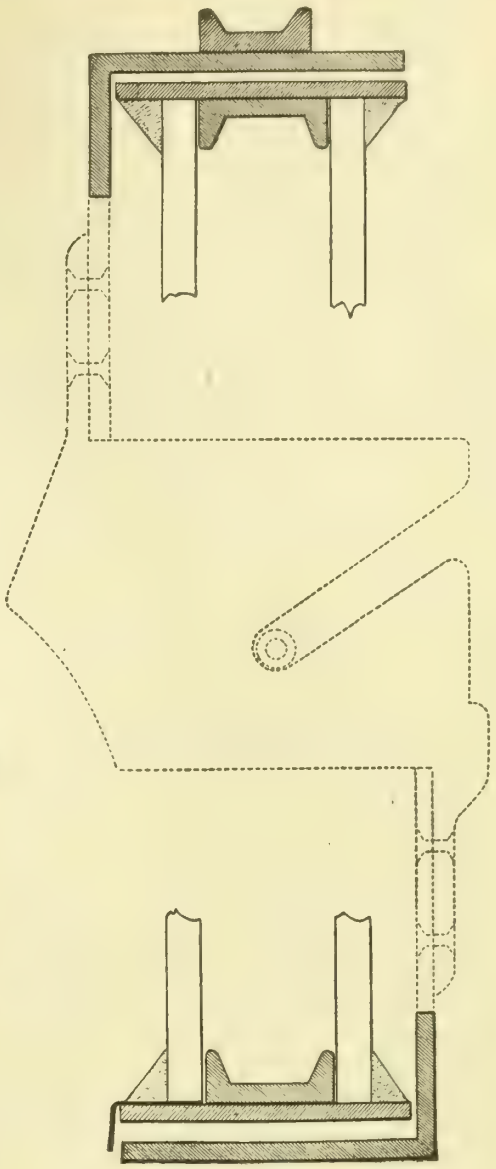


Fig. 6. VERTICAL SECTION WITH DOUBLE GLASS

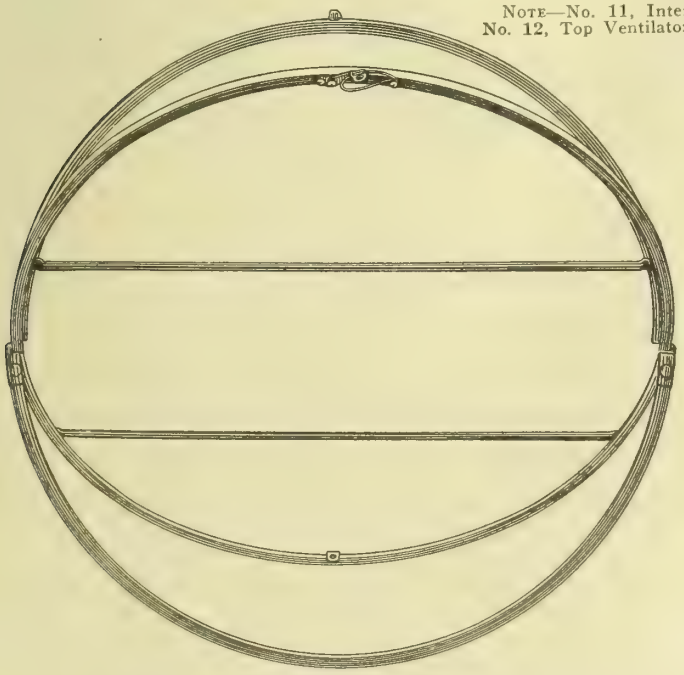


Fig. 8. NO. 17 CIRCULAR VENTILATOR FOR SINGLE GLASS
Circular ventilator also made for storm glass outside and leaded glass inside

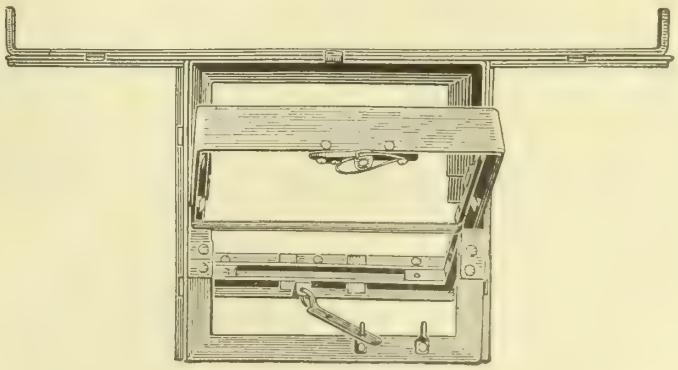


Fig. 7. NO. 14 DOUBLE DOUBLE-BOTTOM BORDER VENTILATOR
For storm glass outside and leaded glass inside
Patented Sept. 22, 1891, and April 23, 1901
Note—No. 15, Intermediate Ventilator with channel from top and bottom; No. 16, Top Ventilator with channel iron only at bottom

Continued on next page

Steel Casement Frames.

These Casement Frames are made of the best mild steel sections, all joints welded. The hardware and butts can be had either of iron or solid bronze. Peg stay-holes are drilled in the inner frame, the outer frame to have all the necessary screw holes for setting in place.

The frames can be hinged to open right or left. Supplied painted with two coats of lead paint or galvanized.

We are prepared to furnish these casements at short notice.

They are guaranteed weather-proof, and work easily.

These Casement Windows are in competition with those of English manufacture. We also make French Casements and Economic Casements.

Shipments.

All goods shipped f. o. b. Philadelphia.

Guarantee.

All our work is guaranteed to be first class in every particular, and weather-proof.

Catalogue.

Send for catalogue.

References.

A few representative customers:

American 3-Way Prism Co., Philadelphia, Pa.
American Luxfer Prism Co., Philadelphia, Pa.
Century Stained Glass Works, Philadelphia, Pa.
D'Ascenzo Studios, Philadelphia, Pa.
F. C. Mammele, Wilmington, Del.
Colonial Art Glass Co., Boston, Mass.
Pawtucket Blind and Sash Co., Pawtucket, R. I.
Von Gerichlen Art Glass Co., Columbus, Ohio
Thos. J. Murphy, Boston, Mass.
H. J. Phipps & Co., Boston, Mass.
Union Stained Glass Works, Dorchester, Mass.
H. E. Goodhue, Cambridge, Mass.
C. H. Farley & Co., Portland, Me.
Geo. H. Payne, Paterson, N. J.
Buffalo Stained Glass Co., Buffalo, N. Y.
Leo Frohe, Buffalo, N. Y.
F. D. Stevenson Contracting Co., Cleveland, Ohio
Pittsburg Plate Glass Co., Cleveland, Ohio
Pittsburg Plate Glass Co., Pittsburgh, Pa.
G. E. Paddock & Son, Kingston, Pa.
Decorative Window Co., Providence, R. I.
Wm. Gilbane & Bro., Providence, R. I.
Bunce Art Glass Co., Richmond, Va.
D. Knickerbocker Boyd, Philadelphia, Pa.
B. F. Willis, York, Pa.
Melody & Keating, Philadelphia, Pa.
Otto Andrle, Buffalo, N. Y.
H. J. Horwood, Ogdensburg, N. Y.
Empire Glass & Decorative Co., Atlanta, Ga.
H. P. Sickles, Rochester, N. Y.
David M. Andrew Co., Baltimore, Md.

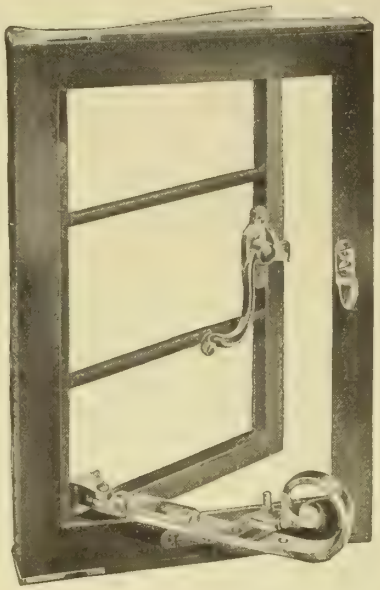


FIG. 9. No. 30 Casement opens out

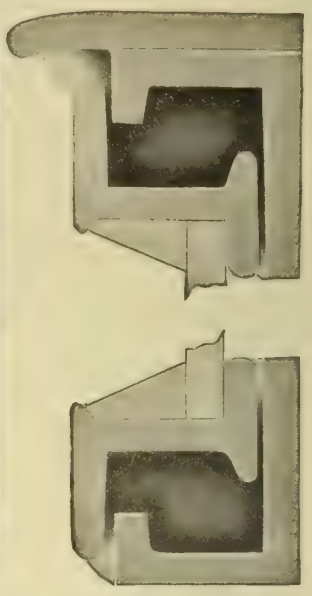


FIG. 10. Sectional view of No. 30

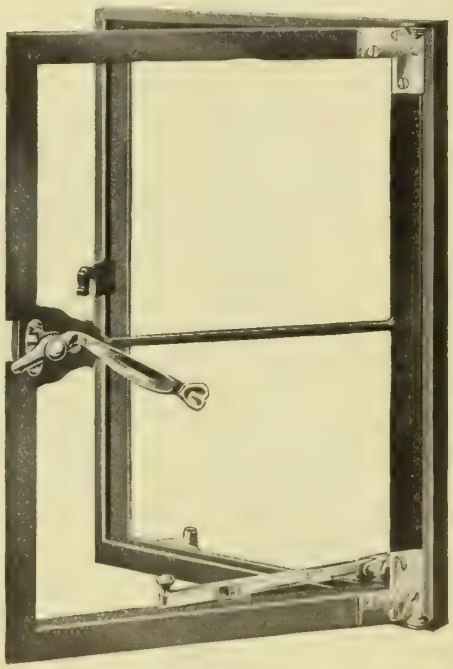


FIG. 11. No. 31 Casement opens in

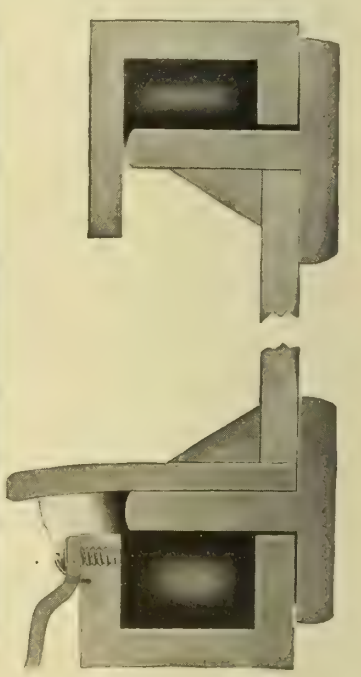


FIG. 12. Sectional view of No. 31

STEEL CASEMENT WINDOW FRAMES

Standard Mirror Co., High Point, N. C.
Horace Wells Sellers, Philadelphia, Pa.
Henry Dagit, Philadelphia, Pa.
H. T. Gernhardt & Co., Baltimore, Md.
Gettier Studios, Baltimore, Md.
L. S. Tyndall, Washington, D. C.
Hooper-Dombrink Art Glass Co., Oakland, Cal.
Worcester Stained Glass Works, Worcester, Mass.
Farley and Loetscher Manufacturing Co., Dubuque, Iowa
Raby-Hinton Co., Inc., Mechanicsburg, Pa.
Petgen Co., Pittsburgh, Pa.
Comes & Kanzor, Pittsburgh, Pa.

HENRY HOPE & SONS

Metal Casement Windows

103 Park Avenue
NEW YORK, N. Y.

TELEPHONE, Murray Hill 1514

Products.

Hope's Solid Rolled Steel and Extruded Bronze Casement Windows, of three strengths to suit size of opening; Leaded Glass; Hardware of superior design and finish; Decorative Lead Work; Factory Sashes and Patent Roof Glazing.

Construction.

All bars solid, straight and true, and free from distortions and hammer marks. All joints are cut on milling machines and welded solid, as are also the brackets and plates for hardware.

Hardware.

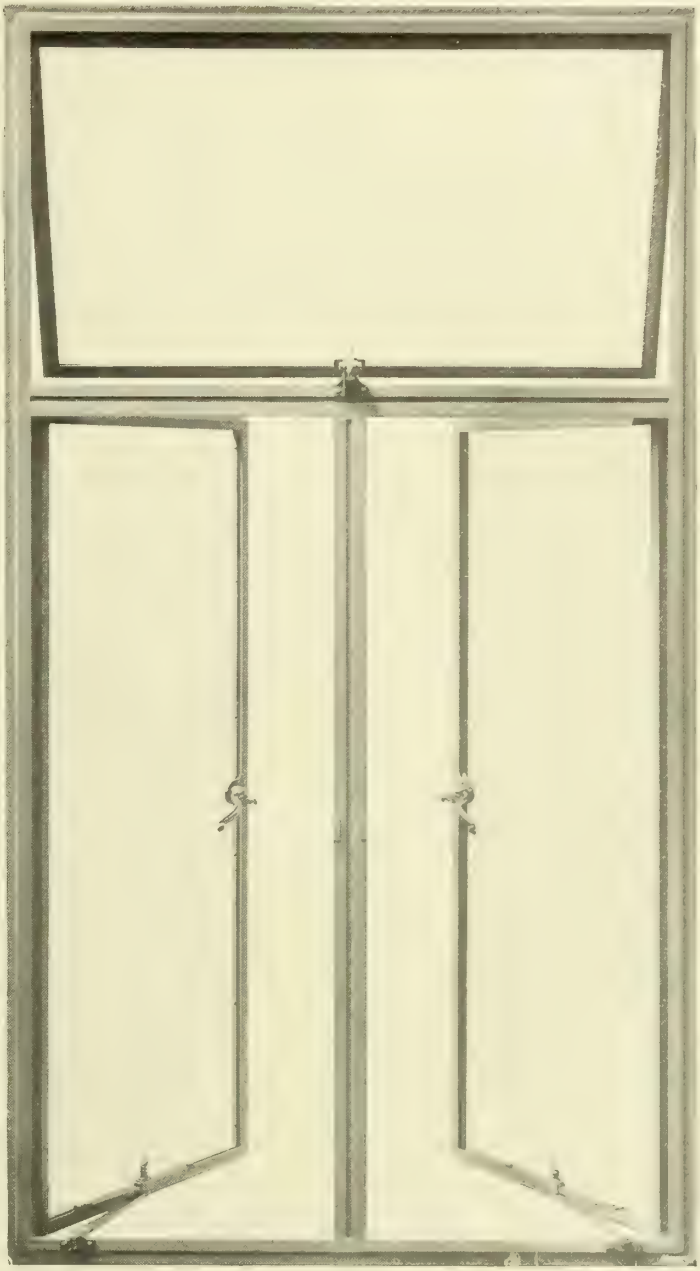
Hinges are of solid bronze heavy butts. Hardware throughout is bronze to U. S. Naval specification, and to Hope's patented designs, affording the widest range of ventilation and free use of screens, curtains and shades.

Finish.

Surfaces are cleaned of scale by sand blast, and dipped twice in special anti-corrosive paint. A finishing coat of hard drying enamel is recommended, and supplied when required.

Glazing.

We manufacture the best leaded glass at moderate prices; and prefer to take contracts including setting and glazing, so that we may be responsible for the entire work. Glazing beads, of galvanized steel or hardwood, are strongly recommended for good work, and should be specified. Glazing may be outside or inside, but the former is recommended.



HOPE'S Z TYPE OFFICE WINDOW

Supplied for London County Hall; Manitoba Parliament Buildings, Winnipeg; South American Insurance Co., Buenos Aires; Excelsior Life Building, Toronto; New Zealand Insurance Company, Auckland; Savoy Hotel, London, etc.

Specification,

Architects, who wish for immunity from trouble, should specify "Hope's sections 21, 22 or 23 according to size, to be supplied and set."

Catalogue.

Illustrated catalogues of Hope's manufactures will be forwarded on application.

Continued on next page

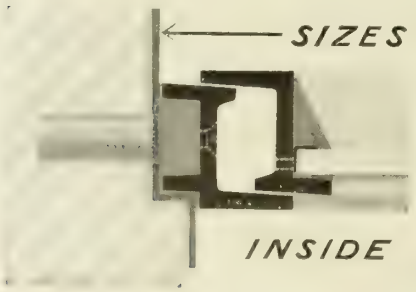
SIDE HUNG CASEMENT WITH LEADED GLAZING AND FITTED WITH HOPE'S PATENT TWO-POINT HANDLE AND 223 ADJUSTER

Can be made to open in or out, and be hung at top or bottom

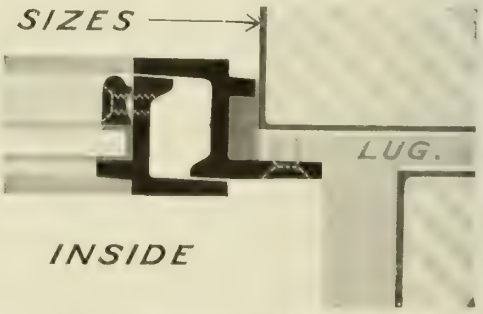
VERTICALLY PIVOTED CASEMENT WITH LEADED GLAZING AND HUNG ON HOPE'S IMPROVED BRONZE STRAP HINGES

Projection when open does not exceed 2⅛". Also made to swing horizontally

NOTE—Casements opening out should have ⅜" outside rebates at head, jambs and sill; casements opening in should have ⅜" inside rebates at head and jambs with ⅜" outside rebate at sill



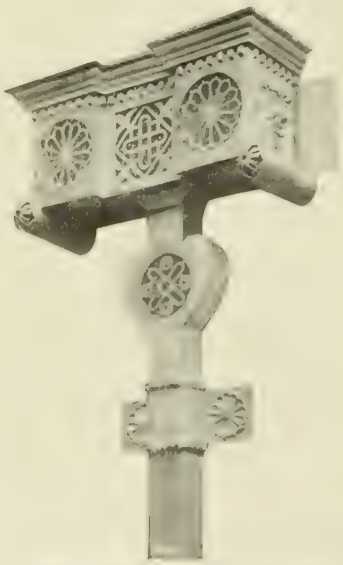
DETAIL SHOWING APPLICATION OF HOPE'S SECTION 22 CASEMENT FOR SETTING INTO REBATED STONE OR WOOD



DETAIL SHOWING APPLICATION OF HOPE'S SECTION 22 CASEMENT WITH PATENTED FLANGED FRAME TO ALLOW FOR INTERIOR TRIM

S50 S52

HOPE'S HARDWARE



LEAD RAINWATER HEADS AND LEADER PIPES

Illustrated Catalogues sent on request

S95 S49

HOPE'S HARDWARE

ANGLE WINDOW & DOOR CO.

OFFICE AND FACTORY
146-150 Clinton Street
BUFFALO, N. Y.

Products.

FIREPROOF WINDOWS and DOORS in STEEL and BRONZE, for Factories, Schools, Public Buildings, etc., covering Labor and Underwriters' requirements.

Advantages.

Economy in maintenance, durability, beauty of finish, simplicity in design, great practical increase of light area and one of the best fire-resistants known.

TRADE-MARK

Description.

Sash made of structural angle iron, 1½ by 1½ by ⅛ inch mild steel, with welded corners forming a continual frame; hung with steel tape of tested strength. Sash provided with improved wind shields making application of weather-strips unnecessary. The glass has a reveal of ⅞ inch as fire- and weather-protection.

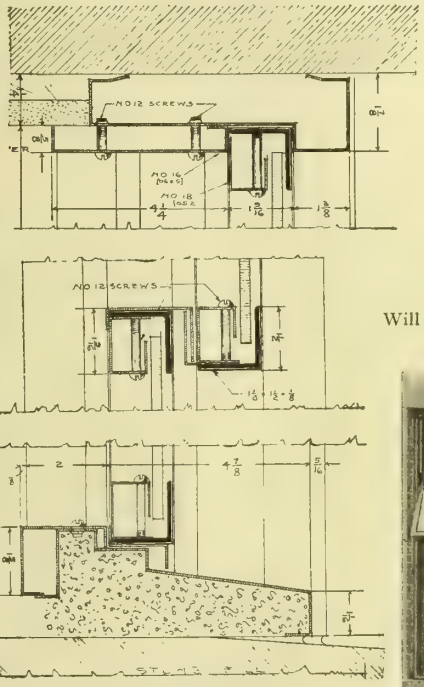
Jambs, sills and heads are of No. 16-gauge steel free from buckles, with angles and corners formed straight and true. Corners are welded firm and rigid, with sills and heads bolted between jambs. Frame is set perfectly air-tight in wall. The sills are filled with cement concrete, insuring weather-tightness and solidity.

Doors have flush panels, formed of two plates No. 16-gauge, pickled and cold-rolled metal furniture steel, edges accurately flanged with suitable concealed reinforcements for butts and other hardware. Doors are framed of 1¾ by 1¾ inch angles similar to sash frames, making a neat design with an exceptionally large glass area for glass panels.

Finish.

Any color baked on at high temperature. Hardware to match trimming of building.

SECTION THROUGH ANGLE WINDOW



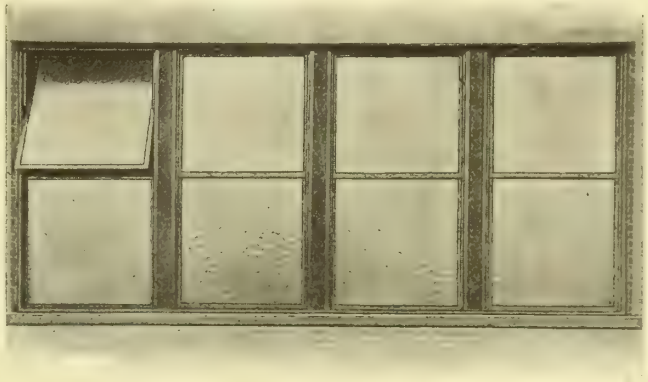
DETAIL SECTIONS THROUGH ANGLE WINDOW

Top-Pivot

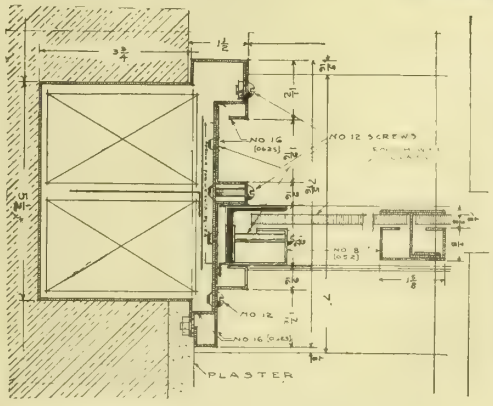
Double-Hung

Counterbalanced

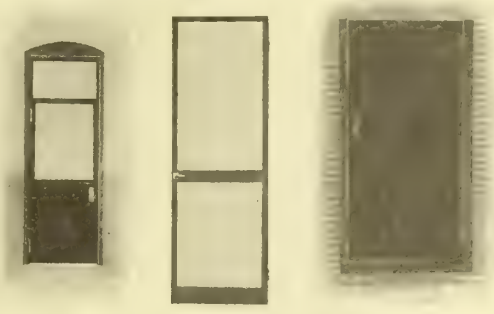
Will not bind, shrink or swell. Glass may be of rough wire, ribbed wire or polished wire plate



Quadruple Mullioned Window, Top Sash Pivoted
ANGLE STEEL FIREPROOF WINDOWS



PLAN OF ANGLE WINDOW



ANGLE STEEL FIREPROOF DOORS

INTERNATIONAL CASEMENT CO., INC.

Manufacturers of Solid Rolled Steel and Bronze Casement Windows

NEW YORK OFFICE
1733 PARK ROW BUILDING
Telephone, CORTLAND 7916

GENERAL OFFICES
JAMESTOWN, N. Y.

FACTORIES
JAMESTOWN, N. Y.
LIVERPOOL, ENG.

AGENCIES IN ALL THE PRINCIPAL CITIES

Products.

INTERNATIONAL CASEMENTS in Rolled Steel and Drawn Bronze, with HARDWARE of Special Design and Construction; LEADED and STAINED GLASS.

Construction.

International Casements have three weathering points; all joints are solid welded by autogenous process; frames and sashes are carefully hung and fitted.

Service.

We are prepared to work out any problems in window construction, and will make full-size details on request. Our Engineering and Designing Departments are in Jamestown, N. Y.

Facilities.

We can guarantee immediate shipments from our plant at Jamestown, N. Y. If manufactured in our plant at Liverpool, England, deliveries can not be guaranteed, but we can give our customers the benefit of a lower price, owing to the import duties being very small.

Guarantee.

Owing to the exceptional design of our sections and careful manufacture of our windows, we can guarantee them absolutely weather-tight under any conditions.

Specifications.

Casements shall have three weathering points, complete with all necessary solid bronze hardware and steel glazing beads set with brass screws, to be manufactured by INTERNATIONAL CASEMENT CO., INC., Jamestown, N. Y.

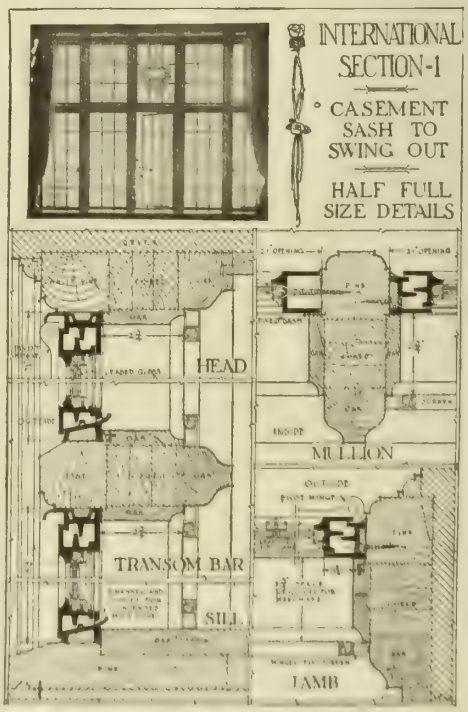
Catalogue.

Catalogue will be sent on request. This contains architectural plates, photographs and measured drawings of sixteenth century Tudor residences in England.

References.

We have furnished International Casements for a large number of high class residences and public buildings, and will furnish complete list on request.

ILLUSTRATION FROM OUR BOOKLET, "METAL CASEMENTS, OLD AND NEW"



REDUCED SPECIMEN PAGE OF ARCHITECTURAL PLATE TAKEN FROM OUR CATALOGUE

WM. H. JACKSON COMPANY

Ornamental Metal Work

2 West 47th Street
NEW YORK, N. Y.

FOUNDRY AND SHOPS
535 Carroll Street
BROOKLYN, N. Y.,

Products.

METAL WINDOWS.

For Tile for general decorative purposes, see our name in General Index.

Air-Tight Water-Tight Windows.

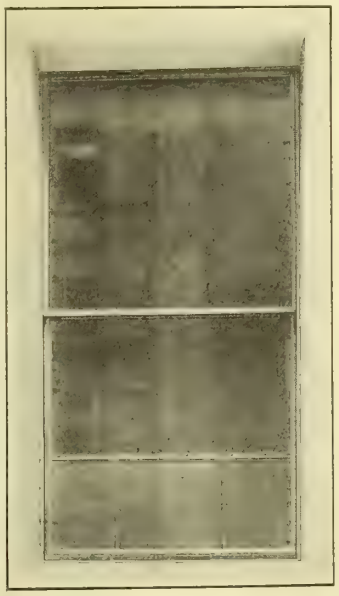
We have designed, patented and perfected an absolutely air-tight and water-tight window that meets the most exacting demands of architects and builders. Its use eliminates weather-strips and all devices of complicated hardware.

Made in bronze, iron or wood, casement, and double-hung; and are strongly built and easily installed.

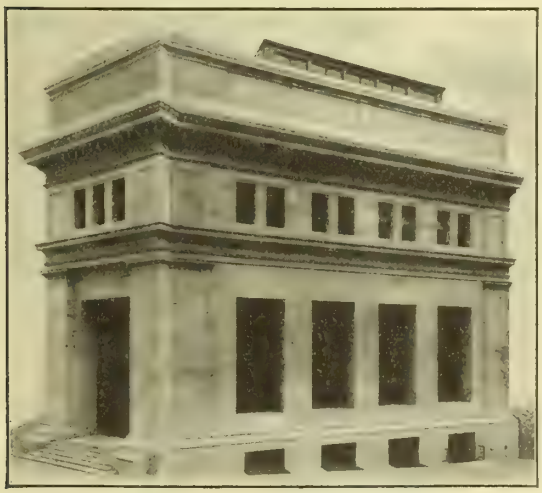
Co-operative Service.

Send us plans and specifications and we will be pleased to submit typical details of our window, shown in connection with the adjoining work, accompanied with estimates.

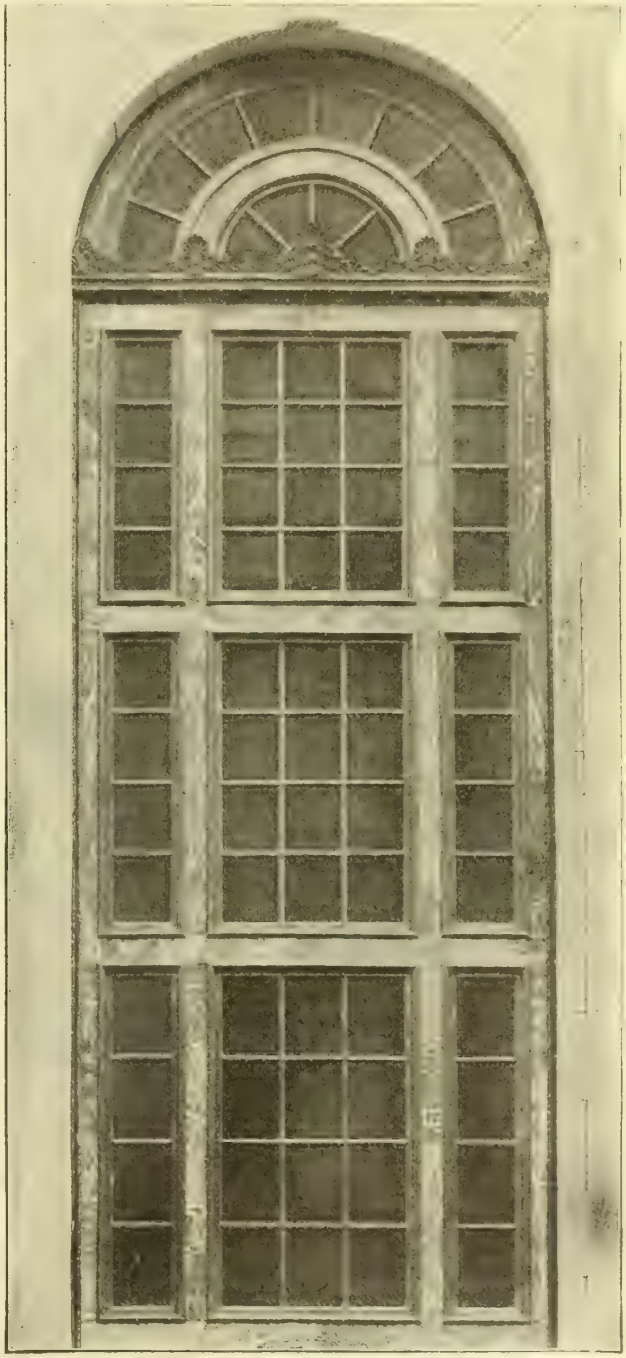
BRONZE AIR-TIGHT AND WATER-TIGHT WINDOWS, FIRST FLOOR, NEW HAMPSHIRE HISTORICAL SOCIETY BUILDING, CONCORD, N. H.
GUY LOWELL, Architect



LARGEST DOUBLE-HUNG BRONZE WINDOWS IN THE WORLD, FURNISHED FOR J. P. MORGAN & CO. BUILDING, NEW YORK, N. Y.
Each sash weighs 1,600 lbs.; perfectly counterbalanced; air-tight and water-tight



THE MORGAN BUILDING, NEW YORK CITY
General offices of J. P. Morgan & Co.
TROWBRIDGE & LIVINGSTON, Architects
Windows are bronze; air-tight and waterproof; double hung
Windows on first floor 11 feet wide by 22 feet high; perfectly counterbalanced. See window detail above
Furnished by WM. H. JACKSON COMPANY



BRONZE AIR-TIGHT AND WATER-TIGHT WINDOW, FIRST NATIONAL BANK, BOSTON, MASS.
R. CLIPSTON STURGIS, Architect

KNISELY BROTHERS

INCORPORATED

Manufacturers of Patent Automatic Fireproof Windows

Twenty-Eighth Place and Fifth Avenue

TELEPHONES: Calumet 1266, 1267

CHICAGO, ILL.

Products.

We are manufacturers of Knisely Brothers Patent Automatic Fireproof Windows, with Wire Glass.

Also, Slate, Tin, Tile and Corrugated Iron Roofs, and Metal Cornices.

Styles of Windows.

The Knisely Brothers Patent Window is made in all styles, embracing the vertical and horizontal swing on either one or both sashes; also the double-hung or sliding sash window, with either one or both sashes movable as desired. These windows are equipped with special automatic closing devices operating in case of fire.

Official Approval.

Our fireproof windows meet all the requirements of the National Board of Underwriters and bear their label before leaving the factory.

Fig. 1. STANDARD DOUBLE-HUNG WINDOW

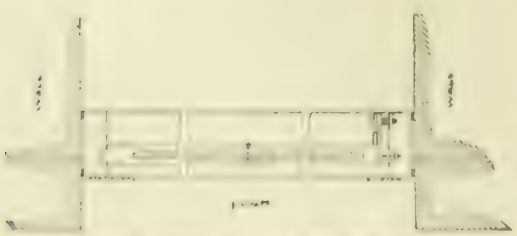


Fig. 2. GROUND PLAN OF FIG. 1

Prices and Catalogues.

Quotations will be furnished on receipt of plans, specifications or schedules.

Catalogues will be mailed on application.

Special Construction Specification.

Details for special construction will be furnished on application. We make all windows to architects' specifications.

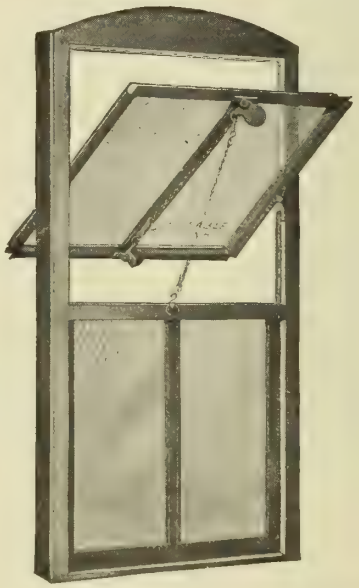


Fig. 3. STANDARD PIVOTED WINDOW

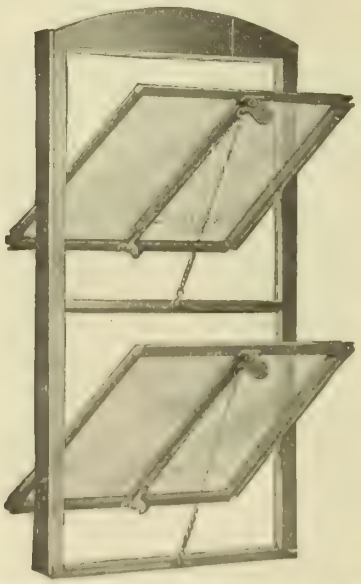


Fig. 4. STANDARD DOUBLE PIVOTED WINDOW

THOMAS LEE

Manufacturer of Hollow Metallic Windows and Doors

OFFICE AND FACTORY
128-132 West Second Street
CINCINNATI, OHIO

Products.

Lee Labeled Approved Hollow Metallic Windows.

Lee Metal-Clad Paneled Doors.

Labeled Tin-Clad Fire-Doors.

For Dampered Ventilators, see name in General Index.

Facilities and Experience.

Not only extensive factory space and the best of modern machinery, but all connected with the establishment have had years of practical experience. Prompt shipment of goods is guaranteed to any part of the United States.

Advantages and Superiority.

The Lee Windows are superior, owing to their simple construction, strength, perfect operation of sash, and general good appearance. All sash, whether stationary, pivoted or double-hung, can be easily set in or taken out of frames. Sash can be glazed by removing outside section and glazing strip of the top rail. No bolts are used in constructing the frame and sash of double-hung type.

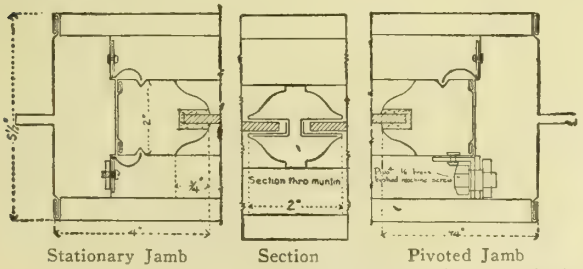
Adaptability.

Lee Metal Windows are adaptable for use in office buildings, hotels, theaters, factories, or any building in which the window openings must be protected.

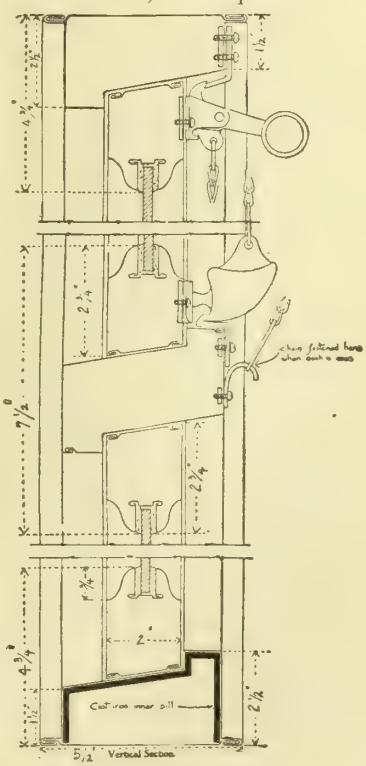
Official Approval.

All Labeled Windows must be made to conform to the sample that has been tested and approved by the National Board of Fire Underwriters.

The following styles of Lee Hollow Metallic Windows are inspected and labeled by the National Board of Fire Underwriters before leaving the factory: Double-hung; top stationary, bottom sliding; single pivoted; double pivoted; stationary; upper pivoted, lower stationary; lower pivoted, upper stationary; hinged at top.



Stationary Jamb Section Pivoted Jamb



VERTICAL AND HORIZONTAL SECTIONS OF UPPER PIVOTED, LOWER STATIONARY WINDOW

Lee Labeled Metal-Clad Wood Doors.

Lee labeled metal-clad wood doors are approved for use in corridors, fire-escapes or room partitions. They are constructed of white pine, with asbestos core and galvanized steel covering. Furnished with or without labeled steel frames or wood metal-clad frames and trim.

Made with metal or wire glass panels.

Guarantee.

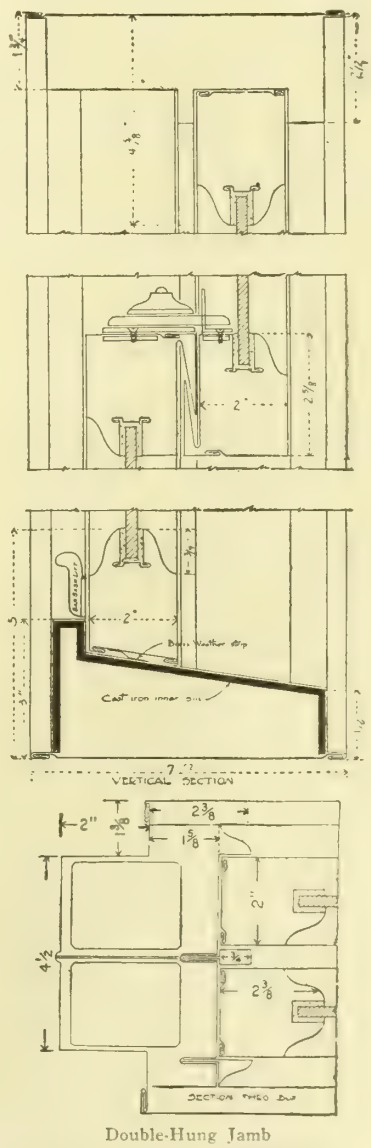
All products are guaranteed to be first class in every respect.

Prices.

Prices will be quoted on receipt of plans and specifications or a list giving number and sizes of windows and doors wanted.

Specifications.

Printed directions how to specify these windows and doors, and provide for them in plans will be sent to architects, on request.



Double-Hung Jamb

VERTICAL AND HORIZONTAL SECTIONS DOUBLE-HUNG WINDOW

LIGHTWELL STEEL SASH COMPANY

Manufacturers of Solid Steel Sash

TELEPHONE, Bell 398

GENERAL OFFICE AND FACTORY
NEWPORT, DEL.

Products.

"Lightwell" Solid Rolled Steel Sash, including the following types: Side Wall Sash, with Pivoted Ventilators; Continuous Sash, for Monitors and Sawtooth Roofs, Center-Pivoted and Top-Hung; Horizontal Sliding Sash, for Side Walls and Monitors of Mill Buildings; and Power-House Sash.

"Lightwell" Steel Doors, Hinged and Sliding.

"Lightwell" Solid Rolled Steel Portable Partitions, for Office Buildings and Factories.

"Lightwell" Solid Rolled Steel Fire-Escape Doors.

"Lightwell" Steel Operators, for Controlling Hinged or Pivoted Side Wall or Other Continuous Sash.

"Lightwell" Rolled Steel Sash.

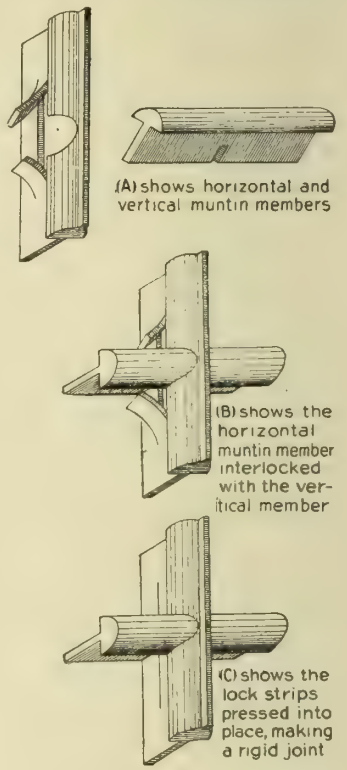
"Lightwell" Rolled Steel Sash is an up-to-date fire-protective product of simple, rigid construction, which has gained definite and strong recognition for its neat appearance and effective durability.

"Lightwell" sash are so constructed as to be absolutely accurate and uniform throughout. Every sash is thoroughly inspected during the process of manufacture, and also before shipping. All pivoted ends of the steel bars are drawn tight by substantial riveting. All ventilators are inspected before hanging in the frames and after they are fitted to the frames to insure proper hanging and weathering.

"Lightwell" Steel Sash may extend the entire length and width of a building and from a point two feet above the floor to the full height of each story. At the muntins, mullions, lintels and jambs there is practically no obstruction to the light, due to the strong, narrow sections used. This means no idle or dark corners—maximum lighting throughout—increasing the available working space and cutting down lighting bills.

These sash are adapted to apartment houses, libraries, schools, colleges, hospitals, office buildings, loft buildings, department stores, store fronts, warehouses, railway stations, piers, car barns, roundhouses, power stations, textile mills, chemical plants, factories, foundries, machine shops, coalbreakers, asylums, jails, and in fact practically every type of modern industrial and office building.

All sash receive a brushed shop coat of paint before shipping. The finish of the sash is high grade in all respects, as is evident from its attractive appearance after installation.



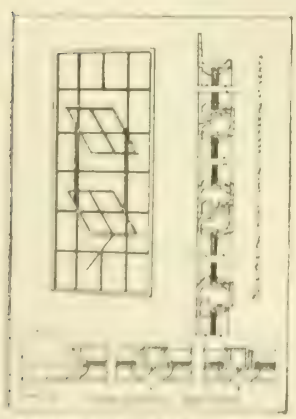
DETAILS SHOWING PATENT MUNTIN CONSTRUCTION OF "LIGHTWELL" STEEL SASH

This construction, with its straight, neat lines, is assembled without crystallizing or straining the steel, and assures the strongest and most rigid joint

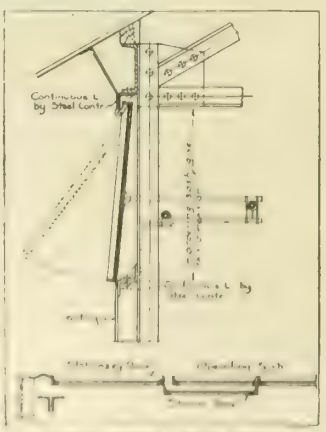
Advantages.

Strength and Rigidity — "Lightwell" Steel Sash is very strong and rigid, due to the superior construction of the interlocking of the muntins at the joints (see adjoining details), the method of making other intersections, and the use of solid low-carbon one-piece rolled steel sections.

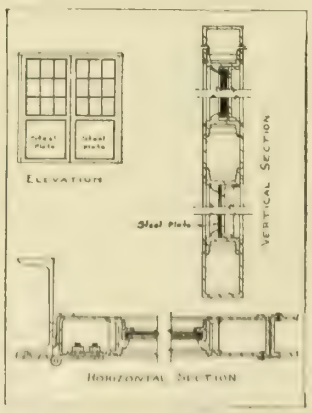
Weather Protection — "Lightwell" Steel Sash is as wind- and weather-proof at the union of the outside window sections with the building structure as the material into which they are built. All joints are weather-proof. All ventilators, when closed, are proof against driving rain,



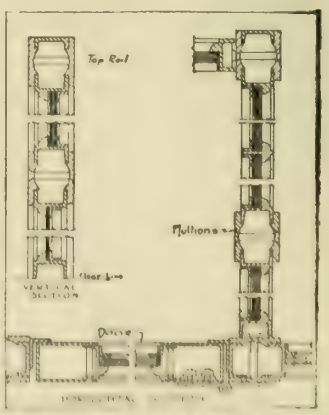
SIDEWALL SASH WITH TWO VENTS
Two-Piece Center Weather Vent



CONTINUOUS TOP HUNG SASH
Detail of Storm and Stationary Panel



"LIGHTWELL" STEEL DOORS
Detail Plan and Elevation



"LIGHTWELL" SOLID ROLLED STEEL PORTABLE PARTITIONS
Sectional Details

Continued on next page

drifting snow, and drafts, due to the flat *double contact* at top, bottom and sides.

Architectural Attractiveness—"Lightwell" sections, with rounded outside surfaces and the straight lines obtained by the rib of the vertical muntins, produce a steel sash that is pleasing to the eyes of the most critical.

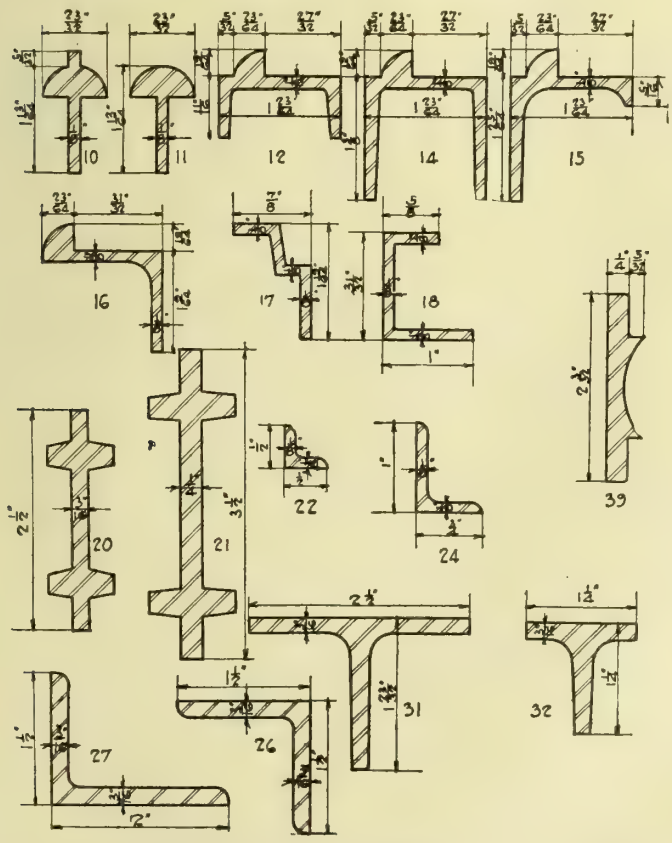
Ventilators.

"Lightwell" Ventilators are double-weathered on sides, top and bottom, and are permanent under all working conditions. The standard for vertical swinging ventilators is to pivot them above the center, although pivots can be placed at any point on the sides within three inches of the top or bottom. Pivots can also be placed so ventilators will swing horizontally. The special sections, No. 16 at the top, and No. 15 at the bottom of all ventilators, keep them in perfect alignment. The heavy concealed pivots are assembled with a three eighths inch bronze pin, and are strong, positive in action and weatherproof. They will allow the opening of the ventilators through an angle of ninety degrees if desired.

Unless otherwise specified all single ventilators, and the lower ventilators of two or more vents in the same sash unit, will be equipped with peg and stay, which holds the vents open at any angle, or securely locks them when closed. The stay consists of an angle section which folds against the sash when the vents are closed; all ventilators in the same sash unit are connected by two arms, one on each side, with peg and stay attached to the lower ventilator; thus the operation of the lower ventilator causes the simultaneous operation of those above it in the same unit.

Spring catches or gravity latches, instead of peg and stay, will be provided at small additional cost, to operate the ventilators with cord or chains. Those ventilators pivoted above center will automatically close in case of fire, when the chain contains a fusible link which melts at one hundred and fifty degrees.

When shipping sash with ventilators, the peg and stay are always attached. In double ventilators, or ventilators equipped with spring catch or gravity latch, the connecting arms are wired to the sash, while the spring catch or gravity latch are shipped in a separate box. This is due to the liability of their being broken in transit. They are adjusted to the vents, however, before shipping.



DETAILS SHOWING ALL STEEL MEMBERS USED ON "LIGHTWELL" STEEL SASH CONSTRUCTION

Glazing.

"Lightwell" Steel Sash are glazed either with glazing angles or with "Lightwell" glazing clips, although the former is not recommended. The clips are made of spring wire shaped to have a surface pressure against the glass of about one inch. They do not project from the muntins, and hence require a minimum of putty. They are quickly and easily inserted by means of an ordinary putty knife. They press the glass firmly against the back putty, and are elastic enough to take up the variations of the glass thickness.

Glass of all kinds can be used with "Lightwell." This Company will gladly furnish estimates on standard kinds of glass. Glass in ventilators coming to the edge of the vent must be trimmed seven eighths of an inch at the top, sides and sill.

Putty—"Lightwell" putty glazes easily and smoothly, adheres perfectly to both metal and glass, hardens evenly and uniformly throughout, and gives efficient and satisfactory results.

EXPLANATORY NOTES TO ADJOINING DETAILS

Section 10—Used as the interior vertical muntin bar in all "Lightwell" sash.

Section 11—Used as the interior horizontal muntin bar in all "Lightwell" sash.

Section 12—Used as an outside member at head, sill and jambs. Also at jambs occurring against sections 20 and 21, or when expandable plate mullions are used. Section 15 is recommended for outside framing.

Section 15—Used as outside member at head, sill and jambs except against mullions, other than a T-mullion, when section 12 should be used. Used at bottom of all ventilators. Note shape of section 15, which gives a broad face for weathering contact and a key to hold grouting when inserted in masonry walls. It also adds extra strength and stiffness to the sash.

Section 16—Used as the top bar of ventilators.

Section 17—Used as a special weathering section at the head of ventilators.

Section 18—Used as a weathering section at both jambs of ventilators, giving a two-point flat contact.

Section 20—Used as a mullion between units of sash.

Section 21—A heavier mullion section of exactly the same type as section 20.

Section 22—Used as a glazing angle. This method of glazing is not recommended except in partitions.

Section 24—Used at the bottom of ventilators for weathering. Also as the stay for ventilators.

Section 26—Used as the jamb member of "Lightwell" Continuous Sash whenever it is necessary to divide a long run or to join with the building structure.

Section 27—Used as the head member of "Lightwell" Continuous Sash. The hinges are attached to this section.

Section 31—Used at bottom of "Lightwell" Continuous Sash. Also as special mullion section, making a most serviceable mullion construction when used with section 15 at jambs.

Section 32—Used as the vertical muntin bar of "Lightwell" Continuous Sash.

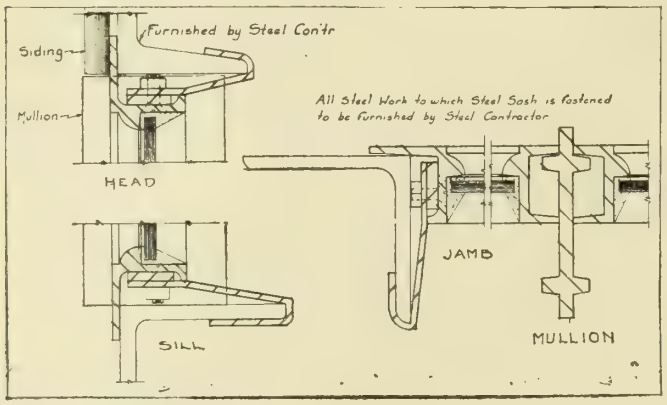
Section 39—Used in conjunction with section 12 as a mullion at jambs of sash units; also, in "Lightwell" partitions.

Continued on next page

Specification Notes.

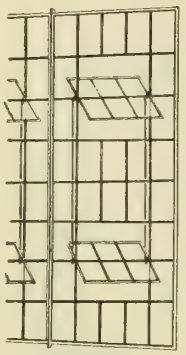
Handling and Stacking—"Lightwell" Steel Sash should always be stacked on edge on three or four pieces of lumber three by four inches, with strong uprights against which they may lean. Do not lay the sash flat or pile one on top of the other. The sash should be carefully inspected before placing in the opening, to be sure that they have not been bent or twisted during transportation or handling, as the sash leave the factory in perfect condition.

Erecting—All sills must be level and all jambs must be plumb. Block up the sash carefully, by placing blocks directly under the jamb and mullion to allow the frame to set perfectly plumb. Clearance should be left at the head and jamb to allow free operation of the ventilators. The lintels over the sash must carry the walls without deflecting or transmitting any portion of the load on the sash. All ventilators are wired to the sash and should not be loosened until the sash is completely set. When two or more ventilators occur in a sash, the connecting arms should be attached after the sash is set. All glass should be back puttied and have one eighth inch clearance on all sides, for it will split if too light. After glazing, the ventilators should be closed and left locked for a few days until the putty becomes fairly stiff.

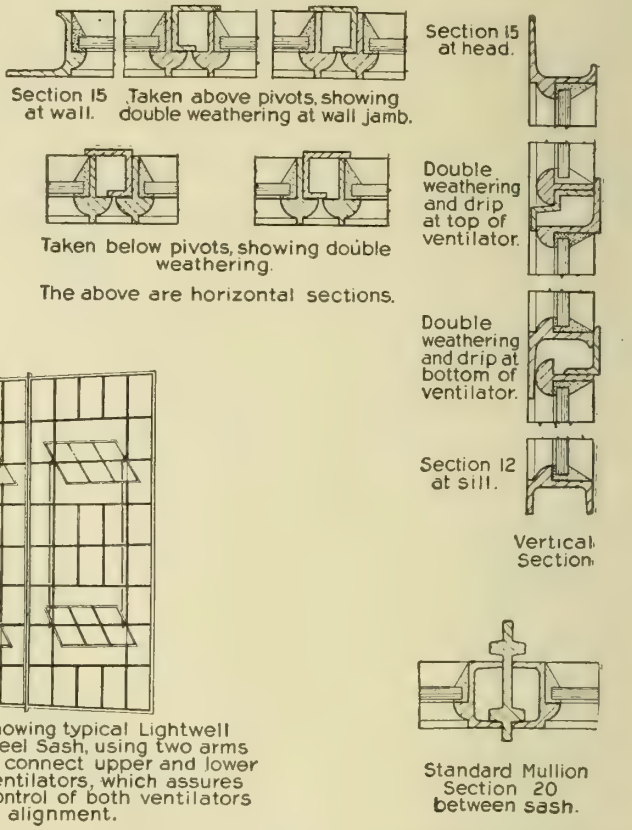


DETAIL SHOWING INSTALLATION OF SASH WITH STEEL FRAMING

Reduced reproduction of one of a set of Standard Detail Blue-print Sheets, showing types of construction to which "Lightwell" Steel Sash are adapted

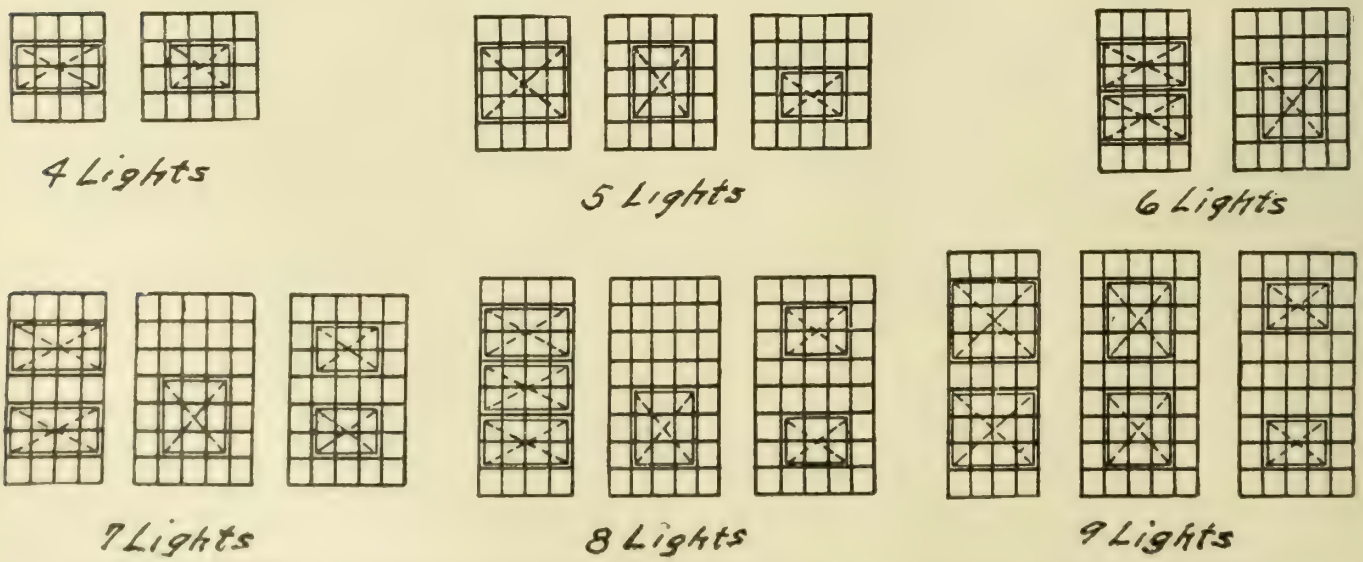


Showing typical Lightwell Steel Sash, using two arms to connect upper and lower ventilators, which assures control of both ventilators in alignment.



VENTILATOR SECTIONAL DETAILS OF "LIGHTWELL" STEEL SASH

One-fourth full size



DIAGRAMS SHOWING STANDARD ARRANGEMENTS OF VENTILATORS IN "LIGHTWELL" STEEL SASH UNITS

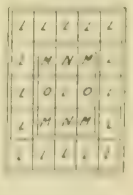
Location and size of ventilator should always be clearly stated when ordering

Explanation of Stock Numbers (See Details above)—Each pane size is indicated by a letter; the numerals following give a complete description of the sash.

L, 10" x 16"; I, 8" x 11"; M, 12" x 17"; N, 12" x 18"; NX, 13" x 19"; N, 14" x 20"; NX, 15" x 21"; O, 16" x 22"; OX, 17" x 23"; P, 18" x 24".

Example: In M 5191, "M" is 12" x 18" glass; first figure "5" is five panes wide; second figure "3" is two panes high; third figure "1" is number of ventilators; fourth figure "9" is number of panes in ventilator; fifth figure "1" is number of panes between sill and ventilator.

In adjoining illustration, panes marked "L" are all the same size in ventilated sash; panes marked "N" are ⅛" shorter and ⅛" narrower; panes marked "N" are ⅞" shorter; panes marked "O" are ⅛" narrower.



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Suggestions for Specifying "Lightwell" Steel Sash.

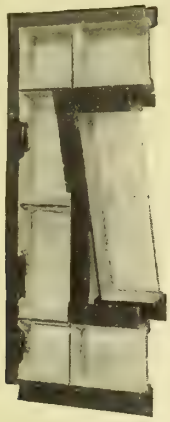
It is suggested for the sake of brevity that architects and engineers state in their specifications, after describing the various types to be used, the following:

"The steel sash in this building to be of the type manufactured by LIGHTWELL STEEL SASH COMPANY, delivered, erected, and left complete in accordance with the descriptions, standards of construction and specifications given on their pages in SWEET'S CATALOGUE, 1916 Architectural Edition."

Note—Specify as to putty and method of glazing, kind of glass, first coats of paint, etc.

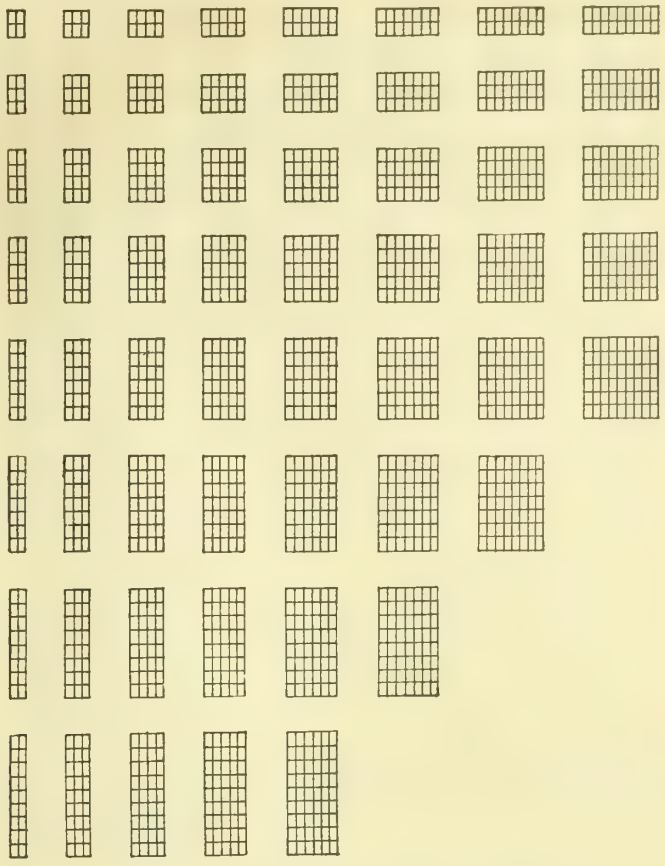
Blue-prints.

A set of blue-prints (see reduced sample reproduction on opposite page) showing typical applications of "Lightwell" Sash to concrete, brick, stone, terra cotta and steel constructions will be sent on request.



GLAZING CLIPS

The illustration introduces "Lightwell" glazing clips. The easy way in which these are applied and their strength and efficiency to maintain the glass in place make them a boon to the glazers.



STANDARD "LIGHTWELL" SASH UNITS
See Table below for Dimensions

TABLES GIVING WIDTHS AND HEIGHTS OF "LIGHTWELL" STEEL SASH

WIDTHS OF SASH UNITS

WIDTH OF LIGHT	1-SASH-2-LIGHTS WIDE			3-LIGHTS WIDE			4-LIGHTS WIDE			5-LIGHTS WIDE			6 LIGHTS WIDE			7-LIGHTS WIDE			8-LIGHTS WIDE		
	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15
10"	1-10"	1-11⅜	1-10⅝	2- 8⅜	2- 9¾	2- 9⅛	3- 6¾	3- 8⅛	3- 7⅞	4- 5⅛	4- 6½	4- 5⅝	5- 3½	5- 4⅞	5- 4⅜	6- 1⅞	6- 3¼	6- 2⅝	7- 0¼	7- 1⅝	7- 0⅛
10½	1-11"	2- 0⅜	1-11⅛	2- 9⅜	2-11¼	2-10⅜	3- 8¾	3-10⅜	3- 9⅞	4- 7⅜	4- 9	4- 8⅛	5- 6½	5- 7⅞	5- 7⅜	6- 5⅜	6- 6¾	6- 6⅛	7- 4¼	7- 5⅜	7- 4⅝
11	2- 0	2- 1⅜	2- 0⅛	2-11⅜	3- 0¾	3- 0⅛	3-10¾	4- 0⅛	3-11⅞	4-10⅛	4-11½	4-10⅝	5- 9½	5-10⅜	5-10⅞	6- 8⅜	6-10¼	6- 9⅜	7- 8¼	7- 9⅜	7- 8⅝
11½	2- 1	2- 2⅜	2- 1⅛	3- 0⅜	3- 2¼	3- 1⅛	4- 0¾	4- 2⅛	4- 1⅞	5- 0⅜	5- 2	5- 1⅛	6- 0½	6- 1⅞	6- 1⅜	7- 0⅜	7- 1¾	7- 1⅛	8- 0¼	8- 1⅜	8- 0⅝
12	2- 2	2- 3⅜	2- 2⅛	3- 2⅜	3- 3¾	3- 3⅛	4- 2¾	4- 4⅛	4- 3⅞	5- 3⅜	5- 4½	5- 3⅛	6- 3½	6- 4⅞	6- 4⅜	7- 3⅜	7- 5¼	7- 4⅛	8- 4¼	8- 5⅜	8- 4⅝
12½	2- 3	2- 4⅜	2- 3⅛	3- 3⅜	3- 5¼	3- 4⅛	4- 4¾	4- 6⅛	4- 5⅞	5- 5⅜	5- 7	5- 6⅛	6- 6½	6- 7⅞	6- 7⅜	7- 7⅜	7- 8¾	7- 8⅛	8- 8¼	8- 9⅜	8- 8⅝
13	2- 4	2- 5⅜	2- 4⅛	3- 5⅜	3- 6¾	3- 6⅛	4- 6¾	4- 8⅛	4- 7⅞	5- 8⅜	5- 9½	5- 8⅛	6- 9½	6-10⅞	6-10⅜	7-10⅞	8- 0¼	7-11⅛	9- 0¼	9- 1⅜	9- 0⅝
13½	2- 5	2- 6⅜	2- 5⅛	3- 6⅜	3- 8¼	3- 7⅛	4- 8¾	4-10⅛	4- 9⅞	5-10⅜	6- 0	5-11⅛	7- 0½	7- 1⅞	7- 1⅜	8- 2⅜	8- 3¾	8- 3⅛	9- 4¼	9- 5⅜	9- 4⅝
14	2- 6	2- 7⅜	2- 6⅛	3- 8⅜	3- 9¾	3- 9⅛	4-10¾	5- 0⅛	4-11⅞	6- 1⅜	6- 2½	6- 1⅛	7- 3½	7- 4⅞	7- 4⅜	8- 5⅜	8- 7¼	8- 6⅛	9- 8¼	9- 9⅜	9- 8⅝

HEIGHTS OF SASH UNITS

HEIGHT OF LIGHT	1-SASH 2-LIGHTS HIGH			3-LIGHTS HIGH			4-LIGHTS HIGH			5-LIGHTS HIGH			6-LIGHTS HIGH			7-LIGHTS HIGH			8 LIGHTS HIGH		
	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15	12	15	12-15
16	2-10"	2-11⅜	2-10⅝	4- 2⅜	4- 3¾	4- 3⅛	5- 6¾	5- 8⅛	5- 7⅞	6-11⅛	7- 0½	6-11⅝	8- 3½	8- 4⅞	8- 4⅜	9- 7⅜	9- 9¼	9- 8⅛	11- 0¼	11- 1⅝	11- 0⅛
16½	2-11	3- 0⅜	2-11⅛	4- 3⅜	4- 5¼	4- 4⅛	5- 8¾	5-10⅛	5- 9⅞	7- 1⅜	7- 3	7- 2⅛	8- 6½	8- 7⅞	8- 7⅜	9-11⅜	10- 0¾	10- 0⅛	11- 4¼	11- 5⅜	11- 4⅝
17	3- 0	3- 1⅜	3- 0⅛	4- 5⅜	4- 6¾	4- 6⅛	5-10¾	6- 0⅛	5-11⅞	7- 4⅜	7- 5½	7- 4⅛	8- 9½	8-10⅞	8-10⅜	10- 2⅜	10- 4¼	10- 3⅛	11- 8¼	11- 9⅜	11- 8⅝
17½	3- 1	3- 2⅜	3- 1⅛	4- 6⅜	4- 8¼	4- 7⅛	6- 0¾	6- 2⅛	6- 1⅞	7- 6⅜	7- 8	7- 7⅛	9- 0½	9- 1⅞	9- 1⅜	10- 6⅜	10- 7¾	10- 7⅛	12- 0¼	12- 1⅜	12- 0⅝
18	3- 2	3- 3⅜	3- 2⅛	4- 8⅜	4- 9¾	4- 9⅛	6- 2¾	6- 4⅛	6- 3⅞	7- 9⅜	7-10½	7- 9⅛	9- 3½	9- 4⅞	9- 4⅜	10- 9⅜	10-11¼	10-10⅝	12- 4¼	12- 5⅜	12- 4⅝
18½	3- 3	3- 4⅜	3- 3⅛	4- 9⅜	4-11¼	4-10⅝	6- 4¾	6- 6⅛	6- 5⅞	7-11⅜	8- 1	8- 0⅛	9- 6½	9- 7⅞	9- 7⅜	11- 1⅜	11- 2¾	11- 2⅛	12- 8¼	12- 9⅜	12- 8⅝
19	3- 4	3- 5⅜	3- 4⅛	4-11⅜	5- 0¾	5- 0⅛	6- 6¾	6- 8⅛	6- 7⅞	8- 2⅜	8- 3½	8- 2⅛	9- 9½	9-10⅞	9-10⅜	11- 4⅜	11- 6¼	11- 5⅛	13- 0¼	13- 1⅜	13- 0⅝
19½	3- 5	3- 6⅜	3- 5⅛	5- 0⅜	5- 2¼	5- 1⅛	6- 8¾	6-10⅛	6- 9⅞	8- 4⅜	8- 6	8- 5⅛	10- 0½	10- 1⅞	10- 1⅜	11- 8⅜	11- 9¾	11- 9⅛	13- 4¼	13- 5⅜	13- 4⅝
20	3- 6	3- 7⅜	3- 6⅛	5- 2⅜	5- 3¾	5- 3⅛	6-10¾	7- 0⅛	6-11⅞	8- 7⅜	8- 8½	8- 7⅛	10- 3½	10- 4⅞	10- 4⅜	11-11⅜	12- 1¼	12- 0⅛	13- 8¼	13- 9⅜	13- 8⅝

The dimensions of widths and heights given under the headings Section 12 are based on this section being used at both head and sill. Under the heading Section 15 the measuring points are based on the similar use of Section 15. The headings Section 12 to 15 refer to the use of one of these sections at the head and one at the sill, or No. 15 at the jamb and 12 at the mullion

For standard mullion Sections 20 and 21 add 3/16 inch. The mullion is used against frame member Section 12. For Tee Mullion Section 31 add ½ inch. This mullion is used only with Section 15 as the frame member. 10" x 16", 12" x 18" and 14" x 20" sash are stock sizes

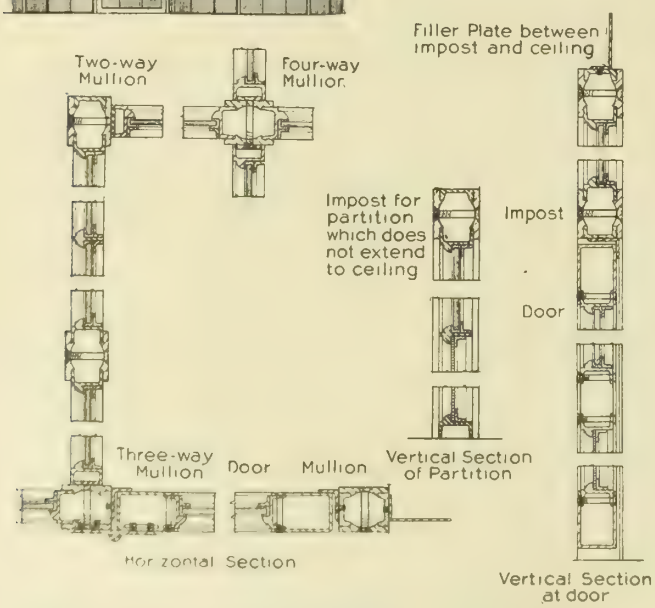
Continued on next page

"Lightwell" Solid Rolled Steel Partitions.

These partitions are strong and rigid in construction, neat and attractive in appearance, provide fireproof and permanent equipment at very low first cost, and are ideal for subdividing large floor areas into small offices, shipping rooms, time offices, etc., in office buildings, factories and stores.

They are constructed in units, which can be easily assembled at the place of installation by means of mullions and bolts. The units have steel plates in the lower parts, and glass in the upper part. This style of construction makes it possible to easily rearrange offices, stock rooms, etc., if desired, by taking down certain units and re-erecting them at some other point to meet the requirements of changed conditions from time to time. It also permits the introduction of additional units whenever required.

Partitions are one and three eighth inches thick, thus taking up practically no floor space. They are made in heights of eight, ten and twelve feet. The units should not be more than five feet, six inches in width. They are securely fastened to the floor by heavy malleable castings inserted between the mullions at the side of each unit.



TYPICAL ELEVATION AND DETAILS OF "LIGHTWELL" ROLLED STEEL PARTITIONS

"Lightwell" Continuous Sash.

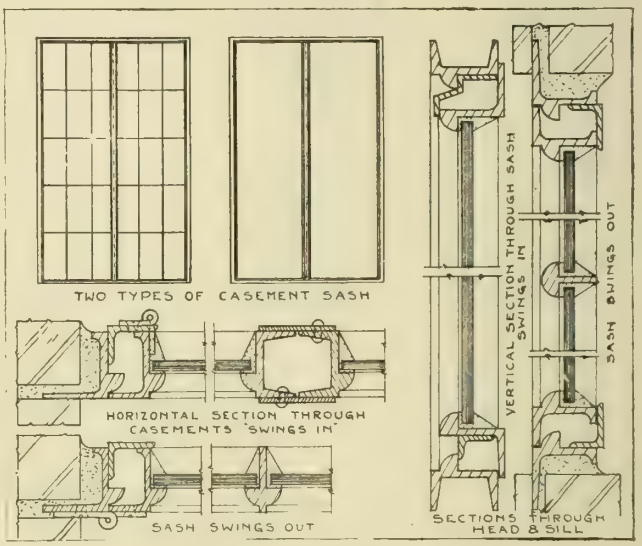
This sash can be used in sawtooth and monitor roof construction, running the entire length of the building, and can be easily operated by means of mechanical operating devices. It consists of two types, center pivoted and top hung.

Its members are solid rolled steel sections, which are accurately framed and fitted, and then oxy-acetylene welded at joints. This insures maximum strength and rigidity. They are made in panels twenty feet long and in heights of three, four, five and six feet. Vertical muntins are placed on two-foot centers.

Center-pivoted can be opened so as to give full one hundred per cent ventilation. This type does not allow the pocketing of obnoxious gases under the roof. Being balanced in the center, they are easily operated. Heavy malleable iron pivots with bronze pins are used with both the center-pivoted and top-hung types.

"Lightwell" Steel Doors.

They are either of the swinging or sliding type, and have the same general appearance as the partition, the steel plates being of the same height and glass panes corresponding. The swinging doors are hung to the frame with heavy steel butts, and equipped with standard locks and hardware. If other butts, locks or hardware are desired, these should be specified. The sliding doors include the necessary track, trolley, door pull, and other equipment. Doors of large area give best satisfaction when of the sliding type. All doors are welded at the corners, and are thus strong and most rigid.



DETAILS OF CASEMENT SASH

Service and Equipment.

Our well-equipped factory, located three miles south of Wilmington, Del., on the Philadelphia, Baltimore & Washington Railroad, main line between Philadelphia and Baltimore, enables us to guarantee prompt deliveries. We are prepared to contract for and execute orders of any magnitude. Our Engineering Department is composed of such competent men as to insure a uniform product, and is prepared to submit plans and specifications or estimates on plans submitted to them.

A FEW REPRESENTATIVE "LIGHTWELL" INSTALLATIONS

Joseph Bancroft & Sons Co., Wilmington, Del.
Benzol Products Co., Marcus Hook, Pa.
Smith, Drum & Co., Philadelphia, Pa.
General Chemical Co., Easton, Pa.
Philadelphia & Reading R.R., Philadelphia, Pa.
Pennsylvania R. R., Philadelphia, Pa.
Bethlehem Steel Co., Saucon, Pa.
Tennessee Coal, Iron & Railway Co., Birmingham, Ala.
Liberty Baking Co., Pittsburgh, Pa.
Harlan & Hollingsworth, Wilmington, Del.
Krebs Pigment Chemical Co., Newport, Del.
Poole Engineering Co., Woodberry, Md.
Hess-Bright Mfg. Co., Philadelphia, Pa.
Thurmoid Rubber Co., Trenton, N. J.
Fred G. Hodges, Reading, Pa.
Traymore Hotel, Atlantic City, N. J.
Cleveland White Metal Co., Cleveland, Ohio.
U. S. Government, Philadelphia, Pa.
United Gas Improvement Co., Philadelphia, Pa.
Wier Stove Co., Taunton, Mass.

DAVID LUPTON'S SONS CO.

Daylight and Ventilation for Buildings

Allegheny Avenue and Tulip Street

PHILADELPHIA, PA.

SALES OFFICES

CHICAGO, ILL., David Lupton's Sons Co., 743 Insurance Exchange Building
NEW YORK, N. Y., David Lupton's Sons Co., 50 Church Street
CLEVELAND, OHIO, David Lupton's Sons Co., 906 Swetland Building
BALTIMORE, MD., Walter S. Brauns, Munsey Building
BOSTON, MASS., David Lupton's Sons Co.
PITTSBURGH, PA., David Lupton's Sons Co., 1415 Oliver Building
DETROIT, MICH., Malcomb J. McLeod, Majestic Building
DENVER, COLO., Geo. P. Heinz & Co., Chamber of Commerce Building

Products.

Lupton Steel Sash, in Various Types, for Side Walls; Lupton Steel Partitions and Doors; Pond Continuous Sash for Monitor and Sawtooth Construction; Pond Operating Device, for Long Lines of Sash and Louvers; Pond Patented Roof Truss; Lupton Rolled Steel Skylights; Lupton Standard Fireproof Hollow Metal Windows, with Underwriters' Laboratories Labels; Waldmire Louvers and Siding.

Appliances for Greenhouse Ventilation; Sash Gearing; Ventilators; Architectural Sheet Metal Work; Ornamental Stamped Work; Conductor Pipe, Eaves-Trough, Elbows and Shoes; Light Structural Steel.

Facilities.

Plant covers 323,400 square feet ground area; equipped with latest machinery; railroad sidings facilitate shipment.

Lupton Service.

We maintain a Service Department for the purpose of giving authoritative information concerning all problems of daylighting and natural ventilation for buildings of any kind. You are invited to avail yourselves freely of this department, the value of which is based on our experience of more than forty years as recognized experts in lighting and ventilation. We will prepare, without charge, comprehensive drawings showing the most effective roof formations, best types of sash for roofs and side wall openings, their proper areas and location, for buildings of any size and for any purpose. Best results may be obtained if we are consulted when preliminary sketches are being made.

Lupton Catalogue.

The Lupton Catalogue is a valuable handbook on effective methods of lighting and ventilating modern buildings. The catalogue shows what Lupton service, co-operating with prominent architects and engineers, has accomplished in many of the most notable manufacturing plants in the country, in fine monumental buildings and in smaller buildings of many kinds. The catalogue also illustrates and describes the complete line of Lupton products, giving working details of each product, the several Pond truss roof designs in detail and installation, and other interesting roof formations designed by Lupton Service.

Every architect and builder should have a copy of the current edition of the Lupton Catalogue.

Investment Value.

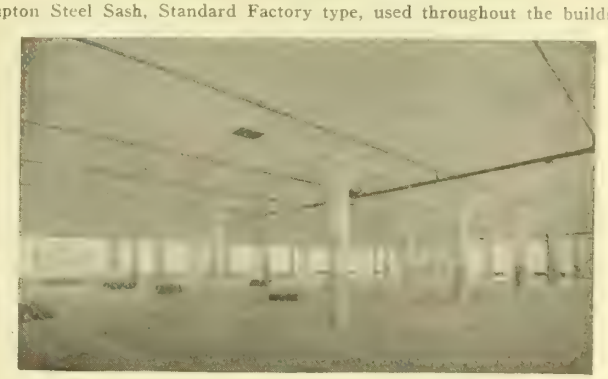
Each Lupton product, by reason of the strength and integrity of its parts and construction, its highly finished detail, its practicability of purpose and simplicity of use, is accepted as the standard of its kind. Lupton products are sold solely on a basis of their demonstrable efficiency in use and economy of maintenance, and the investment represented by their higher first cost is always economy.

Lupton Steel Sash.

Lupton Steel Sash are made in a wide variety of types, all of which are fully described and illustrated in the Lupton Catalogue. Members used in all types are solid one-piece rolled steel sections of suitable weight and shape—no built-up sections or underweight solid sections are used in any Lupton sash.

Standard Factory Type (Patented and Patents Pending)—Joints at intersections of mutins are formed to preserve the strength of members and to prevent corrosion. Ventilators are constructed with a permanently tight double weathering. (See Lupton

SNELLENBURG BUILDING, PHILADELPHIA
Lupton Steel Sash, Standard Factory type, used throughout the building



SNELLENBURG BUILDING, PHILADELPHIA
View of one of the floors

Continued on next page

Catalogue for complete information, tables of sizes, details of construction and of wall connections, etc.)

Packard Type—An economical sash where more attention to design is wanted than is given by factory type.

Projected Ventilator Type for Hospitals—Ventilators swing in from top and operate by arms moving in grooves at sides. No stays or operators are required. Screens may be applied outside and shades hung inside. Free circulation of air is supplied without drafts.

Power-House Type (Patented and Patents Pending)—Lines harmonize with massive effect of well designed power-house. Frames of heavy steel plate; sash are welded. Made for openings of any size; square, semi-circular or segment heads.

MISSISSIPPI RIVER POWER CO., KEOKUK, IOWA
Lupton Steel Sash Power-House type

Counterbalanced Type (Patents Pending)—Lupton Steel Sash, Counterbalanced Type, increases ventilating area. Heavy construction, adaptability of shades and superior workmanship are the essential features of Lupton counterbalanced sash. Window cleaning is also simplified.

For opening over 12 feet, these sash are made three sash high; under 12 feet, two sash high.

As the name implies these sash are exactly counterbalanced. In the case of the two sash high, when the lower sash is raised or lowered, the upper sash is lowered or raised in exact proportion and in direct alignment. A fifty per cent ventilating area is maintained at all times, the current of air coming in the lower part of the opening, and the impure air of the room forced out in the upper part.

The sash members of this type of window are made of heavy one-piece rolled steel sections, welded together by the oxy-acetylene process. The jamb and mullion sections are made of heavy rolled steel members. When work benches are desired near the windows, wind shields may be used to afford ample protection for the workmen.

GENERAL ELECTRIC CO., ERIE WORKS, ERIE, PA.
Lupton Steel Sash Counterbalanced type used in side walls, and Pond Continuous Sash used in sawtooth roof

OTIS STEEL CO. 14TH STREET PLANT, CLEVELAND, OHIO
Lupton Steel Sash Counterbalanced type, 15,000 square feet in side walls. Pond Continuous Sash, 50,000 square feet in warehouse monitors and in both side walls and monitors throughout mill

Counterweighted Type (Patent Pending)—Lupton Steel Sash, Counterweighted Type, is particularly suitable for fine office and public buildings. All joints are assembled by oxy-acetylene welding.

Sash members are made of solid one-piece rolled steel sections welded together by the oxy-acetylene process. The weight boxes are made of No. 14-gauge sheet steel plate bent to receive the solid rolled steel jamb section. A rolled bronze weather-strip fastened to the jamb section insures absolutely weatherproof conditions and greatly facilitates the sliding of the sash. The head and sill members are made of No. 12-gauge sheet steel plate bent to form a perfect weather-contact with the sash members.

Wind shields are furnished, when specified.

GENERAL ELECTRIC CO. LABORATORY BUILDING NO. 5, SCHENECTADY, N. Y.
There are 48,000 square feet Lupton Steel Sash Counterweighted type in this building

Lupton Steel Partition (Patents Pending).

Partition units are made of heavy rolled steel sections strongly assembled and carefully finished. Units are set between mullions and imposts made of heavy plate steel. All parts are interchangeable; entire partition can be taken down and re-erected without re-

Continued on next page

moving glass. Lupton steel partitions have strength and rigidity for use in factory buildings combined with attractiveness, which makes them suitable for fine office divisions.

GENERAL VEHICLE CO., LONG ISLAND CITY, N. Y.
Lupton Steel Partitions and Lupton Steel Tube Doors used throughout all offices

Lupton Steel Tube Doors.

Constructed of seamless rectangular steel tube mitered and welded at joints; made in any size and for any purpose.

Pond Continuous Sash (Patented by Clarke P. Pond and Patents Pending).

A weatherproof sash which opens continuously, forming a weather-sealed area of glass and steel. Members are solid rolled steel sections of weight and shape to give necessary strength; welded at all points of assembly; *used in monitor and saw-tooth construction and in side walls positively weather-tight when open.* It is controlled by Pond operating device.

Pond Operating Device (Patented by Clarke P. Pond and Patents Pending).

Controls by tension transmission without loss of power from friction or torsion. Worm and segment gears are machine cut from solid steel, cased, and immersed in oil; hot headed steel rods with malleable barrel couplings; phosphor bronze hinged connections; power is applied by compound levers, of designs adapted to different types of sash, so that leverage always increases with load.

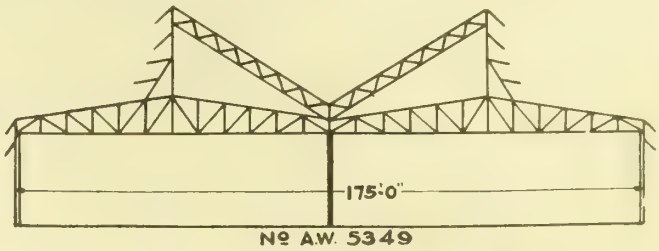
Motor-Driven Type—Special high-starting torque motor enclosed in dustproof case; automatic cut-out limits operation of sash in both directions and stops gears without strain on device.

Pond Operating Device, hand operated or motor driven, solves all problems in control of long or intricate lines of sash.

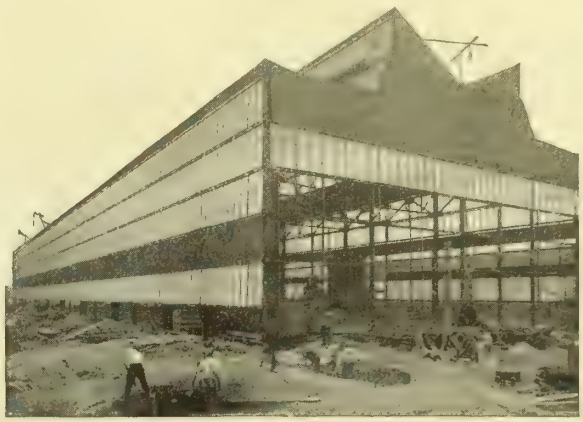
HYDRAULIC PRESSED STEEL CO. FORGE SHOP, CLEVELAND
Pond Truss. All sash in roof and side walls is No. 6 Pond Continuous Sash, controlled by Pond Operating Device

Pond Truss, Foundry and Forge Shop Type of Sash (Patented by Clarke P. Pond).

Pond Truss provides roof areas of such sizes and slopes and in such location as to deflect gases and heat toward sash, preventing down-drafts and all reversed currents of air when sash are open. Sash is so located as to introduce light in the early and late parts of the day and to avoid direct rays of sun at mid-day.



SECTIONAL VIEW OF POND TRUSS ON BUILDING 175 FEET WIDE



HYDRAULIC PRESSED STEEL CO. FORGE SHOP, CLEVELAND
Exterior View

Pond Truss, Glass Furnace Type of Sash (Patented by Clarke P. Pond).

Pond Truss monitor sash over glass furnaces provides building with circulation of fresh, cool air at all times.

Pond Truss, Power-House Type of Sash (Patents Pending by Clarke P. Pond).

Introduces daylight and fresh air to firing alleys and discharges gases outside of building. Truss is adapted to power-houses of any size.

Lupton Rolled Steel Skylight (Patented by Joah Brogden).

U-shaped double lipped one eighth-inch rolled steel bar; glass held between strands of saturated oakum which prevents breakage; caps 16-ounce copper held by malleable iron studs and brass dome nuts. Parts exposed to weather are non-corroding metals, copper and brass. Adapted to any type of skylight construction.

Lupton Sheet Metal Fireproof Window.

Made of heavy bronze, copper, or galvanized Keystone metal; complies with every requirement of National Board of Fire Underwriters.

Waldmire Louvers (Patented).

Made with continuous slats lapped at joints; no parts are soldered. Can be erected by ordinary mechanics, no metal worker's tools being necessary.

THE MOESCHL-EDWARDS CORRUGATING CO., INC.

Manufacturers of Sheet Metal Building Material

COVINGTON, KY.

Products.

"Mecco" Fireproof Metal Windows.
"Mecco" Fireproof Doors.
"Mecco" Metal Spanish Tile.
"Mecco" Pancoast Ventilators.

Also, Metal Ceilings, Cornices, Skylights, Columns, Culverts, Finials, Garages, Gutter, Metal Lath, Marquise, Shingles (Tin, Galvanized or Copper), Shutters, Roofing and Siding (Painted and Galvanized), Corrugated Sheets (Painted and Galvanized).

Description of "Mecco" Fireproof Metal Windows.

The "Mecco" double-hung window is made entirely of stamped sheet metal and wire glass, and is so designed that the parts which are admitted to be weakest in the ordinary metal window are in reality the strongest and safest part of the "Mecco" device.

Adjustable Feature.

With our adjustable device the sash can be easily raised or lowered and made to fit perfectly between the jambs at all times and under all conditions. The track or guide for sash is continuous. There are no joints or weight pocket covers to bind or obstruct the smooth and noiseless operation of sash. The adjustment is made with a screwdriver.

The meeting rails of the "Mecco" windows are designed with deep interlocking tongues and grooves on both upper and lower part of rail. These are strengthened with No. 16-gauge reinforcements riveted to each rail with air space between the two locks so that it is impossible for draught or fire to come through.

Underwriters' Approval.

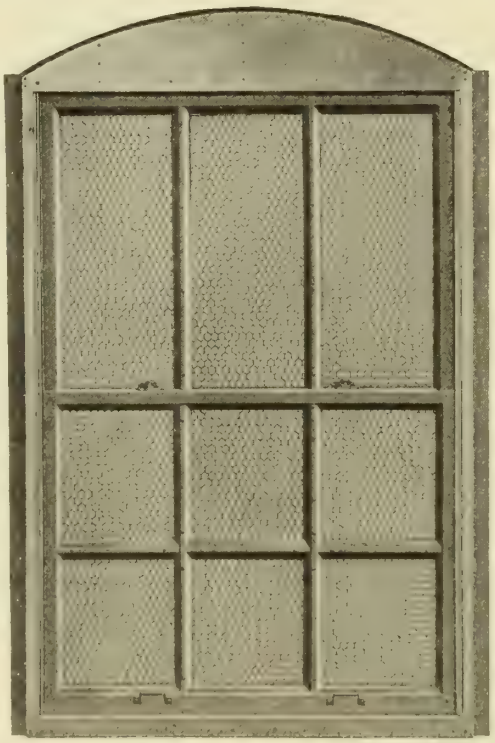
"Mecco" fireproof metal windows and doors are fully approved by Underwriters and bear their label.

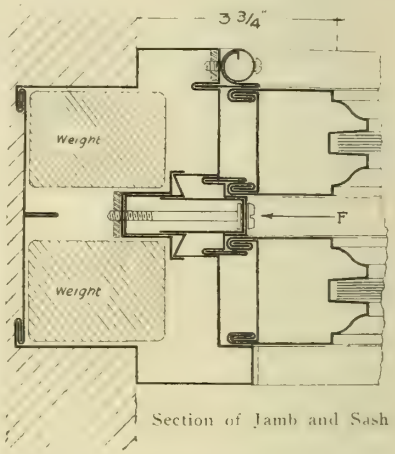
Other Styles of Fireproof Windows.

This Company manufactures fireproof windows in every style for buildings where fire and burglar protection is required.

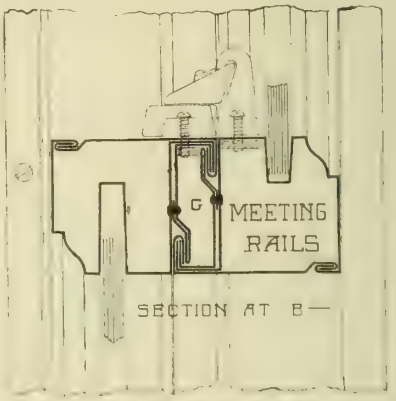
Estimate Information.

To estimate on windows, give number and sizes of wall openings, style of window and glass; whether square or segment head and number of lights wanted in each opening.





Section of Jamb and Sash



Section of Patented Meeting Rails

"MECCO" ADJUSTABLE FIREPROOF METAL WINDOWS

"Mecco" Pancoast Ventilators.

The "Mecco" Pancoast is a scientifically and substantially constructed ventilator, effective in deflecting downward currents of air and rain, without materially interfering with the free egress of air from the interior. It is always effective when the wind blows and will not choke in a calm.

The "Mecco" Pancoast has an arrangement of flat surfaces of such shape, and in such relation to one another, that they provide positive barriers to [illegible] would [illegible] en-

trance into the common ventilator. This same arrangement of surfaces also causes strong outward currents which exhaust air and smoke from the neck of ventilator, dividing and discharging same through channels which offer the least possible resistance, thus affording the best and quickest exit.

Details, full information and prices will be gladly given on request.

"Mecco" Metal Spanish Tile.

This Company manufactures two different constructions of Spanish tile. Individual tile with lock joint, and cluster tile made in sheets containing eight and ten tile. Both styles are made from painted tin, painted galvanized iron, painted steel and copper.

Full information and samples given on request.

McFARLAND-HYDE COMPANY

SUCCESSORS TO J. C. McFARLAND & CO.

Art Metal Fire Doors and Trim, Metallic Windows and Puttyless Skylights

27th Street and Fifth Avenue

CHICAGO, ILL.

Products.

Manufacturers of all kinds of FIREPROOF METAL WINDOWS, HOLLOW METAL and ROLLED STEEL; ART METAL FIREPROOF DOORS and TRIM; "NONPAREIL" PUTTYLESS SKYLIGHTS; "WILSON REVERSO" ONE-PLANE REVERSIBLE WINDOW.

Also, SHEET METAL WORK; SLATE and TILE ROOFING.

Fireproof Hollow Metal Windows.

We make Metal Windows in all styles, Double-Hung, Pivoted, Casement Hinged, Reversible, etc. Equipped with the Underwriters' Laboratory label.

Metal Doors and Trim.

We make Art Metal Doors for corridors and stairways; also Trim and Partition Work. Our doors bear the Underwriters' Laboratory label of approval.

Construction—Our door is made of furniture steel, each piece interlocked in a manner which prevents any portion of the door coming apart, after which it is welded and made perfectly rigid, positively the strongest door on the market.

Our special steel formed buck is made to allow for adjustment and is anchored to masonry with special adjustable anchors, thus allowing the jambs to be set perfectly true and plumb after the plastering, no wood of any description being used.

Finish—Doors finished with the baked enamel process, grained to imitate any kind of wood or any of the metal finishes.

Hardware.

Triple lock is made of malleable iron; constructed to slip in through top of door, all concealed except bolts. For single or double doors, with door checks, self-closing and automatic locking without use of springs. For double doors there is an interference device which prevents wrong door closing first. Operated with regular knobs from either side. Can be provided with cylinder locks to operate from outside.

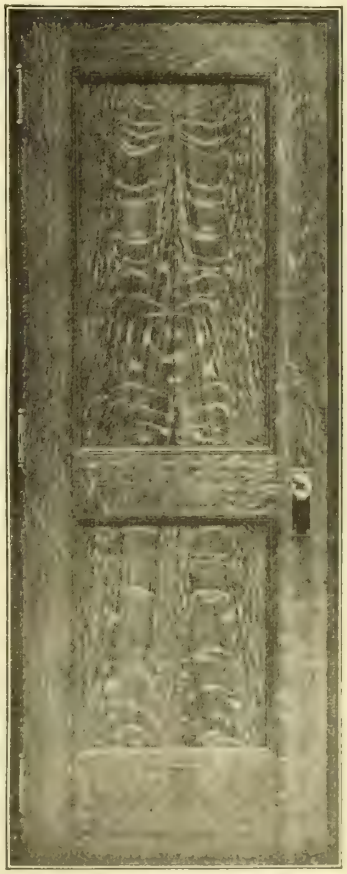
Can be applied to other makes of hollow steel doors. Approved by Underwriters' Laboratories.

When sending list of windows, indicate every frame, whether sash are to be sliding, pivoted, hinged, stationary or reversible.

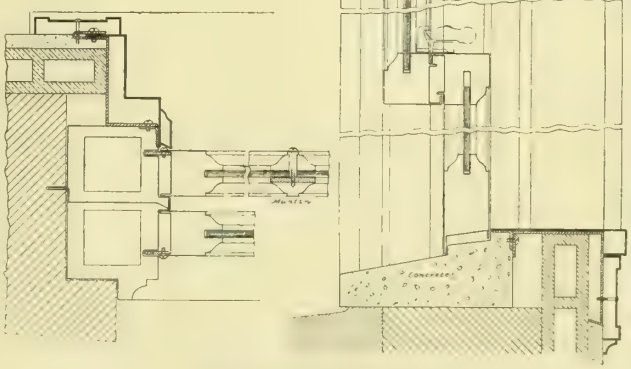
"Nonpareil" Puttyless Skylights.

The "Nonpareil" (patented) is adaptable to any kind of light, or place where a skylight is required. This includes the so-called shingle pattern, also style where lapped glass may be desired.

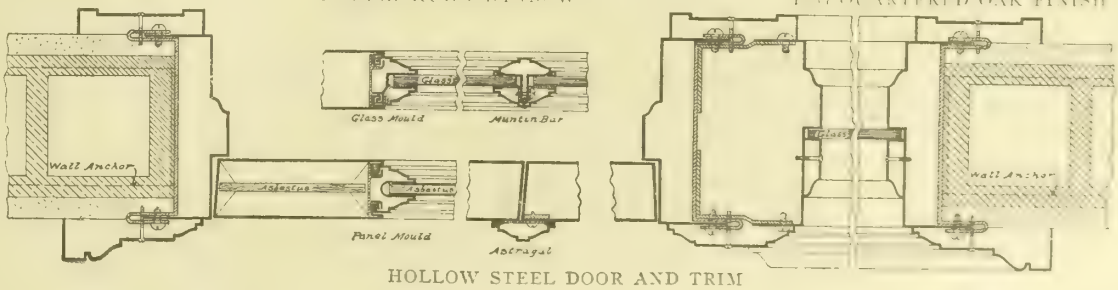
Advantages—Referring to the diagram of details you will notice the bar is made of two parts, the lower forming a stem or core; this part takes the burden of the weight of glass, etc. It can be made of any gauge of metal from No. 22 to No. 10, according to span, and will, with the top member or glass rest, when in place and riveted to same, span the open space be-



HOLLOW STEEL DOOR SHOWING QUARTERED OAK FINISH

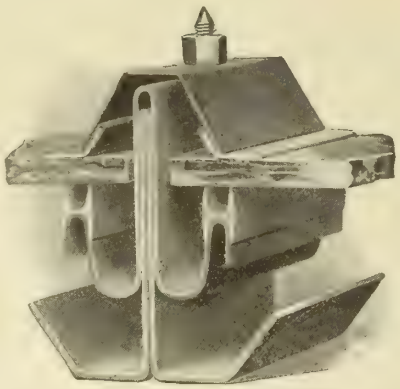


DOUBLE HUNG WINDOW

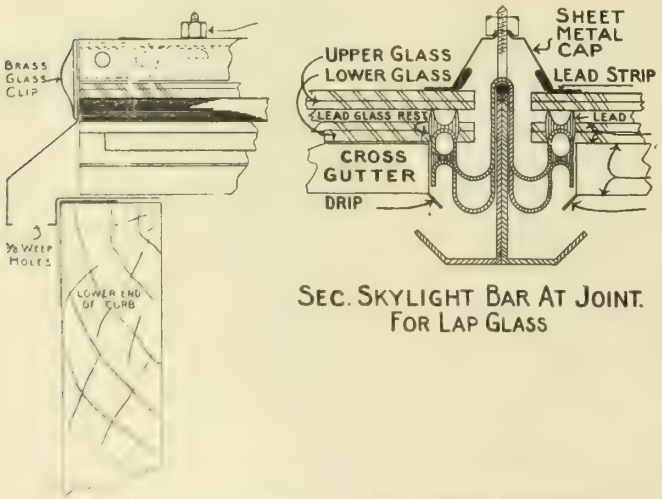


HOLLOW STEEL DOOR AND TRIM

tween purlins for any required distance of ten, twelve, fifteen feet or more without other support. The upper bar at each side forms a gutter for water which may possibly get in at side of glass. (The gutter is continuous from ridge to eaves.) This upper bar at same time provides a foundation for our "H" lead strip or glass rest. Our lead glazing strip in the shape of the letter "H" is a new idea. It is formed through a die. The parts projecting against the glass are drawn to a thin, almost knife-like edge. The edge is made thin so that the glass, with its uneven surfaces, will embed itself and find its proper level for its entire length and thus prevent breakage. We desire to call your particular attention to the air space between the two upturned edges. This is a bar and sure preventive for water or condensation passing this point. It unfailingly must drop into the upper or lower gutter. Our cap is made of any desired metal, with projecting flanges of lead so that the outer edges will press down into the uneven surfaces of the glass and prevent water passing under. The nut on our bolt, for holding cap in position, is made cup shape on under side to cover a reverse rise in the copper, fitting tightly around the bolt to prevent any inflow of water at this point.



SKYLIGHT BAR SECTION



SEC. SKYLIGHT BAR AT JOINT. FOR LAP GLASS

DETAILS OF "NONPAREIL" PUTTYLESS SKYLIGHT

Experience.

We have been in the business continuously since 1870 and have skylights in all parts of the United States and on the best class of buildings. From this long and varied experience we make the statement that the skylight here presented provides longevity and the best protection against leaks and broken glass which has been placed on the market. It is not the cheapest (we manufacture other styles) at first cost, but the freedom from repairs, and other skylight troubles, will make it so in the end. Will guarantee a perfect installation or no pay.

The "Wilson Reverso" Window.

Description—This is a one-plane window, each sash being supported on special hardware, which makes the sash self-balanced and each sash independent of the other; can be arranged for one, two, three or more sash, each above the other and in the same plane.

POWERS BUILDING, DECATUR, ILL.
Equipped with Wilson Reverso Windows-Wood

Operation—By merely releasing the fastener at the sill each sash can be operated by an outward push and will remain in whatever position it is placed. The hardware is so located that, by pushing the sash out, it will make a complete reverse and come up against the stop with the outside of sash on the inside of the room, making a complete reversible sash.

Hardware—All parts of the operating hardware is made of cold-drawn steel galvanized, and all bearing and pivot points brass to prevent rusting. This hardware is equally applicable to wood, hollow metal or rolled steel and does away with the necessity of weights, chains or pulleys, eliminating their numerous troubles.

Advantages—

Ventilation: We wish to emphasize the effective ventilation secured without drafts, and the insurance of any desired amount of fresh air from one to one hundred per cent.

Cleaning: As each sash makes a complete revolution all of the glass can be cleaned from the inside of the building, and during the operation of cleaning the window opening is entirely closed leaving no opening for incoming storm or the blowing of papers from desks. This operation also allows all reglazing to be done from the inside of the building and without removing the sash.

Awning: By placing a shade on each sash, when the sash are open they will act as ideal awnings, shutting out the hot rays of the sun, but allowing the cool breezes to enter below the shade, and permitting the use of space close to windows. This also gives the advantage of light and ventilation which cannot be obtained from the old type window.

Weather-stripping: There is no window made that can be so easily, effectively and inexpensively weather-stripped as the "Wilson Reverso," either in wood or metal.

Continued on next page

Screens: This window can be thoroughly screened on the inside, no portion of the sash projects inside of stop line to interfere with screens, shades or drapery.

Storm-proof: During storm the sash can be open to allow a certain amount of ventilation, but it will not admit storm or rain to wet sill, floor or drapery. An ideal window for schools, hospitals, sleeping porches, etc.

Burglar-proof: The operation of closing this window is such that the top sash projects up into the head, and at the meeting rail the sash interlock. When the sash-lock at the sill is fastened, it is impossible to open the window from the outside without breaking the glass; thus making it absolutely burglar-proof.

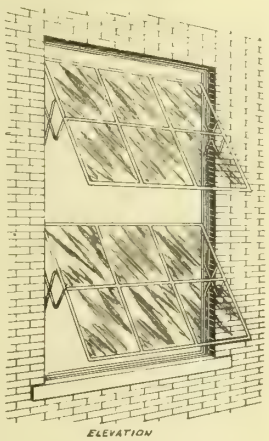
Rattling: As each sash closes tight against the stop and does not have the clearance necessary for the old-style sliding sash there is no rattle whatever of the sash.

Annoyance: As there are no weights or chain required the annoyance of the continual breakage of the chain is eliminated.

Mullion: By the omission of weight boxes a small frame or mullion can be obtained, thus giving more light and glass area.

Hollow Galvanized Iron Underwriters' Sash.

The "Wilson Reverso" Hollow Galvanized Iron Window Frame is not only approved by and bears the Board of Underwriters' label, but also bears their casualty label, which gives their approval as a safety window, wherein all glass is cleanable from the inside of the building, thus saving the hazardous operation of cleaning glass from the outside and reducing the liability insurance of window cleaners.



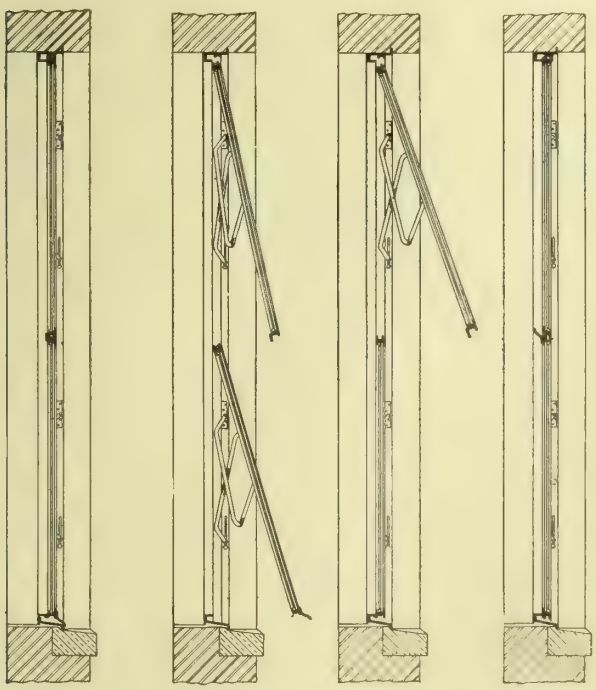


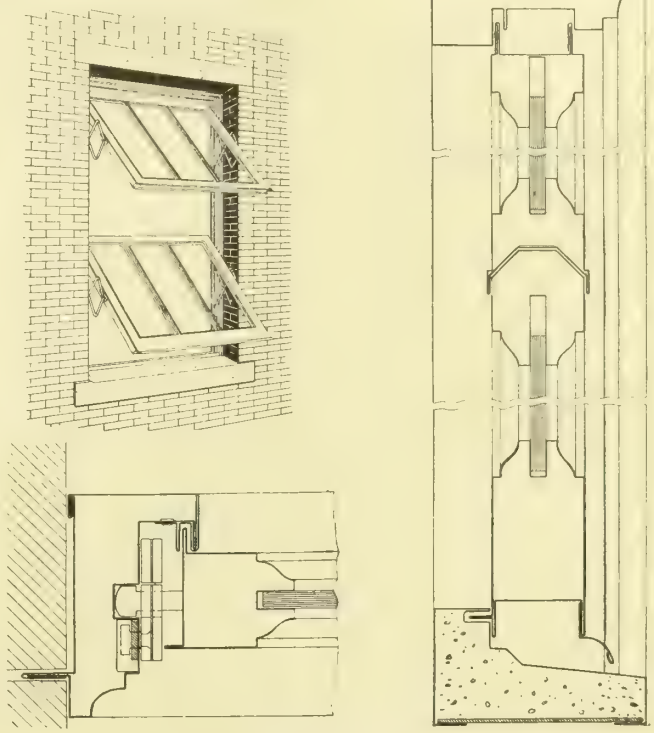
Fig. 1 Closed — *Fig. 2* Partly Open — *Fig. 3* Top Sash Open — *Fig. 4* Reversed

VERTICAL SECTIONS
Showing sash in various positions

Rolled Steel Sash.

Particular attention is called to the detail of the rolled steel sash, a high-grade finished article and suitable for any class of building.

Advantages—Comparing this window with what is known as the ordinary factory type rolled-steel sash there are many advantages in its favor. With the factory type nine tenths of the window is fixed and unbearably hot when the sun shines on it; this is so even when shades are used, for you get the reflected heat through the shade. The "Wilson Reverso" opens the entire glass area and in such sections as can be easily handled. The shades being on the sash, the air enters between you and the shade and kills this heat effect and gives perfect ventilation at all times. When these sash are closed, they will close air- and dust-tight, and this is more than can be said of any of the two-point touch affairs.



DETAILS OF HOLLOW GALVANIZED IRON WINDOW

Co-operative Service.

We will furnish estimates, details and full information on request. Send plans at our expense.

References.

Below are mentioned some of the more important buildings in which our products have been used. These contracts represent our work to the amount of $1,000,000.

BUILDING, LOCATION AND ARCHITECT

Union Station, Washington, D. C., D. H. Burnham & Co.
Pennsylvania Terminal, New York, N. Y., McKim, Mead & White
Rand-McNally Building, Chicago, Ill., Holabird & Roche
Grand Central Station, New York, N. Y., Reed & Stem and Warren & Wetmore
Marine National Bank, Buffalo, N. Y., Green & Wicks
Post Office, New Orleans, La., James Gamble Rogers
King County Court House, Seattle, Wash., A. W. Gould

BUILDINGS EQUIPPED WITH THE WILSON REVERSO

Powers Building, Decatur, Ill., Patton, Holmes & Flynn, over 450 wood frames being used
Bloomington High School, Bloomington, Ill., Arthur Pillsbury, over 200 rolled steel frames used
Y. M. C. A. Hotel, Chicago, Ill., Robert C. Berlin, over 2000 frames, 1400 wood and 600 hollow galvanized iron Underwriters' windows used
Lyon & Healy Building, Chicago, Ill., Marshall & Fox, 125 hollow galvanized iron Underwriters' windows used.

S. H. POMEROY CO., INC.

Hollow Metal Fire Retardant Windows and Partitions

FACTORY AND GENERAL OFFICE
282-296 East 134th Street
NEW YORK, N. Y.

SALES OFFICE: NEW YORK, N. Y., 30 East 42nd Street

Products.

Pomeroy Hollow Metal Fire Retardant Windows and Pomeroy Hollow Metal Fire Retardant Partitions.

Scope of Line.

The Pomeroy line includes twenty-seven standard window types—more than are offered by any other one concern—enabling the Company to meet practically all conditions with standard construction; hence, the architect and owner are not forced to accept some untried compromise. A recent addition to this line is the Pomeroy Hollow Metal Partition in sectional construction and in a variety of types.

Official Approval.

The following standard Pomeroy Windows have been approved by the National Board of Fire Underwriters' Laboratories, and bear their label:

Double-hung (three types) counterbalanced, double-hung with pivoted transom, double-hung with hinged transom; twin double-hung; stationary, twin stationary; casement; top-hinged upper and stationary lower; pivoted upper sash; pivoted lower sash; pivoted upper and lower sash; single-pivoted sash; three-pivoted sash; two upper sash pivoted with stationary lower; special mullion window; twin-pivoted sash; tilting sash.

Facilities.

Hollow metal fire retardant windows have been the exclusive specialty of this Company for twenty years, and the methods of production are the outgrowth of this long specialized experience. The factory is equipped with up-to-date machinery, much of it specially built, and the product is made under the interchangeable part system, guaranteeing uniformity. Pomeroy Windows are manufactured—not built. Hand labor is minimized, hand fitting eliminated, and only skilled specialists are employed. The result is one uniform Pomeroy quality—the highest obtainable.

POMEROY HOLLOW METAL FIRE RETARDANT PARTITIONS
In sectional construction and in a variety of combinations and styles

...ue's Catalogue

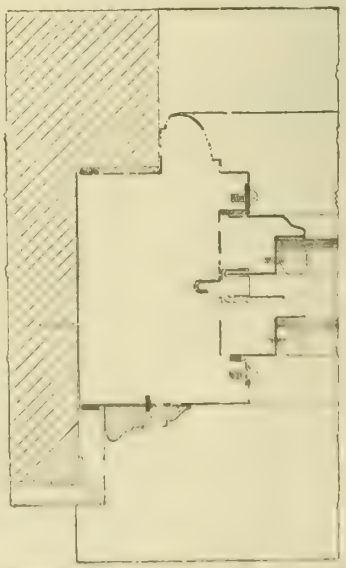
Policy.

The Pomeroy policy demands a strict adherence to a price which covers the most sound, substantial and efficient construction, looking toward the permanent satisfaction of architect, owner, agent and tenant. Pomeroy Windows are not made to meet a price but to set a standard of service, a standard to be maintained only by exclusive specialization on one line.

POMEROY HEAVY GAUGE DOUBLE-HUNG WINDOW
For street fronts, made in steel, copper or bronze

Distinctive Features.

Use of best grade of heavily galvanized steel; methods of handling which keep the zinc coating intact; all cutting and punching done by costly special dies; interchangeable construction throughout; specialized factory methods and organization; improved hardware; maximum fire resistant capacity; exceptional weathering qualities, with greater efficiency in dust- and cold-proofness than is found in any other line of easy-operating hollow or rolled-metal windows; prompt deliveries, due to unequaled facilities and ample stocks of raw materials.



DETAIL OF POMEROY HEAVY GAUGE DOUBLE-HUNG WINDOW
Made under the supervision of Underwriters' Laboratories, Inc., label service

Special Service.

Twenty years of specialization is the basis of Pomeroy service offered architects confronted with window problems. This service is free, and cheerfully offered. The Company welcomes an opportunity to cooperate with architects in any way—either in adapting standard Pomeroy types to specific conditions, or in working out new types for any purpose.

MESKER BROTHERS IRON COMPANY

Fire Retardants

ST. LOUIS, MO.

Products.

We manufacture HOLLOW METAL WINDOWS; SOLID SECTION-STEEL SASH; SOLID SECTION STEEL CASEMENT WINDOWS; COMBINATION STEEL and CONCRETE INTERIOR STAIRS (patented); PLATE STEEL DOOR FRAMES or JAMBS; PLATE STEEL SECTIONAL DOORS and SHUTTERS (patented); METAL COVERED WOOD CORE DOORS; FIREPROOF DOORS and SHUTTERS; STEEL and GLASS STAIR and ELEVATOR ENCLOSURES; PLATE STEEL SASH DOORS.

Also, PLATE STEEL COLUMN GUARDS for Concrete Piers; STEEL and GLASS CORRIDOR PARTITIONS.

Mesker Fireproof Hollow Metal Windows.

Our windows are approved by the National Board of Fire Underwriters, and are designed along the same lines and contain the same amount of light area as wood windows. (Send for stock sizes and prices.)

Specifications (*Plate No. 1*)—We manufacture the following types of approved windows: Double hung, standard pivoted, double pivoted, single pivoted, single hinged, vertically pivoted, casement, stationary, and a combination thereof. Supplied complete inclusive of hardware, sash weights and chains and ¼-inch rough, ribbed, prism or polished wire-glass. Frames and sash are of No. 24 galvanized steel or 20-ounce copper.

Windows may be in single, twin, triple or quadruple form. Transoms for windows may be either hinged, pivoted or stationary.

Mullions for openings 9 feet or under in width and 5 feet or less in height require no beams nor concreting. See Section "XX."

Mullions for all windows exceeding 9 feet in height and 5 feet in width, simultaneously, require beams and concreting as shown by Sections "Y" and "YY."

Transom bars for windows not over 9 feet in height require no beams nor concreting.

Transom bars for all windows exceeding 9 feet in height must be 5 by 9 inches arranged for reception of I-beams and concrete as shown by Section "X."

Mesker Solid Section Steel Sash (Plate No. 2).

Made of specially designed solid sections and rolled from our own rolls of soft steel. Sash can be made horizontally or vertically pivoted, top or bottom hinged, casement, counterbalanced or of special construction. Ventilating bars are of the double contact type, insuring a weatherproof and non-leakable sash. Intersections of muntins are welded on inside, which increases rigidity of joints and adds to other weather resisting qualities.

Our units offer a wide scope of combinations for complete lighting and proper ventilating of factories, office buildings, etc. Any number of units may be combined with the use of our special mullion bar for large glass areas. We furnish all hardware, anchors, bolts and glazing clips.

Mesker Solid Section Steel Casement Windows (Plate No. 3).

Made up of solid moulded bars throughout, with double weathering at all points, superior to those made of plain bars in this and European countries, and more economical in cost. Can be arranged singly or in pairs, with or without transoms and sidelights, for large or small glass, with bar or rectangular hollow mullions for multiples. We furnish all hardware, anchors, bolts and glazing clips or moulds.

Specially adapted to office buildings, hotels, apartments, schools, colleges, hospitals, asylums, etc.

Write for full-size detail sheet.

Specifications for Interior Stairs (Plate No. 4).

Stringers shall be 3/16-inch steel plate of width shown on plans and bent in channel form.

Treads and risers shall be made of one continuous No. 12 steel plate bent to form as indicated. Treads shall be supported at ends by special clamps securely bolted to stringers, and shall be filled with concrete or other material (1½-inch more or less in thickness) by others.

Platforms or landings shall be No. 12 steel plate, with nosings same as treads, and supported on a 2- x 2- x 3/16-inch angle frame, riveted or bolted to stringers, and reinforced with tees not over 2 feet on centers.

Newels shall be No. 12-gauge blue annealed steel, with cast caps and pendants. Newels are welded at corners, making a continuous one-piece seamless newel.

Railings to be of design indicated on drawings.

Adapted to—Schools, colleges, theaters, office buildings, apartment houses, store buildings, warehouses, hotels, power-houses, foundries, factory buildings, railroad stations, and other fireproof buildings.

Mesker Sanitary Plate Steel Door Frames and Trim (Plate No. 5).

No wood, steel bucks or trim are necessary when our Plate Steel Door Frames are adopted.

These sanitary door frames are constructed of plate steel of No. 10-, 11-, or 12-gauge for plain and No. 13-gauge or lighter for moulded types. We supply anchors and foot braces, plates and strike boxes and weld the miters, making a one-piece frame and trim, the initial setting of which completes the opening, except hanging of doors.

Figs. 1 and 2 show Plain Sanitary Frames for light partitions—flush finish. Figs. 3 and 4 show Plain Hospital Sanitary Frames for partitions, 4 inches thick and over—flush finish.

Fig. 5 represents our Sanitary Frame and Trim Rounded Type. Fig. 6 shows Moulded Frame and Trim for light partitions.

Figs. 7 and 8 illustrate Moulded Frames and Trim for partitions 4 inches thick and over. Figs. 10, 11, 12 and 13 show our various forms of Seamless Transom Bars.

Plain steel frames are especially adapted to hospitals, asylums, sanitariums and warehouses, while moulded types may be used in office buildings, hotels, schools, colleges, court houses, etc.

Specifications Mesker Sectional Steel Doors (Plates Nos. 6 and 7).

Jambs—To be made of ⅛-inch to 3/16-inch thick steel plates, and consist of back, partition and cover. Jambs shall be securely fastened by through wall bolts about four feet apart. Cover to be fastened to jamb by means of slot hooks provided in jamb partition to engage into lip formed in cover.

Pulleys—To be made of best gray iron castings 5 inches in

Continued

diameter, secured to wrought iron brackets, and fastened to top of jambs by means of self-locking tongue and groove.

Sections—Shall consist of steel plate from No. 22- to No. 16-gauge, either black or galvanized. Sections shall have locking edges formed to interlock each other when door is closed, giving rigidity and making door perfectly fireproof and weatherproof.

Ends of sections shall be provided with stiffeners of No. 14 steel 2 inches wide. Outside edge of stiffeners to be formed into cylinder shape to receive guides of ½-inch diameter rods to hold sections in proper position.

Cables—Shall consist of best Swedish iron wire 3/16-inch diameter, to be encased into jambs, insuring full protection from fire and weather. To ends of cables shall be attached clamps made of two pieces ¼-inch plate with corrugated grooves, securely riveted together.

Counterweights—Shall be made of rolled flat iron bars. Two weights, one in each jamb, to be provided for each section which counterbalances each individual section perfectly. Cables when attached to each section, shall pass over pulley at top of jamb and down into weight box, and be secured to corresponding weights. The sections being thus independently counterbalanced make a door readily and easily opened, partly, or to full height, requiring only sufficient force to overcome friction of moving parts.

Automatic Closing—Doors, when required, to be equipped with fusible link connection to cable, enabling doors to close automatically at approach of fire.

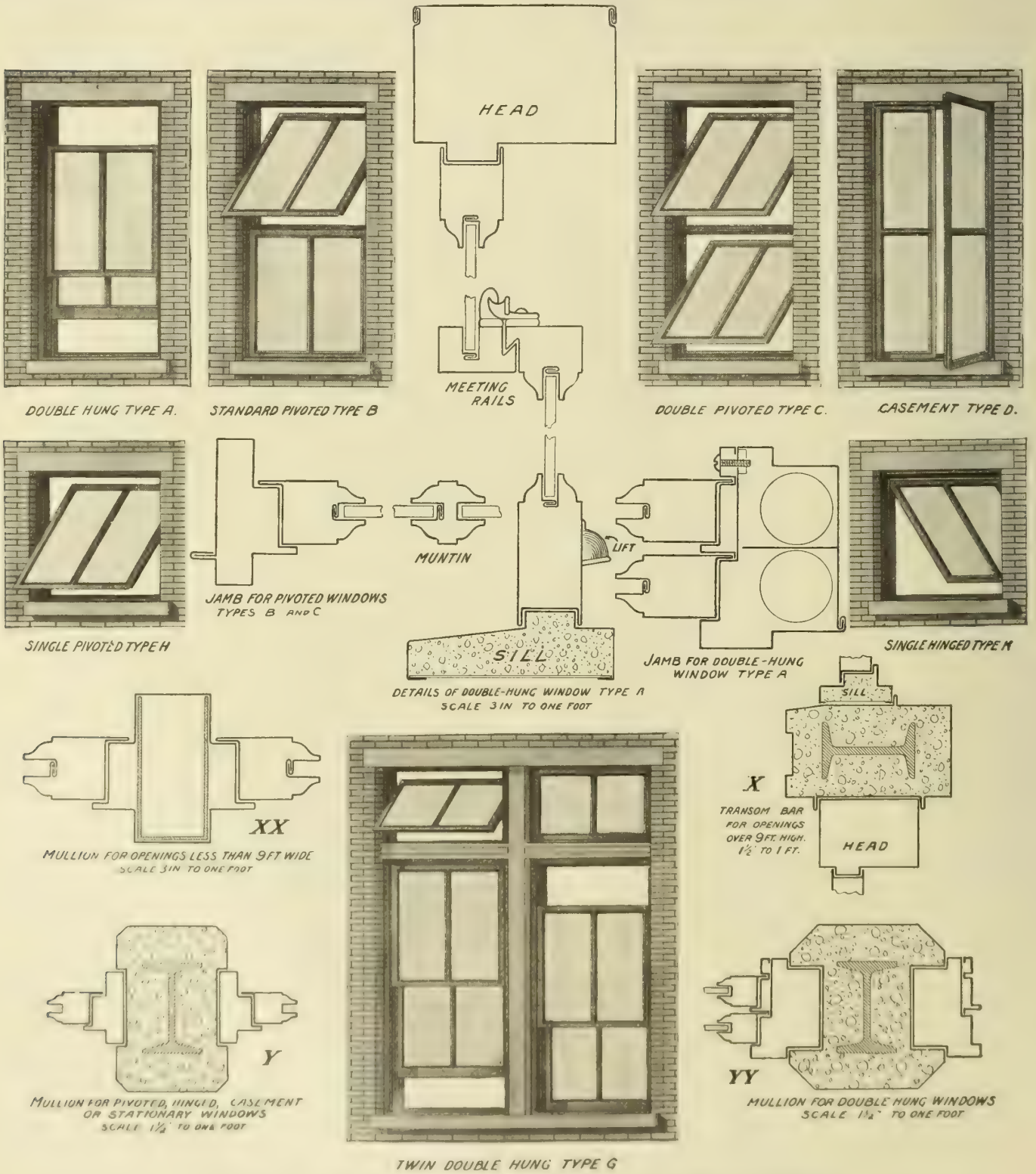


PLATE NO. 1 DETAILS OF MESKER FIREPROOF HOLLOW METAL WINDOWS

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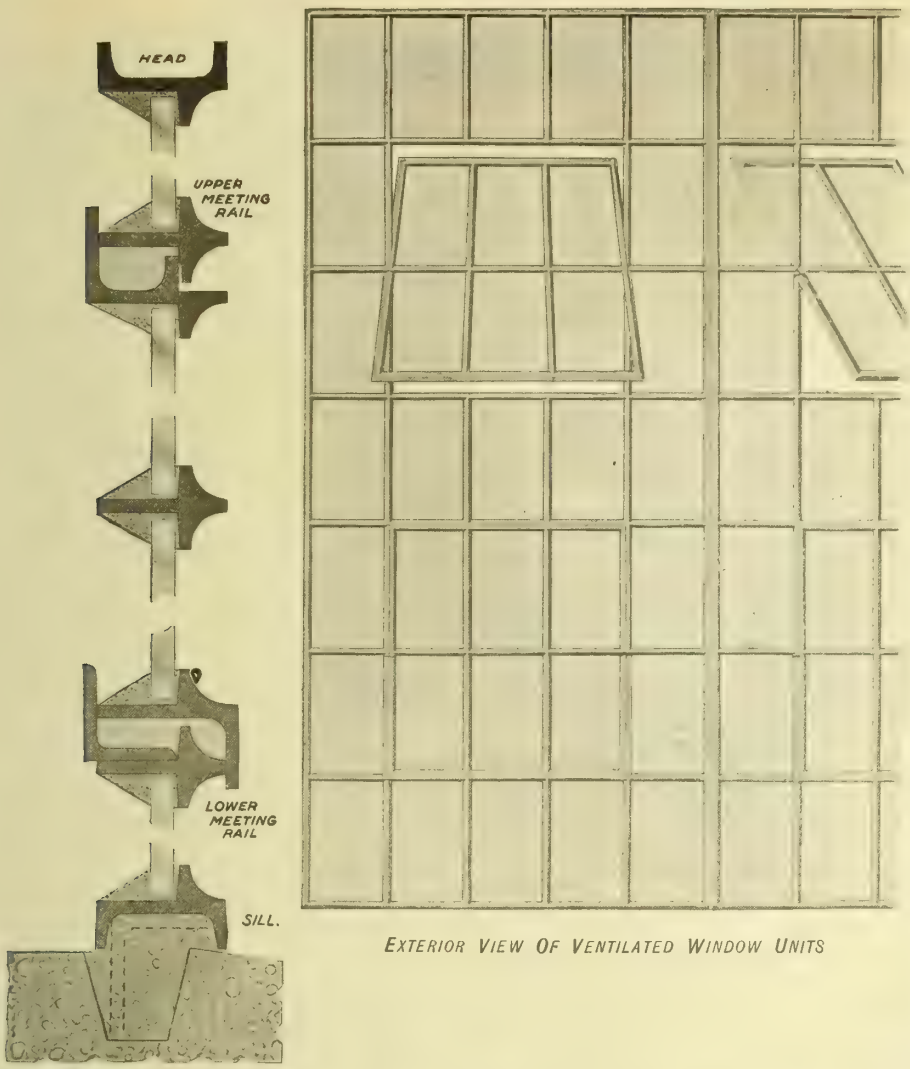
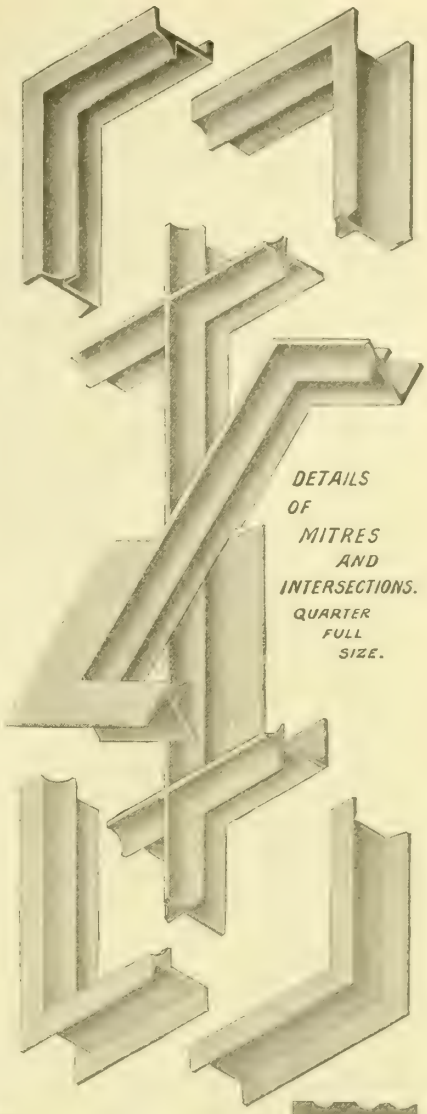
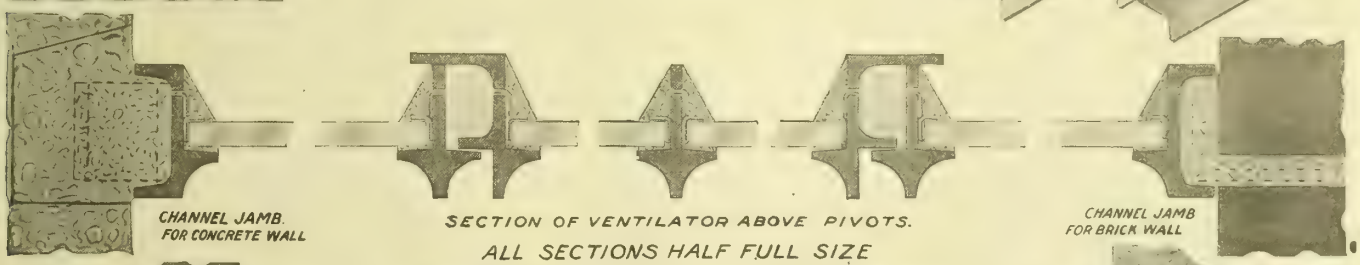
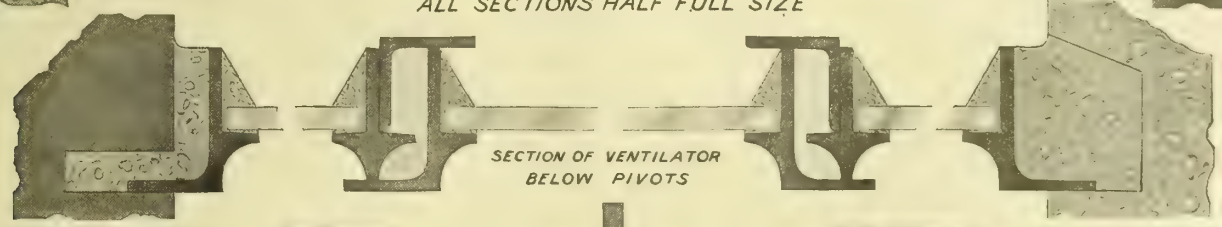


EXTERIOR VIEW OF VENTILATED WINDOW UNITS





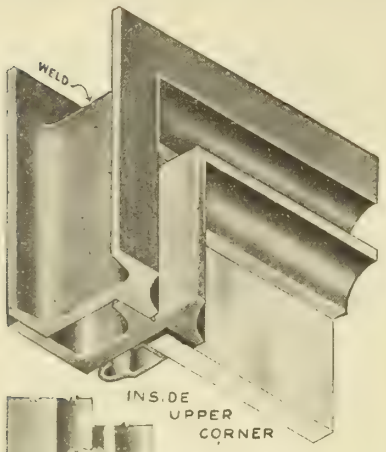
SECTION OF VENTILATOR ABOVE PIVOTS.
ALL SECTIONS HALF FULL SIZE

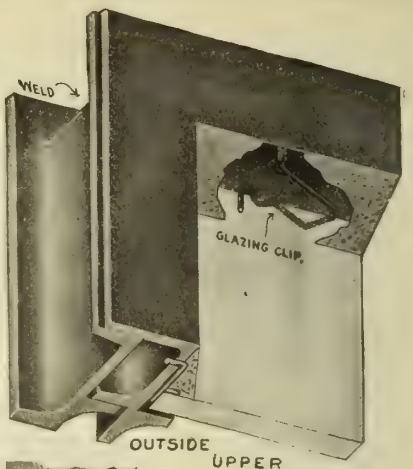


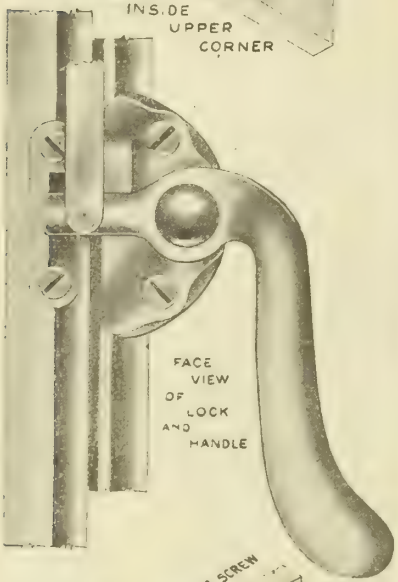
SECTION OF VENTILATOR BELOW PIVOTS

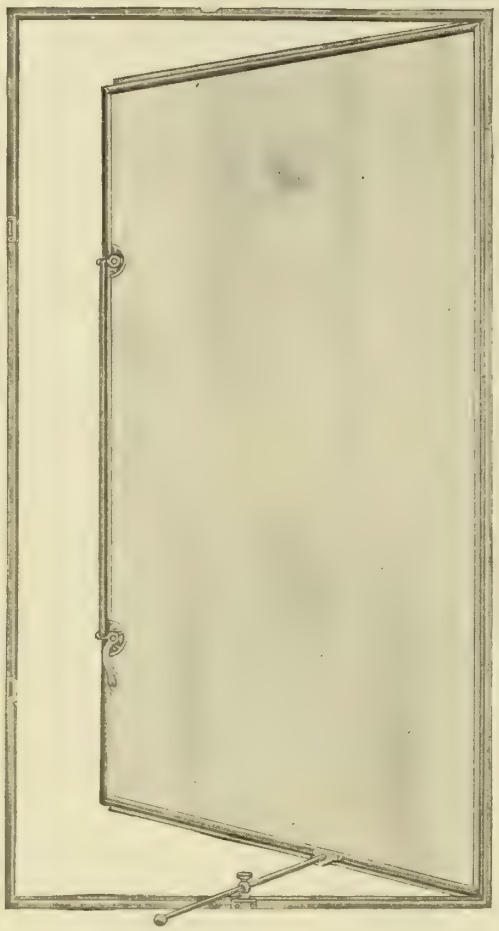
PLATE NO. 2. DETAILS OF MESKER SOLID SECTION STEEL SASH

Continued on next page

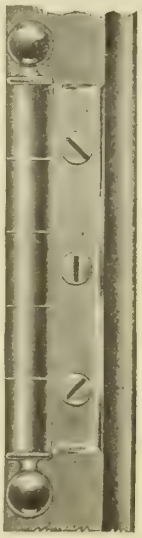


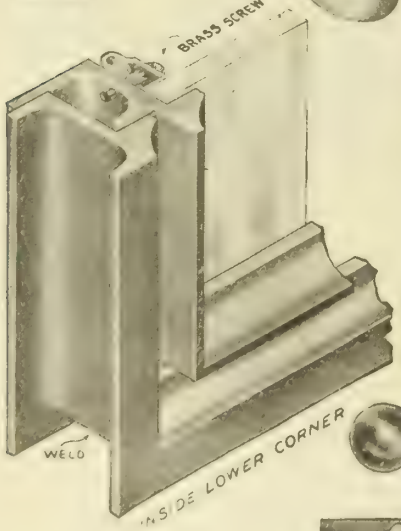


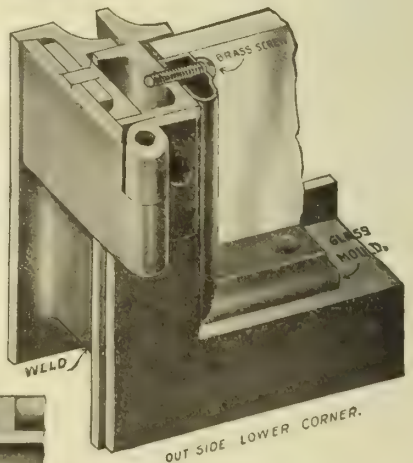




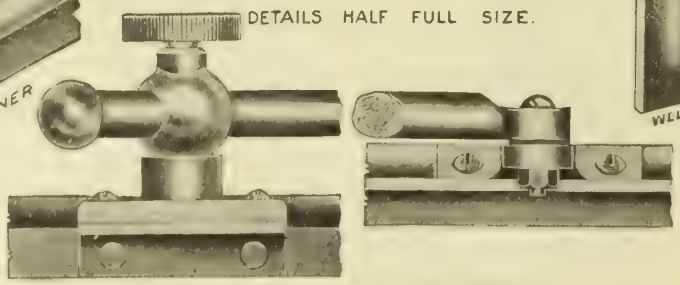
ONE LIGHT TYPE, SIDE HUNG, OPEN OUT.







DETAILS HALF FULL SIZE.



SOLID BRONZE ADJUSTER

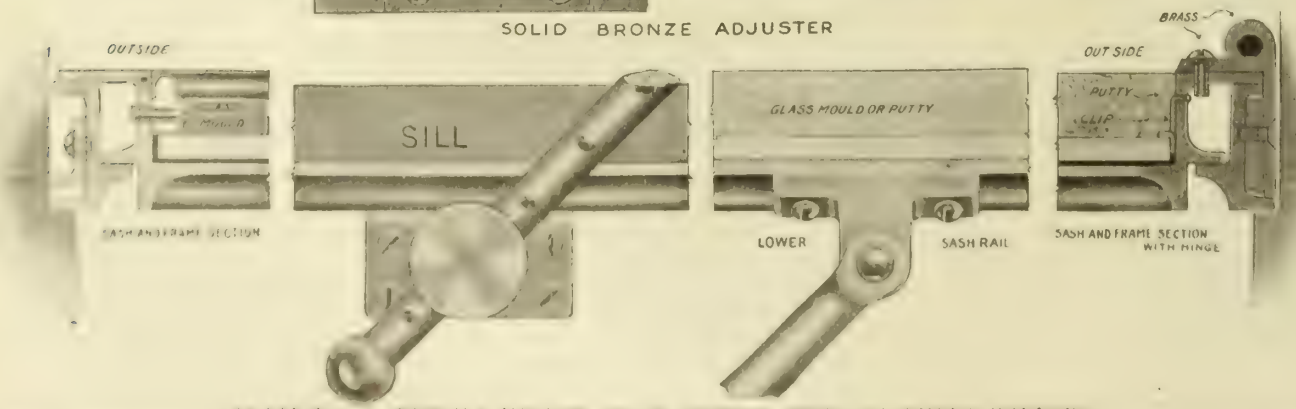


PLATE NO. 3 DETAILS MESKER SOLID SECTION STEEL CASEMENT WINDOWS

Continued on next page

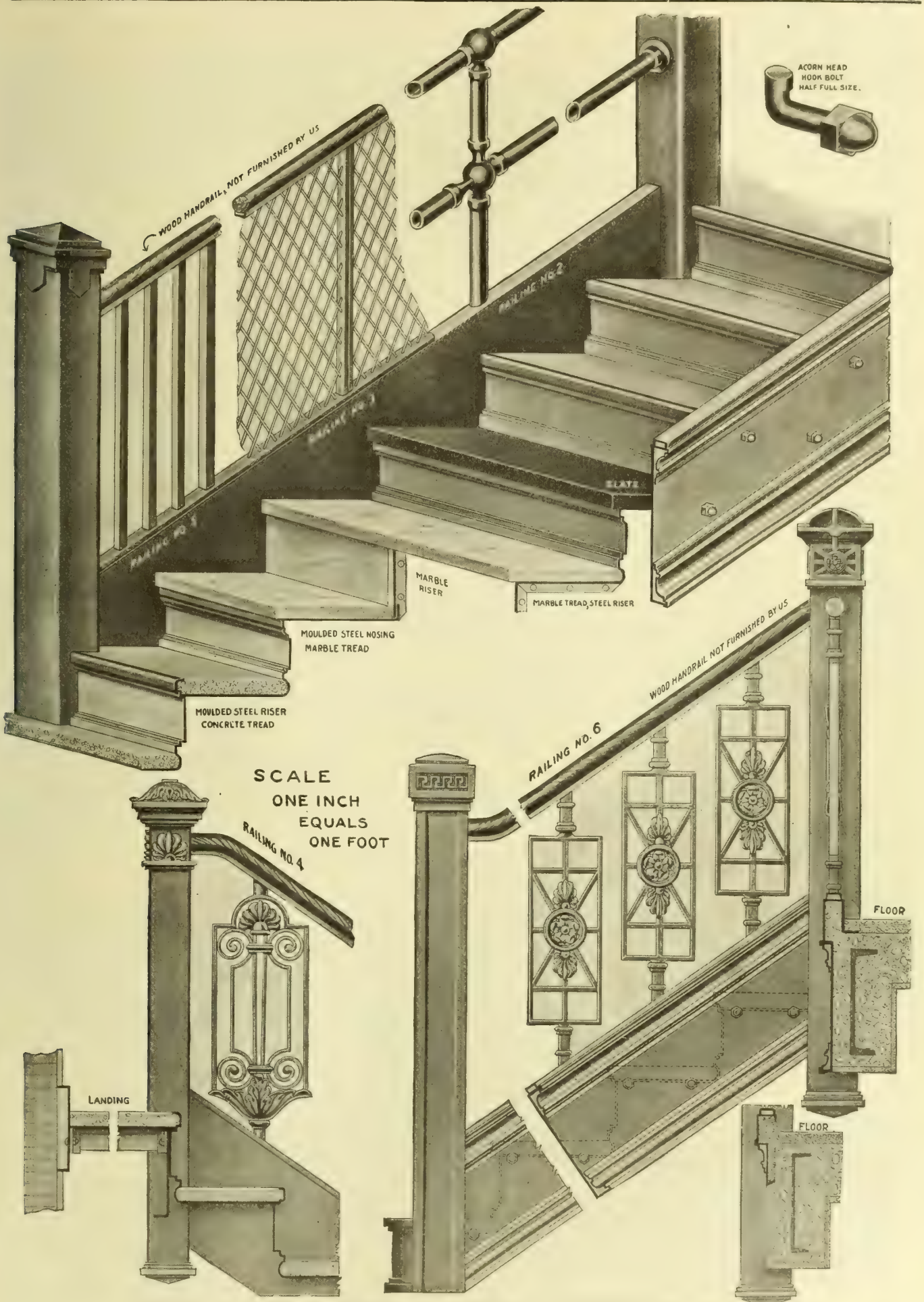
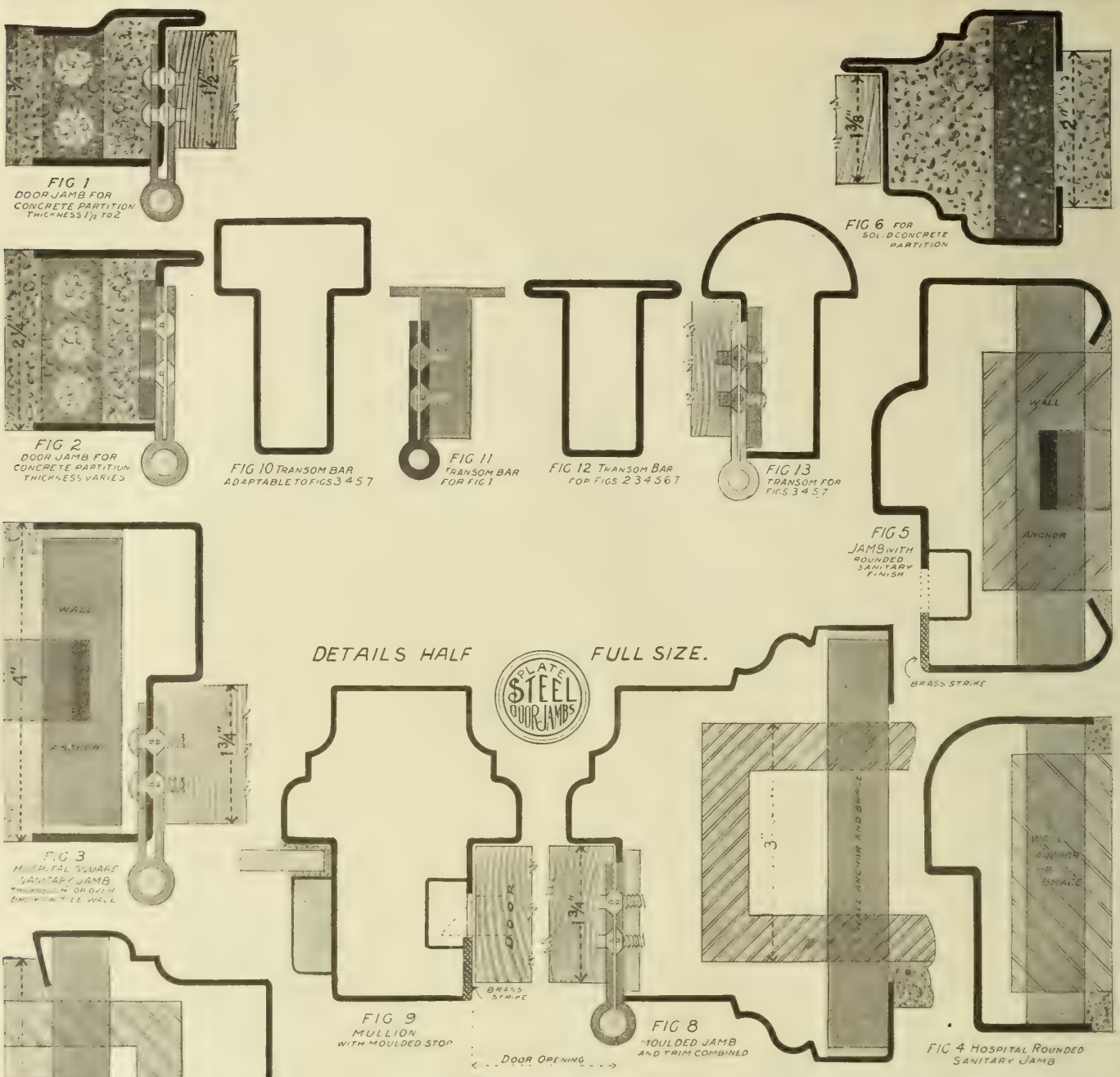
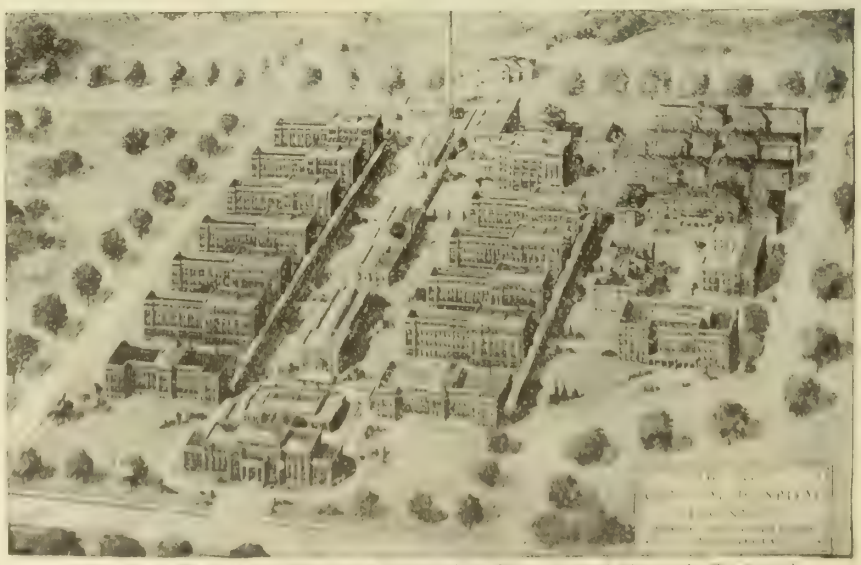


PLATE NO. 4. DETAILS MESKER COMBINATION STEEL AND CONCRETE INTERIOR STAIRS

Continued on next page





3000 Door Frames and Transoms Installed in New General Hospital, Cincinnati

PLATE NO 5. DETAILS MESKER SANITARY PLATE STEEL DOOR FRAMES AND TRIM

Continued on next page

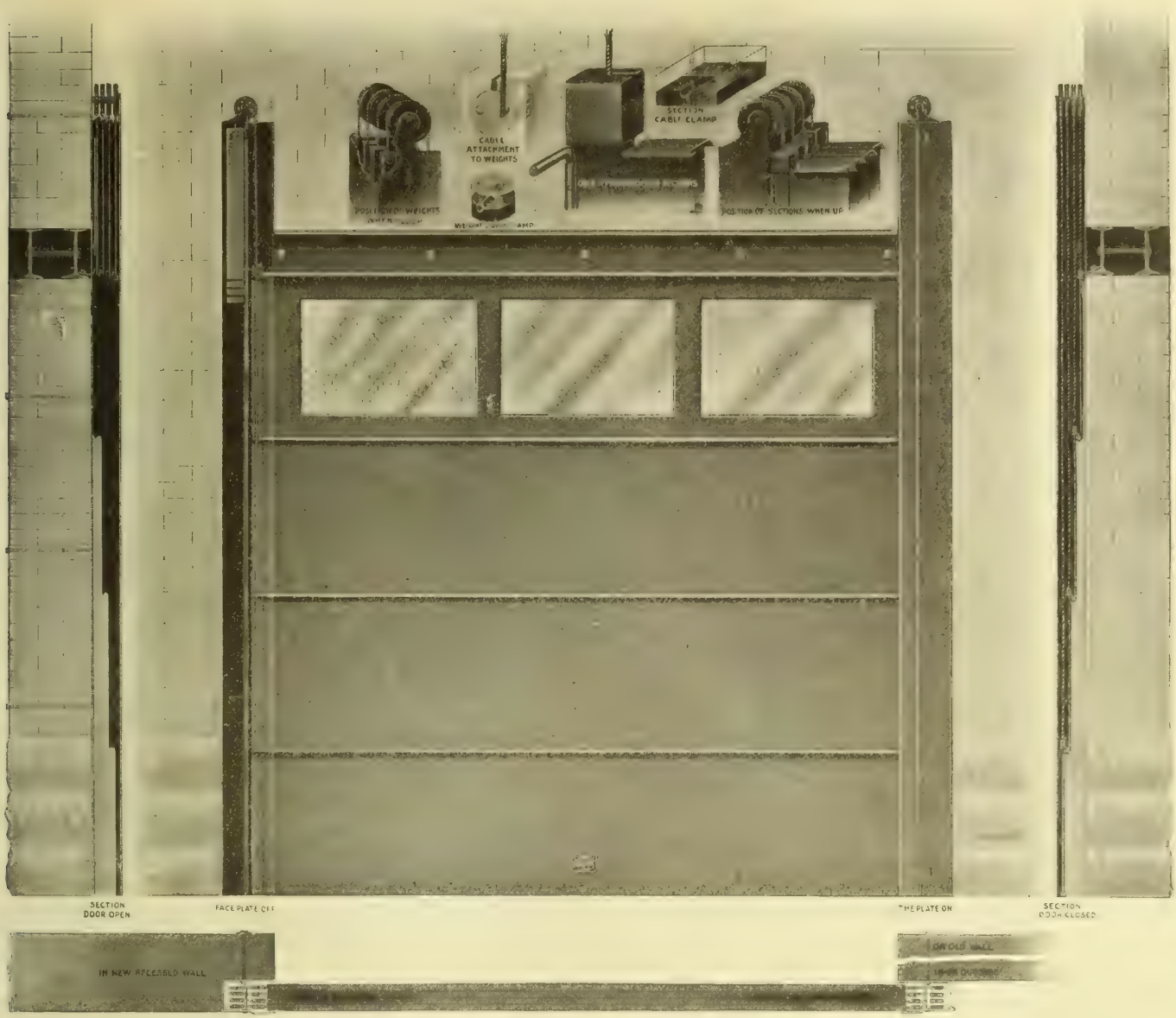


Plate No. 6. DETAILS MESKER SECTIONAL STEEL DOORS

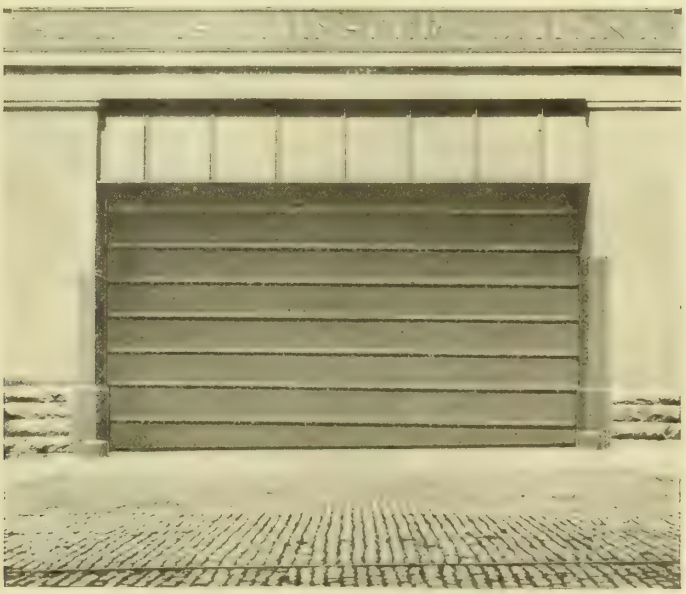


Plate No. 7. THE MESKER PATENT PLATE STEEL SECTIONAL DOOR, SIZE 35 FEET BY 16 FEET
Has been in constant daily use for 14 years

RICHEY, BROWNE & DONALD, INC.

Manufacturers of Browne Solid Metal Windows
Architectural Iron and Bronze Work

OFFICE AND FACTORY
2101 Flushing Avenue
MASPETH, N. Y.

Products.

Browne Solid Steel and Bronze Fire-, Weather- and Dust-Proof Windows.

Also, Stairs, Railings, Elevator Enclosures and Cars, Doors, Grilles and Gates, Marquees, Store Fronts, Facias, Counter Screens, etc., in Wrought and Cast Iron and Bronze.

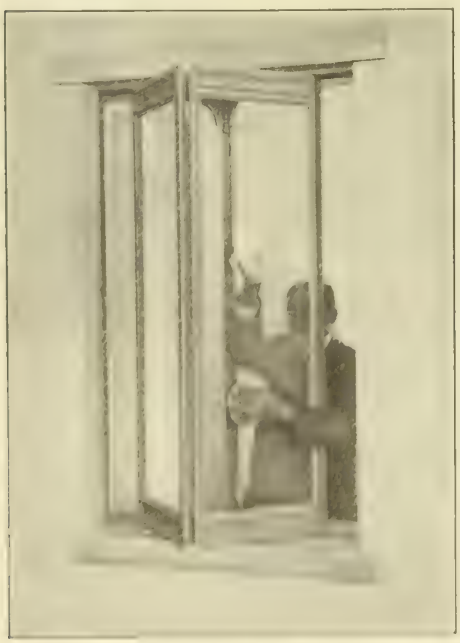
Description.

The Browne Window is made of solid steel or bronze of the best quality. With the exception of the glass, all parts are manufactured at our plant. The windows are shipped complete, with one shop coat of paint, and are ready to be installed in a building, and set by our own workmen.

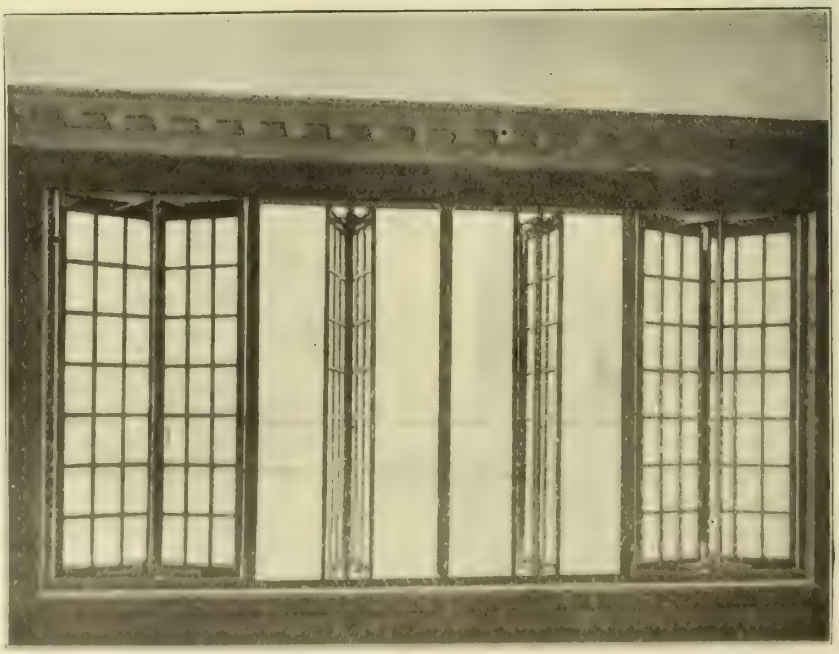
The glass should preferably be furnished and set by the glazing contractor. Painting specifications should provide for all finishing coats of paint. Hardware of solid bronze is invariably furnished by us.

The construction is extremely rigid. The sash are firmly hinged together and simply swing open and shut under the symmetrical control of the hinged arms. These arms, which are attached to the stationary center bar, afford perfect rigid support, being made of forged steel and each arm tested to sustain a weight of 500 pounds. No track mechanism of any kind is employed; and there are, therefore, no grooves to accumulate water and dirt. A simple catch lock, fastened to the center of the sash, locks itself on the center bar of the window when the sash are completely closed.

THE BROWNE WINDOW SLIGHTLY OPENED, SHOWING UNOBSTRUCTED VIEW



METHOD OF [illegible] THE BROWNE WINDOW



BROWNE WINDOWS IN A GROUP OF FOUR, SHOWING LIGHTING AND VENTILATING FEATURES

Continued on next page

Advantages.

The Browne Window meets every requirement of light, ventilation, protection, economy and service, and has proved under severe tests to be fireproof, waterproof, dustproof and air-tight. Some of these advantages will be obvious if the accompanying detail is referred to. Metal-to-metal joints are avoided by the introduction of removable strips of specially selected felt.

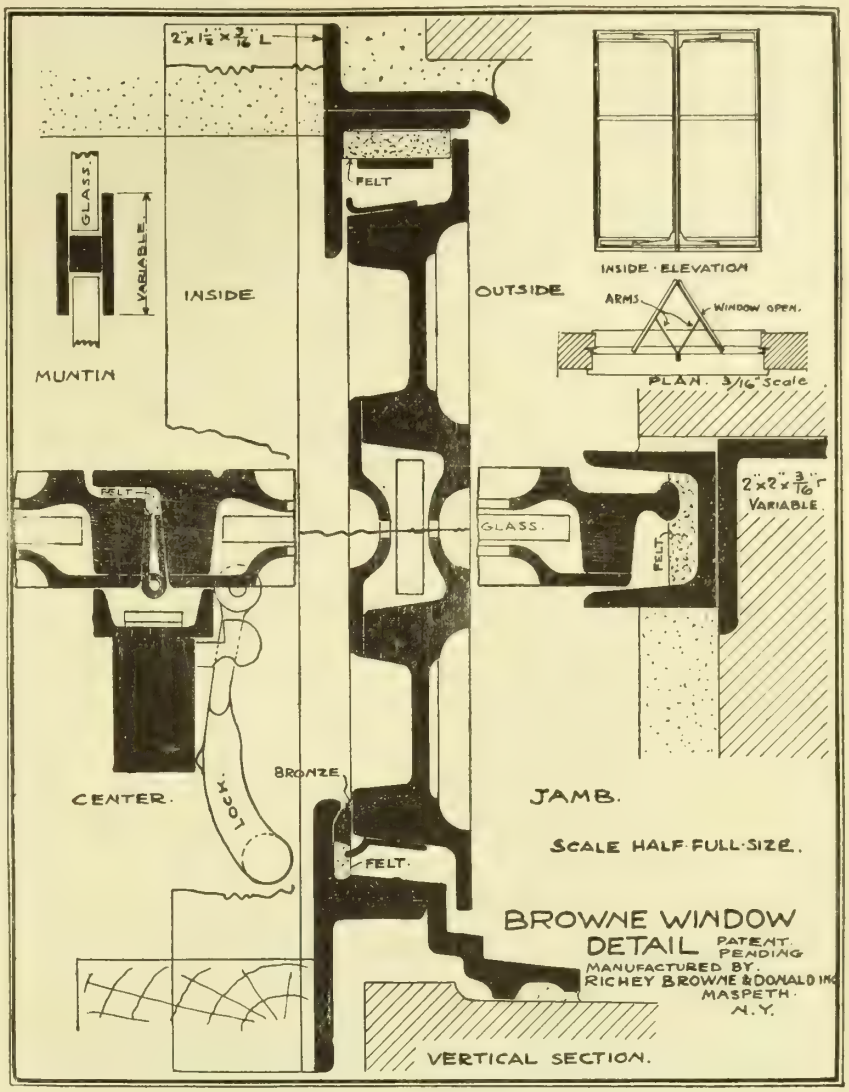
The Browne Window can be opened to any angle, and will remain firmly in place. It operates smoothly, noiselessly and without effort. (See plan and elevation on detail sheet.)

It does not extend into the room, and will not interfere with shades or curtains when opened, but absolutely prevents shades from being whipped out of the window and exposed to the weather. Curtains and shades can be treated as in double-hung windows, with additional support given by the center bar. Simple screens may be placed inside the window, and by means of a simple device the window may be opened and closed without disturbing them.

There are no sash chains, weights, adjusting bars, pulleys, or operating devices to get out of order. The Browne Windows never rattle and cannot be blown about or disturbed by the wind.

There are no hollow weight boxes to create drafts or take up available window space.

Interior and exterior surfaces of the glass can readily be cleaned from the inside of the room, reducing cleaning expense, eliminating danger of accidents and reducing employers' liability insurance.



CONSTRUCTION DETAILS OF TYPICAL BROWNE WINDOW

The Browne Window eliminates maintenance cost and reduces heating expenses.

It can be given a transom effect without corresponding increase in cost by providing a horizontal muntin.

It is suitable for any type of building.

Its glass is in one plane.

All parts are easily accessible for cleaning and painting.

Long life and rigidity are secured by simplicity of parts, heavy solid sections and type of joints. Continuous service will not rack the frame or the sash.

This window affords absolute weather protection.

Subjected to scientific test under pressure equal to that of wind blowing up to the rate of 140 miles an hour, it proved superior for resistance to air, under continuous service, to any other window so tested.

It cannot sag.

It gives maximum light and ventilation.

Perfect ventilation can always be secured without draft.

Underwriters' Labels.

The Browne Window is also made of a special type to meet the Underwriters' requirements. It has been approved by the Underwriters' Laboratories and bears their label.

Co-operation.

Architects are invited to present their problems to this Company. We will submit suggestions, sketches, details, etc., and offer all assistance possible. We have every facility for giving the best possible service in the manufacture of Browne Windows and Ornamental Iron and Bronze. Our organization consists of Designing and Drafting Departments; Pattern and Modeling Shops; Foundry; Machine, Grille, Fitting, Cleaning and Plating Departments.

INSTALLATIONS

Munsey Building, Washington, D. C., McKim, Mead & White, Architects

Union Arcade Building, Pittsburgh, Pa., F. J. Osterling, Architect

Workingmen's Savings and Trust Building, Pittsburgh, Pa., F. J. Osterling, Architect

Hamilton County Court House, Cincinnati, Ohio, Rankin, Kellogg & Crane, Architects

City and County Building, Pittsburgh, Pa., Edw. B. Lee and Palmer, Hornbostel & Jones, Architects

Sunderland Residence, Omaha, Neb.

Grand Rapids Savings Bank, Grand Rapids, Mich., Osgood & Osgood, Architects

Public Service Building, Baltimore, Md., Parker, Thomas & Rice, Architects

J. F. RUTH

Manufacturer of Metal Windows

TELEPHONES { Delmar 2468R / Lindell 3709

Easton and Pendleton Avenues
ST. LOUIS, MO.

Products.

J. F. Ruth Metal Window Frames and Sash (patented).

Also, Elevator Doors and Gates and Metal Shutters.

Description.

Rigidness—This window is provided with simple and novel features of construction which provide great rigidness.

Friction—Perfect control of the friction between the sash and frame is maintained in a simple manner, so that greater or less friction can be readily obtained without lessening the fire-, weather-, or dust-proof qualities of the window.

Jamb—The jamb, which performs the function of a weather parting-strip, is adjustable, detachable and expansive, and allows a variation of three quarters of an inch in the width of a window opening.

Inserting of Weights—The counterbalancing weights are inserted through openings formed in the window frame beneath the detachable jamb; and, therefore, the jamb is not weakened by cutting, and the weight openings are hidden from view.

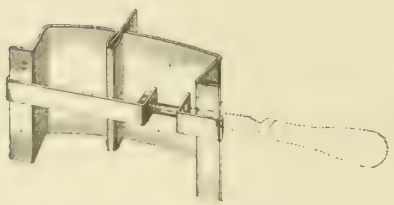
Free and Easy Operation of Sash—The detachable jamb is very rigidly formed from one piece of metal, and extends from the sill to the head of the frame; the pocket for inserting of weight is beneath this jamb, and there are no joints to interfere with the free movement of the sash.

Replacing Weather-Strips—Embossed zinc is used for the weather-strip, being inserted into end of auxiliary jamb, and easily removed and replaced. Friction strip at head and sill is of bronze and held in position by friction, and can be replaced within ten minutes.

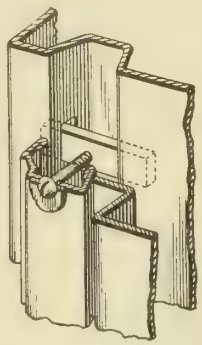
Sash—Each sash is provided with a weather fin, which operates in a corresponding slot formed in the frame; the contact between fin and frame being approximately one sixteenth of an inch, reduces the friction to a minimum.

Sorting the Sash—When the window frames are of one size, the sash may be sorted in pairs and placed in the frames (any pair of sash fitting any frame). The jambs are then expanded by means of a screw-driver, so as to neatly fit sash; after which the window jambs and stops are adjusted to obtain the desired friction, and the sash will now operate in the frame perfectly, without rattle or vibration, and the entire window is fire-, weather- and dust-proof.

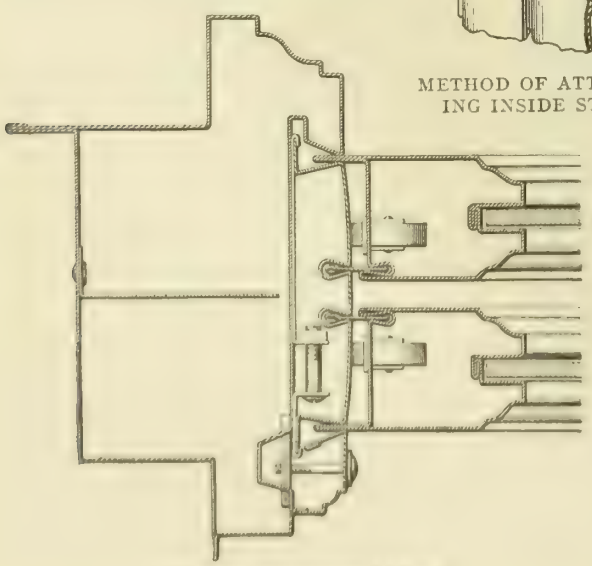
Assembling—The sash can be hung, fitted and adjusted, and the window completed by any ordinary mechanic (not necessarily a tinner), in from twenty-



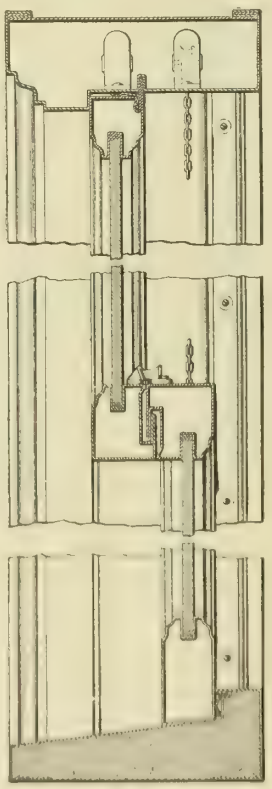
ADJUSTMENT OF CUSHION PLATE



METHOD OF ATTACHING INSIDE STOP



SECTION THROUGH JAMB



SECTION THROUGH WINDOWS

SASH AND CUSHION PLATE BEING LOCATED

Continued on next page

October 24th | November 21st | December 20th | February 1st | April 17th

SHOWING PROGRESS OF INSTALLATION, RAILWAY EXCHANGE BUILDING

five to forty minutes, with the use of only a screw-driver and pliers.

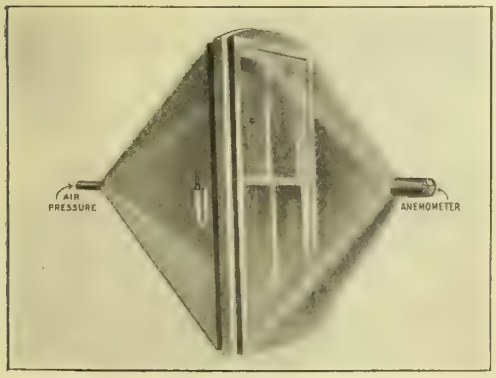
Readjustment—Should the sash be improperly fitted and adjusted in the frame, readjustment can be readily accomplished in a moment's time by the use of a screw-driver; and, after proper adjustment is attained, it need never be changed.

Adjustment owing to Settling of Building—Should the window frame be improperly set, or should it be affected by a settling of the wall of the building, the adjustable features are such that any reasonable amount of variation can be easily taken care of.

Comparison—It is impossible to compare this window with any other window on the market, as it has heretofore been impossible to get a perfect weather-, fire- and dust-proof window in which the sash operate freely, and which window is easily and quickly adjusted.

Estimates.

Estimates will be quoted upon application. Accompany request with the following data: Type of windows, number of openings, and kind of glass wanted; width of opening between walls; height of opening between sill and lintel of arch; rise of arch, thickness of wall.



METHOD USED FOR TESTING AIR PASSAGE

Specifications.

To insure against the substitution of inferior goods specify as follows: "All windows shall be the J. F. Ruth Type A Metal Windows and shall bear the authorized label of the Underwriters' Laboratories, Inc."

RAILWAY EXCHANGE BUILDING, ST. LOUIS, MO.

Mauran, Russell & Crowell, Archts. Westlake Construction Co., Gen. Contractors
Largest office building in the world, equipped with $145,000 worth of J. F. Ruth Type "A" Sheet Metal Windows with Perfect Weather-Strips

This window was selected from among twenty-three models of full-sized windows, submitted by leading American and Foreign manufacturers, by committee consisting of Owners, Architects, Engineers, after being tested for passage of air and water; also, a second air test was made by the contractor who furnishes heat for the building

S AND S WINDOW CORPORATION

TELEPHONE:
JOHN { 1523
1524

41 Liberty Street
NEW YORK, N. Y.
ORDERS TAKEN AND EXECUTED IN CANADA

CABLE ADDRESS:
"WINDCORP, NEW YORK"
A B C 4th and 5th Edition Codes

Products.

S and S DOUBLE-HUNG VENTILATING REVERSIBLE and STORM-PROOF WINDOWS, S and S HINGED and PIVOTED WINDOWS, S and S PRISON and ASYLUM WINDOWS.

Materials.

In wood, wood metal-covered, hollow metal galvanized, bearing the Underwriters' label; also, in heavy gauges of galvanized steel, iron, copper and bronze.

Fully Reversible.

Both sashes can be easily reversed for cleaning. This feature is controlled with a key, and no one other than the persons authorized to do the window cleaning can reverse them.

S AND S DOUBLE-HUNG REVERSIBLE WINDOW
Easily reversible for cleaning

Underwriters' Approved Safety Appliance.

The National Board of Fire Underwriters (Casualty Department), after making a thorough inspection and test of the ventilating and reversible features of our window, have awarded us a special label for the safety features of our window. This label will in the future appear on all S and S Ventilating and Reversible Windows regardless of the kind of material the window frames and sash are made of.

Saving in Insurance.

The reversible feature of the S and S Window eliminates all risks to the occupation of window cleaning, and effects a large saving in the cost of liability insurance, which will, within a short time, repay to the owner the extra cost of this improvement.

Storm- and Dust-proof.

The stiles and rails of both sash are fitted with the S and S Weather-stripping system, making it the only storm- and dust-proof reversible window on the market.

Labor Saving.

Economy and efficiency are equally certain in the cost of window cleaning. All so-called safety devices are unnecessary with the S and S Window, and should therefore be omitted.

S AND S DOUBLE-HUNG REVERSIBLE WINDOW
Outside of sash cleaned from inside

Perfect Ventilation.

The lower sash may be inclined inward for ventilation. In this position it forms a deflector which permits the free circulation of air at the meeting rail level, thus giving to the occupant perfect ventilation and protection from draughts.

VENTILATION WITHOUT DRAUGHTS

Continued on next page

No Exposure.

The illustration on page opposite shows the advantage of ventilation without draughts. The occupants of the room are relieved of annoyance and exposure.

Fresh air is essential to good health. This is true for every one; much more is it true for those employed in an office all day, with only limited opportunities for out-door air and exercise.

Operation.

The S and S Window is operative in a manner similar to any double-hung window. In addition to this, the openings as shown in illustrations herewith (Figs. A, B, and C) can also be secured; from which, it is apparent, far greater advantages follow.

Fig. D shows one sash reversed for cleaning. Both sashes are reversible in like manner.

Removable Sashes.

Both sashes may be removed from or hung into the frame in less than one minute, without the use of tools. The practical and economical value of this feature will be greatly appreciated when glazing and painting are to be done. Scaffolding is not required, the life risk is eliminated, and an increased output in quantity of work will effect a saving of thirty per cent.

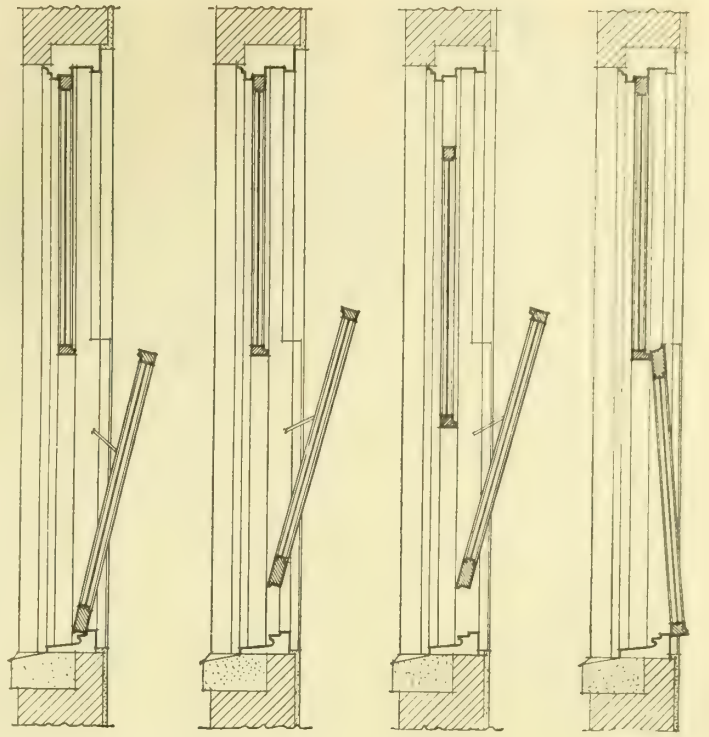


Fig. A Deflected Centre Opening | Fig. B Deflected Centre and Bottom Openings | Fig. C Deflected Centre Top and Bottom Openings | Fig. D Sash Reversed for Cleaners

DETAILS OF OPERATION S AND S WINDOW

Fool-Proof.

The S and S is the only window having instantly removable and reversible sashes under the control of a key which protects it from mischievous tampering.

Service.

The S AND S WINDOW CORPORATION is always at the service of architects, engineers and contractors to consult, or to furnish details and specifications for the manufacture and installation of its products.

Installations.

A FEW RECENT INSTALLATIONS AND CONTRACTS

Third National Bank Building, Springfield, Mass., Starrett & Van Vleck, Architects, Hoggson Bros., Contractors.

Union National Bank, Cleveland, Ohio, Walker & Weeks, Architects, The Crowell-Lundorff-Little Co., Contractors.

Guardian Trust Building, Cleveland, Ohio, Walker & Weeks, Architects, John Gill & Sons, Contractors.

Central Branch, Y. M. C. A., Brooklyn, N. Y., Trowbridge & Ackerman, Architects, The Whitney Co., Contractors.

Carnegie Library, Perth Amboy, N. J., Jensen & Brooks, Architects.

Montefiore Home, New York, N. Y., Buchman & Fox and Arnold Brunner, Associate Architects, Hedden Construction Co., Contractors.

Prairie Oil and Gas Co. Building, Independence, Kans., Madorie & Birdsall, Architects, Thompson Starrett Co., Contractors.

THIRD NATIONAL BANK BUILDING, SPRINGFIELD, MASS.
STARRETT & VAN VLECK, Architects HOGGSON BROS., Contractors

TRUSSED CONCRETE STEEL COMPANY

Manufacturers of United Steel Sash

YOUNGSTOWN, OHIO

ATLANTA, GA.	CLEVELAND, OHIO	EL PASO, TEX.	MINNEAPOLIS, MINN.	PORTLAND, ORE.
BALTIMORE, MD.	COLUMBUS, OHIO	INDIANAPOLIS, IND.	NEW ORLEANS, LA.	ROSWELL, N. M.
BOSTON, MASS.	DALLAS, TEXAS	KANSAS CITY, MO.	NEW YORK, N. Y.	ST. LOUIS, MO.
BUFFALO, N. Y.	DENVER, COLO.	LANCASTER, PA.	NORFOLK, VA.	ST. PAUL, MINN.
CHICAGO, ILL.	DES MOINES, IOWA	LOS ANGELES, CAL.	PHILADELPHIA, PA.	SALT LAKE CITY, UTAH
CINCINNATI, OHIO	DETROIT, MICH.	MILWAUKEE, WIS.	PITTSBURGH, PA.	SAN ANTONIO, TEXAS
SEATTLE, WASH.	SPOKANE, WASH.	SYRACUSE, N. Y.	WASHINGTON, D. C.	

Products.

All types of United Steel Sash to meet every requirement for daylighting and ventilating; Fire Windows; and Steel and Glass Partitions and Doors.

For Reinforcing Steel, Metal Lath, Chemical Products, etc., see our name in General Index.

Co-operation.

Our sash specialists co-operate fully with engineers, architects, owners and contractors in selecting the proper sash for any conditions. Large book on United Steel Sash sent on request.

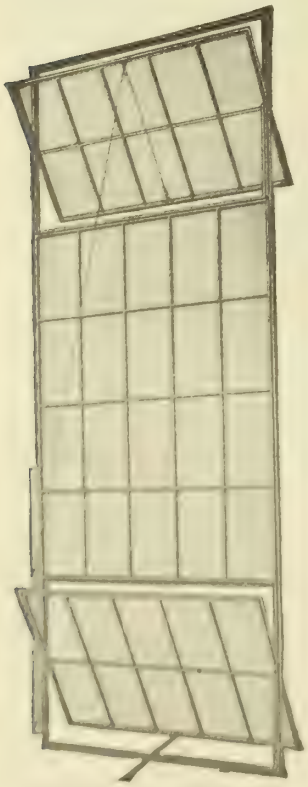
United Steel Sash.

United Steel Sash are built of deep rolled steel sections, united under powerful presses into members of the greatest strength and rigidity. The joints are not weakened by cutting or punching away any of the metal. Other advantages include mitered corners at joints, continuous I-beam sections, extra heavy ventilator frames, double contact weathering, superior workmanship, special hardware of our own manufacture and improved glazing with spring clips.

United Steel Sash is a complete line including special types of sash for all classes of buildings: Horizontally and Vertically Pivoted Side Wall Sash; Vertical Sliding Sash with all types of counterbalances; Continuous Sash, Center Pivoted and Top Hung; Horizontal Sliding Sash; United Steel Casements; Steel and Glass Partitions; Doors, Fire Windows, etc.

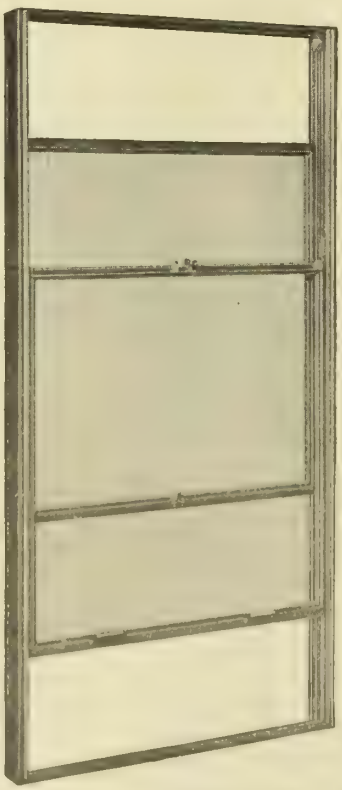
The standard units of these products are combined by mullions to fit all sizes of openings.

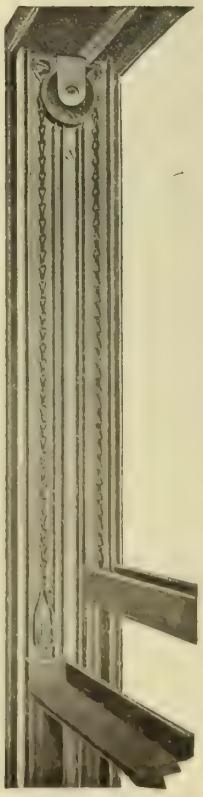
CONTINUOUS UNITED STEEL SASH,
FORD MOTOR CO., DETROIT, MICH.



HORIZONTAL PIVOTED
UNITED STEEL SASH

COUNTERBALANCED SLIDING UNITED STEEL SASH,
WITH "G" MULLION





SPECIAL UNITED STEEL SLIDING SASH
COUNTERBALANCED

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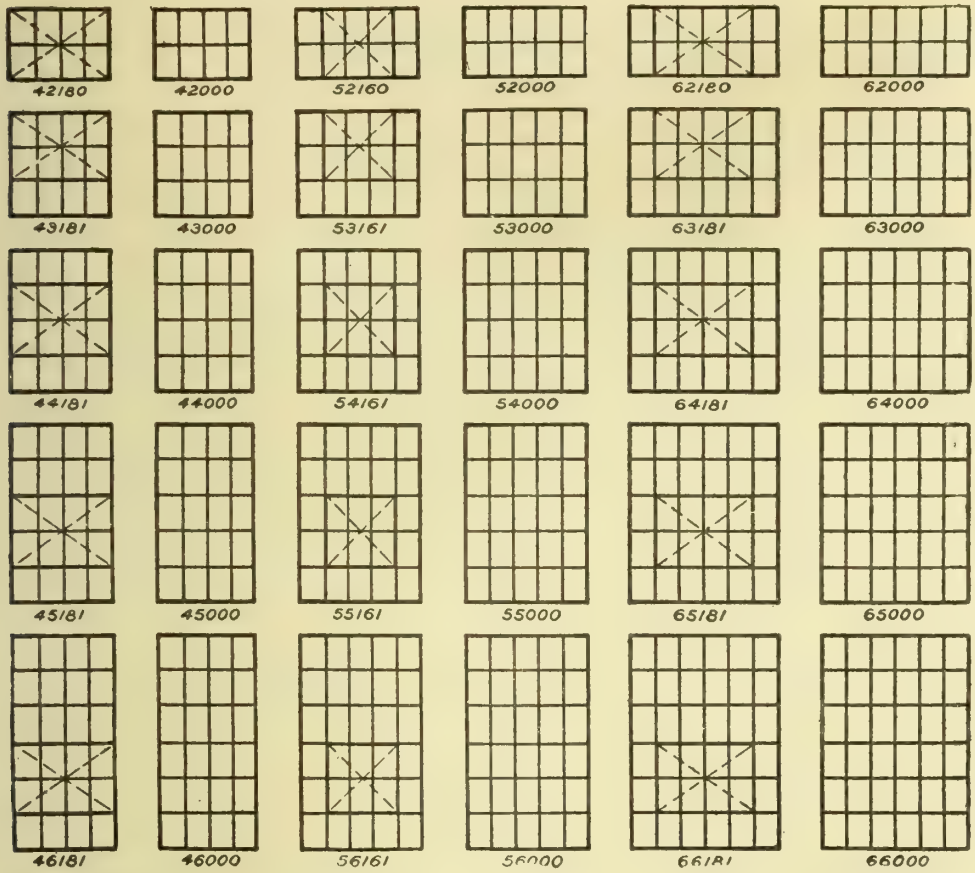


STOCK UNITS OF UNITED STEEL SASH—PIVOTED VENTILATORS AND UNVENTILATED

WINDOW OPENINGS—USING STOCK UNITS

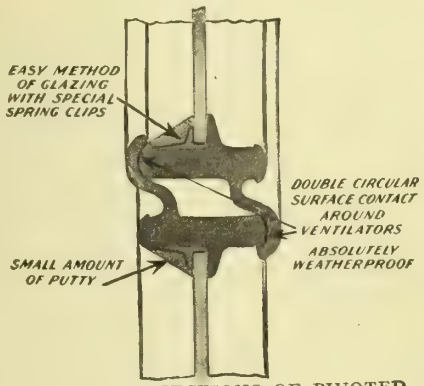
Widths of Window Openings	Size of Glass	No. of Sash Units	Total No. of Lights Wide
4′– 3¼″	12x18	1	4
4′ 11¼″	14x20	1	4
5′ 3¾″	12x18	1	5
6′– 1¾″	14x20	1	5
6′– 4¼″	12x18	1	6
7′– 4¼″	14x20	1	6
8′– 8½″ to 8′– 9½″	12x18	2	8
10′– 0½″ to 10′– 1½″	14x20	2	8
10′– 9½″ to 10′ 10½″	12x18	2	10
12′– 5½″ to 12′– 6½″	14x20	2	10
12′ 10½″ to 12′–11½″	12x18	3	12
13′– 1½″ to 13′– 3½″	12x18	3	12
14′– 2 ″ to 14′– 4 ″	12x18	3	13
14′–10½″ to 14′–11½″	14x20	2	12
15′– 1½″ to 15′– 3½″	14x20	3	12
15′– 2½″ to 15′– 4½″	12x18	3	14
16′– 3 ″ to 16′– 5 ″	12x18	3	15
16′– 4 ″ to 16′– 6 ″	14x20	3	13
17′– 3½″ to 17′– 5½″	12x18	3	16
17′– 6½″ to 17′– 8½″	14x20	3	14
17′– 9½″ to 17 – 9½″	12x18	4	16
18′– 4 ″ to 18′– 6 ″	12x18	3	17
18′– 9 ″ to 18′–11 ″	14x20	3	15
19′– 4½″ to 19′ – 6½″	12x18	3	18
19′– 7½″ to 19′ 10½″	12x18	4	18
19′–11½″ to 20′ – 1½″	14x20	3	16
20′– 2½″ to 20′– 5½″	14x20	4	16
21′– 2 ″ to 21′– 4 ″	14x20	3	17
21′– 8½″ to 21′–11½″	12x18	4	20
22′– 4½″ to 22′– 6½″	14x20	3	18
22′– 7½″ to 22′ 10½″	14x20	4	18
23′– 9½″ to 24′– 0½″	12x18	4	22
25′– 0½″ to 25′– 3½″	14x20	4	20
25′–10½″ to 26′– 1½″	12x18	4	24
27′– 5½″ to 27′– 8½″	14x20	4	22
29′–10½″ to 30′– 1½″	14x20	4	24

Heights of Window Openings	Size of Glass	No. of Sash Units	Total No. of Lights High
3′– 1¾″	12x18	1	2
3′– 5¾″	14x20	1	2
4′– 8¼″	12x18	1	3
5′– 2¼″	14x20	1	3
6′– 2¾″	12x18	1	4
6′–10¾″	14x20	1	4
7′– 9¼″	12x18	1	5
8′– 7¼″	14x20	1	5
9′– 3¾″	12x18	1	6
10′– 3¾″	14x20	1	6

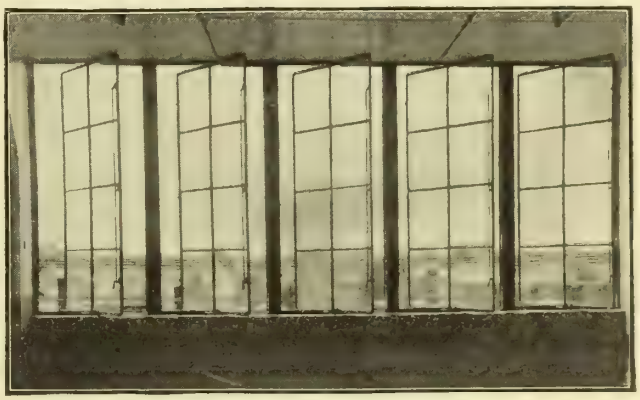
Stock Sizes.

Stock sizes of United Steel Sash will meet all building requirements. They contain the same quality of material and workmanship as all other types of United Steel Sash.

The use of stock sizes will permit the standardizing of window openings without sacrificing architectural effect.



VENTILATOR SECTIONS OF PIVOTED STEEL SASH



VERTICALLY PIVOTED UNITED STEEL SASH

Semi-Stock Sash.

In addition to the Stock Sash, we also carry in warehouse stock large numbers of standard size ventilators which can be readily fitted into especially made frames. The saving in time by this method over that of "made-to-order" ventilators is considerable.

To-Order Sash.

Includes all varieties of pivoted semicasement sash, manufactured in glass size varying by inches to meet all building requirements. A few of the sash are illustrated below. We also carry stock size of counterbalanced sliding sash.

Sash Book.

Our large sash book sent free to architects, describing all types of sash in detail, and giving full information.

ECONOMY CASEMENTS OF UNITED STEEL SASH

VOIGTMANN & COMPANY

MANUFACTURERS OF

Metal Windows and Doors

445-459 West Erie Street

CHICAGO, ILL.

TELEPHONE, 1305 SUPERIOR

Products.

FIREPROOF WINDOWS, VOIGTMANN AUTOMATIC CLOSING and LOCKING WINDOWS, WIRE-GLASS WINDOWS, METAL WINDOW FRAMES, METAL DOORS, METAL SASHES; INTERIOR PARTITIONS of METAL; APPROVED FUSIBLE LINKS.

Official Approval.

As a result of tests held at the Laboratory of the National Board of Fire Underwriters at Chicago, the following types of our construction have been approved, and reports covering these approvals have been filed with each State and City Underwriters' Association:

Stationary—Twin stationary, not over 9′ 0″ x 5′ 0″ without reinforced mullion; stationary upper and lower and pivoted middle sashes; top-hinged; top-hinged upper sash, stationary lower sash; single sash pivoted; twin single sash pivoted, not to exceed 9′ 0″ x 5′ 0″ without reinforced mullion; pivoted upper and stationary lower sash; pivoted lower and stationary upper sash; upper and lower sash pivoted; three sash pivoted. Casement—Casement with stationary, pivoted or top-hinged transom. Double-hung, two types—Double-hung with stationary, pivoted or top-hinged transom.

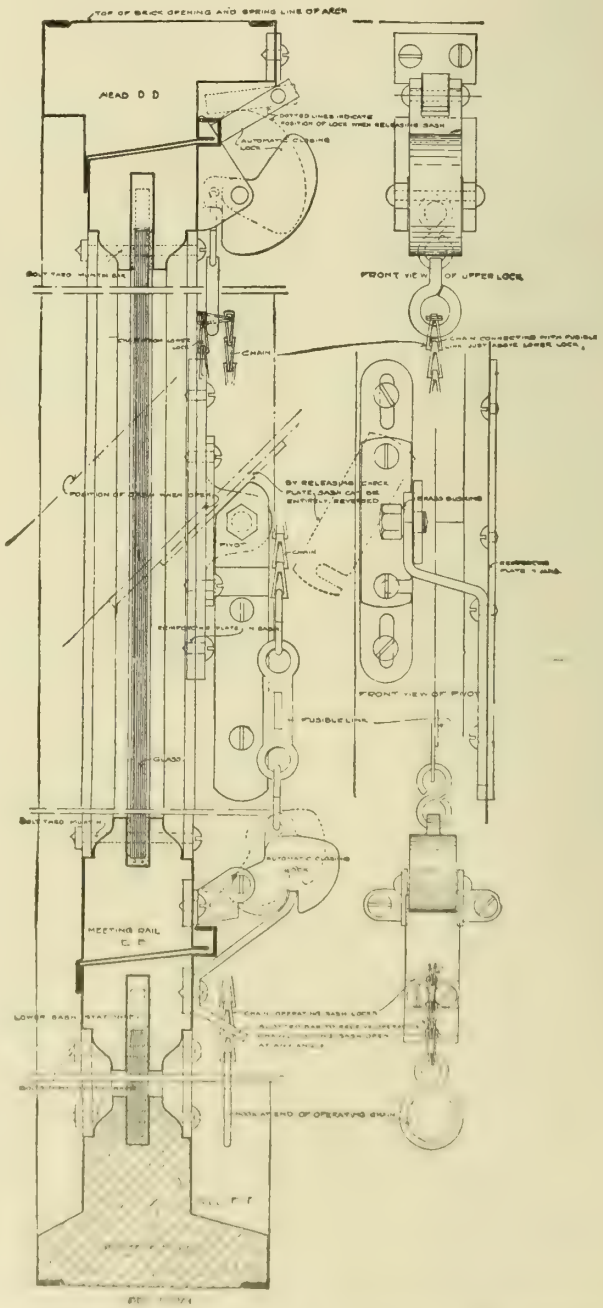
Voigtmann Standard Pivoted Automatic Fire Window.

The lower sash is stationary, being built as a part of the frame. The upper sash is pivoted on ⅜-inch trunnions and is so arranged that it can be revolved for cleaning, but is provided with a stop which in action prevents the sash being tilted too far to prevent its positive closing in case of fire.

Our pivots and plates are made of cold-rolled strip steel; the holes in which the trunnions revolve are heavily bushed with brass to prevent the possibility of rust interfering with their perfect working. Both pivots and plates are attached to the sash rails and frame sides by button-head screws that are screwed into heavy plate iron reinforcements within the sash and frame. The pivots are adjustable, thus allowing a very nice location of the sash in the frame opening.

The sash is so hung that about sixty per cent of its weight is below the point of revolution. When open it is held in position by a chain that runs through an eye attached to the upper lock and then passes down to the lower lock to which it is attached by a fusible link that will melt at 160° Fahr., releasing the sash which will swing shut and lock.

Our locks are of our own design and manufacture; the cast portions are malleable and the housings and small parts are stamped metal. They are made entirely without springs; fitted to both top and bottom rails of the sashes, and the latch parts are attached and adjusted so that their operation can not be affected by the impact of the closing sash. They are absolutely positive in action. Inside of frames and sashes we rivet reinforcing plates to which hardware is attached.



SECTIONS OF THE VOIGTMANN AUTOMATIC FIRE WINDOW
Frame 6¼ inches thick

Continued on next page

Hollow air-chamber construction throughout, made of No. 24-gauge galvanized sheet iron. Heavier gauges of iron or any acceptable gauge of copper furnished on special order.

Unless otherwise specified we furnish ¼-inch ribbed wire-glass cut to size ready for setting; glass is always shipped separately. We recommend that architects always include the glass in the metal-window specifications to insure its being cut to correct and full size; the lights must have not less than ⅝-inch bearing in the grooves.

Before shipment we give each window a priming coat of gray paint, and fit all necessary hardware in place.

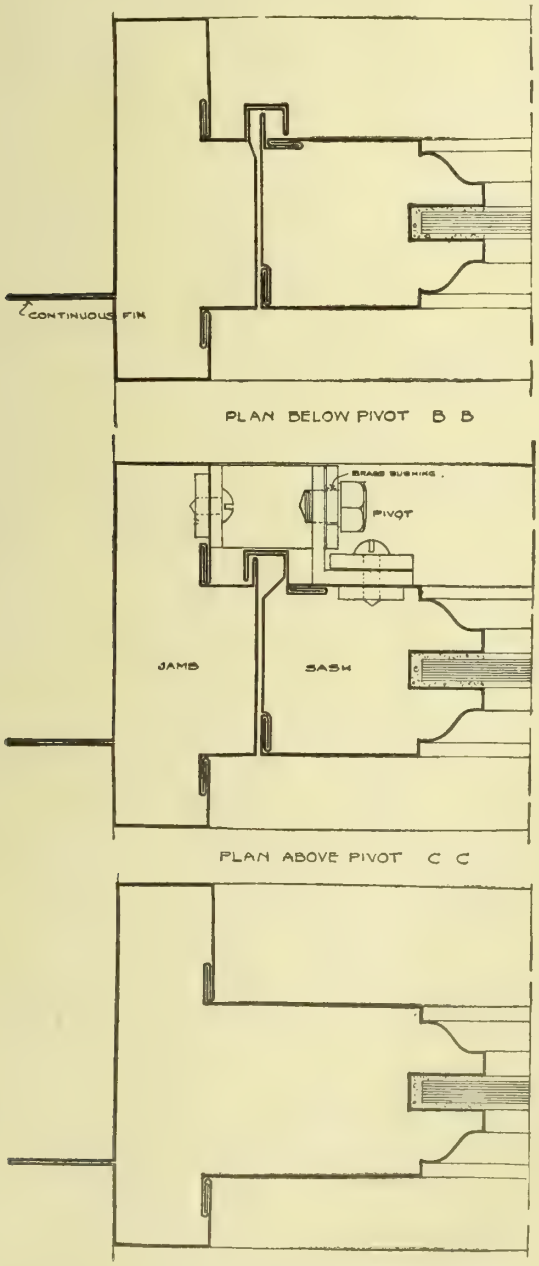
Double-Hung Windows.

By cutting all of our miters with dies and using jigs in the assembling of our frames and sashes, to insure correct rectangularity and exactness of size, we are enabled to make double-hung windows more wind- and dust-proof than has heretofore been possible.

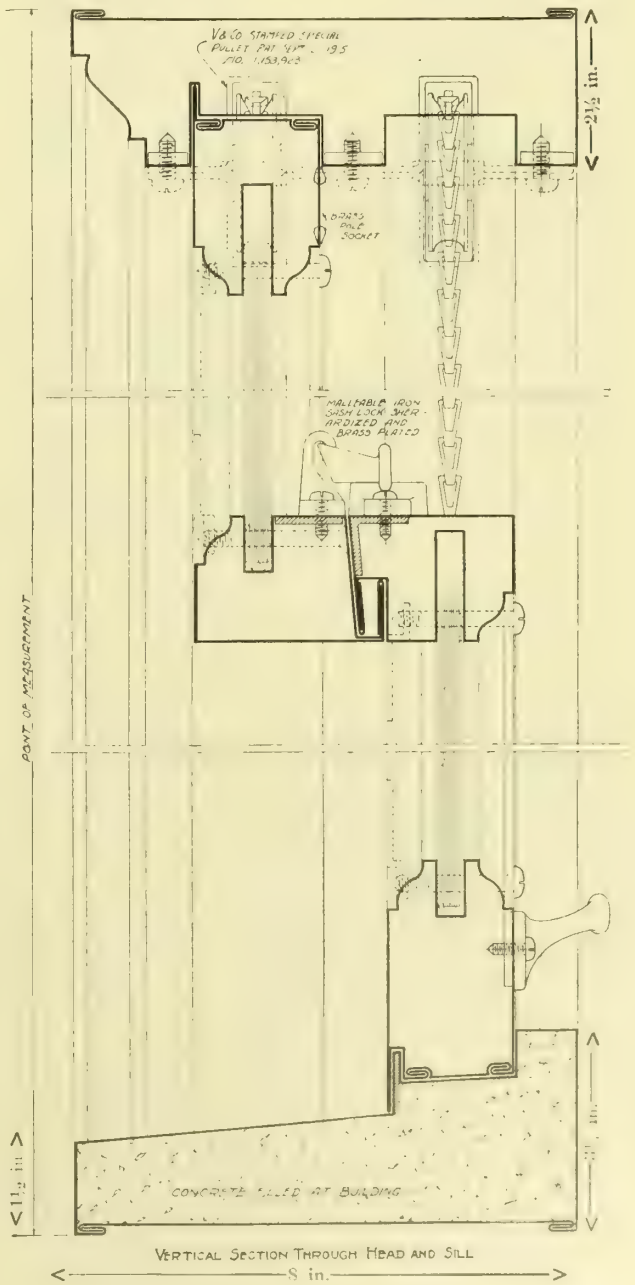
The window of this type we now show has the hanging stile and walling-in fin formed as a part of the jamb. The continuous weather stops are adjustable and easily removed from frame to permit hanging of weights and sashes. The continuous slots and fins at outer surface of sash rails and sash stiles prevent wind and dust getting past outer surface of sashes.

Hardware.

Standard equipment per Underwriters' requirements. Ives "Crescent" sash lock, made of malleable iron, sherardized and then bronze plated. Voigtmann & Company special combination overhead and side pulley sets (patented); heavy steel sash chain sherardized; Voigtmann & Company special bar sash lifts, designed



SECTIONS OF THE VOIGTMANN AUTOMATIC FIRE WINDOW



VERTICAL SECTION THROUGH HEAD AND SILL DOUBLE-HUNG WINDOW

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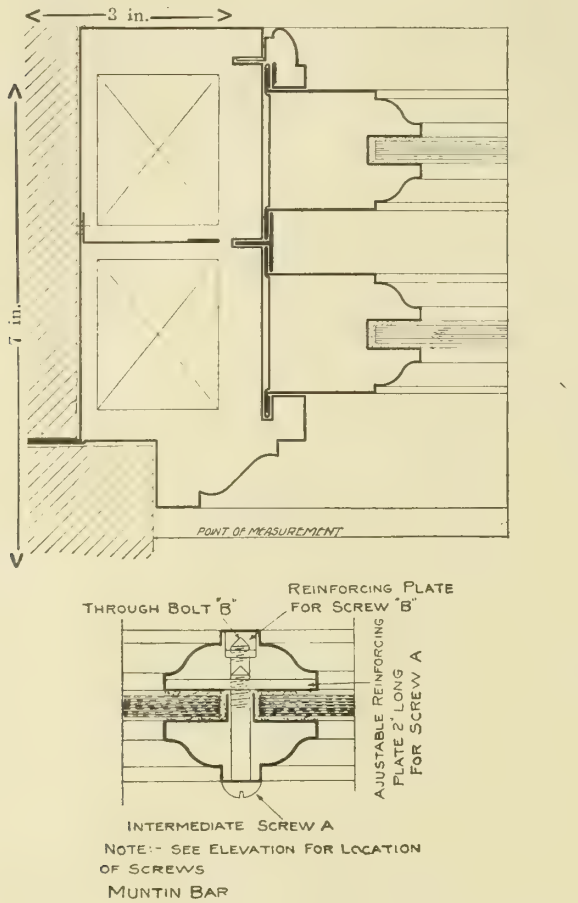
for metal windows, made of cast iron and bronze plated. Pole socket, made of brass and spun in sash rail. Weights cast iron.



DETAILS OF VOIGTMANN DOUBLE-HUNG WINDOW

Hanging of Weights.

From a point slightly above upper surface of sill an opening 2¾ by 14 inches is blanked out of inner face of pulley stile for insertion of the weights. This opening is closed with a removable cap held in place with machine screws and fitted flush with face of pulley stile. The vertical joints are overlapped and hidden from view by the weather stops, the horizontal joints by the lower sash stiles. The parting stops are held in place by friction, the fin fitting tightly in jamb slot, also being inserted into head and fastened at sill with a machine screw. To hang the weights, remove the inner weather stops first, by taking out screw in jamb at lower end of weather stop; pull out stop at sill first, swinging it to center of frame, and then out of head; remove lower sash, letting upper sash rest on sill; then remove outer weather stops, by removing screw at upper end; pull stops out at upper end first, swinging them to center of frame; then pull them upward, to remove tongue which is inserted into sill. Avoid bending weather stops. Remove the upper sash and pocket caps from frame; then proceed to hang weights and sash, the same way they are installed in the ordinary wooden windows. See that chains are not kinked or twisted, and that they are securely attached to weights and sashes. The weights are 2 by 2½ inches in section, as shown by detail, and are included in proposal, unless we specifically stipulate to the contrary.

Hollow air chamber construction throughout, made of No. 24 gauge special tight-coated galvanized sheet iron or steel. Heavier gauges of iron or any acceptable gauge of copper furnished on special order.

Unless otherwise specified, one fourth-inch ribbed wire glass, cut to size ready for setting, is furnished; glass always shipped separately.

Before shipment, each window is given a priming coat of gray paint, and all small hardware is fitted in place. Weights, chains and sash lifts are always shipped separately.

Glazing.

Remove the muntin caps, putty the side and bottom grooves and the face of the stationary half of the muntin. Do not putty the upper groove. Insert the glass in the grooves in the upper sash rail, then let it drop down to fill the lower groove, forcing it into place in the side groove; repeat this for each light, replace the muntin caps, cut off any superfluous putty and point up the edges of the upper groove on both sides, and, if you wish, the edges of the muntin caps, although this is very seldom necessary. Where sashes have but one light, the grooves in the top and bottom sash rails are made as detailed, but the side stiles have removable glazing caps that are easily taken off to admit the placing of the glass. Unless otherwise specified, windows are always arranged to carry glass as large as allowed under Underwriters' rules, which limit us to 720 square inches for one light.

Other Details.

The other details of Voigtmann Double-Hung Windows are the same as for Standard Pivoted Windows.

Services and Estimates.

We offer the services of a competent architect and draughtsman, who may be able to aid you with suggestions for incorporating our work in your plans.

In order to furnish an estimate we must know the kind of windows wanted, the size of the openings in the masonry to receive the windows, and whether such openings have flat or arched tops.

From these data we will furnish an estimate, which will, unless otherwise requested, include a priming coat of paint, all hardware, sash chain and weights, where the construction requires them, if specifically mentioned, and glass cut ready for setting in cases where deliveries are for points outside of Chicago.

Doors.

We offer a high-class hollow door, made of galvanized "Armco" iron, or black steel, as may be preferred. The parts of this door are not drawn, therefore the coating on the galvanized metal is left intact; the moulding is clear and sharp in contour, and very pleasing in design. Prices, details and full information upon request.

WINSLOW BROS. COMPANY

Winslow Window Department

4600-4700 West Harrison Street

CHICAGO, ILL.

TELEPHONE, 445 AUSTIN

BRANCH OFFICES

NEW YORK, N. Y., 8 West 40th Street PITTSBURGH, PA., Ferguson Building LOS ANGELES, CAL., Central Building

AGENCIES IN ALL PRINCIPAL CITIES

Products.

Designers and Manufacturers of the WINSLOW WINDOW (Austral Balance) and the WINSLOW FIRE WINDOW.

For Ornamental Iron and Bronze see our name in General Index.

Construction.

All parts of window solid rolled open-hearth steel, of specially designed sections.

Mountings, hardware, shade fittings, cleaner bolts, glazing stops, etc., of solid bronze and drop forged steel of special design.

Finished in one coat best quality red lead and oil, Tockolith, or other selected paint, ready for finishing paint by others.

Simple exposed construction. No concealed counterweights or other mechanisms.

Austral Balance.

Is a special feature of the window, connecting the upper and lower sash in perfect balance.

One Plane.

Upper and lower sash lie in one plane when window is closed, avoiding unsightly overhang at meeting rail.

Appearance.

The architectural value of the Winslow Window is definitely recognized on account of its inconspicuous lines and lack of heavy or clumsy construction.

Efficiency.

Scientific ventilation, easily controlled.

Complete weather tightness.

Ease of operation, as both sash are always in balance.

Additional daylight obtained approximating 15 per cent more than with ordinary double hung type of window.

Awnings.

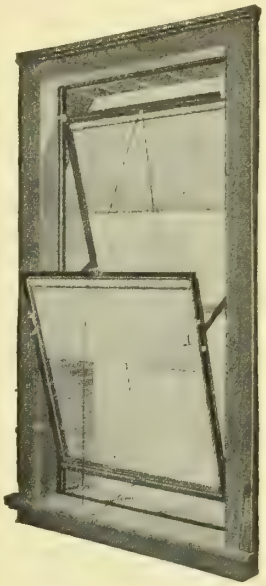
The unique arrangement of shades on upper and lower sash makes perfect awnings, avoiding any necessity of separate exterior unsightly and expensive awnings.

Cost.

In considering comparative cost of the Winslow Window the following elements of ordinary windows are eliminated: Counterweights, chains, weight pockets, shade brackets, cleaner bolts, poles, etc.; heavy walls involving extra steel construction, exterior awning, etc.

IMPORTANT INSTALLATIONS WITH ARCHITECTS' NAMES

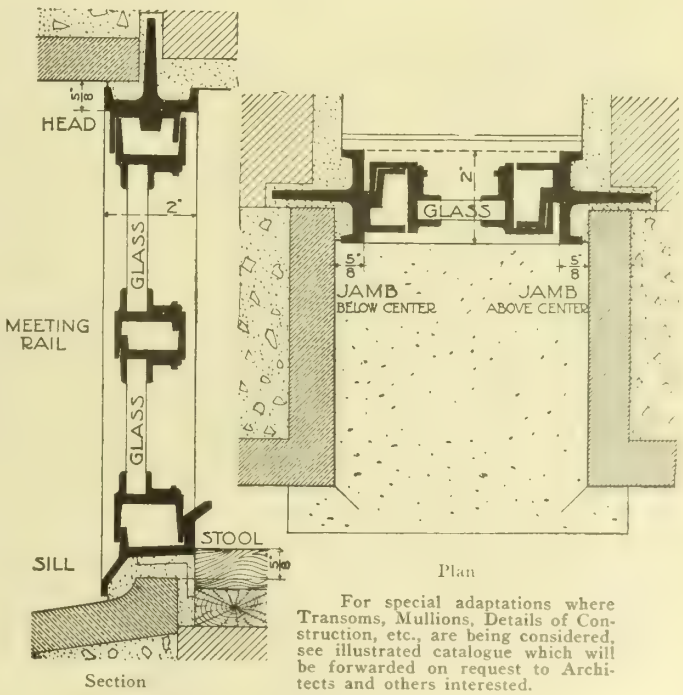
Equitable Building, New York, N. Y., E. R. Graham
8 West 40th Street, New York, N. Y., Starrett & Van Vleck
Guaranty Trust Building, New York, N. Y., York & Sawyer
Heckscher Building, New York, N. Y., Jardine, Hill & Murdock
First National Soo Line Building, Minneapolis, Minn., R. W. Gibson
Lumber Exchange Building, Chicago, Ill., Holabird & Roche
Fletcher Trust & Savings Building, Indianapolis, Ind., Vonnegut & Bohn
Borland Building, Chicago, Ill., C. S. Frost
Mercy Hospital, Chicago, Ill., Chas. Prindeville
McKelvey School, Pittsburgh, Pa., Carlton Strong
Indianapolis Public Library, Indianapolis, Ind., Zantzinger, Borie & Medary
Pacific Mutual Building, Los Angeles, Cal., W. J. Dodd
Security National Bank, Los Angeles, Cal., John Parkinson



Window in this position gives good circulation of air, even on still days. Note that shades arranged as awnings make unnecessary expensive maintenance of exterior awnings

A slight pull, and window will open up to 6 inches at meeting rail, while remaining closed at top and bottom, giving perfect indirect ventilation

WINSLOW WINDOWS, AUSTRAL BALANCE



For special adaptations where Transoms, Mullions, Details of Construction, etc., are being considered, see illustrated catalogue which will be forwarded on request to Architects and others interested.

DETAILS OF A TYPICAL WINSLOW WINDOW

GEORGE WRAGGE, LIMITED

INCORPORATED

Rolled Steel and Bronze Casement Windows

105 West Fortieth Street
NEW YORK, N. Y.

TELEPHONE, BRYANT 7464

FACTORY
MANCHESTER, ENG.

Products.

"WRAGGE" ROLLED STEEL and BRONZE CASEMENT WINDOWS; LEADED GLAZING, plain and ornamental.

Material and Finish of Casement Windows.

Made in solid rolled steel, or solid drawn bronze, and in all styles, opening outwards or inwards. Fitted with special hardware of our own designs, in either bronze or iron, highly finished. The bars are hydraulically straightened, corners machine mitred and welded; thoroughly cleaned free from rust or scale by sandblasting. All steel work is oiled, and painted one coat of pure red or white lead, and one coat lead paint, and enameled if desired.

Guarantee.

Windows are guaranteed absolutely weather-tight.

Specification Form, Casement Windows.

Casement Windows to be "Wragge" [rolled steel, drawn bronze], swinging [inward, outward], transoms [pivoted, top hung, bottom hung]. Hangings to be mild steel forgings bushed with gun-metal; handle plates and stay jaws to be mild steel forgings welded solid to sections. Hardware to be of selected designs in [iron, bronze], including two-point fastener. All joints of frame and sash to be accurately machine mitred, welded solid (not brazed), the whole cleaned free from rust or scale by sandblasting. Steel work oiled and painted one coat pure red or white lead, and one coat lead paint, prepared for glazing with [leaded, plate] glass. Set complete by makers, GEORGE WRAGGE, LIMITED, INC., 105 West 40th Street, New York, N. Y., and guaranteed absolutely weather-tight.

Glazing Beads.

Angle steel glazing beads are recommended, but are not absolutely essential if the glazing be done with our special metallic cement.

FIG. 1 RESIDENCE OF LOUIS ROSENSTEIN, TARRYTOWN, N. Y.
TAYLOR & LEVY, Architects

Continued on next page

Fly Screens.

Where casement windows open inward, fly screens can be fitted on the outside; but for windows opening outward, we have perfected a special adjuster which does not project into the rooms, thus permitting the use of screens on the inside. (See Fig. 2.) The latter method is the most satisfactory, as it affords no interference with shades and curtains.

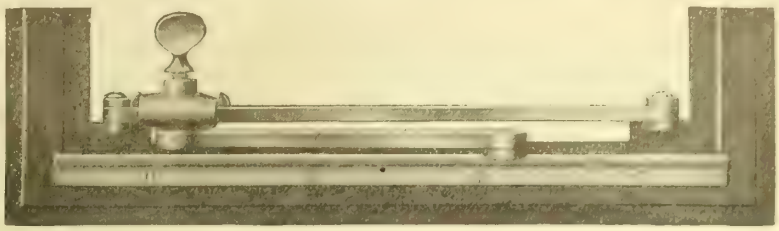


FIG. 2. SPECIAL ADJUSTER REFERRED TO IN PARAGRAPH "FLY SCREENS"
This Adjuster has positive action when casement is only three inches open

Variety of Shapes and Sections.

We have several sizes and shapes of bars for the manufacture of casements suitable for every class of building. Illustration shows full-sized section for casements swinging out, up to 5 feet high (Fig. 3).

Prices, Estimates.

Owing to various sizes, method of swinging, and style of hardware, it is impossible here to give a complete price-list, but we will promptly furnish estimates and detailed drawings on receipt of sizes and particulars.

For guidance of architects using metal casements for residences, we give a price-list of Section No. 2, full-size section illustrated here. Prices include all necessary bronze hardware and the applying of same, but are exclusive of glass.

PRICES FOR CASEMENTS AND TRANSOMS
Width up to Two Feet

Height	Per Casement	Per Transom
Up to 3 ft. 0 in.....	$10.00	$8.25
Up to 3 ft. 6 in.....	10.50	8.75
Up to 4 ft. 0 in.....	11.00	
Up to 4 ft. 6 in.....	11.50	
Up to 5 ft. 0 in.....	12.00	

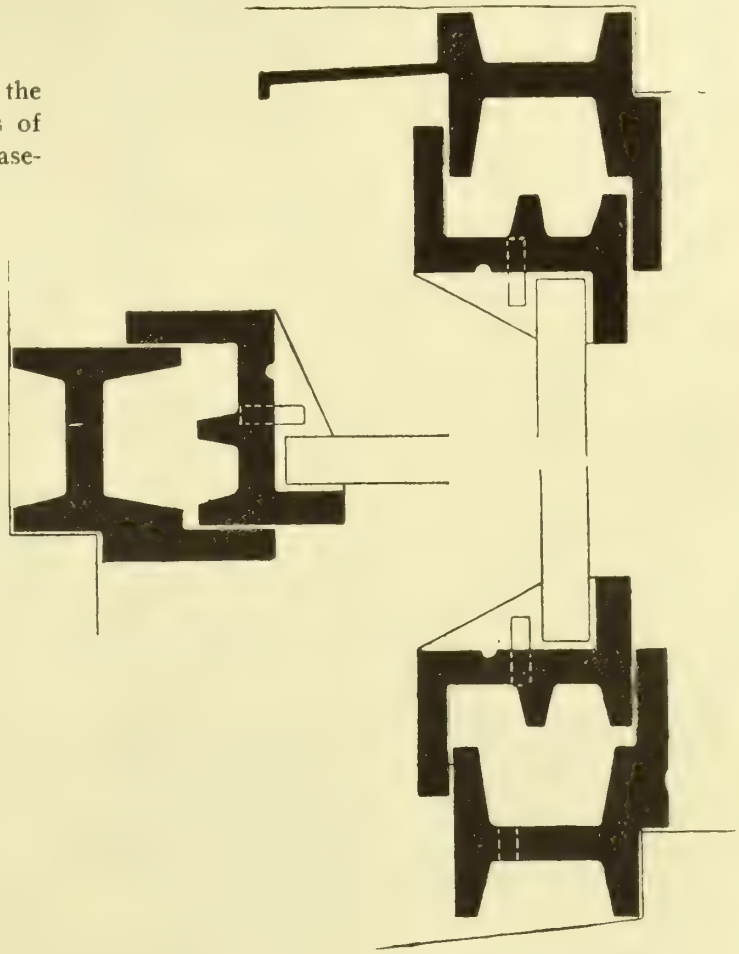


FIG. 3. FULL-SIZE DETAILS OF SECTION NO. 2 CASEMENT TO OPEN OUTWARDS

Safety Cleaning Casements.

Made up of special sections, rain- and dust-proof, projection into room two and one half inches when open and giving a space of five inches for cleaning. Three thousand of these casements set in Singer Tower, New York, N. Y.

References.

List of buildings equipped with our windows and the names of architects will be gladly sent on request.

Catalogues.

We have recently issued a small booklet concerning two improved sections, one of which we illustrate. Pending the complete revision of our large catalogue, a copy of this booklet will be mailed on request and will be found extremely interesting.

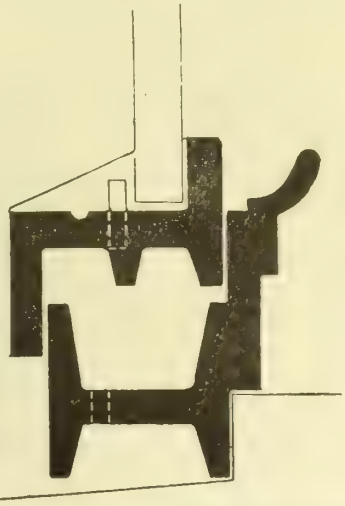


FIG. 4. DETAIL SHOWING BRONZE CONDENSATION CHANNEL
Can be fitted to all sections, if desired

KEYSTONE SASH COMPANY

Weather-stripped Reversible Windows

PITTSBURGH, PA.

REPRESENTED IN ALL LARGE CITIES

Products.

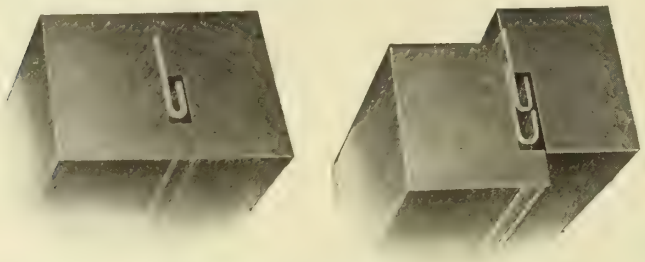
"KEYSTONE" METAL WEATHER-STRIPPED PIVOTED SASH, "KEYSTONE" WEATHER-STRIPPED DOUBLE-HUNG REVERSIBLE WINDOW, "KEYSTONE" WEATHER-STRIPPED PLANK FRAME REVERSIBLE WINDOW, "KEYSTONE" PIVOTED CASEMENTS and TRANSOMS.

General Description.

The "Keystone" is an improved device combining the advantages of metal weather-strips, pivoted sash and patent ventilators in a practical window, and one that costs less than other devices used for similar purposes. The window consists of a frame that differs from the ordinary only in that it is grooved for receiving the Keystone system of double bead weather-stripping, and a pair of pivoted sash of improved construction. The pivoted sash may be used alone, without the system of double bead weather-stripping on frames; in which case they will fit any window frame, and are adapted for replacing ordinary sash in old buildings.

"Keystone" Metal Weather-stripped Pivoted Sash.

The sash is constructed on the familiar principle of attaching to an ordinary sash a pair of reversing strips or hanging stiles. The improved means used for accomplishing this purpose and the advantages derived therefrom are as follows:



SECTIONAL VIEWS SHOWING APPLICATION OF WEATHER-STRIPS AT JOINT BETWEEN SASH AND ATTACHED REVERSING STILES

(1) Joint at each side, between sash and attached reversing strips, is perfectly weatherproof, made so by the application of interfitting metal weather-strips that form an air-tight joint when sash is closed.

(2) The pivot hinge used is of the friction type, dispensing with the use of springs and ratchet devices that experience has shown do not stand up under service. The material used is cold-rolled steel, the parts being stamped out of the solid and rustproofed by the reliable sherardizing process.

SHOWING PIVOT HINGE

(3) "Keystone" sash is assembled at the factory and comes to the building with all parts attached. It is fitted and hung just like ordinary sash, requiring no expert labor for installing.

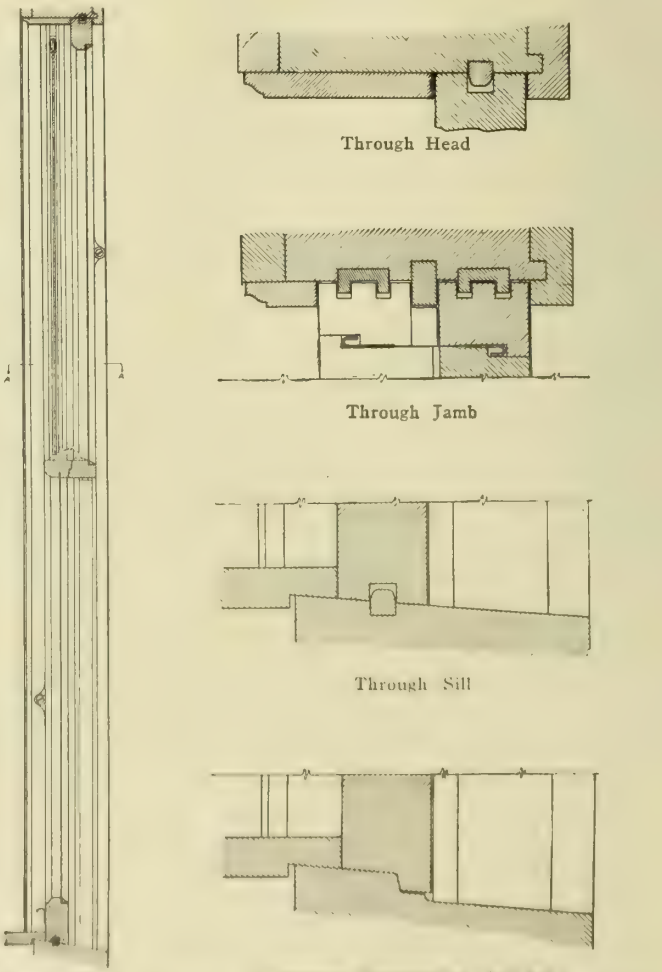
(4) It will fit any window frame of standard construction, and is adapted for use in combination with any make of weather-stripping used on ordinary windows.

Specifications—"All exterior windows throughout building, unless otherwise specified, shall be equipped with "Keystone" metal weather-stripped springless friction pivoted sash as manufactured by KEYSTONE SASH COMPANY of Pittsburgh, or equal."

Full-size details furnished on application.

"Keystone" Double-Hung Reversible Window.

The "Keystone" pivoted sash described, when used in a frame equipped with the "Keystone" system of double bead weather-stripping, provides an improved window that combines the advantages of metal weather-strips, pivoted sash and patent ventilators, at less than the cost of other devices used for similar purposes.



SECTIONAL VIEWS "KEYSTONE" DOUBLE HUNG WINDOW

Continued on next page

As illustrated, the "Keystone" system of double bead weather-stripping consists of oiled hardwood strips set solidly into grooves machined in frame members for the purpose. Corresponding grooves in sash members engage projecting parts of weather-strips, the combination forming an efficient and durable system of double bead weather-stripping.

The strips come to the building cut to proper length, and are applied to frame when hanging the sash. The work is easily performed by any carpenter from instructions sent, and requires but a few minutes of labor per window.

The advantages claimed for the "Keystone" double-hung window are:

(1) It provides an air-tight, dust-tight, rainproof, windproof and non-rattling window, of practical and inexpensive construction.

(2) The system of weather-stripping used is simple and durable. The strips, being set in grooves, can not develop "leaks" or come loose.

CLEANING BOTTOM SASH

CLEANING TOP SASH

(3) The pivoted sash permit cleaning the window from the inside, eliminating all danger from the work of window cleaning and saving two thirds the time and labor formerly required.

(4) With the bottom sash slightly tilted the window provides an improved mode of hygienic ventilation. The fresh air enters at the meeting rails and is deflected upwards to prevent drafts.

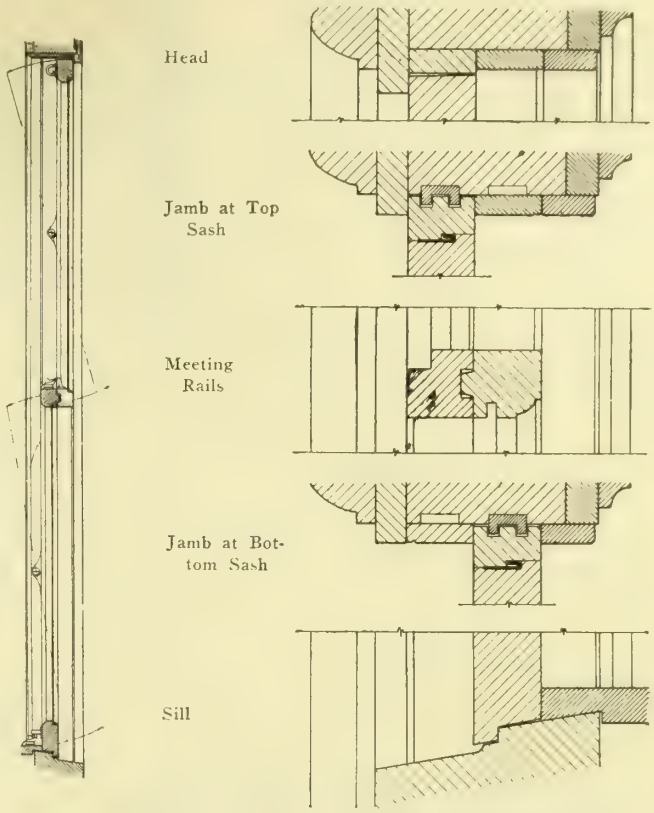
Specifications—"All exterior double-hung windows throughout building, unless otherwise specified, shall be equipped with "Keystone" metal weather-stripped springless friction pivot sash and "Keystone" system of double bead weather-stripping—all as manufactured by Keystone Sash Company of Pittsburgh, or equal."

SHOWING VENTILATION

Full-size details furnished on application.

"Keystone" Plank Frame Reversible Window.

The "Keystone" double-hung window described is for use on dwellings and other buildings where provision has to be made for fly screens. For buildings where screens are not used, such as schools, business blocks, office buildings and, under certain conditions, the upper stories of hotel and apartment buildings, the "Keystone" plank frame reversible window has the advantage of costing less than the double-hung type.



SECTIONAL VIEWS PLANK FRAME WINDOW

In its main features the plank frame type is similar to the double-hung, except that the sash do not slide. The omission of weight boxes, weights, pulleys and chain effect considerable saving in the cost of the window.

Special window hardware used at the sill, consisting of combination bar pull and lock, draws bottom of sash tightly against rabbeted sill and respective stool, providing a dust-tight and water-tight sill construction.

DRAFTLESS VENTILATION

MAXIMUM VENTILATION

Draftless ventilation is provided by tilting the top sash. In very warm weather both sash may be tilted, throwing the entire window open for ventilation. This feature is made use of in school buildings for quickly changing the air of classrooms during recess time.

Individual shades mounted on each sash provide an ideal shade arrangement that serves at the same time the purposes of an awning. By manipulating the

Continued on next page

shades it is possible always to exclude the direct glare of the sun, while permitting diffused light to enter. Unlike awnings, the arrangement does not darken the room, nor does it choke up the free circulation of air through the window.

Specifications—"All exterior windows throughout building, unless otherwise specified, shall be of "Keystone" weightless plank frame construction equipped with "Keystone" metal weather-stripped springless friction pivot sash and "Keystone" system of double bead weather-stripping—all as manufactured by KEYSTONE SASH COMPANY of Pittsburgh, or equal.

IMPROVED SHADE ARRANGEMENT

Office Buildings.

"Keystone" weather-stripped reversible windows, either in the double-hung or the plank frame type, provide an ideal window for use on office buildings, the plank frame type having the advantage of lesser cost. The window is rainproof, windproof and non-rattling—features that are important for exposed buildings; it provides draftless ventilation easily regulated, a feature that is very important for crowded offices; it provides an ideal shade arrangement that at the same time serves the purposes of an awning; and last, but not least, it not only eliminates all danger from the work of window cleaning, with a resultant decrease in liability insurance, but also saves two thirds the time and labor needed to perform this work.

School Buildings.

The "Keystone" weatherproof reversible window in the plank frame type is particularly adapted for use in school buildings. Being practically air-tight, it prevents outside wind pressure from interfering with the proper working of the heating and ventilating fan system. For school buildings not equipped with a fan system, it provides draftless ventilation easily regulated. It permits quickly changing the air in classrooms during recess time by throwing the windows wide open. The shade arrangement is ideal for school purposes, and is a great improvement over ordinary shades. No weights being used, there is a saving of six inches or more in the width of each mullion. The window is easily and quickly cleaned, saving the time of the janitors and eliminating all danger from the work.

PARTIAL LIST OF INSTALLATIONS

Gladstone School, Pittsburgh, Pa.
McKelvy School, Pittsburgh, Pa.
Madison School, Youngstown, Ohio
Cathedral High School, Pittsburgh, Pa.
Western Theological Seminary, Pittsburgh, Pa.
St. Regis Home, Pittsburgh, Pa.
United Presbyterian Community House, Pittsburgh, Pa.
Kenrick Seminary, St. Louis, Mo.
Seaman-Sleeth Office Building, Pittsburgh, Pa.
Lutheran Orphanage, Pittsburgh, Pa.
Palace Office Building, Erie, Pa.
Elks Club, Braddock, Pa.
I. O. O. F. Building, South Fork, Pa.
Apartment Building, Donora, Pa.
Christian Church, Bethany, W. Va.
Methodist Episcopal Church, Waverly, N. Y.
Evangelical Lutheran Church, Plymouth, Ind.
United Presbyterian Church, Newton, Iowa
Cathedral High School, Toledo, Ohio
Chalmers School, Youngstown, Ohio

WESTERN RESERVE BANK BUILDING, WARREN, OHIO
C. F. OWSLEY, Youngstown, Ohio, Architect
GEORGE A. FULLER CO., New York, N. Y., Contractor

CHENEY HIGH SCHOOL, PITTSBURGH, PA. (15S ROOMS).
[illegible], Pittsburgh, Pa., Architect
THOMPSON, STARRETT CO., New York, N. Y., Contractor

AMERICAN CHAIN COMPANY, INC.

BRIDGEPORT, CONN.

CANADA: DOMINION CHAIN COMPANY, LIMITED, MONTREAL, QUE.
FACTORY: NIAGARA FALLS, ONT.
LONDON OFFICE: 8 WHITE STREET, MOOREFIELDS, LONDON, E. C.

Products.

Manufacturers of NIAGARA, EUREKA, TENSO and LOCK LINK STEEL WIRE CHAINS in more than a hundred sizes.

The celebrated AMERICAN FLAT STEEL CHAINS in twenty-six sizes.

APPROVED (GUARANTEED) STEEL, GALVANIZED and BRONZE SASH CHAINS; HERCULES SASH CHAIN.

SAFETY, FURNACE and PLUMBERS' CHAINS.

NIAGARA PIPE-HANGING CHAINS; S HOOKS, EIGHT HOOKS and SPECIAL SHAPES of all kinds in Flat or Round Wire.

"S. R. P." FINISH PORCH SWING and HAMMOCK CHAINS.

Sole Manufacturers of the CAMPBELL HAMMERLOCK SELF-SPREADING COTTER PINS.

Approved American Sash Chain and Fixtures, Guaranteed.

Steel, Hot-Galvanized—American Guaranteed Hot-Galvanized Steel Sash Chain is manufactured from high-grade steel, galvanized in our own plant by our own special hot process, insuring a uniform, heavy, rust-proof coating—with links perfectly free—running smoothly and noiselessly over the smallest pulleys, and is unquestionably the strongest sash chain made. Also furnished in any other finish desired.

Bronze—American Guaranteed Bronze Sash Chain is made from our own special rich, bronze composition, insuring the hardest and best-wearing bronze chain possible to obtain.

AMERICAN GUARANTEED HOT-GALVANIZED STEEL SASH CHAIN

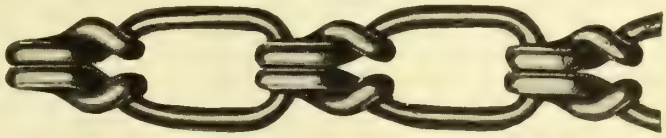
	SIZES			
Number	80	100	130	250
For Sash Weighing	80 lbs.	100 lbs.	130 lbs.	250 lbs.

Hercules.

Wherever a chain is required to harmonize with interior finish, we earnestly recommend our Guaranteed Hercules Sash Chain. It is made of high-grade steel, hot-galvanized, with a heavy electro-copper plate over the galvanizing, which makes a rich, red bronze color; and it is absolutely rust-proof. The price is about two thirds that of bronze chain. Being made of steel, it is stronger than any alloy chain, and in case of fire will maintain its load at a temperature fifty per cent greater than bronze chain of any mixture.

Chain for Fireproof Folding Doors, Rolling Doors and Shutters.

Lock Link Sprocket Chains, made in seventeen sizes to fit any pitch sprocket. This chain is standard for Hand Chain or Fireproof Folding Doors and Steel Rolling Doors and Shutters. Furnished in hot-galvanized, or any other finish desired.



LOCK LINK STEEL WIRE CHAIN

American Galvanized Arc Light Chain.

This chain is especially designed for Arc and Incandescent Lamp suspension. It is heavily galvanized and positively rust-proof. Ice or sleet does not interfere in any degree with its operation, and it is superior to rope or cable in point of operation and wear. It has been on the market for nearly twenty years; millions of feet are in use. It has been adopted by a vast majority of all street lighting companies.

AMERICAN GALVANIZED ARC LIGHT CHAIN

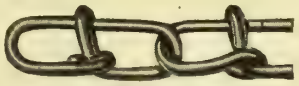
It is made in three sizes, viz., No. 31 and No. 33 for suspending arc lamps, and No. 35 for suspending incandescent lamps. We supply Arc Lamp hooks to easily connect lamp and chain, and also a strong ring which can be attached to pole end of chain with connecting hook.

Other Types of Chains.

We show below a few patterns of other types of chains we manufacture.

AMERICAN PATTERN

NIAGARA PATTERN



EUREKA PATTERN

TENSO PATTERN

Cotter Pins.

Sole makers of Campbell Hammerlock Self-spreading Cotter Pin, patented March, 1912, and various automobile specialties.

CAMPBELL COTTER PIN

Co-operation.

If you have any chain problems, our Experimental Department is at your service. Experts in this department devote all their time to the solution of our customers' difficulties.

THE AMERICAN PULLEY CO.

MANUFACTURERS OF

"American" Pressed-Metal Sash Pulleys

4200 Wissahickon Avenue
PHILADELPHIA, PA.

TELEPHONE, 6980 Tioga

STORES

NEW YORK, N. Y., 33-35 Greene Street
BOSTON, MASS., 165 Pearl Street
CHICAGO, ILL., 124 South Clinton Street
SEATTLE, WASH., 536 First Avenue, South

Products.

"American" Pressed-Metal Sash Pulleys.

Also, "Eagle," "Top Notch," "Merit," "Saw-Edge" and "Hollow-Axle" Pressed Metal Sash Pulleys; Wrought-Steel Belt Pulleys; Pressed-Metal Sheaves; Pressed-Steel Shapes of various designs.

"American" Sash Pulleys.

These Sash Pulleys are made throughout of pressed metal. The brass and bronze wheels are made on an entirely new principle, by which the two main side pieces are locked together all the way around, just under the groove, so as to make a wheel indissolubly one. In the steel wheels the two main side pieces are electrically welded together.

The Sash Pulley Wheels are made with a combination groove, serving equally well for either chain or rope. "American" Pulleys are manufactured with three styles of bearings. In roller-bearing wheels the rollers travel between hardened steel thimbles and solid steel axles. In ball-bearing wheels the balls run between hardened steel cones and races (Fig. 1). The plain axle wheel (Fig. 2) has a long straight bearing of heavy metal.

The ball- and roller-bearing wheels can be particularly recommended, since the present designs are the result of long experiment and their excellence has been proved by many severe tests. The case is made entirely of pressed metal electrically welded. The housing (Figs. 3 and 4) is shouldered into a collar on the face plate, making a change of relation between face plate and housing impossible. Axle pins of ample size are made of cold-drawn steel, and shouldered. The pin is riveted outside of the case, which is held between the rivet head and the axle shoulder.

All "American" Sash Pulleys are coated with a compound which prevents rust; and, as listed, are packed in boxes with screws to match the faces of the pulleys. Our pulleys are patented and fully guaranteed.

Advantages.

The "American" Pressed-Metal Sash Pulleys are indestructible, are cheaper, lighter, and better finished than cast pulleys, and can be delivered promptly. "American" Sash Pulleys weigh only about one half as much as cast pulleys of the same size, and there is therefore a saving in freight. There is no breakage in shipping or handling.

Facilities, Shipments, etc.

We are prepared to fill orders for "American" Sash Pulleys in any quantities, and if special sash pulleys are required in large quantities we will furnish estimates.

Fig. 1. BALL-BEARING WHEEL

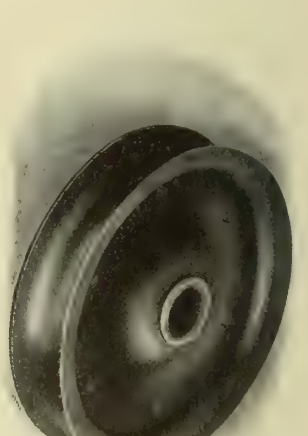


Fig. 2. PLAIN AXLE WHEEL

Fig. 3. SASH PULLEY

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Prices.

Discounts from the following list furnished upon application.

2-INCH PLAIN AXLE

No.		Per dozen List
112	All steel, lacquered face	$1.50
212	Brass plated face, steel wheel	1.80
312	Bronze plated face, steel wheel	1.90
412	Brass face, steel wheel	2.20
512	Bronze face, steel wheel	2.40
222	Brass plated face and wheel	2.00
332	Bronze plated face and wheel	2.10
422	Brass face, brass plated wheel	2.40
532	Bronze face, bronze plated wheel	2.50
442	Brass face, brass wheel	4.00
542	Bronze face, brass wheel	4.10
552	Bronze face, bronze wheel	4.20

Size of face plate, 2-inch pulley, 1⅛ x 5 inches.
Packed with screws.

2¼-INCH PLAIN AXLE

No.		Per dozen List
112¼	All steel, lacquered face	$1.64
212¼	Brass plated face, steel wheel	2.00
312¼	Bronze plated face, steel wheel	2.10
412¼	Brass face, steel wheel	2.44
512¼	Bronze face, steel wheel	2.60
222¼	Brass plated face and wheel	2.24
332¼	Bronze plated face and wheel	2.44
422¼	Brass face, brass plated wheel	2.64
532¼	Bronze face, bronze plated wheel	2.80
442¼	Brass face, brass wheel	4.50
542¼	Bronze face, brass wheel	4.70
552¼	Bronze face, bronze wheel	4.96

2¼-INCH ROLLER BEARING

No.		Per dozen List
8112¼	All steel, lacquered face	$2.14
8212¼	Brass plated face, steel wheel	2.50
8312¼	Bronze plated face, steel wheel	2.60
8412¼	Brass face, steel wheel	2.94
8512¼	Bronze face, steel wheel	3.10
8222¼	Brass plated face and wheel	2.74
8332¼	Bronze plated face and wheel	2.94
8422¼	Brass face, brass plated wheel	3.14
8532¼	Bronze face, bronze plated wheel	3.30
8442¼	Brass face, brass wheel	5.00
8542¼	Bronze face, brass wheel	5.20
8552¼	Bronze face, bronze wheel	5.46

2¼-INCH BALL BEARING

No.		Per dozen List
9112¼	All steel, lacquered face	$2.64
9212¼	Brass plated face, steel wheel	3.00
9312¼	Bronze plated face, steel wheel	3.10
9412¼	Brass face, steel wheel	3.44
9512¼	Bronze face, steel wheel	3.60
9222¼	Brass plated face and wheel	3.24
9332¼	Bronze plated face and wheel	3.44
9422¼	Brass face, brass plated wheel	3.64
9532¼	Bronze face, bronze plated wheel	3.80
9442¼	Brass face, brass wheel	5.50
9542¼	Bronze face, brass wheel	5.70
9552¼	Bronze face, bronze wheel	5.96

Size of face plate, 2¼-inch pulley, 1⅛ x 5½ inches.
Packed with screws.

2½-INCH PLAIN AXLE

No.		Per dozen List
112½	All steel, lacquered face	$1.80
212½	Brass plated face, steel wheel	2.20
312½	Bronze plated face, steel wheel	2.30
412½	Brass face, steel wheel	2.70
512½	Bronze face, steel wheel	2.80
222½	Brass plated face and wheel	2.50
332½	Bronze plated face and wheel	2.80
422½	Brass face, brass plated wheel	2.90
532½	Bronze face, bronze plated wheel	3.10
442½	Brass face, brass wheel	5.00
542½	Bronze face, brass wheel	5.20
552½	Bronze face, bronze wheel	5.50

2½-INCH ROLLER BEARING

No.		Per dozen List
8112½	All steel, lacquered face	$2.30
8212½	Brass plated face, steel wheel	2.70
8312½	Bronze plated face, steel wheel	2.80
8412½	Brass face, steel wheel	3.20
8512½	Bronze face, steel wheel	3.30
8222½	Brass plated face and wheel	3.00
8332½	Bronze plated face and wheel	3.30
8422½	Brass face, brass plated wheel	3.40
8532½	Bronze face, bronze plated wheel	3.60
8442½	Brass face, brass wheel	5.50
8542½	Bronze face, brass wheel	5.70
8552½	Bronze face, bronze wheel	6.00

2½-INCH BALL BEARING

No.		Per dozen List
9112½	All steel, lacquered face	$2.80
9212½	Brass plated face, steel wheel	3.20
9312½	Bronze plated face, steel wheel	3.40
9412½	Brass face, steel wheel	3.70
9512½	Bronze face, steel wheel	3.80
9222½	Brass plated face and wheel	3.50
9332½	Bronze plated face and wheel	3.80
9422½	Brass face, brass plated wheel	3.90
9532½	Bronze face, bronze plated wheel	4.10
9442½	Brass face, brass wheel	6.00
9542½	Bronze face, brass wheel	6.20
9552½	Bronze face, bronze wheel	6.50

Size of face plate, 2½-inch pulley, 1¼ x 5⅞ inches.
Packed with screws.

3-INCH PLAIN AXLE

No.		Per dozen List
113	All steel, lacquered face	$2.26
213	Brass plated face, steel wheel	2.70
313	Bronze plated face, steel wheel	2.84
413	Brass face, steel wheel	3.50
513	Bronze face, steel wheel	3.70
223	Brass plated face and wheel	3.50
333	Bronze plated face and wheel	3.70
423	Brass face, brass plated wheel	4.00
533	Bronze face, bronze plated wheel	4.40
443	Brass face, brass wheel	6.80
543	Bronze face, brass wheel	7.00
553	Bronze face, bronze wheel	7.50

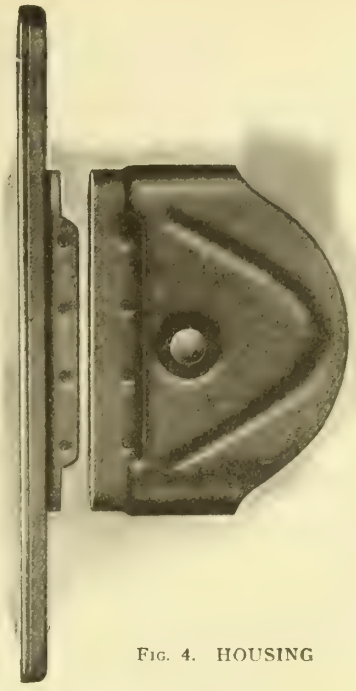


Fig. 4. HOUSING

3-INCH ROLLER BEARING

No.		Per dozen List
8113	All steel, lacquered face	$2.86
8213	Brass plated face, steel wheel	3.30
8313	Bronze plated face, steel wheel	3.44
8413	Brass face, steel wheel	4.10
8513	Bronze face, steel wheel	4.30
8223	Brass plated face and wheel	4.10
8333	Bronze plated face and wheel	4.30
8423	Brass face, brass plated wheel	4.60
8533	Bronze face, bronze plated wheel	5.00
8443	Brass face, brass wheel	7.40
8543	Bronze face, brass wheel	7.60
8553	Bronze face, bronze wheel	8.10

3-INCH BALL BEARING

No.		Per dozen List
9113	All steel, lacquered face	$3.36
9213	Brass plated face, steel wheel	3.80
9313	Bronze plated face, steel wheel	3.94
9413	Brass face, steel wheel	4.60
9513	Bronze face, steel wheel	4.80
9223	Brass plated face and wheel	4.60
9333	Bronze plated face and wheel	4.80
9423	Brass face, brass plated wheel	5.10
9533	Bronze face, bronze plated wheel	5.50
9443	Brass face, brass wheel	7.90
9543	Bronze face, brass wheel	8.10
9553	Bronze face, bronze wheel	8.60

Size of face plate, 3-inch pulley, 1⅜ x 6 1/16 inches.
Packed with screws.

Sample Pulleys.

We would be pleased to furnish to architects and builders sample pulleys made without standard finish face plates, or, with face plates finished to match the hardware.

Report of Comparative Tests.

We will mail, on application, a report made by a prominent engineering firm, showing the superiority of steel pulleys over cast-iron, and a booklet showing the various prominent buildings in this country and elsewhere where our pulleys are now in use.

Sash Pulleys for Steel Sash.

We are prepared to make special pulleys for steel sash, and to submit samples and prices to builders' specifications.

References.

American Sash Pulleys, Pressed Metal, have been installed in the majority of America's most prominent buildings, notably the United States Post Office, Washington, D. C., Metropolitan Building, New York, N. Y., and many others.

AUSTRAL WINDOW COMPANY

Architects Building
101 Park Avenue
NEW YORK, N. Y.

Products.

Manufacturers of AUSTRAL WINDOW HARDWARE, for Austral Balanced Windows.

Also, SPECIAL OPERATING DEVICES and CURTAIN PULLEYS used in connection with the Austral Window.

Scope of Use.

Austral Hardware is applicable to Austral wood, kalamein, rolled steel and hollow metal windows for public buildings, offices, schools, hospitals, libraries, etc.

The One-Plane Solid Steel Window equipped with Austral Balance (as manufactured by the Hecla-Winslow Co., Inc., for which see their pages in General Index) is designed for use in high-grade buildings where special architectural effects are desired.

The Austral Steel Factory Window, light rolled steel sash, automatic closing, fusible link, with Austral hardware, suitable for schools, loft buildings and factories.

Austral Hardware.

The types of Austral Hardware supplied by the AUSTRAL WINDOW COMPANY, and applied to Austral wood or metal windows, are described as follows:

Application to Austral Wood Windows—Type 2 Hardware (best grade): A set consists of two balance arms, four sash guide pins, two parting strip bolts, with screws for applying, *electro galvanized*—special prices on special finish. Type 4 Hardware (second grade) galvanized finish: A set consists of two balance arms, four sash guide pins, with screws for applying.

Application to Austral Hollow Metal and Metal Covered Windows—Type B Hardware: A set consists of two balance arms, four sash guide rollers, two parting strip bolts, with screws for applying. Type B is approved by the Underwriters' Laboratories.

Advantages of Austral Windows.

(1) Permit free ventilation and circulation of air without draft. (2) Absolute control of light. (3) Reversible for cleaning and reglazing. (4) Exterior awnings eliminated. (5) Plain frames only are used, affording additional light area. (6) Austral mullions are made about half the width required for double-hung windows. (7) Windows adjusted by slight pull on lower sash. (8) Extreme simplicity in construction and operation.

Austral Windows.

A simple balanced-window construction through use of Austral hardware, which eliminates sash weights, cords, pulleys, weight boxes and attendant disadvantages.

These windows (except the wood) are built by various licensed manufacturers under the supervision of this Company. Weather-stripping integral with frame and sash. Wood frames and sash built by any mill according to furnished details.

Operation—Austral sash are counterbalanced on pivot bars attached to the centre of frames, with sash guide pins or hooks attached to lower corner of lower sash and upper corner of upper sash. Guide pins or hooks operate in vertical grooves or along parting strip, permitting free adjustment of sash. (See illustrations.)

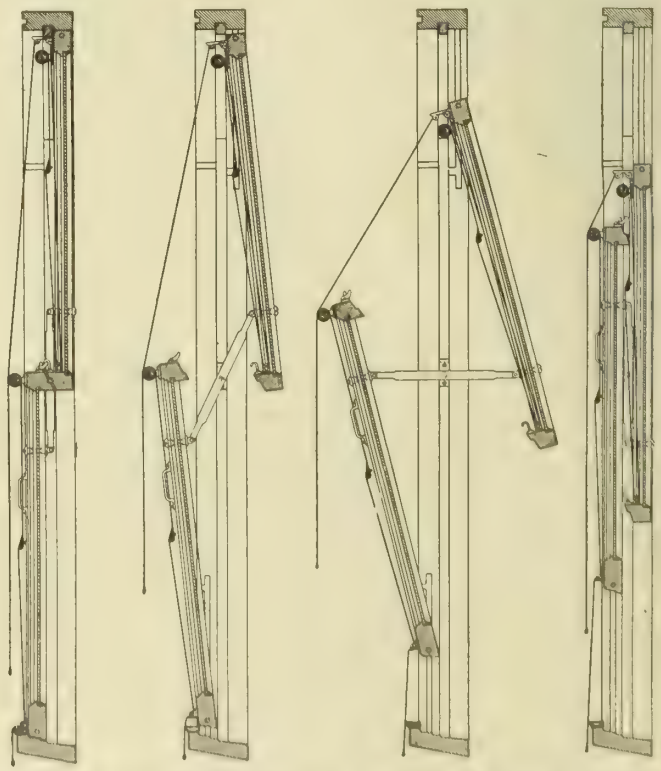
Ordering—Furnish width and height of masonry openings, thickness of sash, type of window.

Co-operative Services.

Full instructions for hanging windows accompany each set of hardware.

Specifications, details, prices, references and full information furnished on request.

AUSTRAL WINDOW EQUIPPED WITH AUSTRAL FIXTURES



VERTICAL SECTIONS THROUGH AUSTRAL WINDOWS SHOWING SASH IN VARIOUS POSITIONS

THE BRIDGEPORT CHAIN COMPANY

MANUFACTURERS OF

Weldless Steel Wire Chains

BRIDGEPORT, CONN.

Products.

"Triumph" Sprocket Chain; Bronze and Steel Sash Chain; Aluminum, Brass, Bronze, and Steel Plumbers' and Safety Chain and Attachments; Brown Pattern Chain, Perfection Coil Chain; Hooks, Rings and Fixtures.

"Triumph" Sprocket Chain.

The standard sprocket chain, used by all leading manufacturers of fire-doors and rolling shutters.

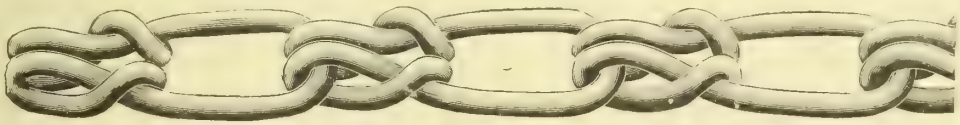
Safety and Plumbers' Chain.

Supplied in aluminum, brass, bronze and steel, with all necessary attachments.

SAFETY CHAIN

Samples, etc.

Catalogue, samples, blue-prints, etc., furnished to interested parties on application.



"TRIUMPH" SPROCKET CHAIN

SASH CHAIN

Sash Chain.

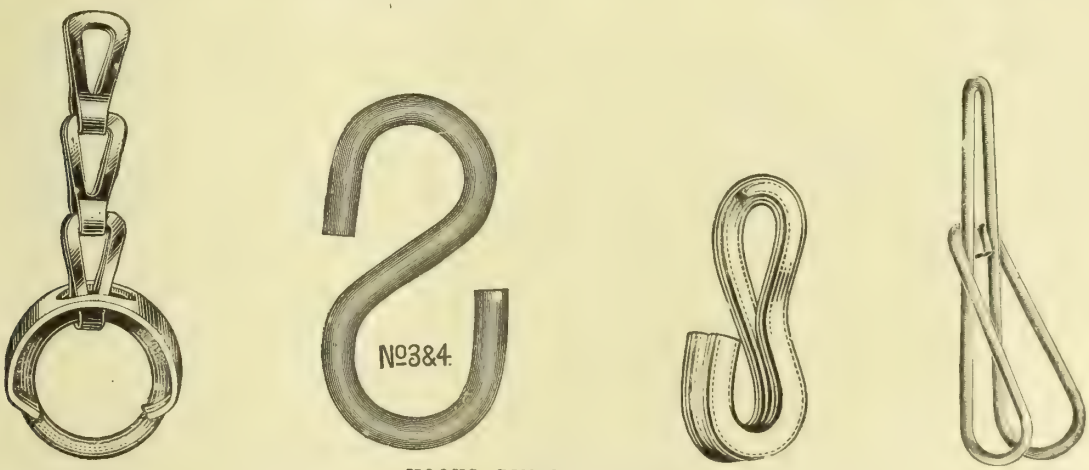
Monarch bronze and steel sash chain is made in six sizes and six finishes. The steel chain is inspected by the Underwriters.

SASH WEIGHTS IN POUNDS

Chain No.	2/0	0	1	2	2½	3	4
Bronze	75	100	125	200	—	250	400
Steel	—	60	80	130	170	195	300

PERFECTION COIL CHAIN

BROWN PATTERN CHAIN



HOOKS, RINGS, FIXTURES

CALDWELL MANUFACTURING CO.

Caldwell Sash Balances, Door Holders, Etc.

ROCHESTER, N. Y.

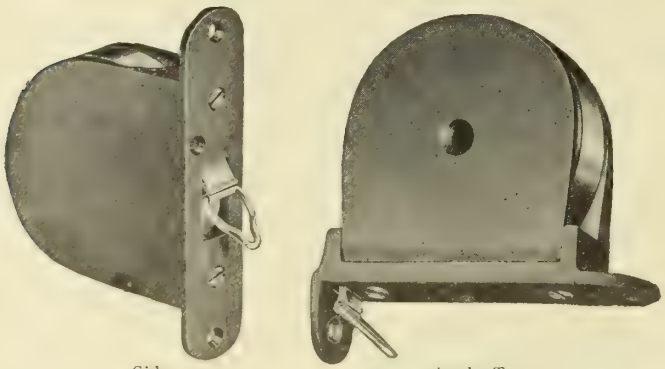
Products.

Manufacturers of CALDWELL SASH BALANCES, VERTICAL, JUNIOR and EMPIRE DOOR HOLDERS, CALDWELL FRENCH WINDOW HOLDER, and other HARDWARE SPECIALTIES.

Caldwell Sash Balances.

This Company has made these sash balances during the past twenty-eight years. They are made of the best material, by workmen thoroughly experienced in the art of producing sash balances with uniform tension, insuring a perfect counterbalance at all points of the sash.

Illustration No. 1 shows an important improvement, which enables the carpenter to apply Caldwell balances in half the time required for the ordinary balance. There is also no danger of injury to the suspending band.



Side Angle Top

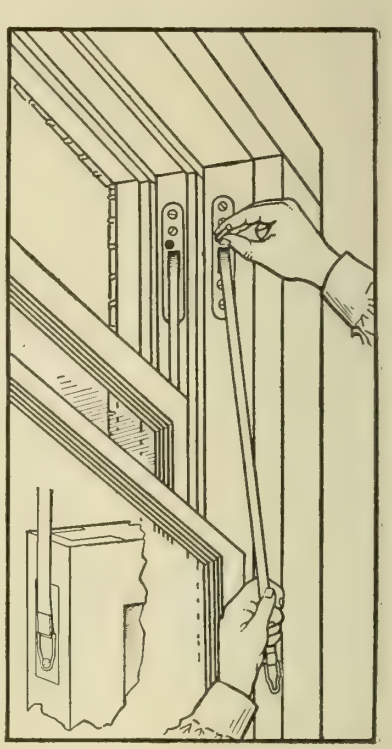
CALDWELL SASH BALANCE

Top Balance—The top balance enables the architect to make the narrowest possible mullion, in order to get the maximum light in a desired space.

Guarantee—Caldwell sash balances are guaranteed fifteen years.

Literature—Send for catalogue, "Suggestions for the Present Day Architect."

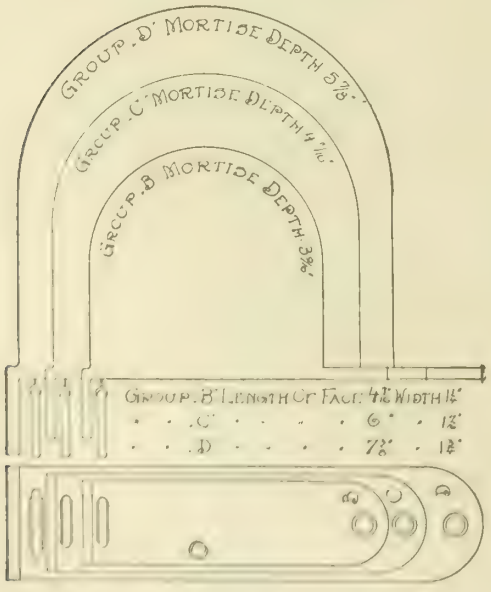
References—The leading architects call for the Caldwell sash balances in their specifications, in order to be sure of getting the best.



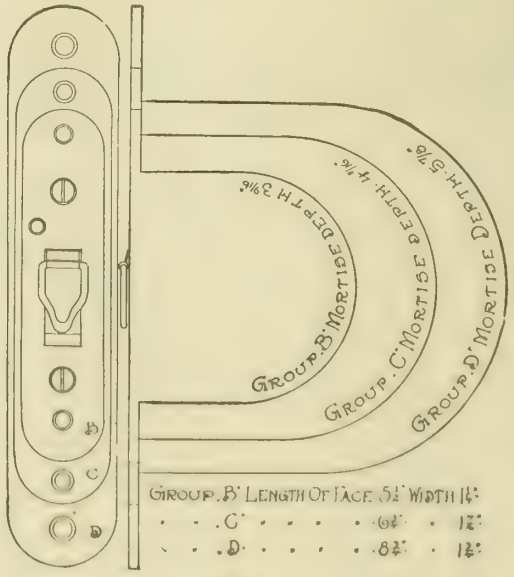
NO. 1. METHOD OF INSTALLING A CALDWELL SASH BALANCE
Patent Pending

Recommended and carried in stock by all first-class hardware dealers.

Our marine balances are standard for the United States Navy Department, and are used by many of the foreign Governments in all classes of vessels.



Top Balance for Mullion Windows



Side Balance

SIZES OF CALDWELL SASH BALANCES

Measurements on outline cuts are full-size. Uniform mortises cut at the mill simplify the application

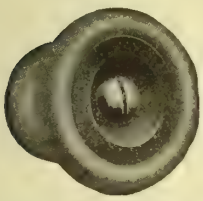
Continued on next page

Caldwell Vertical Door Holders.

Of strongest construction; made in all finishes; have no screw ears.

A bracket affixes the holder immovably to the door, and gives strength at the base of holder where it is most required. Our special large vertical door holder is recommended for use on heavy outside doors, particularly upon vestibule doors, which open over incline floors, such as theaters, moving picture entrances, etc. Made in cast brass and bronze metal only.

Pressers are made of cold-rolled rods, 5/8 inch in diameter. The rubbers are the *original cup shape*, reinforced with hard leather gaskets, which prevent the rubbers from being cut and torn.



RUBBER FOR CALDWELL VERTICAL DOOR HOLDERS
(Full-Size)

1¼ in. Drop.

(Special size)
4¼ in. Drop

CALDWELL VERTICAL DOOR HOLDERS

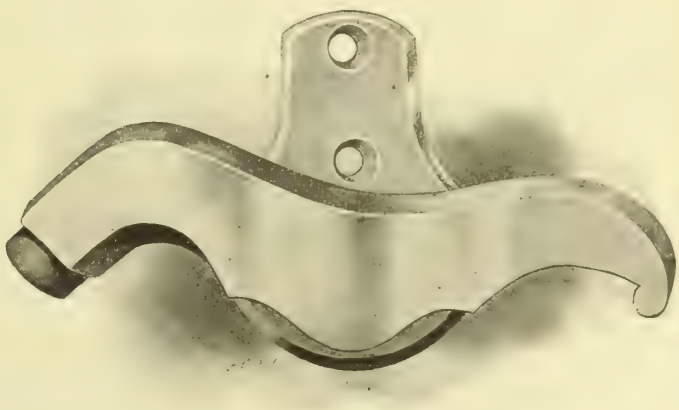
Caldwell Junior Door Holder.

This holder is adapted for use upon interior doors only. They are applicable also to light double acting, pantry and office doors. Always release presser before attempting to close door. Otherwise, the floor is liable to be marred, and the rubber presser is sure to be damaged.

CALDWELL JUNIOR DOOR HOLDER

Empire Door Holder.

This holder is made in three sizes, to hold light, medium and heavy doors. They are made for use upon right- and left-hand doors. The large size is suitable for heavy office, church and vestibule doors. Made of malleable iron and bronze metal in all finishes. Operated by the toe.



EMPIRE DOOR HOLDER
(Improved)

GRANT PULLEY AND HARDWARE COMPANY

"Grant" and "Queen" Overhead Pulleys and "American" Wrought-Steel Sash Pulleys; "Grant" Casement Windows

TELEPHONE CONNECTION Architects' Building, 101 Park Avenue

NEW YORK, N. Y.

We are listed in the Telephone Directories of the Principal Cities of the United States and Canada

PHILADELPHIA OFFICE: LAND TITLE BUILDING

SELLING REPRESENTATIVES

ALBANY, N. Y., H. D. Hansbrough, 247 Park Ave.
BALTIMORE, MD., Henry Keidel & Co., 405 W. German St.
BIRMINGHAM, ALA., C. S. Caldwell, 313 North 20th St.
BOSTON, MASS., R. J. Gilkie, 229 Tremont Building
CHARLOTTESVILLE, VA., Henry Lee Davis
CLEVELAND, OHIO, E. B. Horne Co., 4500 Euclid Ave.
CINCINNATI, OHIO, C. J. Splain, 718 Merchants' Building
CHICAGO, ILL., John C. Bold, Conway Building ' Building
COLUMBUS, OHIO, The B. M. Freeman Co., The Ruggery
DENVER, COLO., W. H. Clark, 312 Continental Building
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GRAND RAPIDS, MICH., A. B. Zierleyn & Co.
HELENA, MONT., Archibald J. Mahan Co., 32 W. 6th St.
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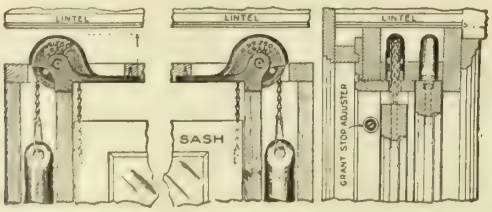
JAMESTOWN, N. Y., Dahlstrom Metallic Door Co.
KANSAS CITY, MO., T. B. Easton, 1302 Grand Ave.
LOUISVILLE, KY., Belknap Hardware & Mfg. Co.
MILWAUKEE, WIS., Kiefer-Haessler Hardware Co.
MONTREAL, CAN., James Walker Hardware Co., P. O. Box 3100
MINNEAPOLIS, MINN., A. N. Stark, 2025 Portland Ave.
NASHVILLE, TENN., George W. Ruth, Builders' Exchange
NEW ORLEANS, LA., Fred J. Allen, P. O. Box 169
OMAHA, NEBR., James Morton & Son Co., 1511 Dodge St.
PHILADELPHIA, PA., Grant Pulley & Hardware Co.
PITTSBURGH, PA., Samuel McKnight Hardware Co.
PORTLAND, ORE., Honeyman Hardware Co.
RICHMOND, VA., D. C. Kennedy & Co., 22 N. 9th St.
ROCHESTER, N. Y., Homer M. Swart, 184 Park Ave.
SAN FRANCISCO, CAL., Pacific Building Materials Co.
ST. LOUIS, MO., Seidel Manufacturing Co.
SYRACUSE, N. Y., Alexander Grant's Sons
SEATTLE, WASH., Clarland Iron Works
SPOKANE, WASH., Spokane Hardware Co.
TAMPA, FLA., G. M. MacDonough, 406½ De Leon St.
WASHINGTON, D. C., C. A. Hamilton, 424 Munsey Building
WINNIPEG, CAN., Edelen-Kilvert Co., Tribune Building
WILMINGTON, N. C., Peck & Holloway, 109 N. Front St.
YOUNGSTOWN, OHIO, Stambaugh-Thompson Co.

Products.

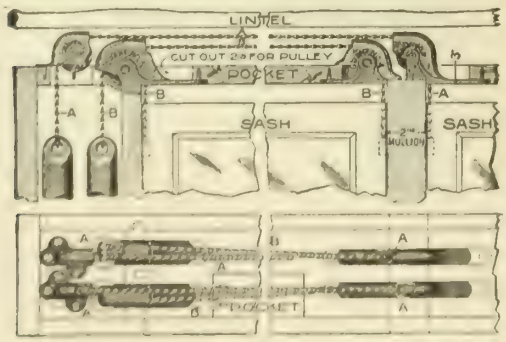
We are manufacturers of Roller- and Ball-Bearing "Grant" and "Queen" Overhead Pulleys for Single, Twin, Triple, and Quadruple Windows; also, "Grant" Show-Case Pulleys; "Grant" Ball-Bearing Noiseless Door Sheaves and Flush Track; "Grant" No. 10 Pressed-Steel Pulleys for Metal Frames; "Grant" Window-Stop Adjusters; "Grant" Sash Fixtures; "Grant" Sash Chain, Bronze and Coppered Steel; "Turner" Patent Antifriction Drawer Slides and Supports; "Grant" Antifriction Vertical Pivot Lifts; "Grant" Antifriction Casement Window Device; "Grant" Wood Rolling Partitions.

All our goods are protected by United States Patents.

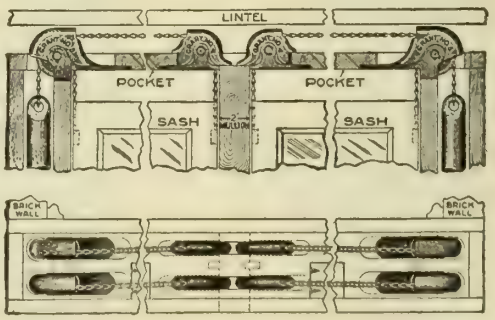
Selling Agents for "American" Plain Axle, Roller- and Ball-Bearing Steel (Side) Sash Pulleys; Common Sense, Eagle, Top-Notch Sash Pulleys; "Von Duprin" Self-Releasing Safety Fire Exit Devices; "Howarth" Reversible Sash Center and Pivots; "Geisey" Vertical Pivot Lifts; "Geisey" Casement Window Fixtures; "Diamond" Tubular Ball-Bearing Door Hangers; Crittal Steel Casements.



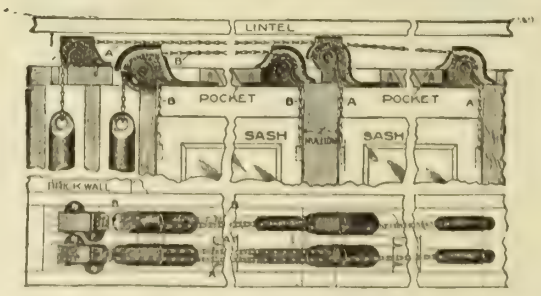
SINGLE-FRAME WINDOW AND SECTION OF FRAME



"GRANT" PULLEYS FOR TRIPLE WINDOWS



"GRANT" PULLEYS FOR TWIN WINDOWS



"GRANT" PULLEYS FOR QUADRUPLE WINDOWS

Continued on next page

"Grant" Overhead Pulleys.

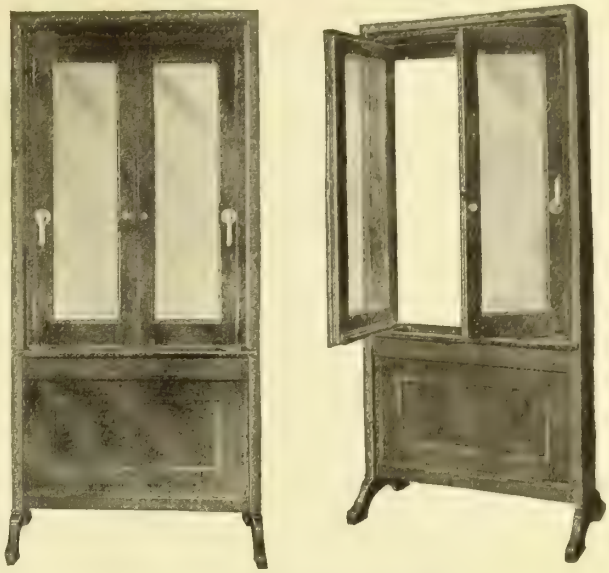
In the "Grant" Overhead Pulleys the housings are made in one piece, so they will resist any load without breaking. The housings connect with the soffit, so the mortar can not clog the wheels. The chain or cord is easily inserted with a mouse, which is furnished with every order.

On account of the additional pocket room gained by the use of "Grant" Pulleys, iron weights can be used, instead of lead, for the heaviest plate-glass windows, thus materially reducing the cost. The frames are cut by a regular pulley machine.

The "Grant" Casement Window.

A casement window, opening into the room, fitted with a "Grant" Antifriction Device, will fill a long-felt want by giving, without changing the natural appearance, an inexpensive and absolutely weather-proof casement window.

This device is made on a well-known mechanical principle, is easy to operate, simple and strong in construction and can not get out of order. It also does away with the use of casement bolts, as the windows are unlocked and opened simultaneously by raising the handle



"GRANT" CASEMENT WINDOWS

"Grant" Antifriction Vertical Pivot Lift.

The "Grant" Antifriction Pivot Lift has been patented and put on the market to meet the demands of architects for a weather-proof window, pivoted top and bottom, which can be quickly and easily opened for ventilation and cleaning. By using this antifriction device the heaviest and largest plate glass windows can be opened with as little effort as the ordinary double-hung windows with counterbalanced weights.

PIVOT WINDOWS, EQUIPPED WITH "GRANT" ANTIFRICTION LIFTS

"Turner" Patent Antifriction Drawer Slides.

The "Turner" Patent Antifriction Drawer Slides and Supports are absolutely noiseless. When fitted with the "Turner" attachment a drawer can not fall from the case when pulled out suddenly, nor can it sag, if heavily loaded, when opened to its utmost limit. This attachment is easily applied to any drawer; it is never out of order, is noiseless, durable, and inexpensive, and enables a heavily loaded drawer to slide as easily as an empty one. We shall be glad to submit details and samples, either direct or through our agents.

"TURNER" PATENT ANTIFRICTION DRAWER SLIDES

References.

A partial list of recent buildings equipped with pulleys and specialties sold by the GRANT PULLEY AND HARDWARE COMPANY:

BUILDINGS	LOCATION	ARCHITECT
Altman Building	New York, N. Y.	Trowbridge & Livingston
Wiedner Building	Philadelphia, Pa.	Horace Trumbauer
Penn Mutual Building	Philadelphia, Pa.	Edgar V. Seeler
Greenpoint Hospital	Brooklyn, N. Y.	Frank J. Helmle
Pope-Whittemore Building	Cleveland, Ohio	Henry Bacon
Empire Building	Augusta, Ga.	W. L. Stoddard
Post Office and Court House	New Orleans, La.	James G. Rogers
Municipal Building	Waterbury, Conn.	Cass Gilbert
Albany County Court House	Albany, N. Y.	Hoppin & Koen
Brooklyn Hospital	Brooklyn, N. Y.	Lord, Hewlett & Tallant
High School Building, Girard College	Philadelphia, Pa.	J. H. Windrim
Post Office	South Chicago, Ill.	Oscar Wendroth
Aetna Life Insurance Building	Hartford, Conn.	Donn Barber
Murchison National Bank Building	Wilmington, Del.	Kenneth M. Murchison

THE CASEMENT HARDWARE CO.

9 South Clinton Street
CHICAGO, ILL.

TELEPHONE, FRANKLIN 2790

Products.

"HOLD-FAST," "BULL-DOG" and "AUTO-LOCK" ADJUSTERS, "HOOKFAST" FASTENERS and SASH REVERSING DEVICE, all for Outswinging Casement Windows.

Advantages of C-H Adjusters in General.

Operation Wholly from Inside the Screen and Storm Sash—Outswinging casements thus equipped are weather-tight, convenient to operate, and permit of more artistic and practical treatment of shades and screen than do casements swinging in.

Quick, Positive Action Combined with Powerful Leverage—By patented telescoping handle and direct-acting bent lever. Release, swing, and relock sash with one continuous, quick motion. This rapid action, important in case of storms, etc., is impossible with more complicated adjusters.

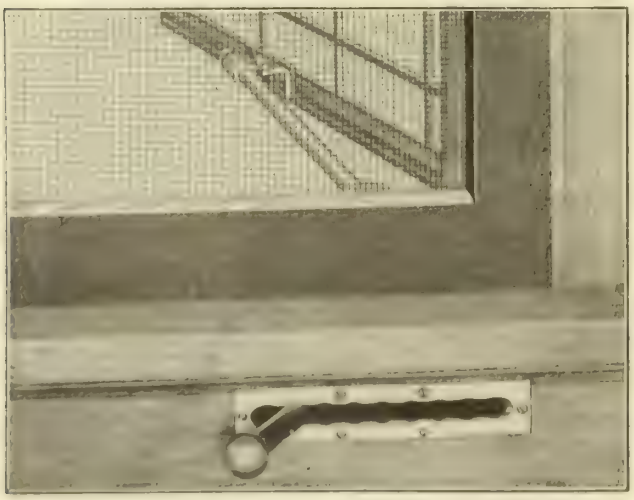
Compactness—Handles telescope practically flush with edge of stool. Neat, without difficulties of removable handles. Adjusters shipped in strong separate boxes with complete installation data in each box.

New, Improved Non-Rattling Sash Connection—Outer arm slides through brass swivel tube sleeve; reduces friction; *entirely eliminates rattling.* This sash connection, being fixed, prevents loss of leverage occurring on adjusters having a traveler on end of arm sliding back toward hinge side as sash swings out.

No Rights and Lefts—Saves trouble to architects, estimators and contractors in specifying, ordering and installing.

Guarantee.

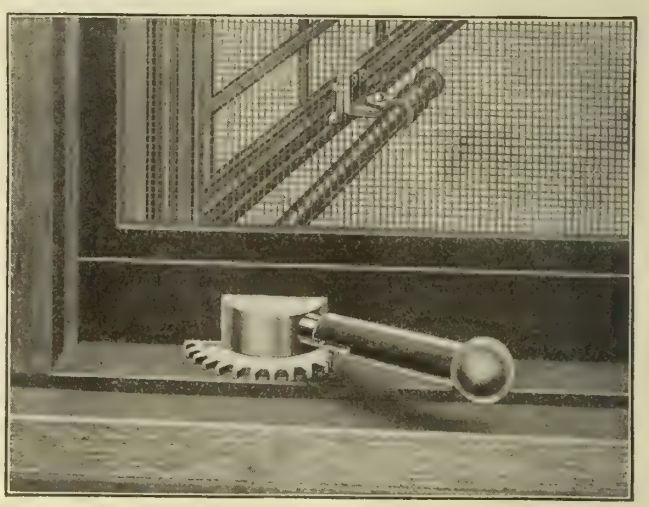
All C-H Adjusters guaranteed for five years. The best proof of their durability rests in the present efficiency of thousands which have had hard use for eight and nine years. Important improvements and refinements have been incorporated in our latest types.



THE "HOLD-FAST" CASEMENT ADJUSTER

Application to steel casement by means of wrought steel lug. Screen in place, sash partly open, (full opening 85 to 90°). Pivot between screen and sash. See detail next page for operation. Standard equipment is for wood sash

...ALL'S CATALOGUE



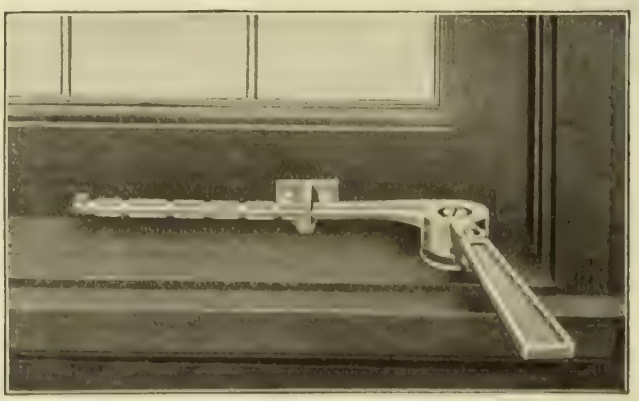
THE "BULL-DOG" CASEMENT ADJUSTER

Application to steel sash as with "Hold-Fast." Screen in place, window partly open (full opening 90°). Very simple to install—only six screws and fitting of rebated screen stop required. Standard equipment is furnished for wood sash

No. 2 "Hookfast" Casement Fastener.

The only satisfactory fastener made for outswinging wood casements. Pulls the sash perfectly tight at top, even when warped. Fully ⅜ inch draw, or thrice as much as any turn-buckle fastener. Can not work loose to drop over edge of sash and strike jamb when closing—a trouble too frequently found in the best turn-buckle fasteners. Hook shank pulls against heavy brass spring concealed back of sash plate.

NO. 2. "HOOKFAST" FASTENER



"AUTO-LOCK" CASEMENT ADJUSTER

Shown with screen removed

A low-priced adjuster made only in plated or electro-galvanized cast iron for inexpensive cottages, bungalows, etc.

Continued on next page

Sash Dimensions.

For tightness, strength, and ease in handling, wood casements should seldom exceed 28 by 58 inches. This is larger than the usual English practice.

Butts—Use 3½ by 3½ inch galvanized steel butts with loose brass pins.

How to Detail.

We can furnish an adjuster in standard or special size for almost any detail. The following limitations should, however, be observed for each type, in detailing sills and trim.

"Hold-Fast" Data—From face of apron (or sub-apron in deep inside reveals) to center of pivot through stool 2¾ to 3 inches. This distance is fixed.

Minimum distance from center of pivot to screen ¾ inch.

Minimum distance from center of pivot to sash 1¼ inches. This distance may be increased up to 5 inches by use of "long" sash plates, which must be specified. Maximum thickness stool plus moulding 2¼ inches.

"Bull Dog" Data—Standard space between sash and screen 1⅞ to 2⅛ inches. Minimum 1⅞ inches.

For space greater than standard, specify "long" sash plates.

For deep inside reveals over 2 inches inside of screen, allow 2¼ to 3 inches between sash and screen. Reveals of 5 inches or deeper require special outer arm.

For sash narrower than 18 inches (in deep reveals 19 inches), specify "short" outer arm.

"Auto-Lock" Data—Made with standard sash plates only for space 1⅞ to 2⅛ inches between sash and screen. Will fit inside reveals of any depth.

"Hookfast" Data—May be applied to any single wood casement swinging out. Works in minimum space of 1⅞ inches between sash and screen.

How to Specify.

For Wood Sash—Equip each sash as shown with one "Hold-Fast" ["Bull-Dog"] adjuster and one No. 2 "Hookfast" fastener made by The Casement Hardware Co., Chicago, Ill. Equip each sash 5 feet high or over with two "Hookfasts." Casement hardware shall be installed in accordance with manufacturer's printed or special instructions.

For Steel Sash—Proposals for steel (or sheet metal) casement sash (and frames) shall not include adjusters, which will be furnished by The Casement Hardware Co. of Chicago, Ill. Each steel sash shall have a mild steel lug welded to same and accurately drilled for attachment of adjuster sash plate bolts. Location of lugs on sash and detail of same to conform to special details to be furnished by contractor for adjusters. All necessary drawings and information for these details shall be furnished by sash contractor.

Tightness—It is advisable to specify for "Hold-Fast": One solid wood block 8 inches long, filling space under stool, and notched out to allow for swing of adjuster lever at hinge side of opening. Sash to be hinged to swing as per contract floor plans.

Materials.

All materials and finishes warranted best of their respective kinds.

Brass "Bull-Dog," all wrought brass (2½ pounds).

"Hold-Fast," all brass except minor concealed operating parts of cold-rolled steel (2½ pounds).

Combination steel and brass "Bull-Dog"; handle and sash plate sleeve wrought brass; balance plated steel.

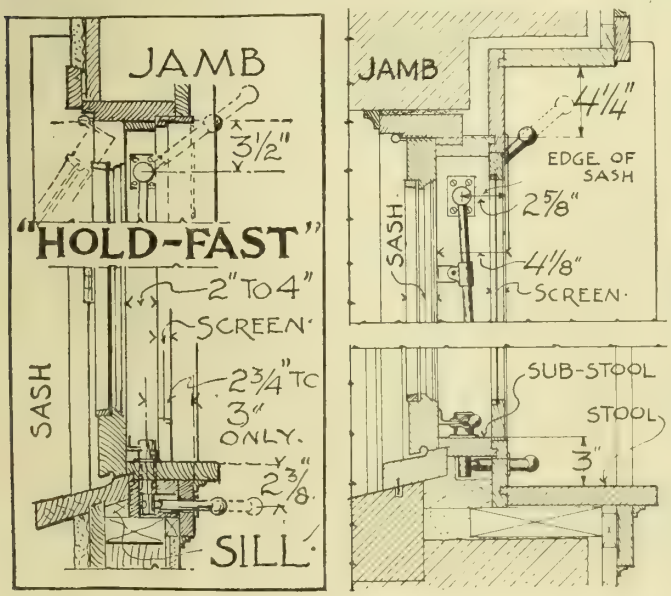
"Auto-Lock," cast iron; plated or electro-galvanized.

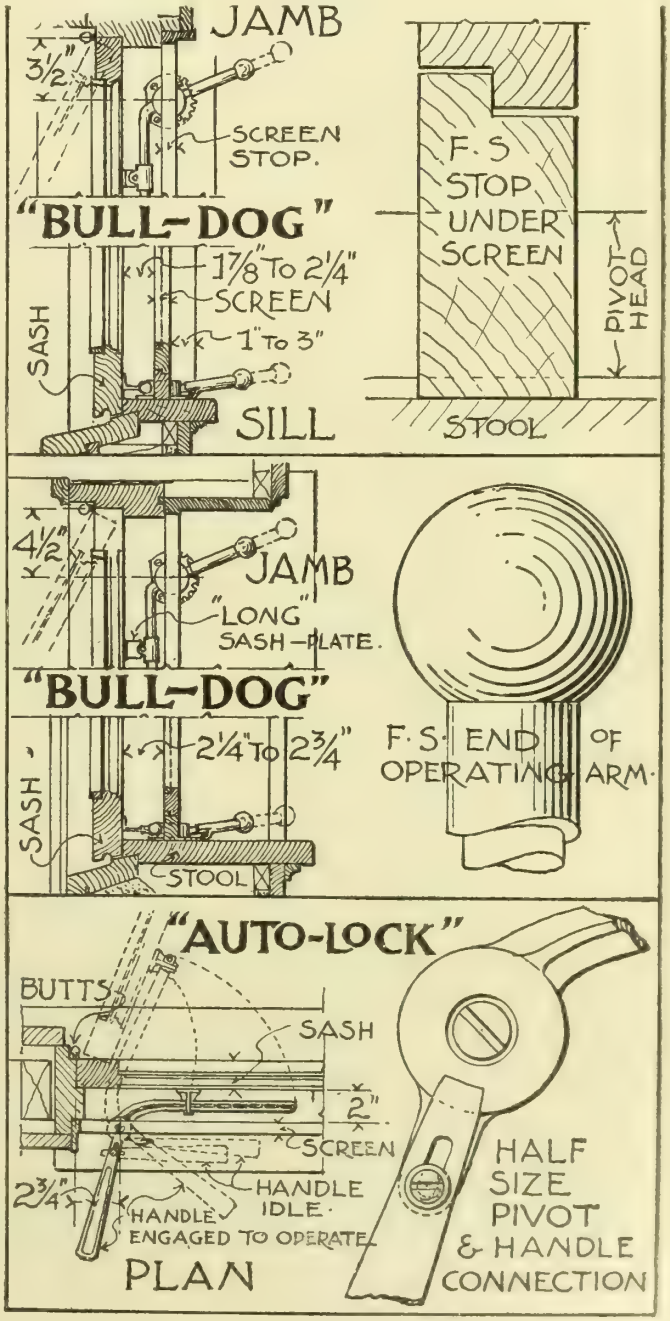
No. 2 "Hookfast," cast brass.

Finishes—Any special finishes desired at prices slightly higher than standard dull brass.

Prices.

There are no devices of similar construction to compare in price; but all C-H devices are as low-priced as any adjusters containing a similar quantity of like materials, and are lower priced than many. We issue fair price-lists for architects and owners, showing what our products will cost the client. Quotations may be had from most good hardware dealers.





DETAILS SHOWING APPLICATION OF "BULL-DOG," "HOLD-FAST" AND "AUTO-LOCK" ADJUSTERS

Continued on next page

RESIDENCE, ELMHURST, ILL.
WALTER BURLY GRIFFIN, Architect

RESIDENCE OF R. C. SPENCER, JR.,
RIVER FOREST, ILL.

RESIDENCE OF J. H. ANDERSON,
KNOXVILLE, TENN.
CHAS. I. BARBER and BEN MCMURRAY,
Architects

HOUSE AT YONKERS, N. Y.
ALBRO & LINDEBERG, Architects

RESIDENCE OF J. C. KIMBALL,
KNOXVILLE, TENN.
CHAS. I. BARBER and BEN MCMURRAY,
Architects

RESIDENCE OF N. W. WILLIAMS,
EVANSTON, ILL.

COUNTRY HOUSE OF W. P. COWAN,
WHEATON, ILL.

SACRED HEART HOSPITAL, PENSACOLA, FLA.
A. V. VON HERBULIS, Architect

SKINNER RESIDENCE, OAK PARK, CHICAGO
C. E. WHITE, Architect

A FEW TYPICAL INSTALLATIONS OF C. H. ADJUSTERS

KING CONSTRUCTION CO.

Sash Operating Machinery

NORTH TONAWANDA, N. Y.

AGENTS

NEW YORK, N. Y.	PHILADELPHIA, PA.	DENVER, COLO.	LONDON, ENG.
BOSTON, MASS.	CHICAGO, ILL.	SEATTLE, WASH.	PARIS, FRANCE

Products.

SASH OPERATING MACHINERY for all purposes.

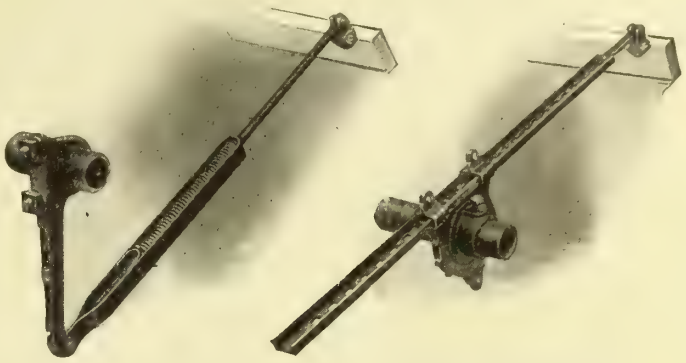
Styles of Apparatus.

(1) King Rack and Pinion Apparatus for heavy windows and long runs of sash hinged at top or bottom, or horizontally pivoted.

(2) King Apparatus with Double-Jointed Fittings for sash hinged at side, or vertically pivoted.

(3) King Worm and Gear Apparatus for short runs and light sash.

(4) King Patent Spring Connector. With this type a brass spring is placed in the connection between the sash and the operating device. In case of snow or ice accumulating under one or more sash, the spring connector allows these sash to remain slightly open till the obstruction disappears; the spring then automatically closes sash. This device thus prevents the whole strain of the operating machine from concentrating on any one sash, and in this way greatly reduces the liability of the apparatus getting out of order.



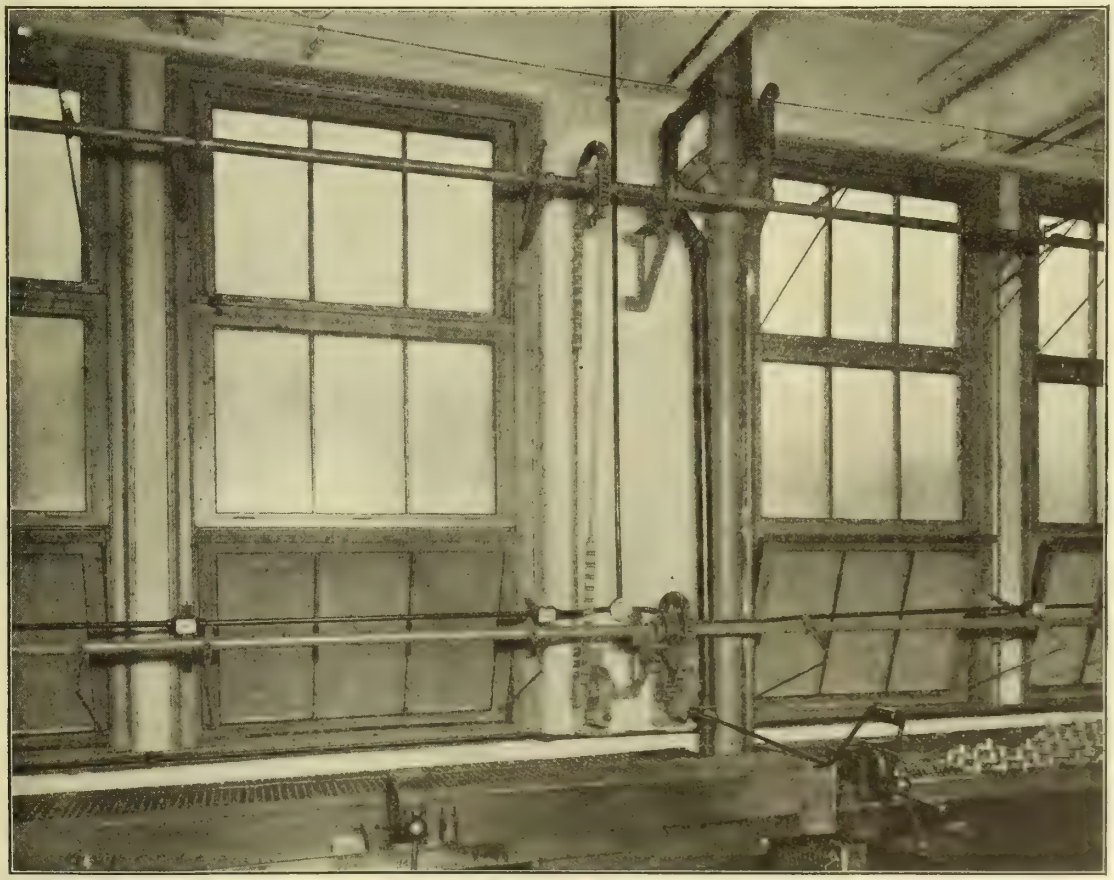
FITTING WITH KING PATENTED BRASS SPRING CONNECTOR

KING RACK AND PINION
For opening heavy sash or long runs

References and Catalogues.

King Sash Operating Apparatus is used by such concerns as The American Radiator Co., The American Locomotive Co., The International Harvester Co., The Canadian Pacific Railway Co., The New York Central and Big Four Systems, Westinghouse, Church & Kerr Co., and others.

Send for complete catalogue.



INCLOSED TYPE KING SASH OPERATING MACHINE, INSTALLED FOR BOSCH MAGNETO COMPANY, SPRINGFIELD, MASS.
Note that upper and lower row of windows are operated separately. Operating device arranged so that machines can be worked with key operator only

LORD & BURNHAM CO.

MANUFACTURERS OF

Sash Operating Apparatus for Hinged and Pivoted Sash

IRVINGTON-ON-HUDSON, N. Y.

Products.

SASH OPERATING and VENTILATING APPARATUS in various styles and sizes for Operating Hinged and Pivoted Sash in Factories, Foundries, Car-Barns, Roundhouses, Power-Houses, Machine-Shops, Steamers, Banks, Churches, Prisons, Greenhouses, etc.; TRANSOM OPERATORS for heavy Transoms in such places as Store Fronts, Hotels, Public Buildings, etc.

Rocker Shaft Apparatus.

Our Standard Apparatus (Fig. 1) consists of a worm and gear to turn a rocker shaft, to which are attached arms that in turn act directly on the sash through suitable rods. Arms are secured to shaft by combined bolting and set screw cap, or by set screw only if desired.

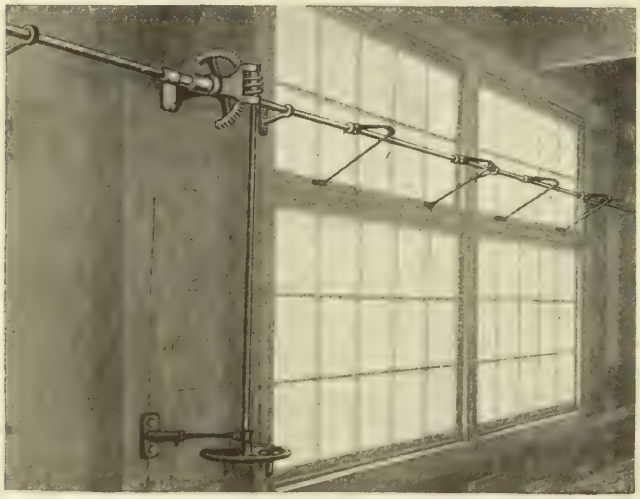


FIG. 1. ROCKER SHAFT APPARATUS

Rack and Pinion Apparatus.

This type of apparatus (Fig. 2) is intended primarily for long runs of heavy hinged sash. On account of the small pitch radius of the pinion (1½ inches) the leverage on the shaft is so much reduced that the torsion of the shaft is reduced to a minimum.

By means of shoulders on the pinion and guides on the rack these parts are so made that it is an absolute impossibility for them to cramp together in any way. They have been so designed that they always run on their pitch line.

The simplicity of this apparatus is a strong point in its favor. The direct horizontal thrust given to the sash prevents all harmful strains

FIG. 2. RACK AND PINION APPARATUS

Tension Lever Apparatus for Long Runs.

We advocate the use of this Tension Lever System (Fig. 3) on runs of over 140 feet in length. No bearings required for horizontally moving shafts; gear power has ball bearings; ball and socket joints on arms and rods; minimum friction and minimum back lash throughout; maximum freedom of motion. It is light, yet strong; free from complicated parts; easy to erect; enduring.

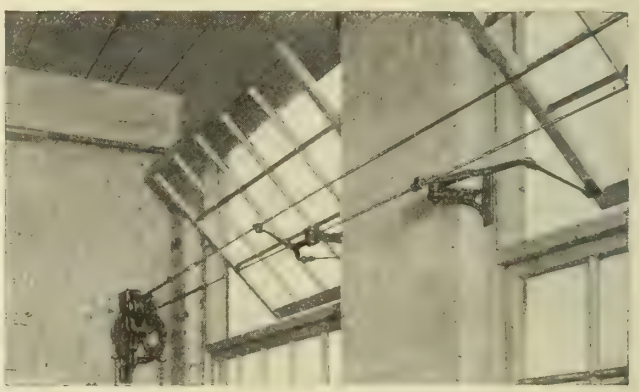


FIG. 3. TENSION LEVER APPARATUS

Transom Operators.

Transom Operators (Fig. 4) made in two sizes: No. 1 for heavy and No. 2 for extra heavy transoms. This apparatus consists of two enclosed miter gears, one of which is threaded; the threaded gear engages with a vertical rod which operates the transom by an intermediate rod. For extra heavy transoms the vertical rod operates a rocker shaft at bottom of transom, thus allowing it to be supported by an arm and rod at either end, relieving it of all injurious strains, and holding it rigidly in position against wind pressure.

FIG. 4. TRANSOM OPERATOR

Erection.

Full directions for erecting are sent with apparatus, so that it can be easily installed by any mechanic.

Estimates and Co-operative Service.

On receipt of data giving description of sash and that part of the building where it is intended to install the apparatus, we will gladly submit sketches, suggestions and estimates for furnishing our stock apparatus, or one specially designed to meet unusual conditions; also, estimates for erecting the apparatus when desired.

Catalogue.

Catalogue giving full and detailed description of each apparatus sent on request.

MICHIGAN ENGINE VALVE COMPANY

Sole Manufacturers of Howarth's Sash Centers

115-117 West Columbia Street
DETROIT, MICH.

Products.

HOWARTH'S FRICTION and ANTI-FRICTION SASH CENTERS and EXTENSION HOOKS.

Finishes.

All iron Sash Centers are finished in good serviceable imitation bower-barff finish. Brass goods finished natural. We will make special finishes to match any requirements or specifications.

General Information.

We manufacture ten distinct styles of Sash Centers and make them for any thickness of sash from one and one eighth inches to three inches. A large stock of centers is always kept on hand and shipments are made promptly.

We issue a complete catalogue, giving full details, price-lists, etc., and will be pleased to mail one to any address upon application.

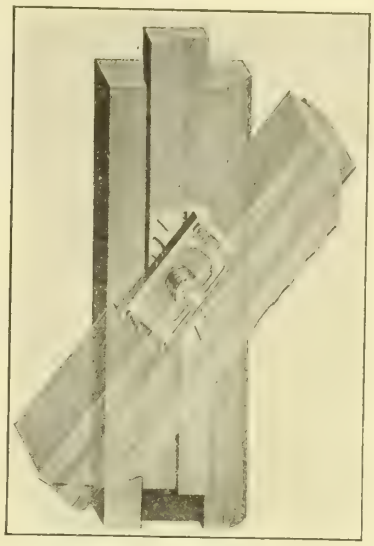
All hardware men are familiar with our Sash Centers and are prepared to quote discounts.

Adaptability.

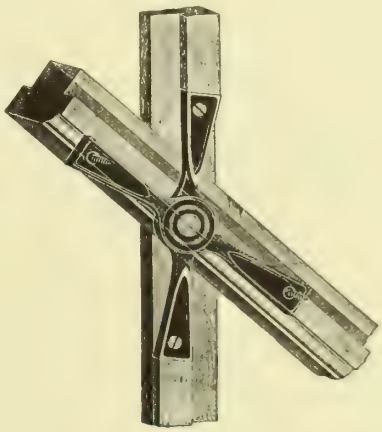
Where a friction center is desired to hold the sash at different angles without the use of adjusters we recommend the No. 300A to 0306. These centers are ideal for pivoting sash in office buildings, schools, factories, foundries, etc., and can be used for swinging sash either horizontally or vertically. The hanging stile as shown in illustration should be fitted to the sash, and the centers applied to them at the sash factory; the rabbet should be one half inch.

For monitor windows, or where windows are operated in batteries or with cords and pulleys, and where a good serviceable water-tight job is required, use our No. 10 to 012 Centers; with hanging stiles, rabbet should be one half inch.

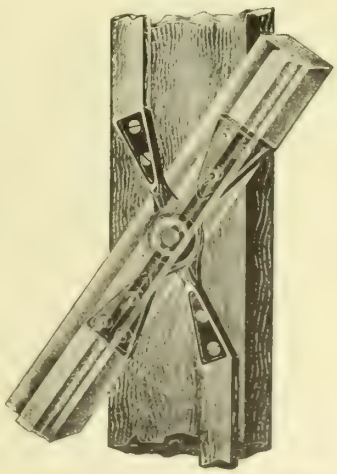
Where an inexpensive construction is wanted for foundries, factories, etc., use our No. 20 to 022. No hanging stiles are necessary for these centers. The centers are fitted to the sash and to the jambs. Nail a stop to the jamb on the outside from the head of frame to center and on the inside from the center down to the sill; sash should be made the full width of the opening.



HOWARTH'S SASH CENTER, APPLICATION OF NOS. 300A TO 0306
Patented October 2, 1900



HOWARTH'S SASH CENTER, NOS. 10 TO 012



HOWARTH'S SASH CENTER NOS. 20 TO 022

SIZES AND PRICES OF HOWARTH'S SASH CENTERS

Iron		Brass	
No. 300A, for 1⅛ inch sash, for one sash	$1.00	No. 0300A, for 1⅛ inch sash, for one sash	$4.40
No. 300, for 1⅜ inch sash, for one sash	1.00	No. 0300, for 1⅜ inch sash, for one sash	4.40
No. 301, for 1¾ inch sash, for one sash	1.15	No. 0301, for 1¾ inch sash, for one sash	4.60
No. 302, for 2 inch sash, for one sash	1.40	No. 0302, for 2 inch sash, for one sash	4.85
No. 303, for 2¼ inch sash, for one sash	1.70	No. 0303, for 2¼ inch sash, for one sash	5.40
No. 304, for 2½ inch sash, for one sash	2.00	No. 0304, for 2½ inch sash, for one sash	6.00
No. 305, for 2¾ inch sash, for one sash	2.30	No. 0305, for 2¾ inch sash, for one sash	6.50
No. 306, for 3 inch sash, for one sash	2.60	No. 0306, for 3 inch sash, for one sash	7.00
No. 10, for 1⅜ to 1½ inch sash, for one sash	.40	No. 010, for 1⅜ to 1½ inch sash, for one sash	1.70
No. 11, for 1¾ to 2 inch sash, for one sash	.50	No. 011, for 1¾ to 2 inch sash, for one sash	2.60
No. 12, for 2¼ to 2½ inch sash, for one sash	.80	No. 012, for 2¼ to 2½ inch sash, for one sash	4.40
No. 20, for 1⅜ inch sash, for one sash	$0.50	No. 020, for 1⅜ inch sash, for one sash	$2.30
No. 21, for 1¾ inch sash, for one sash	.60	No. 021, for 1¾ inch sash, for one sash	3.00
No. 22, for 2¼ inch sash, for one sash	.90	No. 022, for 2¼ inch sash, for one sash	4.75

METALLIC SASH-OPERATOR CO.

Geared Sash-Operating Devices for Wood and Metal Sash

932 Syndicate Trust Building
ST. LOUIS, MO.

CHICAGO REPRESENTATIVES, Universal Steel Products Co., 942 Webster Building

Products.

We manufacture Geared Sash-Operating Devices, to control any style or arrangement of sash.

Geared Sash-Operators.

All of our Sash-Operators are built with a worm and gear drive, which locks the sash in any position.

Styles, Nos. 1, 2 and 3.

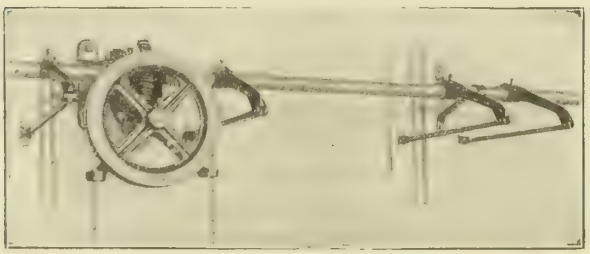
Are practically the same in construction, with the exceptions as noted at the bottom of the illustrations.

The conditions handled with these devices are horizontal runs of top or bottom hinged and horizontally pivoted sash.

No. 1 is the simplest and least expensive of the three, and it is often used because chain can hang where it would not be practical to fasten a vertical rod.

The chain, used with all styles of devices, is of a special tied link pattern; is hot galvanized, and has a tensile strength of 1,400 pounds.

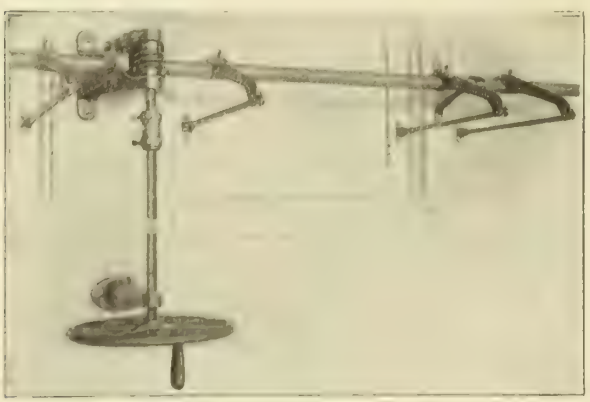
Operating Shaft used with our Styles Nos. 1, 2, 3, 4, and 5 is $1\frac{5}{16}$ inches in diameter.



SASH-OPERATOR, STYLE NO. 1

A very practical and simple Operator for controlling side-pivoted and top or bottom hinged sash. Controls 100 feet or less of pivoted sash and hinged sash according to their weight and position

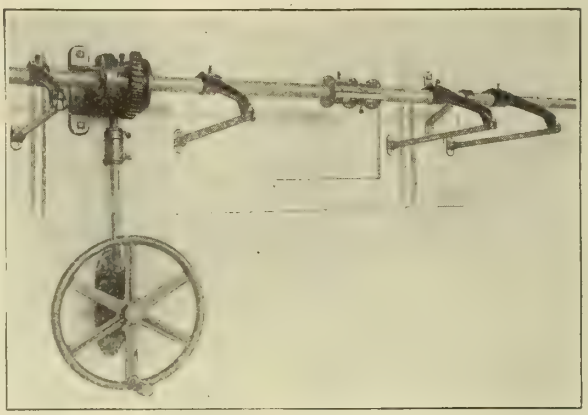
A continuous chain transmits power from the hand to the gear. Gears are made in three sizes and connecting arms in two. Wrought shaft brackets can be had in almost any length



SASH-OPERATOR, STYLE NO. 2

Same as No. 1 with one exception—a hand-wheel and [illegible] inch rod transmit power from the hand to the gear

Our No. 290 Connecting Arm, when used with either Styles 1, 2 or 3, will control short runs of top and bottom pivoted sash or casement sash.



SASH-OPERATOR, STYLE NO. 3

Same as No. 1 with one exception—a hand-wheel, bevel gear, and $\frac{3}{4}$-inch rod to transmit power from the hand to the gear

Style No. 4.

Is designed to handle long runs of top and bottom pivoted sash and some conditions of side-hinged sash. It is very powerful and durable. It is made as a chain operator only.

SASH-OPERATOR, STYLE NO. 4

Used to control top and bottom pivoted or side-hinged sash; will successfully operate a run of two hundred feet of either. Shaft supported by roller brackets; power transmitted to gear by endless chain

Various Installations.

We give here only a few places in which our various Sash-Operators have been installed.

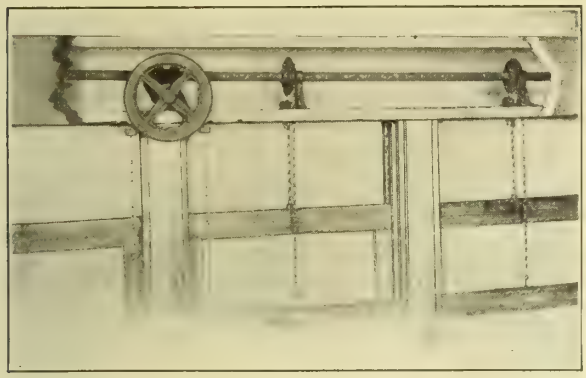
Sub-Station for Electric Company of Missouri, St. Louis, Mo.
Central High School, Minneapolis, Minn.
Commonwealth Steel Co., Granite City, Ill.
Grover Cleveland High School, St. Louis, Mo.
United States Penitentiaries, Leavenworth, Kan., and Atlanta, Ga.
Roundhouses and Freight Houses for Big Four, Chicago & Alton, Missouri Pacific, and Terminal Railroad Association of St. Louis, Mo.
Western Cartridge Co., East Alton, Ill.
Aluminum Ore Co., East St. Louis, Ill.
U. S. Post Offices
Empire Rolling Mills, Cleveland, Ohio
Monsanto Chemical Co., St. Louis, Mo.
St. Louis Water Works, Filtering Building

Continued on next page

Style No. 5.

Is designed to control counterbalanced, vertically sliding sash.

Sash of this kind have considerable friction, and in order to reduce this as much as possible, we furnish sash rollers, which should be inserted at the four corners of the sash. Where required, we furnish a chain which connects the bottoms of the sash and passes through a pulley fastened to the sill. With this addition, the sash are pulled in both directions.



SASH-OPERATOR, STYLE NO. 5

Shaft may be enclosed, as shown, or suspended in front of sash. The amount of sash that can be handled by one gear is determined by conditions. No weights or other hardware are needed

Style No. 9 (Tension Device).

This style is for heavy top hung and continuous sash, and will operate a run of 100 feet. The power is delivered to the gear by an endless chain. The gear should be located at the end of the run. The entire device is attached to the sill, and the angle that is attached to the sash should be located 3 inches up from the sill. The sill angle should be at least 3 by 3 inches.

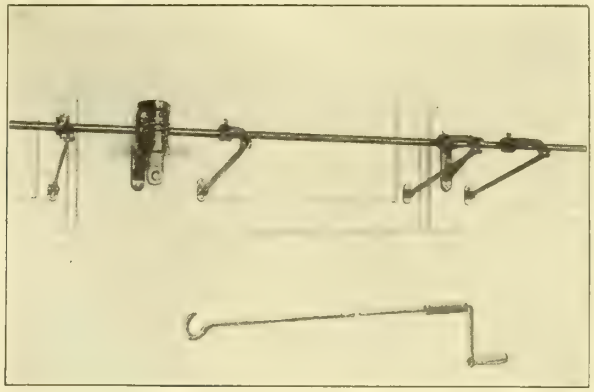
The gear is enclosed, and is very powerful. The power is delivered to the shaft by a worm, worm gear, pinion gear and heavy gear rack. The teeth on the gear rack are 1¼ inch wide.

The entire device is extra heavy and strong, and has thrust ball bearings. This device can be furnished motor-driven.

Style No. 6.

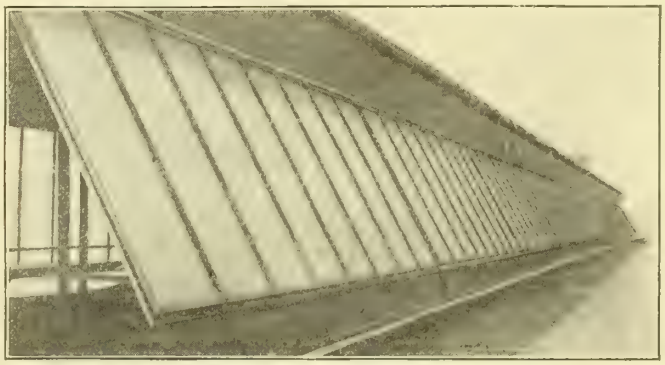
Is designed to control sash such as are found over display windows. The operating shaft is three fourths of an inch in diameter, and made of solid steel. We have often found it convenient and desirable to have our heavier gears made up with this detachable handle.

Often the customer does not care to have a chain hanging down or a rod run down, and we furnish this detachable handle, which can be put away in a convenient place, and brought into use when needed.



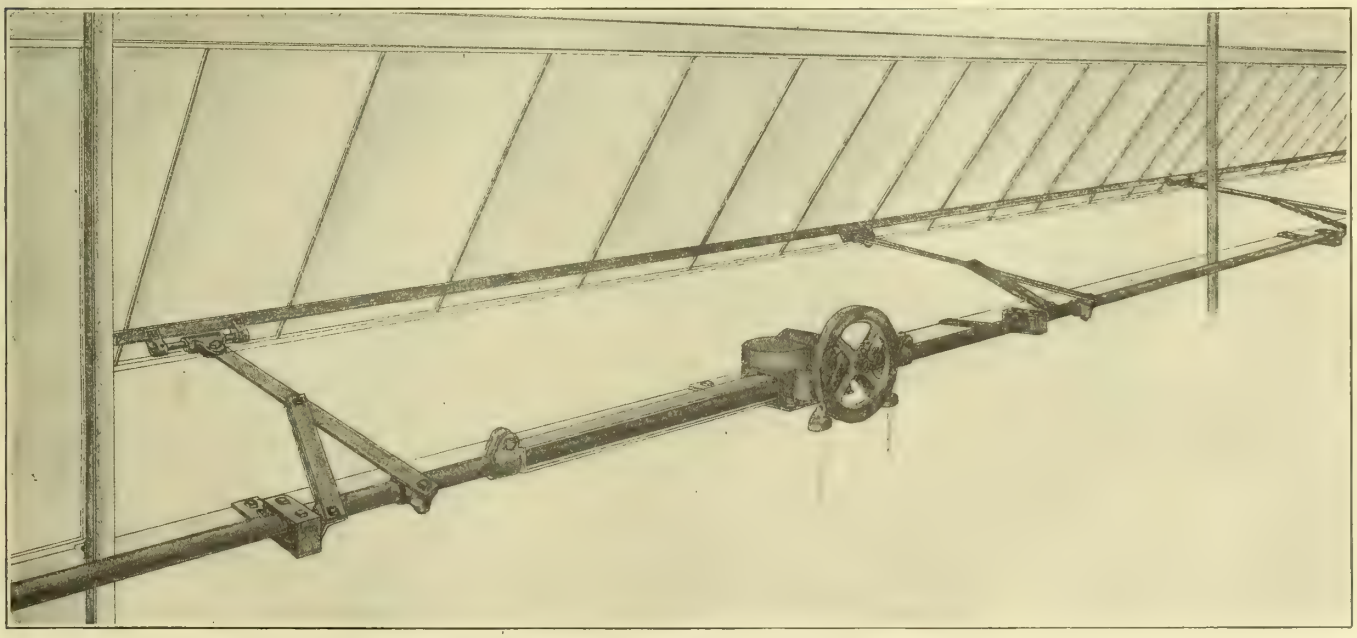
SASH-OPERATOR, STYLE NO. 6

Power transmitted by means of detachable handle, furnished in lengths to suit conditions. Controls a run of 20 feet of small pivoted sash and hinged sash according to their weight and position



SASH-OPERATOR, STYLE NO. 9

A 140-foot run of continuous top-hung steel sash, 5 feet high, for Monsanto Chemical Co., St. Louis, Mo.



SASH-OPERATOR, STYLE NO. 9. TENSION DEVICE
(Patent applied for)

ESTABLISHED 1875

THE PAYSON MANUFACTURING COMPANY

Manufacturers of Builders' Hardware, and

THE DEARBORN HARDWARE MANUFACTURING CO.'S

Line of Sash-Operating Devices

2920 Jackson Boulevard
CHICAGO, ILL.

REPRESENTATIVES

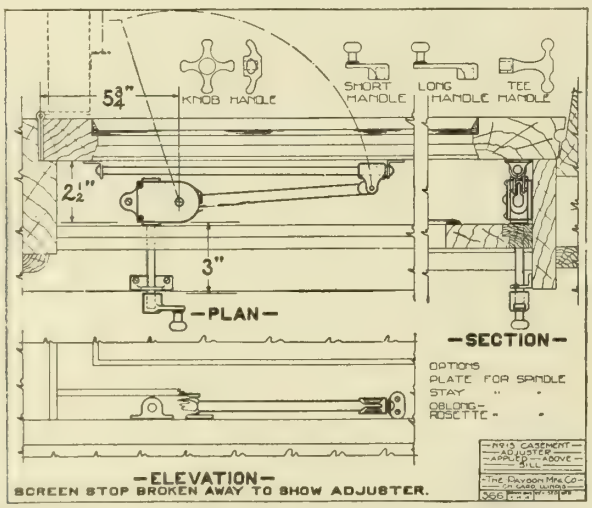
NEW YORK, N. Y., Frederick Pfeifer, 107 Reade Street
BALTIMORE, MD., Henry Keidel Co.
SAN FRANCISCO, CAL., A. V. Morse, Rialto Building

Products.

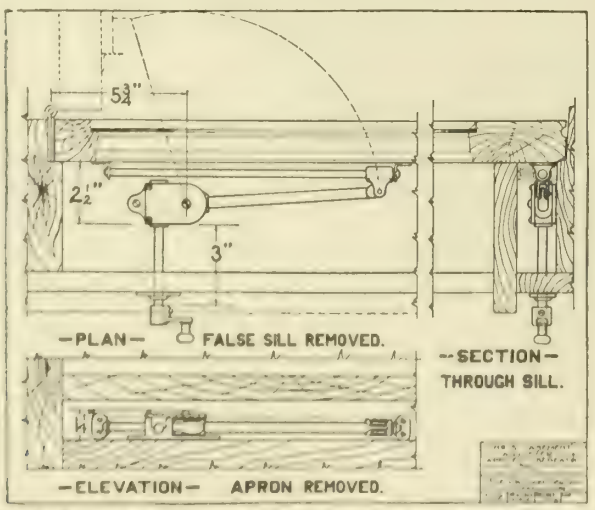
"Dearborn" Geared Operators; "Harris" Concealed Transom Lifter; "Harris" Casement Adjuster; Signal Sash Locks; "Simplex" Transom Lifters; Transom Hardware; Underwriters' Sash Locks; Ventilating Sash Locks; Concealed Casement Adjusters; Schoolhouse Coat and Hat Hooks; "Harris" Operators.

"Harris" No. 15 Casement Adjuster—Worm and Gear Type (Patent applied for).

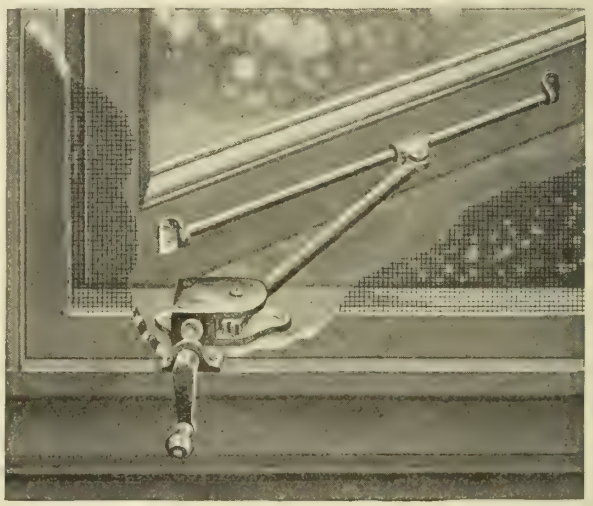
Always locked. Lock 1⅝ by 2¼ inches, four screw holes for attaching.



DETAIL NO. 15 CASEMENT ADJUSTER PLACED ABOVE SILL



DETAIL NO. 15 CASEMENT ADJUSTER PLACED BELOW SILL



"HARRIS" NO. 15 CASEMENT ADJUSTER

Guide rod ⅜ by 13⅛ inches over all.
Operating rod ½ by 8 inches between centers.
Operating shank 3 inches between lock and handle.
Furnished with 2-inch crank handle and heavy stay plate.
A smaller crank, knob or key may be had.
A plate or oblong rose may be used instead of stay plate.
Made in iron, brass and bronze; with crank, tee, or knob handle.
Used either above or beneath the stool, to operate out-swinging casements without opening the screen.

Advantages.

Construction—The simplest construction and operation—a plain worm and gear, cut to allow no play.
The direct control of the sash.
The strength of the material used, ½-inch rod lever and equally strong slide.
Four screws attach the lock to the sill, one of which passes entirely through the lock.
Reversible by removing top plate and turning worm and gear over.
Operation—Fool-proof—locked at all points; crank control—understood by every one.
Holds without shake or rattle, and forces sash to a tight lock at closed and full open position.
When sash is wide open (where wind pressure is greatest) the lever and lock form a brace for the sash.
Relieves strain on the butts and sash and gives better control because of the distance of the point of operation and sash attachment from the butts.

Continued on next page

The method of attachment to the sash gives more strength and less wear to the adjuster.

Only six complete turns to open sash 90 degrees.

For asylums, a detachable handle may be used; prevents tampering with lock and sash.

The regular minimum distance between sash and screen is 2½ inches. Mortising the screen over the lock makes the space 1¾ inches.

Standard adjuster controls a casement with openings between jam trim of 15½ to 30 inches. Specials made for other openings.

Lock should always be as close to sash as possible, which is ¾ inch.

The center of the gear in the lock should be placed 5¾ inches from the hinge line. If the lock is so placed the sash will open to 90 degrees and the operating rod will always form a brace with the sash—even when the sash is at right angles. This forms the strongest adjuster made.

When there is very wide stool, the operating shank should be lengthened. The screen can be hung on side or top. Adjuster is reversible—making it right or left.

Casement sash out of reach may be operated with this adjuster by the use of corner gears.

"Harris" Concealed Transom Lifter (Patent allowed).

This Concealed Transom Lifter does not require the special treatment of the transom sash and trim, which is necessary when other concealed transom lifters are used. A space is required in the casing 1 inch by 2 inches deep.

It has several distinct advantages over all other types. It will be noted that the control is located near the center of the transom, and this overcomes several of the defects found in other types. It eliminates the lost motion which prevents the transom from being securely held; it permits of an ease of operation that is not found where the connection with the transom is made near the pivoted point; and lastly, the screw and cross-head mechanism is so powerful that the lifter, for its weight, will operate a very heavy transom.

We guarantee this lifter to be the strongest, simplest, most efficient and handsomest on the market. It will operate any kind of transom sash without any special preparation. There is no complicated mortising necessary; and the two mortisings that are needed can be made at the mill. The carpenters will have absolutely no trouble in attaching the device, and the time saved through its use will be found a considerable item.

We furnish several styles of operator handles, or knobs, to suit the taste of the owner.

Fig. 1 shows a phantom view of lifter in position.

Fig. 2 shows details of the lifter. The transom is opened or closed through its connection with the moving cross head, actuated by the Archimedes screw. The slotted opening is protected from weather and dust by a shield which moves with the cross-head.

Fig. 3 shows a transom equipped with this lifter.

With this lifter available, there are no reasons for marring the trim of a door with transom rods of the old type, and the lines of the woodwork may be preserved intact.

In specifying, call for the "Harris" Concealed Transom Lifter, manufactured by The Payson Manufacturing Company, Chicago, Ill.

"Pilot" Straight-Pull Operator.

The Pilot Straight-Pull Operator is an operator of the tension type. Made in two styles; one especially designed for side pivoted sash, and one for top hinged sash.

Fig. 1. Phantom View

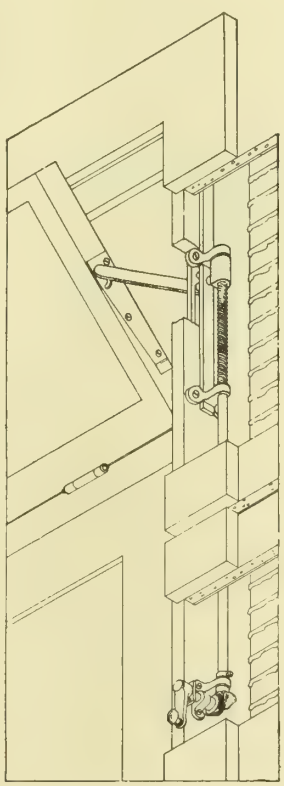


Fig. 2. Details

Fig. 3. Transom Equipped

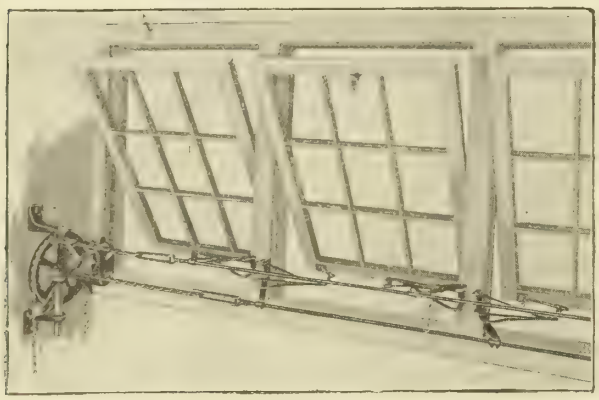
"HARRIS" CONCEALED TRANSOM LIFTER (PATENT ALLOWED)

Continued on next page

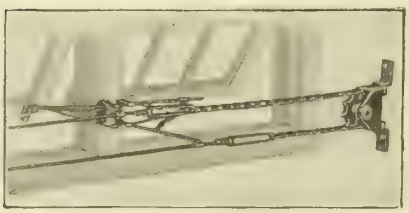
The levers which attach to the sash are of the compensating type. The special lever used on pivoted sash is so designed that its leverage is greatest when the sash is shut. The type of sash lever used on top hinged sash is of the compensating type, so designed that it increases in power as the sash open and the load increases. This increase in leverage is in constant ratio to the increase in load, and is so carefully worked out that the sash are perfectly balanced in any position. The sash levers may be either operated by steel rod or cable.

Brackets, arms, and connecting rods which attach to the mullions and operate the sash are made of steel with brass washers, supporting all movable steel parts.

The "Pilot" Operator for Pivoted Sash—Will operate a run several hundred feet in length. The sash are held securely in any position, and when shut are drawn firmly in their frames.



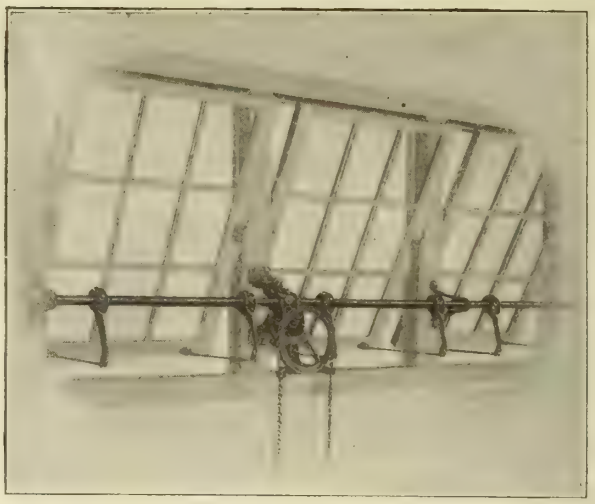
Side Pivoted Type



Top Hinged Type

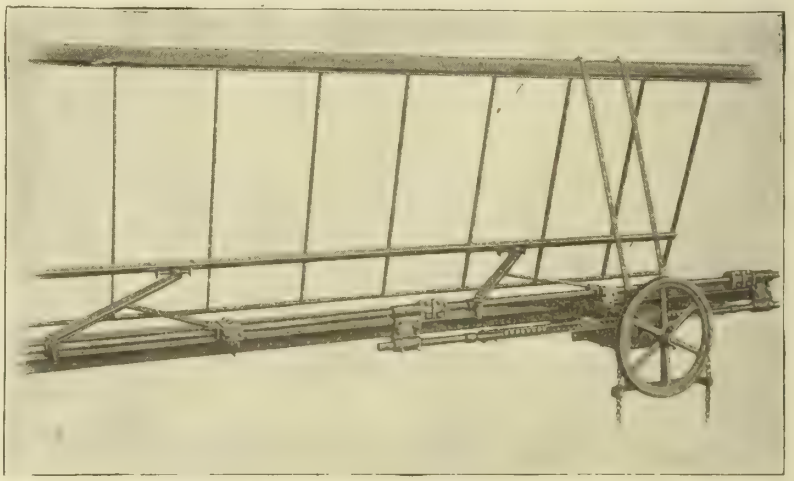
"PILOT" STRAIGHT-PULL SASH OPERATOR

The "Pilot" Straight-Pull Operator for Top Hinged Sash—Will handle sash as per the schedule found under the head of the Peerless Straight-Line Operator.



"IDEAL" SASH OPERATOR

tory operators for handling top-hinged, continuous sash of any type. The old type "Peerless," formerly manufactured by the DEARBORN HARDWARE MANUFACTURING Co., has been remodeled along the line of the "Harris" No. 15 Continuous Sash Operator. The operating power is of the worm and gear type which is enclosed in an oil-tight case; the worm being provided with ball thrust bearings, of a very high grade. The shaft, which is $1\frac{5}{16}$ inches outside diameter standard pipe, is driven by a cut toothed steel rack, operated by a pinion, revolved by gears. This operator is the most powerful on the market, and by its use all counterbalances have been eliminated.



"PEERLESS" STRAIGHT-LINE SASH OPERATOR
Patent applied for

"Ideal" Sash Operator.

The "Ideal" Sash Operator is an operator of the torsion type, operated with a chain wheel. The chain control is a very simple and inexpensive one, and is in many ways superior to the hand-wheel method of operating torsion devices. The expense of installation is less than that of installing the torsion device or the rod and hand-wheel type.

The sash are securely held in any position.

This device, we recommend as the simplest and strongest of all torsion operators.

"Peerless" Straight-Line Sash Operator (Patent allowed and pending).

The new "Peerless" operator is a combination of what have been recognized as the only two satisfac

Continued on next page

Installation of a "Peerless" Straight-Line Operator.

Note carefully the following, regarding the steel uprights, etc. Where the sash are not over three feet high and where there is a three-inch angle, Z-bar, or channel sill at the bottom of the sash, the apparatus may be attached to this member; but where there is no such sill member and in all cases where the sash are over three feet high, steel uprights $2\frac{1}{2}$ by $\frac{3}{16}$ inch angles, or their equivalent, must be provided by the steel contractor, and should be spaced more than eight feet apart and beginning three or four feet from the end of the sash for properly attaching this apparatus. An angle or a tee bar, or some other means of attachment, must be provided by the contractor furnishing the sash for properly connecting the lifting arms or levers to the sash.

Installation Data—One operator will control a run of sash approximately as follows:

Sash 3 feet high, top hinged, continuous—hung vertically—runs up to 150 feet. 45-degree opening—actual width of opening 28 inches; or, at slight additional cost, 90-degree opening—actual width of opening 48 inches. For ease of operation we recommend runs of approximately 100 feet.

Sash 3 feet high, top hinged, continuous—hung off the vertical—runs up to 110 feet. 45-degree opening—actual width of opening 28 inches; or, at a slight additional cost, 90-degree opening—actual width of opening 48 inches. For ease of operation we recommend runs of approximately 80 feet.

Sash 4 or 5 feet high, top hinged, continuous—hung vertically—runs up to 100 feet. 30-degree opening—actual width of opening 34 inches; or, at a slight additional cost, 45-degree opening—actual width of opening 50 inches. For ease of operation we recommend runs approximately 90 feet.

Sash 4 or 5 feet high, top hinged, continuous—hung off the vertical—runs up to 80 feet. 30-degree opening—actual width of opening 34 inches; or, at a slight additional cost, 45-degree opening—actual width of opening 50 inches. For ease of operation we recommend runs of approximately 70 feet in length.

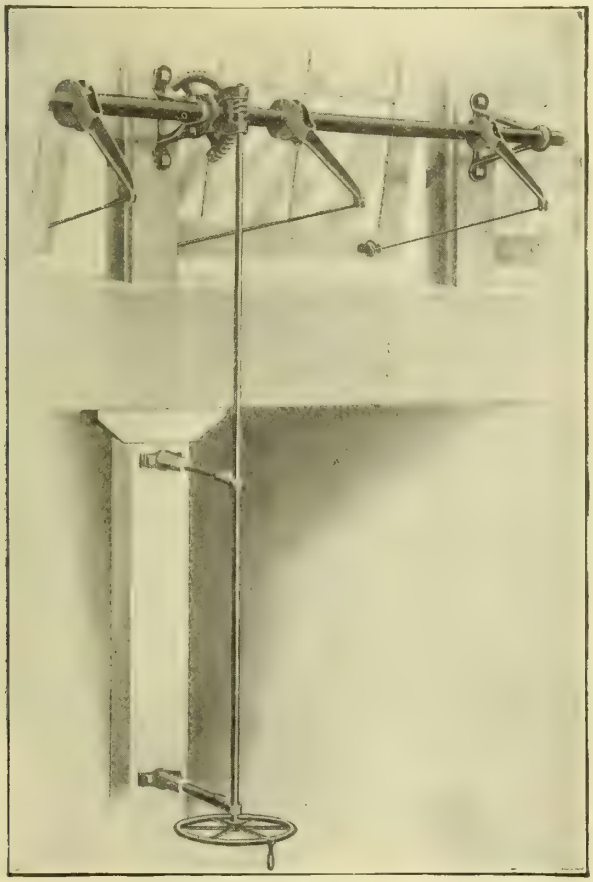
Estimates.

Send us your plans and specifications and we will gladly make estimates on the material required, and will also be glad to advise with you concerning the proper operator that should be used.

Superior Sash Operator.

This operator, of the torsion type, is made in many sizes, and can be used for handling runs of side pivoted sash up to 125 feet in length.

The worm and gear locking mechanism holds the sash securely in any position.



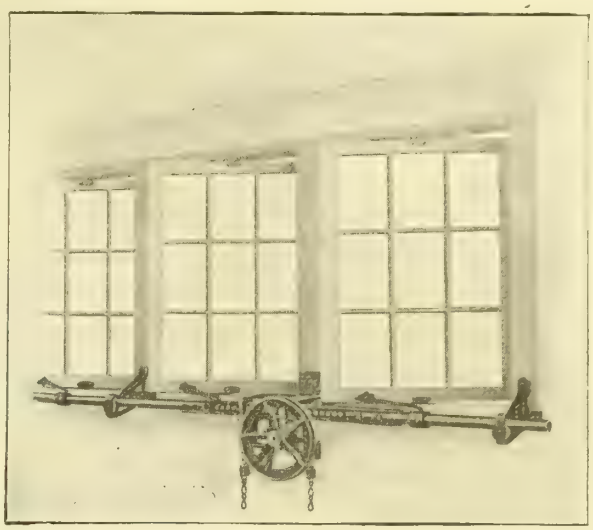
SASH OPERATOR

"Victor" Sash Operator.

The "Victor" Operator is especially designed for operating top and bottom pivoted sash and side hinged sash. It is of the worm and gear type. The sash are opened and closed by means of a sliding rod which travels on roller bearings.

For small sash one attachment is all that is needed, but on sash that are large, or on sash that are extremely high, the rod should be carried across both the top and bottom of the sash. In this way, the sash is held absolutely rigid.

This device will control runs of top and bottom pivoted sash up to 300 feet in length.



"VICTOR" ROLLER-BEARING SASH OPERATOR

"Harris" Geared Sash Operators.

Our line of Geared Sash Operators is now the largest and most complete in the world. Our equipment is such that we can handle contracts of any size, and on large contracts we are prepared to erect the machines. On all orders we furnish complete erection drawings, showing the placing of every screw.

Our machines may be operated with compressed air, or electricity, if so desired. Devices of this type are quite commonly used in large power-houses or other plants, where electrical current can be obtained cheaply.

References.

Cleveland Crane & Engineering Co., Wickliff, Ohio
Ft. Wayne Electric Co., Ft. Wayne, Ind.
River Furnace Power House, Corrigan McKinney, Cleveland Ohio (McClintic-Marshall Co.)
Transue E. Williams Co., Alliance, Ohio
Willard Storage Battery Co., Cleveland, Ohio
Libby McNeil Packing Co., Sacramento, Cal.
Citrus Packing Co., Whittier, Cal. (Albert W. Rea and Chas. Rathburn, Engineers)
Carter White Lead Co. (A. S. Coffin, Architect)
Commonwealth Edison Co. (Holabird & Roche)
Texas Power & Light Co., Paris, Tex.
Building Panama Canal (Panama Canal Commission)
Hercules Gas Engine Co., Evansville, Ind.
Hormiguero Central Co., New York, N. Y.
Locomotive Superheater Co., East Chicago, Ind.
Aluminum Ore Co., East St. Louis, Ill.
Youngstown Sheet & Tube Co., Youngstown, Ohio
Benton Harbor Malleable Foundry Co., Benton Harbor, Mich.
American Car & Foundry Co., Milton, Pa.
Bridgeport Projectile Co., Forge Shop, Bridgeport, Conn.
Gulf Refining Co., Gibson's Point, Philadelphia, Pa.
Pennsylvania Salt Mfg. Co., Wyandotte, Mich.
H. J. Heinze Co., Pittsburgh, Pa.
Sivver Steel Casting Co., Milwaukee, Wis.
Bethlehem Steel Co., South Bethlehem, Pa.
The Miller Rubber Co., Akron, Ohio
Ingalls Shepard Foundry, Harvey, Ill.
Midvale Steel Company, Nicetown, Pa.
U. S. Cast Iron Pipe, Bessemer, Ala.
Pettibone & Mulliken, Chicago, Ill.
U. S. Ball Bearing Mfg. Co., Chicago, Ill.
Swift Packing Co., Montevideo, Uruguay, S. A.
Westinghouse Co., Pittsburgh, Pa.

PITTSBURGH PLATE GLASS COMPANY

Distributers of Simplex Window Fixtures

OFFICES IN ALL PRINCIPAL CITIES EXCEPT PACIFIC SLOPE

Products.

SIMPLEX WINDOW FIXTURES.

Description.

These fixtures consist of a pair of double-acting arms made of rustless steel (or bronze when desired), with pivot shoes, springs, etc., which, when properly applied to a window sash and attached to the window frame, provide maximum ventilation and render the window sash easily reversible for cleaning the outside of same from the room. The closing of the lower sash of the two-light window provides ample ventilation without drafts, and the casement window can be readily adjusted to prevent drafts and at the same time procure the maximum ventilation.

The use of these fixtures eliminates all sash weights, cords, chains, pulleys, box frames, etc. On account of this elimination, windows equipped with the Simplex fixtures are practically no more expensive than the old type of window; and where they replace lead weights, the cost is less.

Windows to which these fixtures are attached, when opened to the fullest extent, never project into the room to interfere with shades, draperies, or fly screens; and they lend themselves very readily to efficient weather-stripping where desired.

These windows are simple, durable, noiseless, weatherproof; and when the sash are closed, it is impossible to open them from the outside without breaking the glass, thus rendering them burglar-proof. They are very readily and easily installed, the expense of same being no more, if as much as the cost of installing the double-hung window adjusted by weights, etc.

These windows are adapted to use in office buildings, schools, factories, apartment houses, and residences. They solve the sleeping porch problem.

Distribution and Installations.

The sash and frames for these windows can be procured through the regular channels, and any carpenter can install the fixtures.

Catalogues, etc.

Illustrated catalogue with full information will be sent upon request.

We furnish architects with full-size blue-print details.

References.

Simplex windows are being specified by some of the most prominent architects in the country; and wherever they have been used, they have been entirely satisfactory. List sent on request.

DETAIL, SHOWING SIMPLEX DOUBLE-ACTING ARMS

SIMPLEX VERTICAL WINDOW

Showing volume of ventilation without draft. Reverse into room for cleaning

SIMPLEX CASEMENT WINDOW

With or without transom. Easily adjustable to prevent draft. Reverse into room for cleaning

Height of Sash	No. of Fixture	Height of Sash	No. of Fixture
1′ 0″ to 1′ 1½″	1	3′ 7″ to 3′9½″	12
1′ 2″ to 1′3½″	2	3′10″ to 4′0½″	13
1′ 4″ to 1′6½″	3	4′ 1″ to 4′3½″	14
1′ 7″ to 1′9½″	4	4′ 4″ to 4′6½″	15
1′10″ to 2′0½″	5	4′ 7″ to 4′9½″	16
2′ 1″ to 2′3½″	6	4′10″ to 5′0½″	17
2′ 4″ to 2′6½″	7	5′ 1″ to 5′3½″	18
2′ 7″ to 2′9½″	8	5′ 4″ to 5′6½″	19
2′10″ to 3′0½″	8	5′ 7″ to 5′9½″	20
3′ 1″ to 3′3½″	10	5′10″ to 6′0½″	21
3′ 4″ to 3′6½″	11		

Width of Sash	No. of Fixture	Width of Sash	No. of Fixture
To 1′0″	A	To 2′6″	G
To 1′3″	B	To 2′9″	H
To 1′6″	C	To 3′0″	I
To 1′9″	D	To 3′3″	J
To 2′0″	E	To 3′6″	K
To 2′3″	F		

Order one set for each sash

SAMSON CORDAGE WORKS

88 Broad Street
BOSTON, MASS.

Products.

Manufacturers of SOLID BRAIDED CORD in all sizes and colors and for all purposes, including SAMSON SPOT CORD, SAMSON WIRE-CENTRE CORD and other SASH CORDS; VENTILATOR CORD; CURTAIN and SHADE CORD; AWNING LINES; MASON'S LINES; CHALK LINES; DUMB-WAITER ROPE; ARC LAMP and TROLLEY CORD; SIGNAL CORD; CLOTHES LINES, TRANSMISSION ROPE, etc.

TRADE-MARK

Samson Cord.

All goods bearing the trade-mark of Samson and the Lion are made of extra quality stock; are carefully inspected, and warranted free from the rough braiding and finishing which destroy common cords so quickly.

We manufacture three grades of sash cord, but the lower grades are made for competing trade in cheap work and do not bear the Samson trade-mark. They do not fill specifications for Samson Cord, which is much more economical in the end.

Samson Spot Cord.

The same quality and price as the plain white Samson cord. The spots on the cord serve as a means of identification after the label is removed. Spot Cord will wear many times longer than chain, or than the common cord so often found on the market, made of inferior yarn, roughly braided and poorly finished, causing early destruction by abrasion on the pulley.

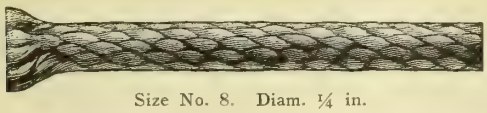
SAMSON SPOT CORD

The spots on the cord and the words "Spot Cord" are trade-marks registered in the U. S. Patent Office. Beware of imitations with labels removed

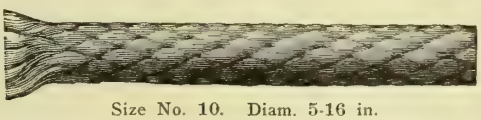
Price—The price of Samson Spot Cord averages about one cent per foot.

Tests—Tests show that it outwears chain many times over. A copy of these tests sent on application.

Size No. 6. Diam. 3-16 in.
About 18 lbs. per doz.; about 66 ft. per lb. Suitable for weights of less than 5 lbs. Minimum diam. of pulley allowable 1½ in.



Size No. 8. Diam. ¼ in.
About 27 lbs. per doz.; about 44 ft. per lb. Suitable for weights from 12 to 20 lbs. Minimum diam. of pulley allowable 2 in.



Size No. 10. Diam. 5-16 in.
About 44 lbs. per doz.; about 27 ft. per lb. Suitable for weights from 30 to 40 lbs. Minimum diam. of pulley allowable 2½ in.

Specifications—Architects' specifications should read,

"Windows to be hung with Samson Spot Cord; size of cord and size of pulleys to agree with manufacturer's list," as given at the bottom of the page.

In figuring weights of windows, the weight of glass may be taken at 3½ pounds per square foot, for plate glass; 1⅓ pounds for double thickness glass; and 1 pound for single thickness glass. For weight of wooden sash, add together height and width, in feet, of each sash, and multiply by 2.1 for 2¼-inch sash; by 1⅔ for 1¾-inch sash; and by 1⅓ for 1⅜-inch sash. These figures are sufficiently accurate for determining size of sash cords and pulleys; but actual weights can only be determined by weighing each sash after it is glazed, as the weight of the glass often varies considerably.

Sample Cards—Sample cards, showing proper sizes for use with different weights and pulleys, will be gladly sent to architects and builders.

Wire-Centre Cord.

A Metal Sash Cord, protected by a braided cotton surface which acts as a noiseless cushion and harmonizes with the window finish. It wears longer than any chain, unprotected wire, or metal tape, and withstands fire more than twice as long as bronze metal sash chain.

SAMSON MAHOGANY WIRE-CENTRE SASH CORD

Carried in stock in mahogany color, and made to order for large buildings in other colors to match finish. Price of Size No. 8, 3½ cents per foot

Special Cords.

Besides cotton cord, we carry Linen and Italian Hemp Cord in stock. We also make cords to order for any purpose, in special braid, finish or color.

Territory.

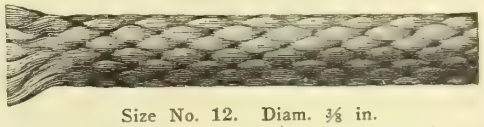
Samson Spot Cord and our other goods are sold all over the world, and are carried by most of the builders' hardware dealers in the United States.

Catalogues.

Send for catalogues and sample cards. Samples filed with Architects Samples Co., 101 Park Avenue, New York.

Size No. 7. Diam. 7-32 in.
About 22 lbs. per doz.; about 55 ft. per lb. Suitable for weights from 5 to 12 lbs. Minimum diam. of pulley allowable 1¾ in.

Size No. 9. Diam. 9-32 in.
About 33 lbs. per doz.; about 36 ft. per lb. Suitable for weights from 20 to 30 lbs. Minimum diam. of pulley allowable 2¼ in.



Size No. 12. Diam. ⅜ in.
About 60 lbs. per dozen; about 20 ft. per lb. Suitable for weights from 40 to 50 lbs. Minimum diam. of pulley allowable 3 in.

SAMSON SASH CORD

The number indicates the diameter in 32ds of an inch

SILVER LAKE CO.

Manufacturers of the "Silver Lake" Sash, Bell and Signal Cord

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BRANCH OFFICES

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SAN FRANCISCO, CAL., 111 New Montgomery Street

Products.

We manufacture "SILVER LAKE" SOLID BRAIDED WINDOW-SASH, RAILROAD-BELL, TROLLEY, SIGNAL, CURTAIN and SHADE CORD; ARC LAMP, DUMB-WAITER and TRANSMISSION ROPE; MASONS' LINES and CLOTHES LINES, and all kinds of SOLID BRAIDED CORDAGE.

Description of Solid Braided Cordage.

We are the pioneer manufacturers of Solid Braided Cordage. "Silver Lake" Cords have been used for the best work since 1868 and have become known as the standard. "Silver Lake" Solid Braided Sash Cord is made of the best quality of selected cotton yarn; twice doubled and twisted, and then braided on solid braiding machines of our own design.

Advantages—"Silver Lake" Cord costs less per pound than linen and other fine fibers, and its weight is so much less that it costs less per foot than cords that are cheaper per pound. Cotton is the only fiber that will stand constant bending over a pulley; consequently a cotton cord is more durable than one made of linen or hemp. It varies in diameter, by thirty-seconds of an inch, and is adapted to all styles and sizes of weights and pulleys. Our process of finishing takes up all the stretch, so that "Silver Lake" Cords do not lengthen, as they wear, but maintain the weight at its original height. Ordinary twisted cords kink badly in unwinding from the hank, and a great deal of time is required to straighten them out. "Silver Lake" Braided Cord comes out smoothly, and makes it possible to hang more sash in a given time than when ordinary cords are used. "Silver Lake" Cord is smooth in finish, and cannot work in between pulley and sheaf, a fact that precludes all possibility of broken sash cords. Our shade cords are extremely handsome in appearance, and do not fray and break.

Furthermore, we issue a certificate of guarantee protecting every architect who specifies our "Silver Lake" A Sash Cord against the breakage of same for a period of twenty years after installation.

Tests—Tests as made by the United States Government, Bureau of Standards, show that "Silver Lake" outwears many times chains and cheap cords. The hard braid and smooth finish also make it more fire-resisting than chains.

Special Cords.

We manufacture to order all colors of wire center cord and a great variety of other braided cords for special purposes. We furnish estimates promptly on any sample sent to us. Anything in the way of a solid braided cord, in any color or design, may be had of us.

Territory.

Our cords are in use the world over, and are carried by dealers throughout the United States. Orders of any size promptly filled.

Trade-Marks.

All hanks of genuine "Silver Lake" Cord are bound with our label, bearing our trade-mark. As an additional protection and means of identification, we stamp every foot of our cord with our name. Cord not so marked is not the genuine "Silver Lake."

REPRODUCTION OF "SILVER LAKE" CORD WITH TRADE-MARK AND NAME
Registered in U. S. Patent Office

Sizes, Weights, etc.

The following table gives the sizes and weights of cords, and the weight which each size will safely carry:

Size	Diameter	Weight per Dozen Hanks	Feet per Pound	Minimum Diameter of Pulley Allowable	Suitable for Weights
No. 6	3/16 in.	18 lbs.	about 66	1½ ins.	up to 10 lbs.
No. 7	7/32 in.	23 lbs.	about 52	1¾ ins.	10 to 15 lbs.
No. 8	1/4 in.	27 lbs.	about 44	2 ins.	15 to 25 lbs.
No. 9	9/32 in.	33 lbs.	about 36	2¼ ins.	25 to 35 lbs.
No. 10	5/16 in.	44 lbs.	about 27	2½ ins.	35 to 45 lbs.
No. 12	3/8 in.	60 lbs.	about 20	3 ins.	45 lbs. and up

PRICES

Our best cord, "Silver Lake" A, comes as follow:

White Cotton	50c per lb.	Italian Hemp	.75c per lb.
Drab Cotton	55c per lb.	Linen	.$1.00 per lb.

Prices of "Silver Lake," a thoroughly reliable cord:

White Cotton	45c per lb.	Drab Cotton	.50c per lb.

TABOR SASH FIXTURE CO.

Makers of Window Hardware and Appliances

MAIN OFFICE AND FACTORY

61-71 Polk Street

NEWARK, N. J.

REORGANIZED APRIL 20, 1914

REPRESENTED IN EVERY LARGE CITY IN THE UNITED STATES AND CANADA

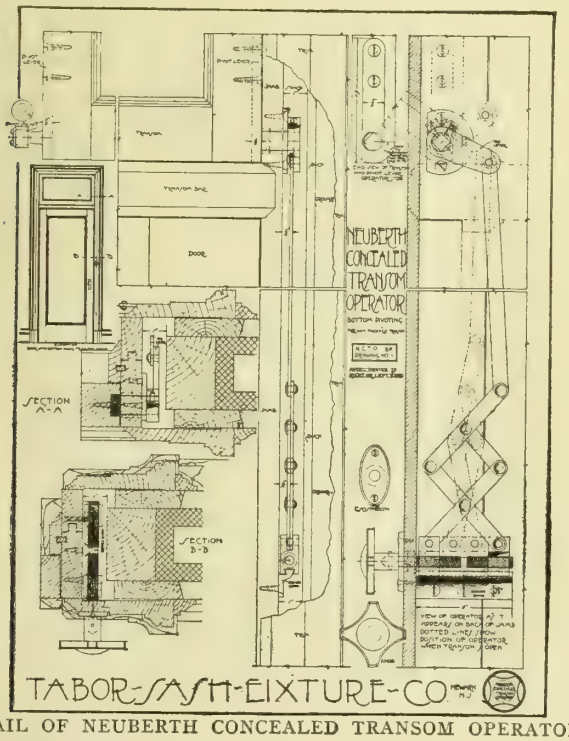
Products.

The NEUBERTH CONCEALED TRANSOM OPERATOR for Bottom, Center and Top Hung Transoms; HARDWARE for Elevating Vertically Hinged Casements; AUTOMATIC CASEMENT ADJUSTERS for Vertically Hinged Casements; ELEVATING FIXTURES for Vertically Pivoted Sash; the TABOR STRIP and FIXTURE for Reversible Double Hung and Plank Frame Windows; FRICTION CENTERS, Plain and Rabbeted, for Horizontally and Vertically Pivoted Sash; PLAIN SASH PIVOTS; TRANSOM PIVOTS and MONITOR SASH PIVOTS; METAL WEATHER-STRIPS for Doors and Windows.

Neuberth Concealed Transom Operator.

This device is, first of all, the simplest ever developed. It is efficient in the highest degree, and is so durably made that it performs its function of operating the transom indefinitely. It has no cogs, gears, bolts or delicate mechanism—no lost motion. It is securely riveted into a solid structure, a single unit, to be secured into a one-inch space between the buck and the jamb. It operates smoothly without vibration. One complete turn of the knob opens the transom twenty degrees; turn more, and the transom opens more; stop turning, and the transom holds firmly without any locking device or catch. It is adaptable for either bottom, center or top hung transoms.

NEUBERTH CONCEALED TRANSOM OPERATOR

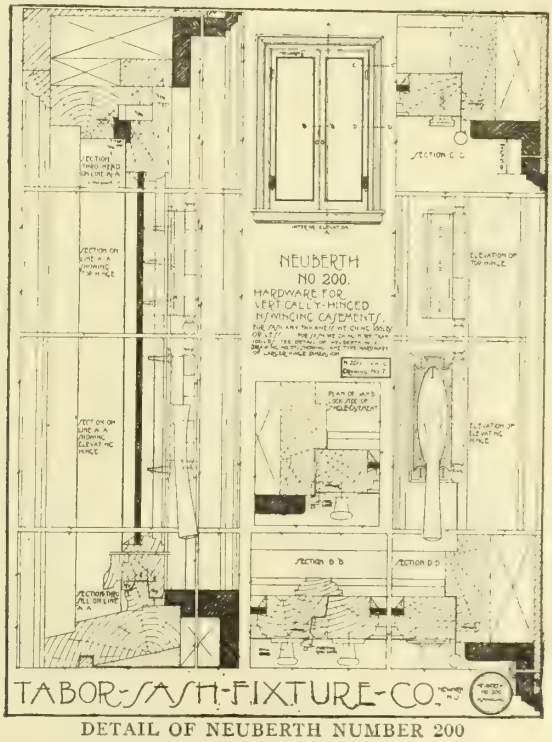


DETAIL OF NEUBERTH CONCEALED TRANSOM OPERATOR

Neuberth Number 200.

This is an equipment for inswinging vertically hinged casements. It combines the prime element of mechanical perfection with a notably attractive appearance. The elevating hinge and top hinge are of the five knuckle ball tip design. By thus conforming to the other hardware throughout the building, this design assures the much desired feature of complete uniformity. This device draws the sash down as well as lifts it, and does not depend upon the weight of the sash to lower it. It is so constructed that it can not mar the stool or the sash, through being lowered when in an open position. We emphasize the extreme durability of this excellent device, it being proof, not only against misuse and rough handling, but against any damage short of deliberate breakage. We make this fixture for outswinging, as well as two cheaper equipments for inswinging casements. Send for catalogue.

NEUBERTH NUMBER 200



DETAIL OF NEUBERTH NUMBER 200

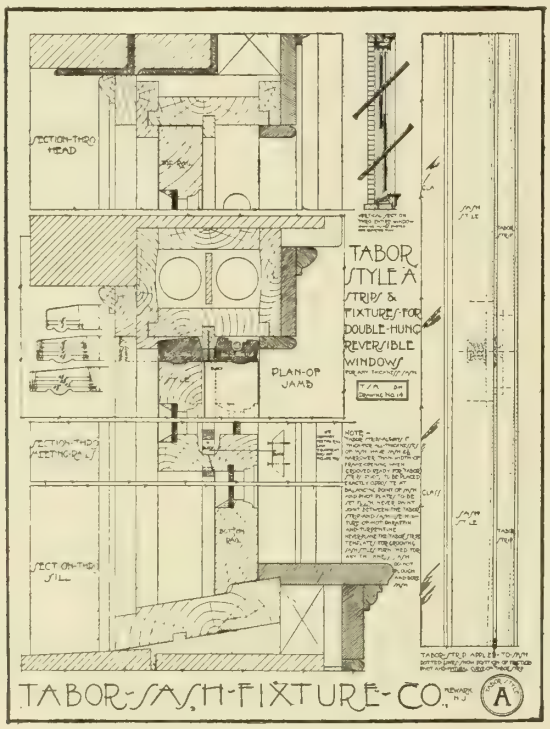
Tabor Style "A."

This is an equipment that makes it possible to pivot an ordinary double-hung window. Its installation is quick and simple. All that is required is the regular standard box frame with the sash two inches narrower than the frame opening, omitting plough and bore. Sash stiles are then grooved; Tabor strip and fixtures at-

Continued on next page

tached; and sash is ready to be hung the same as any weighted window sash. Each strip is slightly curved; and when drawn to the sash at the pivotal point, this curve forms a spring of the strip itself, making a tight and permanent contact between sash and strip. One edge of the strip fills the entire space between the jamb and the sash. Corrugations on the pivot plates hold the sash, when pivoted, at various positions for ventilation.

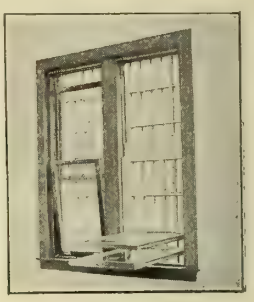
TABOR STYLE "A"



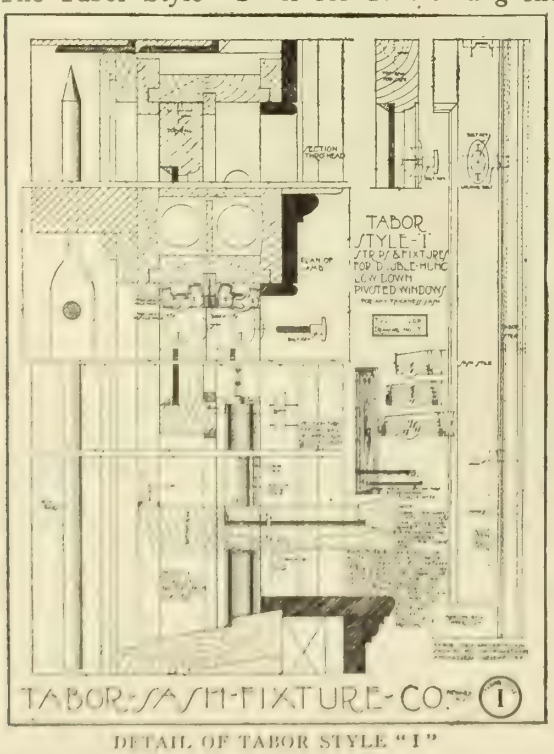
DETAIL OF TABOR STYLE "A"

Tabor Style "I."

The Tabor Style "I" is for double-hung sliding windows that have permanent stationary screens, bars or gratings. Like the style "A" equipment, the window, except for the pivoting feature, is identical with the double-hung construction. It is the Tabor strip given a reverse curve, with the pivot fixtures about four inches from the lower end. This equipment is particularly adapted for banks, asylums and prison buildings. The locks are placed where they can not be tampered with or operated except with a key. The complete locking system, as shown by the drawing, eliminates twisting or warping away of the sash from the Tabor strip. The Style "I" construction renders the cleaning of the outside of the sash a safe and easy operation.



TABOR STYLE "I"

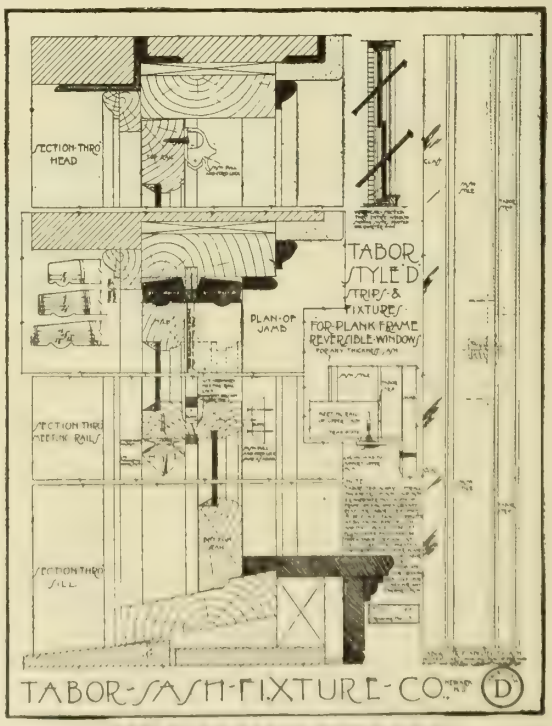


DETAIL OF TABOR STYLE "I"

Tabor Style "D."

The Tabor Style "D" is the Tabor strip applied on plank or solid frame construction. Its ideal utility is for school houses, and office building equipment, and for buildings where it is not necessary to screen windows. It eliminates the cost of box frames, weights and chains, thereby offering increased efficiency at a very low cost. The plank frame construction, equipped with the Style "D" fixture, allows a greater light area, particularly in mullion windows, and a more complete control of ventilation without draft than any other form of construction. Accessibility for cleaning, and "Safety First" precautions are the same considerations as in the selection of our Style "A" fixture. Since it is not necessary with Style "D" to slide the sash, same can be fitted very tightly, and assures a more weatherproof construction than the regular double-hung. Window shades, being attached directly on the sash, provide a perfect substitute for awnings.

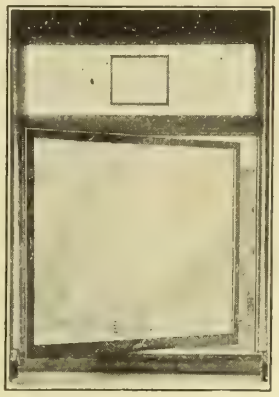
TABOR STYLE "D"



DETAIL OF TABOR STYLE "D"

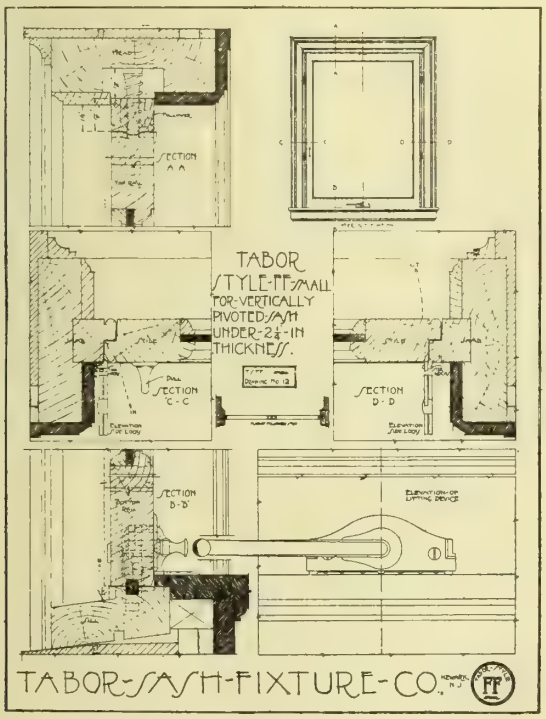
Continued on next page

Tabor Style "FF."



TABOR STYLE "FF"

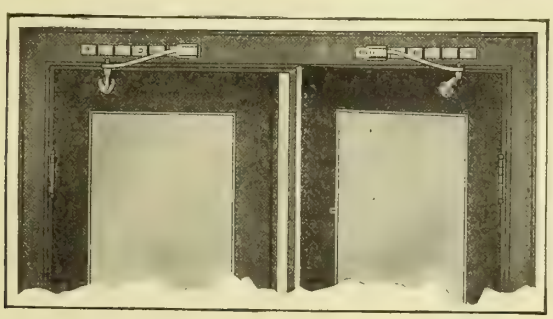
Like our elevating fixtures for hinged casements, this equipment raises the sash above a weather-stripped sill and above the stool. It permits the sash to be swung entirely around for cleaning, and to be locked at any angle for ventilating purposes. It is not dependent upon gravity to lower the sash behind the stool and onto the sill when closed. It draws the sash down, thus forcing a weather-tight condition of the sill; an impossible result, if dependent upon the weight of the sash. The equipment includes locking plates for the jambs and stiles which force the sides of the sash tightly into the rabbets of the frame. It is impossible for intruders to pry up or open the sash from the outside, even though the lever may not be all the way down at the time. This equipment is made in two sizes; the smaller model for sash under 2¼ inches in thickness and the larger model for sash 2¼ inches or over.



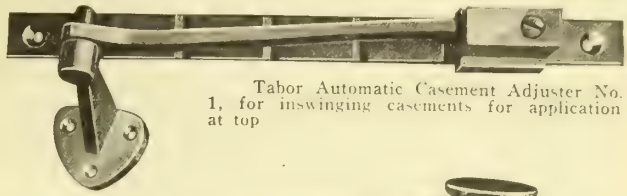
DETAIL OF TABOR STYLE "FF"

Tabor Automatic Casement Adjuster.

The Tabor Casement Adjuster is designed for either inswinging or outswinging casements. It may be placed at the top of the window as well as at the bottom. It automatically adjusts the sash at the desired angle, and holds it firmly. The exertion of undue pressure, however, causes it to "give," so that it is never strained to an injurious point. All parts but the stud or bracket are of extruded metal, and are therefore true and accurately shaped. After the fixture is adjusted it needs no further attention.

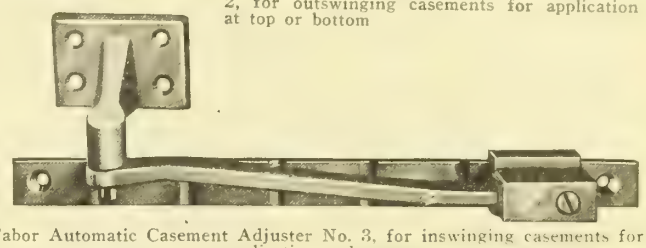


TABOR AUTOMATIC CASEMENT ADJUSTERS



Tabor Automatic Casement Adjuster No. 1, for inswinging casements for application at top

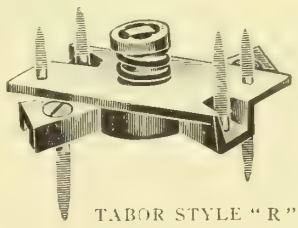
Tabor Automatic Casement Adjuster No. 2, for outswinging casements for application at top or bottom



Tabor Automatic Casement Adjuster No. 3, for inswinging casements for application at bottom

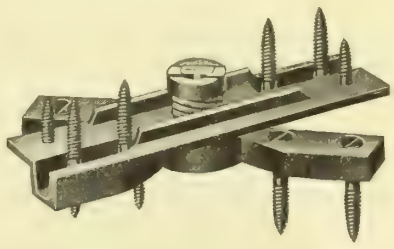
Tabor Centers.

Tabor Style "R"—A rabbeted center for transoms and light horizontally pivoted sash, having a friction control that holds the sash at various positions. It allows for the shrinkage of the sash, and is made in various sizes from 1⅜ inches to 2¾ inches in width. The same type fixture is made for plain or non-rabbeted sash.



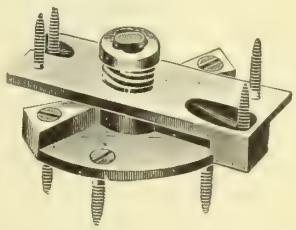
TABOR STYLE "R"

Tabor Style "S"—This center is identical with the "R" excepting in length. It is for heavy horizontally and light vertically pivoted sash. It is made for any thickness sash.



TABOR STYLE "S"

Tabor Style "P"—A cheap but strong cast-iron rabbeted friction center, designed chiefly for use in cheap factory construction. Made only in unpolished cast-iron, galvanized, dead black, copper, bronze or brass plated. Made in all sizes.



TABOR STYLE "P"

Metal Weather-Strips.

Weather-strips furnished for all types of windows and doors.

Catalogue.

For full information, scale drawings, etc., illustrating our products, send for our Catalogue No. 87A. Full size details will also be sent promptly upon request.

WHITNEY WINDOW CORPORATION

Manufacturers of Whitney Window Hardware

MINNEAPOLIS, MINN.

In Territory West of Mississippi River
WHITNEY WINDOW CORPORATION
305 Fifth Street South
MINNEAPOLIS, MINN.

In Territory East of Mississippi River
H. E. HOLBROOK CO.
444 John Hancock Building
BOSTON, MASS.

TRADE-MARK

Products.

WHITNEY WINDOW HARDWARE is made for Single, Double, Triple and Multiple Casement Windows and all Transom Openings.

Window Sash and Frames.

Sash and frames in either wood or metal are furnished by the builder, and made to details furnished by the manufacturer or agents.

Description.

Whitney Casement Hardware is applied to sash and frame in such a way that the window will, when closed, be tightly forced into place and give a perfectly weather-tight construction, but will readily open without friction between sash and frame.

The hardware (Figs. 2, 3 and 5) consists of a heavy interlocking brass sill track with sliding shoes connected to lower inner corners of sash with a substantial brass pivot hinge. The inner top corners of sash are held by a roller working in a $1\frac{1}{16}$ by $\frac{5}{8}$-inch groove in the head of frame.

Brass hinges are used to connect pairs of casements, and the lower hinge is supplied with a handle for pulling the sash into place. Single windows have a brass arm connected to one side jamb and center of sash, top and bottom.

Whitney windows should always open out.

The Whitney window is fully covered by patents and patents applied for in the United States and foreign countries.

Features.

Any width of unobstructed opening may be obtained by using single, double, triple or any number of double sash in an opening without the use of mullions.

Whitney windows are self-adjusting, never stick, open and close easily, give entire opening for ventilation and an unobstructed view, are tight and weatherproof when closed and not affected by wind when open, permit of any arrangement of shades or draperies.

Both sides of a Whitney window, single or in pairs, can be cleaned from the inside of the room.

Operation.

To open a single Whitney window, unlatch and push the sash out to any position desired.

To open a double Whitney window, unlatch, take hold of handle on lower middle hinge and push open to any desired position.

Each pair of sash in large openings operates independently of any other sash, and may be placed or left in any part of the opening.

All metal parts of Whitney Casement Windows are made of brass and will not wear out.

Where Used.

The Whitney window is used on all classes of buildings.

As a schoolhouse window it has no equal and is rapidly taking the place of the check rail window.

For sleeping rooms, sun rooms and porches the Whitney window is the only one that makes possible a large opening without mullions.

For office buildings, hotels, libraries, churches, hospitals, and all types of residence and bungalow work, the Whitney Casement Window is fast coming into favor, and will, when known, be universally used.

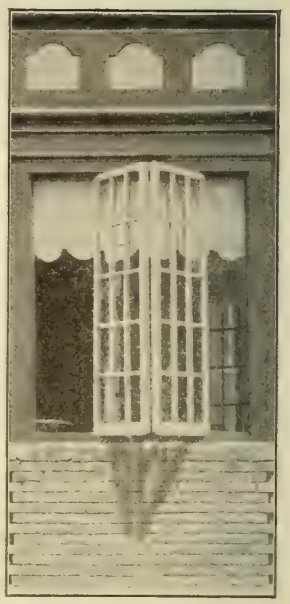


FIG. 1. WHITNEY WINDOW IN OPEN POSITION

Installation.

Complete directions for installing are sent with every shipment of Whitney Casement Hardware, and any mechanic can do the work.

Screens.

Screens are placed on the inside. Every emergency has been satisfactorily provided for.

Suggestions for screening any type of window sent on application.

Storm Sash.

Storm sash may be placed on the inside or fastened to the outside of the windows. Double glazing is the most satisfactory and is strongly recommended.

Catalogues.

Whitney Window Book and Details will be furnished by any of the Whitney Window Agencies which are established in nearly every large city.

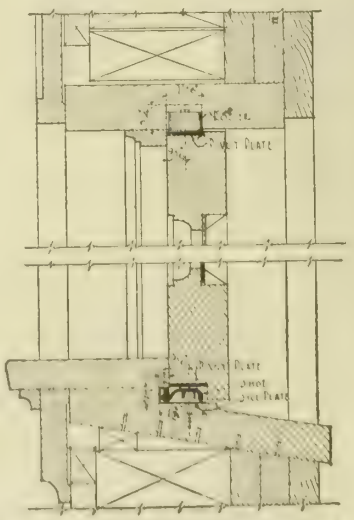


FIG. 2. SECTION OF DOUBLE OR SINGLE CASEMENT
Head and sill, Type "A"

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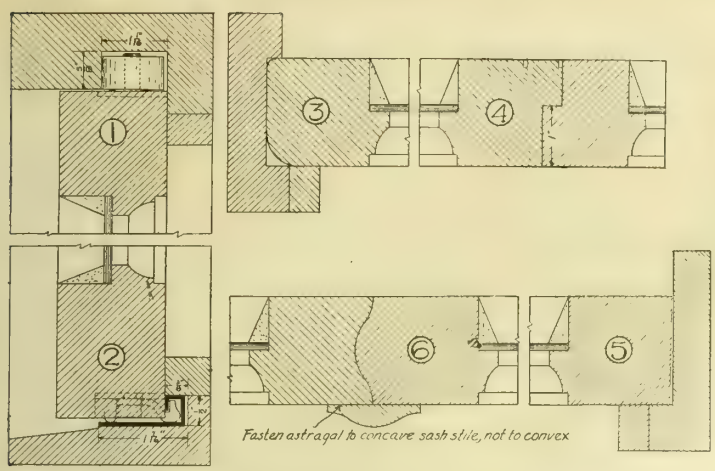


FIG. 3. DETAILS OF THE WHITNEY WINDOW

(1) Detail of head jamb of window. (2) Detail of sill of window. (3) Detail of side jamb of window. (4) Detail of hinged stiles of pairs. (Be sure inside joint is central, as shown.) (5) Detail of side jamb of single, only on side pushing out; for jamb on other side, use detail 3. (6) Detail of meeting style where two pair or pair and single abut

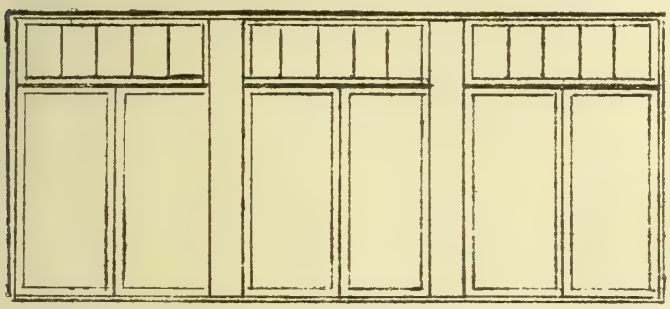


FIG. 4. TYPICAL SCHOOLHOUSE WINDOWS

A SLEEPING PORCH AND SUN PARLOR

INTERSTATE BUILDING, KANSAS CITY, MO.
C. L. MERRY, Owner. J. C. SUNDERLAND, Architect

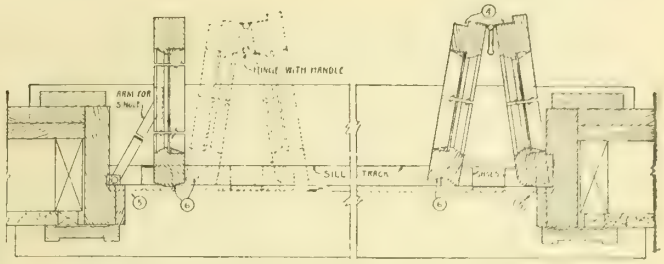


FIG. 5. PLAN OF TRIPLE SASH OPENING
Single sash may be situated at either side

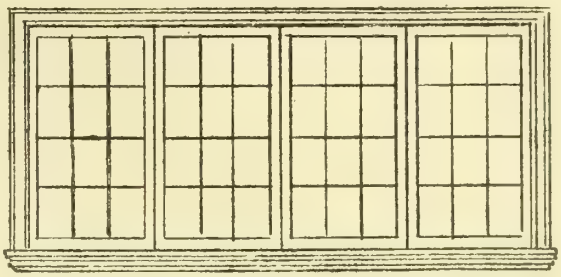
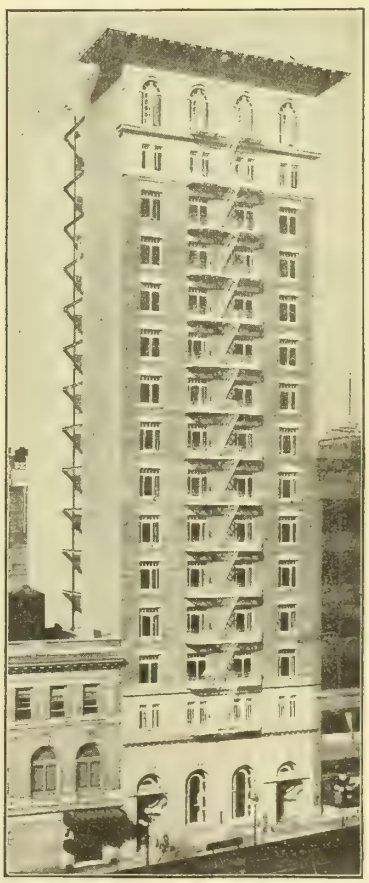


FIG. 6. INTERIOR ELEVATION OF TWO PAIR OF SASH

ENTRANCE PORCH



CHANCELLOR HOTEL, SAN FRANCISCO, CAL.
ROUSSEAU & ROUSSEAU, Architects

GEORGE LESTER WILKINS

Manufacturer of Casement Adjusters

7067 North Clark Street
CHICAGO, ILL.

Products.

The WILKINS and the SECURITY ADJUSTERS, for convenient control of Out-swinging Casement Windows.

Description.

The Wilkins and the Security Casement Adjusters are simple, neat and efficient devices for easily opening, closing and locking, in any position, out-swinging casement windows. They can be operated without moving or disturbing screens or storm sash, when these are installed. Raising and swinging an inside handle over the window stool moves a lever, the outer end of which slides in a guide tube fixed on the lower rail of the sash, and correspondingly controls the casement. When the handle is released, it drops and locks, holding the sash firm against wind or other such outside influence.

Wilkins Adjusters—These are furnished in two styles, as tabulated below, and are made only of the best French brass and statuary bronze, with the locking device of best case hardened steel, all thoroughly and accurately machined. Supplied in any desired finish.

Security Adjusters—These are lower in cost, and are furnished in only one style, for sash not less than 15 inches wide and where these are not less than 1¾ inches distant from screens or storm windows. They are made only in malleable iron with slide and guide tube of steel. Supplied in a large variety of finishes.

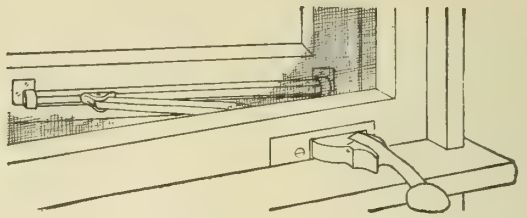
Advantages.

The simplicity of application of these adjusters makes unnecessary any special modifications in the window.

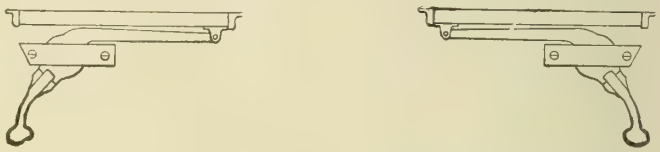
Operating, as they do, entirely from the inside, they make a window insect-proof, when they are properly applied and the screens are properly fitted.

If the handle of the adjuster is raised to unlock and swing the casement and is not returned to a locked position, a slight movement of the casement, as by a wind, will permit it to lock itself and thus save slamming and possible breakage of expensive glass.

The adjusters are strong enough to control a casement of any reasonable width, and to last indefinitely.

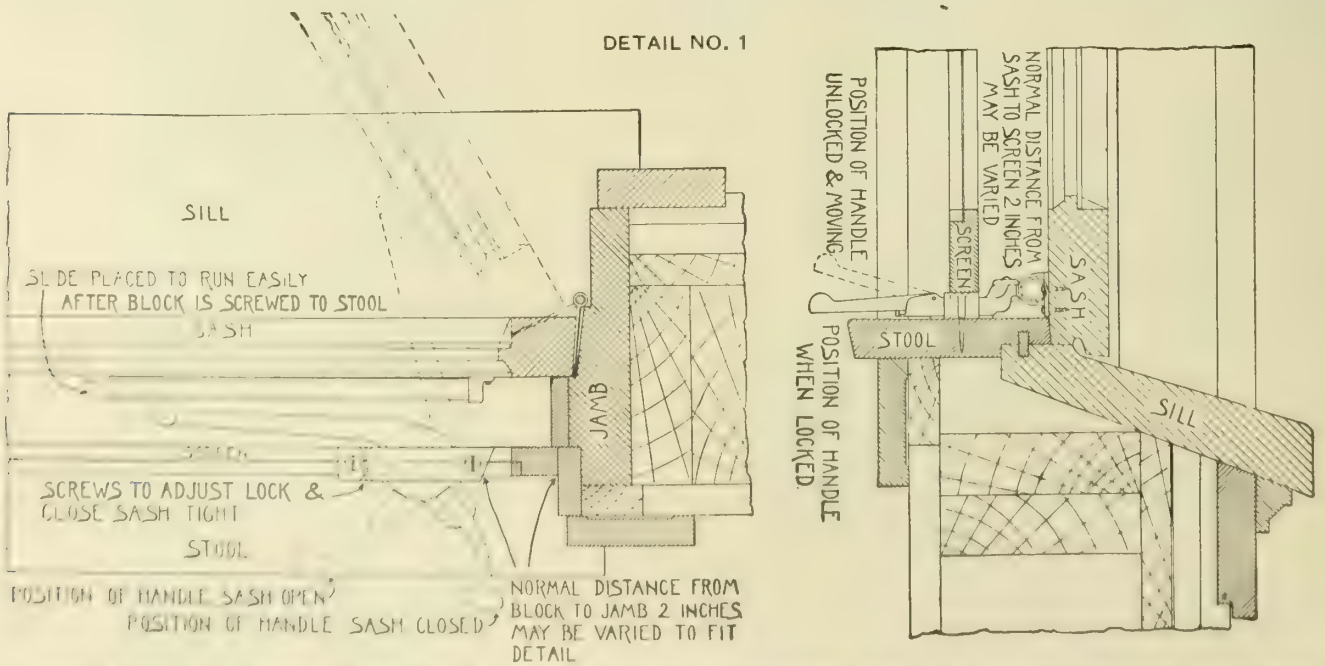


WILKINS ADJUSTER, WINDOW OPEN AND SCREEN IN PLACE
Block should be so placed that sash will swing out nearly to a right angle, but not past it



Left hand Right hand

WILKINS CASEMENT ADJUSTER
In ordering, state whether for right or left hand, and number of each



DETAIL SHOWING METHOD OF APPLYING WILKINS CASEMENT ADJUSTER TO SIMPLE CONSTRUCTION OF WINDOW WITH CASEMENT OPENING OUT; STYLE A, SIZE 1 INDICATED
Guide or track on sash shown above is 12 inches over all; lever is 8 inches from end to center of hub; handle is 5 inches from end to center of hub, and block is 4½ inches long over all

Continued on next page

They are so designed that no working part rubs against any exposed surface of another part. This prevents much marring, and aids in preserving the many fine and delicate finishes which are used.

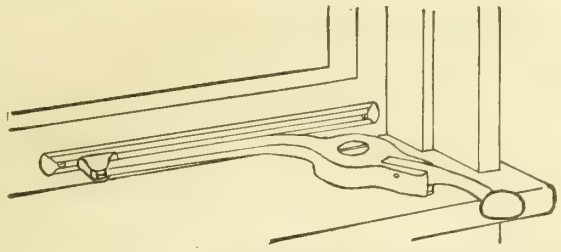
Styles and Sizes of Wilkins Adjusters.

Style A, Size 1—Recommended for general use on sash 12 to 28 inches in width, where distance between screen and sash is not less than 1¾ inches nor more than 3 inches. The most satisfactory result is obtained when distance between screen and sash is 2 inches and greatest width of sash does not exceed 28 inches. Placing butts so pin is as close to sash and jamb as possible, aids in making a satisfactory job.

Style A, Size 2—Intended for use on sash 18 to 36 inches in width, where distance between screen and sash is not less than 1⅞ inches nor more than 5 inches. Normal distance is about 2¼ inches.

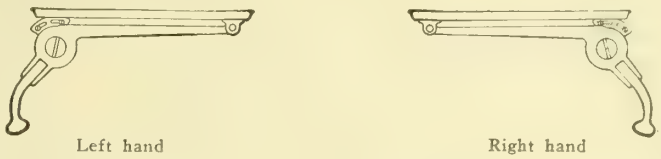
Style B, Size 1—Should be used on same size sash as Style A, Size 1, but minimum distance between screen and sash may be as narrow as ⅞ inch. This distance between screen and sash is considered too close except for very special cases.

Style B, Size 2—Should be used on same size sash as Style A, Size 2, but minimum distance between screen and sash may be as narrow as 1⅛ inches.



SECURITY ADJUSTER, WINDOW CLOSED AND SCREEN REMOVED

Adjuster should be so placed that sash can not swing beyond the right angle; or opening in lower rail of screen should be cut, so adjuster can not swing farther



Left hand Right hand

SECURITY CASEMENT ADJUSTER

In ordering, state whether for left or right hand, and number of each

Application.

It is very easy to apply the adjuster to the window. First, firmly screw the base block in the desired position on the stool, then fasten the tube to the sash so that the casement will open to nearly a right angle and the sliding part moves easily. If the casement does not close snugly and lock, loosen the screw on one side of the base block and tighten the opposite one until the sash will close tightly and be held firmly.

Prices.

List prices for the Wilkins Adjusters range from $6.25 to $18.50 (gold plated), according to size, style and finish; for Security Adjusters from $3.00 to $13.50, according to finish.

Full detailed price-list, with list of finishes, sent on request.

Blue-Prints Furnished.

Full-size detail blue-prints of both adjusters, as illustrated herewith, may be had by architects, dealers or contractors, on application. These blue-prints illustrate only one of the ways in which the adjusters may be used on the simplest form of detail for stool and sash.

Special Details.

If it is desired to place these adjusters on special and unusual details, instructions and information for so doing will be given when asked for, if tracing or blue-print is furnished to work from.

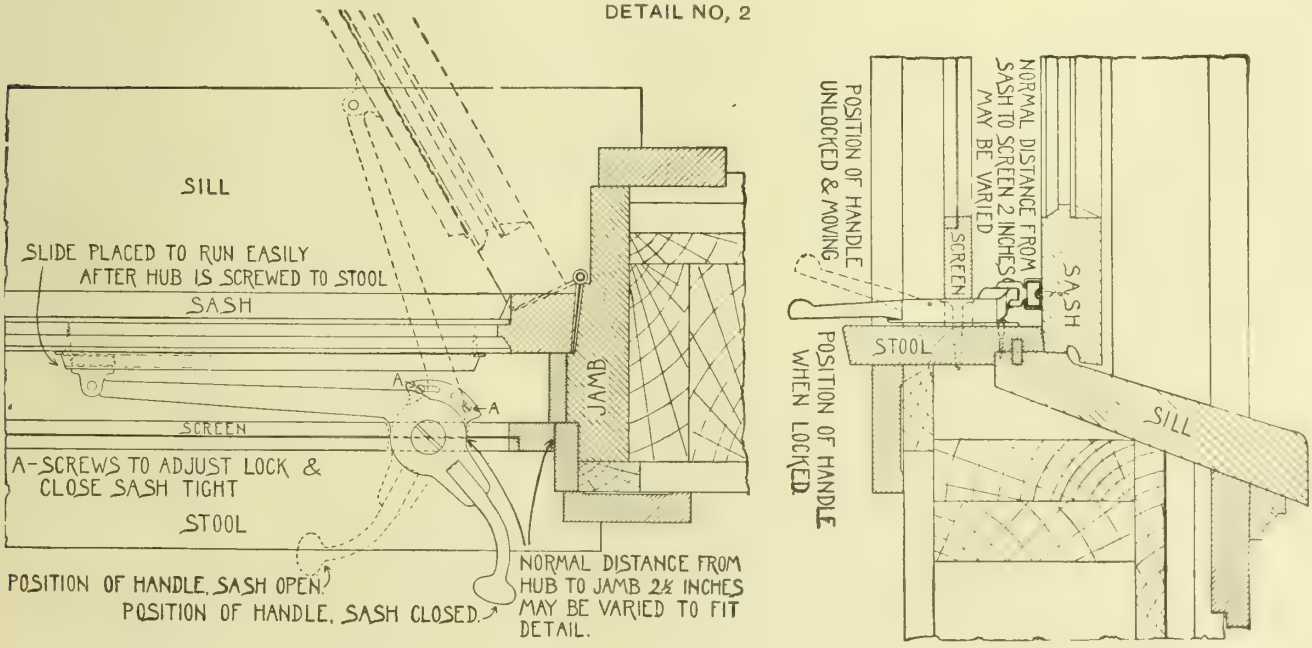
Guarantee.

The Wilkins Casement Adjuster is guaranteed to be made of the best material obtainable, and the utmost care is given to the workmanship and construction. We cannot become responsible for misapplication and abuse.

Prompt Shipment.

The most frequently used finishes may be had on short notice. The more unusual finishes require two or three weeks more time to finish.

DETAIL NO, 2



DETAIL SHOWING METHOD OF APPLYING SECURITY CASEMENT ADJUSTER TO SIMPLE CONSTRUCTION OF WINDOW WITH CASEMENT OPENING OUT

Guide tube is 12¾ inches over all; lever is 10¼ inches from end to center of hub; handle is 5½ inches from end to center of hub

THE WILLIAMS PIVOT SASH COMPANY

Reversible Window Fixtures

CLEVELAND, OHIO

Products.

Manufacturers of REVERSIBLE FIXTURES for PLANK FRAME, DOUBLE-HUNG, VERTICAL PIVOT WINDOWS, SINGLE SASH and TRANSOMS.

Also, WILLIAMS STORM-PROOF SUB-SILL for SINGLE and DOUBLE CASEMENT WINDOWS, and SPECIAL HARDWARE.

Williams Double-Hung Reversible Window.

The Williams Double-Hung Reversible Window requires nothing new in either frame or sash construction. The added advantage of the corrugated strip, truncated cone pivot, roller spring bearing contact with side jambs, guarantees tight fitting sash.

Easy to operate. Rapid, safe, and economical to clean. This device has solved the problem of ill-fitting, noisy and leaky windows.

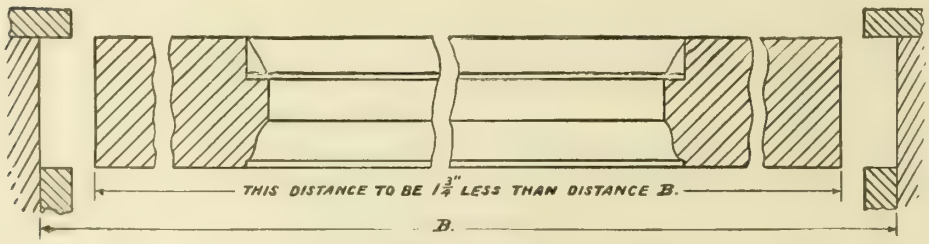
Illustrations.

In illustrations on this and the following pages, the parts furnished by this Company are shown in *solid lines* (except mill detail). Full-size details furnished on application.

Alignment Guides.

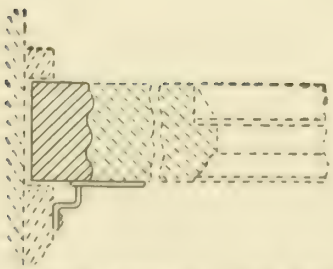
The alignment guides automatically force the meeting-rails together, an invaluable asset to tight-fitting windows.

WILLIAMS DOUBLE-HUNG REVERSIBLE WINDOW



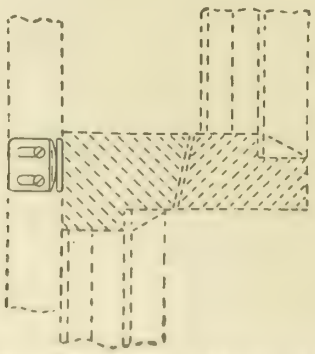
MILL DETAIL

Sash to be made 1¾ inches narrower than jamb opening



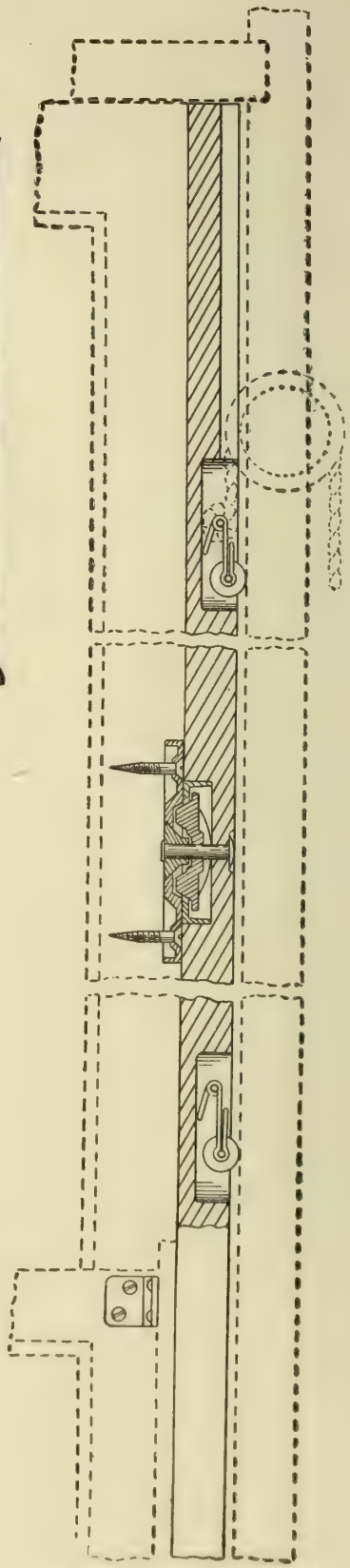
SECTION THROUGH ONE SIDE OF SASH

Showing Corrugated Strip



SECTION THROUGH MEETING RAILS

Showing Alignment Guides in Position



SECTIONAL DETAIL OF SIDE CORRUGATED STRIP

Showing Truncated Cone Pivot and Roller Springs

Continued on next page

Williams Plank Frame Reversible Window.

Permits of being fitted tighter than any other window made.

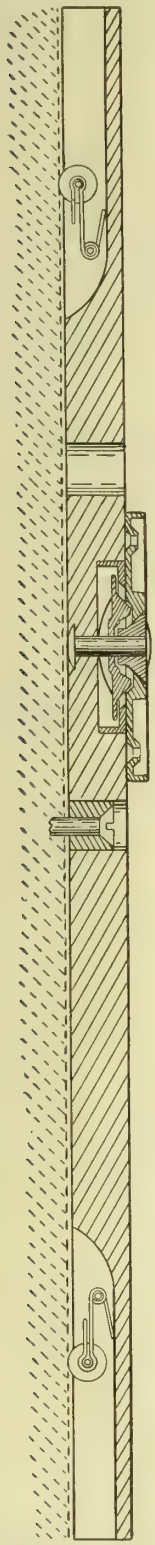
Absolutely nothing in its construction to get out of order.

With our Truncated Cone Pivot Construction we use the weight of the sash and glass to draw the Corrugated Strip and Sash together.

Perfect contact with side jambs is provided, which gives easy displacement and aids in holding the strip in alignment. *Note Roller Spring Bearing Contact with Side Jambs.*

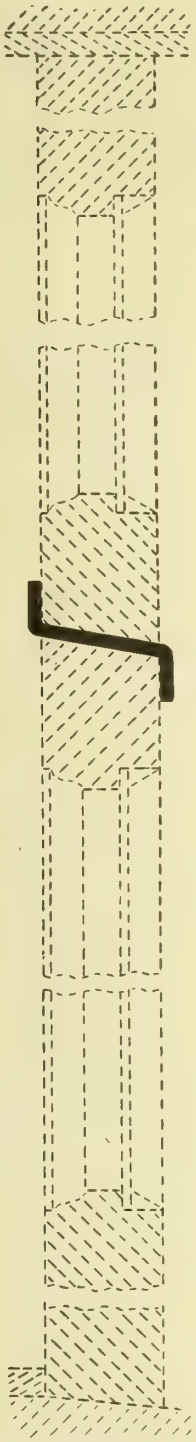
Corrugated Strip.

Unless otherwise ordered, the Williams Corrugated Strip will always be 7/8-inch stock, and will be made to conform to thickness of sash. No special construction of frames required.



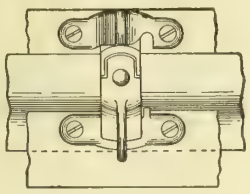
VERTICAL SECTION OF SIDE CORRUGATED STRIP

Showing Truncated Cone Pivot and Roller Springs

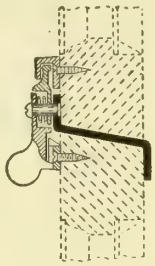


VERTICAL SECTION OF WINDOW

Showing position of Metal Bar set at 10 degrees pitch between Meeting-Rails of Sash.



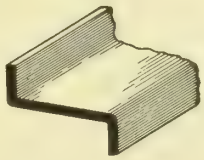
Front View



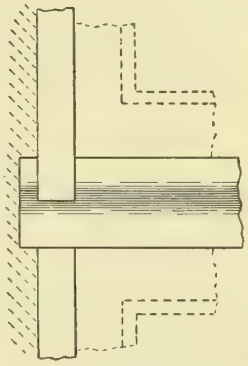
Vertical Section

WILLIAMS SASH LOCK RIVETED TO METAL BAR LOCKING BOTH UPPER AND LOWER SASH

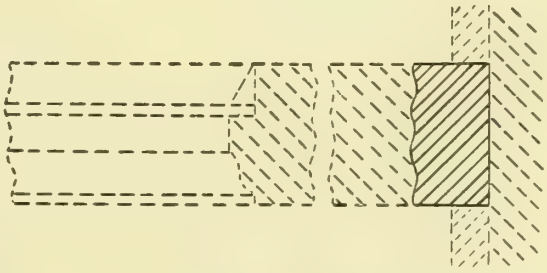
WILLIAMS PLANK FRAME REVERSIBLE WINDOW



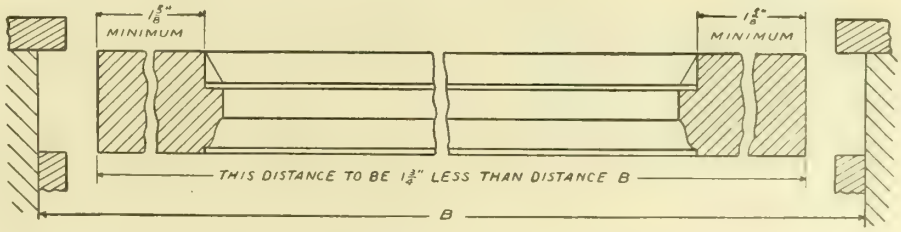
METAL "Z" BAR



ELEVATION, SHOWING METAL BAR LET INTO SIDE JAMBS 5/8 INCH



SECTION THROUGH ONE SIDE OF SASH, SHOWING CORRUGATED STRIP



MILL DETAIL

Sash to be made 1¾ inches narrower than jamb opening

Continued

Williams Single and Double Casement Window Fixture.

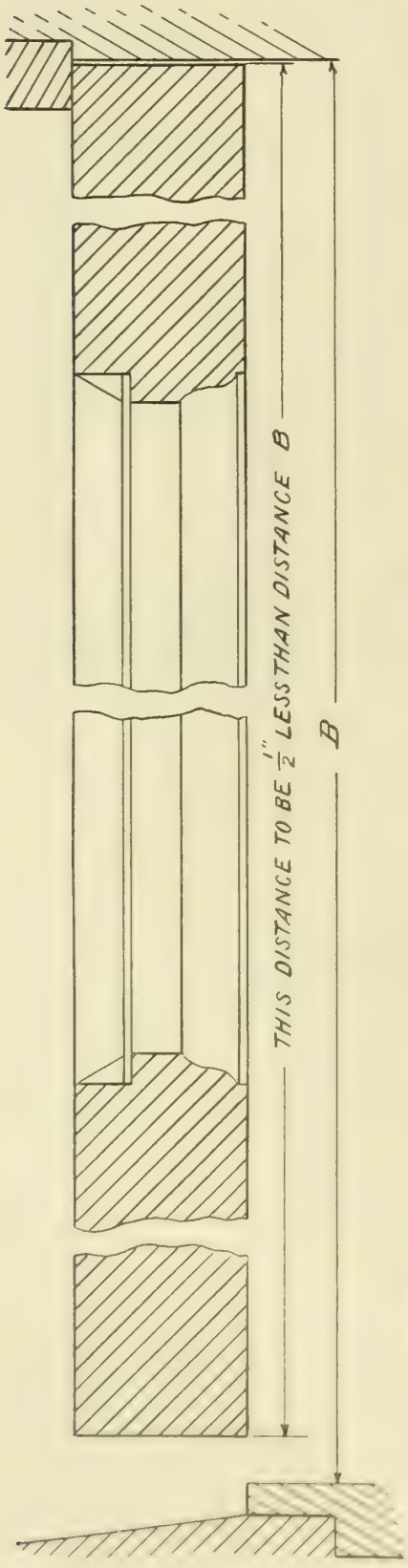
A perfect Weather-proof Casement Window Sill.

No special construction of header, sill or side jambs required.

Double Casement Fixture made with divided Closure Bar providing for independent operation of each sash.

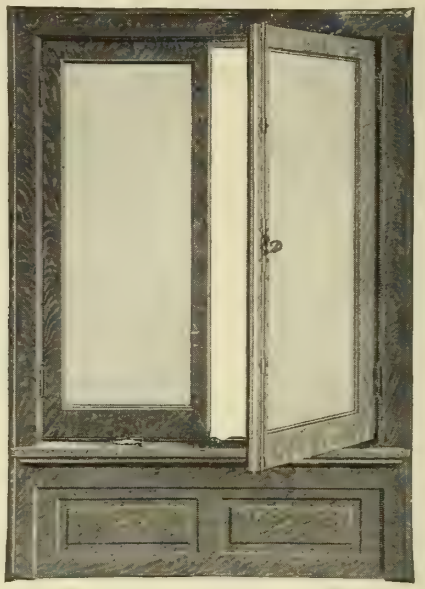
We furnish Sub-sill and Closure Bar with Operating Devices attached.

Use the ordinary butt hinge.

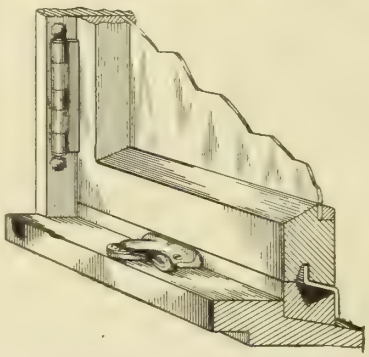


MILL DETAIL

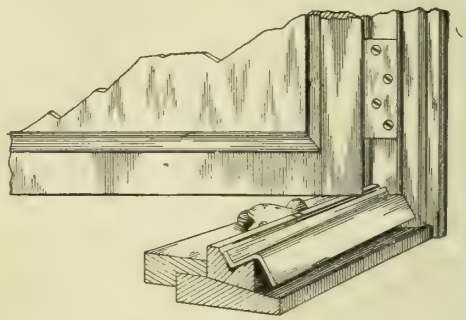
SINGLE CASEMENT WINDOW



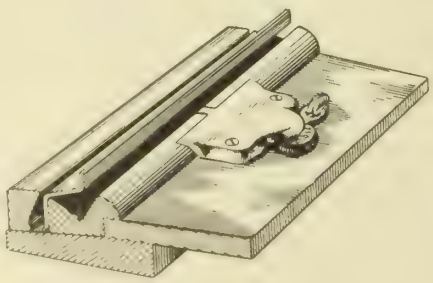
DOUBLE CASEMENT WINDOW



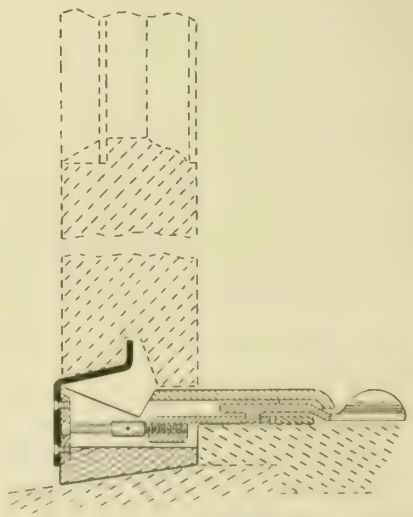
SECTION THROUGH BOTTOM RAIL, SUB-SILL, STOOL AND SILL
Sash and Closure Bar in closed position



SECTION THROUGH BOTTOM RAIL, SUB-SILL, STOOL AND SILL
Sash and Closure Bar in open position



SECTION THROUGH SUB-SILL, FLOOR LINE AND SILL
Closure Bar raised, showing mold on inside and exterior protection for French or casement doors



SECTION THROUGH BOTTOM RAIL AND OPERATING DEVICE
Showing Stool Plate, Eccentric Lever, Threaded Adjusting Rod, and Closure Bar Engaged in Groove in Sash when Closed

Continued on next page

HEADER CONSTRUCTION, SHOWING TOP PIVOT, FOLLOWER STRIP, ROLLER SPRINGS AND GUIDE SCREWS

Williams Vertical Pivot Window.

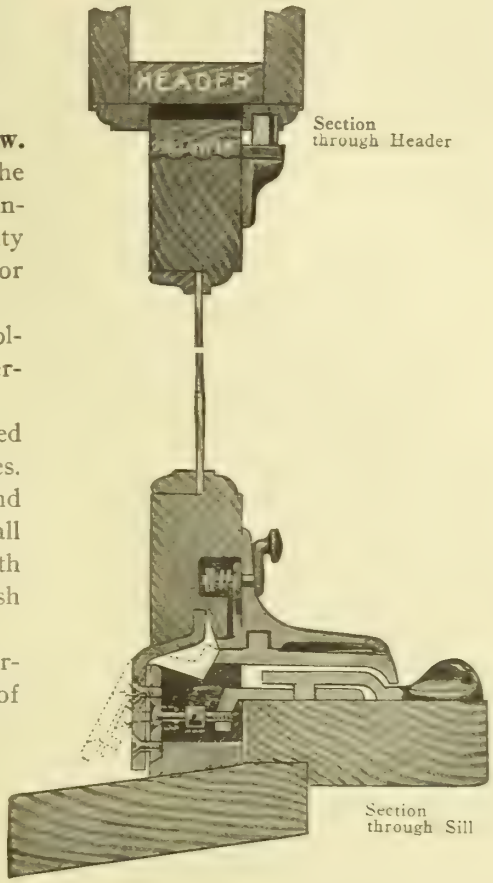
By raising and lowering the closure bar, sash is locked and unlocked; we eliminate the necessity of lifting the sash to reverse for cleaning.

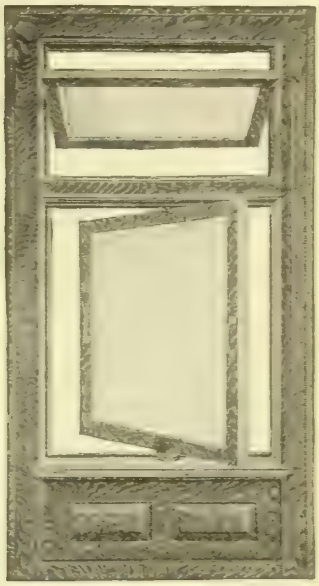
With the closure bar and follower strip we guarantee a perfectly tight sill and header.

An effective stop is provided to hold the sash at different angles.

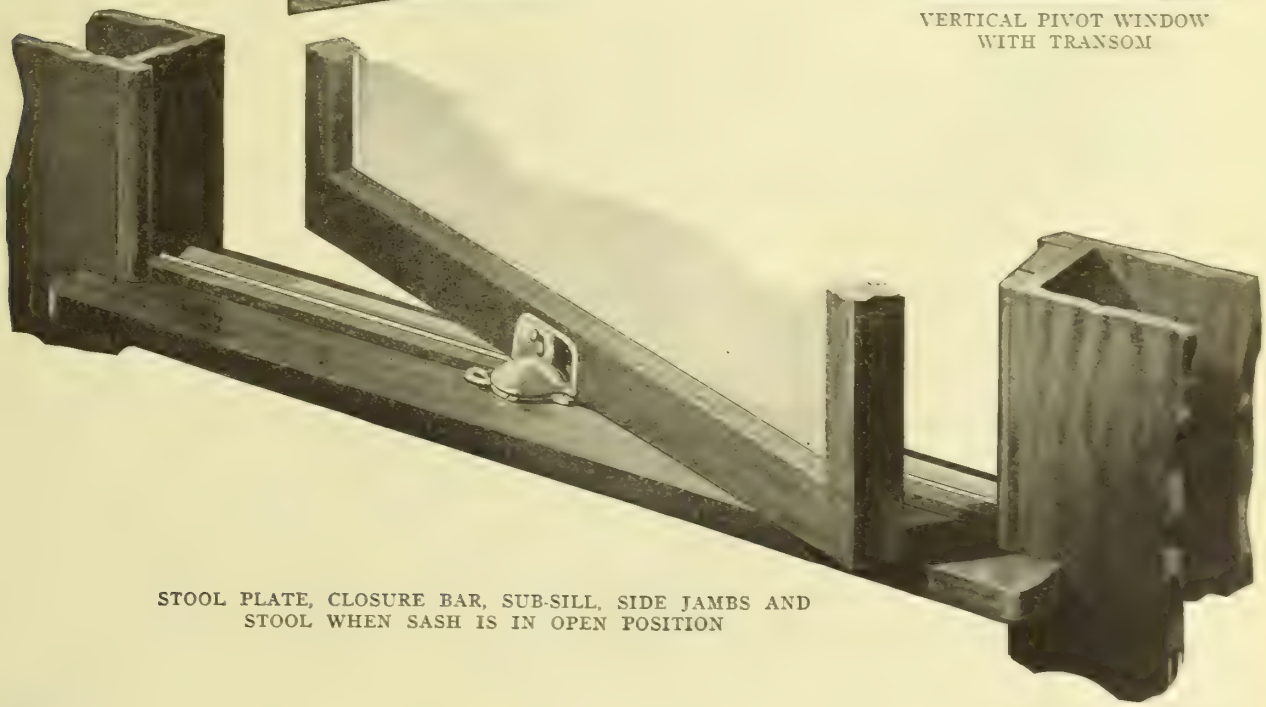
We furnish the follower and wood sub-sill with closure bar; all parts fitted and equipped with hardware in any material or finish desired.

Sub-sill and closure bar furnished to conform to thickness of sash.



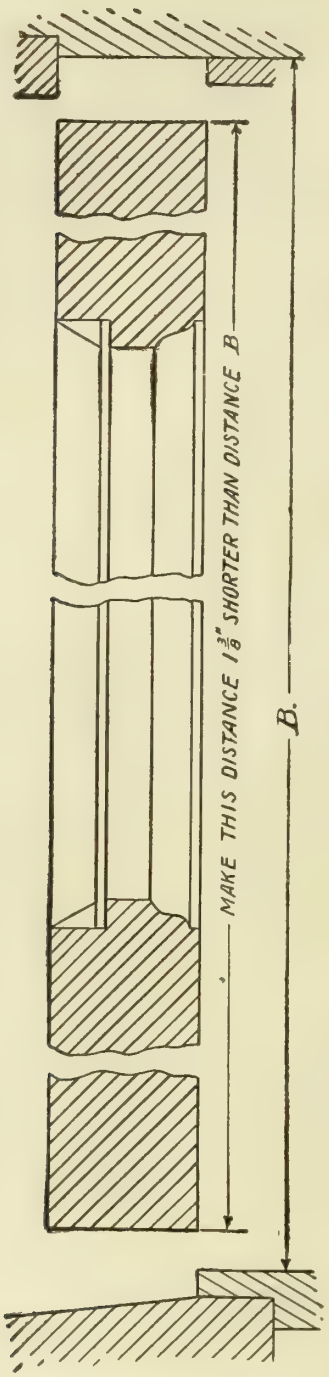


VERTICAL PIVOT WINDOW WITH TRANSOM



STOOL PLATE, CLOSURE BAR, SUB-SILL, SIDE JAMBS AND STOOL WHEN SASH IS IN OPEN POSITION

Continued on next page



MILL DETAIL, WILLIAMS VERTICAL PIVOT WINDOWS
Indicating required dimensions

How to Specify.

The following brief specification forms are intended as suggestions to cover all usual cases. It is recommended that it be specified, wherever practicable, that the fixtures be applied by this concern, thus insuring proper fitting and fixing the responsibility.

Double-Hung Reversible Windows

All Double-Hung Windows, as indicated on plans, shall be constructed in accordance with details (Sheet No. .....) and equipped, as shown, with "Williams" Reversible Sash Fixtures.

Frames and sash to be furnished by General Contractor, but The Williams Pivot Sash Company, Cleveland, Ohio, shall furnish all Reversible Strips, apply same to sash, and shall fit and install sash, after plastering has been completed.

The Williams Pivot Sash Company, Cleveland, Ohio, is to furnish [and apply] the special hardware necessary for the successful operation of the Fixtures, such as Sash Handles (or lifts), Sash Sockets, Alignment Guides, Hooks and Poles—all to be of the same [or equal] metal and finish as finishing hardware used in respective rooms.

Sash details and descriptions may be seen at the office of the Architect, or by applying to The Williams Pivot Sash Company, who will furnish same on request.

Plank Frame Reversible Window

All Plank Frame Windows, in basement and on ..... floors, as indicated on plans, shall be constructed in accordance with details (Sheet No. .....) and equipped as shown, with "Williams" Plank Frame Reversible Sash Fixtures.

Frames and sash to be furnished by General Contractor, but The Williams Pivot Sash Company, Cleveland, Ohio, shall furnish all Reversible Strips, apply same to sash, and shall fit and install sash, after plastering has been completed.

The Williams Pivot Sash Company, Cleveland, Ohio, is to furnish [and apply] the special hardware necessary for the successful operation of the Fixtures, such as Sash Locks, Sash Sockets, Sash Handles (or lifts), Hooks and Poles—all to be of the same [or equal] metal and finish as finishing hardware used in respective rooms.

The Metal "Z" Bars to be inserted in the frames when assembled at the Mill.

The same detail is used (with the omission of Metal "Z" Bar) for Single Sash and Transoms.

Sash details and descriptions may be seen at the office of the Architect, or by applying to The Williams Pivot Sash Company, who will furnish same on request.

Williams Casement Window Fixtures

All Casement or side hinged Sash, as indicated on plans, shall be constructed in accordance with details (Sheet No. .....) and equipped, as shown, with the "Williams" Casement Sash Fixture.

The Williams Pivot Sash Company, Cleveland, Ohio, is to furnish [and apply] the parts necessary for the successful operation of the Fixtures, such as wood Sub-Sills with Closure Bars, Stool Plates and Operating Device. All interior hardware to be of the same [or equal] metal and finish as finishing hardware used in respective rooms.

Stools shall be placed by carpenter contractor before sash are fitted; same to be laid to the inside line of the outside stop (allowing for exact thickness of sash) and not to plaster line, thereby avoiding gap between stool and Sub-Sill when laid.

The fitting and installing of the sash to follow the finishing coat of plaster.

Sash details and descriptions may be seen at the office of the Architect, or by applying to The Williams Pivot Sash Company, who will furnish same on request.

Williams Vertical Pivot Sash

All the Vertical Pivot Sash, as indicated on plans, shall be constructed in accordance with details (Sheet No. .....) and equipped, as shown, with "Williams" Vertical Pivot Fixtures.

The Williams Pivot Sash Company, Cleveland, Ohio, is to furnish [and apply] the parts necessary for the successful operation of the Fixtures, such as wood Sub-Sills with Closure Bars, Follower Strip, Top Pivot Plate, Stool and Pivot Plate with Operating Device. All interior hardware to be of the same [or equal] metal and finish as finishing hardware used in respective rooms.

Stools shall be placed by the carpenter contractor before sash are fitted; same to be laid to the inside line of the outside stop (allowing for exact thickness of sash) and not to plaster line, thereby avoiding gap between stool and Sub-Sill when laid.

Do not glaze the sash before they are fitted; braces to be nailed on sash and glass cut square so that sash are not sprung out of alignment after fitting.

The fitting and installing of sash to follow the finishing coat of plaster.

Sash details and descriptions may be seen at the office of the Architect, or by applying to The Williams Pivot Sash Company, who will furnish same on request.

THE G. F. S. ZIMMERMAN CO., INC.

"Superior" Shutter and Casement Fasteners

FREDERICK, MD.

Products.

"Superior" Shutter Fastener and "Superior" Casement Adjuster.

Models.

Working models of the "Superior" Shutter Fastener will be furnished to architects on application.

"Superior" Shutter Fastener.

The "Superior" Shutter Fastener consists of an adjusting bar and hinge, a locking device and a separate window bowing regulator for each shutter. One can bow the shutter at any angle desired without danger of slamming in a high wind and the shutters can be fastened back against the house when desired in that position.

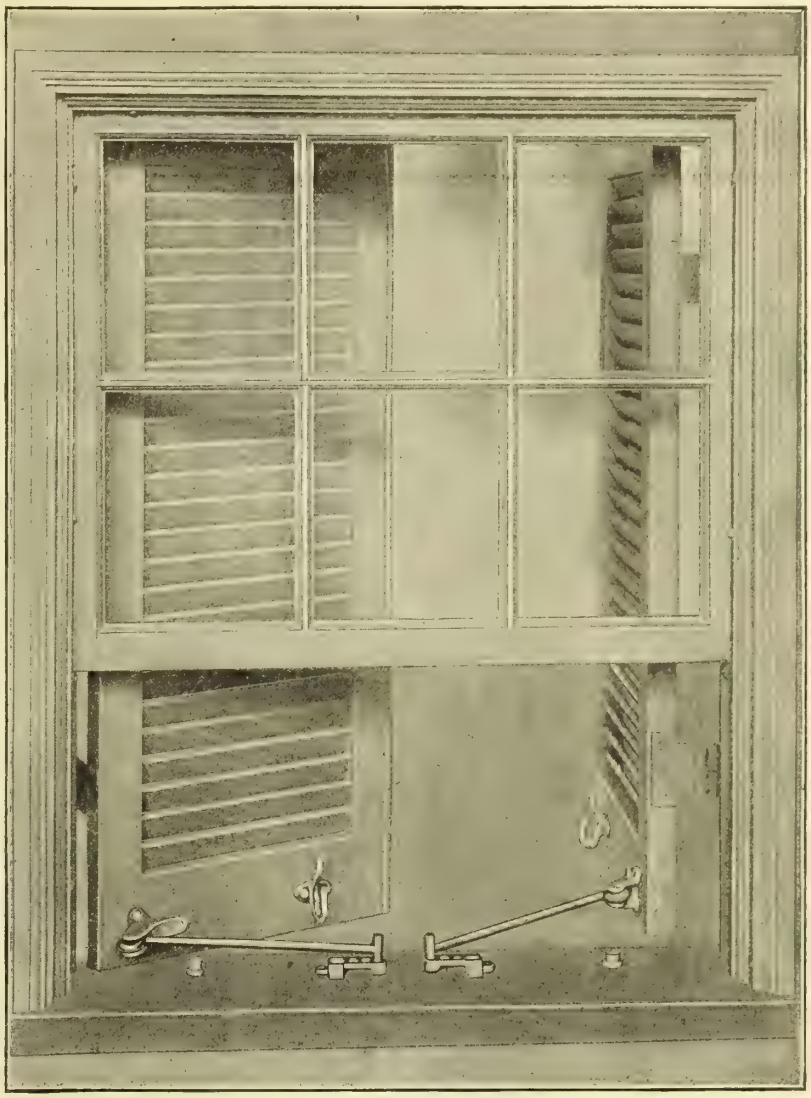
Method of Fastening.

The method of fastening shutters consists in throwing the shutter back and catching the end of adjusting bar in a hole in a plate placed on window sill for that purpose. (See illustration.) To fasten shutter back against the house, set end of adjusting bar in the hole of the stop provided for that purpose.

To close and lock shutter, remove bar from the plate, pull in the shutter, fasten bar under the looped lock on the shutter and insert end of adjusting bar in hole of plate on the window-sill. Shutter will then be firmly held in place without rattling or movement.

"Superior" Casement Adjuster.

Principle is practically the same as the Shutter Fastener, except parts on window-sill are countersunk and window-sill is free from obstruction. (See illustration.)

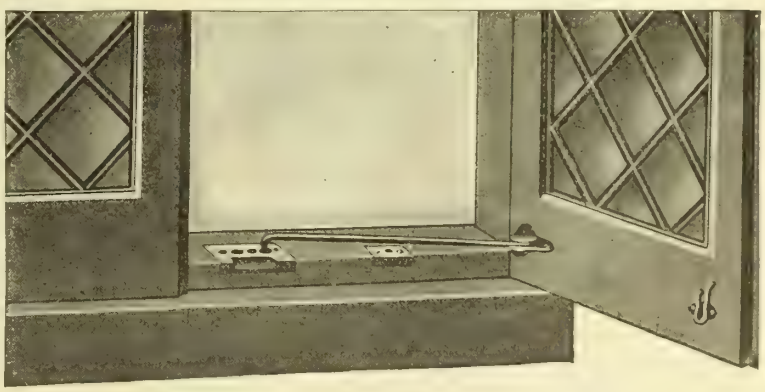


"SUPERIOR" FASTENER APPLIED TO SHUTTERS
Showing method of fastening end of bar in slotted plate on window-sill

PRICES AND SIZES OF "SUPERIOR" SHUTTER FASTENERS

Size, Ins.	Japanned	Galvanized	Used on Outside Blinds or Casement Sash, Ins.
7 $\frac{5}{16}$ Steel	$4.50	$6.00	12 or less
9 $\frac{5}{16}$ Steel	4.50	6.00	13 wide
10¾ $\frac{5}{16}$ Steel	5.00	6.50	14 or 15
12 $\frac{5}{16}$ Steel	5.50	7.00	16 or 17
14 $\frac{3}{8}$ Steel	6.50	7.75	18 or 19
16 $\frac{3}{8}$ Steel	7.00	8.50	20 or 21
18 $\frac{7}{16}$ Steel	8.00	10.00	22 or 23
20 $\frac{7}{16}$ Steel	8.50	10.50	24 or 25
22 $\frac{1}{2}$ Steel	9.50	11.50	26 or 27
24 $\frac{1}{2}$ Steel	10.00	12.00	Over 28

All Fasteners up to and including 20-inch, packed one pair each, with screws, in cartons. Terms—Net 30 days.



"SUPERIOR" CASEMENT ADJUSTER APPLIED TO CASEMENT WINDOW

LUTHER O. DRAPER SHADE COMPANY

Adjustable Window Shades

SPICELAND, IND.

Products.

Draper's "Sanitary" Roller Shade, and Bell Adjustable Folding Shade.

Also, Draper's "Number 2" Roller Window Shade, Eclipse "A" Adjustable Folding Shade, and Draper's "Number 3" Roller Shade.

Draper's "Sanitary" Roller Shade.

The Draper "Sanitary" roller window shade is constructed throughout of the best materials. We use the best grade of canvas or ducking. The rollers, specially built, are large and strong and of the best material known to us. These rollers will not run away or buzz, because they are provided with a positive stop, or locking device, that automatically catches the roller the moment the operator releases his hold upon the bottom pull. The top stick is of strong, hard wood.

Operation—The cord so operates that it is at all times in a vertical position. It works so simply that a child can adjust the shade without being instructed in any of its peculiarities.

We have eliminated the slow and uncertain process of looping, folding or hooking. All you have to do is to pull and let loose in the natural way.

Sanitary Features and Lighting—There are no folds or pockets to catch and hold dust and germs, nor will it dump dust upon the operator, as do many shades when allowed to stand in one position for some time.

There are many dark, gray days when every inch of the window is needed for lighting purposes. In this case Draper's "Sanitary" shade readily exposes the entire surface of the window.

Bell Adjustable Folding Shade.

The Bell adjustable folding shade is constructed on the same general principles as the Draper "Sanitary" roller shade, and only the best grade of ducking or canvas in either green or tan color is used in its manufacture. It is simply made and is operated by the same method, the hands never being required to come in contact with the shade proper, thus insuring perfect cleanliness at all times. This shade lowers from the top and folds from the bottom.

Color.

We carry in stock two colors, green and tan. The buyer must decide as to color. However, we have sold many more of the tan than of the green.

Sizes.

As all our shades are made to order, our facilities enable us to construct any size desired. Our large shades are suspended and operated by means of double pulleys and extra large cords. In hanging the ordinary size shades we use a cord, woven soft and flexible, which allows the lower end of the shade to drop in position automatically without any special assistance from the operator.

Measurements.

When shades are to be placed on the outside, or facing, of the casing, give measurements from out to out, or from end to end of shade roller for widths, and then give the height of your window. The shades, when sent you, will be narrower than your figures to allow necessary margin on each end of roller.

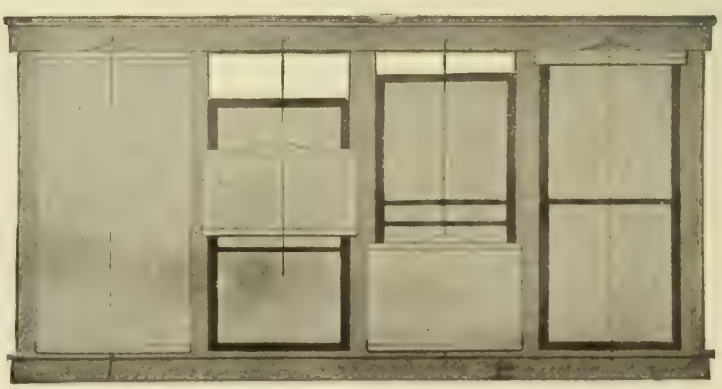
We at all times, whenever practicable, recommend the overlap shade, but we can manufacture your shades to conform to either inside or outside measurements.

Samples.

Send us your estimates, and we will send you small samples that will explain the workings of our shades in every detail.

Guarantee.

Should any part or fixture become inoperative or out of order within four to ten years, they will be replaced without charge.



DRAPER "SANITARY" ROLLER SHADE

THE AEROSHADE COMPANY

MANUFACTURERS OF

Splint-Fabric Porch Shades, Sleeping Porch Curtains, Awnings, etc.

WAUKESHA, WIS.

Products.

AEROLUX NO-WHIP PORCH SHADES, SLEEPING PORCH CURTAINS, AWNINGS, WINDOW VENTILATORS, WINDOW SHADES, PARTITION CURTAINS.

AEROLUX NO-WHIP

TRADE-MARK

Aerolux Splint-Fabric Awnings.

Shut out the hot outside air as well as the direct rays of the sun. Do not absorb and retain heat. Can be instantly adjusted to shade any part of window. When rolled up to top, do not screen any part of window. Finished in pleasing colors. Durable.

Aerolux No-Whip Splint-Fabric Porch Shades.

Aerolux porch shades beautify any house, adding a finishing touch of beauty and comfort to bungalow or mansion. Constructed of narrow linwood splints securely woven together with finest seine twine. Splints are of uniform width, as are spaces between them. Manufactured in sizes to fit and completely fill any porch opening. Easily put in place. Transform any porch into a shady, secluded living room, shutting out sun, yet admitting plenty of light and air. Patented no-whip attachment makes it impossible for them to whip in the wind. Transform any porch into an ideal outdoor sleeping room for summer use. Manufactured in any width, from twelve inches up to twenty feet, and in several grades and finishes. Furnished, when so ordered, with adjustable hanging attachments to drop from top as well as roll up from bottom.

COMPLETE EQUIPMENT OF PORCH SHADES AND AWNINGS

END OF PORCH MADE INTO SLEEPING PORCH

Aerolux Partition Curtains.

Much used for dividing a large room, such as a church lecture room or Sunday-school room, into a number of small secluded class rooms. Made of splint-fabric and strong canvas. Top can be dropped, affording perfect ventilation. Can be rolled up entirely out of the way.

Catalogue.

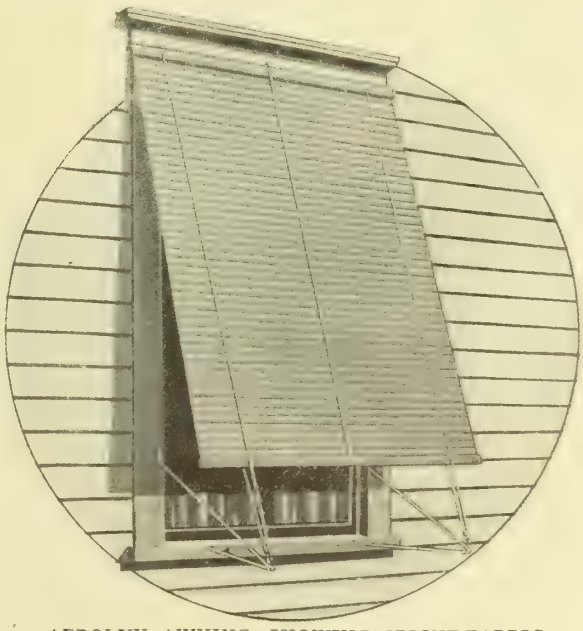
Illustrated catalogue, describing the entire Aerolux line, sent upon request.

Aerolux No-Whip Sleeping Porch Curtains.

Combine Aerolux splint-fabric with strong canvas, affording absolute protection from rain, snow or wind. Any porch equipped with them becomes an ideal all-the-year-'round outdoor sleeping apartment. Patented top drop attachment makes it possible to drop entire curtain from top in addition to rolling it up from bottom. Canvas may be rolled up from bottom, leaving only splint-fabric. No-whip attachment makes it impossible for curtains to whip in wind. Sizes to fit any porch.

Aerolux Splint-Fabric Window Shades.

Add much to the appearance of schools, banks, stores, offices and public buildings. Instantly adjusted to admit as much light as desired, while affording perfect ventilation. Can be dropped from top or rolled up from bottom. Do not crack nor fray at edges and do not catch and hold dust. Sizes to fit any window; quickly put in place. Do not get out of order; instantly adjusted by a child. Economical, durable and artistic.



AEROLUX AWNING, SHOWING SPLINT-FABRIC

GEO. B. CARPENTER & CO.

SOLE MANUFACTURERS AND DISTRIBUTORS OF

The Carpenter "Spring Shade" Awning

430-440 Wells Street

CHICAGO, ILL.

Product.

CARPENTER "SPRING SHADE" AWNING.

Description.

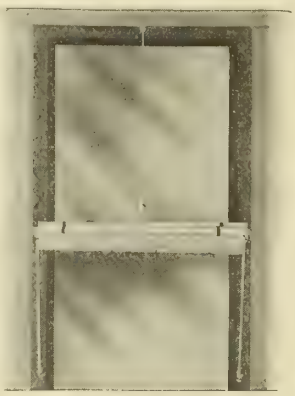
"The awning that works from the inside." It consists merely of a one-piece canvas or stripe cover which rolls up from its center on a specially constructed spring roller. The roller is suspended from galvanized brackets at the center of the window. A pocket in the top of the upper canvas conceals a wood batten, to the center of which is attached the operating cord. The cord is led through a small jamb pulley at the top of the window. When the cord is pulled, the spring roller is released and permits the two parts of canvas to unroll from the roller, the upper part moving up flat against the upper sash, the lower part, which carries the hinged extension arms, falling downward and outward to any position desired, the jamb pulley holding the cord whenever it is released.

Advantages.

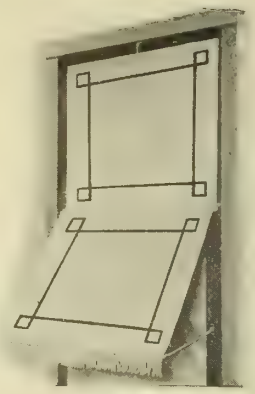
The "Spring Shade" is the only awning which can be successfully operated from the inside of the room without raising the screen or window. It is practically noiseless even in a high wind; the parts are few and of the utmost simplicity, and remain permanently on the window, although the shade itself can be easily taken down in the fall and rehung in the spring, without the use of a single tool. The "Spring Shade" affords the maximum ventilation together with the maximum protection from the sun. The original cost is slightly higher than the old-style awning, but the cost of maintenance is less. The "Spring Shade" requires less labor to take down and rehang, and the cloth renewal expense is less, as the amount of cloth required is less, size for size, than in the case of the old-style awning.

Efficiency.

The sunlight that annoys is the direct glare coming straight through the window. Against this glare, on account of its lower drop, the "Spring Shade" gives more protection than the old-style awning.



"SPRING SHADE" ROLLED UP



"SPRING SHADE" EXTENDED

Installation.

The shades are furnished complete with all necessary fixtures and the installation is an easy and simple matter. It can be taken down and rehung without the use of a single tool.

Adaptability.

The "Spring Shade" Awning is adaptable to all kinds of windows except the casement or hinged window opening outward.

Guarantee.

We guarantee the spring roller and all metal parts for two years.

Where Sold.

"Spring Shades" are sold by the best awning manufacturers in most of the larger cities.

SIZES AND PRICES OF CARPENTER "SPRING SHADES"

WIDTH	FOR WINDOWS 6 FEET HIGH OR LESS			FOR WINDOWS 7 FEET TO 6 FEET HIGH			FOR WINDOWS 8 FEET TO 7 FEET HIGH			FOR WINDOWS 9 FEET TO 8 FEET HIGH		
	Standard Stripe, Blue or Brown, each	Yale, Van Dyke, Illinois, Princeton, Chicago, Triplex and Standard Duplex, Tan and Green, each	Other Stripes, each	Standard Stripe, Blue or Brown, each	Yale, Van Dyke, Illinois, Princeton, Chicago, Triplex and Standard Duplex, Tan and Green, each	Other Stripes, each	Standard Stripe, Blue or Brown, each	Yale, Van Dyke, Illinois, Princeton, Chicago, Triplex and Standard Duplex, Tan and Green, each	Other Stripes, each	Standard Stripe, Blue or Brown, each	Yale, Van Dyke, Illinois, Princeton, Chicago, Triplex and Standard Duplex, Tan and Green, each	Other Stripes, each
2' 6" or less	$3 51	$3.75	$4.00	$3.65	$3 85	$4 10	$3 80	$4 00	$4 25	$4 00	$4 20	$4.45
2' 6" to 2' 6"	3 85	4 05	4.30	4 05	4.30	4.55	4 25	4 50	4.75	4.45	4.70	5.00
2' 6" to 3'	4 05	4 30	4.55	4 25	4 50	4.75	4 50	4.75	5.00	4.75	5 00	5.25
3' to 3' 6"	4 20	4 45	4.70	4 45	4.70	4.95	4 70	4 95	5.20	5 00	5.20	5.45
3' 6" to 4'	4 95	5.25	5.55	5 20	5.50	5.80	5 40	5.70	6 00	5 70	6.00	6 30
4' to 4' 6"	5 10	5.50	5.85	5 40	5.75	6.10	5.70	6 00	6 35	6 00	6 30	6 70
4' 6" to 5'	5 55	5 81	6 15	5.90	6 30	6 70	6 30	6 65	7.10	6.60	7 00	7.45
5' to 5' 6"	6 00	6.45	6 90	6.20	6 65	7.10	6 50	6.95	7.40	6.80	7 30	7 70

For any size lying between the above divisions take the list of the next higher size.
Quantity discount on application.

WALGER AWNING COMPANY

TELEPHONE, SUPERIOR 1090
215-219 West Ohio Street
CHICAGO, ILL.

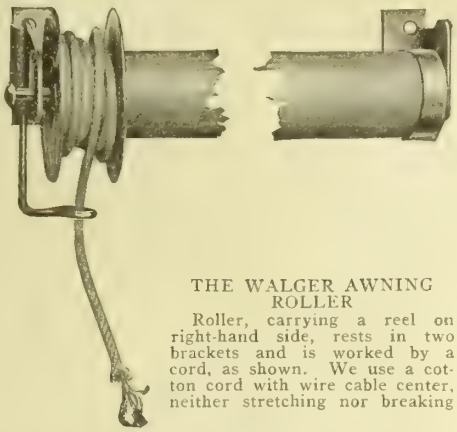
Products.

The WALGER NEW MODEL AWNING.

We specialize in high-class FANCY and STENCILED AWNINGS.

Walger New Model Awning.

Construction and Operation—The simplicity of construction makes the New Model the most reliable awning on the market. The awning cloth is securely fastened to a wooden roller, made of white pine, guaranteed not to warp.



THE WALGER AWNING ROLLER

Roller, carrying a reel on right-hand side, rests in two brackets and is worked by a cord, as shown. We use a cotton cord with wire cable center, neither stretching nor breaking

WALGER NEW MODEL AWNING (PATENTED)

After cord is unhooked, awning slides down through its own weight; upper part being held in a vertical position by stay rod (C), lower part dropping out and extending. After cord is secured, and braces (D) attached, this awning is storm-proof and noiseless

To raise awning, unhook cord, which will allow braces enough play to drop out automatically; pull cord, and awning will easily slide up to top of window.

No springs used, therefore parts are not liable to get out of order.

All metal parts are sherardized and guaranteed to stand a test of ten dips in a 50 per cent solution of copper sulphate. This warrants rustless fixtures

Sightliness—Architects particularly appreciate its neat appearance, doing away with the ugliness of the old-fashioned awning.

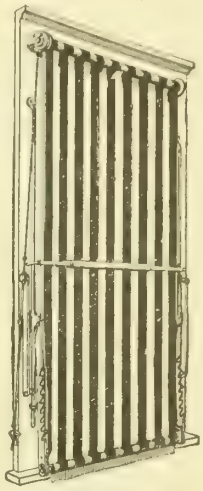
Advantages and Superiority—The success of our New Model Awning depends on its properties: Neat appearing, easily operated, most reliable, being stormproof and noiseless, allowing constant and perfect ventilation, giving great comfort, being safe and economical. Being the only stormproof and noiseless awning in existence, it is far superior to any other make, and also excels its rivals relative to economy. The cloth, when rolled up, is protected from rain and drippings. No awning man is required for taking down and rehanging.

C. W. BRAND'S RESIDENCE, CLEVELAND HEIGHTS, OHIO

For Bedroom and Sleeping Porches.

If used in connection with the New Model Fastener, our awning gives protection against storm, rain, and dust without preventing circulation of fresh air. By sliding up extension arms in reversed position, and snapping ratchet in special hooks, cloth will be brought parallel to the window, covering the full opening as demonstrated in illustration herewith.

Installation—All fixtures are fastened to the window-frame. Our awning can be installed by any one familiar with tools.



AWNING
Patented for Bedrooms and Sleeping Porches

Endorsements—The Board of Fire Underwriters recommends this awning, as it does not offer any lodging for matches, or other destructive agents.

The New Model Awning does not interfere with cleaning windows.

FONTENELLE HOTEL, OMAHA, NEBRASKA

Price—Considering the material used, and the time it will last, it is not more expensive than any other awning.

Guarantee—We guarantee our fixtures for five years.

BURLINGTON VENETIAN BLIND CO.

MAIN OFFICE AND FACTORY

BURLINGTON, VT.

BRANCHES IN THE PRINCIPAL CITIES

Products.

Manufacturers of Venetian Blinds, Sliding Blinds, Window Screens, Screen Doors.

Venetian Blinds.

Our Venetian Blinds are attached to windows by brackets similar to a shade roller. The slats are hung on interwoven ladder tape and operated by cords, by which light and ventilation can be instantly controlled. They are made of any desired wood and finish.

For very large blinds we have a roller device employing aluminum bronze bands and fabric hand tape for operating in place of cords, and for which we make an extra charge.

Sliding Blinds.

Sliding Blinds are usually made in three sections in height, the two upper ones having stationary slats and the lower one rolling slats, but they may be made in more or less sections, and more than one with rolling slats, if desirable. These sections may be at various elevations in the windows as suits best for admission or exclusion of light. They are made in two or more divisions of slats or panels, according to the width of openings; are made of any wood and with any finish desired. The grooved guideways in which the sections run take the place of the sash stops.

Window Screens.

We make Window Screens in two styles: one style being for the inside of the window and operating in grooves similar to our Sliding Blinds; the frames being one half inch thick, of various woods and usually in a natural, varnish finish. The other style is used outside the window, either covering the entire window, or operating on splines attached to the edges of blind stops, and covering one half the window, the frames being ⅞ inch thick, usually of soft wood, painted to match the sash color.

Screen Doors.

Our Screen Doors are mortised 1⅛ inch frames, thoroughly made and intended to last a lifetime. Made of various woods, with arrangement of panels as desired.

All our goods are made to order only. The installation of our blinds and screens is easily accomplished with but a few simple tools.

Prices and Catalogue.

It will give us pleasure to forward our detail catalogue and to submit prices.

BURLINGTON VENETIAN BLIND

BURLINGTON SLIDING BLIND

SWEDISH VENETIAN BLIND COMPANY

Importers and Sole Distributors on this Continent of Swedish Venetian Blinds

TELEPHONE, GREELEY 188

1328 Broadway
NEW YORK, N. Y.

CABLE ADDRESS, "VENETBLIND"

AGENCIES IN ALL PRINCIPAL CITIES

Products.

SWEDISH VENETIAN BLINDS: SLIDING VENETIAN, for inside and outside use; VENETIAN AWNING BLINDS; VENETIAN PORCH BLINDS; manufactured in Sweden. Established 1850.

For ROLLING SHUTTERS and PARTITIONS OF STEEL OR WOOD, see our page in General Index.

Swedish Venetian Blinds.

These Blinds are the only imported blinds on the market, and are radically different from all others, excelling in material, improved construction, ease of operation, durability, and harmony of color.

The slats are made of Norway pine, straight grain, very thin, and by our secret treatment guaranteed not to warp; and are very flexible, tough and strong as steel slats.

They stay automatically at any height when pulling ceases, and are adjusted automatically to any desired angle by a patent regulating device, and need no tying or fastening as with the ordinary style.

They can be put up and taken down as easily as a roller shade. No tools required.

Space.

When pulled up, they occupy one third less space than is required by domestic makes. Our blinds close tightly, giving a neat appearance, and darken the room entirely. They are installed in the finest residences throughout the country.

Sliding Venetian Blinds.

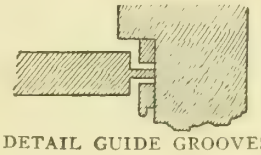
Our blinds are constructed for outside as well as inside purposes; with or without grooves, as desired. They are also made with extensions, taking the place of awnings. They answer the purpose of a shutter to a certain degree when let down.

Venetian Porch Blinds.

Sleeping porches and outside lounging rooms can not adequately serve their purpose without our Venetian Blinds, which insure absolute privacy, at the same time allowing free ventilation, a feature that is so much sought nowadays.

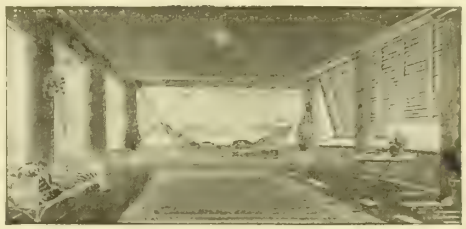
Swedish Venetian Quality.

The Swedish Venetian Blinds ask just credit and no more than just credit for the quality of their make. Added to that excellence of make are conveniences, refinements and niceties, which, together with the perfect service and easy control, give a luxury only to be expressed by the words "Swedish Venetian."

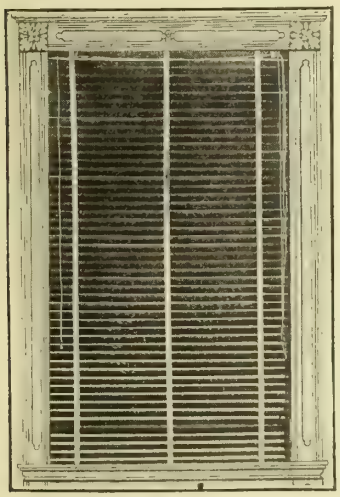


DETAIL GUIDE GROOVES

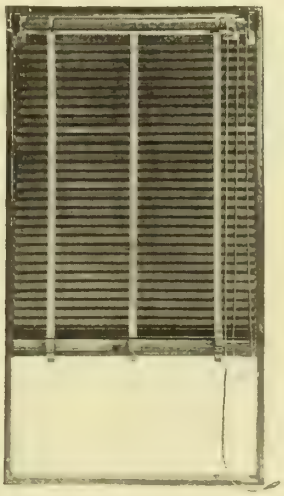
GLASS RING THROUGH WHICH CORD RUNS TO PREVENT WEARING



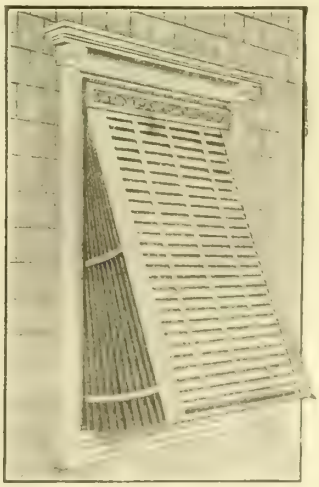
IMPORTED VENETIAN BLINDS
Used for outside lounging room



REGULAR STYLE



SLIDING BLIND IN GROOVES



OUTSIDE BLIND AND AWNING COMBINED
Slats running in grooves with exten-

THE E. T. BURROWES CO.

MANUFACTURERS OF

Burrowes Rustless Screens for Windows, Doors and Porches

GENERAL OFFICES AND FACTORIES

PORTLAND, ME.

ADDRESS OF NEAREST BRANCH OFFICE FURNISHED ON APPLICATION

Products and Services.

INSECT SCREENS as follows:

"NEW CENTURY" ADJUSTABLE WOOD-FRAME SCREENS.

"REGIS" REWIRABLE METAL-FRAME SCREENS.

"PRIMUS" ONE-PIECE METAL FRAME SCREENS.

AUSTRAL PIVOTED SASH SCREENS.

COMBINATION SCREENS for PIVOTED STEEL SASH VENTILATORS.

SCREEN DOORS OF ORIGINAL DESIGNS.

SCREENS for VERANDA, BALCONY, LOGGIA or PORCH.

RUSTLESS "COPBRONZE" NETTING.

Personal expert service, catalogues, drawings and estimates furnished on request.

Wood-Frame Screens.

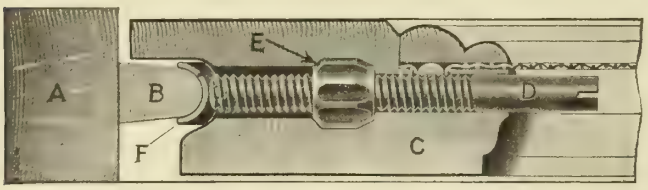
Made in any desired wood or finish. For outside use, selected kiln-dried Michigan white pine, well painted to match immediate surroundings, and varnished, is recommended. Inside screens to match interior finish. Screen doors may be of same wood as house doors and finished to match.

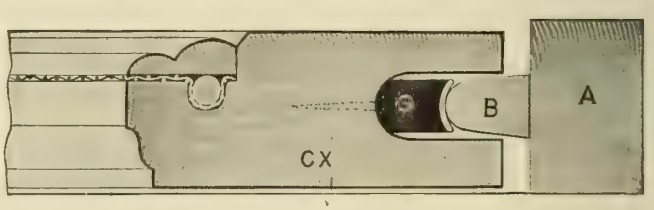
Burrowes Rustless "Copbronze" Netting.

More than 93 per cent pure copper; practically indestructible. No paint, varnish or other treatment necessary.

Burrowes Lock-Strip Device.

Securely and permanently fastens, by patented machines, every strand of netting taut and smooth.





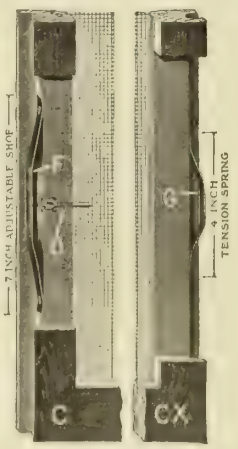
FULL-SIZE SECTION "NEW CENTURY" ADJUSTABLE WOOD-FRAME WINDOW SCREEN

(A) Blind Stop. (B) Slide Moulding. (C) Left-hand Screen Stile. (CX) Right-hand Screen Stile. (D) Bronze Screw Bolt Through (E) Stationary Nut Operating (F) Adjustable Shoe or Bearing. (G) Elliptical Tension Spring for Perfect Balance

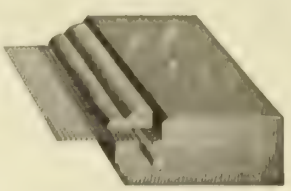
"New Century" Sliding Screens.

Wood frame, grooved on edges, to slide on runs attached to blind stops (outside) or to stop beads (inside), and to be used at either upper or lower opening of double-hung windows. "Twin-Sliding" for Casement windows. Left-hand groove carries two adjustable shoes or bearings, operated by bronze screw-bolts turning in nuts embedded in frame. Right-hand groove carries two elliptical tension balance springs.

The object is to permanently equalize any irregularities in window frames due to the weathering or settling of the house, securing perfect fit through easy adjustment; to guarantee, because of all-metal slide bearings, the extreme of ease in operation, together with proper spring tension to maintain any position.



LEFT AND RIGHT STILE, "NEW CENTURY" ADJUSTABLE SLIDING SCREEN

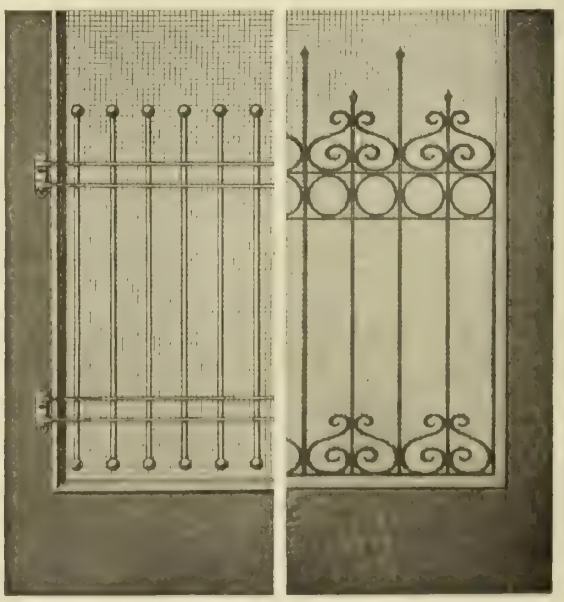


SECTION OF WINDOW SCREEN STOCK

Reduced size

Screen Doors.

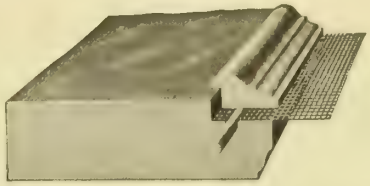
Made in many standard designs, also to architects' plans and specifications, in any wood and any finish. They are very strong; made with the greatest care, from best selected, kiln-dried lumber; either straight-grained pine, painted to any desired color, or hardwood



FINE SCREEN DOORS IN OUR OWN OR ARCHITECTS' SPECIAL DESIGNS

Continued on next page

finished to match the house door. Netting is twice as heavy as for window screens; lock-strip fastening.



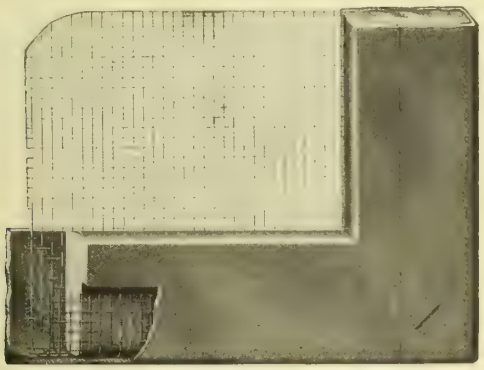
SECTION OF SCREEN DOOR STOCK
Reduced size

Lower panels may be reinforced with heavy 3-mesh guard, 1¼-inch diamond mesh guards, plain or ornamental grilles of bronze or iron. Special door designs on application.

"Regis" Metal Screens.

Exceptionally strong and rigid, but very small in the frame. They have an inner subframe of rust-proofed steel, electrically welded at corners, making a perfectly rigid support for netting. Frame and edges of netting enclosed in smooth wire-holding casing flush on outer edges, held together by bronze screws and housings; easily rewired. All steel parts thoroughly sherardized (rustproofed) and enameled any color. Made of solid bronze if desired.

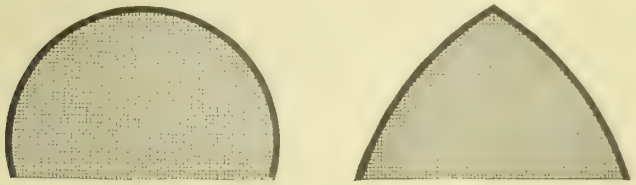
ELECTRICALLY WELDED CORNER OF FOUNDATION FRAME



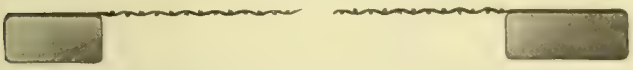
CORNER SECTION OF "REGIS" SCREEN ASSEMBLED

"Primus" Metal Screens.

Have a one-piece continuous solid metal frame with electrically welded corners, sherardized, painted and enameled. Made of solid bronze if desired. Adapted for every shape of opening, including circles, ovals, gothic arches, etc. The netting is firmly and smoothly soldered to the face of frame.



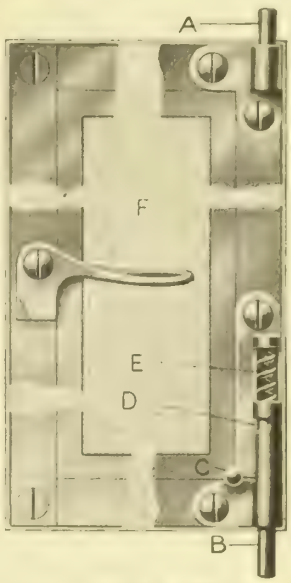
"PRIMUS" METAL SCREENS FOR CIRCULAR AND GOTHIC OPENINGS



SECTION THROUGH "PRIMUS" SOLID METAL SCREEN

Full Length Metal Screens Pivoted at Side to Swing In.

Screen is fitted close to casing and held by stationary pivot (A) at top and spring-actuated pivot (B) at the bottom. These pivots engage metal keepers imbedded in window casing. Screen is installed by inserting pivot (A) and raising pivot (B) by means of pin (C) to locking notch (D). The coil spring (E) holds pivot (B) down when in use. The catch (F) engages a keeper buried in the casing. Installed and removed with extreme ease. The frame is very rigid and will not sag.



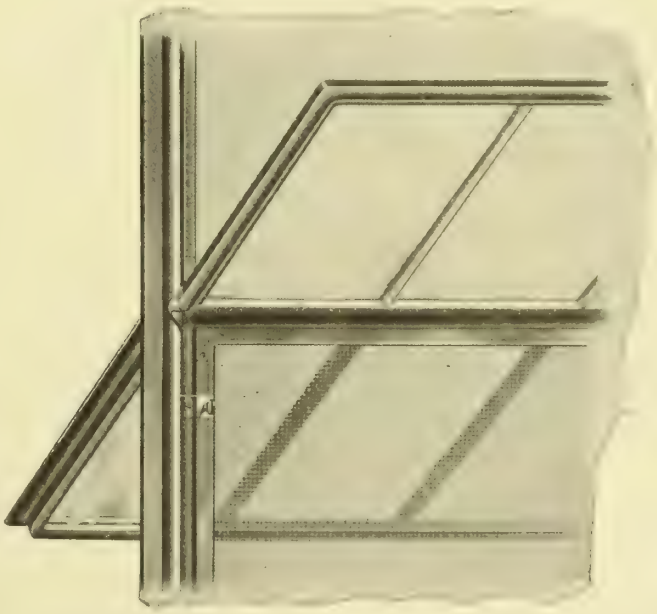
FULL LENGTH METAL SCREENS
Pivoted at side to swing in

Steel Sash Ventilators.

Our methods of equipping all leading types of steel sash ventilators with our metal frame screens are practical, simple and neat.

All screens can be easily put in place (or removed) from inside the building.

Write for details.



BURROWES SCREENS APPLIED TO ALL TYPES OF PIVOTED SASH

Porch Screens.

Specially designed and constructed to meet architectural requirements. Made in sections of a size to insure convenience in handling and storing for winter. Sketches and special designs submitted for approval.

Hardware.

Of our own designs, in twelve standard finishes, applicable to all types of Burrowes window, door and porch screens.

THE HIGGIN MANUFACTURING CO.

Window and Door Screens

NEWPORT, KY.

SALES AGENCIES IN FIFTY OF THE LARGER CITIES THROUGHOUT THE COUNTRY
Look up Our Local Office in Telephone Directory, or write to Newport, Ky., for Information

Products.

Manufacturers of HIGGIN ALL-METAL WINDOW SCREENS, WOOD-FRAME WINDOW and DOOR SCREENS, all of which are made to order.

For Higgin All-Metal Weather-Strips, see our name in General Index.

Higgin All-Metal Window Screens.

The Higgin Metal-Frame Window Screen is made entirely of metal and is adapted for use on either wood or metal window casings. It is especially suited to fire-proof buildings. It is set just outside the upper sash and requires only $\frac{9}{16}$-inch space, which includes the guide strips or channels in which the screen slides.

Construction—The screen (see illustration) is made with an inside frame of ¼-inch galvanized steel or copper-clad rod. Around this rod the wire netting is drawn, stretched perfectly tight, and held securely there by the outside mouldings. The netting can not pull out or get loose, and there are no sharp edges bearing against it with a tendency to cut it, as it expands or contracts with changes in the atmosphere.

In the "Higgin" Screen only round surfaces bear against the netting. The mouldings are made from open-hearth basic steel thoroughly galvanized and finished in baked enamel, which may be black or in color; or from copper or bronze in various finishes.

It is designed for use on sliding, bow, casement, oval, round and pivoted windows. Each style has its own special fittings looking to security and convenience in use. The sliding screens have side springs so as to be easily removed from the window and replaced. The guide strips are made of copper or galvanized steel. The bottom mouldings are perforated so as to allow for perfect drainage.

Each screen is numbered so as to identify it with the opening for which it has been made.

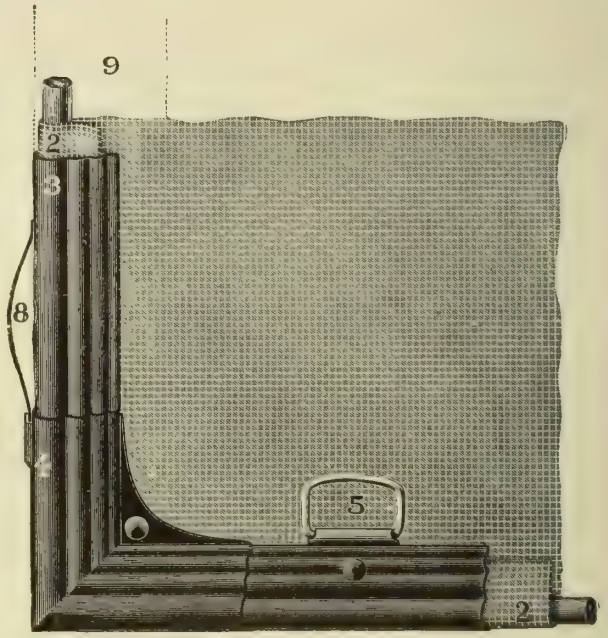
No screen of greater durability than this has ever been produced.

Wood-Frame Screens.

We manufacture high-grade Wood-Frame Screens of standard construction, to measurements only.

Screen Doors.

We make, to order, a full line of high grade screen doors of pine, quartered oak, cherry, mahogany, etc. Doors are fitted, as required, with guard wire protection, or with copper grille, which we make in a variety of styles.



SECTION OF SCREEN, SHOWING CONSTRUCTION
One half actual size

Wire Netting.

The Netting used in both screens and doors is made of solid bronze wire and is usually 14-, 16- or 18-mesh.

For special work, such as office or bank windows, laundry dry rooms, varnish rooms, etc., we are prepared to furnish 20, 24, 40, or even finer, mesh netting, if desired.

Estimates.

Estimates will be cheerfully furnished by any of our sales agents, who will also superintend the erection of the work.

Facilities.

Our extensive plant is centrally located, and prompt deliveries can therefore be made to all parts of the United States. Our facilities are constantly being increased to meet the growing demand for our products.

Continued on next page

The Higgin Re-Wirable All-Metal Screen.

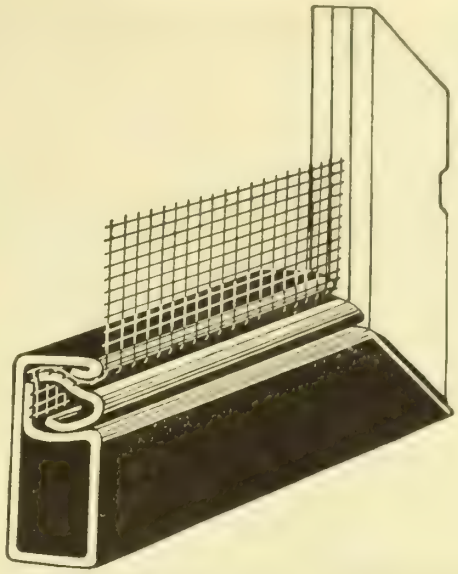
This screen is manufactured under patents issued February 15, 1916, with additional patents applied for.

The Frame—The frame is of hollow construction, so made that no solder is used, thus making it possible to thoroughly enamel the inside as well as the outside of the steel frame and bake it at the high temperature necessary. The surfaces are plain and smooth. The corners are reinforced with triple steel angles, locked mechanically, no soldering or brazing being used, the outside molding or frame being neatly mitered.

Re-Wiring—The netting is held in the groove by means of a stiff, non-resilient spline so formed as to roll into place and lock. This spline can be removed for the purpose of re-wiring the screen without danger of damaging it, making it unnecessary to order new splines from the factory.

Shapes—It can be made of any necessary shape to fit bow, circle top or round windows.

For information as to Screen Doors, Netting, Estimates, etc., see previous page.

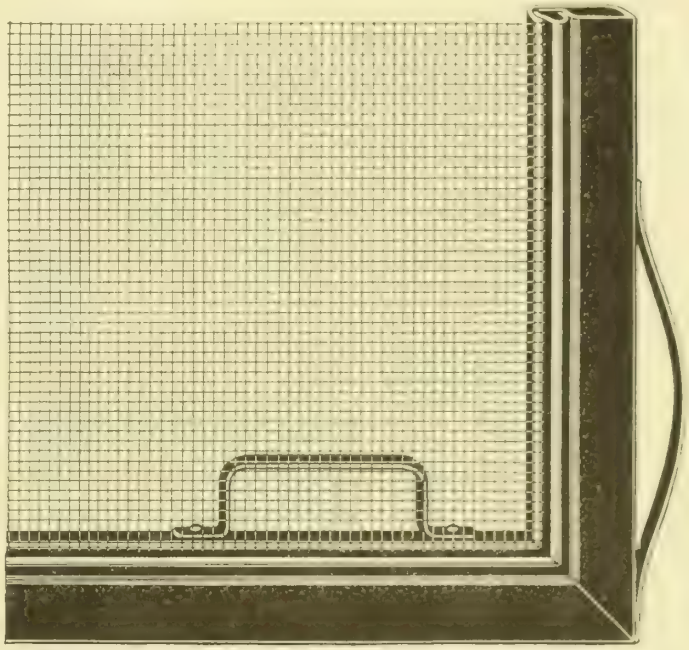


SECTIONAL VIEW, SHOWING CONSTRUCTION

The Invisible Roll Screen.

We have the exclusive sales agency for the Invisible Roll Screen for the United States and Canada. It is ideal for use on casement windows opening out and for all windows where it is desired to have the screen out of the way when not in use.

EQUIPMENT FOR PIVOTED STEEL SASH
Inside View



CORNER SECTION, SHOWING LIFT AND SIDE SPRING

Higgin Equipment for Ventilating Steel Sash.

This equipment, consisting of angle plates and metal rolls permanently attached to the window frame, together with two straight Higgin Screens, the upper on the outside and the lower on the inside, and which are removable, thoroughly screens the opening with the sash at any angle. It does away with the use of unsightly basket screens at less cost. It is adapted to all the standard makes of steel sash.

KANE BLIND & SCREEN COMPANY

KANE, PA.

Products.

Manufacturers of RUSTLESS DOOR, WINDOW and PORCH SCREENS (Rewireable).

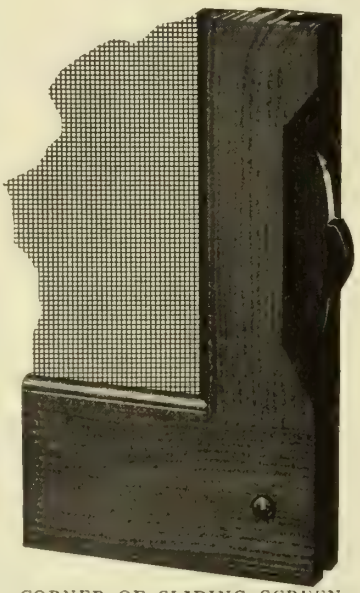
Kane Sliding Window Screens.

Made to order only. Kane window screens are made from any wood desired, thoroughly seasoned and kiln-dried; they do not warp nor twist; take and hold paint indefinitely; and are finished to match the surrounding woodwork.

Construction—Screen has a shallow groove on one edge, and a deep groove on the opposite edge. These grooves engage with slide strips or mouldings attached to each side of the window frame. Corners of screen are full mortise and tenon joints, glued, and reinforced with special brass rivets. The spring in side groove is made from clock spring steel, and is covered with a tough coat of enamel to prevent corrosion.

Adjustability—Screens may be instantly removed by a slight pressure sidewise against the springs; also, by sliding up and down on the slide strips, the screen may be used in either the upper or lower half of window.

Special Shapes — Screens made circular, elliptical, segmental, box or any shape desired.



CORNER OF SLIDING SCREEN
Showing Flanged Friction Spring and Brass Rivet

Stationary Screens.

Materials and construction are the same as in the sliding pattern, except the location of the grooves and springs. These are hung by special hinges at either top or sides of window; suitable locks are provided, permitting instant removal.

Door Screens.

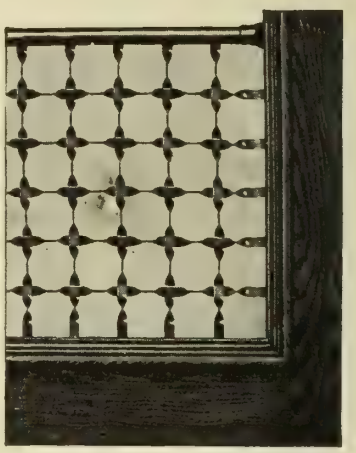
Made in any design, with or without grills or guards, from any kind of wood, as desired; color or finish will harmonize with the surroundings; full mortise and tenon joints, glued and wedged; and screen can not sag nor warp.

Wire.

The best grades obtainable—bronze, galvanized or enameled—are the only types of wire used in all screens; and of any mesh desired.

Hardware.

A full line of solid and plated fixtures for both doors and windows is carried in stock.



CORNER OF DOOR

Facilities.

We have been making screens for fifteen years.

Our plant is modern in every particular and manned by skilled workmen; with excellent shipping facilities, enabling us to make prompt deliveries to points East of the Mississippi River.

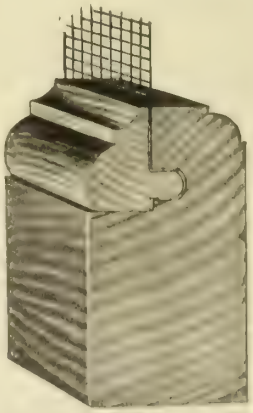
Prices.

Quoted upon application.

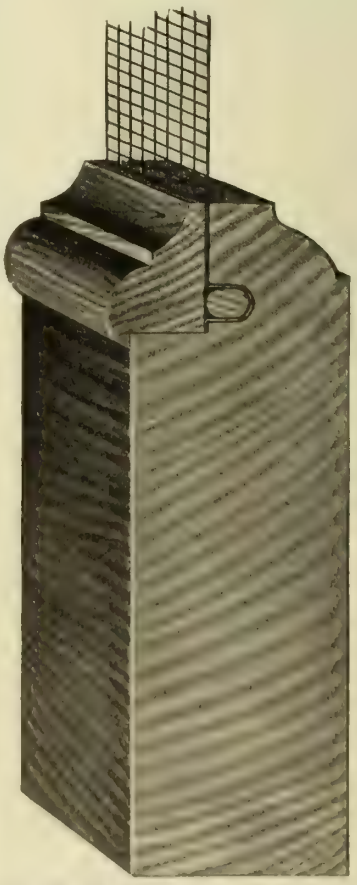
Installations.

Some of our recent installations:

Cresson Sanatorium, Cresson, Pa.
Hotel Dieu, New Orleans, La.
State Hospital for Insane, Trenton, N. J.
U. S. Marine Barracks, Norfolk, Va.
Tuberculosis Sanatorium, Meriden, Conn.
U. S. Army Barracks, Fort Huachuca, Ariz.
U. S. Post Office and Court House, Muskogee, Okla.
National Geographical Society Building, Washington, D. C.
U. S. Government Building, Boise City, Idaho
Cape May Hotel, Cape May, N. J.
Soldiers and Sailors Home, Erie, Pa.
J. N. Adam Memorial Hospital, Perrysburg, N. Y.



KANE METHOD OF FASTENING WINDOW NETTING



KANE METHOD OF FASTENING DOOR NETTING

F. D. KEES MFG. CO.

Window Screen and Storm Sash Hangers and Fasteners

BEATRICE, NEB.

Products.

"Kees" (Gossett) Hinges (or Hangers) and Fasteners for full-length Window Screens and Storm Sash. Also, "Kees" Hangers for Half Screens.

TRADE-MARK

"Kees" (Gossett) Hinges.

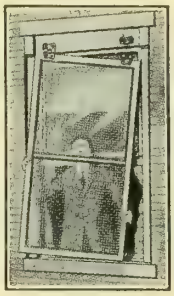
"Kees" (Gossett) Hinges are separable so that the screen or storm sash can be hung in place or removed easily and quickly without the use of tools or ladder.

Advantages—Screens hung from the top will not sag out of true. Can be opened to drive out the flies or to wash windows. Storm sash can be opened for ventilation.

None but full-length screens keep all the flies out and still allow the windows to be opened from the top. "Kees" (Gossett) Hinges afford the most convenient way to attach them.

Cost—The hinges cost no more than common hinges, and can be applied to any screens or storm sash.

Where Used—"Kees" (Gossett) Hinges have been used for the past sixteen years; their sale is still increasing in the Central West, where they were first introduced. They will be found on many residences, business and public buildings. Some few larger installations are: Office Building, General Conference of Seventh-Day Adventists, Takoma Park, Washington, D. C.; United States Army Barracks at Fort Slocum, New Rochelle, N. Y., Fort Leavenworth, Kan., Fort Leary, N. Y., and Vancouver, Wash.



HANGING STORM SASH OR SCREEN FROM WITHIN BUILDING

WASHING WINDOWS WITHOUT REMOVING SASH OR SCREEN

"Kees" (Gossett) Fasteners.

No. 1 Fasteners secure the screen on the inside at the bottom. No. 2 Fasteners lock storm sash when closed, and also when opened for ventilation. They require less space, and are stronger and more convenient than hooks and screw-eyes.

NO. 2 FASTENER APPLIED

Storm Window open for ventilation (actual length 8 in.). Made rights and lefts, can be used on sides of sash as well as at bottom

"KEES" (GOSSETT) HINGE

One half full size

"Kees" Half Screen Hanger.

Acts as a corner-brace for the screen frame.

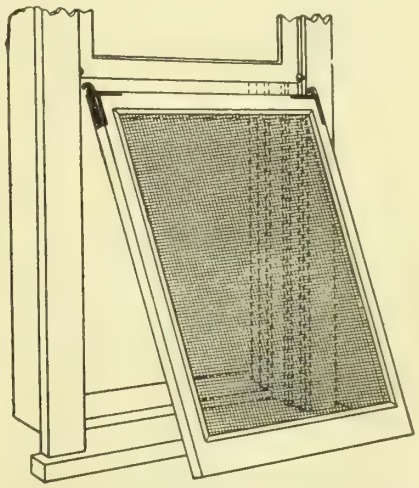
Easily attached. The screws on which the screen is hung are put in place after the screen is fitted and the hangers are attached. They can be located accurately so that the screen fits tight against the jamb of the window frame.

Screen can not fall off when swung out even if it should shrink.

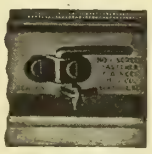
Screen can be swung out or removed when washing windows or driving out flies, etc.

LOWER SECTION OF "KEES" (GOSSETT) HINGES

A pair or set consists of two pieces (like cut) needed to hang either a screen or storm sash after the window has already been fitted to hang the other. The part of the hinge attached to the building answers for both

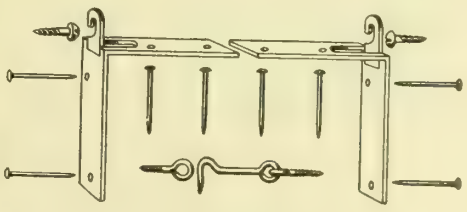


"KEES" HALF SCREEN HANGER APPLIED



NO. 1 FASTENER

One third size



"KEES" HALF SCREEN HANGER

One third full size

Material and Finishes (all Products).

Made regularly of pressed steel, japanned or galvanized. Furnished to order in solid brass and solid bronze.

Distribution.

Sold by dealers in hardware and building material or may be ordered direct from us.

Samples and Prices.

Samples will be furnished free and prices quoted on request.

PHENIX MANUFACTURING COMPANY

Custom-made Screens, Storm Sash, Awnings, Hangers and Fasteners

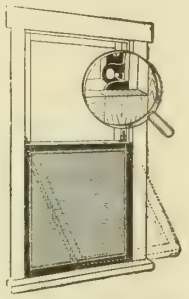
22 to 46 Center Street
MILWAUKEE, WIS.

Products.

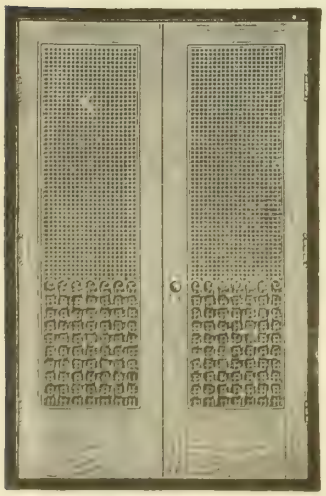
"PHENIX" WIRE FLY SCREENS for Windows and Doors; VERANDA SCREEN ENCLOSURES; "PHENIX" COMBINED WINDOW SCREENS and AWNINGS; STORM WINDOWS and ENCLOSURES; REVERSIBLE or REVOLVING WINDOW FRAMES for all Regular and Balcony Windows; "PHENIX" HANGERS and FASTENERS for Window Screens and Storm Sash.

"Phenix" Rust-Proof Window and Door Screens.

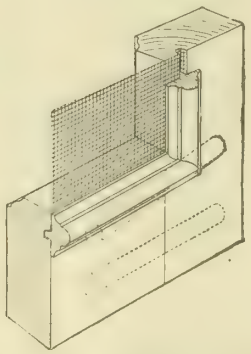
Made to order only, from thoroughly seasoned woods, and wired with either rust-proof or copper-bronze wire-cloth. Window screens are made in both full and half lengths. For ideal ventilation, full length screens are recommended.



"PHENIX" HALF SCREEN
Hangs and swings. Does not slide or stick



"PHENIX" SCREEN DOOR



"PHENIX" WEDGE GRIP AND CORNER JOINT
Showing method of wiring without tacks. Holds every wire taut

"PHENIX" VERANDA SCREEN ENCLOSURE

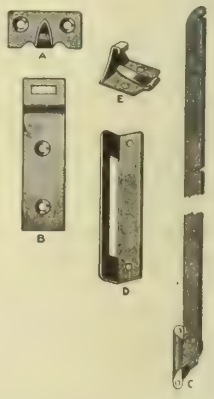
"Phenix" Door Screens and Veranda Screen Enclosures are made to order to fit any opening.

Note the "Phenix" wedge-grip method of wiring screens without tacks. Holds every strand of wire perfectly taut and secure. "Phenix" Wedge Lock Corner Joints and Hardwood Dowels set dovetail in glue.

"PHENIX" SCREENS AND STORM SASH
Easily hung from inside of room. Swing out for cleaning and ventilation

"Phenix" Hangers and Fasteners.

Make it easy for any one to hang or remove entire screens or storm sash from the inside of the room. The screen and sash are hung from the top and fastened at the bottom with a lock that draws them up firmly to the building. There is an attachment for extending the screen or sash so that the window can be cleaned; or, in a case of storm sash, for ventilation. "Phenix" Hangers and Fasteners are made of wrought steel, galvanized finish; also, solid brass. Simple, strong, weather-proof.



"PHENIX" HANGERS AND FASTENERS
Half set

"Phenix" Combined Window Screen and Awning.

Consists of a "Phenix" full-length screen with awning attached directly to the screen sash. Equipped with "Phenix" Hanger and Fastener No. 1, making it possible to put up both screen and awning at one operation and from the inside of the room. With this device it is not necessary to open the screen to raise and lower the awning, as awning is operated from the inside of the building by means of a cord and patent cord socket running through the screen sash.

"PHENIX" COMBINED SCREEN AND AWNING
Awning raised and lowered without opening screens. Full length screen makes perfect ventilation possible

Catalogue.

We cater to the best class of order work only. "Phenix" Catalogue sent on request. Estimates gladly furnished.

ESTABLISHED 1880 INCORPORATED 1910

ROBBINS MANUFACTURING COMPANY

Insect Screens and All-Metal Weather-Strips

1801-1815 North Central Park Avenue
CHICAGO, ILL.

SELLING AGENCIES

NEW YORK, N. Y., 47 West 34th Street
BOSTON, MASS., 36 Bromfield Street
PHILADELPHIA, PA., 542 Land Title Building
PITTSBURGH, PA., Jenkins Arcade Building
MONTREAL, CANADA, Window Strip Co.
AND IN ALL PRINCIPAL CITIES

Products.

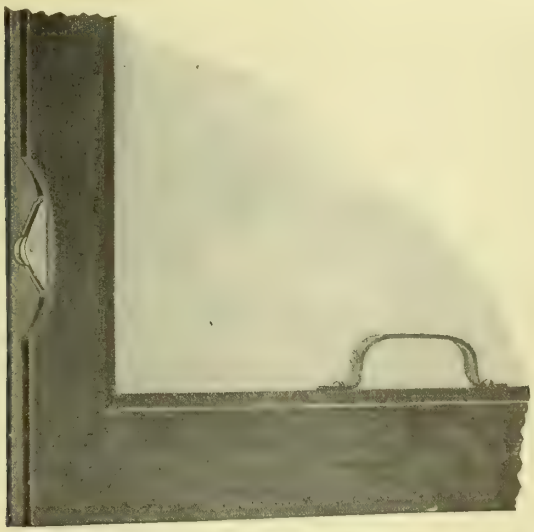
Weather-Proof Wire Insect Screens, Wood or Metal Frames, made to measure only.
Robbins All-Metal Weather-Strips.

Description of Screens.

Wood frame screens made from any kind of wood desired, although we recommend the use of soft woods for outside screens and exposed doors. The netting used in Robbins screens and doors is the best procurable in various weaves. We carry in stock all standard meshes, and recommend the use of copper bronze, non-rustible. The wire-cloth is crimped into a groove on the inner edges of screens and doors, each strand being securely held by a bamboo spline, over which a neat finishing molding is placed. Frames are easily rewired. Metal frame screens made from electro-galvanized steel, bronze or brass.

Roller Bearing Screen.

Fitted with concave brass rollers on the left side, and semi-elliptical clock steel springs with lips on the right side. The screen is not affected by weather conditions, running smoothly at all times.



CORNER OF ROBBINS ROLLER BEARING SCREEN

Spring Sliding Screen.

We are also prepared to furnish a regulation spring sliding screen, supplied with guides running the full height of the opening.

PLANT OF ROBBINS MANUFACTURING CO.

Doors and French Casements.

These are made from any wood, and, if desired, in special styles, from heavy moulded stock, of width and thickness best suited to the conditions to be met. They are joined with full mortise and tenon corners, filled with waterproof glue, tightly wedged. They are made in various thicknesses, and with stiles and cross-rails of various widths; are equipped with suitable latches of brass or bronze material, and ball-tipped loose pin butts of various styles, finishes and cost.

Metal Frame Screens.

These are made 1-inch wide, 3/8-inch thick. The corners are doubly reinforced. Any standard wire-cloth may be used. Frames are made in two sections and are easily rewirable. They are made in either spring sliding type, full size, or casement. Frames may be finished any color desired. Where enamels are used they are carefully baked on and are very durable. U-shape guides, running the full height of window opening, are furnished with all metal-frame sliding screens.

All-Metal Weather-Strip.

We are prepared to supply and install weather-strip equipment of either zinc or bronze. It is permanent, produces a uniform temperature in all parts of every room, becomes a part of the house, prevents windows from rattling, keeps out dust and cold, and prevents an escape of radiation. Its use has demonstrated the saving of fuel from 20 to 45 per cent.

Co-operation and Service.

Our practical men are, without obligation, at the service of architects, builders or owners in the preparation of full-sized details of any building on which screens or weather-strips are to be used. Estimates cheerfully furnished.

WATSON MANUFACTURING CO.

Insect Screens, Car Screens, Metal Office Furniture

TELEPHONES { Bell 730 / Home 220

FACTORY AND EXECUTIVE OFFICE
JAMESTOWN, N. Y.

BRANCH OFFICE: NEW YORK, N. Y., 101 Park Avenue. Telephone, Murray Hill 8157, 8158

REPRESENTED IN ALL PRINCIPAL CITIES

Products.

"20th Century" Insect Screens: Wood Window, Door and Porch Screens; Bronze and Steel Window, Door and Porch Screens; Bronze and Steel Roll Screens; Bronze and Steel Light Metal Doors; Bronze and Steel Heavy Metal Doors.

Imperial Car Window Screens: Bronze and Steel Car Window Screens.

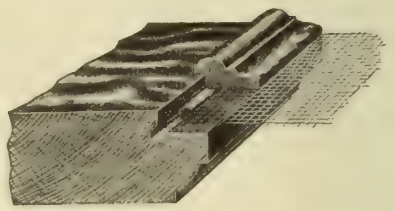
All Screen Work built to specifications only, to fit any openings and requirements and to match any color or finish.

Efficiency Metal Office Furniture: Metal Furniture and Filing Devices for Commercial Offices, Banks, Court Houses, Hospitals, Armories and other Public Buildings, including Desks (Flat and Roll Top), Filing Cases, Counters, Tables, Plain Shelving, Omnibuses, Vault Fixtures, Lockers (Bathroom, Clothing, Toilet and Medicine), Wardrobes, Storage Racks, Cabinets and Steel Boxes.

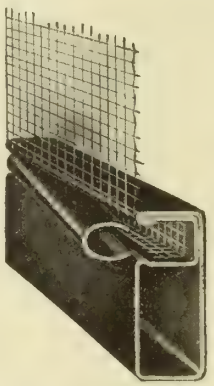
With the following and other devices as may be required:

Card, Letter, Check and Document Files, Roller Book Shelves, Plain Shelves, Box Drawers, Pigeonholes, Cupboards, Deposit Boxes, Security or Bond Boxes, Map Drawers, Storage Files, etc.

TRADE-MARKS



Section Through Wood Door Showing Strip Attachment for Holding Wire Cloth



Section Through Metal Frame Showing Tubular Construction and Method of "Rewiring" Screens

Outside Sliding Screen

"20TH CENTURY" INSECT SCREEN

Description.

Our work embodies many improvements and advantages making for superiority in material, construction, applicability, etc.; but on account of the varied character of the product, which is built to order, a detailed or even a general description is impossible.

Prices and General Information.

Catalogues and general information regarding details, advantages of material, construction, application and adaptability will be gladly furnished upon request.

TYPICAL VAULT EQUIPMENT

Co-operative Service.

Our corps of engineers and draftsmen will furnish sketches and drawings, assisting architects and others in the preparation of plans and specifications and the working out of special problems.

Inquiries.

Inquiries addressed to the Home Office will receive prompt attention at the hands of our nearest representative.

References.

References will be furnished on request.

MALLORY MANUFACTURING CO.

Manufacturers of Shutter Workers

225 Main Street

FLEMINGTON, N. J.

Product.

MALLORY'S STANDARD SHUTTER WORKER.

Description.

It operates shutters in any wind or storm, saves repair cost caused by damage from pulling in blinds by the slats, locks the blinds against opening from outside, avoids cold currents in winter by keeping windows shut, permits instant removal of blind for painting, automatically holds blind firmly in any position or against house, does away with rattling, and removes danger of leaning out of window to release catch.

It is easily installed in old or new houses, frame, brick, concrete, or stone, without tearing out walls. There is no disturbance of upper hinges on blinds already hung. (On new work we furnish upper hinges free.)

Automatic two-fold blind attachment can be furnished to operate blinds where one blind is hinged to the other and folded back upon the other when open. These can be operated with our shutter workers so that such blinds can be opened or closed from the inside.

Mallory shutter workers are also used to operate casement windows, and special workers to fit peculiar conditions can be made upon receipt of specifications.

Construction.

They are made of durable metal, carefully hand fitted and finished in every part, insuring easy working qualities and long wear.

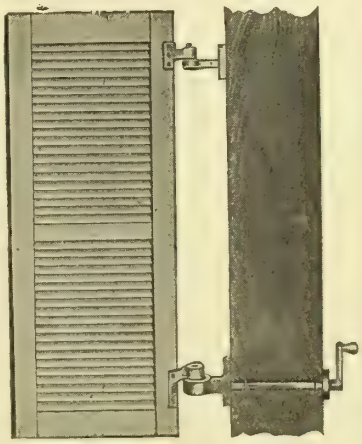
The principal working parts are of malleable iron and wrought steel forgings, accurately machine cut. They are tightly encased and can not be affected by any kind of weather. The encasing box is small and neat, and is inconspicuous both from inside and out. The handle is two inches long and, with escutcheon plate, adds to the finish of the casing.

Installation.

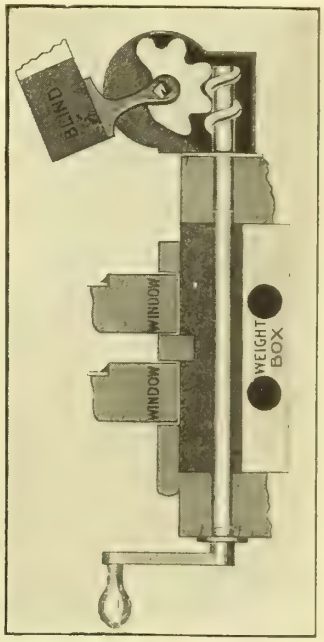
Installing merely requires a half inch hole bored through the casing, centered 7/8 of an inch from edge of casing, which does not interfere with the sash weights; the worker is attached to the shutter and the escutcheon plate is then screwed on. Each shutter operates independently.

Where sub-jambs are used, they should be placed, if possible, 3½ inches to 4 inches from edge of casing, to give room for handle to revolve, and the hanging style should also have a width of at least 1⅜ inches to make room for the worker on the outside.

Workers vary in throw of hinge and length of rod. Frame workers throw the blinds around a reveal of 2½ inches; rods 10⅛ inches long, less 7/8 inch for handle. Brick-house workers throw around a 3½-inch reveal; rods 17⅛ inches long.



Showing Handle on inside of room and Rod passing through wall



Sectional View of Worker, showing Screw and Worm-wheel

Interior View

Exterior View

MALLORY STANDARD SHUTTER WORKER

THE J. G. WILSON CORPORATION

Manufacturers of Venetian Blinds and Awnings

TELEPHONE, BRYANT 7693
CABLE, "LYDIAN, NEW YORK"

8 West Fortieth Street
NEW YORK, N. Y.

FACTORY ADDRESS
MAIL AND TELEGRAPH: NORFOLK, VA.

BRANCH OFFICE: CHICAGO, ILL., 332 South Michigan Avenue

Products.

SLIDING VENETIAN BLINDS, for inside and outside use; VENETIAN AWNING-BLINDS; VENETIAN PORCH BLINDS; ROLLING BLINDS.

For Steel Rolling Doors and Shutters, "Salamander" Rolling Shutters, Wood Rolling Doors, Swing Sliding Doors, Wood Rolling Partitions, English Wood Block Flooring, and Hygienic Wardrobes, see our name in General Index.

Wilson Awnings.

Type 1—This type (Fig. 1) is a combination outside blind and awning. It can be raised or lowered vertically to any position; it can be extended to form an awning, and the slats can be deflected to modify lighting and ventilation, whether the outfit is used as a blind or as an awning. Perfect control of light is thus obtainable and the temperature of the room can be regulated to a degree unattainable by any other similar device. The raising or lowering of the blind, and the deflection of the slats, can be effected from the inside of the room without opening the sash.

Blinds of this type are constructed at the factory in wooden frames that fit into the openings prepared for them, and can be placed in position very readily. Slats are operated on collapsible phosphor bronze ladder or imported linen ladder, as specified.

Type 3—This type is a moderate priced awning-blind (Fig. 2), without the side protection afforded by Type 1. Perfect protection from the sun and wind, and yet ample ventilation is obtained at low cost.

This type of awning is especially adapted to pagodas, main porches, sleeping porches and other locations where side protection is not required. It is much more attractive and far superior to usual type of porch awning.

Wilson Inside Modern Venetian Blinds.

The Venetian Blind has well passed the century mark in design, and by that token has proved its fundamentally good qualities.

A cord on the right of the blind operates the raising or lowering device, and one turn around the cord holder keeps the blind in any position. On the left hand a similar cord operates the slats at any angle, increasing or decreasing the light as desired; the slats are held at any angle by one turn around the cord holder.

In this type, as in most of the Wilson Venetian Blinds a device termed the "Traverse Roller" is generally used. This is a device which accomplishes the important feature of keeping the slats of the blind always horizontal and, therefore, the entire blind symmetrical.

The blind can be made of any wood and finish to match the woodwork of the room.

Heights of Pockets for Awnings and Blinds.

The following sizes are based on the assumption that bottoms of pockets are at top of window openings, and that the blinds are to be wholly concealed within the pockets when drawn up. It is seldom considered necessary, however, to provide such pockets or to conceal any portion of Inside Venetian Blinds. They are more frequently hung between window jambs, stop beads, or upon the head casings, without any pockets whatever, and when so hung present a very good appearance. For space occupied when slats are entirely up, add to the pockets heights given below:

HEIGHTS OF POCKETS FOR AWNINGS AND BLINDS

Height of Opening.	Inside Slats 2¾ ins. wide, Metal Tapes.	Inside Slats 2⅜ ins. wide, Linen Tapes.	Inside Slats 2 ins. wide, Linen Tapes.	Inside Slats 1½ ins. wide, Linen Tapes.	Awning Slats 2⅜ ins. wide, Metal Tapes.
4 feet	13 inches	12 inches	13½ inches	16 inches	14 inches
5 feet	11¼ "	13¼ "	15 "	18 "	15½ "
6 feet	15¾ "	14½ "	16½ "	19¾ "	17 "
7 feet	17 "	15½ "	17¾ "	21½ "	18½ "
8 feet	18½ "	16¾ "	19 "	23½ "	20 "
9 feet	19¾ "	18 "	20½ "	25½ "	21½ "
10 feet	21 "	19 "	22 "	27¼ "	23 "
11 feet	22¼ "	20¼ "	23¼ "	29 "	24½ "
12 feet	23⅜ "	21½ "	24½ "	31 "	26 "

NOTES—If fronts of pockets are not removable add one inch to the above. For blinds over 6 feet wide and up to 8 feet high add two inches. If over 6 feet wide and 8 feet high, add 3½ inches.

Inside width of pockets should not be less than 4½ inches for linen tapes, or 5¾ inches for metal tapes. The width must be more when the blinds are not to slide in grooves, in order to allow for swaying.

General Cost.

Price lists for general use are so unsatisfactory that it is deemed best to not include them herewith. As a guide, would say, however, that we can supply an Inside Venetian Blind for windows 3 feet wide by 6 feet high at $7.00 per window, and upwards; or a No. 1 Wilson Awning for a similar window for $22.00 and upwards.

FIG. 1 WILSON AWNING, TYPE 1, IN THREE POSITIONS

FIG. 2 WILSON AWNING, TYPE 3, APPLIED TO PAGODA

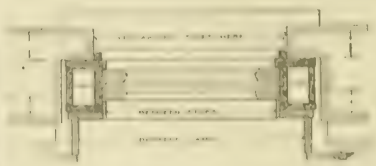


FIG. 3. DETAIL SHOWING WIDTH DIMENSIONS REQUIRED IN ORDERING AWNINGS OR BLINDS, ACCORDING TO POSITION

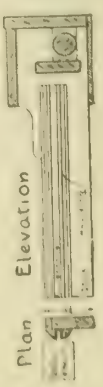


FIG. 4. OUTSIDE AWNING SLIDING IN FIXED VERTICAL GROOVE

ATHEY COMPANY

Manufacturers of Cloth-Lined Metal Weather-Strips

Twenty-Fourth and La Salle Streets

CHICAGO, ILL.

BRANCHES AND AGENCIES IN PRINCIPAL TOWNS OF UNITED STATES AND CANADA

Products and Service.

"ATHEY" CLOTH-LINED METAL WEATHER-STRIPS.

Our Weather-Strip is used successfully on the coaches of many railroads.

Athey

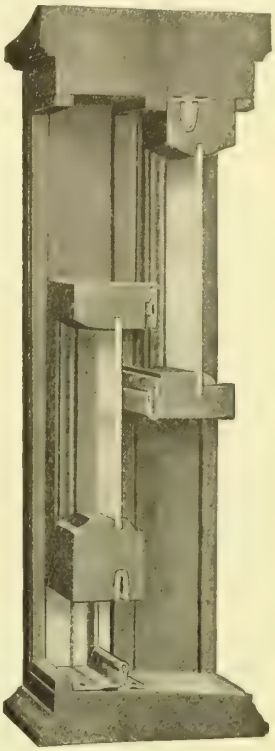
TRADE-MARK

Advantages of Flexible Contact.

Our flexible contact of cloth to metal gives an absolute protection against both wind and dust not possible with any metal-to-metal or metal-to-wood contact. Saves fuel. Seals the opening.

Application and Co-operation.

"Athey" cloth-lined metal weather-strip can be applied satisfactorily to windows or doors of wood, metal, or metal-covered of every type; double hung, hinged, pivoted or of special design or construction. We are glad to submit drawings, samples and prices for consideration.



Cloth Lining.

Cloth in channel is not felt, but a three-ply Windsor or billiard table cloth, which will not stretch, and which we chemically treat in a way that makes it impervious to moisture.

Guarantee.

Our cloth is guaranteed not to rot nor mildew; and not to cut, stretch nor tear, for years.

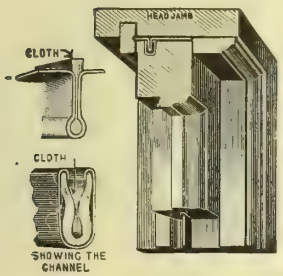


FIG. 1. STRIP AND APPLICATION

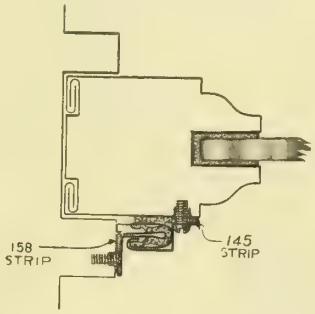
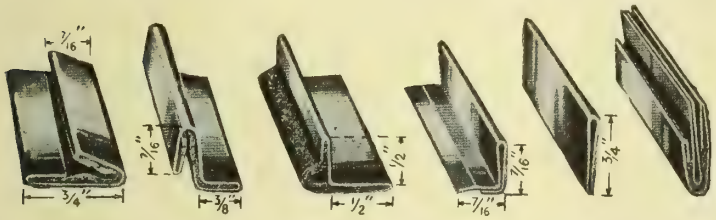


FIG. 2. ONE OF NUMEROUS METHODS OF INSTALLING CLOTH-LINED STRIP ON SURFACE OF SHEET-METAL SASH



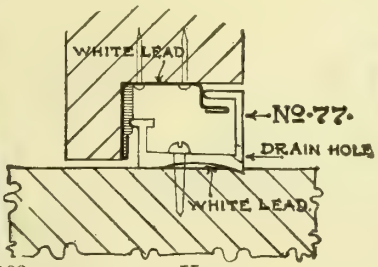


FIG. 3. VARIOUS TYPES OF "ATHEY" STRIP FOR DOORS AND CASEMENT WINDOWS

Nos. 180 and 182 for top and lock edge. Nos. 181 and 182 for hinge edge. No. 77 extruded on sill, bronze and heavy felt on sash, absolutely waterproof. Note particularly No. 77 bottom for inswinging casements and French doors

FIG. 4. SECTION OF COMPLETE WINDOW MODEL FITTED THROUGHOUT WITH CLOTH-LINED EQUIPMENT

Note cloth-to-metal contact top, bottom, sides and meeting-rail. No wind or dust leakage, no friction, binding or rattling

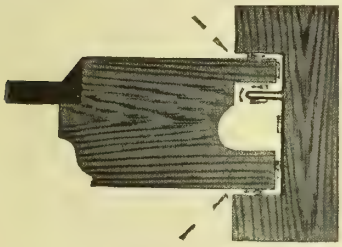
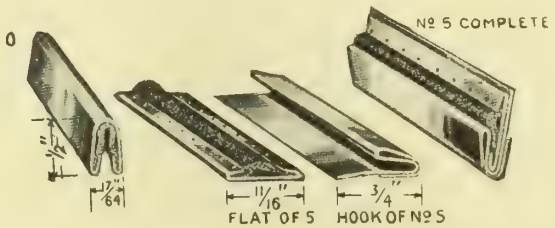


FIG. 5. ORDINARY WEATHER-STRIP

Showing leakage without channel at sash cord groove



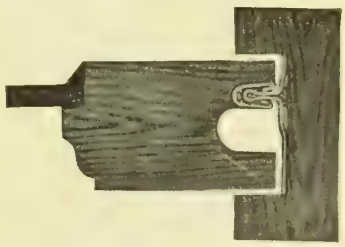


FIG. 6. CLOTH-LINED CHANNEL

No leakage possible even at sash cord grooves

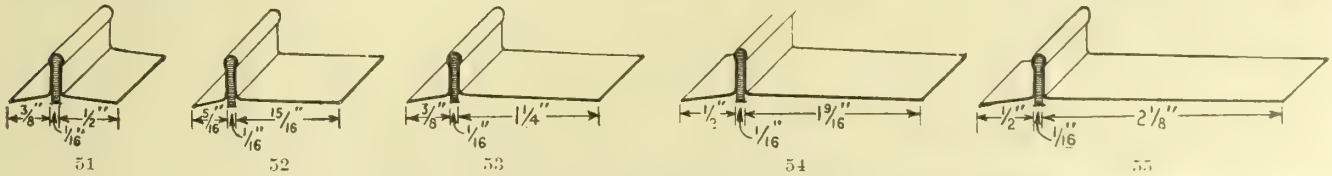


FIG. 7. STANDARD CLOTH-LINED EQUIPMENT FOR DOUBLE-HUNG SASH

No. 0 channel in sash, all sides in connection with rail 51 to 55 as thickness of sash demands. No. 5 at meeting-rail. Cloth-to-metal contact throughout, an absolute protection against wind, dust and binding. No friction as with metal-to-metal or metal-to-wood weather-strips. See Figs. 1, 4 and 6. Note ball tip on rail, sealing channel; cloth insert in back of rail, preventing back leakage

AMERICAN METAL WEATHER STRIP CO.

HOME OFFICE AND FACTORY

GRAND RAPIDS, MICH.

Product.

Manufacturers of the "WINDUSTITE" METAL EQUIPMENT for all kinds of Windows and Doors; also the "WOLVERINE" WEATHER-STRIP.

Windustite TRADE MARK

REGISTERED

"Windustite" American Weather-Strip.

This strip (Fig. 1) is made in two channels, the inner one of No. 9 Gauge zinc attached to the sash with rustless nails; the outer one of No. 17 Gauge zinc attached to the frame with countersunk rustless screws. It protects the sash against wearing, as the two flat surfaces of metal travel one within the other, causing no friction on the wood.

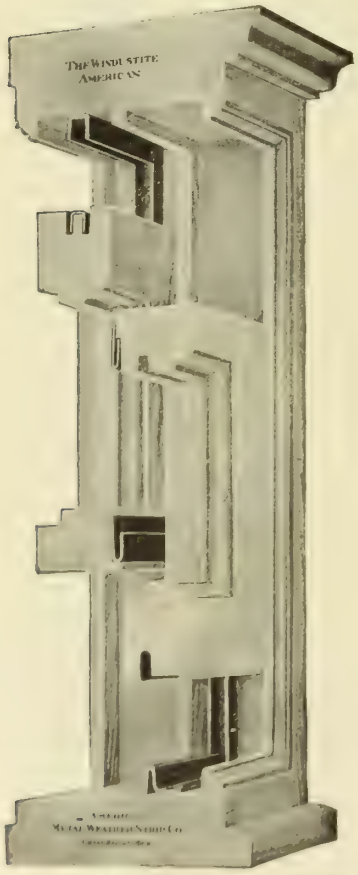


FIG. 1. "WINDUSTITE" AMERICAN WEATHER STRIP
Patented

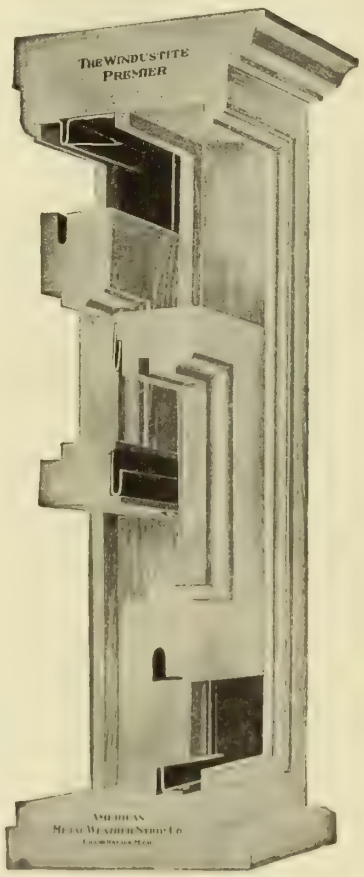


FIG. 2. "WINDUSTITE" PREMIER WEATHER-STRIP

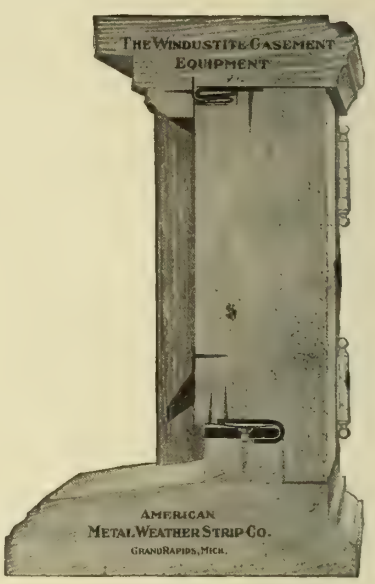


FIG. 3. "WINDUSTITE" CASEMENT EQUIPMENT

Detail Blue-Prints of this and of our complete line furnished to Architects on request

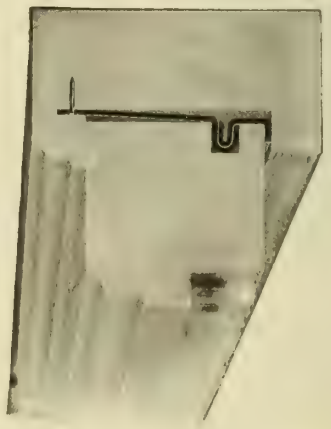


FIG. 4. THE "WINDUSTITE" PREMIER WEATHER-STRIP AS APPLIED TO SASH AND FRAME
Patents Pending

"Windustite" Premier Weather-Strip.

This is a double protection flexible strip which *takes up the shrinkage of the sash* without losing any of its effectiveness (Fig. 2). It is also composed of two metal channels applied to the sash and frame as shown in Fig. 4. The strip on the frame is No. 9 Gauge zinc and on the sash No. 10 Gauge. No sharp edges are exposed, and a quarter of an inch groove in the sash is made to receive this strip.

Continued on next page

FIG 5. "WOLVERINE" WEATHER-STRIP

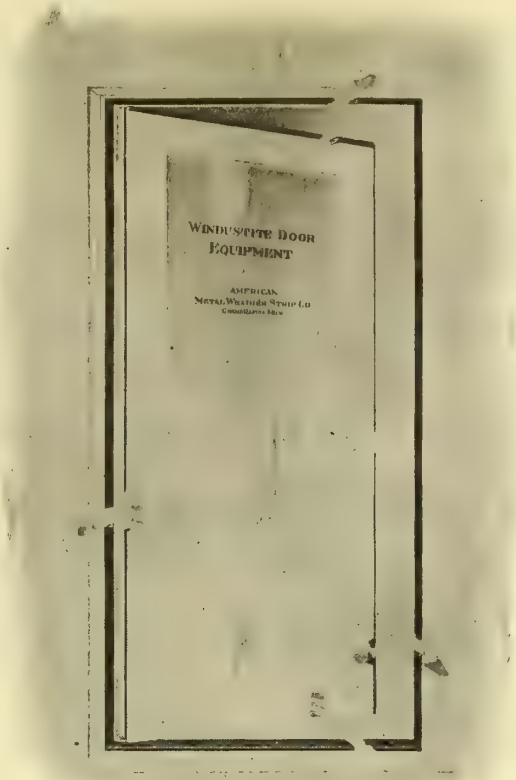


FIG. 6. "WINDUSTITE" DOOR EQUIPMENT

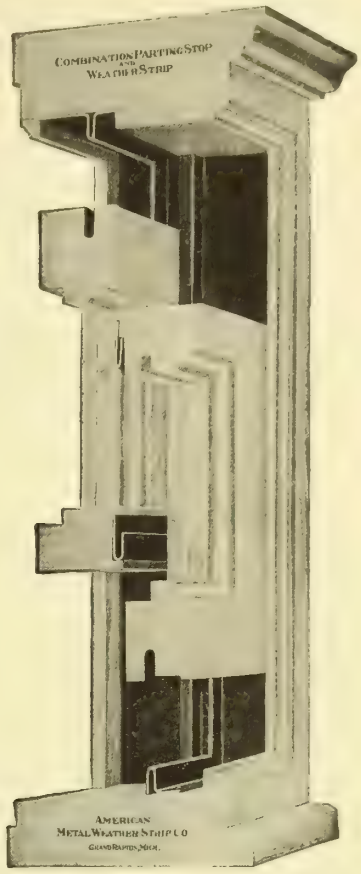


FIG. 7. COMBINATION PARTING-STOP AND WEATHER-STRIP
Patented

"Wolverine" Weather-Strip.

A single ribbed strip (Fig. 5) made of heavier metal than most strips of this kind. Where that type of strip is required, the "Wolverine" will be found most suitable.

"Combination Parting-Stop and Weather-Strip."

This strip (Fig. 7) is designed especially for new buildings, but it may also be used on old work, by removing the parting-stop, as no wood stop is required. It is made in two styles: No. 1 and No. 2. No. 1 is made narrow, extending three eighths of an inch on either side from the parting bead. No. 2, as shown in cut, extends the full width of the frame and under the inside finishing stop. The strip is installed in two pieces with the joint at the meeting-rail. This also reverses the weather-strip rib to either side. A cheaper grade of lumber may be used in frames as it is completely covered and strengthened by metal plate.

"Windustite" Door Equipment.

We use either Interlocking or Spring Bronze on the top and sides of doors, and our "Windustite" threshold on the bottom. (See Fig. 6.) Fig. 8 shows end view of this bottom. It is made of solid brass and bronze and attached with solid brass screws. When doors are rabbeted special equipment will be furnished.

We use the same meeting-rail with all of our various strips. It is composed of two hooks made of No. 12 Gauge Zinc. A perfect joint is made between the sash, and because of the heavy metal used the sash can not spread.

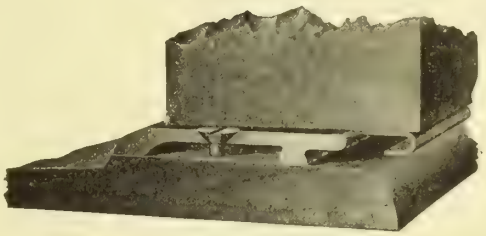


FIG. 8. END VIEW OF BOTTOM OF "WINDUSTITE" THRESHOLD

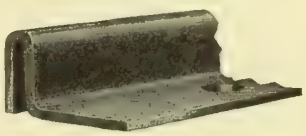


FIG. 9. SILL STRIP
Made of No. 17 Gauge Zinc and installed with screws. It is guaranteed to hold a man's weight without crushing, and is used with our "Windustite" or Combination Strips.

Quality and Co-operation.

We furnish the highest quality weather-strips in zinc, copper or bronze; assure the highest class workmanship, and we will cooperate with Architects and Contractors in making weather-strip a superior adjunct to any building.

Estimates and Catalogue.

Estimates for strips include installation by our expert workmen. Send for Catalogue.

CHAMBERLIN METAL WEATHER STRIP COMPANY

GENERAL OFFICES

109 Third Avenue

DETROIT, MICH.

OFFICES AND SHOWROOMS

BALTIMORE, MD., 123 East Fayette Street
BOSTON, MASS., 17 Pearl Street
BUFFALO, N. Y., Curtiss Building
CHEYENNE, WYO., Box 462
CHICAGO, ILL., 626 South Dearborn Street
CINCINNATI, OHIO, 237 West 4th Street
CLEVELAND, OHIO, 4500 Euclid Avenue
COLUMBUS, OHIO, 346 North High Street
DES MOINES, IA., 803 Hubbell Building
HARRISBURG, PA., 405 Telegraph Building
INDIANAPOLIS, IND., 232 North Delaware Street
KANSAS CITY, MO., 3301 Gilham Road
MANCHESTER, N. H., 913 Elm Street
MINNEAPOLIS, MINN., 1035 Plymouth Building
NEW HAVEN, CONN., 87 East Orange Street
NEW YORK, N. Y., 456 Fourth Avenue
OKLAHOMA CITY, OKLA., Majestic Building
OMAHA, NEB., 318 South 19th Street
PHILADELPHIA, PA., 708 Real Estate Trust Building
PITTSBURGH, PA., 1022 Bessemer Building
RICHMOND, VA., Travellers Building
ROCHESTER, N. Y., 161 Clinton Avenue, North
ST. LOUIS, MO., 4230 Olive Street
SPOKANE, WASH., 606 Peyton Building
WASHINGTON, D. C., 218 Bond Building
WILKESBARRE, PA., Miners' Bank Building

FACTORIES: DETROIT, MICH. PERU, ILL.

Product and Services.

"CHAMBERLIN" METAL WEATHER STRIP for WINDOWS and DOORS.

We install "Chamberlin" Metal Equipment to stop leakage, to eliminate draughts, to keep out dust and noise, to perfect the operation of the sash, to insure even heating of the building throughout, to assist heating and ventilating plants so as to secure maximum efficiency. The equipment is all metal, either solid zinc, copper or bronze. It can be installed in either old or new buildings of any kind and for any size or shape of window or door.

Co-operative Service.

We will mail to architects and engineers on request full-sized details and illustrations of "Chamberlin" as applied to Double-Hung Windows, Casements opening in or out, Transoms, Doors, Hollow Metal Sash, Kalamein or Metal Covered Doors or Windows, Pivoted Windows (top or bottom wood, metal or metal covered), Show Cases, Garage Doors, etc.

CHAMPION METAL WEATHER STRIP AND PARTING BEAD CO.

179 Summer Street
BOSTON, MASS.

AGENCIES

ALBANY, N. Y., C. M. Ward, 76 Jay Street
AUBURN, ME., Eugene F. Lane, 261 Main Street
BUFFALO, N. Y., G. H. Peters Co., 289-93 Oak Street
CHICAGO, ILL., United Ornamental Iron Works, 703 Security Building
DALLAS, TEX., T. J. Thornhill, 206 Scollard Building
NEW YORK, N. Y., Howell, Field & Goddard, Inc., Review Avenue, Long Island City
PHILADELPHIA, PA., M. B. Blakemore, 34 South 18th Street
PORTLAND, ME., Roscoe S. Davis, 91 Eastern Promenade
WASHINGTON, D. C., George T. Kolb, 713 14th Street, N. W.

Products.

"Champion" Metal Weather Strip and Combination Parting Bead for windows; Automatic "No-Dust" Strip for bottom of doors; Automatic Spring Strip for sides and top of doors; Special Forms of Metal Weather Strips adapted to the various details of Casement Windows swinging in or out.

Distinctive Features.

The distinctive feature of the "Champion" is that it is a practical combination of a metal weather strip and parting bead. It consists of a single piece of metal, zinc, formed so as to incase the parting bead and provide a projecting rib which fits a groove made in the edge of the sash. (Figs. 1 and 4.) This combination affords the most *complete protection* against wind, rain, dust, soot and cold.

The results are permanent. No joint between the weather strip and parting bead by which air and dust can be admitted back of the strip itself. Wood parting bead protected from shrinkage and decay and from coming out at the bottom.

It is applied with screws, the adjustment is automatic, and it can be removed and replaced by any one. No difficulty to householder when he has broken glass or cords to repair.

It provides a smooth surface for the window to run in at all points of contact (including parting bead).

The sill piece has a galvanized steel spline folded within the zinc, so can not be accidentally crushed or bent over (Fig. 2).

Adaptability, Installation.

The "Champion" Metal Weather Strip can be applied to any style of window, new or old. It should be applied only by our own mechanics. We guarantee every order we install ourselves.

Casement Windows that Swing Inward.

The new "Champion" Patented Weather Strip for "Swinging-In" casements is unique and entirely different from anything else in this line on the market. It is the only strip that will effectively prevent leakage of water in this style of window.

Automatic "No-Dust" Weather Strip for Doors.

This strip is applied to the bottom of door, is invisible and will not disfigure the finest work. It is controlled by an adjusting screw inserted in the jamb, which throws down the strip when the door is shut, making a tight joint on the bottom. Invaluable for doors and French windows in exposed positions on seashore and mountain (Fig. 3).

Fig. 1. SIDE STRIP OR COMBINATION WEATHER STRIP AND PARTING BEAD

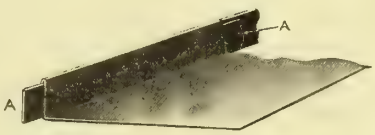


Fig. 2. SECTION OF SILL PIECE
A—Galvanized Steel Spline

Fig. 3. DOOR STRIP

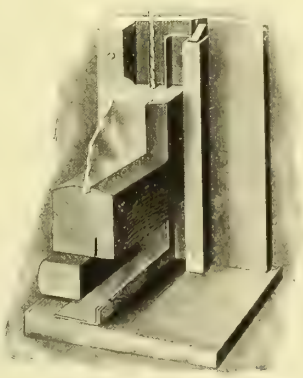


Fig 4. STRIPS IN PLACE

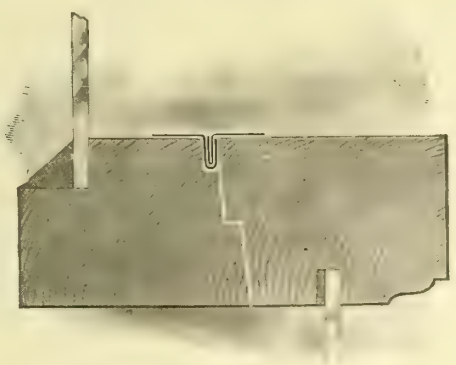


Fig. 5. SECTION OF MEETING RAIL

THE HIGGIN MANUFACTURING CO.

Metal Weather-Strips

NEWPORT, KY.

SALES AGENCIES IN FIFTY OF THE LARGER CITIES THROUGHOUT THE COUNTRY
Look up our local office in Telephone Directory, or write to Newport, Ky., for information

Products.

Manufacturers of HIGGIN ALL-METAL WEATHER-STRIPS.

For Higgin All-Metal Window Screens, Wood-Frame Window and Door Screens, see our name in General Index.

Higgin All-Metal Weather-Strips.

Complete Equipment—The complete equipment for sliding windows (see illustration) consists of two strips, one of which is attached to the window frame and is made with a ⅜-inch tongue or raised portion that forms a track on which the sash slides. This track is usually made of zinc, but bronze may also be used.

The other strip, called the insert, is made of very light spring bronze, and is inserted in a groove made in the sash and slides on the track strip. The spring flanges of the insert lightly contact with the tongue of the track and effectually seal the aperture. As the insert is higher than the tongue of the track there is no chance for it to cut the insert.

At the meeting-rail a zinc strip is attached to the lower rail of the upper sash and a spring bronze strip to the upper rail of the lower sash in such manner that as the sashes are closed the strips interlock, sealing up the opening completely.

Plain Equipment—The plain equipment, consisting of the track strip only, can be furnished at less cost, if desired, but it is not so effective as when the insert strip also is used.

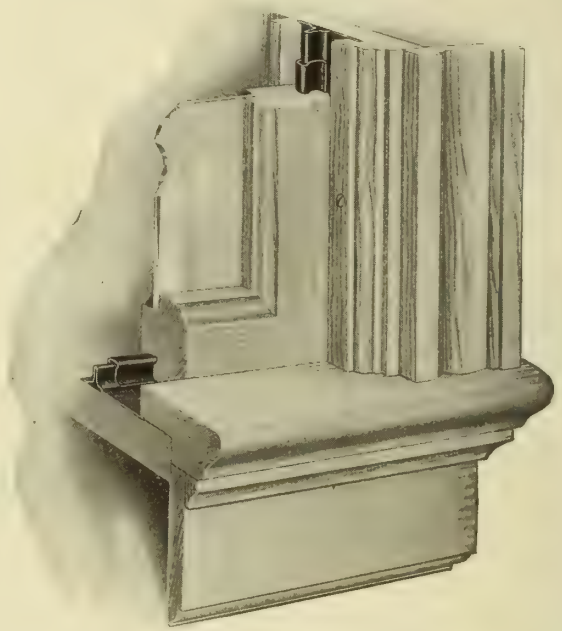
Casement Strip.

We manufacture a number of strips specially designed to conform to the different conditions to be met on casement windows. Because of the difficulty encountered in the past in making casement windows water-tight, particularly those opening in, some architects have not used them as often as they desired.

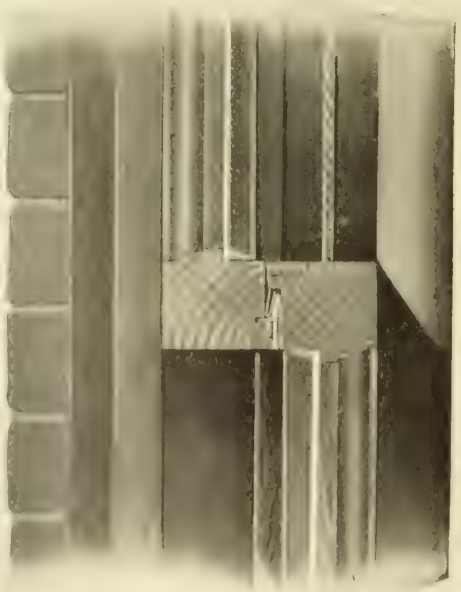
There no longer exists any reason for not using this very popular style of window.

Other Strips.

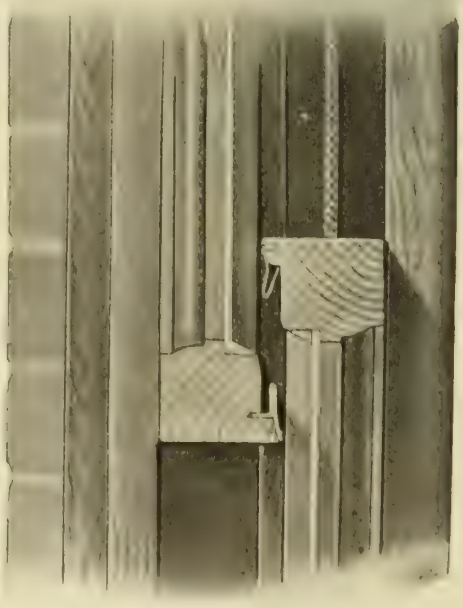
Strips of various kinds have been designed for circle top and all other styles and kinds of windows, making our line complete in every particular and equal to every need.



TRACK AND INSERT STRIPS
Patented September 21, 1909



MEETING RAIL STRIP LOCKED, SASH CLOSED



MEETING RAIL STRIP, SASH PARTLY OPEN

Continued on next page

Specifications.

In order to insure the best possible results, specifications should call for "Higgin Complete Equipment." In no other way can the same results be obtained.

Durability and Efficiency.

Nothing can wear out or get out of order, because the method of construction is such that the two parts do not cut or damage each other. Note their difference in height (Fig. 1). The head of the raised portion of the track *can not* cut into the insert strip. The sides of the insert only come in contact with the upright portion of the track and effectually close up the space.

Fig. 1
First Position

Fig. 2
Second Position

Fig. 3
Third Position
TRACK AND INSERT STRIPS

When the sash is loose and is drawn away from the side, the contact is as in Fig. 2. The space is closed tight and there is no chance for dust or air to get through.

When the sash is tight against the side, the contact is as in Fig. 3. Note that the ends of the insert rest on the slightly raised portion of the track, so there is no friction between the sash and the track. This insures an *easy sliding window.*

Figs. 4 and 5 graphically illustrate the advantage of the use of the insert strip, where the sash is cut out to accommodate the sash cord. When the track strip alone is used, there is absolutely nothing to prevent the air coming in. The use of the insert strip seals the space completely. The insert strip is essential to a perfectly tight job.

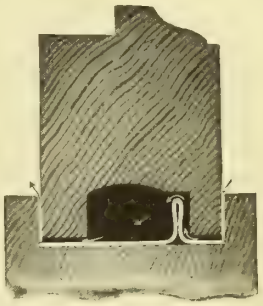


Fig. 4
TRACK STRIP ONLY
Where sash is cut out for sash cord

Fig. 5
TRACK AND INSERT STRIPS
Where sash is cut out for sash cord

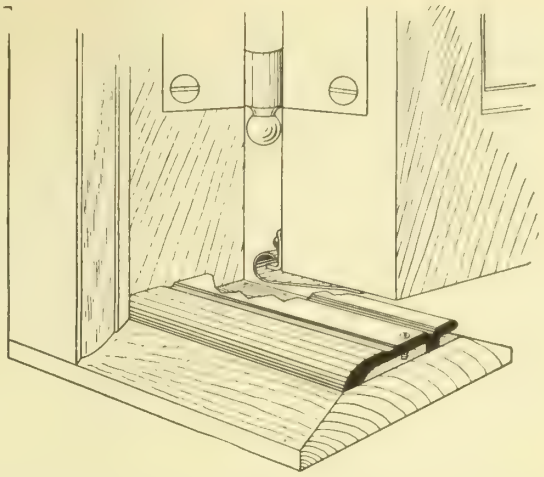
Fuel Saving.

The saving in fuel effected by the plain track equipment is from ten to thirty per cent, depending upon the condition of the openings. The complete equipment effects a considerably larger saving.

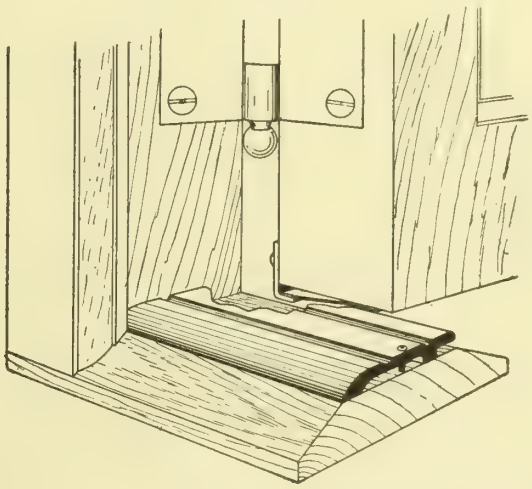
Estimates.

Estimates of cost for either complete or plain equipment will be furnished from any of our branches or sales offices, located in all the principal cities of the country, or from the home office.

Canadian inquiries may be referred to our factory in Toronto, Ontario.



Special Spring Bronze Strip attached to bottom of Door contacting with the Bronze Threshold as the Door closes



Hook Strip on inside of Door Bottom, Spring Bronze Strip on bottom of Door contacting with Bronze Threshold as Door closes
DOOR BOTTOM STRIPS

Door Strips.

In addition to the door bottom strips shown above we use several other styles. At the sides and top a spring bronze strip is used that comes in contact with the edge of the door in closing. This prevents slamming and effectually closes up the space between door and frame.

Installation.

The work of installation is done by our trained mechanics, scattered all over this country and Canada. They are prepared to meet in a satisfactory way all the difficulties to be encountered on either new or old work.

Catalogue.

Our booklet, "The Reasons for the Higgin Metal Insert Strip," shows in figures and charts the relative efficiency of the strips. Sent on request.

MONARCH METAL WEATHER STRIP COMPANY

GENERAL OFFICES AND FACTORY
4121-4123 Forest Park Boulevard
ST. LOUIS, MO.

EXCLUSIVE LICENSEES IN ALL SECTIONS OF UNITED STATES AND CANADA

Product and Services.

Manufacturers of MONARCH ALL-METAL SELF-ADJUSTING WEATHER STRIP EQUIPMENT for windows and doors of every description.

Contractors for the installation of MONARCH METAL WEATHER STRIPS in windows and doors of every kind, shape and condition, including SPECIAL FORM STRIPS, in new buildings and old.

TESTING and HEATING ENGINEERS on window and door leakage and its effect on heating and ventilation.

TRADE-MARK

Purpose.

The basic principle of a weather strip is to have as many positive lines of contact under all conditions as possible.

All other weather strips have, to some degree, a line of contact depending absolutely on the condition of the windows or doors to which they are attached.

The Monarch, as applied to windows and doors, not only offers the greatest number of lines of contact under favorable conditions, but also maintains the same lines of contact during the swelling, shrinking and warping of frames and doors.

Specific Functions and Advantages.

Material—Non-corrosive; bronze, copper and zinc.

Construction—Tubular; no exposed raw edges; interlocking and flexible.

Protection—Continuous, around all cracks of a window or door.

Efficiency—Over eighty-nine per cent (89.36%) in preventing rattling and passage of air and dust.

Position—Concealed at one corner of sash, does not interfere with sash cord or operate in cord slot.

Contact—Not less than two lines of contact under any and all conditions, such as swelling, shrinking and warping.

Installation—By expert mechanics, with special tools.

Application—Nailed every two inches, with 5/8-inch No. 18 needle point, barbed, flat head, tinned nails for zinc; and solid brass or copper nails for bronze and copper.

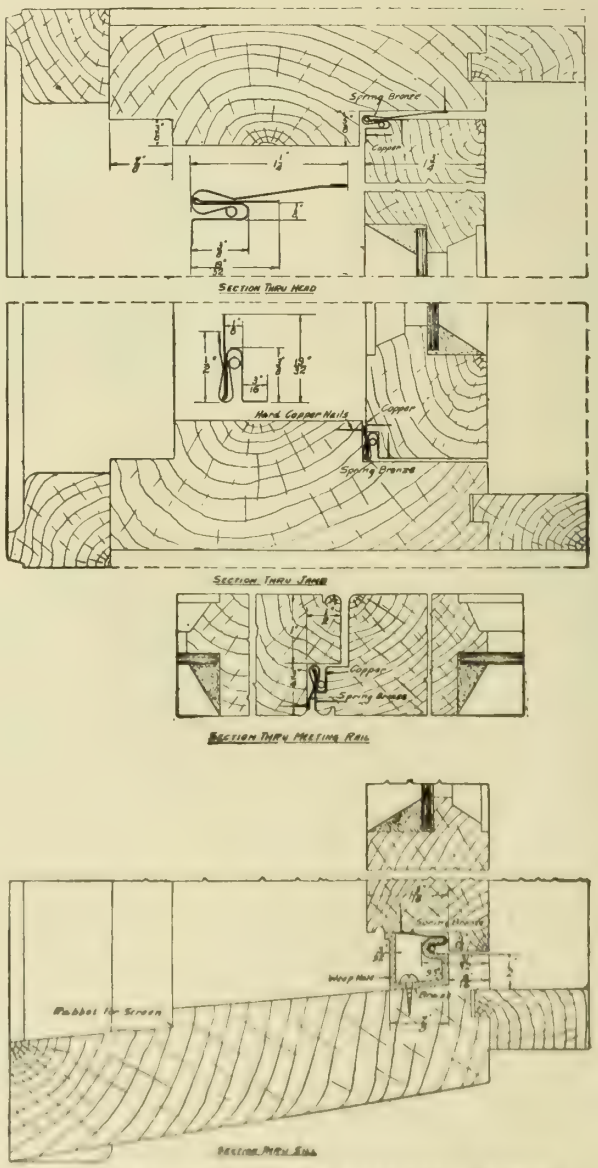
Representation—Exclusive Licensees in every section of the United States and Canada.

For Casement and Pivoted Windows.

The essential feature of a weather strip for casement and pivoted windows is an absolute seal during process of shrinkage and warping. Monarch all bronze, self-adjusting, interlocking casement strip not only insures a perfect seal under such conditions, but is so designed that the strips engage each other as a window is opened or closed. The lines of contact at the sides, head and meeting-rail of casement windows are at the outside edge of the sash, nearest the weather.

The bronze is resilient; therefore, eliminates the possibility of damage, because the spring in the metal causes it to resume its original shape whenever the pressure from any cause is relieved.

The wide flange, inclined at an angle to the runway, forms a plane or guide for the hook member on the sash to slide over, thereby bringing the hook in a position to receive the hook on the sash member.



SECTION THROUGH DOUBLE CASEMENT WINDOW

Continued on next page

The bottom of a casement window is provided with a heavy brass channel that prevents any water, which may run down the face of the sash and in at the bottom, from getting into the building. First, the water is met with resistance by the outside lip of the channel. If the water should get beyond this point, it is again met by a drip formed by the edge of the strip being turned downward. Beyond this is another point of contact or resistance where the hook of the strip on the sash engages the hook on the channel. The water is then conveyed down into the trough and escapes through the weep holes.

The strips at the side and the meeting-rail, having their lines of contact outside the line of contact at the bottom of the sash, carry the water either into the trough or outside of it (depending on the thickness of the sash); in either case the water is brought below the level of the inside rabbet of the sill or stool.

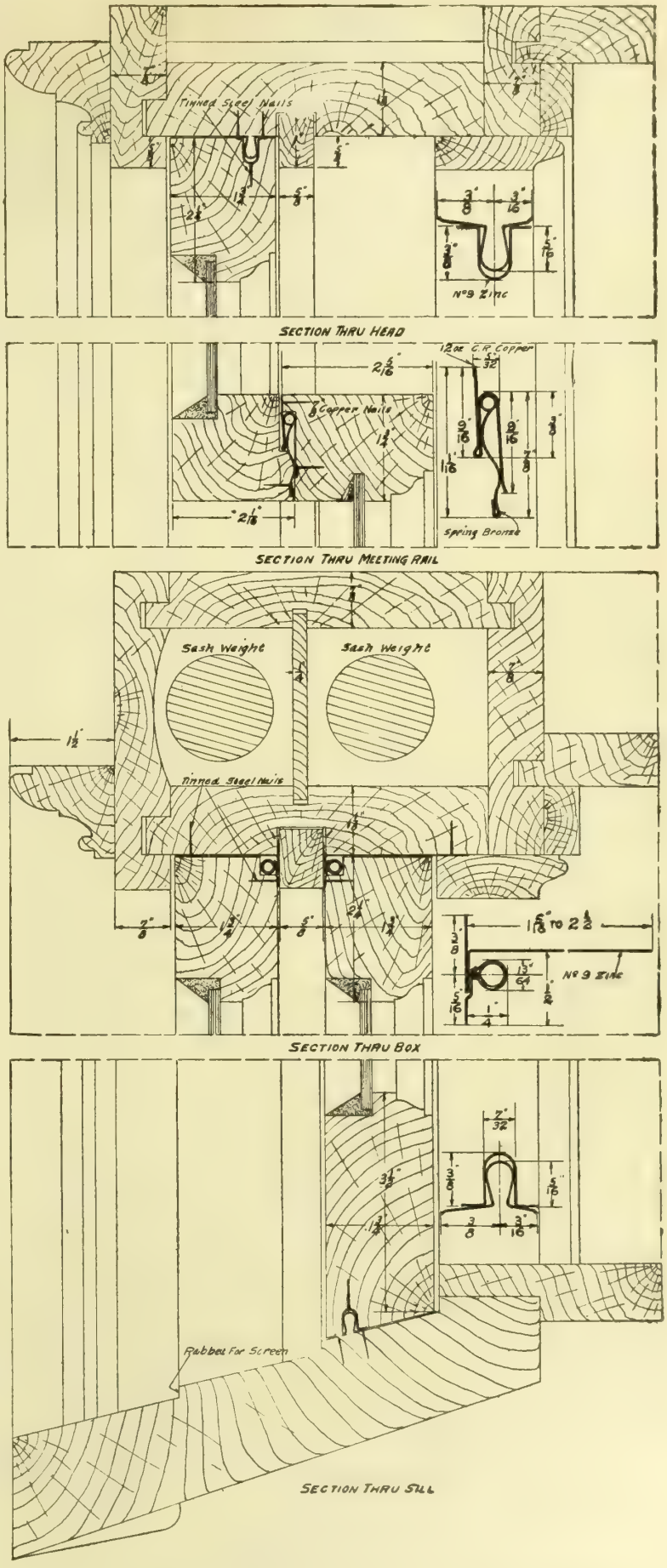
For Double Hung or Box Frame Window.

Head—The top rail is lined to prevent wear and rot; the walls being parallel, make the line of contact uniform and continuous; the undercut bead of the frame member reduces friction; the tube being stronger than a flat bead, prevents warping; made of zinc cut across grain to prevent splitting.

Meeting-Rail—At the meeting-rail the upper sash has a spring bronze member, making a positive contact at not less than two lines with a female member attached to the lower sash. The male member permits the bending of the strip, up or down, edgewise at the center to take care of the warping; e. g., if the meeting-rail is warped out at the middle, then the strip is bent down at the center, thereby elevating the ends (which are nearest the parting bead). These two ends engage the female member, thus forming an effective seal. The resiliency of the male member causes it to resume its original position when the window is opened, allowing all rails to pass one another. (See detail.) When the sash warps in at the middle, the male member first engages the female member at the center.

Side—These lines of contact are obtained by an interlocking tubular female member, attached to the edge of the sash, engaging a male member, also of tubular shape, with a resilient hinge extending across the face of the running stile and nailed under the stops of the frame. A flange, projecting at right angles to the running stile into the cracks between parting bead and walls of groove, prevents the passage of air behind the strip and out at the top of the meeting-rail of the lower sash.

Sill—The sill strip is simple, but strong. The tubular construction, substantially resting on two bracing legs, reduces to a minimum the danger of crushing or bending. The lining of the groove in the lower sash prevents moisture entering and rotting the wood, and protects it from wear when coming in contact with the sill piece, especially if the lower rail warps.



SECTION THROUGH DOUBLE HUNG OR BOX FRAME WINDOW

NIAGARA METAL WEATHER STRIP CO.

GENERAL OFFICES
737 Main Street
BUFFALO, N. Y.

Product.

Manufacturers of "Peace" Metal Weather Strip for Windows and Doors.

"Peace" Metal Weather Strip.

"Peace" Metal Weather Strip is simple in construction and perfect in operation. It is made from 26 U. S. standard gauge zinc.

Type A (see Figs. 1, 2 and 4) is the only metal weather strip reinforced by wood, and is the strongest and most practical strip on the market. The wood reinforcement is considerably compressed in manufacture, and is, therefore, not subject to further compression.

Type B (see Figs. 1 and 4) is non-collapsible and of quadruple protection. Consists of metal strip folded back on itself, giving maximum strength, and is nailed along top and bottom edges to prevent tearing off or collapsing.

Adaptability.

Types A and B Weather Strips can be applied to all types of windows, old or new, loose or tight, round or square, swinging or bowed, arched or curved.

Fig. 4 shows "Peace" Metal Weather Strips as applied to Casement Windows. Here advantage is gained by strength and depth of hooks; also, double nailing.

This all-brass channel casement sill, affording new protection for the bottom of casement windows, is adaptable to any style of these windows. It is guaranteed waterproof.

Advantages.

From Fig. 2 it will be seen that a pressure exerted at (*a*) in the direction of the diagonal line is met by the resistance of the wood with pressure at (*f*). In the same way pressure at (*b*) and (*c*) is met by counter pressure at (*d*) and (*e*) respectively. Unless the wood yields the strip can not dent or collapse.

Fig. 3 shows what happens to the ordinary weather strip. If this strip were reinforced with wood, as in Fig. 2, the sides could not be drawn together to thus weaken the base.

In the manufacture of weather strip the depth of the tongue must ordinarily be limited, owing to the loss in strength as the depth increases. This tongue being reinforced in the "Peace" Equipment, it is obvious that we are able to manufacture a rib of greater depth, insuring greater protection.

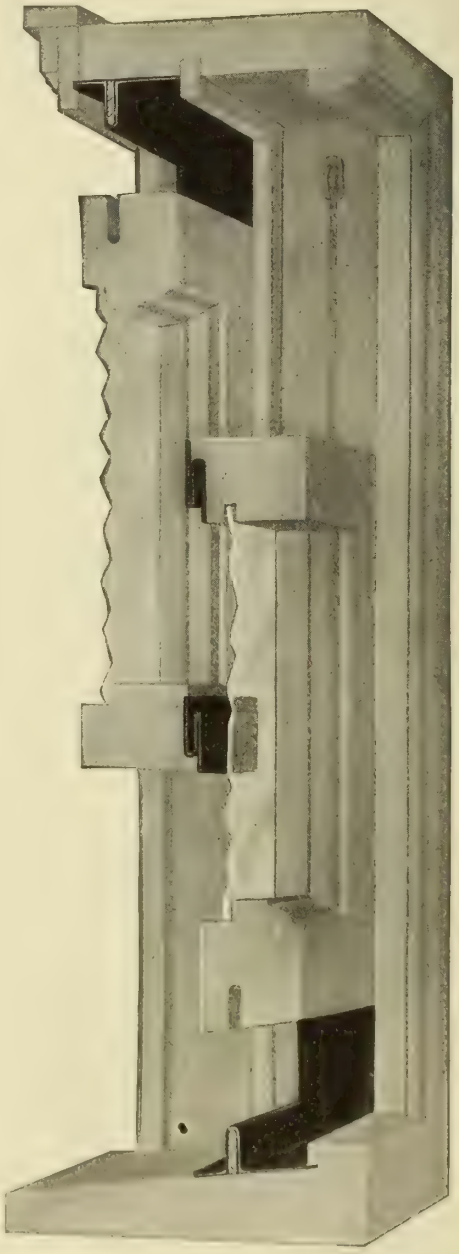


Fig. 1. SECTIONAL VIEW SHOWING HALF D. H. WINDOW WITH "PEACE" WEATHER STRIP APPLIED
Type A, Top and Bottom; Type B, at Meeting Rails

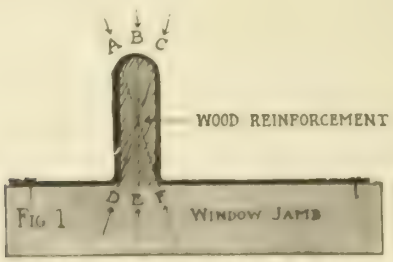


Fig. 2. SECTION OF TYPE A STRIP

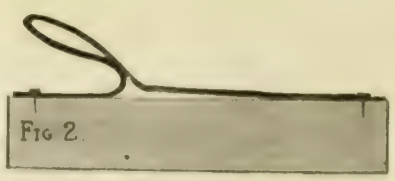


Fig. 3. SECTION SHOWING WEAK POINT OF ORDINARY WEATHER STRIP

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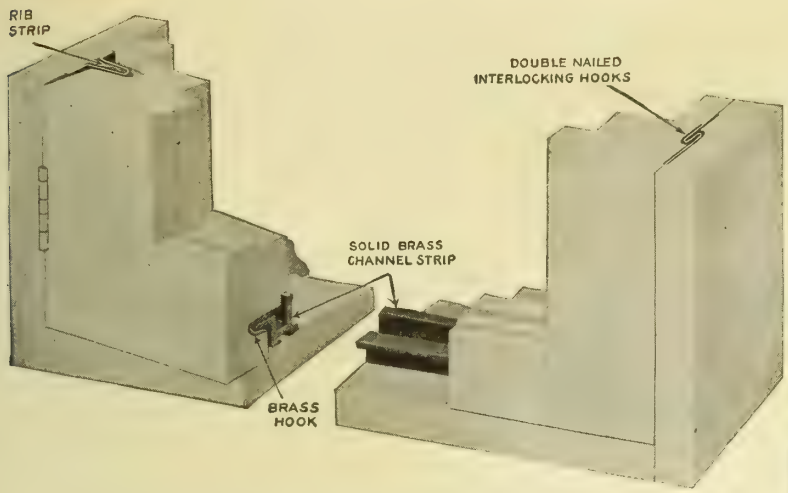


FIG. 4. CASEMENT WINDOW PROTECTED WITH "PEACE" METAL WEATHER STRIPS, TYPE A AND TYPE B

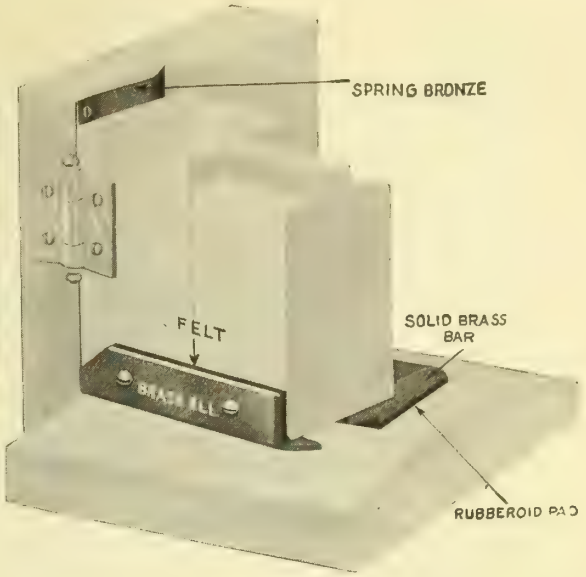


FIG. 6. "PEACE" THRESHOLD AS APPLIED TO BOTTOM OF DOOR

The extra strong construction of Type B Strip makes it possible for us to give it the deepest hook on the market, insuring highest efficiency. Where this strip is applied to the meeting rails, which usually require most protection, this advantage is of great importance.

"Peace" Weather Strips insure easy running windows, and evenly heated rooms, and prevent rattling.

They offer twenty to forty per cent in fuel economy, fifteen to twenty-five per cent reduction in radiation, and one hundred per cent in extra comfort.

For these reasons many of the most prominent heating engineers and architects throughout the country make a most liberal reduction in size and cost of a heating plant when the "Peace" Equipment is used.

"Peace" Spring Bronze Strip.

Fig. 6 shows "Peace" Spring Bronze as placed in rebate of door frame, springing against edges of door when same is closed. "Peace" Spring Bronze is noted for its extra heavy gauge and straightness.

Spring Bronze can also be used for Casement Window Equipment as shown in Fig. 5.

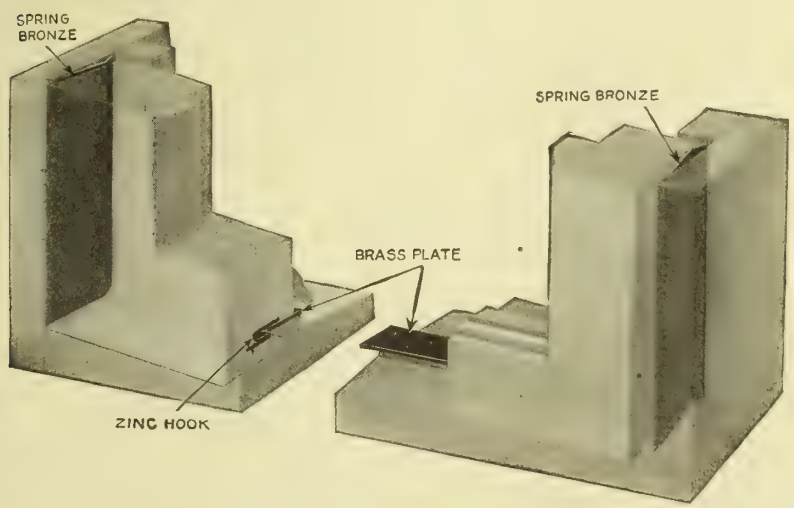


FIG. 5. "PEACE" SPRING BRONZE AS APPLIED TO CASEMENT WINDOWS

"Peace" Threshold Protection.

The "Peace" Threshold Protection, shown in Fig. 6, consists of brass bar and hook. The bar is beveled on the inside edge, as shown in the sketch, extending the width of the door sill, and screwed to the floor. A hook, lined with felt, is screwed to the inside of the door. The lower end of this hook engages the bevel when the door is closed.

There are no springs and no moving parts to wear out. Being on the inside of the door, snow and ice cannot affect its working.

Durability.

The "Peace" Metal Weather Strips will last the lifetime of any ordinary building. They need no adjustment or repairing. The initial cost is the only cost.

Guarantee.

Every inch of "Peace" Metal Weather Strip is absolutely backed by an old reliable company, and they guarantee all work undertaken.

Estimates.

Estimates cheerfully given, and any other information will be promptly furnished on request.

Territory.

Should there be no resident agent for "Peace" Metal Weather Strip, the General Sales Office will handle all business coming from such locality.

Specification.

To insure its installation architects should specify: "Install the 'Peace' Metal Weather Strip manufactured by the NIAGARA METAL WEATHER STRIP CO., of Buffalo, N. Y."

H. B. DODGE & CO.

ESTABLISHED 1885 — INCORPORATED 1905

Wilson's Rolling Partitions and Blinds

332 South Michigan Avenue

CHICAGO, ILL.

Products.

Wilson's Rolling or Coiling Partitions, in two types: Horizontal or Overhead Coiling, and Vertical or Side Coiling, which roll around a metal shaft into box or case at top or side of opening.

Sanitary Wardrobes for Schools.

Venetian Blinds and Awnings.

Uses.

Coiling Partitions are extensively used to separate and subdivide rooms.

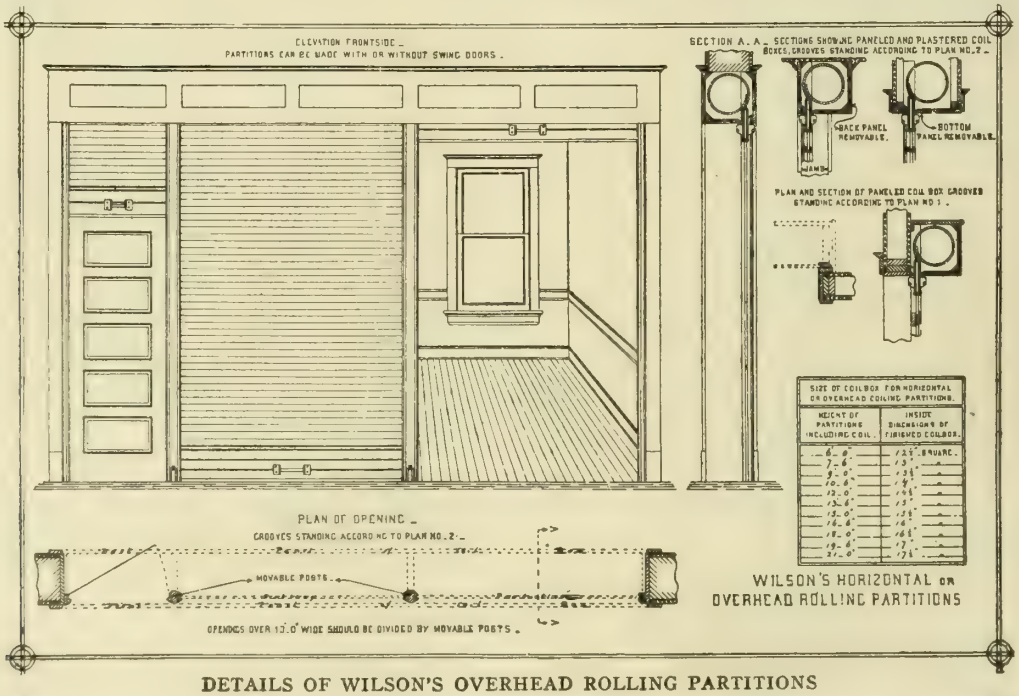
Service.

It is recommended, wherever possible, that customer purchase the doors installed by the manufacturer. This Company has skilled and experienced men that do the installing, and will guarantee perfect working doors.

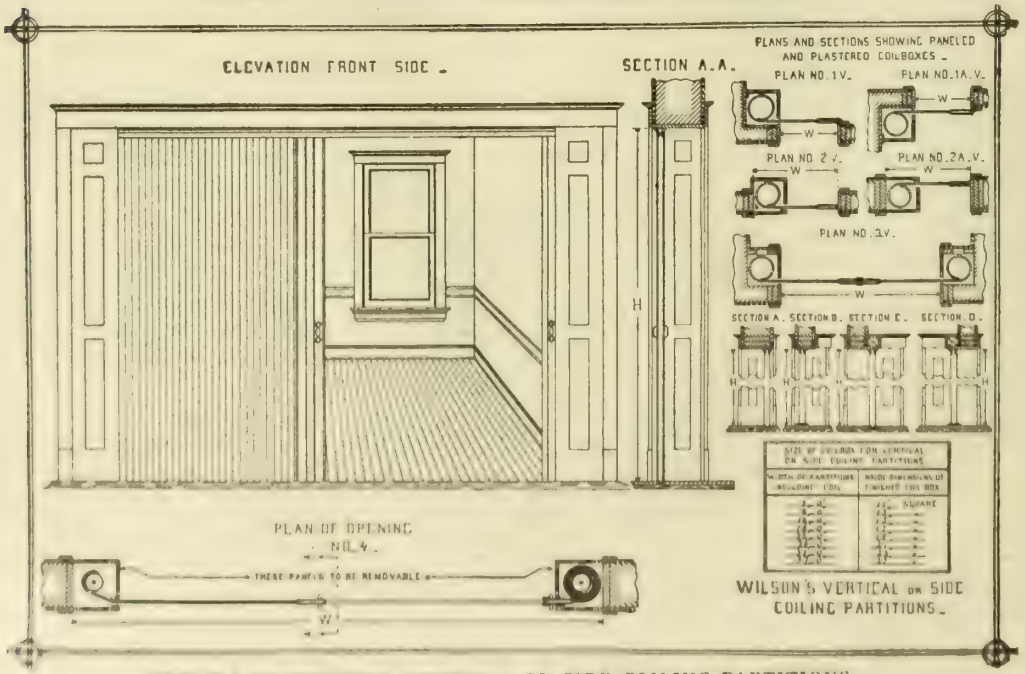
Their thirty years' experience is at your command.

Details.

Below are shown a few of the most common applications. Write us for further details.



DETAILS OF WILSON'S OVERHEAD ROLLING PARTITIONS



DETAILS OF WILSON'S VERTICAL OR SIDE COILING PARTITIONS

FOLDING PARTITION COMPANY

Manufacturers of Improved Sectionfold Partitions

200 Broadway
NEW YORK, N. Y.

TELEPHONE, CORTLANDT 4147

Products.

The IMPROVED SECTIONFOLD PARTITIONS.
Also, SECTIONFOLD WARDROBES.

Scope of Use.

Improved Sectionfold Partitions can be used in churches, schools, Y. M. C. A.'s, auditoriums, assembly halls, in-door playgrounds, ballrooms, gymnasiums, bungalows, and office buildings, or wherever subdivision of floor space is desired.

Description.

The partitions are composed of doors hinged together in pairs.

The partition, being supported on adjustable roller-bearing actions, located at the outer corners of each pair of doors and which are pivotal, works in conjunction with a swivel guide piece at the head that slides in a narrow groove used for guiding purposes only. The adjustable actions, being located at the bottom, allow of adjustment at any time, thus providing for the sagging of floor or settling of building.

To Fold—Each two-door section is rolled along on the track to the end of the line, where the ceiling guide on one side permits the two doors of the section to fold together at that side of the track and stand next to the other folded sections.

To Unfold—Each section is opened in turn and rolled to its proper place. The sections may be arranged to run to either end of the track, or both, and may be subdivided as desired.

Construction.

Improved Sectionfold Partitions are made in steel or in all woods and finishes. They can be made of slow-burning material, and sound-proof. The panels may be of glass, wood or slate. An unobstructed flush surface the whole length of both sides of the partition can be provided if desired. Communicating or shuttle doors can be put in any section, thus giving a passageway through, without the need of folding any part of partition.

Long partitions are as easily moved as short ones, being simply a number of two-door sections. Cross partitions may be used without the necessity of posts at the intersections, as the partitions butt against each other at these points.

Hinges may be visible or invisible as desired. The tracks are flush with the floor, with a ¼-inch slot in the center for a guide attached to the rollers.

Designs, Exhibit, etc.

Erected per standard details; modified to meet existing conditions; or after architect's designs and details. The required measurements are the actual size of the space to be filled, floor to ceiling or beam, width, wall to wall.

Improved Sectionfold Partitions require no special wall, ceiling or floor construction.

We manufacture the partitions complete, and furnish heads, wall stiles and tracks with each and entirely fill the opening. All hardware will be applied to partitions ready for erecting.

We guarantee all partitions erected by us.

PARTITION UNFOLDED

PARTITION FOLDED

The Improved Sectionfold Partitions now have many added improvements, thus giving an absolutely perfect folding partition, it being next to impossible for them to get out of order at any time.

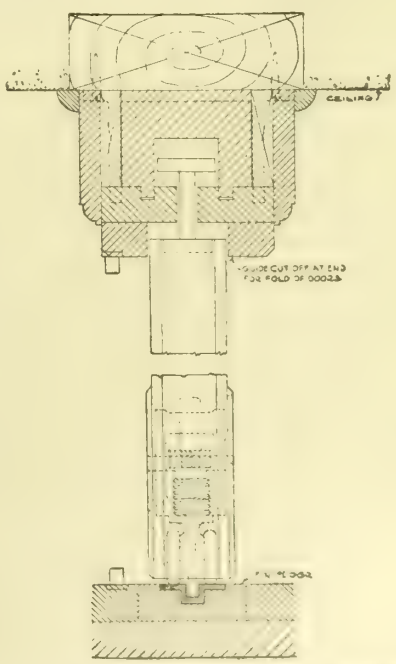
So simple in construction that any boy or girl can operate the largest partitions with perfect ease.

Full-size exhibit in the rooms of the Architects Samples Company, Architects Building, 101 Park Avenue, New York, N. Y.

Send for particulars regarding our new sectionfold wardrobes.

Specifications.

"—— to be Improved Sectionfold Partitions as manufactured by the FOLDING PARTITION CO., 200 Broadway, New York, N. Y."



SECTION DETAIL, SHOWING GUIDE AT HEAD AND ACTION AT FLOOR

GRANT PULLEY AND HARDWARE CO.

Vertical Coiling Doors and Horizontal Rolling Partitions

Architects' Building, 101 Park Avenue

TELEPHONE CONNECTION NEW YORK, N. Y.

We are listed in the Telephone Directories of the Principal Cities of the United States and Canada

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ATLANTA, GA., T. W. Clanton, 78 Marietta St.
BALTIMORE, MD., General Sales Co., 117 Cheapside
BIRMINGHAM, ALA., C. S. Caldwell, 313 North 20th St.
BOSTON, MASS., Robert J. Gilkie, 73 Tremont St.
BUFFALO, N. Y., Chas. Forrest, 46 East Mohawk St.
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CINCINNATI, OHIO, C. J. Splain, 718 Merchants Building
CLEVELAND, OHIO, E. B. Horne Co., 4500 Euclid Ave.
COLUMBUS, OHIO, The B. M. Freeman Co., The Ruggery
DENVER, COLO., The Centennial School Supply Co.
DETROIT, MICH., A. Gloetzner Co., 505 Dime Savgs. Bk. Bldg.
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PHILADELPHIA, PA., Grant Pulley and Hardware Co.
PITTSBURGH, PA., C. M. Eichenlaub, 318 Bissell Block
RICHMOND, VA., D. C. Kennedy & Co., 22 North 9th St.
ROCHESTER, N. Y., Homer M. Swart, 184 Park Ave.
SAN FRANCISCO, CAL., Pacific Building Materials Co.
SEATTLE, WASH., Clarland Iron Works, 2938 16th Ave.
ST. LOUIS, MO., F. A. Cammann Builders' Service Co.
TAMPA, FLA., G. M. MacDonough, 406½ DeLeon St.
WASHINGTON, D. C., C. A. Hamilton, 424 Munsey Building
MONTREAL, CAN., The James Walker Hardware Co.
TORONTO, CAN., S. L. Hammond, 65 Victoria St.
WINNIPEG, CAN., Edelen-Kilvert Co., 304 Tribune Building

Products.

Manufacturers of "Grant" Vertical Coiling Doors and Horizontal Rolling Partitions for Churches, Schools, Public Buildings and Residences.

Also, Ventilating School Wardrobes with front rolling either vertically or horizontally, accommodating any number of pupils.

Construction.

"Grant" Doors and Partitions are made of ¾-inch and ½-inch thick mouldings, respectively, and of any kind of wood. We varnish, finish, stain or paint the wood to harmonize with the interior of a building, and supply all Doors and Partitions with appropriate Hardware. Material and workmanship are the best obtainable.

Rolling Partitions.

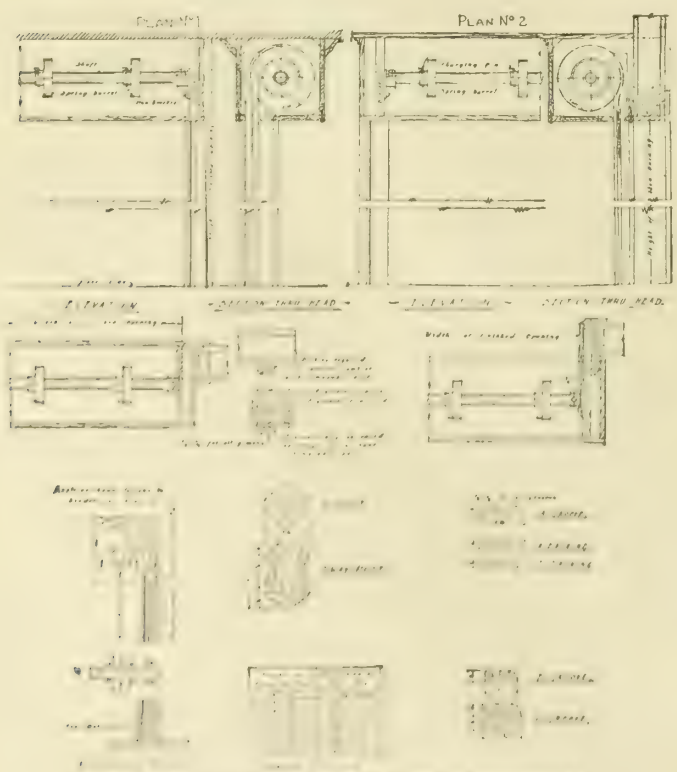
Openings of any width can be closed with one or more horizontal partitions. By use of movable posts a clear floor is secured when partitions are rolled up.

Guarantee.

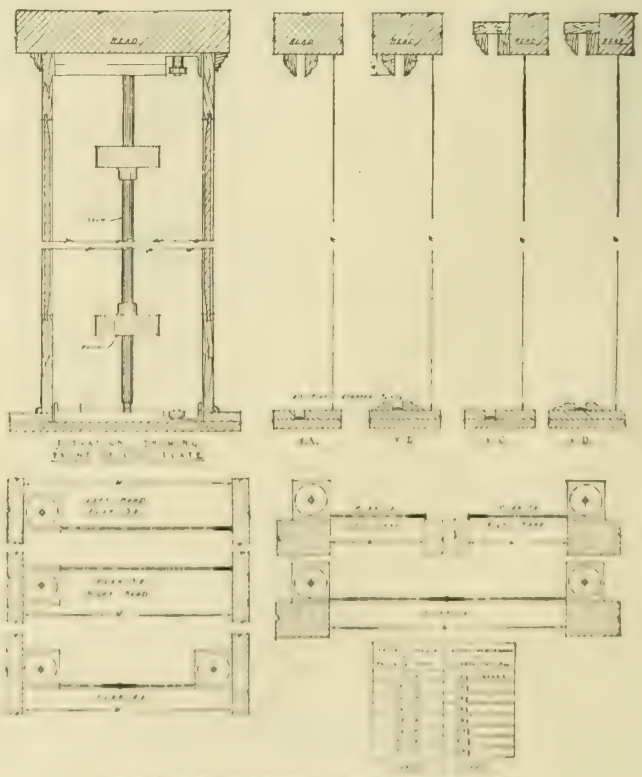
All "Grant" Doors and Partitions are guaranteed to work satisfactorily if installed in accordance with our instructions.

Illustrations.

The illustrations below show methods of installation and measurements.



"GRANT" HORIZONTAL ROLLING PARTITIONS



"GRANT" VERTICAL COILING DOORS

IMPROVED OFFICE PARTITION CO.

Sole Manufacturers of the Telescoping Portable Sectional Partition

536-538 Broome Street
NEW YORK, N. Y.

TELEPHONE, SPRING 3822

SALES AGENCIES IN PRINCIPAL CITIES

Product.

TELESCO PARTITION, a Telescoping, Portable, Interchangeable, Office Partition (patented), used for subdividing tenants' space.

Made of Wood and Steel.

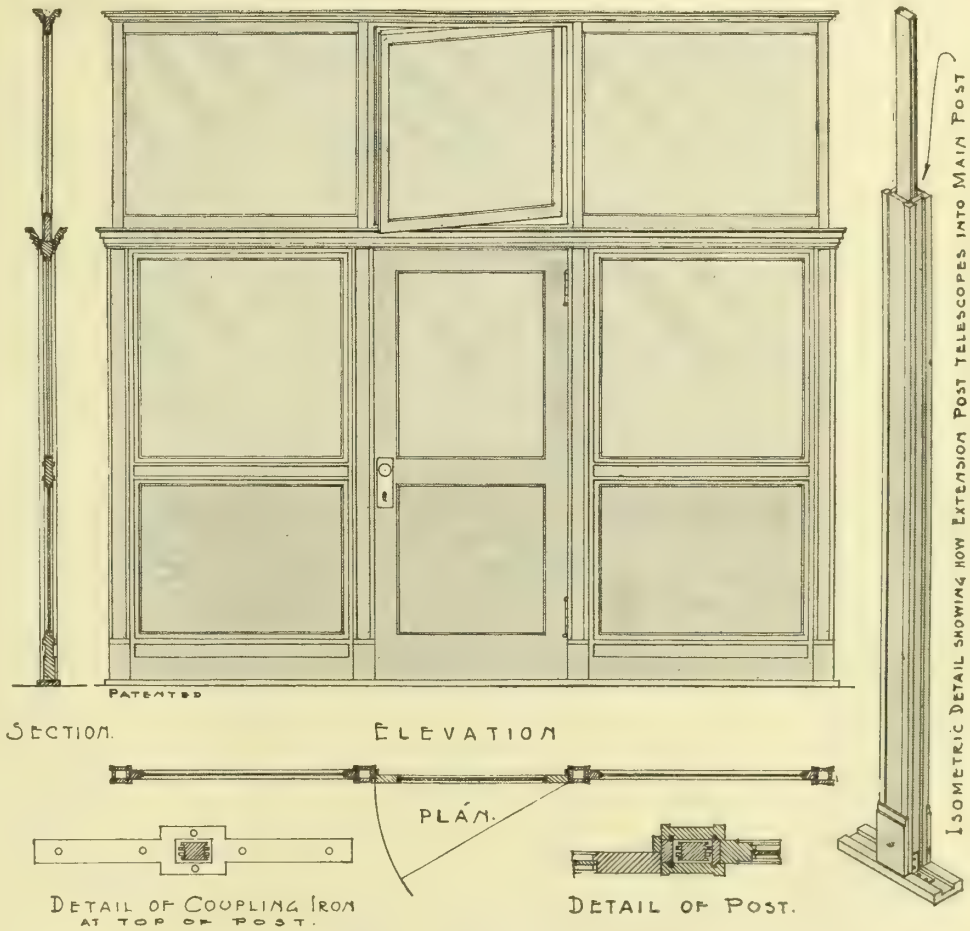
TELESCO Partition
TRADE-MARK

How Shipped.

Telesco partition is shipped knocked down in sections, ready for erection, from New York and Milwaukee, and can be assembled by any mechanic. It is union-made.

Description.

Telesco Partition is absolutely sectional; units are of different widths; posts are built up hollow 7 feet high, and contain telescoping extension posts 7 feet long to reach ceilings up to 13 feet. No nails are used; and as all parts are screwed together, it can be moved without cutting or damaging. The partition can be put up and changed in the shortest possible time.



TELESCO PARTITION, DESIGN NO. 2
Made in Plain Oak, Quartered Oak, Birch and Mahogany; also Hollow Steel

Construction.

Material—Plain oak, quartered oak, birch and mahogany.

Sections—Made of 1¼-inch stock, 7 feet high and are 18, 24, 30, 36, 42, 48 and 54 inches wide.

Doors and Panels—Doors and panels are built up and veneered.

Posts—Built-up hollow, 3½ x 2¾ inches, 7 feet long. Contain telescoping extension posts, 7 feet long.

Hardware—Bronze locks.

Glass—Florentine, moss, or plain (double thick).

Finish—Filled, shellaced, varnished and rubbed.

Advantages.

Telesco Partition is specially designed to reduce operating costs, and to make tenant's changes quickly and cheaply without loss of time or rent.

The first cost does not exceed that of non-portable partition of equal grade. As the partition can be moved many times without loss of material, it remains a permanent asset.

REFERENCES

Equitable Building, New York, E. R. Graham, Architect
Architects' Building, New York, La Farge & Morris and Ewing & Chappell, Architects
Columbia Trust Company Building, New York, McKim, Mead & White, Architects
Fire Corporation Building, New York, Graham, Burnham & Co., Architects
42nd Street and Madison Avenue Building, New York, Buchman & Fox, Architects
Munsey Building, Washington, McKim, Mead & White, Architects
Scranton Life Building, Scranton, Edward Langley, Architect
Union Central Building, Cincinnati, Graham, Burnham & Co., Architects
Park Building, Worcester, Cross & Cross, Architects

MONROE SCREEN, BLIND AND PARTITION CO.

MANUFACTURERS OF

Monroe's Rolling Partitions

120 South Central Avenue
LIMA, OHIO

Products.

MONROE'S ROLLING or COILING PARTITIONS for Churches, Schools, Residences and Fronts of Book-Cases. Also, SLIDING and VENETIAN BLINDS and WINDOW SCREENS. All products made in any kind of wood.

Advantages.

They are practical, durable, easily operated, look well and the prices are right. They contain ball bearings instead of frictional bearings, and adjustable springs instead of weights suspended by cords and cables. Friction is reduced to a minimum because weight is carried on ⅜-inch steel balls (see Fig. 2). Also note the eight different points for attaching curtains, making a complete and perfect adjustment.

Openings of any width can be closed with one or more partitions. By the use of removable posts a clear opening is secured when partitions are rolled up.

Single partitions should not be over twelve feet wide.

Co-operative Service.

Will furnish estimates, details and full information on request. Send plans at our expense.

Blinds.

Our Sliding and Venetian Blinds (see Fig. 1) are made with same precision and care as are our Partitions

DIMENSIONS

Height of Partition, including Coil	Dimensions of Coil Box
6′–0″	12″ sq. inside
8′–0″	12½″ sq. inside
10′–0″	13″ sq. inside
12′–0″	14″ sq. inside
14′–0″	14½″ sq. inside
16′–0″	15″ sq. inside
18′–0″	15½″ sq. inside
20′–0″	16″ sq. inside

Material Guarantee.

Only best of all woods and best of steel goods used. Our Partitions and Blinds are guaranteed to give perfect satisfaction if installed in accordance with instructions accompanying every shipment.

Illustrations.

The illustration show construction of our Rolling or Coiling Partitions; also how measurements should be taken

Sliding Venetian

FIG. 1. MONROE SLIDING AND VENETIAN BLINDS

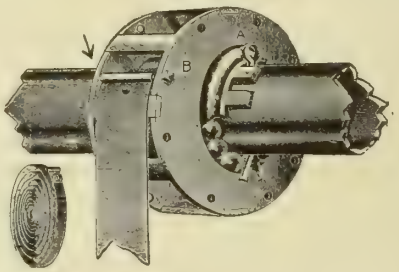
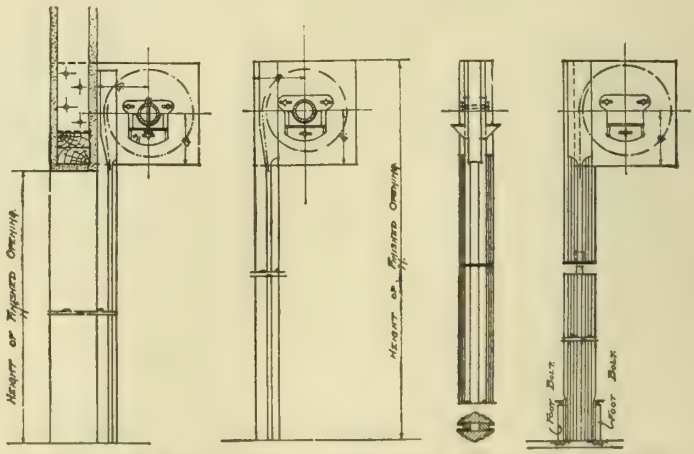


FIG. 2. "NE PLUS ULTRA" BALL-BEARING FIXTURE



Section through Head "Plan No. 1" Section through Head "Plan No. 2" Movable Post "D," Furnished Complete by Manufacturer

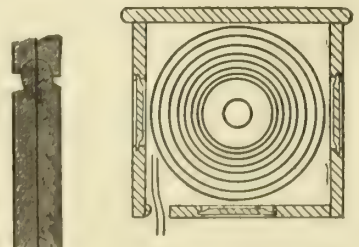


FIG. 4. COIL BOX

FIG. 3. DETAIL OF COILING PARTITION

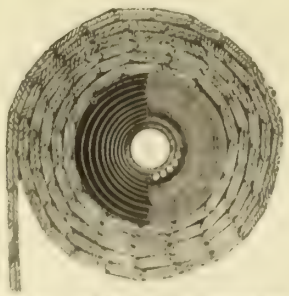


FIG. 5. PARTITION COILED ON BALL-BEARING ANTI-FRICTION ROLLER

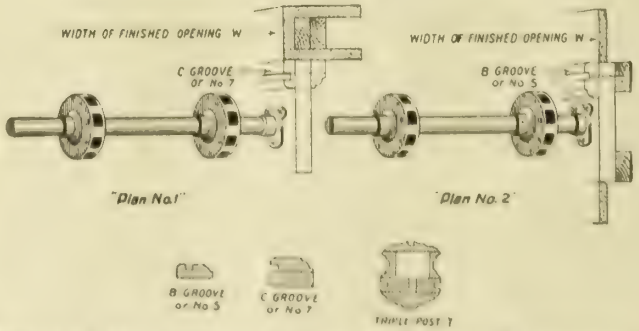


FIG. 6. VERTICAL AND HORIZONTAL SECTIONS, SHOWING "PLAN 1" AND "PLAN 2" ARRANGEMENTS OF COILING PARTITIONS ALSO MOVABLE POST "D," AND TRIPLE POST "T"

SWEDISH VENETIAN BLIND COMPANY

Importers and Sole Agents for Rolling Shutters, Partitions, and Blinds

1328 Broadway
NEW YORK, N. Y.
AGENCIES IN ALL PRINCIPAL CITIES

TELEPHONE, GREELEY 188

CABLE ADDRESS, "VENETBLIND"

Products.

ROLLING SHUTTERS, PARTITIONS and BLINDS of every description, manufactured in Germany. Established 1856.

For IMPORTED SWEDISH VENETIAN BLINDS for all purposes, see our page in General Index.

Description.

Shutters, Partitions and Blinds, as shown here, are the only imported ones on this market, and are radically different from all others, excelling in material and improved construction. Illustration (Fig. 1) shows Blind open, extended out like an awning, giving perfect ventilation. Illustration (Fig. 2) shows it closed down and folded in. It can be locked and used as a burglar-proof shutter when the house is closed. Operated from the inside by strap, spring roller or gear wheel.

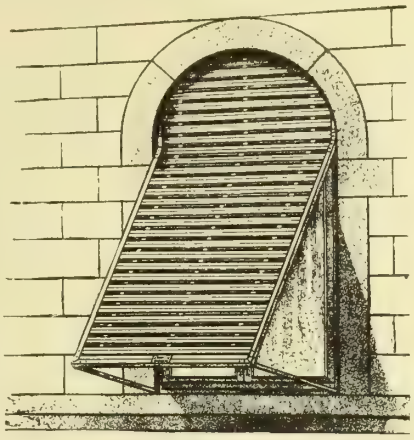


FIG. 1. BLIND OPEN AND EXTENDED OUT LIKE AN AWNING

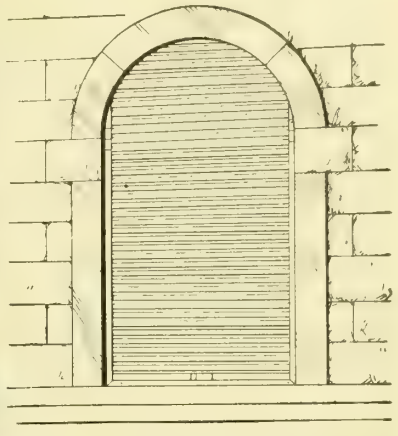


FIG. 2. BLIND CLOSED DOWN AND FOLDED IN

Partitions.

Are made for all purposes where division of rooms is necessary, such as in schools, churches, club rooms, etc., and operated with great ease by the best mechanism, according to the size of the partition.

Steel Shutters.

Made of the best English corrugated steel sheets, and used for all kinds of openings, windows, doors, driveways, etc. Over fifty years' experience in this line guarantees a perfect article.

Prices.

Although these goods are of superior quality, the prices are not higher than those for goods of inferior grade.

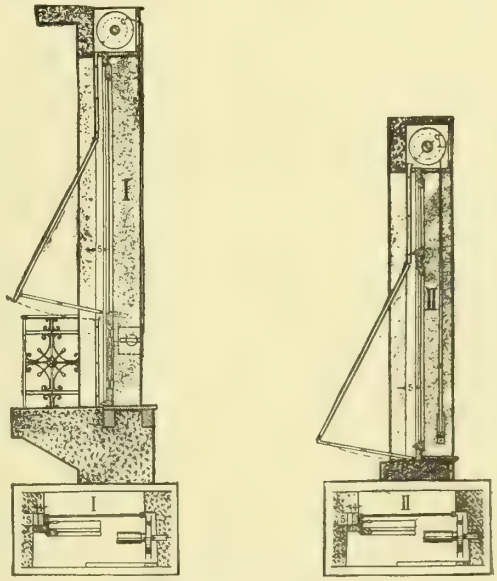
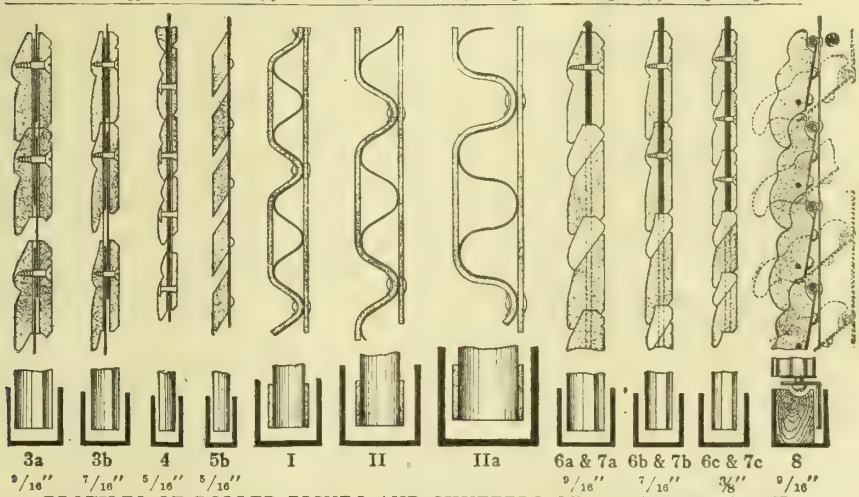


FIG. 3. DETAILS OF ROLLER BLINDS AND SHUTTERS

DIAMETER IN INCHES OF SPACE REQUIRED FOR ROLLER BLINDS OR SHUTTERS WHEN ROLLED UP

Height of Shutter.....	4′7″	5′3″	5′11″	6′7″	7′3″	7′11″	8′7″	9′3″	9′11″	11′7″	13′3″	16′7″
Prof. I.....	10¼	10¼	10¾	10¾	11	11	11½	11¾	12¼	12½	13½	13¾
Prof. II.....	11	11½	11¾	12¼	12¾	12¾	13	13½	13¾	14½	15	15¾
Prof. IIa.....	11¾	12¼	12½	13	13½	13¾	14¼	14½	15	15½	15¾	17¾
Prof. 3a, about 5/16″.....	9	9½	10	10¼	10½	11	11½	11¾	12¼	13	13¾	
Prof. 3b, about 7/16″.....	7½	7¾	8¼	8¾	9	9½	10	10¼	10½	11	11¾	
Prof. 4, about 5/16″.....	6	6	6¼	6¾	7	7	7½	7¾	8¼	8¾	9	
Prof. 5b, about 5/16″.....	5	5¾	6	6	6¼	6¼	6¾	6¾	7	7½	7¾	
Prof. 6a and 7a, about 9/16″.	7¾	8¼	9	9½	10	10¼	10½	11	11½	12¼	12½	
Prof. 6b and 7b, about 7/16″.	7	7½	7¾	8¼	8¾	9	9½	10	10¼	10½	11	
Prof. 6c and 7c, about 3/8″.	6¾	7	7½	7¾	8¼	8¾	9	9½	10	10¼	10½	
Prof. 8, about 9/16″.....	8¾	9	9½	10	10¼	10½	11	11½	11¾	12½	13½	



PROFILES OF ROLLER BLINDS AND SHUTTERS OF WOOD AND STEEL.

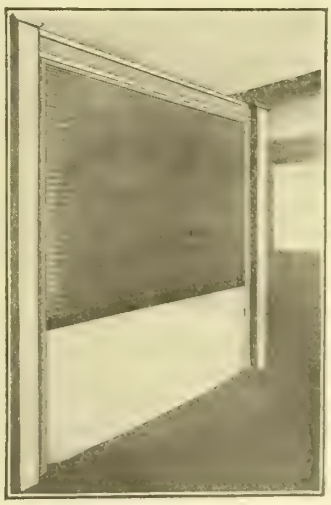


FIG. 4. ROLLING PARTITION

UNION BLIND AND LADDER CO., INC.

MANUFACTURERS OF

Horizontal Rolling Partitions and Vertical Coiling Doors

3545 Peralta Street

OAKLAND, CAL.

Products.

ACME HORIZONTAL ROLLING WOOD PARTITIONS and VERTICAL COILING DOORS, for Churches, Schools, Residences, Warehouses, Garages, etc.

Also, COILING WARDROBE FRONTS, ROLLING STORE LADDERS, and other Patented BUILDING SPECIALTIES.

Description of Horizontal Rolling Partitions.

Regularly made of white cedar; but pine, fir, oak or other woods furnished as desired. Finish may be stain and wax, shellac and varnish, special oil, or in the natural white. For school purposes a blackboard surface can be furnished on one side of the partition.

Standard horizontal partitions or doors (coiling overhead) are composed of wood slats, 1½ inches wide and ½ inch thick, or thicker as required, accurately machined and threaded on galvanized steel cables. Provision is made for automatic adjustment of slats and equalization of variance due to climatic conditions.

Horizontal partitions should not be over fourteen feet wide, but any width opening can be closed with two or more partitions with removable mullions.

Equipment consists of coiling apparatus adjusted ready to place in position, socket hangers to support shaft, solid brass lacquered handles and, where necessary, brass mounted pull to operate curtain above reach; also, removable mullions when required.

Advantages of Acme Rolling Partitions.

By their use convenient and economical floor arrangements can be obtained. Dispenses with folding and accordion doors which take up valuable floor space.

Durability of Acme partitions is shown by those in continuous operation for eighteen years in the Ferry Building, San Francisco.

Improved double annular ball-bearing coiling device insures ease of operation and noiselessness. A ten- by twenty-foot partition is easily operated with one hand.

Vertical Coiling Doors.

Designed to close openings six to fifty feet wide, seven to fourteen feet high without use of removable mullions. Woods and finishes as above. Steel floor track and special hardware included in quotations. Special details furnished for all orders. Installing very simple, as doors are tested and adjusted at factory; shipped in mill dressed coil boxes, ready to be set up.

Garage Doors.

Acme horizontal wood coiling doors roll up above opening, giving clear space; do not take up valuable room; operate easily with one hand. Same insurance rate as steel doors, except in extremely hazardous exposure.

Guarantee.

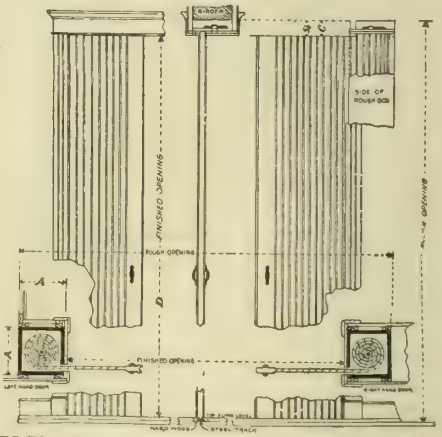
Acme partitions and doors are guaranteed to be just as represented in material, workmanship and finish, and to work satisfactorily when installed in accordance with our instructions; sizes will conform to dimensions received, and broken parts will be replaced without charge unless broken by accident or intentionally.

VERTICAL COILING DOOR IN FOREGROUND, HORIZONTAL ROLLING PARTITION IN BACKGROUND

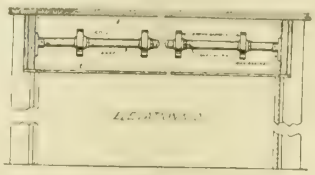
BOX SPACE REQUIRED FOR ACME VERTICAL PARTITIONS

Width Opening, Feet	For Pair Doors, Inches	For Single Doors, Inches
	Lines A	Lines A
8	12	14½
10	13	15½
12	13	16½
14	14	17½
16	15	18½
18	15	19½
20	16	20
22	16	20½
24	17	21
26	17	21½

Allow one inch more than table calls for to accommodate coil box.



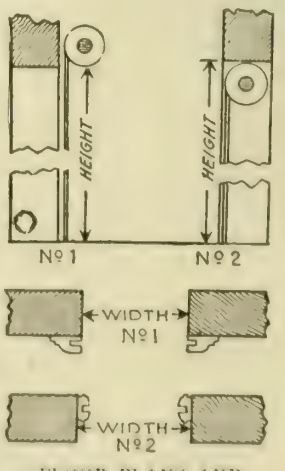
ELEVATION AND SECTIONAL DETAILS ACME VERTICAL COILING PARTITIONS



LONGITUDINAL SECTION COILING DEVICE OF HORIZONTAL ROLLING PARTITIONS

DIMENSIONS OVERHEAD HORIZONTAL ROLLING PARTITIONS

Height Inc. Coil	Coil Space Inches Square	Height Inc. Coil	Coil Space Inches Square
Feet		Feet	
4	10½	14	14½
5	11	15	15
6	11½	16	15
7	12	17	15
8	12½	18	15½
9	13	19	15½
10	13½	20	16
11	14	21	16
12	14	22	16
13	14½		



FLOOR PLANS AND TRANSVERSE SECTIONS OVERHEAD ROLLING PARTITIONS

THE J. G. WILSON CORPORATION

Rolling Partitions, Wardrobes, and Wood Block Flooring

TELEPHONE, BRYANT 7693
CABLE, "LYDIAN, NEW YORK"
8 West Fortieth Street
NEW YORK, N. Y.
FACTORY ADDRESS
MAIL AND TELEGRAPH: NORFOLK, VA.
BRANCH OFFICE: CHICAGO, ILL., 332 South Michigan Avenue

Products.

Manufacturers of ROLLING PARTITIONS, HYGIENIC WARDROBES, and WOOD BLOCK FLOORING.

For Rolling Doors and Shutters in Steel, Wood, and Bronze, and also for Venetian Blinds and Awnings, see our name in General Index.

General Quality.

Wilson Rolling Partitions and School Wardrobes were first introduced and manufactured by James G. Wilson in 1876. Since that time many improvements have been made in a never-ceasing effort to perfect these goods. The test of time, nearly forty years, in every State of the United States, and in almost every country in the world, has demonstrated the wonderful quality of the Wilson Partition, its construction being of such a character as automatically to adjust itself to every condition of climate.

Nearly thirty thousand churches and schools are fitted with Wilson Rolling Partitions and Wardrobes, and many hundreds of letters commending them have been sent this Company. Some of the Wilson equipped buildings will be found listed at the end of these pages.

Wilson Horizontal Rolling Partitions.

Wilson Improved Patent Rolling Partitions are composed of wood slats 1½ to 2 inches wide and ½ to ¾ inch thick, fitted with rule joints, edge to edge, and threaded upon tempered steel bands running from top to bottom about sixteen inches apart. These bands are riveted to the top bar of the partition, and each band is attached separately to a spiral spring anchor concealed in the bottom rail, and fitted with simple means of adjustment for regulating the tension.

This tension on steel bands holds all slats in close contact, so that, when partition is rolled down, joints are absolutely air-tight and form a sound-proof screen.

Width—Horizontal partitions should not be over twelve feet in width. This will insure great ease in operation; yet with movable posts, which are very light and easily handled, any size room can be advantageously divided with these partitions.

HORIZONTAL ROLLING PARTITIONS, PARK M. E. CHURCH, BLOOMFIELD, N. J.

HORIZONTAL ROLLING PARTITION WITH BLACKBOARD

NOTE—See next page for information on Blackboards.

Brief Erecting Instructions, Horizontal Partitions (See Details Below).

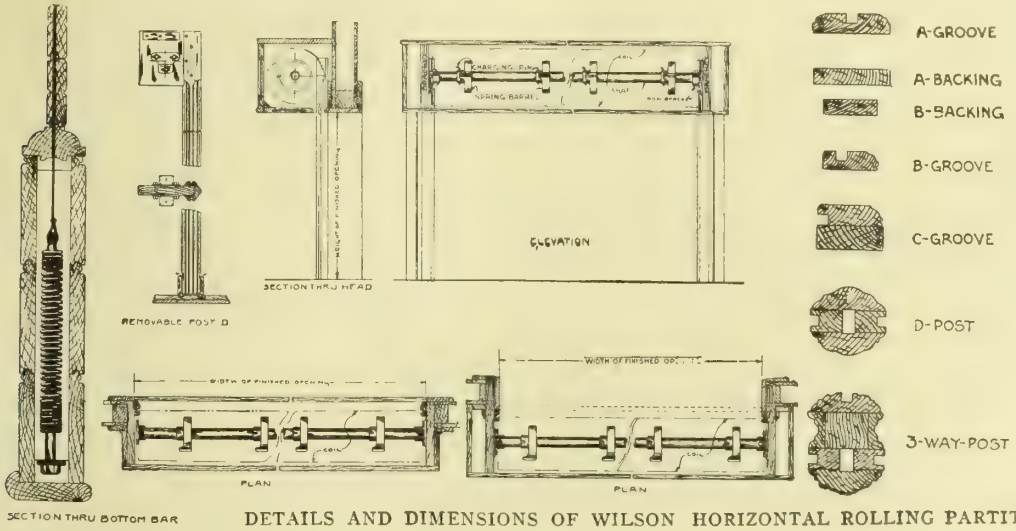
Brackets—These (except when otherwise specified) shall be furnished by contractor, and shall consist of 2-inch wood blocks securely spiked or screwed to wood framing of opening. These brackets must be carefully placed, giving about ½-inch clearance at end of coil.

Sockets—These cast-iron fixtures anchor the ends of shaft and are adjustable. They must be fastened to the wood blocks with lag screws, and must be on exactly the same level.

Shaft—Put in place so that shoulder, on cast-iron barrels will face toward opening. Be sure that both bolts at end of shafts are tightened up before inserting curtain.

Grooves—Must be plumb and fastened securely to plastered wall, or to face of casing. Distance between backs of grooves should be ¼ inch more than width of curtain. Tops of all grooves must be rounded off, or bell mouthed, so that curtain will enter easily and without any damage to slats.

Curtain—Should be placed on scaffold near top of opening. Bottom bar passed over top of shaft down into grooves. When bottom bar reaches floor, top bar should be about opposite shoulders of barrels and be fastened to them with stove bolts. After charging pins are taken out, curtain will be ready to be tried



DIMENSIONS

Height of Partition, Including Coil	Coil Box, Inside
6′–0″	12 ″ Square
8′–0″	12½ ″ ″
10′–0″	13 ″ ″
12′–0″	14 ″ ″
14′–0″	15 ″ ″
16′–0″	16 ″ ″
18′–0″	17 ″ ″
20′–0″	18 ″ ″

DETAILS AND DIMENSIONS OF WILSON HORIZONTAL ROLLING PARTITION

Continued on next page

Wilson Vertical Rolling Partitions.

This organization has perfected many substantial improvements in the actuating mechanism of partitions coiling sidewise, and finds no difficulty in closing openings of fifty feet in width without the aid of intermediate posts.

The operating device is very simple, and cannot get out of order if properly installed and given ordinary attention.

In the illustration below showing section of slats for Vertical Rolling Partition note how little of the wood, and consequent strength, is taken away.

One face or a part of one face of partition is made smooth and even when blackboard or decorative surface is desired.

Brief Erecting Instructions, Vertical Partitions.

The Opening—Must have even, level and clean floor.

Bottom Plate—"L. B." or "R. B." (cast iron) to be screwed in position first; must rest on solid floorings, and flange must be flush with inside of groove.

Track—To be screwed to bottom of groove, flush with coil plate and perfectly level.

Top Groove—Shall be formed from two mouldings, be nailed to head of opening and be absolutely plumb above track at ends and in middle. A 1⅛-inch clearance to be provided in groove above top line of partition.

Curtain—Cords shall not be untied until coil is standing on bottom plate, with casters down and with heavy bar opposite end of grooves.

Shaft—Is fitted with a steel pin to fit in socket bearing of bottom plate. Top end is now to be secured by top plate.

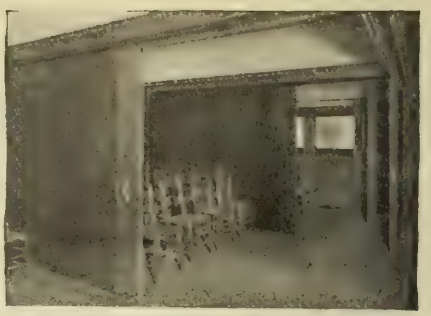
Top Plate—Must be absolutely plumb above bottom coil plate. Clearance is to be left above coil, and shaft must be held firmly, yet free to turn. Sides must line up with grooves.

Lubrication—Lubricate bottom plates with thin machine oil; also put a few drops on track, and at both ends of shaft.

Casing—Or boxing (usually of a plain paneled design) shall be fitted together with round head screws, so that at least one section may be removed. Allow ample clearance between edges of the slot, to prevent slats being damaged even after the building settles.

Blackboard or Decorative Surfaces.

In either horizontal or vertical type partition, when a portion or the whole of one side of a partition is prepared with a flat, smooth surface, as for blackboard use or decorative purposes, the joints are so close that the lines are discernible only at a very short distance, and when the surface is coated with black silicate it is in every respect equal to a regular blackboard.



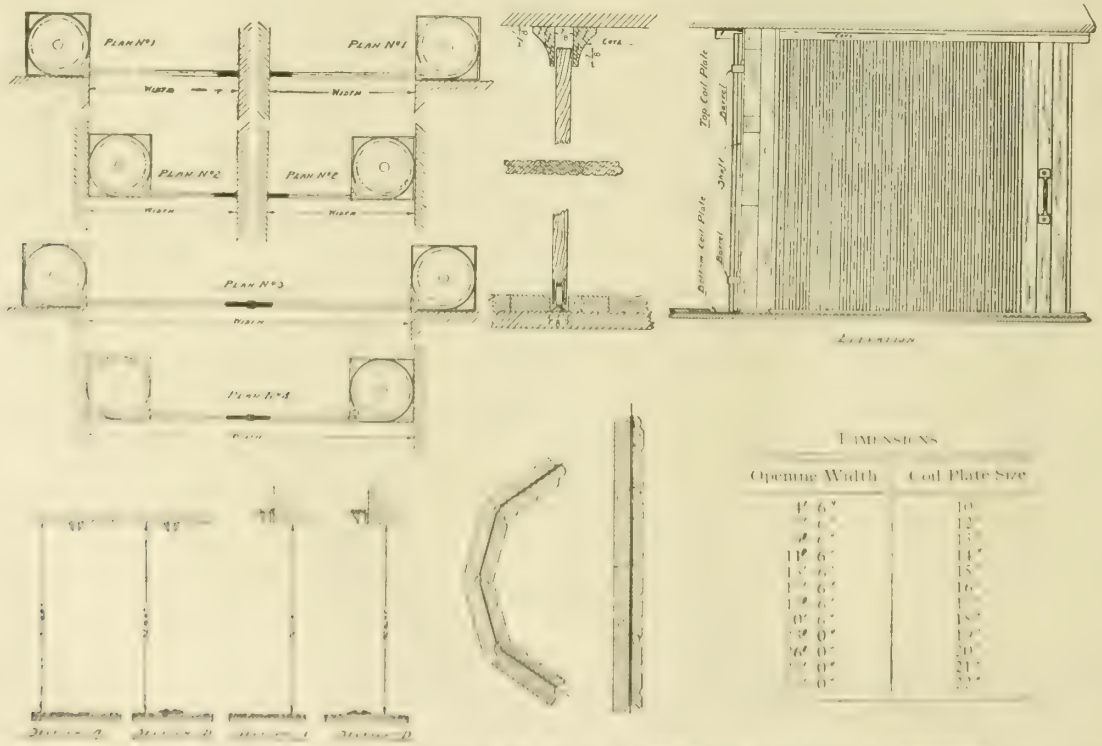
VERTICAL ROLLING PARTITION, FIRST CHRISTIAN CHURCH, IRVINGTON, N. J.

This surface can be used for decorative purposes where it is desired that the partition should harmonize in color with the walls.

To Specify Horizontal and Vertical Partitions.

To enable architects and owners, adopting the Wilson modern methods of converting large floor space into enclosable units, and to secure the results obviously desired, The J. G. Wilson Corporation have in these pages shown detail drawings and given erecting instructions which will afford standards that may be followed for specifying and installing. Therefore, when the qualities evolved by this corporation, including ease and quietness of operation, are desired, specifications may be drawn as follows:

The partitions, or openings, shown on plans (describe them by notes or otherwise) are to be furnished and completely equipped with rolling wood partitions of the vertical [or horizontal] type, constructed in accordance with the detail drawings shown on pages ——— of Sweet's Architectural Catalogue, 1916 Edition, and of woods to match the finish of the various rooms enclosed. These are to be delivered at the building by the manufacturer, with all hardware, parts and fittings required, and are to be erected by the general contractor [or carpenter] in full accord with the "erecting instructions" supplied by the manufacturer, and are to be left in complete and easily operating working order.



DETAILS SHOWING CONSTRUCTION OF WILSON VERTICAL ROLLING PARTITIONS

Continued on next page

Wilson Hygienic Wardrobes.

The Wilson Hygienic Wardrobes have been used as standard by a great many architects, who, after careful investigation and tests, have found them added features to school hygiene. They economize space to such an extent that they more than pay for themselves in total reduction of the size or cost of building.

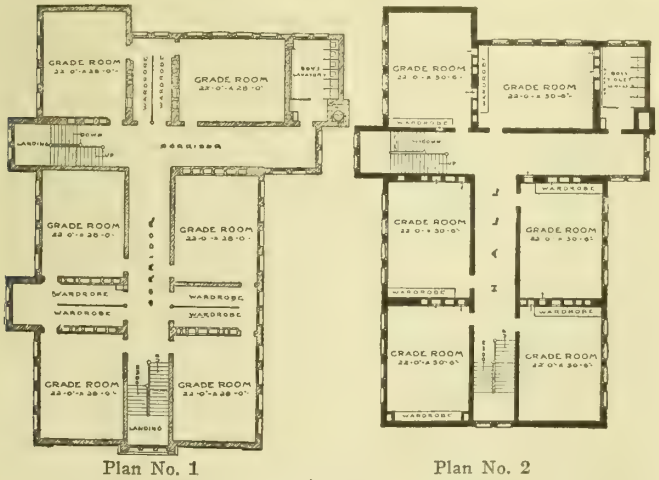
HYGIENIC WARDROBE, TYPE B, PUBLIC SCHOOL, HEMPSTEAD, L. I.

The wardrobe is generally made up of units about four feet wide; these are often advantageously connected with the ventilating system. Hot water or steam pipes, when placed in wardrobes, effectively dry clothing.

HYGIENIC WARDROBE, TYPE C, HIGH SCHOOL, UNIONTOWN, PA.

These wardrobes are manufactured in four styles. Types A, B and C are similar in construction, the difference being that Type A has a false floor, giving space for heating purposes; and Type C has a wire instead of a solid panel back. In Type D, doors roll vertically. Type B seems to have given the very best satisfaction.

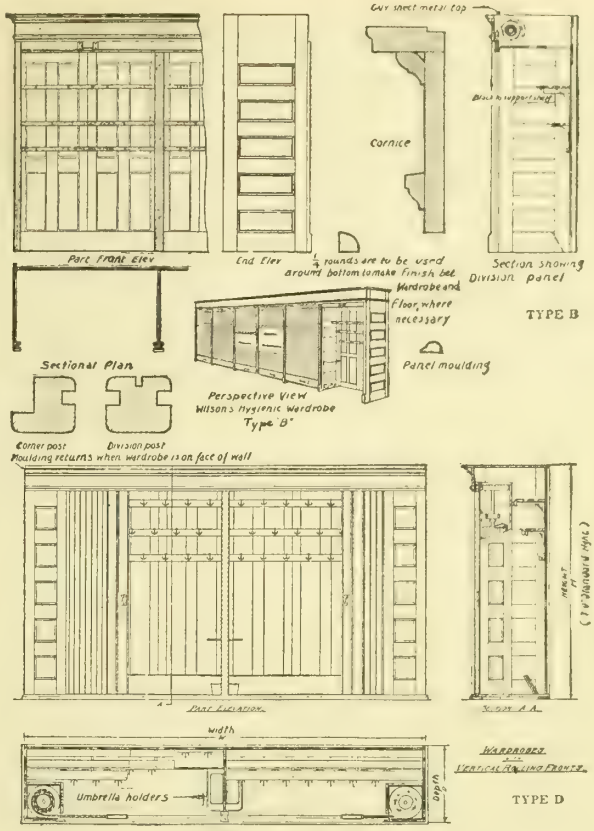
HYGIENIC WARDROBE, TYPE D, PUBLIC SCHOOL NO. 32, BUFFALO, N. Y.



Plan No. 1 Plan No. 2

ALTERNATIVE PLANS SHOWING ADVANTAGES OF WILSON WARDROBES

Plan No. 2 was designed as an alternative to No. 1, with a view to reducing cost. Area of entire floor space is 330 square feet less than No. 1, and yet all rooms are 2 feet 6 inches wider. This building (three stories) contains 50 400 cubic feet less than building as per Plan No. 1, and cost, after purchasing Hygienic Wardrobes, $3500 less

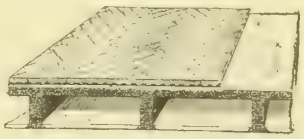


DETAILS OF WILSON HYGIENIC WARDROBES

Wood Block English System Flooring.

This system of securing a solid wood surface without nailing can be applied to any construction of floor beams. Every block is firmly and completely anchored to the concrete foundation by a bituminous compound which not only serves as a damp- and vermin-proof course, but forms also a key, binding the wood flooring and the concrete foundation into one solid structure.

Indestructible, perfectly solid, noiseless and fireproof. Possesses complete sanitary advantages of imperviousness to dry rot, vermin, dirt, disease germs, damp and draughts, etc. Admirably adapted for use in public and private buildings.



WOOD BLOCK ENGLISH FLOORING

A FEW WILSON INSTALLATIONS

ROLLING PARTITIONS

Church of the Intercession	New York, N. Y.
Young Men's Christian Association	Birmingham, Ala.
St. Mary's Catholic School	Mobile, Ala.
Young Men's Christian Association	Oakland, Cal.
Emanuel College	Saskatoon, Can.
Carnegie Library	Denver, Colo.
Young Men's Christian Association	Boston, Mass.
Greenwood Heights Reformed Church	Brooklyn, N. Y.
Temple Beth Sholom	Brooklyn, N. Y.
Euclid Avenue United Brethren Church	Dayton, Ohio
Knox Presbyterian Church	Cincinnati, Ohio
School, District No. 29	Mayger, Ore.

WARDROBES

High School	Adrian, Mich.
High School	Monroe, Mich.
Normal Training School	Detroit, Mich.
Hodge School	Cleveland, Ohio
High School	Crafton, Pa.
Fairmount School	West Orange, N. J.
High School	Schenectady, N. Y.
Public Schools	Buffalo, N. Y.
St. John's Parochial School	Uniontown, Pa.

CALIFORNIA REDWOOD ASSOCIATION

501 Newhall Building
SAN FRANCISCO, CAL.

Products.

REDWOOD LUMBER in all Grades and Sizes, and Manufactured Products, for Builders and Architects.

General Description.

Timber: its Location and Characteristics—Redwood grows only in California, its range being largely confined to the fog belt, extending from the coast inland from ten to thirty miles in the counties of Del Norte, Humboldt and Mendocino.

The trees vary from one hundred and fifty to three hundred feet in height, and from three to twenty feet in diameter. To this enormous size and close growth, as shown in the illustration, are due many of the wonderful qualities of the timber.

Uses of Redwood—Redwood is a superior timber for exterior finish (siding cornice, window and door frames, porches, columns, doors, sash, etc.), and interior trim; for shingles and shakes of roofs and sides of houses; for pergolas, summer houses, flower boxes and vases; for special farm uses—such as silo construction—and for hot-bed sash, beehives and incubators; for tanks, pipes, flumes, culverts, and cesspools; for greenhouse construction; for interior finish wherever great beauty of grain, freedom from knots or blemishes, and immunity from shrinkage or warping is desired in a finish wood; wherever wide paneling from one piece is required; for railroad ties and telegraph poles.

Lasting Qualities of Redwood.

Redwood is in every sense a specialty wood whose proper use presupposes a knowledge of its valuable qualities, chief amongst which, for outdoor uses, is its longevity. The botanical name of Redwood, "Sequoia Sempervirens", meaning "ever living", describes its ability to resist decay under the most severe conditions. It will endure unimpaired for years, under or above ground, without even a protecting coat of paint.

This great durability is probably due in part to the age of the trees and in part to a peculiar preservative which Nature has put into the wood.

Resistance to Fire.

Redwood, containing absolutely no pitch or other resinous substance, is slow to ignite and offers unusual resistance to fire. There has never been any loss from forest fires in Redwood timber. As Redwood absorbs water readily, fire can be quickly extinguished once it has taken hold. At many places in the great San Francisco fire of 1906, the conflagration was stopped where buildings made of Redwood faced the flames.

Shingles.

The Redwood Shingle is made in two grades, both of which are free from sap when laid. It is the sap of any wood that rots first, and an all-heart Redwood Shingle will give satisfactory service for half a century or more without paint or stain of any kind, provided only that the proper kind of shingle nail is used. This point can not be emphasized too strongly. *Use only the old fashioned cut iron nail, or, better still, a zinc coated nail.*

Containers of All Kinds.

Redwood is universally used in California for all kinds of tanks, silos, pipe, flumes, culverts and cesspools. Many years ago, Redwood logs bored through the center were used as water mains in various cities, and these are still sound and tight after from thirty-five to fifty years of service. The water supply of San Francisco is carried through flumes built of Redwood forty and fifty years ago. All California wines are stored in tanks made of Redwood. Mining companies use it in their operations, as it is unaffected by acids. Redwood tanning vats that were built in 1859 are found still in use in San Francisco.

Pergolas and Greenhouses.

Redwood pergolas, summer houses, flower boxes and fences, whether painted or unpainted, will outlast many years those made of materials not possessing similar qualities. No better lumber exists for use in greenhouse construction. It is not affected by the wet earth in the "benches," nor by the difference in temperature between the outside and inside atmosphere, at any time of the year. Constant repairs, due to decay, warping and twisting, are avoided when the greenhouse is built of Redwood.

Railroad Construction.

For any type of construction that is much exposed to the elements, such as tunnel timbers and lagging, bridges, culverts, telephone poles and railroad ties, where water and earth conspire to produce decay, Redwood is the first choice of those who understand its exceptional qualities. Redwood ties are famous the world over. They are used in England, on the Continent of Europe, in India, China, the Philippine Islands; in South Africa, in Mexico, and in South America. These uses of the wood are due to its extraordinary durability, and its comparative freedom from attack by destructive insects, such as the white ant.

Interior Finish.

The beauty of Redwood Finish has long been known in California, but east of the Rockies its merits for this purpose are just beginning to be known. Outside of its beauty, it is exceptionally valuable for this purpose, because proper drying renders it immune from swelling, shrinking, warping or cracking.

Redwood is a soft wood, obtainable in a great variety of grains; the clear grades are absolutely free from knots or blemishes. Carpenters like it because it is easy to work, and the large trees make it possible to furnish wide panels in one piece without the necessity of gluing them together. Many beautiful effects, impossible in other woods, can be obtained with Redwood.

An unusual book, entitled "Finish Book," has been issued, giving photographs of Redwood interiors all over the country, together with colored plates showing different finishes, with formulas for producing the same. This will gladly be sent to all who are interested.

Redwood on the Farm.

In addition to ordinary uses in the construction of farm buildings, there are several special farm uses that call unmistakably for Redwood. The most important of these is silo construction. A wooden silo is the best and most economical; and the right wood to use is Redwood. The great advantage of using Redwood is that when the wood is properly seasoned, the staves do not shrink or swell; therefore the hoops do not get loose

Continued on next page

and cause the silo to "fall to staves." Redwood is not affected by the chemical action of the ensilage. Redwood is the best material for hotbed sash, beehives and incubators. For the last named, it is now very generally used because the contrast between the heat inside and the cold outside does not cause it to shrink, swell or split.

Miscellaneous Uses.

A special grade of selected soft Redwood is made for pattern purposes. Redwood pattern lumber is becoming more widely used in the East; and among the large consumers, the United States Government.

Because of its "staying put" and because of its tonal qualities, Redwood is used in musical instruments, particularly for the wind-chests and pipes of organs.

Casket shells and boxes should be made from Redwood, as it is light, dry and free from odor or stain of any kind, and lasts indefinitely in the ground.

Manufacturers of doors, furniture, pianos and other veneered work use Redwood for cores on which to apply veneers.

Painting.

It is not necessary to paint or stain Redwood in any way in order to make it durable; but those who prefer a painted effect, will find Redwood one of the most satisfactory woods to use, not only for exterior work, but for interior enamel work. The grain does not raise, and there is no pitch to ooze out after the painting is supposedly finished.

Facilities.

The Redwood country now has direct rail connection, and shipments can be made to any point in the United States or Canada without being transferred.

Some of the mills have spent hundreds of thousands of dollars in equipping themselves especially to take care of this Eastern car trade.

Redwood is now handled in hundreds of cities and towns throughout the East; but if any one is unable to get it in his particular locality, he can be supplied if he will write to the Association.

Export shipments are generally made direct from the mills on Humboldt Bay or along the Mendocino Coast; parcel lots are handled from San Francisco.

The completion of the Panama Canal makes it possible to ship Redwood at reasonable cost by vessel to the east coast of the United States, also providing a more direct route to that of South America and to Europe.

Cost.

Many people think that Redwood must necessarily be a high-priced wood, on account of its being found only in far-away California; but this is not the case. Because Redwood is lighter than other woods when dry, the item of freight is consequently reduced; also, the ability of the manufacturer to furnish a wide variety of Redwood products in a single car enables even the smallest dealer to carry this wood without making too large an investment. Generally speaking, Redwood sells at about the same price as similar woods, such as cypress and Western red cedar. It is a little more expensive than Southern yellow pine and Douglas fir, and costs less than white pine.

Available Supply.

It is estimated that there are standing to-day at least seventy-five billion feet of Redwood timber. The present production of Redwood is about six hundred million feet annually. Allowing for the natural increase of output which will inevitably come as its merits become better known, there is over a century's supply to look forward to within this comparatively limited area in California.

United States Government Reports on Redwood.

The United States Department of Agriculture has issued a detailed report on Redwood in Bulletin No. 95. For information regarding the strength of Redwood compared with other woods, see Bulletin No. 108, entitled "Tests of Structural Timbers." The mechanical properties of Redwood are discussed in Forest Service Circular No. 193.

Economy in Using Short Length Stock.

The cost of Redwood may be considerably reduced by specifying exact measurement when lengths shorter than ten feet are required. Standard lengths are ten to twenty feet; but where three to nine foot lengths can be used, a much lower price is quoted. Short stock, however, cannot be furnished wider than twelve inches, except when put together on Linderman machines.

Co-operative Service Department.

The Service Department of the California Redwood Association tries to live up to its name and to furnish literature, samples or any other information about Redwood and its products that it can. Different booklets and pamphlets are issued from time to time, bearing upon the specific applications of the wood.

Redwood is not recommended as a "cure-all" for every building trouble; neither is it adapted for all kinds of work.

If any one is in doubt about using Redwood, the Service Department will be glad to give frank and full advice on the subject.

CALIFORNIA REDWOOD (SEQUOIA SEMPERVIRENS)

CURTIS SERVICE BUREAU

CLINTON, IOWA

MAINTAINED AND OPERATED IN THE INTEREST
OF THE FOLLOWING CURTIS COMPANIES

CURTIS BROS. & CO., Clinton, Iowa
CURTIS & YALE CO., Wausau, Wis.; Pittsburgh, Pa.; Washington, D. C.
CURTIS-YALE-HOWARD CO., Minneapolis, Minn.
CURTIS, TOWLE & PAINE CO., Lincoln, Nebr.
CURTIS SASH & DOOR CO., Sioux City, Iowa
CURTIS, BOOTH & BENTLEY CO., Oklahoma City, Okla.
CURTIS DOOR & SASH CO., Chicago, Ill.; Detroit, Mich.

Makers of Trade-Marked and Guaranteed Woodwork for the Home

Products.

1866 CURTIS
TRADE-MARK

Doors: White Pine, Front and Interior; White Pine, with Yellow Pine Panels, Front and Interior; Hardwood Veneered, Front and Interior; Mirrored; French, Slab or Sanitary; Store; Garage, and Swinging Water-Closet.

Windows and Sash: Cottage Front; Double-hung and Casement.

Interior Wood Trim and Cabinet Work: Window and Door Trim, Beam Ceiling, Panel Wainscoting, Window Seats, Mantels and Mantel Shelves, Colonnade Openings, Sideboards, Buffets, Kitchen Cupboards, and Medicine Cases.

Stairways: Newels, Balusters, Rails, Stair Panels, Stringers, Treads and Risers.

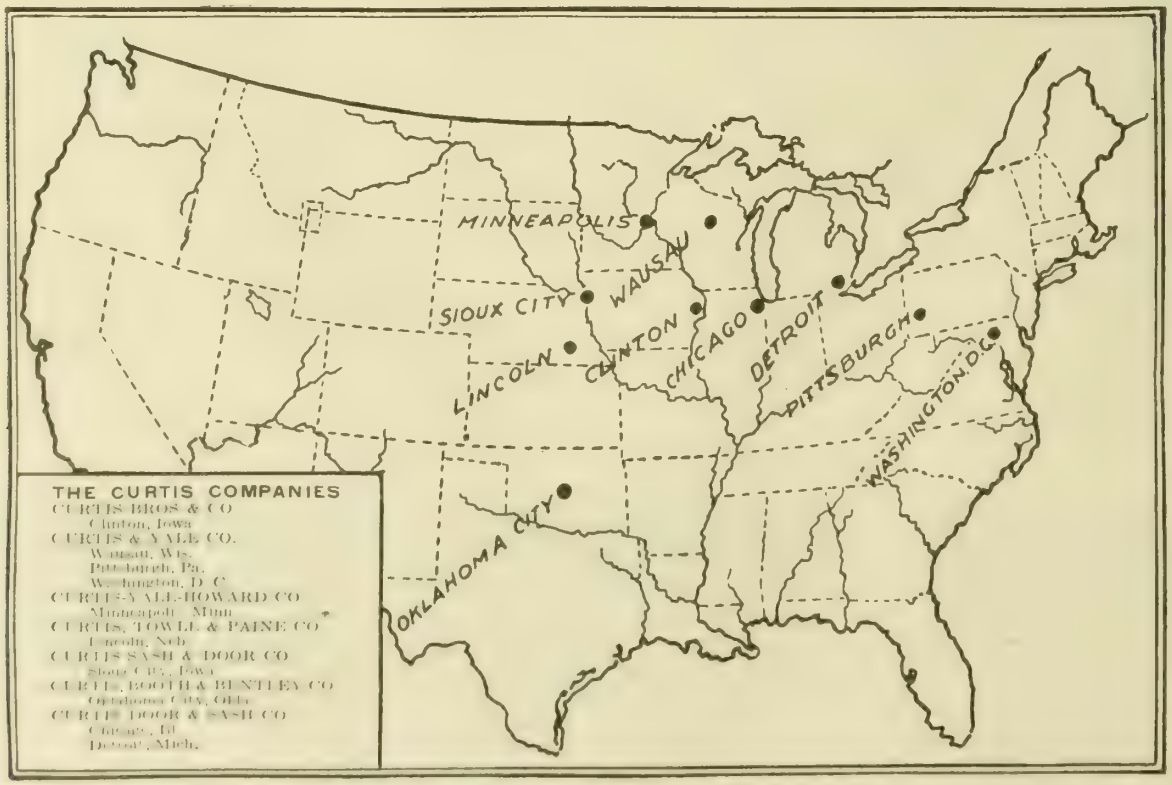
Porch Work: Columns, Pilasters, Pedestals, Rails, Posts, Balusters, and Composition Capitals.

Blinds: Inside and Outside.

Frames: Window, Sash, Door, and Front Entry.

Store Fronts: Wood and Metal.

Also, Hardwood Flooring, Thresholds, Moulding, Base Angles, Corner Beads, Roof Lookouts, Glass (Figured, Plain Plate, Beveled Plate and Leaded Art); and all kinds of Woodwork.



MAP SHOWING LOCATION OF CURTIS COMPANIES

Distribution.

The above map shows location of Curtis factories and warehouses; also their offices at Pittsburgh, Pa., and Washington, D. C. Only a glance is needed to know the wide distribution made possible by the location of Curtis plants. In a great many states, only a minimum freight haul is required. In remote territory, service can be given that would be impossible without the large number of warehouses so well located.

Continued on next page

Quality and Service.

Curtis products and service are the result of a scientific study of the needs of builders throughout the country. They meet the demand for well-designed, ready-for-shipment, honest products, suitable in every respect to dignified and honest types of building construction. They are the result of continuous conscientious efforts to attain perfection throughout a period of over fifty years.

The excellent, up-to-date facilities for distribution, through the several Curtis Companies, assure prompt delivery throughout a large part of the United States. Curtis products are almost immediately obtainable through any local dealer. See map on preceding page.

Standard Designs and Sizes.

Curtis designs are standard and made in standard sizes. Every Curtis Company uses the same specification and detail when making any Curtis design. Home-builders are thus assured the same construction, when buying of any Curtis institution, and the even quality that always results from standardization. Standard sizes of standard designs of all Curtis products can be shipped *immediately* by any Curtis Company.

Doors, Front and Interior, White Pine.

These are made from a high quality, even grade of white pine, most of which is selected and shipped from the Curtis cutting plant in California. The White Pine Door is light, durable, easy to fit, and takes any desired finish. Interior doors are carried in 4 panel, 5 panel and 5 cross panel. There are forty different designs of Curtis Exterior White Pine Front Doors.

Doors, Front and Interior, White Pine with Yellow Pine Panels.

The White Pine frame precludes the possibility of warping; while the Yellow Pine panel, either solid or laminated, harmonizes with Southern Pine trim. The interior doors are carried in 5 cross panel, solid panel, and also in 1, 2, 3, and 5 flat panels. Exterior doors to match the interior patterns are also carried.

Doors, Front and Interior, Hardwood Veneered.

Due to its construction, the Curtis Veneered Door is light, durable, and does not warp. It will match the grain and finish of any hardwood trim and interior woodwork. Special attention is given the drying of all lumber that is used in making a Curtis Veneered Door. The core is made of thoroughly dry narrow strips glued together, and is covered with a face veneer of beautiful hard wood. Special machinery extracts all moisture from the veneers in excess of the amount found in the air under ordinary conditions. Even when making doors of unselected materials, every effort is made to avoid sharp contrasts. All long light sash doors are made with ¼-inch veneer, and ⅛-inch veneer is used in other designs. The five patterns of interior doors, shown on a subsequent page, are carried in standard sizes in Plain Red Oak and Unselected Birch. Front doors to match the interior patterns are also carried. Veneered doors will be made to order in any kind of wood.

The stile core of the Curtis Slab or Sanitary Veneered Door runs vertically. The rail core, which is dowelled into the stiles, runs horizontally. Over the core is glued a banding of hardwood veneer, with the grain running across the door. Then the finish of ⅛-inch veneer is applied. The grain of this runs vertically.

Windows and Sash.

Made from high quality White Pine that will take any desired finish. All two-light windows are back puttied.

Interior Trim and Cabinet Work.

The most careful effort is made to supply builders with the finest kind of interior trim and cabinet work. These are made to order in any kind of wood; but the Curtis standard designs in standard sizes are carried, ready for immediate shipment, in Plain Red Oak and Yellow Pine.

Stairways.

Although newels, rails and stairway material are constructed with the utmost caution and sold separately, the Curtis Companies really specialize in the manufacture of complete stairways. These are shipped K. D.; but absolutely all mechanical work has been done to make the installation easy, accurate and quick.

Other Commodities.

Curtis Products include every other kind of commodity which can properly be termed woodwork.

Advantages.

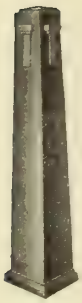
The advantages to the architect, home-builder, and contractor in using Curtis commodities are many. Curtis products are the products of experience. From the location of their plants, a national distribution is possible. Standard construction insures prompt service, and even quality at the minimum cost consistent with an entirely reliable commodity. Curtis woodwork for the entire home means convenience, quality, and harmonious effect—all essential to satisfaction.

Guarantee.

The Makers of Curtis Woodwork *guarantee* complete satisfaction to its users. We're not satisfied unless you are.

Continued on next page

C-1416. Yellow Pine



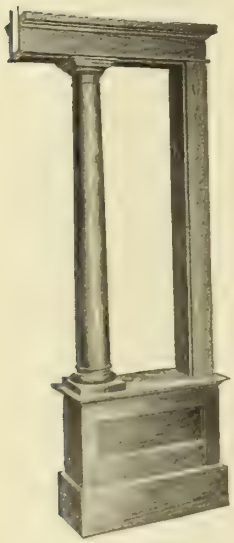
C-1204. Plain Red Oak. Yellow Pine

C-1211. Plain Red Oak. Yellow Pine

C-1207. Plain Red Oak. Yellow Pine

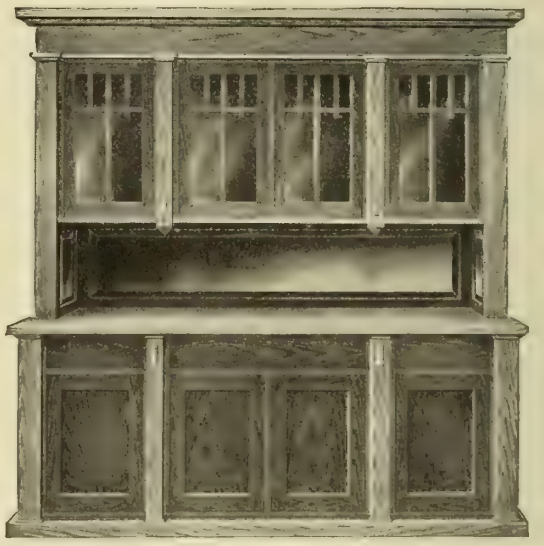
C-1302. Plain Red Oak. Yellow Pine

C-1303. Plain Red Oak. Yellow Pine



C-1300. Plain Red Oak. Yellow Pine

C-1301. Plain Red Oak. Yellow Pine



C-1401. Plain Red Oak. Yellow Pine

DESIGNS OF CURTIS CABINET WORK AND INTERIOR TRIM CARRIED IN STANDARD SIZES IN THE WOODS LISTED

ALL WOODWORK IN THESE TWO INTERIOR ILLUSTRATIONS IS CURTIS STANDARD DESIGN AND SIZE

Continued on next page

C-58. Plain Red Oak. Unsel. Birch

C-95. Plain Red Oak. Unsel. Birch

C-78. Plain Red Oak.

C-17. Plain Red Oak. White Pine

C-73. Plain Red Oak. White Pine

C-42. White Pine

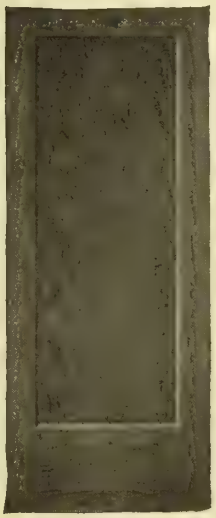
C-85. Oak. Unsel. Birch

C-52½. Plain Red Oak Unsel. Birch. White Pine. W. P. S. & R.—Y. P. P.

C-34. Oak. Unsel. Birch. White Pine. W. P. S. & R.—Y. P. P.

C-83. Plain Red Oak. Unsel. Birch. White Pine. W. P. S. & R. —Y. P. P.

C-50. Plain Red Oak. Unsel. Birch. White Pine. W. P. S. & R. —Y. P. P.



C-53. Plain Red Oak. Unsel. Birch. White Pine. W. P. S. & R. —Y. P. P.

C-52. Plain Red Oak. Unsel. Birch. White Pine. W. P. S. & R. —Y. P. P.

C-67. Plain Red Oak. Unsel. Birch. White Pine. W. P. S. & R. —Y. P. P.

C-71. Plain Red Oak. Unsel. Birch. White Pine. W. P. S. & R. —Y. P. P.

CURTIS DOORS CARRIED IN STANDARD SIZES IN THE WOODS LISTED

Note—Unsel. (Unselected); W. P. S. & R.—Y. P. P. (White Pine Stiles and Rails—Yellow Pine Panels)

ARKANSAS SOFT PINE BUREAU

LITTLE ROCK, ARK.

Products.

ARKANSAS SOFT PINE LUMBER, LATH and PLANING MILL PRODUCTS, Stock and Special patterns in Interior Finish.

Specific Uses.

Of prime interest to architects, are the remarkable qualities of Arkansas Soft Pine as interior trim. Soft woods have frequently been tabooed by architects since the passing of painted woodwork, in that over-absorption frequently dulled the luster of the stained or varnished finish.

Arkansas Soft Pine, while a soft wood, absorbs stains, varnish or enamel to exactly the right degree. The fiber is free from resinous content and is very tough and resilient. Consequently, the priming filler penetrates the raw wood in perfect proportion, and supplies a fixed surface to which the finishing coats are applied. With the same class of workmanship, careful selection of materials, and proper amount of time ordinarily devoted to finishing rare and costly tropical and native hardwoods, Arkansas Soft Pine supplies a woodwork of rare beauty and rich tones. The satin-like surface will retain its luster indefinitely. Where dining-room walls are to be paneled and white enameled, Arkansas Soft Pine offers a superior base for this purpose. This wood positively will not stain the enamel from underneath.

General Uses.

Framing material of Arkansas Soft Pine is preferred by carpenters, because it is more easily worked than pines of greater density. Furthermore, it combines strength with lightness. Government tests give the modulus of rupture at 7710 pounds per square inch for Arkansas Soft Pine framing material, on a test average from seventy trees. Joists 2 by 10 inches, surfaced side and edge, weigh 2600 pounds per thousand feet as against 2800 pounds for long leaf pine. Shiplap and boards average 100 to 200 pounds lighter per thousand feet than long leaf. Corresponding light weights obtain in all items of exterior finish, including lap siding. The latter holds paint well, due to the same absorbing qualities indicated above, combined with an absence of resin. Plaster lath weigh 500 pounds per thousand; are soft, bright, light and of uniform manufacture; and may be had in 32 inches and 48 inches.

Edge grain (Quarter sawn) Arkansas Soft Pine flooring, 2¼-inch face, weighs 1800 pounds per thousand feet, and is manufactured in multiples of 2 feet 8 to 18 feet. These lengths offer a distinct advantage over the short 18-inch pieces of other materials, as the number of end joints are reduced to the minimum. Frequently rooms are floored entirely in one length, as for example 16 feet, thus eliminating end joints entirely. Such floors will last a lifetime.

Government Reports.

"Freer from resinous matter (than long leaf), softer, more easily worked, not less susceptible of a good finish, lumber of short leaf Pine is oftener preferred by the cabinet maker."

"Short leaf Pine in Arkansas is generally considered of a higher grade than the same species grown in other regions. It is soft, of good color, and the wide annular rings show well in the grain."

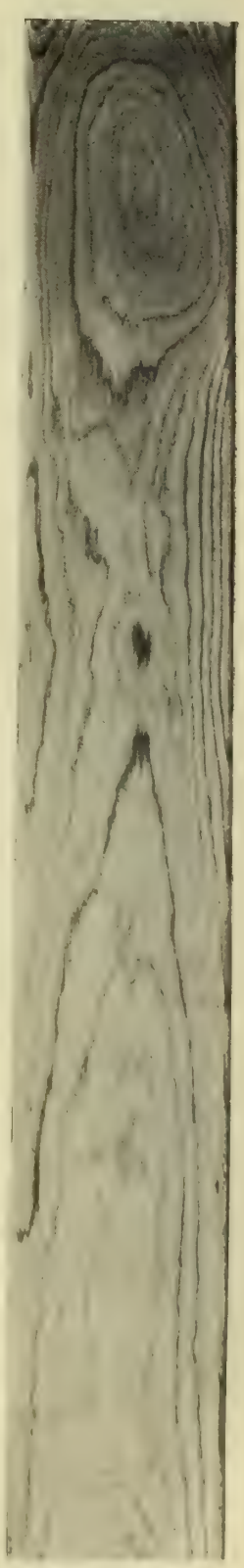
Source of Supply.

Arkansas Soft Pine comes from the virgin forests of South Central and South Western Arkansas. The following, composing the ARKANSAS SOFT PINE BUREAU, Little Rock, Ark., are manufacturers of genuine, trademarked Arkansas Soft Pine in all items:

Arkansas Land & Lumber Co., Malvern, Ark.
Arkansas Lumber Co., Warren, Ark.
Cotton Belt Lumber Co., Bearden, Ark
Crossett Lumber Co., Crossett, Ark.
Eagle Lumber Co., Eagle Mills, Ark.
Edgar Lumber Co., Wesson, Ark.
Freeman-Smith Lumber Co., Millville, Ark.
Fordyce Lumber Co., Fordyce, Ark.
Gates Lumber Co., Wilmar, Ark.
Southern Lumber Co., Warren, Ark.
Stout Lumber Co., Thornton, Ark.
Valley Lumber Co., Reader, Ark.
Wisconsin & Arkansas Lumber Co., Malvern, Ark.

Information.

Booklet and samples sent on request.



TYPICAL GRAIN OF SLASH SAWN ARKANSAS SOFT PINE CASING
From an actual photograph

A. C. DUTTON LUMBER CORPORATION

Douglas Fir Timbers

SAW AND PLANING MILLS
SOUTH BEND, WASH.
TACOMA, WASH.

GENERAL OFFICES
SPRINGFIELD, MASS.

WHARVES, WAREHOUSES
AND STORAGE YARDS
POUGHKEEPSIE, N. Y.

REPRESENTING WEST COAST LUMBER MANUFACTURERS IN NEW ENGLAND, NEW YORK, NEW JERSEY, PENNSYLVANIA

Products.

DOUGLAS FIR, RED CEDAR, GRAY FIR, WASHINGTON SPRUCE, via Panama Canal; CALIFORNIA SUGAR and WHITE PINE; REDWOOD; PORT ORFORD CEDAR.

Douglas Fir.

Douglas Fir forms immense forests in the extreme northwest of America. The tree attains a height of 300 feet and occasionally a diameter of ten feet. It really belongs to the spruce family, but as its wood more closely resembles that of the pine, it is also called Oregon Pine.

The sap growth is light and firm, will not discolor, and is not a defect, as in other woods. Grain is clear and straight, and wood is easy to work. Nearly all the flag staffs of the Columbian Exposition were of Douglas Fir.

Strength.

Government tests, as well as the continued use of this lumber, prove Douglas Fir to be the strongest coniferous wood for its weight for structural purposes in America. It is twenty-five per cent lighter than the next strongest.

Ready for Immediate Delivery.

Douglas Fir is kept in stock for immediate delivery in dressed boards, rough lumber and heavy timbers, in dimensions ranging from 2 by 3 to 12 by 16 inches, 10 to 40 feet long.

Uses of Douglas Fir in Architectural Construction.

Douglas Fir has long been used throughout the West for heavy framing, and it is especially valuable for truss timbers, posts, and for joists exceeding twenty-four feet span. It is also a most desirable wood for interior trim, owing to its exceedingly beautiful grain and uniform color. Some of the principal uses to which it is put are:

Heavy Timbers, Stringers, Joists, Posts, etc.
Heavy Factory Flooring.
House and Store Flooring, Vertical or Flat Grain.
Porch Flooring, Casings and Base.
Partition, Ceiling and Mouldings.
Window and Door Jambs.
Rustic or Novelty Siding.
Stepping.
Interior and Exterior Finishing.
Sheet Piling.

Relative Cost.

Pacific Coast woods, while having wonderful merit, are comparatively cheaper than Eastern coniferous woods, owing to the fact that they are not as yet thoroughly enough introduced into the East to have created as comparatively a heavy demand as have the woods more generally in use for a long period of time.

Standard Gradings.

We supply standard grades, as made by the West Coast Lumber Manufacturers Association, in all varieties of rough and dressed stock.

Facilities and Distribution.

This Company owns one of the best equipped docks and yards on the Atlantic Coast. Deep sea vessels dock there, bringing cargoes of 5,000,000 feet of lumber, and railroads radiate to all points.

Dressed lumber is piled on end in specially constructed booths, so that the lumber can not warp nor bend. Modern dry sheds have recently been completed, and a model re-saw and planing mill is in process of construction.

We serve all territory east of Ohio and north of Maryland.

AVERAGE STRENGTH VALUES, AIR SEASONED STRUCTURAL TIMBERS WITH ORDINARY DEFECTS

1	2	3	4	5	6		7	8	9	10	11		12	13
Species	Number of tests	Grade of material	Cross-section of stringer, Inches	Moisture, Per Cent	Weight per board foot, Lbs.		Modulus of rupture, Lbs. per Sq. In.	Modulus of elasticity, 1000 lbs. per Sq. In.	Center load required to break an 8″ x 16″ stringer on a 15-foot span, Lbs.	Center load required to cause a ¼″ deflection in an 8″ x 16″ stringer on a 15-foot span, Lbs.	Relative weight of Douglas fir and long leaf pine		Relative maximum strength of Douglas fir and long leaf pine, Per Cent	Relative stiffness of Douglas fir and long leaf pine, Per Cent
					Air Dry	Oven Dry					Air Dry	Oven Dry		
[a] Douglas Fir	10	[d] Select and merchantable	8 x 16	16.4	2.75	2.37	6740	1621	51,200	9110	100.0	100.0	100.0	100.0
[b] Long-leaf Pine	9	[d] Merchantable	4 x 11 to 8 x 16	21.2	[c] 3.42	[c] 3.00	5750	1704	43,700	9560	124.3	126.6	85.2	105.0

NOTE—*a*. Results from Table No. 11, U. S. Forest Service, Bulletin 88. *b*. Results from Table No. 3, U. S. Forest Service, Circular 189.
c. Results from Table No. 3, U. S. Forest Service, Bulletin 88.
d. Timbers of the two species were graded by different rules. The pine, however, contained fewer knots than the Douglas fir. See data in column "Number of Knots," pages 110 to 113 U. S. Forest Service Bulletin 108.

GUM LUMBER MANUFACTURERS' ASSOCIATION

1320 Bank of Commerce Building
MEMPHIS, TENN.

Products.

RED GUM, botanically known as LIQUIDAMBAR STYRACIFLUA, and called by different names in different localities, such as SWEET GUM, GUM, GUM WOOD, SATIN WALNUT, HAZELWOOD, and other local names. SAP GUM—the Sap or outer part of the same tree.

Gum Lumber—Its Nature and Uses.

The red gum tree, a hardwood growing plentifully in the Southern States, produces both heart wood and sap wood. Commercially the term "Red Gum" applies to the heart wood of this tree. "Sap Gum," or unselected gum, may be partially heart and partially sap wood, or wholly sap wood.

Red Gum is adapted for trim and interior finish of every kind, special order furniture and carved detail work, cabinets, doors, flooring, siding, fixtures, etc., where the natural beauty of grain of a fine hardwood is desired.

Sap Gum excels where a good, reliable wood without color or grain is desired, as in porch columns, flooring, building trim, siding, and as a basis for white enameled work.

Red Gum is America's *finest* cabinet wood.

Effects Obtained with Red Gum.

Red Gum takes a beautiful polish, showing rich coloring, and offers a wide variety of color schemes for architectural uses. The heart of the wood shows much variety of figure. It is a few shades darker than new cut mahogany, and choice pieces are frequently more richly figured. The color closely resembles mahogany, but has a wider range. In general effect the wood most nearly resembles Circassian Walnut.

In using Red Gum for interior trim, an architect has a choice of many color schemes. Finished in the natural color, it gives a beautiful effect, as nearly all Red Gum has a pleasing figure, whose ornate richness (which still is soft and delicate in its character) is brought out with unusual effectiveness by the filler and varnish. Red Gum "finished natural" is rapidly growing in favor among people of high artistic taste. When stained and properly done, Red Gum is very handsome. Any of the following stains may be employed with entire success: Dark Mahogany, Flemish Brown, Forest Green, Mission, and Dutch Brown. When dark mahogany stain is used, one of the most beautiful colors is produced. The stain is not sufficiently heavy to entirely eliminate the figure, and the result is a dark mahogany finish with the original beautiful figure of the Red Gum plainly visible.

The accompanying illustrations show a few of the many effects to be obtained by various treatments of Red Gum and Sap Gum.

QUARTER-SAWED RED GUM FIGURED WOOD
Richness of stripes and color tones peculiar to this method of manufacture, used in the best lines of furniture and architectural wood work

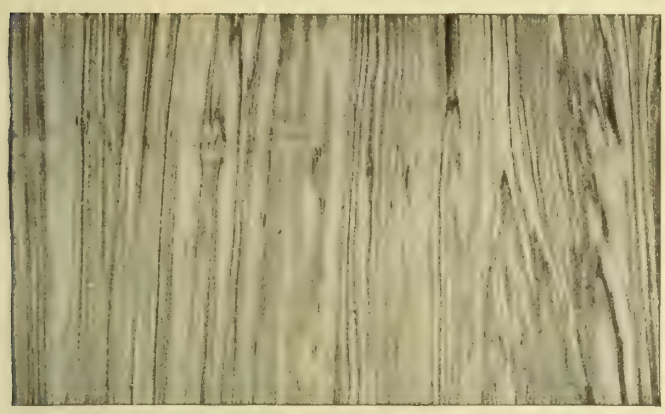
PANEL OF QUARTER-SAWED RED GUM VENEER FIGURED WOOD MATCHED
[illegible]

Advantages Over Other Hardwoods.

Red Gum works easier than any other hardwood and with less waste, for the reason that gum timber is large and the lumber naturally runs to better widths and lengths in firsts and seconds. Red Gum has become a leading cabinet wood, because of its beauty, adaptability, and fine workable qualities.

QUARTERSAWED RED GUM PLAIN WOOD
Finished natural or stained, is very pleasing and attractive. Stain applied light enough to show the beautiful grain of the wood

Continued on next page



PLAIN-SAWED RED GUM FIGURED WOOD
In demand for special cabinet work of all kinds

Specific Applications.

Doors—Red Gum veneer-built doors are as rigid and free from warp as any high-grade hardwood doors, and as for appearance they compare favorably with the best at a much smaller cost.

Fixtures—Red Gum is eminently suitable for bank fixtures, office and store fixtures, cabinets, library fittings, etc.

Factory Flooring—Red Gum is very well adapted for flooring factories where there is a good deal of trucking to be done. It can also be recommended for paving blocks for shops and mills; and, when so used, creosoting of the blocks is not necessary.

Enamel Work—Sap Gum, even in the cheapest, unselected grades, makes the best basis for white enamel. It takes paint with avidity, and sets it to a hard, brilliant face that never cracks or blisters.

Porch Columns—Sap Gum is now very generally used in the manufacture of porch columns, possessing as it does every element of stability and strength.

Apartment Houses—Sap Gum trim may be put into apartment house construction at a very reasonable cost.

General Flooring—Red Gum and Sap Gum are tough and durable, and selected stock can be used unhesitatingly for flooring in the most expensive buildings.

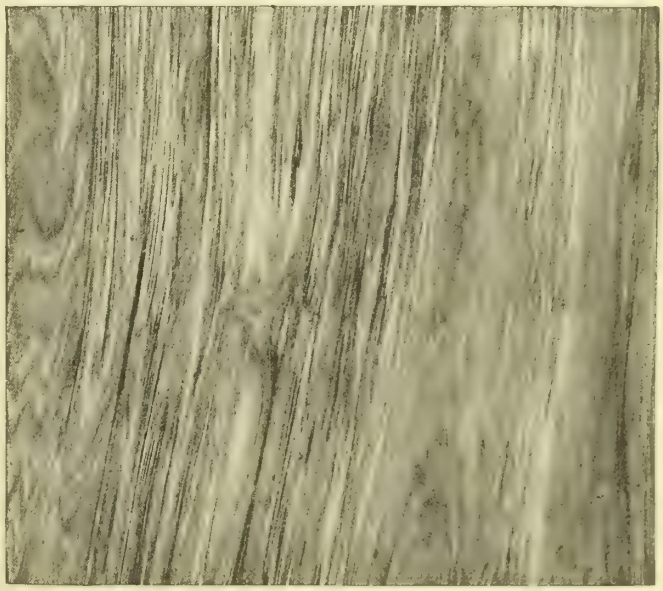
Siding—Sap Gum siding contains no pronounced grain, in this respect being equal to yellow poplar. It is not streaked with pitch, nor are the cells filled with resin, preventing the absorption of paint. It contains no acid or other ingredients injurious to nails.

Specification Notes and Service.

Experience has taught dry-kiln men how to handle Red Gum through the dry-kiln satisfactorily, and as a result no more difficulty is had in kiln drying Red Gum than any of the other fine cabinet woods. Architects can secure perfect satisfaction by specifying Red Gum, thoroughly air-dried, or naming producers that guarantee this treatment.

All woods are porous, and the better seasoned they are the more readily they absorb moisture. As soon as received, all hardwood doors and trim should get one coat of filler, shellac or stain. They should not be set until the plaster is well dried out. Trim should get one heavy coat of back paint before placing.

For proper specifications and all matter pertaining to the finishing of Red Gum we refer to any first-class varnish house. The GUM LUMBER MANUFACTURERS' ASSOCIATION will also be glad to aid in the formation of careful judgments as to individual cases, and places its entire resources at the disposal of interested persons.



ROTARY-CUT RED GUM VENEER FIGURED WOOD
An ideal veneer wood, because it works easily, without waste, and take and holds glue better than most other woods

NEW HOTEL MIAMI, DAYTON, OHIO
Interior Trim of Red Gum

MUEHLEBACH HOTEL, KANSAS CITY, MO.
Interior Trim of Red Gum

INDIANA LUMBER & MANUFACTURING CO.

Manufacturers of High-Grade Interior Trim

742 South Michigan Street

SOUTH BEND, IND.

Products.

Manufacturers of Special High-Grade INTERIOR TRIM, including DOORS, STAIRS, CABINETS, STORE and OFFICE FIXTURES, CHURCH PANELING, RAILING, etc.

EXTERIOR MILLWORK also furnished when desired.

Classes of Construction.

We make a specialty of furnishing Interior Trim of high quality for residences, churches and office buildings.

Methods.

We either prepare the Trim for contractor to erect on the building, or we will figure to assemble Trim at the factory ready to be applied to the opening.

Stock.

We carry a large stock of high-grade hardwood lumber. We have extensive dry-kiln capacity. These facilities enable us to give prompt service on urgent orders.

Equipment.

Our factory is equipped with the most improved machinery. This is operated in an economic manner so that cost of production is reduced to a minimum.

Estimates.

We are always pleased to quote prices on all classes of millwork, and we ask architects and builders to send plans for estimate. We pay express on plans both ways.

Plans.

All plans sent to us will be considered for our use only, and all facts pertaining thereto will be considered as confidential.

Attention to Details.

We have maintained the highest standard in our workmanship for many years, and, on account of the reputation thereby gained, do give careful attention to details of plans and specifications.

Co-operative Service.

We are always ready to co-operate with the architect by suggesting practicable methods of millwork construction.

We are always glad to furnish millwork estimates on tentative plans.

References.

PUBLIC BUILDINGS

City Hall, South Bend, Ind., Freyermuth & Maurer, South Bend, Ind.

High School, South Bend, Ind., Wm. B. Ittner, St. Louis, Mo.

J. M. S. Building, Office, South Bend, Ind., S. S. Beeman, Chicago, Ill.

Y. M. C. A. Building, South Bend, Ind., S. S. Beeman, Chicago, Ill.

First M. E. Church, South Bend, Ind., Bagley & Nicklas, Cleveland, Ohio

Citizens National Bank, South Bend, Ind., Freyermuth & Maurer, South Bend, Ind.

EXAMPLES OF INTERIOR TRIM

Continued on next page

References—Continued.

PUBLIC BUILDINGS

Union Banking Co., St. Joseph, Mich., Jos. E. Mills, Detroit, Mich.

Public School, Benton Harbor, Mich., J. C. Schwert, St. Joseph, Mich.

Oliver Hotel Annex, South Bend, Ind., Prack & Perrine, Pittsburgh, Pa.

Oliver Chilled Plow Co., Office, Hamilton, Ont., Prack & Perrine, Pittsburgh, Pa.

City Hall, Auburn, Ind., Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio

RESIDENCES

R. P. Milton, South Bend, Ind., W. P. Parker, Indianapolis, Ind.

F. A. Miller, South Bend, Ind., E. R. Austin, South Bend, Ind.

Jno. B. Campbell, South Bend, Ind., E. R. Austin, South Bend, Ind.

E. J. Roche, South Bend, Ind., E. W. Young, South Bend, Ind.

F. L. Stedman, South Bend, Ind., E. W. Young, South Bend, Ind.

H. A. Engman, South Bend, Ind., Geo. W. Keats, Boston, Mass.

N. P. Beebe, Niles, Mich., W. W. Schneider, South Bend, Ind.

J. R. Starr, Winamac, Ind., C. J. Horne, Logansport, Ind.

EXAMPLES OF INTERIOR TRIM AND EXTERIOR MILLWORK

INSULAR LUMBER COMPANY

MANILA, P. I.

SOLE AGENTS FOR THE UNITED STATES

INDIANA QUARTERED OAK COMPANY

NEW YORK, N. Y., 52 Vanderbilt Avenue — BOSTON, MASS., 88 Broad Street

WARREN ROSS LUMBER COMPANY
JAMESTOWN, N. Y.

THE NICOLA, STONE & MYERS COMPANY
CLEVELAND, OHIO

ZORNS LUMBER COMPANY
GRAND RAPIDS, MICH.

ROBERT DOLLAR COMPANY
SAN FRANCISCO, CAL.

Product.

PHILIPPINE MAHOGANY.

Philippine Mahogany.

This timber grows on the island of Negros, about four hundred miles south of Manila, P. I.

The best of the wood is exported to the United States and Great Britain, in the form of manufactured lumber, the Company having large modern band-saw mills at their plant at Sagay, P. I.

Adaptability—The wood is even in color and texture and runs largely to ribbon figure. After being properly dried, this wood stays in place and does not shrink or fade. It is especially suitable for interior trim, doors, mouldings, mantels, and all purposes where cost of the wood is an item and results that can be obtained only from mahogany, are desired.

Grain—The figured logs are not taken out to be sold at a higher price for veneer, with the result that the regular run shows a large percentage of finely figured wood.

Fireproofing—Tests made show that Philippine Mahogany fireproofs as well as soft red oak, the latter being the recognized standard.

Finish—The wood has a great range of possible finishes. On account of its texture it will readily take any stain, and may be colored from silver gray to darkest mahogany shade. We shall be glad to supply formulæ for finishing.

Sample Specifications—As this wood is carried in stock by all the Selling Agents whose names are given above, it is merely necessary to specify "Philippine Mahogany," "Light Red" or "Dark Red," as the case may be, and to be "plain sawed" or "quarter sawed," for figure, standard thicknesses and widths, as desired.

Prices—Our lumber being shipped direct from Manila to New York, free of duty, the price at New York is about the same as Firsts and Seconds Quartered White Oak. In fact, the Philippine Mahogany is really cheaper, on account of the greater widths and lengths and consequently much less loss in manufacturing, less gluing and fewer waste ends and edgings.

FANCY FIGURE GRAIN OF PHILIPPINE MAHOGANY

HISPANIC SOCIETY BUILDING, NEW YORK, N. Y.
West 156th Street, west of Broadway — CHAS. P. HUNTINGTON, Architect

Where the Wood Has Been Used.

Following are a few of the buildings in which Philippine Mahogany has been used:

Brooklyn Trust Co. Building, Brooklyn, N. Y., York & Sawyer, Architects
Hispanic Society Building, New York, N. Y., Chas. P. Huntington, Architect
Euclid Avenue Presbyterian Church, Cleveland, Ohio, Cram, Goodhue & Ferguson, Architects
Texas Co. Building, Houston, Tex., Warren & Wetmore, Architects
Royal Bank Building, Toronto, Canada, Ross & MacDonald, Architects; Geo. A. Fuller Co., Builders
Central Building, Seattle, Wash., Bebb & Mendel, Architects
Canadian Bank of Commerce, Seattle, Wash.
Marsh-Strong Building, Los Angeles, Cal.
Trinity Auditorium, Los Angeles, Cal

MAPLE FLOORING MANUFACTURERS' ASS'N

Maple, Beech and Birch Flooring

Stock Exchange Building

CHICAGO, ILL.

Products.

MAPLE, BEECH and BIRCH FLOORING, of which over 200,000,000 feet are used annually in the United States.

MFMA
TRADE-MARK

Grades and Sizes.

Three standard qualities of flooring are manufactured from Maple, Beech and Birch. They are Clear, No. 1, and Factory, and are produced in a variety of widths and thicknesses. The Association standards are:

Thicknesses, Inches.	Faces, Inches.	Grades.
13/16	1½, 2, 2¼, 3¼	Clear, No. 1 and Factory
1 1/16	2, 2¼, 3¼	Clear, No. 1 and Factory
⅜	1½, 2, 2¼	Clear, and No. 1 only

Certain special sizes are manufactured in limited quantities by some manufacturers.

Grades Defined.

The Clear grade combines appearance and service of the highest degree, and is suitable for the better classes of buildings.

The grade of No. 1 is made for service rather than for appearance, but sufficient attention is given to "looks" to make this grade desirable and satisfactory for use in stores, schoolhouses, and similar structures.

The Factory grade is suitable for factories, warehouses, machine shops and other buildings of like character, where a low priced floor is wanted; and, for wear, nothing better or cheaper can be obtained.

Special Grades.

White Clear in Maple and Red Clear in Beech and Birch are manufactured from stock selected for color, but otherwise the quality is the same as that of the standard Clear.

Uses.

Because of the service Maple gives, it should be used when durable floors are wanted. Maple wears very slowly and with the utmost uniformity. It does not splinter or become rough from wear.

For these reasons Maple flooring is the preferred material with which to floor office buildings, stores, passenger and freight elevators, passenger cars, street cars, factories, machine shops, schools, churches, gymnasiums, dance halls, bowling alleys, apartment buildings, armories, city and country homes.

Wearing Qualities.

Maple makes the most durable interior floor within reach of the builder. Maple floors are not new or untried. They have been subjected to and have withstood every test of usage. Maple's great claim to recognition is its wonderful durability even when employed under adverse conditions.

The wearing qualities of Maple floors are derived from the cohesive structure of the wood. Maple trees grow slowly, the wood is firmly put together, and the structure is uniform. It bears the same relation to other woods that wrought iron does to other metals. It is universally esteemed for its toughness and strength, with which is combined the highest degree of abrasive resistance.

EXTERIOR AND INTERIOR OF A CALIFORNIA RESIDENCE IN WHICH ASSOCIATION FLOORING HAS BEEN USED

Maple Floor Finishes.

Maple floors are not colorless or characterless. The wood is fine grained, of close, even texture, and should be treated with a filler only when a wax finish is to be applied. A paste filler made of silex crystals, pure linseed oil and the best Japan dryer is recommended. For a varnished floor a filler is not necessary.

Beech and Birch Floors.

In some respects Beech and Birch are preferred to Maple for living apartment floors. Both woods possess good color, and both may be stained and waxed or

Continued

Appropriate Flooring for a Building of this Type was Found in Association Maple Flooring

The Modern Home of Moderate Cost

The Office Building

The Modest but Modern Apartment

An Elaborate Country Home

Rooms of this Character

City Apartment Buildings

A City High School

A Village School

TYPES OF BUILDINGS IN WHICH ASSOCIATION FLOORING IS GIVING SATISFACTORY SERVICE

Continued on next page

varnished with good results. Red Clear Beech and Birch are unsurpassed for residence floors where warm, soft tones are desired. Paste silex fillers should be used, tinted, to give a uniform tone.

Beech and Birch Wearing Qualities.

The wearing qualities of Beech and Birch flooring are second only to those of Maple. In practice, Beech is being used where it is subjected to heavy traffic, and is giving satisfaction. Maple excepted, no other flooring will wear so long.

Installation.

When floor lining is used the hardwood flooring should be laid crosswise or diagonal to the sub-floor, which should be smooth, clean, and dressed to even thickness. A sub-floor, however, is not necessary under $\frac{13}{16}$-inch and thicker hardwood flooring, as it can be laid on joists or deafening strips without reference to breaking joints on the joists, because it is all side-matched and end-matched, the end-matching practically making one continuous strip of flooring from wall to wall.

The flooring is furnished in mixed lengths, which facilitates rapid laying, as it enables the workmen to combine the lengths economically and avoids unnecessary waste in cutting.

Floor Values.

On a service basis, Maple, Beech or Birch floors are the cheapest that can be secured. They are maximum value floors. They are sanitary, warm, dry, and a source of comfort and satisfaction to all who use them.

A Finished Product.

Maple, Beech and Birch flooring, in the form now offered the building trade by members of THE MAPLE FLOORING MANUFACTURERS' ASSOCIATION, is a finished product. The process of manufacture has been completed. The floor is ready to assemble.

Through cooperative and individual effort the modern one-piece hardwood floor has been placed within reach of every builder.

PARTIAL VIEW OF MAPLE FLOOR IN CONTINENTAL MOTOR WORKS, DETROIT, MICH.

High Official Standard.

A uniform standard of quality is maintained by Association members through the efforts of an official inspector, who visits the various Association factories from time to time and oversees the grading.

It is to your advantage to specify Association Flooring, because there is no other "just as good."

Association Trade-Mark.

The Trade-Mark, shown on first page, is a guarantee of quality. It has been adopted as a means of identifying the flooring made by members of the Maple Flooring Manufacturers' Association.

Architects can hereafter be sure of getting what they want when they specify Association Flooring. The individual factory is indicated by a number following the Trade-Mark.

Literature for Free Distribution.

"Your Flooring Problem Solved."
"How to Lay and Finish Maple Floors."
"Schoolroom Floors."
"Individuality in the Home—A Woman's Dream."

AN EXAMPLE OF THE RELATIVE WEARING QUALITIES OF SOFT WOOD AND MAPLE FLOORS SUBJECTED TO THE SAME TRAFFIC

NORTH CAROLINA PINE ASSOCIATION, INC.

NORFOLK, VA.

Products.

North Carolina Pine Building Lumber, for Interior Finish, Flooring, Frames, Sashes, Wainscoting, etc., in Standard and Special Grades.

Advantages.

North Carolina Pine wood is of the short-leaf species of pine, and is especially suited to the work of the house builder and carpenter on account of its freedom from resinous matter, its stiffness, and its ease of working.

It is widely used for flooring, and is highly recommended for its wearing qualities. It answers equally well for wainscoting and ceiling work, chair boards, baseboards, brackets, mouldings, cornices, roseblocks, ornaments, carved work, balusters, stairs, railings, panels, etc.

Also largely used for window and door frames and doors, plasterer's laths, shingles, porch columns and porch flooring.

North Carolina Pine is sufficiently hard in texture to permit an exceptionally smooth mill finish. By sandpapering, the surface can be quickly reduced to an ideal base for filler or shellac.

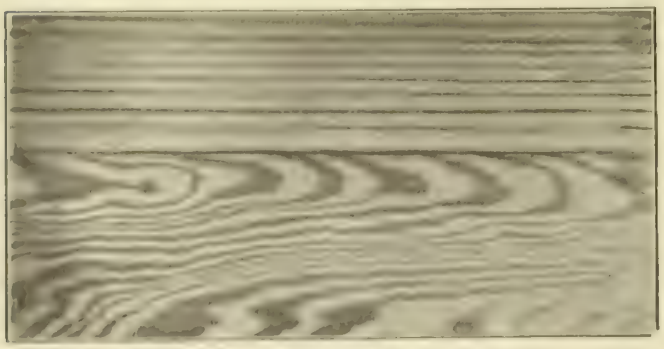
The wood can then be finished in its beautiful natural grain, or stained to imitate any of the hardwood finishes.

The wearing quality and general stability of North Carolina Pine is attested by the many historical buildings, residences, etc., in all parts of this country—some of which have been standing hundreds of years—that are constructed wholly or in part of this wood and are in first class condition to-day.

Grain.

The most fastidious home builder can be well satisfied with the variety of beautiful grain obtainable in this wood. There is an ever changing configuration that will reveal something new in every panel, in every gradation from straight to curly, and that is susceptible to charming effects in the hands of expert decorators and wood finishers, whether the wood is finished in natural color or in stains.

This beautifully grained wood is naturally suited to the interior finish of a house, as trim around the windows and doors, panel work in library and dining-room, beamed ceilings of halls; and for doors, etc.



GRAINING OF NORTH CAROLINA PINE

WASHINGTON'S HOME, MOUNT VERNON, VA.
Built of North Carolina Pine in 1743

Economy.

North Carolina Pine gives more for the money, because it is finished on the half inch. Most woods are worked into flooring, ceiling, etc., on a "three-quarter matching," which means that the actual face width of the flooring is ¾ of an inch less than the strip width that you pay for.

For instance: You buy 1,000 feet of 3-inch flooring. In North Carolina Pine this would be finished 2½ inches wide, and would cover 833 square feet of floor; while the usual method of working the finished width would be only 2¼ inches, and the covering capacity but 750 square feet.

Thus you would secure 11 per cent more flooring in North Carolina Pine, or 83 feet; which means that if the price per 1,000 feet is $40.00, you get $3.33 worth more flooring for your money.

For Exterior Work.

Any species of wood will rot and decay when exposed to the weather if it is not properly protected with paint, and under such exposure the sapwood is of course less durable than the heart.

North Carolina Pine demands only the same selective use and protective treatment as other woods under similar conditions. Where the wood is to come in contact with the ground, or is exposed to alternate wet and dry conditions (like porch floors and steps), heart material should be used exclusively. But for such purposes as siding and weatherboarding, outside finish, etc., the regular run of wood is all that is necessary with the protection afforded by paint.

A modern frame building, kept up as it should be, will last as long as a structure of some of the mineral substances, and with occasional repainting will always look fresh and clean.

No architect or contractor need hesitate to use North Carolina Pine for exterior work in accordance with above suggestions, for it will be found as efficient as any other wood.

Continued on next page

Flooring.

In these days of bare floors and Oriental rugs more attention is now paid to the floor by the home builder than formerly.

The essential features of a satisfactory flooring are strength, durability, beauty of grain, and susceptibility to finish.

North Carolina Pine possesses *all* these qualifications. It is strong, wears well, and has a naturally beautiful grain, which is enhanced in artistic effectiveness by the application of stain, wax, or varnish. It is free from pitch or resin, and may be had both in flat and rift grain. If the wear on the floor is to be light, or if the floor is to be carpeted or otherwise covered, the flat grain is all that is necessary. Where the wear is heavy, rift grain should be used; its longer wear will more than repay for the additional price.

The Forest Service has recently issued a new Bulletin on Short-leaf Pine—No. 308, Nov. 22, 1915—which has the following to say with reference to its use for floors: "The grain is handsome and shows well in natural finish or when stained. Because of its wearing qualities, pleasing appearance, and ready response to oils, wax, and other flooring finishes and dressings, a good deal of short-leaf is made into floorings."

Sources of Supply.

North Carolina Pine is carried in stock by practically every lumber yard in the East, many of the larger concerns having planing mills and specializing in mill-work of North Carolina Pine. There should be no difficulty in securing doors and sash of this wood also, as there are numbers of manufacturers who carry full lines, as well as make special patterns to order.

Grades.

For convenience in specifying North Carolina Pine the grades are briefly epitomized below, giving a general idea of the characteristics of the several grades without going into particulars. Persons wishing the full grading rules may obtain them by writing to the Association.

No. 1 Flooring, Ceiling, Finish, etc., is practically free of all defects on the face side.

No. 2 Flooring, Ceiling, Finish, etc., may contain a limited number of small tight knots, not over half an inch in diameter.

MODERN RESIDENCE BUILT IN BUNGALOW STYLE
Expressing the possibilities of North Carolina Pine

No. 3 Flooring, Ceiling, Finish, etc., will admit sound knots larger than are admitted in No. 2, but in no case over 1½ inches in diameter.

No. 4 Flooring and Ceiling, admits strips below the grade of No. 3, which can be laid without wasting more than 25 per cent of the piece.

Roofers and Factory Flooring admit lumber below the grade of No. 3, and admit small knots and large reasonably sound knots which do not seriously affect the strength of the piece.

Lengths—The standard lengths of Flooring are 8 to 16 feet; of Ceiling, Partition and Finish 6 to 16 feet; in multiples of 1 foot.

Thickness—Flooring is finished $\frac{13}{16}$ of an inch thick; Ceiling $\frac{3}{8}$, $\frac{7}{16}$, $\frac{5}{8}$ and $\frac{3}{4}$; Partition $\frac{3}{4}$ and $\frac{13}{16}$; Finish (base and casing) $\frac{13}{16}$; Siding and Weatherboarding $\frac{3}{4}$ or $\frac{13}{16}$.

Specifications for Finishing North Carolina Pine.

(A) Natural Finish

(*A-1*) *Interior Trim*—1 coat of Liquid Wood Filler; 2 coats of Interior Trim Varnish.

Left in gloss, rubbed dull or polished, as desired.

(*A-2*) *Floors*—3 coats of best Floor Varnish.

(*A-3*) *Exterior Work*—1 coat of Floor Varnish; 2 coats of Exterior Varnish.

(B) Stained Finishes with Gloss Varnish

Oil Stains are best adapted to North Carolina Pine in the following shades: Light Oak, Dark Oak, Weathered Oak, Cherry, Rosewood, Walnut, Golden Oak, Forest Green, Antique, Mahogany and Dark Mahogany.

Following are the specifications:

(*B-1*) *Interior Trim*—1 coat of Oil Stain; 1 coat of Liquid Wood Filler; 2 coats of Interior Trim Varnish.

Left in gloss, rubbed dull or polished, as desired.

(*B-2*) *Floors*—1 coat of Oil Stain; 2 or 3 coats of Floor Varnish.

(*B-3*) *Exterior Work*—1 coat of Oil Stain; 1 coat of Floor Varnish; 2 coats of Exterior Varnish.

(C) Dull Varnish Finish

The following specification produces a dull, velvety finish, but applies only to interior trim, as Dull Varnish should not be used on floors or exterior work. The Weathered Oak Stain is almost always finished in this way.

(*C-1*) *Interior Trim*—1 coat of Oil Stain; 1 coat of Liquid Wood Filler; 1 coat of Dull Varnish.

(D) Silver Gray Effect

The popular Silver Gray Effect is best obtained with an Acid Stain. Acid stains are primarily intended for hard woods and not for soft woods such as North Carolina Pine; but for a Silver Gray effect on North Carolina Pine there is no better method than the specifications listed below. This finish is not suitable for floors, nor exterior work.

(*D-1*) *Interior Trim—Dull Varnish Finish*—1 coat of Silver Gray Acid Stain, sandpapered when dry; 1 coat of White Paste Filler; 1 coat of Shellac; 1 coat of Dull Varnish.

(E) Enamel Finish

In enamel finishing particularly, it is extremely important that all knots be given a thin coat of pure white shellac before finishing. Where a dull finish is wanted without the expense of rubbing, use an "Eggshell" Enamel.

(*E-1*) *Interior Trim*—1 coat of Pure White Lead mixed with equal parts of Linseed Oil and Turpentine with a small amount of Dryer added; 2 coats of Enamel Undercoating; 2 coats of Enamel.

Left in gloss or rubbed dull, as desired.

Important—All knots should be touched up before carrying out the above specifications with a thin coat of white shellac. Where the wood is stained touch up knots after staining.

Each coat of liquid wood filler, shellac or varnish should be sandpapered when thoroughly dry with No. 0 or No. 00 sandpaper before applying the next coat, with the exception of the last coat, which should not be sandpapered.

NORTHERN HEMLOCK AND HARDWOOD MANUFACTURERS' ASSOCIATION

DEPARTMENT "S"

OSHKOSH, WIS.

Products.

BIRCH LUMBER, made from Yellow Birch (*Betula Lutea*) also known as gray birch; and from Sweet or Cherry Birch (*Betula Lenta*).

Description.

No distinction is made between these closely similar species, as a rule. The heartwood of both is sold as red birch, and the sapwood as yellow birch. Birch is sold as unselected birch or red birch. Red birch is not another species, but is simply the reddish colored heartwood of the tree. Unselected is the run of the lumber as it comes from the log, part heartwood and part sapwood.

A beautiful variation called Curly Birch comes from selected logs, and comes either in red or unselected.

Uses.

Out of one hundred and thirty-four representative uses of all commercial woods of the United States, birch finds place in half. Birch is fitted for so large a variety of purposes because of its beauty and its excellent mechanical and physical properties. It is somewhat easier to work than oak or maple, yet possesses the same quality of strength as these species. It is used extensively for trim, doors, flooring, veneer and furniture.

It has won recognition in trim as being a fine hardwood, of very handsome figured grain, and capable of high finish. It is in use not only in a multitude of residences and apartments, but also in very many hotels, office buildings, etc., of the highest class, for both trim and doors.

Birch doors are usually of veneer on a soft wood backing. The veneer may be selected from a wide variety of figures, from the rather modest to the highly ornate.

Birch flooring is comparable in service value with maple flooring, having nearly the same physical properties, including hardness. It comes either in red or unselected. Selected red birch floors are very desirable in most schemes of interior decoration, especially with trim of birch or mahogany.

Birch has the qualities required of the best furniture woods, and for this use is second only to oak in the quantity used.

Birch looks equally well, whether plain, or quartersawed. Rotary-cut birch veneer usually serves all purposes which demand highly figured wood in broad surfaces, such as panels, etc.

Finishing.

Birch lends itself perfectly to the production of any effect of finish which can be applied to a first class hardwood. To several beautiful finishes it is better adapted than any other wood, notably to gray and brown acid staining. It is also frequently and successfully used in place of red stained mahogany.

Because of the small size of the pores, a filler is usually not employed. If a dark filler is used, the pores can be made conspicuous, giving the wood additional figure. Rubbed, or rubbed and polished finishes, give fine results with birch. The user of birch should always remember that he is handling a high-class hardwood, whose peculiar richness of tone and figure is worthy of painstaking treatment. It is of just the right density and texture to form a superior base for white enamel, for which the unselected grade is of course used.

Prices.

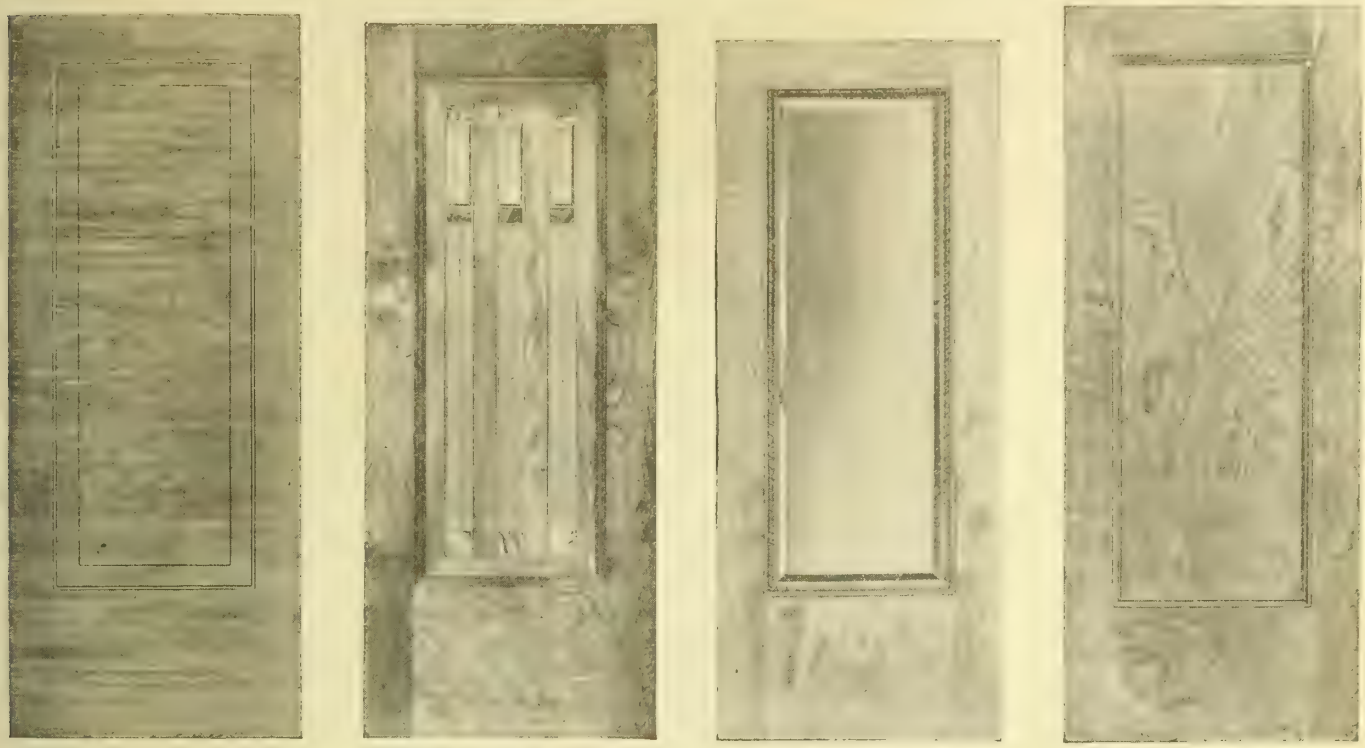
In spite of its beauty, strength and hardness, birch is not costly. It compares favorably in price in most localities with many of the other high class hardwoods.

Information.

A handsome book on Birch and Its Uses, finished samples, and any specific information or assistance required will be gladly supplied on application to Department "S."

TYPICAL GRAIN OF SAWED BIRCH
Natural Size

Continued on next page

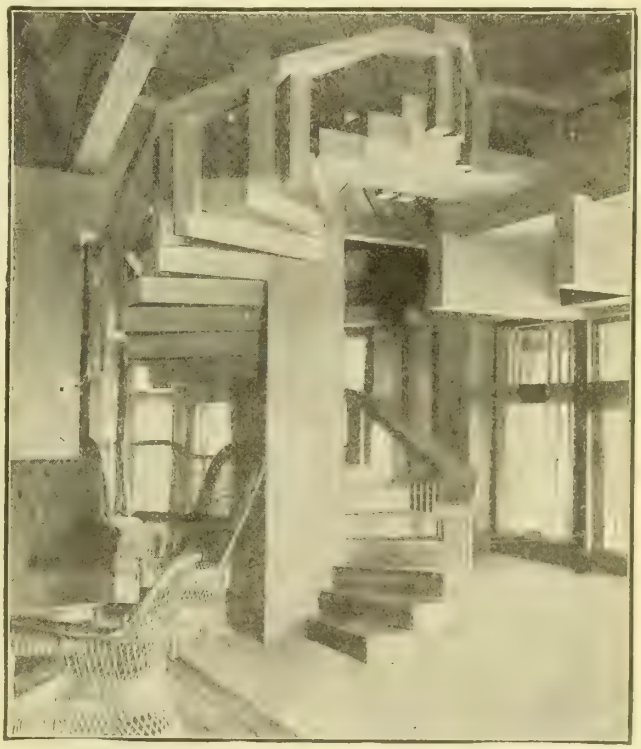


FOUR OUT OF DOZENS OF DESIGNS ALWAYS AVAILABLE IN ROTARY-CUT BIRCH VENEER

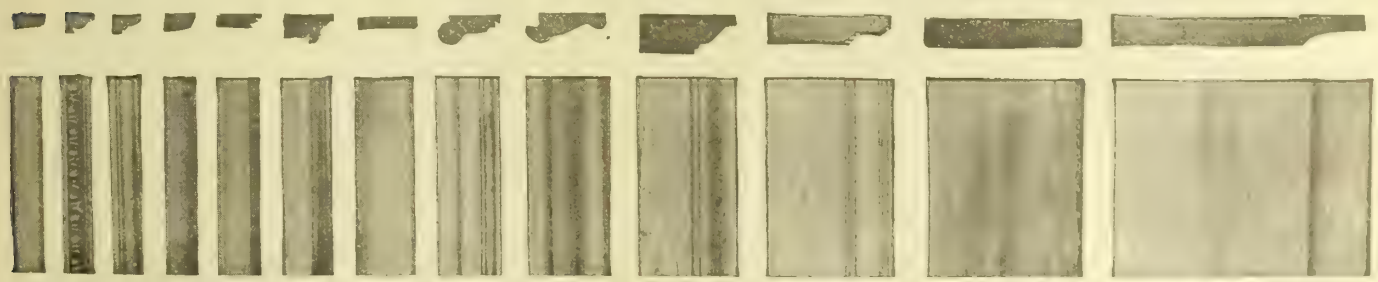
Co-operation.

We shall be glad, for their convenience, to put inquirers in touch not only with our members, but also with manufacturers of birch doors, trim, etc. This will be done only on request.

AN EFFECTIVE "ARTCRAFT" ENTRANCE OF QUARTER-SAWED CURLY BIRCH



INTERIOR OF GRAND CANYON HOTEL, YELLOWSTONE NATIONAL PARK
Birch shipped from Wisconsin for this trim



A FEW OF THE MANY FORMS CONSTANTLY AVAILABLE IN BIRCH MOULDINGS, CASINGS, BASE, ETC.

OAK FLOORING MANUFACTURERS' ASSOCIATION

W. L. CLAFFEY, Secretary

1358 Conway Building

CHICAGO, ILL.

Products.

Oak Flooring; Plain-Sawed and Quarter-Sawed, White or Red; scientifically and thoroughly Kiln-dried, properly Milled and Graded.

Advantages.

The natural characteristics of Oak are too well known to require any eulogy. When made into flooring the diversified figure of Oak is exhibited to perfection. It is a wood that will harmonize with any kind of interior trim, and will do more to give distinction to a home than any other part of the interior construction. Oak Flooring is demanded, because it is rich and cheerful and blends harmoniously with any type of furniture and color decoration. It combines beauty, distinctiveness and durability.

Oak is a sanitary wood, and requires but little care to keep it in good condition. Real estate dealers and owners know the value of Oak Flooring, and emphasize Oak Flooring when advertising their property. It assures better renting and selling values and attracts a better class of tenants.

For economy, 3/8-inch thickness may be laid at a very low cost over old floors in old homes, or in new buildings over cheap sub-floors. It is matched and end-matched so that it can be blind-nailed. When laid, it has in every respect the appearance of heavy flooring.

Durability.

In numerous public buildings and houses throughout the country in which Oak Flooring was laid from twenty-five to forty years ago, these floors are in good condition today. The word "Oak" has long been a synonym for strength and endurance.

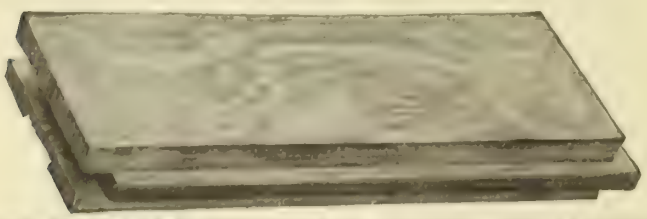
Standard Thicknesses and Widths.

13/16-inch thickness; widths, 1½-inch face, 2-inch face and 2¼-inch face.

3/8-inch thickness; widths, 1½-inch face and 2-inch face.

Oak Flooring Grading Rules.

The grades of Oak Flooring are known as Clear, Sap Clear, Select, No. 1 Common, and Factory.



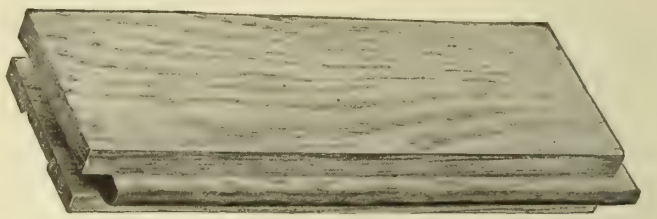
QUARTER SAWED, TONGUED AND GROOVED, END-MATCHED OAK FLOORING

Quarter-Sawed

Clear—Shall have one face practically free from defects, except 3/8 of an inch of bright sap; the question of color shall not be considered; lengths in this grade to be 2 feet and up, not to exceed 15 per cent under 4 feet.

Sap Clear—Shall have one face practically free of defects, but will admit unlimited bright sap; the question of color shall not be considered; lengths in this grade to be 1 foot and up.

Select—May contain bright sap, and will admit pin-worm holes, slight imperfections in dressing or a small, tight knot, not to exceed one to every three feet in length; lengths to be 1 foot and up.



PLAIN-SAWED, TONGUED AND GROOVED, END-MATCHED OAK FLOORING

Plain-Sawed

Clear—Shall have one face practically free from defects, except 3/8 of an inch of bright sap; the question of color shall not be considered; lengths in this grade to be 2 feet and up, not to exceed 15 per cent under 4 feet.

Select—May contain bright sap, and will admit pin-worm holes, slight imperfections in dressing, or a small, tight knot, not to exceed one to every 3 feet in length; lengths to be 1 foot and up.

No. 1 Common—Shall be of such nature as will make and lay a sound floor without cutting; lengths 1 foot and up.

Factory—May contain every character of defects, but will lay a serviceable floor with some cutting; lengths 1 foot and up.

The Use of the Different Grades.

Clear, Quarter-Sawed, Red or White: High class residences, hotels, apartment houses and club houses.

Sap Clear, Select, Quartered, Red or White: An economical substitute for Clear Quartered where a dark finish is desired. These grades make a flooring equally durable as the first grade.

Clear, Plain-Sawed, Red or White: High class residences, hotels, apartment houses, churches and club houses.

Select, Plain-sawed, Red or White: Medium priced residences, hotels and apartments, schools, office buildings and stores.

No. 1 Common: Cheap dwellings, tenements, stores, high class factories and manufacturers' buildings.

Factory: Warehouses, factories and cheap tenements.

Correspondence solicited.

D. M. ROSE & CO.

MEMBERS OF OAK FLOORING MANUFACTURERS' ASSOCIATION

Hardwood Flooring, End Matched, Bored and Hollow Backed

TELEPHONE, 96

KNOXVILLE, TENN.

Products.

FINE RED and WHITE OAK FLOORING, PLAIN and QUARTERED, for Fine Floors whether Strip, Square or Herringbone. Also MAPLE and BEECH FLOORING.

Oak Strip Flooring.

Strips scientifically milled and matched; artistically graded and shaded, so carpenters following instructions may construct easily the finest floors.

Strip floors, when perfect, form the ideal foundation for wall and window decoration. Plainness adds to elegance and artistic effect; also most economical.

Use when possible $\frac{13}{16}$ inch thick by 1½-inch, 2-inch or 2¼-inch face. If impossible, ⅜ inch thick by 1½-inch or 2-inch face is best substitute.

Distinctive Quality in Rose Flooring.

Artistic floors, permanent and inexpensive, are made through factory co-operation with architects, efficiently doing all that a factory should do.

Strip perfection and artistic grouping is our goal. To condition, mill, grade, bundle and keep perfectly for quick shipment, exact requirement is our service.

End Match.

D. M. Rose patented end matcher cuts clean and square every cut, saving full and sharp all four face corners. Only machine that makes a perfect butt joint.

Faster and finer work is done by laying floor with short lengths—all under the eye, no walking—and pieces go together better. Lengths bundled separately.

Machine cuts perfectly to length, strips for squares and herringbone. Side and end match fit exactly. Strips cut half right and half left. No splines needed.

Samples.

Rose perfect end match and mill shown by samples sent on request. They are convincing and the floors are more so. Lengths nine inches and up are cut square automatically.

Rose Grading—Association Grading Perfected.

Clear, Select, and No. 1 Common, each made in two grades: Hearts (good color) and Saps. Hearts again sorted into three shades: Light, fair and dark, bundled separately.

Hearts and Saps separated adds value to Hearts; and sap on every piece looks better than Hearts and Saps mixed haphazard; both are improved.

We submit that Rose All-heart grades, sorted into shades to lay floors uniform in color, are two grades and more above the Association grade mixture. (See Oak Flooring Manufacturers' Association pages in this book.)

Since perfect joints between strips of same shade are features of beauty, lengths are cut one foot and up in all grades. One-foot bundles save cutting longer lengths.

How to Specify.

Floors must be uniform in color, perfect surface in perfect plane, solid as one piece; perfect side and butt joints barely visible between strips of same shade.

Building dry, all other work done. Oak floors (kind, grade, etc., see plans). Lay ½ inch from walls, across joists or subfloor, foundation brought to a perfect plane.

Lay (like shades together) on moist-proof paper, breaking joints, in straight courses. Dry, straight, perfectly milled strips T and G and end-matched, T's fitting G's exactly.

Butt joints up tight; then nail well (8P. cut for 13/16-inch strips, 3P. wire for ⅜-inch strips). Every four runs use maul to tightly close side joints and to even face edges.

Lightly hand veneer. Smooth forty-five degrees, then with the grain. Hand-sand thoroughly. Fill at once, filler shade harmonizing. Sand again and wax two coats. Perfect floor.

NOTE—Rose Clear All-heart grade sorted into shades is the flooring for above specifications, and it is sincerely expected that architects will specify and insist on its use.

Structurally and artistically this floor is superior to the long strip parquet heart floor with mixed shades and unmatched ends, and is less expensive.

Superiority is still more marked compared with the standard clear (mixture) floor, and cost is no more, for saving in smoothing covers extra cost per M.

Cost of Rose Clear Heart Floor per Sq. (100 Sq. Ft.).

To lay, smooth, fill and wax for all kinds, $8. Flooring $\frac{13}{16}$-inch Plain, $8+$8=$16. ⅜-inch Plain, $6+$8=$14. Flooring $\frac{13}{16}$-inch Quartered, $12+$8=$20. ⅜-inch Quartered, $8+$8=$16.

Freight, 1-cent rate—for ⅜-inch strips, 1⅓ cents per Sq.; for $\frac{13}{16}$-inch strips, 2⅔ cents per Sq. As condition is much, freight little, order just requirements when needed. Lay at once without exposure.

Territory and Facilities.

Located centrally in the United States, in the Appalachian oak area, noted for the quality and quantity of its oak, makes easy shipments, CL and LCL to all points.

Equipment complete, special, best possible; operated efficiently by trained men. Forty years' experience. Flooring Strips perfected ten years ahead of the times.

THE SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

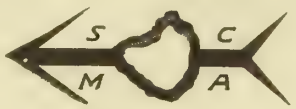
GEORGE E. WATSON, Secretary

1214 Hibernia Bank Building
NEW ORLEANS, LA.

1214 Heard National Bank Building
JACKSONVILLE, FLA.

Product.

Cypress Lumber; Cypress Shingles.



Reg. U. S. Pat. Off.
TRADE-MARK

Where Grown.

The Cypress to-day is distinctly a swamp tree growing along the coasts of the Atlantic Ocean and Gulf of Mexico from Maryland to Texas, and in the Mississippi Valley as far north as Southeastern Missouri.

Varied Utility.

Cypress wood having been used for many years, the evidence of its fitness for numerous purposes is overwhelmingly large. Testimony of its peculiar qualities comes from all parts of the world.

Durability.

Cypress stands almost unique among the woods on the American lumber market in that it has qualities not paralleled by any other wood.

Possessing certain singular antiseptic qualities which protect it where exposed to weathering, its great resisting power to the various decay influences and parasitic injuries is practically unequaled.

It is also free from the ills which affect pine and hardwoods—such as staining and decaying after being cut and placed in a pile.

Color.

Cypress varies in color from almost white, such as found in Arkansas, Tennessee and Missouri, to almost black, such as found in many of the brakes in Southern Louisiana and Florida.

It is usually yellowish, and sometimes grayish brown, with the sapwood considerably lighter in color than the heart wood.

The more southern Cypress is the most valuable. It is usually dark, with a very fine and even grain; frequently marked by various colored zones, which oftentimes extend for great lengths throughout the log.

Other Advantages.

For the greatest variety of uses as a finishing lumber, Cypress ranks high among the woods of to-day. It is rapidly supplanting all other woods for uses where [illegible] and resistance to decay are valued factors.

It is very easy to work and is easy on edged tools, as it is soft and has an even grain, sometimes with beautiful figuring, and is capable of taking an exquisite, rich finish.

Cypress has an average strength, is fine for sill and woodwork anywhere near to or in contact with the earth, but should not be used for framing. It checks and splits very little and is noted for its durability.

It is strongly favored for porch floors, but is not recommended for interior floors except in creameries and similar places.

Interior Uses.

About one third of the higher grades of Cypress is used for fine interior trim in good houses.

For interior finish its ease of working, straightness of grain, non-resinous nature, and the fine, wide, clear sizes obtainable, make it without doubt one of the best woods for mouldings, doors, sills, panels, sash, casings, etc.

As Cypress shrinks or swells imperceptibly it is especially desirable for doors, which are very beautiful when made of this wood.

Exterior Work.

On account of its great durability and weather-resisting qualities Cypress excels for all exterior work, such as foundation timbers, sidings, girders, doors, jambs, facings, window blinds, porches, columns, railings, steps, weatherboarding, etc., whether on wood, brick or stone construction; and everybody knows that Cypress Shingles outlast all others.

Shingles.

Cypress is peculiarly adapted to Shingles. They are almost everlasting, having extraordinary durability. They possess the added virtues of having more wood in them and of weighing more than any other shingle now on the market, and the life is not roasted out of them in the dry kilns. They are sold as dimension Shingles and are always full count.

Country Uses.

For country use—for fencings, posts, water-troughs, well-boxes, silos, incubators, barns and sheds—Cypress is the cheapest and best, owing to its wearing and lasting qualities.

Imparting no odor, taste or color, and being almost non-porous, it is unexcelled for Water-Tanks, and for use in Dairies. Acid Manufactories, Breweries, Laundries, Soap Factories, Tanneries, Dye Plants, etc., should be equipped with Cypress Tanks and Vats.

Greenhouse Construction.

In greenhouses, Cypress is an invaluable wood because of its resistance to decay. The entire woodwork of some of the best greenhouses in the country—rafters, roof, girders, benches—is constructed entirely of Cypress.

Continued on next page

In consequence of its long-lasting power it is well adapted for all kinds of cold frames.

For Fireproof Buildings.

Cypress is an excellent wood for sash and casings in otherwise fireproof buildings, and is being specified and used largely for that purpose by well-known architects and contractors.

"Pecky" Cypress.

In the cheap grades "Pecky" Cypress is recommended for all uses where resistance to decay, and not beauty or great strength, is the chief end in view.

It is a grade of lumber which appears to be more or less honeycombed and decayed, yet in reality is one of the most decay-resisting woods known in this country.

It will not decay in one hundred years and is therefore adaptable for culverts, fence posts, all kinds of underground work or work in damp places; planking of small bridges, barn floors, and for foundation timbers.

Painting.

For both exterior and interior work Cypress can be successfully painted, as the texture of the wood allows the paint to sink in and give perfect results.

Natural Finish.

But as the charm of modern architecture is in the use of the natural wood, Cypress, on account of the beauty of its grain and variety of its rich shadings, should be varnished and finished in the natural.

"Sugi" Finish.

One of the most modern and interesting developments of Cypress for Interior Finish is achieved by the Japanese treatment, known as "Sugi." It reproduces with remarkable accuracy the historic and highly artistic "Driftwood effect."

"Sugi" Finish imitates this famous and greatly coveted finish "without waiting for decades of erosion." It can be done by any one who can wield an ordinary gasoline torch (such as is used by plumbers), and who then has the patience (and good taste) to brush out the charred portion of this peculiar wood. The "Sugi" finish has been tried on other woods, but without success. Its cost is slight. The freedom of Cypress from the resinous quality of most woods renders it adaptable to this extraordinary handling. There is practically no limit to the utilization of American Cypress for this purpose.

Staining.

Cypress can also be stained with great success. In imitation of mahogany—becoming even more beautiful than mahogany itself—of cherry, black walnut, the different oaks; or tinted any desired shade the most fastidious fancy may suggest.

Samples, etc.

Samples, detailed information, "Books of Uses," references, etc., can be had upon application.

United States Government Report on Cypress.

The United States Agricultural Department (Forest Service Bulletin No. 95) reported on Cypress under date of June 30, 1911. The following are extracts therefrom, stated with characteristic conservatism:

"As with many other woods, it is only the heartwood that shows great durability. The sapwood lasts but a few years when subjected to conditions favoring decay. On the other hand, instances have been cited, on what is apparently good authority, showing remarkable periods of use for heart cypress shingles. A roof at Greenwich, Conn., was laid in 1640, and was said to be serving well 250 years afterwards; another in Brooklyn, N. Y., was said to have lasted 228 years, and another at Clifton, Staten Island, had 200 years to its credit when last reported, and was still in use. Many instances of use exceeding a century are cited to show the wood's lasting qualities. This is not only true when used as roofs, but for other purposes. New Orleans cypress water mains remained sound nearly a century, and a cypress headboard at a grave in South Carolina was so well preserved after 140 years that the letters on it were easily read. Marble and sandstone gravestones often decay and crumble in less time. A still longer period has been claimed for cypress coffins in Charleston, S. C. It is said they were found in fair condition at the time of the earthquake, though they had been in the ground since 1678.

"*Exterior and Interior Finish*—Cypress is put to almost every use as interior trim for houses. It may be finished in natural color or stained. The wood contains little resin and thus affords a good surface for paint, which it holds well. It shrinks, swells, or warps but little.

"For the parts of houses exposed to the weather it serves equally well. *As siding it practically wears out before it decays.* When made into porch and portico columns it retains its shape, holds paint, and has sufficient strength to sustain necessary loads. It is placed as cornice, gutter, outside blinds, pilasters and railing, and is much used for porch floors and steps.

"One of the widest uses of cypress is in greenhouse construction. It is pre-eminently fitted for that trying place, where it is called upon to resist dampness, excessive heat, and all the elements that hasten decay. It is said that no other lumber approaches cypress in the quantity used for green and hot houses. It is manufactured into sash, frames, benches, boxes, and practically all else that the builder needs. Its slight tendency to warp has caused its employment by builders of incubators."

Cypress Pocket Library.

We believe we are rendering a real public service by extending the scope of The Cypress Pocket Library (41 vols.), convenient in size, authoritative in character, of provable value as a technical guide, and careful and scrupulous in its every statement or inference.

We do not by any means recommend the use of Cypress without discrimination. Cypress is not the best wood for every use, but where it *is* appropriate it is so emphatically (and demonstrably) the one best wood that the many should know about it, instead of the comparatively few who hitherto have profited by their special knowledge.

Architects are invited to write for any of the 41 volumes of the Cypress Pocket Library. Volume No. 1 contains full list of our publications.

SOUTHERN PINE ASSOCIATION

J. E. RHODES, Secretary-Manager
Inter-State Bank Building
NEW ORLEANS, LA.

Products.

Southern Yellow Pine, manufactured into lumber in all its forms—Dimension, Timbers, Lath, Shingles, and Planing Mill Products of all standard and special sizes and grades.

TRADE-MARK

Uses.

Southern Yellow Pine is the backbone of the building industry. Thirty-six per cent of all the lumber consumed in America is that wood, and enormous quantities are used in Europe for every form of construction. Its distribution over the world is limited only by the restrictions of facilities for transportation. Bulletin 99 of the United States Department of Agriculture, "Uses of Commercial Woods of the United States," says of Southern Yellow Pine: "In a large part of the country it is so universally used that there are few places of importance it does not fill." Its good qualities are so varied, and its adaptability so universal, that it has acquired the title, "The Wood of Service." Its uses range from toys to trestles; from the most delicate interior trim and finish to the giant timbers of the heaviest construction.

Structural Timbers.

Southern Yellow Pine is of the first importance in every type of heavy and mill construction. No other material possesses in such perfect proportion the qualities of cross-breaking strength, crushing strength and resistance to shear. It is universally used for trestles, beams, piling, trusses, sleepers, sills, columns, ties, rafters—wherever strength and rigidity are requirements. In character the wood is heavy, dense, strong; the grain fine, even, straight; durable in contact with the soil.

Light Construction.

Southern Yellow Pine is the "all-purpose" wood in home building and light construction, supplying framework, siding, flooring, ceiling, sheathing, lath, shingles, sash and doors, newel posts, rails, spindles; in a word, every variety of dressed or turned exterior or interior finish and trim.

Its remarkable strength makes it particularly suitable for framing; durability and workability fit it especially for use as siding and all exterior trim. The texture is such that it is suited to the finest joinery, and the handsome grain makes it highly acceptable for use as interior trim.

When the materials are applied in a workmanlike manner, Southern Yellow Pine takes and holds perfectly paints, stains, enamels and varnishes. Special instruction as to obtaining the best results in finishing may be obtained free of charge from the Association.

Creosoted Wood Block Paving.

Municipal engineers everywhere now are agreed that the ideal pavement is the modern pavement of Southern Yellow Pine Creosoted Wood Blocks. It is noiseless, sanitary, smooth, dustless, resilient. In endurance it has repeatedly proved superior to granite blocks, bricks, and asphalt; and its upkeep, or maintenance, is the least of any paving material known.

For floors in factories, mills, warehouses, driveways, stables, and on bridges and viaducts, Southern Yellow Pine Creosoted Wood Blocks are fast growing in general use in preference to any other material at any price. Such floors are dry, clean, sanitary, easily repaired, easy on the feet of workmen and draught animals, and because of their durability are the most economical where floors are subjected to severe usage. Send for the Association booklets, "What the Cities Say About Creosoted Wood Blocks," "Noise—the Nerve Wrecker," and "Floors of Service."

Durability.

Southern Yellow Pine is impregnated with resin and other natural preservatives to a degree that makes it extraordinarily resistant to decay. Proofs of this quality may be seen in hundreds of aged structures everywhere in America and particularly in the humid climate of the South, where there are scores of homes one hundred to one hundred and fifty years old still in use and in a practically perfect state of repair.

New Grading Rules.

Southern Yellow Pine is manufactured to conform to the standard sizes and dressing of the Southern Pine Association. For the use of engineers and architects, tables of nominal and actual sizes have been prepared, and to these have been added data concerning the properties of the sections. These data are of the same nature as those used in connection with steel construction, and afford the builder with wood the same facilities for accurate work.

The Standard Specifications for Southern Yellow Pine Bridge and Trestle Timbers, adopted by the American Society for Testing Materials, September 1, 1910, are in effect identical with those of the American Railway Engineering Association. Also the specifications for the Grading of Structural Material on the basis of density of growth, as suggested by the United States Forest Service and adopted by the American Society for Testing Materials, August 21, 1915, are published, with illustrations of the application of the rules, by the Southern Pine Association.

Under the new rules adopted by the Association, grading is reduced to an exact mathematical calculation and assures absolute dependability in quality. That means the complete elimination of future uncertainty in specifying Southern Yellow Pine for exacting uses in heavy construction.

Sources and Supply.

Southern Yellow Pine is very moderate priced, because it is very plentiful. In spite of the fact that the annual production is more than three times that of any other commercial wood, there is no danger of the supply being exhausted for many years to come.

Association Literature.

The "Manual of Standard Wood Construction," revised and enlarged, with new grading rules, building codes, working formulae, effects of creosoting, etc., is now ready.

Booklets on creosoted wood block paving, silos, farm building helps, house and barn plans, lumber pointers, interior floors, etc., all for free distribution. This literature, or special information suited to your individual needs, sent on request.

ESTABLISHED 1864

BUREAU BROTHERS

FOUNDERS OF

Architectural and Statuary Bronze and Brass

Southeast Corner 23d and Westmoreland Streets

PHILADELPHIA, PA.

Products.

Bronze Work, including Statuary, Bronze and Brass Castings; Architectural Work; Memorial and Inscription Tablets; Mausoleum Doors and Fittings; Balcony Railings; Fountains; Lamp Standards; Grilles and Gates. We do everything in the line of Castings.

Memorial and Inscription Tablets.

We have an increasing demand for our Memorial and Inscription Tablets. Our own designs are the results of the efforts of our best artists. We fill orders for these, however, from special designs as well as designs by architects, or from our large stock of type patterns.

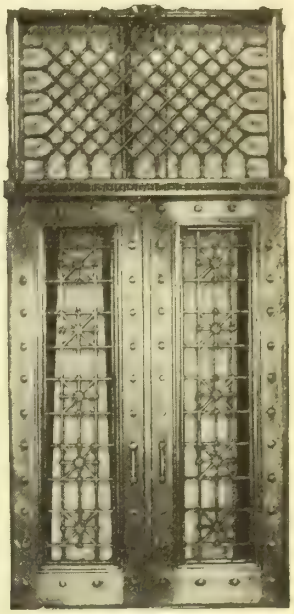
Illustrations.

The accompanying illustrations will give an idea of the character of work executed by us.

Facilities.

Our manufacturing facilities are of the best, enabling us to fill orders of any size. There is no limitation to our territory.

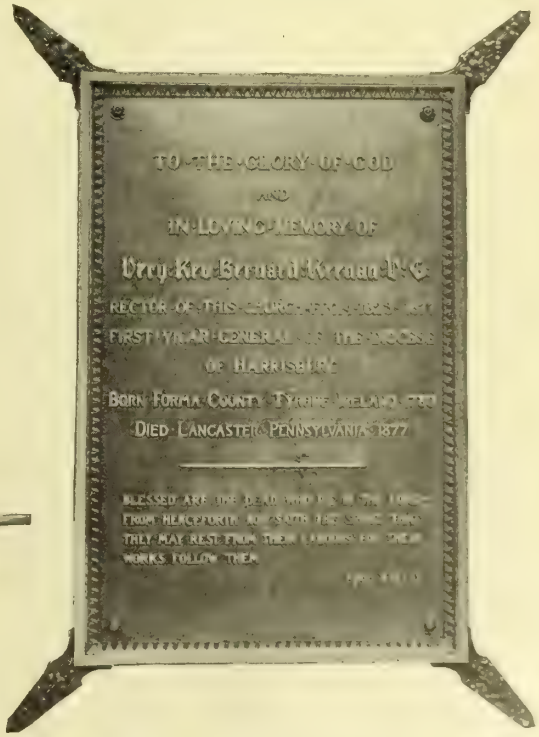
RAILING, RESIDENCE OF MR. POTTS, BRYN MAWR, PA.
Cope & Stewardson, Architects



DOORS, NATIONAL BANK OF CHESTER COUNTY, WEST CHESTER, PA.
E. James Dallett, Architect

MARY JEMISON, LETCHWORTH PARK, GLEN IRIS, N. Y.
H. K. Bush-Brown, Sculptor

GROUP ERECTED IN GENEVA, KENT CO., ILL.
Carl Heber, Sculptor



MEMORIAL TABLET, LANCASTER, PA.

THE AMERICAN BRASS COMPANY

THE COE BRASS BRANCH

MANUFACTURERS OF

Extruded Metal Mouldings

ANSONIA, CONN.

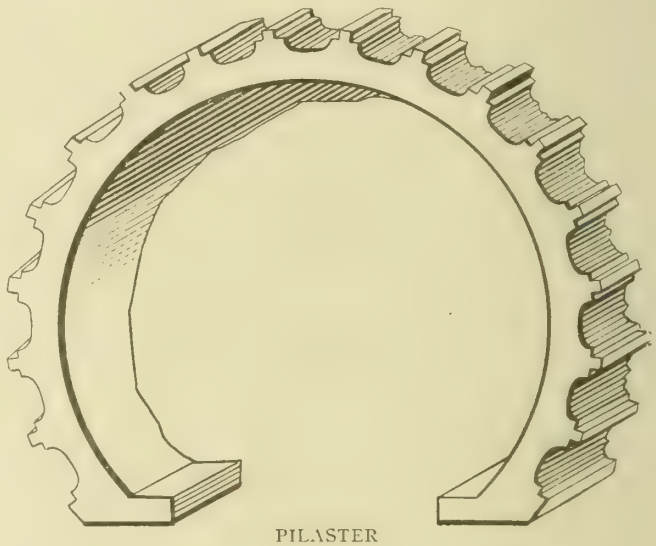
Products.

ARCHITECTURAL BRASS and SPECIAL BRONZE MOULDINGS, ANGLES, CHANNELS, TEES, and other SPECIAL-SHAPED BARS constant in section, manufactured by the Extrusion Process.

Extrusion Process.

A billet is first cast of a convenient size and suitable composition for the purpose intended. This billet is reheated until it is of plastic consistency and then is placed within a very strong cylinder, at the end of which is placed the proper die. Upon hydraulic pressure being applied the plastic metal is forced through the die, issuing therefrom in a long bar of the cross-section required.

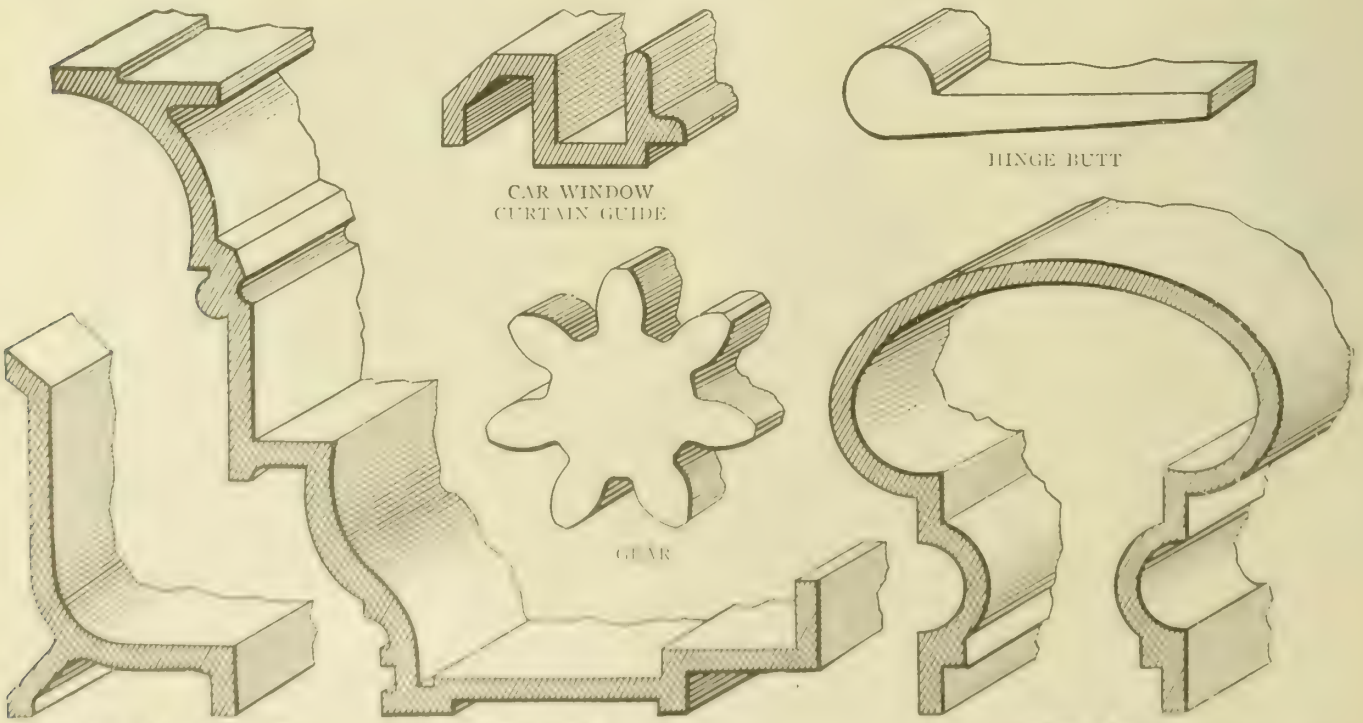
The very high pressure (frequently as high as 60,000 pounds to the square inch) to which the semiplastic metal is thus subjected gives it increased density and renders it perfectly homogeneous and free from possible casting defects. The bars produced by this process have a much higher tensile strength than castings and are very durable for wear. For special purposes, alloys are made having the requisite strength and elongation for work demanding the strength of good quality steel.



PILASTER

CAR WINDOW CURTAIN GUIDE

HINGE BUTT



GEAR

CORNICE

HAND RAIL

Continued on next page

Illustrations.

The accompánying illustrations show a few representative shapes made by the Extrusion Process which we have supplied on orders for various classes of work.

Utility.

Extruded Mouldings and Shapes are specially adapted for use in the construction of fireproof doors, window sash and frames, store fronts, bank counter screens, cornices, hand-rail, stair nosings, sanitary base moulding, and other art-metal construction.

Extruded Shapes are used in various other lines of manufacture, both in bar lengths and sawed up into short pieces. The metal being perfectly smooth and accurate requires little if any machining, and therefore affords an efficient and economical means for making small, intricate parts.

Advantages.

Extruded Mouldings and Shapes cost less than machined castings and are far superior in tensile strength and stiffness. Shapes which can not be rolled or drawn can be made readily by the Extrusion Process. Among the many other advantages are uniformity and clean-cut architectural lines throughout.

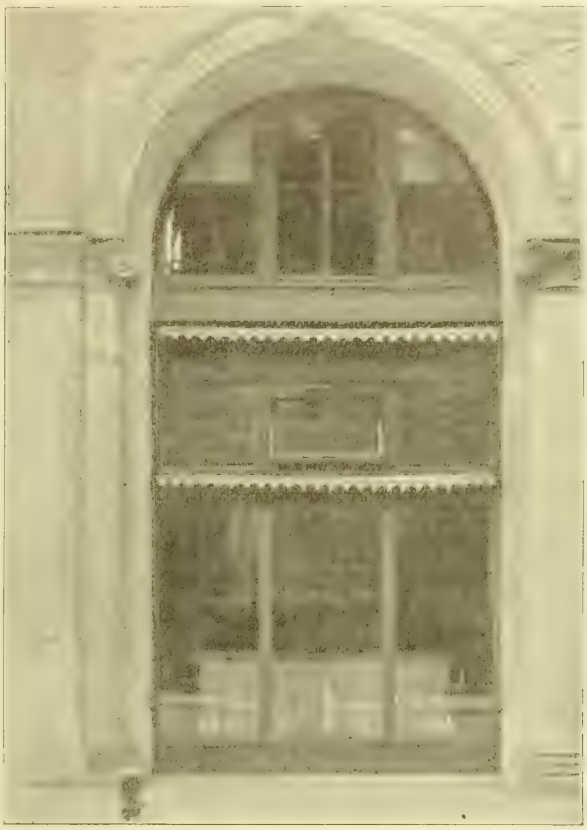
Facilities.

We are equipped to manufacture these Shapes on the most extensive scale, and we guarantee the best of service. They are shipped from our mill having a smooth surface and in the lengths required by metal workers, who can treat them to obtain any finish desired.

Estimates and Co-operative Service.

Practically all Extruded Sections are made up to order in accordance with drawings and specifications. Upon receipt of this information we will give detailed quotation.

We will be glad to send our representative at any time to consult with architects and metal workers in connection with propositions involving the use of Extruded Shapes.



FRONT OF THE GORHAM COMPANY'S BUILDING, FIFTH AVENUE, NEW YORK, N. Y.

McKim, Mead & White, Architects

Showing application of Extruded Mouldings for construction of Store Fronts

NEW YORK PUBLIC LIBRARY BUILDING

Carrère & Hastings, Architects

Patented Metal Window Frames and Sash designed by Ferdinand Müller, Architect, and fabricated by the Henry-Bonnard Bronze Co., Mt. Vernon, N. Y., from our Extruded Mouldings and Shapes

ESTABLISHED 1866

E. T. BARNUM

Wire and Iron Work

DETROIT, MICH.

Products.

Fire-Escapes; Porticos and Canopies; Window Guards, Folding Gates, Steel Shutters, Iron Stairs, Balcony Railings, Iron and Wire Fencing, Grilles, Gratings, Panels; Brass, Bronze and Wire Railings; Stable Fixtures, Stall Guards; Metal Flag Poles, Wire Signs, Mausoleum Doors, Fireproof Vault Doors; Sidewalk Lights and Doors; Lawn Furniture, Ornamental Wire, Iron, Steel, Bronze and Brass Work of every description.

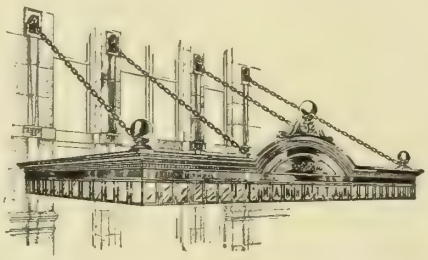
For Jail Equipments, see our name in General Index.

Description of Products.

Principal subjects are herewith illustrated.

Canopies, Marquises and Porticos.

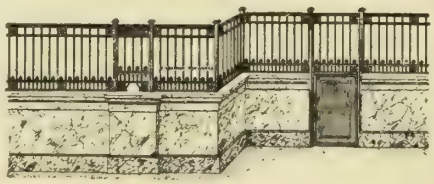
For theaters, hotels, apartments and other public and business buildings. Constructed in cast or wrought iron, sheet copper and galvanized sheet metal.

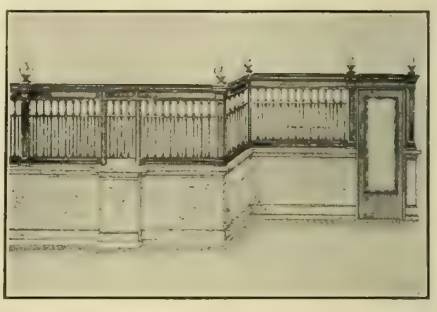


MARQUISES

Bank Screens and Office Railings.

Any design, type or construction made to order from special designs and details.





BANK SCREENS AND OFFICE RAILING

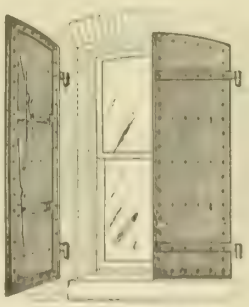
Iron Fencing.

For private grounds, cemeteries, industrial plants, etc. Our Engineering Department will solve your fence problems in regard to grades, ravines, switching tracks, driveways, etc. No obstacles we cannot overcome.

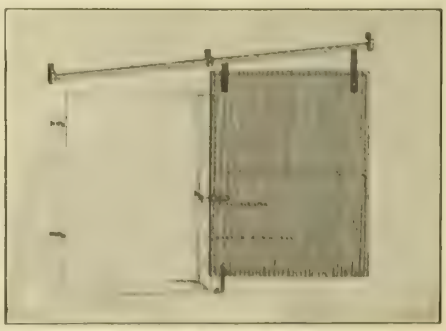
IRON FENCING

Fire Shutters and Doors.

Interior or exterior. Furnished in single- or double-hung and sliding types. These are essential for protection from fire. Any size opening and all conditions are easily covered with our construction. Full particulars on request.



FIRE SHUTTERS

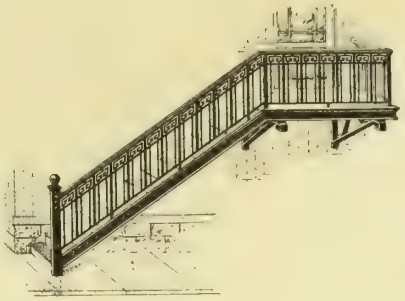


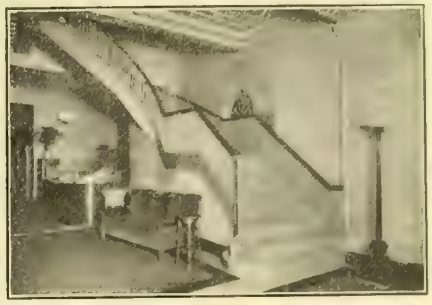
FIRE-DOOR

Continued on next page

Stairways and Stair Railings.

The simplest or the most elaborate designs for residence or apartment use, as well as the plain type for factory purposes. We have hundreds of designs on file for approval.





STAIRWAYS AND STAIR RAILINGS

Signs.

Display signs, in wire, iron, and galvanized sheet steel, for use on factories, mercantile buildings, and industrial plants. Any size and any construction.

SIGNS

Fire-Escapes.

All kinds made and erected to conform to any State laws. Our Engineering Department has exhaustive data covering every type of escape required by law. This information will be given without charge.

FIRE-ESCAPES

Folding and Collapsible Gates.

Entrance enclosures for theaters, public buildings and mercantile institutions are furnished in our own original designs to fit any conditions. Illustrations and full specifications on request.

Mausoleum Doors.

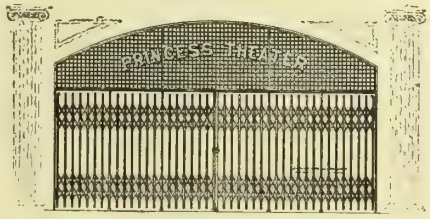
Bronze and brass gates, memorials, tablets, lamp standards, railings and enclosures. Photographs, sketches and drawings will be submitted for selection.

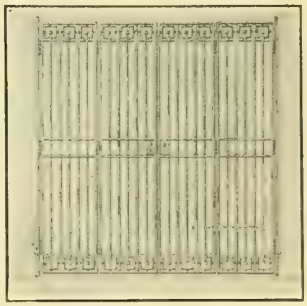
Estimates and Data.

Detail drawings, specifications and proposals will be furnished promptly. Our designers and engineers can make valuable suggestions.

Catalogues.

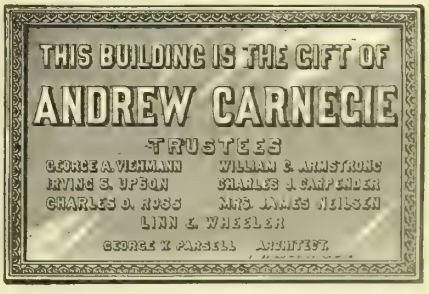
Illustrated catalogue covering various subjects may be had on request. Explain requirements, and we will send the most appropriate printed matter.





FOLDING AND COLLAPSIBLE GATES

MAUSOLEUM DOORS



TABLET

JULIUS BLUM & CO.

DEALERS IN

Ornamental Iron and Light Structural Shapes, and Flexible Metal Hose

TELEPHONES: CHELSEA 3220, 3221, 220

510-512 West Twenty-fourth Street
NEW YORK, N. Y.

CABLE ADDRESS: "JULBLUM"

Products.

ROLLED STEEL (Wrought Iron) MOULDINGS, Plain and Ornamented; WROUGHT IRON WELDED DOOR FRAMES; SQUARE and RECTANGULAR STEEL TUBING; ROUND and OVAL STEEL TUBING; DROP-FORGED FENCE PICKETS; BALL-RIVETS, BALLS and BALL-SCREWS; PEARL BARS; FORGED ROSETTES, LEAVES, CUPS, WREATHS, etc.; ROLLED STEEL DOOR SADDLE, BRIDGE and HAND RAILS; CONCRETE and ASPHALT STEP NOSING, STEEL STAIR TREAD NOSING; SASH BARS, and SKYLIGHT BARS; SQUARE ROOT LIGHT ANGLES, CHANNELS, T- and Z-BARS; FORGED STEEL SHEARING and PUNCHING MACHINES; PRESSED STEEL RISERS; ALL-STEEL STAIR POSTS, STEEL TOPS and DROPS; FLEXIBLE METAL HOSE and TUBING.

Special Rolled Steel Shapes.

We roll to order any section, no matter how difficult, if the quantity is sufficiently large.

We solicit inquiries for difficult rolling propositions.

Rolled Steel (Wrought Iron) Mouldings.

Especially adapted for the construction of store fronts, steel stairways, elevator enclosures and cars, iron doors and door jambs, fences, marquees, and all other ornamental iron work.

Mouldings are made of the best soft steel, rolled true and smooth with sharp lines. They can be bent and forged. Bars are 17 to 20 feet long, and are thoroughly straightened. A large variety of shapes is carried in stock. Some typical designs are shown on page opposite.

Rolled steel mouldings are cleaner and cheaper than those of cast iron. They are free from sand holes, which is important when polishing and plating are desired. The risk of breakage is eliminated.

Pickets.

Drop-forged of best stock, free from impurities, enabling easy welding. The lines are sharp and clear. A large variety is carried in stock.

Square and Rectangular Tubing.

Different sizes and gauges carried in stock. Special tubing for door frames and elevator work. Special locks and hinges kept in stock.

All-Steel Stair Posts.

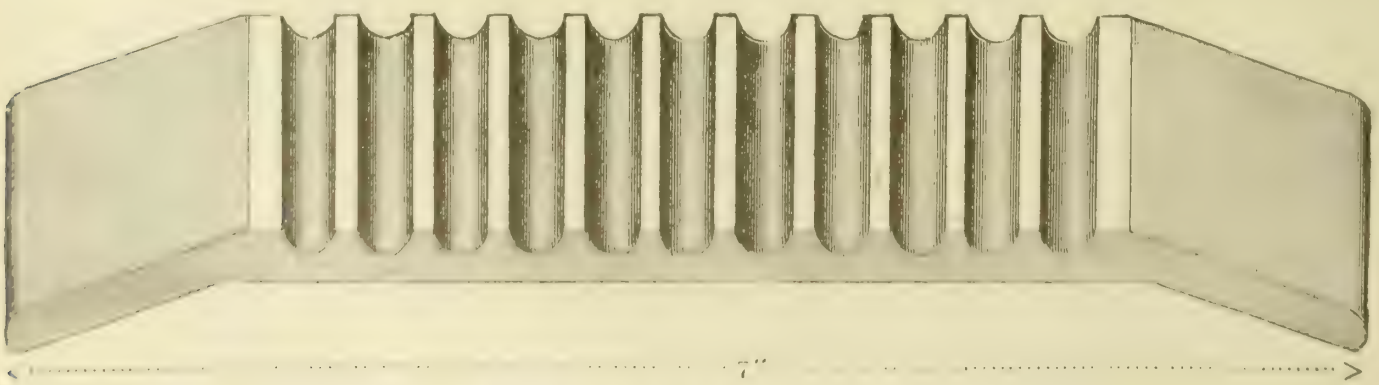
Special 3 by 3 inches by $\frac{3}{16}$-inch square tubing for stair posts. Drop-forged steel caps and drops. Complete posts furnished to specified lengths.

Flexible Metal Hose and Tubing.

The ideal hose for steam, compressed air, welding torches, sand blast, suction, oil, road oil, water, gas, gasoline, vacuum cleaning. Can be furnished in steel, bronze, brass and aluminum from $\frac{3}{16}$ inch up to 16 inches internal diameter. Special metal hose for rock drills, pile drivers, and diaphragm pumps. All styles of fittings attached.

Catalogue.

Catalogue mailed free on request.



ROLLED STEEL DOOR SADDLE No. 1500

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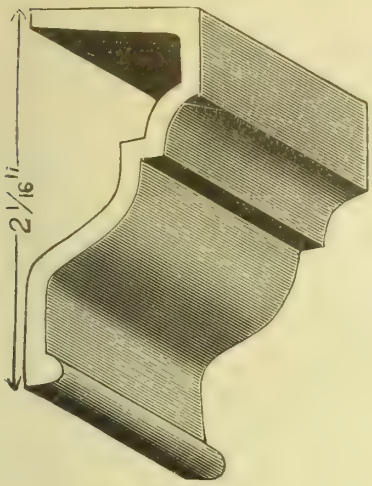

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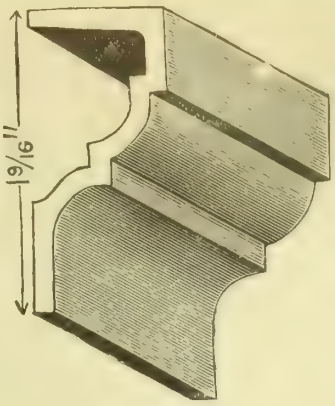

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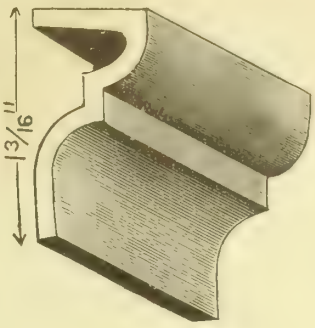

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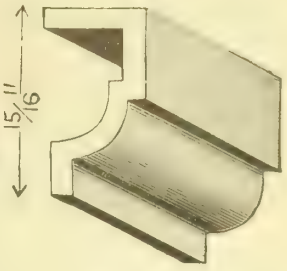

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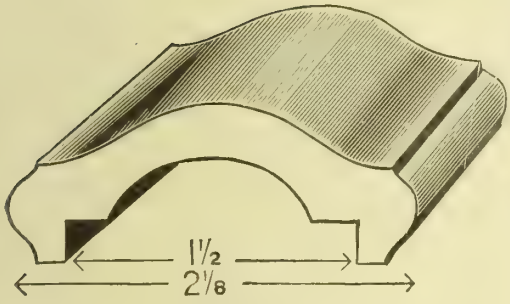

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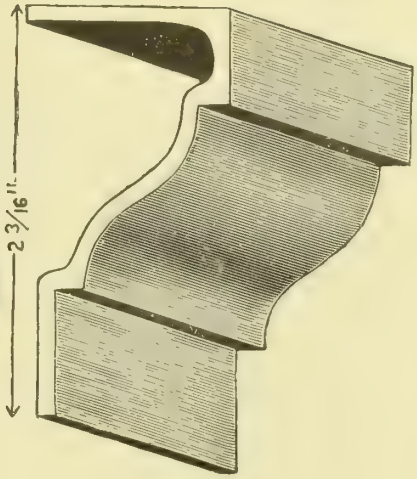

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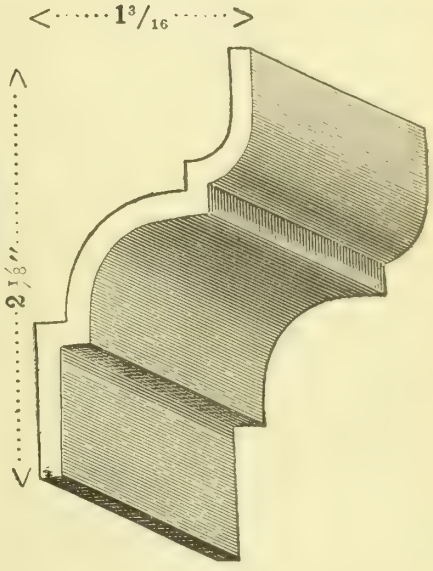

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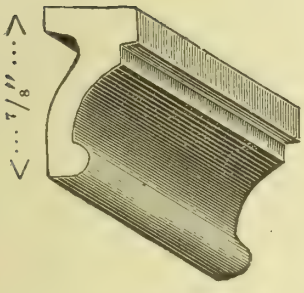

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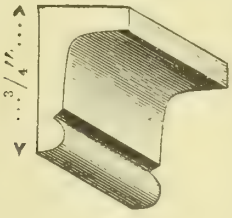

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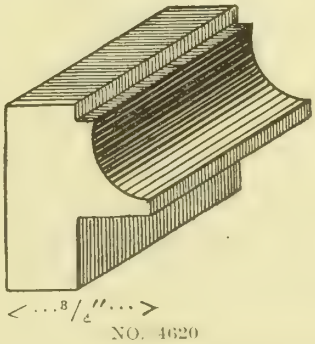

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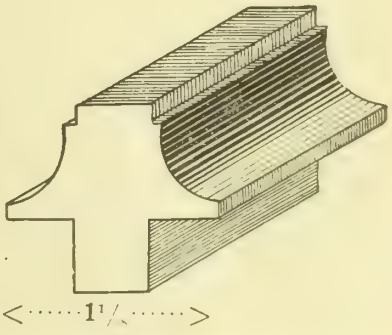

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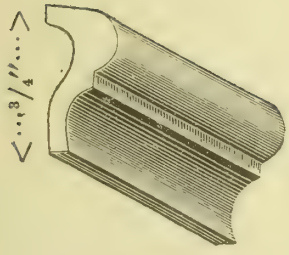

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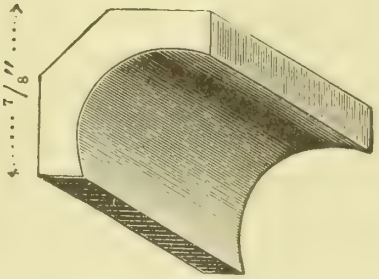

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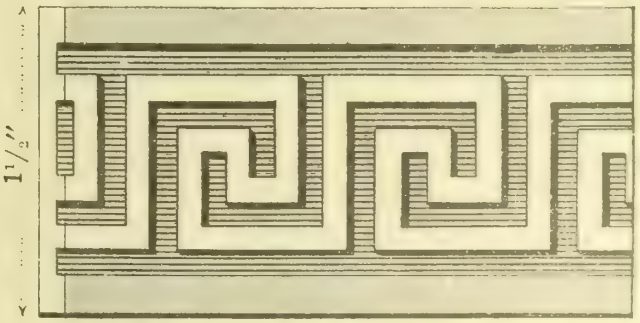


NO. 5071

ROLLED STEEL (WROUGHT IRON) MOULDINGS

Showing Some Designs Carried in Stock

J. E. BOLLES, President
ALFRED J. JONES, Treasurer
J. B. MANSFIELD
Vice-Pres. and Gen. Mgr.
W. H. LEFEVRE, Sales Mgr.
F. L. TULLY, Sec'y and Pur. Agt.

J. E. BOLLES IRON AND WIRE WORKS

INCORPORATED UNDER THE LAWS OF MICHIGAN

Engineers, Designers and Manufacturers

Fourth Avenue and Porter Street
DETROIT, MICH.

Products.

Metal Work: Architectural and Ornamental Brass, Bronze, Iron, Steel.

Bank Enclosures, Bank Fixtures.

Elevator Cars, Doors and Enclosures.

Elevator Safety Devices and Locks, for Elevator Cars.

Marquises.

Fire-Escapes.

Doors: Fireproof, Metal-Covered, Kalameined.

Gates.

Railings for Banks and Offices.

Stairs: All-Steel Circular Stairs; Wrought-Iron Circular Stairs; Spiral Stairs; Wrought-Iron and Steel Stairs (not Circular); Stairway Enclosures.

Bronze Tablets.

Wire Signs.

Fencing: Metal, Wire, Woven Work; Tennis Court Enclosures.

Sidewalk Doors; Stair Plates; Manhole Covers.

Wheel Guards.

Guards for Skylights, Doors, Windows, Trees, Lawns and Flower Beds.

Bank Fixtures and Tellers' Cages.

These are substantial and durable, and for their price cannot be surpassed in appearance. They are made to harmonize with their surroundings. The woodwork is of oak, birch and mahogany.

The counter railings of these fixtures are of genuine standard bronze metal or of polished steel in any of the electro-plated finishes used by the J. E. Bolles Iron and Wire Works. The wickets in these railings have hinges and cylinder bronze locks.

Railings for Bank and Office Buildings.

In the manufacture of these railings special attention is given to office and bank partitions and to wicket and grille work. The ornamental parts of the grille work may be either very elaborate or very simple.

Finish—All work can be finished in gold, silver, nickel, bronze, or in brush-brass and oxidized copper platings in all shades and colors. A finish of baked enamel may be had if desired. The railing may also be either galvanized or sherardized.

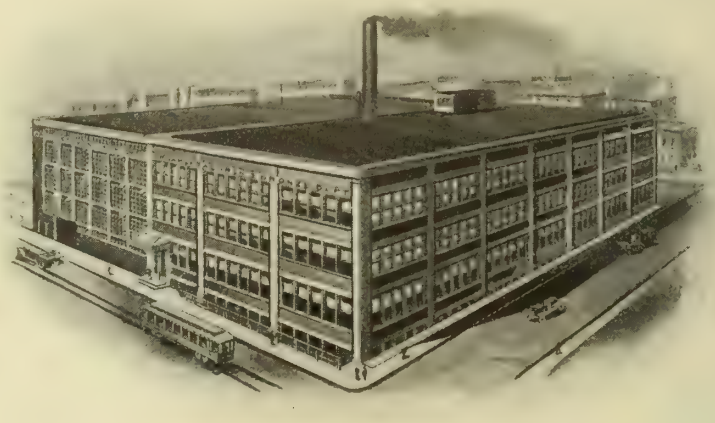
Gates for railings are furnished with spring hinges if desired.

Wire Signs.

The wire signs produced by the J. E. Bolles Iron and Wire Works are built for all purposes. They are made of any desired length or height. In their construction the best galvanized wire is used. Letters are securely fastened to the mesh work with copper wires. The best methods are employed to hold the work in place and to assure durability. All signs are constructed with a view to simplicity and facility of erection. They are erected complete before they are shipped, and then the different parts are so labeled that any good mechanic can put them together properly.

Doors and Entrance Gates.

The J. E. Bolles Iron and Wire Works design and manufacture iron, brass and bronze entrance doors,



J. E. BOLLES IRON AND WIRE WORKS, DETROIT, MICH.

grill room doors, sliding vestibule doors, and also ornamental doors for banking and office rooms.

Entrance gates and vestibule gates are furnished in a great variety of designs. The Bolles gates without arches are attractive for vestibules in churches and public libraries. Arches are furnished separate, if desired, with or without a sign.

The buyer should tell the size of the opening into which the door or the gate is to be fitted, and also the price that he wishes to pay. Illustrations of the best designs will be sent to him, or special sketches will be prepared for him without extra cost, to show what can be done for the price named.

Elevator Cars, Doors and Enclosures.

These products are of many designs and of the best quality. Stock designs of elevator cars are sent on request. The doors are of hollow steel and wire-glass, and can be conformed to any car made.

Marquises.

These are substantial, firmly fastened, beautiful, and in harmony with exterior of the building to which they are attached. They may be made to slant back to the building, where provision may be made for drainage.

Circular or Spiral Stairs.

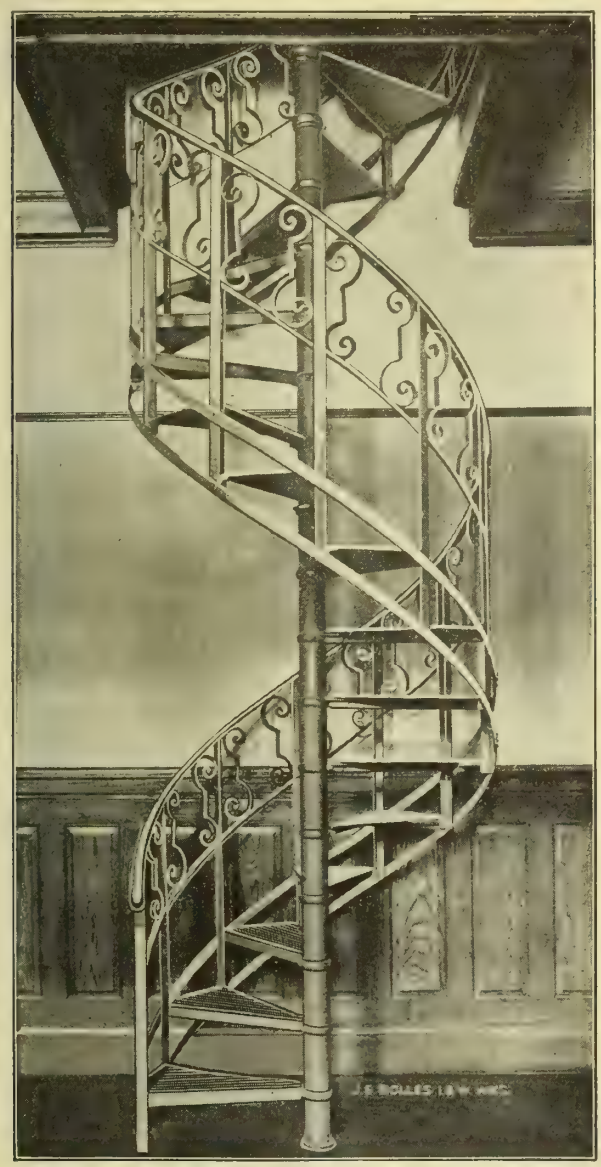
The circular all-steel stairs made by the J. E. Bolles Iron and Wire Works are models of strength and graceful simplicity. They represent the latest improvement in circular-stair construction. Their balustrades may be either plain or elaborate. Their diameters are from twenty-four to sixty inches in size.

Continued on next page

Circular stairs made entirely of wrought iron may be had if desired.

Wrought Iron and Steel Stairs (Not Circular).

For any of these stairs steel stringers are furnished, either plain or ornamental, with treads of slate, marble or steel, and with steel or marble risers. The balustrades and newels are furnished in bronze, iron or steel.



ALL-STEEL CIRCULAR STAIRS D 6605

Outside Stairs or Fire Escapes.

These are constructed under the new Michigan specifications for schoolhouses, halls and public buildings. They are suitable for every-day use as stairs.

When they are ordered, a rough sketch of the side of the building on which they are to be placed should be sent. This sketch should show doors and windows and the location of the work. Approximate measurements should be given. It is especially necessary to tell the number of balconies, the length of each and the height of each from the ground.

Spiral Fire-Escapes.

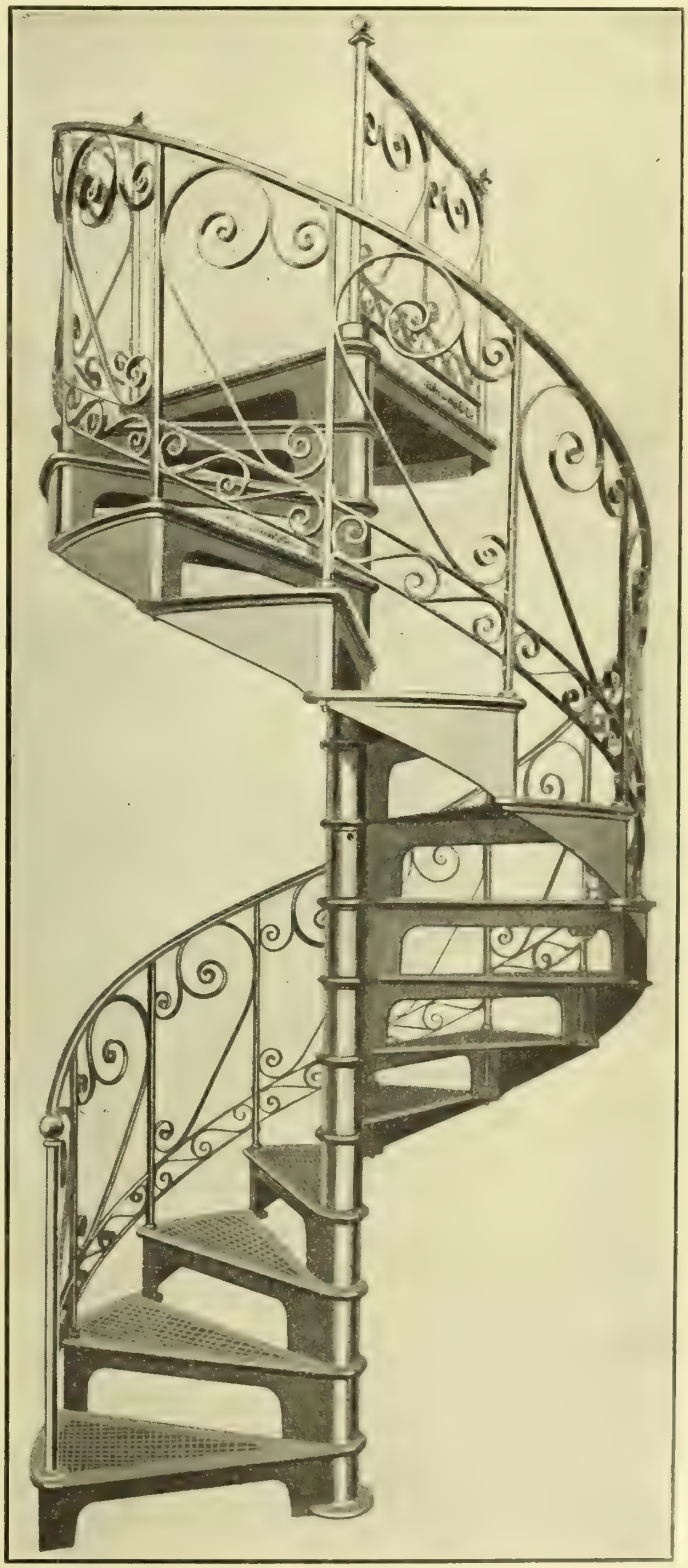
Fire-escapes of this kind are made as high as 260 feet.

Co-operative Service.

The J. E. Bolles Iron and Wire Works are always ready to advise. They will furnish specifications and estimates on plans, and for their regular customers they will prepare special designs without charge.

Information.

Catalogue 29 D is a complete catalogue of plain and ornamental iron, wire, brass and bronze work. It contains approximately three hundred pages, and is a reference book that should be in the office of every architect and general contractor. Write for it.



CIRCULAR STAIRS D 6620, WITH CAST-IRON TREADS AND RISERS

DETROIT MAUSOLEUM EQUIPMENT WORKS

CHARLES BOVENSIEP, PROPRIETOR

Standard Bronze Work for Mausoleums

DETROIT, MICH.

Products.

Designers and Manufacturers exclusively of STANDARD BRONZE WORK for MAUSOLEUMS and MEMORIALS: BRONZE MAUSOLEUM DOORS, WINDOW GRILLES, WINDOW FRAMES, VENTILATORS, CATACOMB HANDLES, and all BRONZE WORK used in and about MAUSOLEUMS; and STANDARD BRONZE CAST MEMORIAL TABLETS.

Construction of Doors.

The mausoleum doors are all of the "built up" type, which consists of two heavy sheets of bronze riveted with countersunk bronze rivets to a substantial inner frame work, forming doors 1 inch thick (standard), 1⅜ inch thick (heavy) and 1⅝ inch thick (extra heavy).

These doors are absolutely rigid, plumb and level; are not affected by extremes of heat or cold, dampness or other weather conditions. They will positively endure for all time, require no care whatever, and are handsome and massive.

Doors are furnished complete with all attachments such as bronze pivotal hinges, threshold, full bronze five tumbler dead lock, slide bolts, ready to set in place. They are made to order only, to fit any size or shape of opening. Hinging attachments are supplied of such shape and type as best adapted for each individual case. Doors can swing in or outward, but usually swing inward.

Separate Door Frames.

Cast bronze separate frames for doors can be supplied if desired, but usually a separate cast frame is not required, as doors are hung direct to granite.

Grilles.

The usual type of mausoleum door has open grille work window, with heavy plate glass shutters on inside, so they can be opened for ventilation.

DESIGN NO. S-800. U. S. STANDARD BRONZE CAST TABLETS

Orders.

Orders should be placed six to eight weeks before actual requirement. Always send floor plan of vault and give full particulars, so that we can understand the exact conditions and suggest best method of hanging to meet each particular case. Complete details are prepared showing how work will be constructed, for architect's approval, before making work.

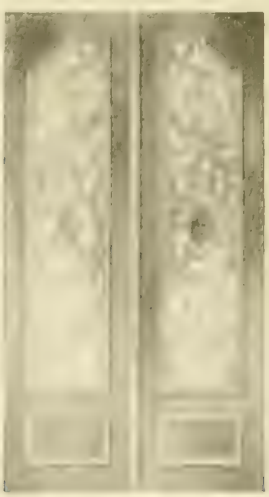
Prices and Catalogue.

No price-list of this work has been prepared, but quote only on receipt of particulars.

Catalogue shows many attractive designs of doors, grilles, frames, catacomb handles, fittings, etc., of interest to the mausoleum builder, and will be sent to architects on application.

Guarantee

This company has furnished bronze equipment for mausoleums all over the country. All the work is absolutely guaranteed first class in material, painstaking workmanship and finish.



Design No. S-91

Design No. S-96

Design No. S-120

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Fire-Escapes
Flag Pole Bases
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Folding Gates
Fountain Jets
Fountains, Display and Lawn
Game Enclosures
Hitching Posts
Iron Railing
Iron and Wire Trellises
Kennel Yards
Lamp Posts and Brackets
Leader Shoes
Lightning Rods
Manhole Frames, Covers and Gratings
Marquees
Ornamental Iron Work
Poultry Runs
Park Benches
Pipe Railing
Paddock Enclosures
Road Boxes (Cast Iron)
Sanitary Stall Drains
Settees, Chairs, Tables
Spiral Stairs
Stable Fittings
Statuary (Metal)
Street Sign Posts
Sundials and Pedestals
Swimming Pool Equipment
Tennis Court Enclosures
Traffic Standards
Tree Guards
Trench Covers and Curbing
Turnstiles
Umbrella Stands
Vases
Vestibule Doors
Weather Vanes (Silhouette and Dial)
Wheel Guards
Wire and Iron Fencing
Wire Office Railing and Partitions
Wire Window Guards

PLATE 3001FS. RAILING AND GATES OF CLARK ESTATE, COOPERSTOWN, N. Y.

Height, 6 feet 6 inches; uprights, ⅞ inch square; rails, 2 x ¾ inches flat; panel posts, 1¼ inches square, set in stone.
Erected by us twenty-five years ago, photograph taken in 1915. Note perfect alignment.

Quality.

The quality of our product is best evidenced by installations for government, states, cities and leading commercial organizations, and upon the private estates of America's most cultured and critical people.

Co-operative Service.

We are pleased to submit estimates for our product either delivered or erected complete. A well organized engineering staff is maintained, and we contract for designing and erection complete when desired. We are anxious to co-operate with the architect, contractor or owner in executing usual specifications.

Where material is delivered only, instructions and drawings will be furnished to enable local mechanics to erect the work. Sketches and designs will be furnished on request, and full information as to sizes and weights of material will be given.

This has been a fixed policy with us throughout more than half a century of successful manufacture and marketing of Ornamental Metal Work.

PLATE 3218FS. ENTRANCE GATE AND LAMPS DESIGNED AND ERECTED FOR THE ESTATE OF MISS BILLIE BURKE, HASTINGS-ON-HUDSON, N. Y.
Width between piers, 17 feet; height, 11 feet

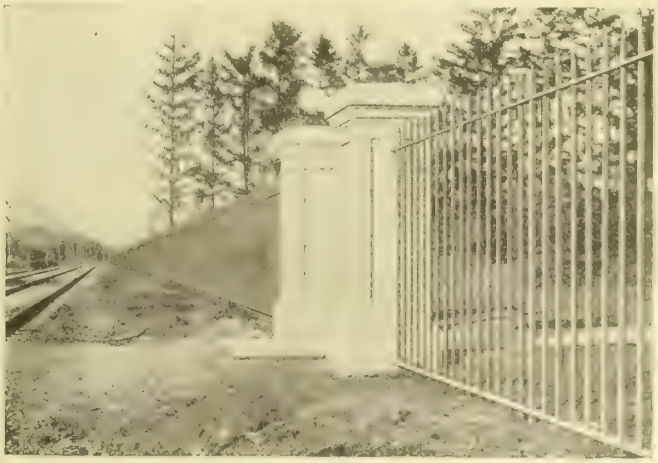


PLATE 3106FS. COMPLETE INSTALLATION OF WROUGHT IRON FENCING, INCLUDING CONCRETE PIERS AND LAMPS, ST. ELIZABETH CONVENT, CONVENT, N. J.
3200 feet of railing, 7 feet high. Posts set in concrete

Continued on next page

"Set-in-Concrete" Posts.

We strongly recommend fence posts being set in concrete. This method keeps the posts from being thrown out of alignment by frost, and prevents them from rusting off at the ground line.

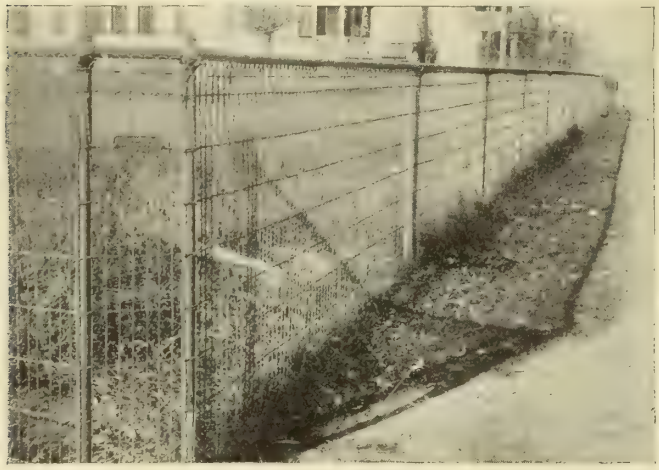
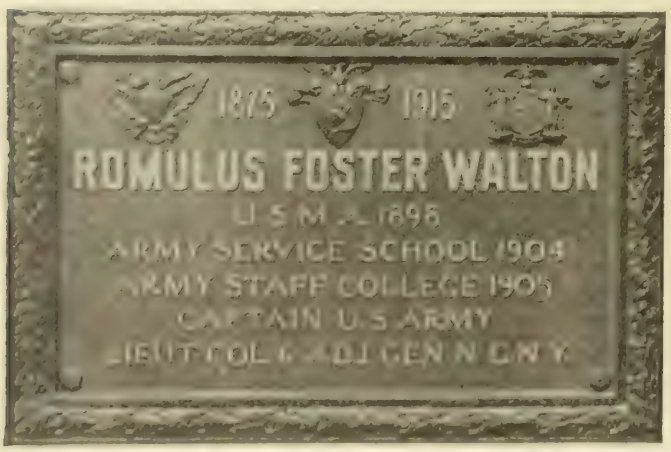


PLATE 3050FS. WOVEN WIRE LAWN FENCE, PASSAIC, N. J.

A neat and substantial wire fence thoroughly galvanized. Can be made in heights up to 8 feet; mesh, 1½ inch; 2¼- or 3-inch "Set-in-Concrete" posts

PLATE 3234FS. CLIMB-PROOF CHAIN LINK FENCE AND GATES, COOK LINOLEUM WORKS, TRENTON, N. J.

Height, 7 feet; mesh, 2-inch No. 6 galvanized wire on "Set-in Concrete" galvanized posts, with malleable iron tops and arms in one piece. Galvanized barbed wire above the fabric. Absolutely climb-proof. Made in height up to 12 feet



BRONZE TABLET AND INSCRIPTION

Furnished from architects' designs or our own designs

PLATE 3305FS. TENNIS-COURT ENCLOSURE, SHIPPAN POINT, STAMFORD, CONN.

Chas. A. Patterson, Architect

Heavy galvanized wire fabric with "Set-in-Concrete" posts, galvanized. Furnished any height

PLATE 3245FS. RAILING AND GATES FOR ANDREW McLEAN COMPANY, PASSAIC, N. J.

7 feet high; ¾-inch square uprights; 2 x ½-inch horizontal rails; "Set-in-Concrete" posts 1 inch square. Railing built in any height and design

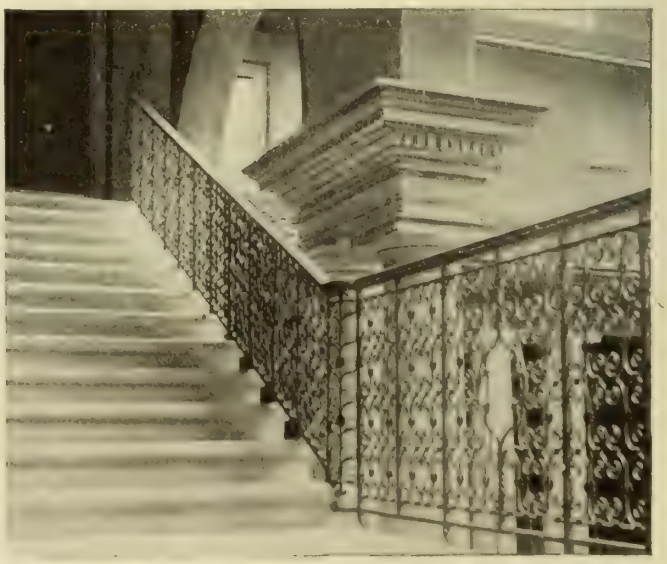


PLATE 3116FS. ORNAMENTAL WROUGHT IRON STAIR RAILING. FURNISHED AND ERECTED FOR ROBERT GOELET, GLENMERE LAKE, N. Y.

Carrère & Hastings, Architects

Continued on next page

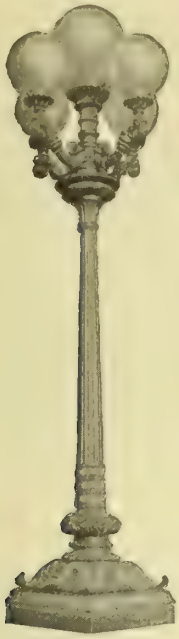


PLATE 439CF
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We have an extensive line of plain and ornamental Electric Light Standards and Brackets for buildings, grounds and general use, made in either cast iron or bronze. Separate catalogue furnished

STABLE FITTINGS FURNISHED AND INSTALLED BY J. W. FISKE IRON WORKS IN WILLIAM ZIEGLER'S STABLE, NOROTON, CONN.
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PLATE 13S. THREE-BASIN FOUNTAIN
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ORNAMENTAL CAST-IRON FLAG POLE BASE, FURNISHED FOR THE MONTCLAIR HIGH SCHOOL, MONTCLAIR, N. J.
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This base, together with a number of other attractive designs, can be furnished for various size poles

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The facilities of this Company for producing Bronze are unequaled; our foundries and shops are the largest in this country devoted exclusively to Bronze production. This equipment, combined with our control of various patents and processes, gives us advantages that are exceptional and unique.

We can cast (by our process), in "healthy" metal, Ornamental Bronze having "undercut" sections at a very slight advance in price over that of ordinary "flat" ornament, thus offering to the designer possibilities that have heretofore been considered prohibitive. See succeeding page.

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Gorham Standard Monumental Construction, Gorham Standard Architectural Construction, and Gorham Standard Commercial Construction offer classifications in Architectural Bronze, in regard to construction and cost, that assure a specifically graded handling which is adapted to works of varied character and is the practical solution of this troublesome problem.

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The services of our Directing Architect and a corps of specialists are at the disposal of architects and prospective purchasers. Requests for information, designs or estimates will receive prompt attention.

References.

Our commissions include some of the most noted examples of American Bronze production of recent years, and we number among our patrons the greatest names in the Nation's Art and Architecture.

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Cleveland Post Office	Cleveland, Ohio	Arnold W. Brunner
Lawyers Title, Insurance & Trust Co.	New York, N. Y.	Clinton & Russell
First National Bank	Richmond, Va.	Clinton & Russell and A. C. Bossom
N. Y. Public Library Approaches	New York, N. Y.	Carrère & Hastings
Manhattan Bridge Approaches	New York, N. Y.	Carrère & Hastings
Head Office, Bank of Toronto	Toronto, Can.	Carrère & Hastings and Eustace G. Bird
Paul Jones Memorial Chapel	Annapolis, Md.	Ernest Flagg
Perry Memorial	Put-In-Bay, Ohio	J. H. Freedlander and A. D. Seymour, Jr.
E. H. Gary Residence	New York, N. Y.	C. P. H. Gilbert
St. Louis Public Library	St. Louis, Mo.	Cass Gilbert
Turks Head Building	Providence, R. I.	Howells & Stokes
Belmont Mausoleum	Woodlawn Cemetery, N. Y.	Hunt & Hunt
[illegible] Savings Bank	E. Boston, Mass.	Thos. M. James
Citizens Savings Bank	Stamford, Conn.	L. E. Jallade
City National Bank	Knoxville, Tenn.	Mowbridge & Uffinger
Morgan Addition, Metropolitan Museum of Art	New York, N. Y.	McKim, Mead & White
[illegible] Trust Co	Boston, Mass.	McKim, Mead & White
McKinley Memorial	Canton, Ohio	H. Van Buren Magonigle
J. P. Morgan Memorial Library	Hartford, Conn.	Benj. Wistar Morris
Commonwealth Trust Co.	Boston, Mass.	Peabody & Stearns
[illegible]	Boston, Mass.	Parker, Thomas & Rice
N. Y. State Educational Building	Albany, N. Y.	Palmer, Hornbostel & Jones
[illegible]	Washington, D. C.	John Russell Pope
[illegible]	Cleveland, Ohio	Charles A. Platt
[illegible]	Lynchburg, Va.	Stem & Fellheimer
[illegible]	Providence, R. I.	Stone, Carpenter & Wilson
Massachusetts Mutual Life Insurance Co. Building	Springfield, Mass.	Trowbridge & Livingston
[illegible]	Jefferson City, Mo.	Tracy & Swartwout
H. C. Alexander Residence	New York, N. Y.	Warren & Wetmore
R. Livingston Beeckman Residence	New York, N. Y.	Warren & Wetmore
[illegible]	Los Angeles, Cal	Weary & Alford Co.
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Hanan Shoe Store	Pittsburgh, Pa.	Seymour & Schonewald
Core Mausoleum	Norfolk, Va.	H. Van Buren Magonigle

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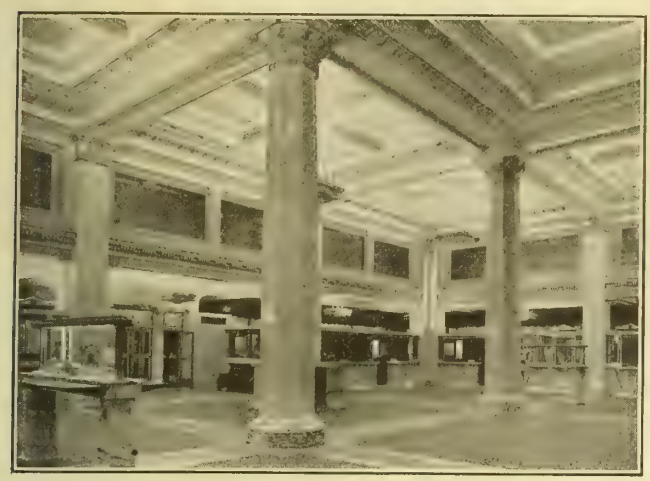
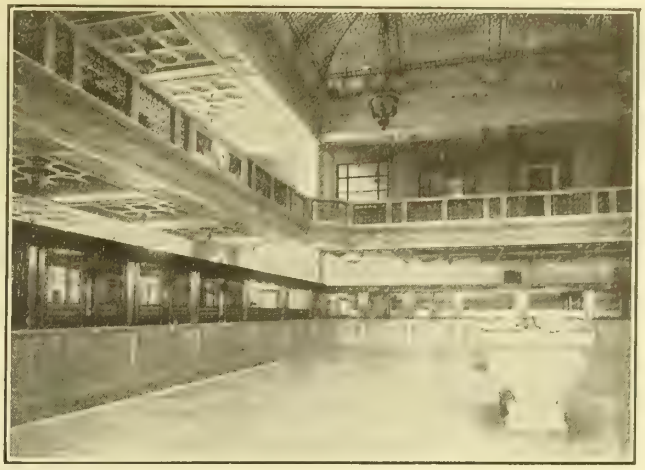
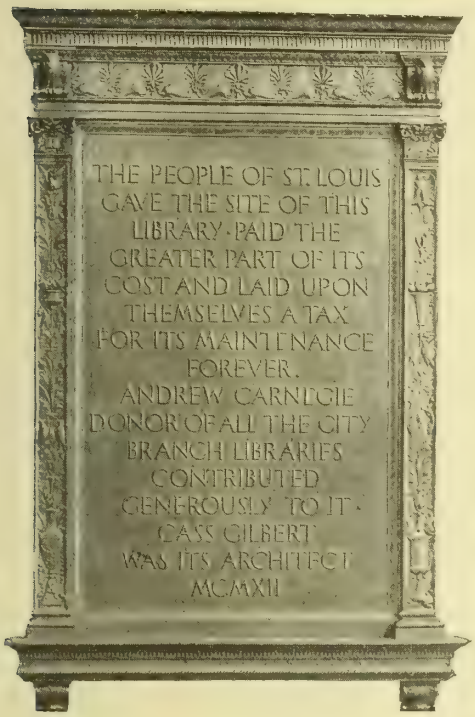


First National Bank, Denver, Colo. Weary & Alford, Designers

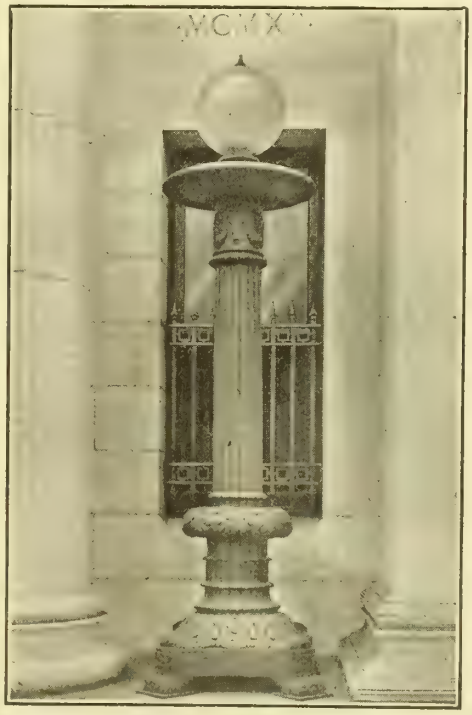


Bank of Toronto Carrere & Hastings and Eustace G. Bird, Architects

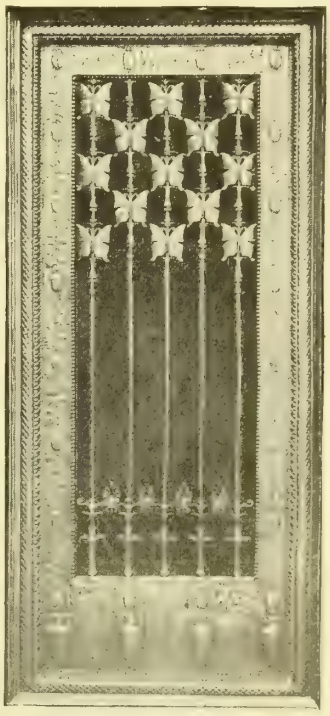
BANKING ROOM EQUIPMENTS



BRONZE TABLET
Cass Gilbert, Architect
Donnelly & Ricci, Sculptors

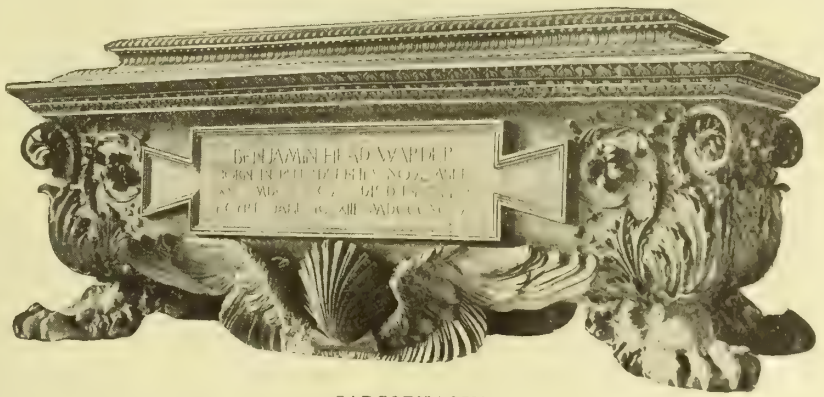


LAMP STANDARD, PEOPLES SAVINGS BANK, PROVIDENCE, R. I.
Clark, Howe & Homer, Architects

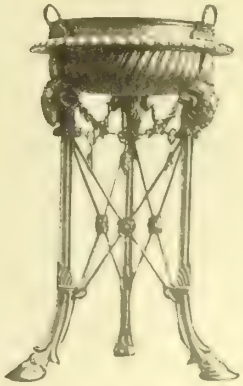


BRONZE DOOR
H. Van Buren Magonigle, Architect
Menconi Bros., Sculptors

TRIPOD



SARCOPHAGUS
Shepley, Rutan & Coolidge, Architects Ph. Martiny, Sculptor



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As we issue a number of catalogues on the various goods we manufacture, kindly specify what line you are interested in and same will be forwarded promptly.

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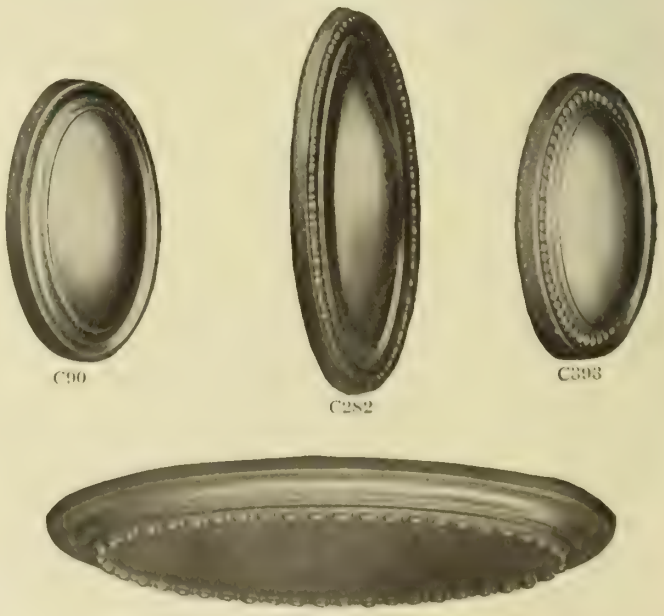

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- ELEVATOR CARS
- ELEVATOR DOOR HANGERS
- ELEVATOR DOOR OPERATORS and LATCHES
- CAST FRONT WORK
- RAILINGS
- GATES
- COUNTER SCREENS
- TABLETS
- WINDOWS (SPECIAL)
- FENCES
- LAMP BRACKETS and STANDARDS
- MARQUISE
- GRILLES
- DOORS

Facilities.

The Hecla plant, with its constructors, designers, draughtsmen, modelers, pattern workers, and large force of bronze workers, iron workers and erectors, has been long established and is continually making and sending its products to all parts of the United States and to many foreign countries.

The works are equipped with whatever is necessary for good work and quick action. They have special electrical and gas equipments for the welding and working of metals, and the latest labor-saving machinery for foundry and shops.

Estimates.

Estimates are promptly furnished, either from architects' designs or from designs specially prepared by Hecla designers. No catalogues are issued.

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Parkway Telephone Building, Philadelphia, Pa.	J. T. Windrim
U. B. A. Hospital, Grand Rapids, Mich.	York & Sawyer
Girard High School, Philadelphia, Pa.	J. H. Windrim
Texas Oil Co. Building, Houston, Tex.	Warren & Wetmore
J. P. Morgan Building, New York, N. Y.	Trowbridge & Livingston
Hotel Biltmore, New York, N. Y.,	Warren & Wetmore
Manufacturers & Traders National Bank, Buffalo, N. Y.	Furness, Evans & Co.
Pelham Building, Boston, Mass.	Blackall, Clapp & Whittemore
Department Interior Building, Washington, D. C.	James A. Wetmore
Franklin National Bank, Philadelphia, Pa.	Furness, Evans & Co. / McKim, Mead & White
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Foster Building, New York, N. Y.	F. E. Townsend
Burton Building, New York, N. Y.	Starrett & Van Vleck
Rockefeller Institute for Medical Research, New York, N. Y.	Shepley, Rutan & Coolidge
Lincoln Memorial, Washington, D. C.	Henry Bacon

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Modeled in Hecla Studio; cast in Bronze

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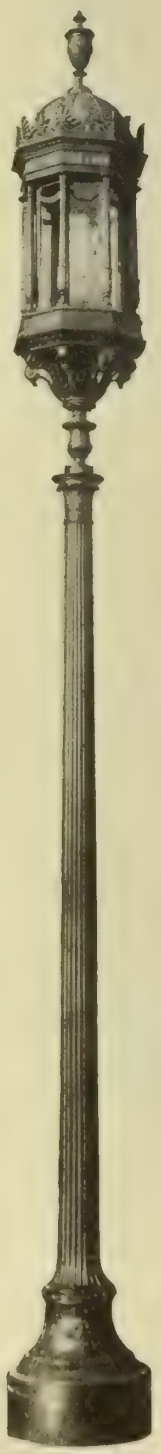
- Balustrades and Railings
- Entrances
- Gates and Doors
- Marquees
- Grilles
- Fences
- Store Fronts
- Window Frames and Sash
- Bank Counter Screens
- Lamp Standards and Electroliers
- Mausoleum Doors
- Memorial Tablets and Signs
- Monumental Work
- Bronze Statuary and Figures
- Bronze and Wrought Iron Art Work

BRONZE FLAG POLE BASE MUNICIPAL BUILDING, WATERBURY, CONN. Cass Gilbert, Architect

BRONZE STATUE OF THOMAS LOWRY Karl Bitter, Sculptor



BRONZE LAMP STANDARD MUNICIPAL BUILDING, WATERBURY, CONN. Cass Gilbert, Architect

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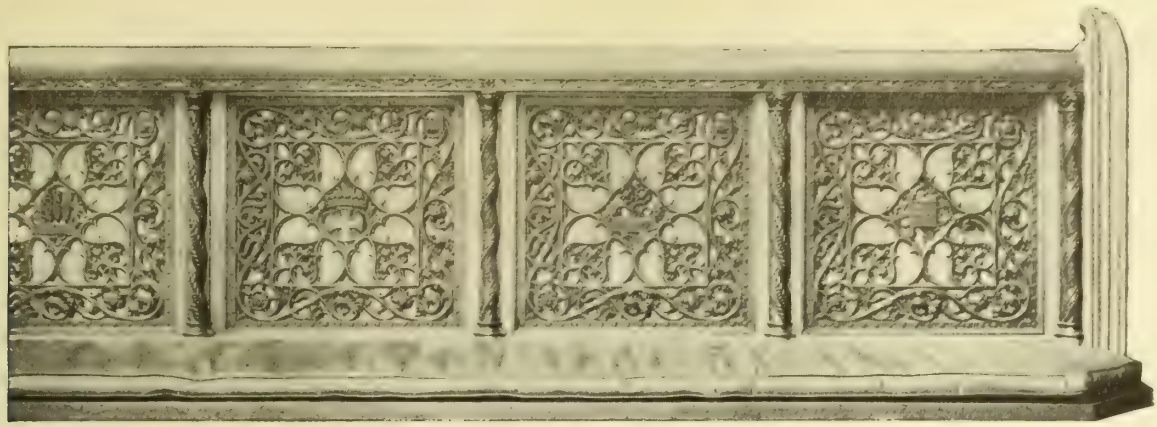
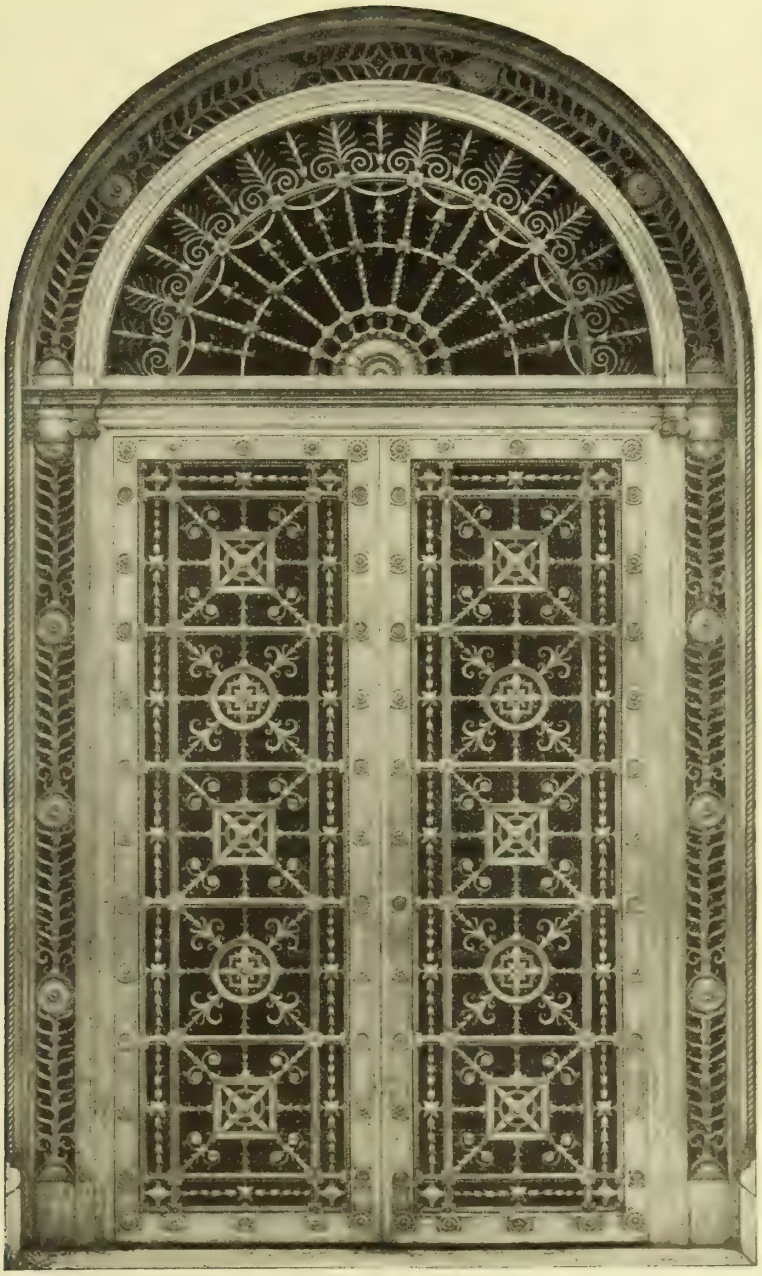


COMMUNICANTS' RAIL, ST. THOMAS'S CHURCH, FIFTH AVENUE AND FIFTY-THIRD STREET, NEW YORK, N. Y.
B. G. Goodhue, Architect



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Cass Gilbert, Architect

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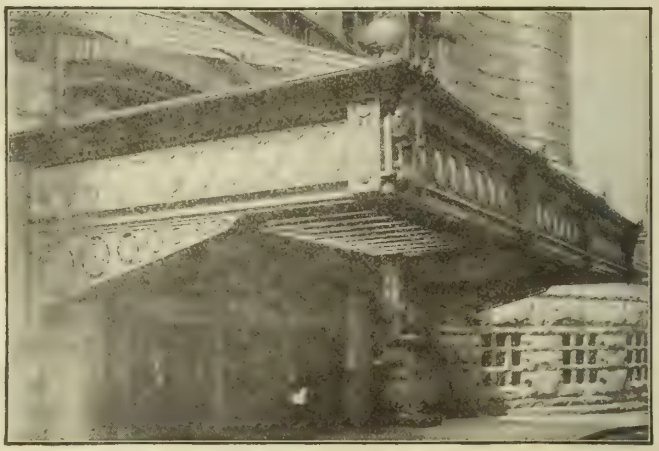

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T. C. Link & Son, Architects

IRON STAIRS, SCOTTISH RITE CATHEDRAL, LITTLE ROCK, ARK.
Charles L. Thompson, Architect

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Louis P. Jamison, Architect

BRONZE ENTRANCE GATES, RESIDENCE EDWARD MALLINCKRODT, Jr., ST. LOUIS, MO.
Louis P. Jamison, Architect

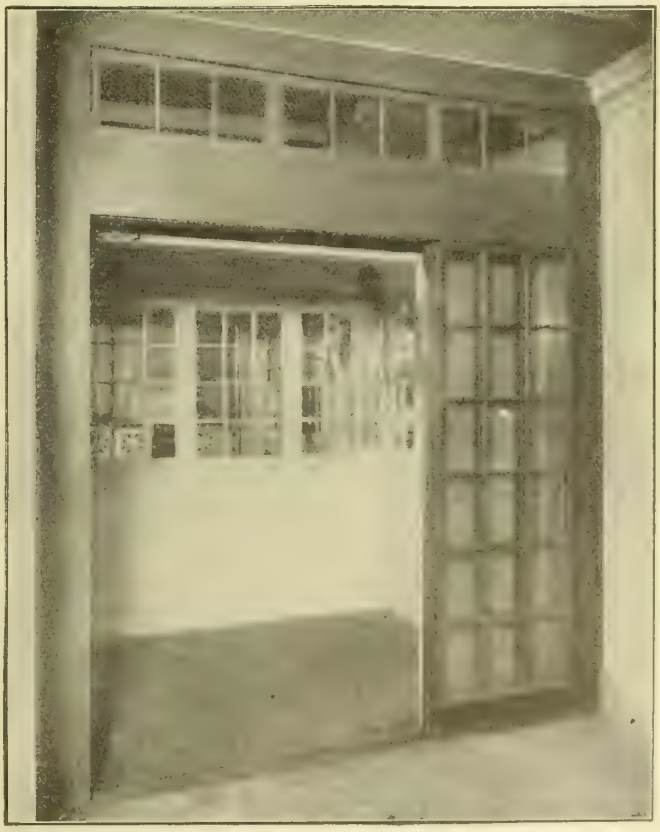
Continued on next page

ELEVATOR CAB

BRONZE ENTRANCE DOORS, HIPPEE BANK, DES MOINES, IOWA
SAWYER & WATROUS, Architects

ELEVATOR ENCLOSURE, WALL BUILDING, ST. LOUIS, MO.
CHARLES WRAY, Architect

BRONZE TABLET



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Rowe & Keyes, Architects

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Chapman & Frazer, Architects

Continued on next page

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GUY LOWELL, Architect

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RAYMOND H. PORTER, Sculptor

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Kick Plates
Lamp Standards
Mail Boxes
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Marquises
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Sweet's Catalogue

Continued on next page

mum cost. It is lighter in weight and lower in cost than all-cast work, and at the same time more substantial than kalameined work, which is made of very light-gauge metal drawn over wood cores.

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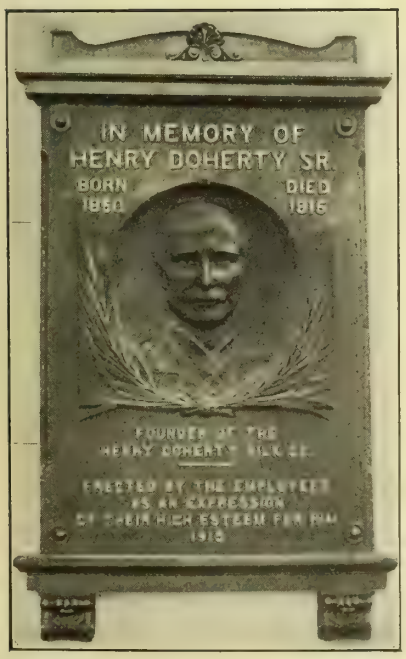

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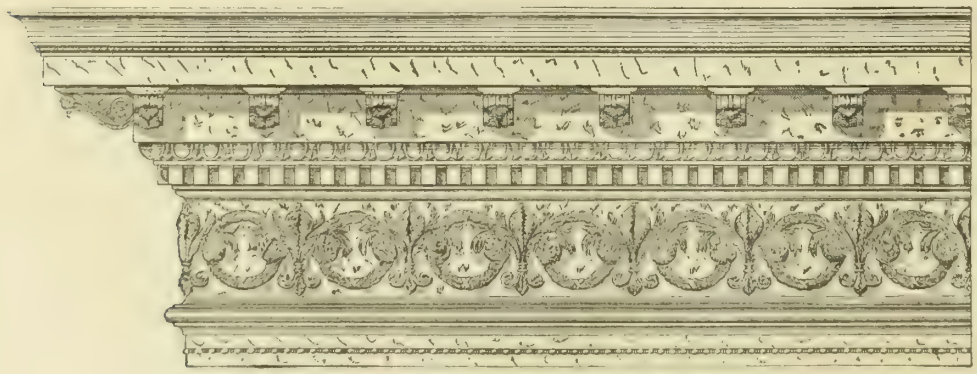
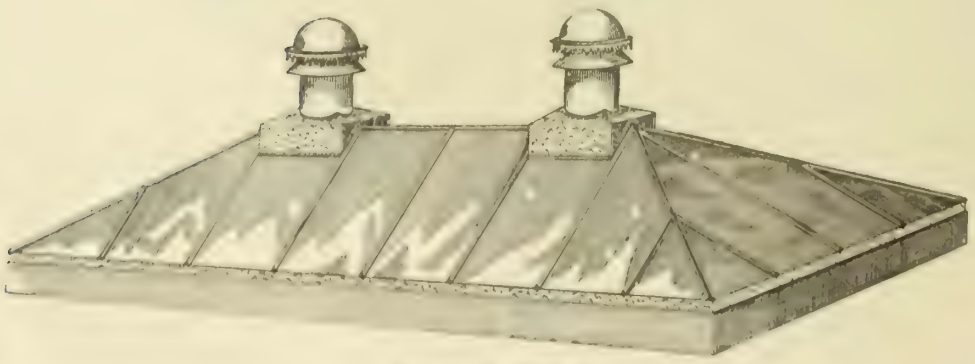


CORNICE NO. 7004



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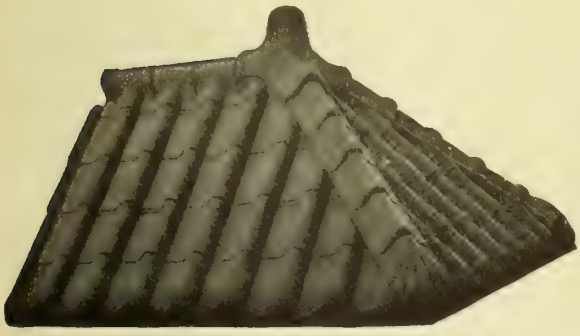

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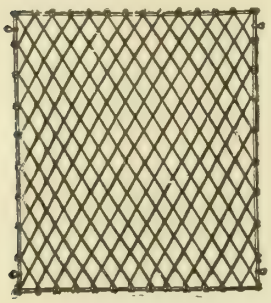
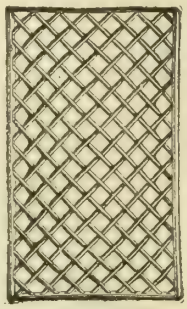
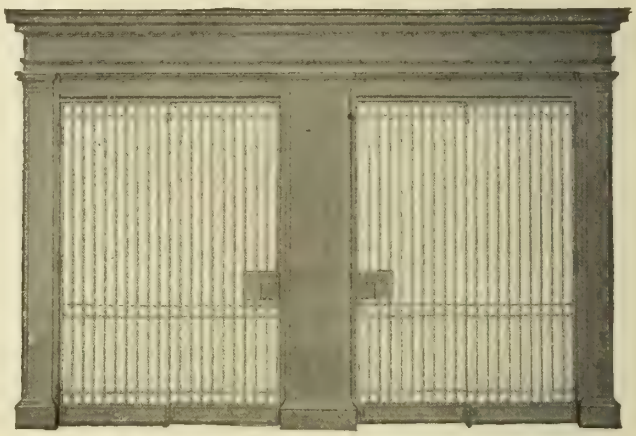


Round Frame

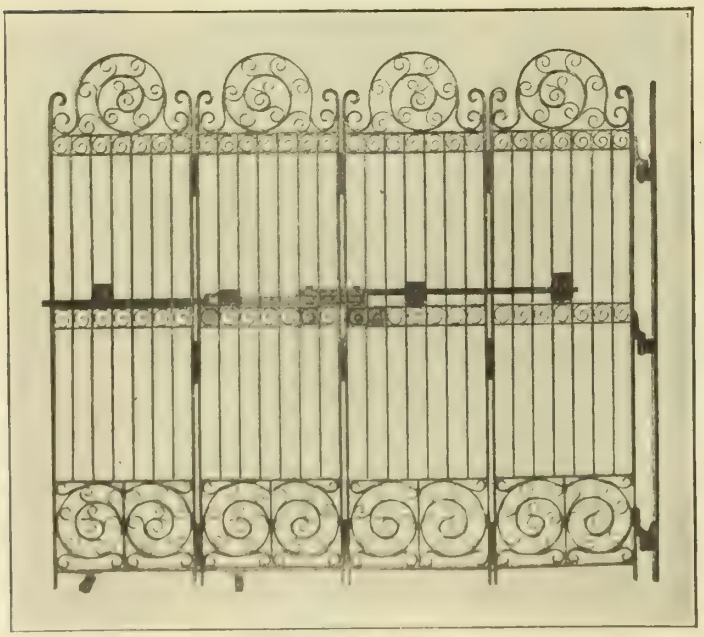


Channel Frame

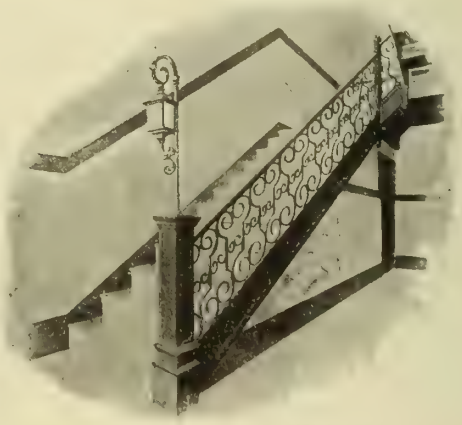
WINDOW GUARDS



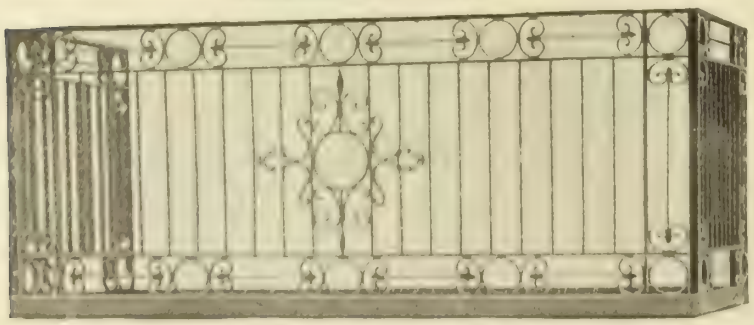
ELEVATOR CARS AND ENCLOSURES



FOUR-FOLD IRON GATE



ORNAMENTAL IRON STAIRS



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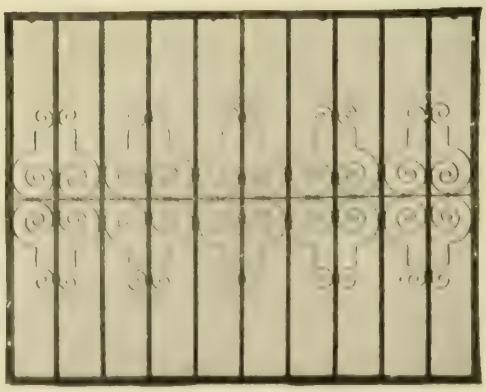

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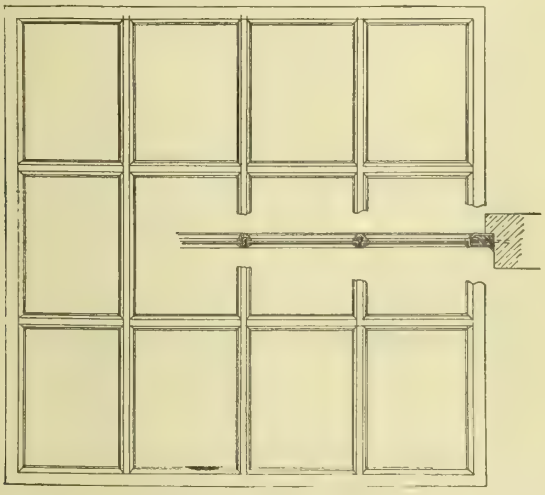
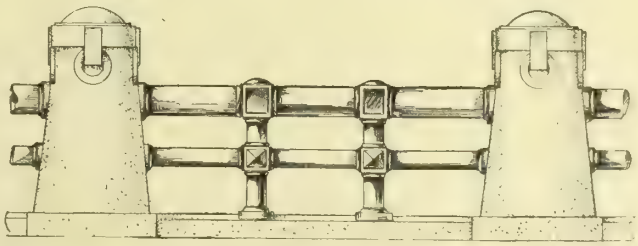


INTERLOCKING WINDOW



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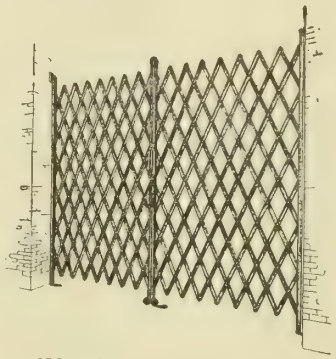
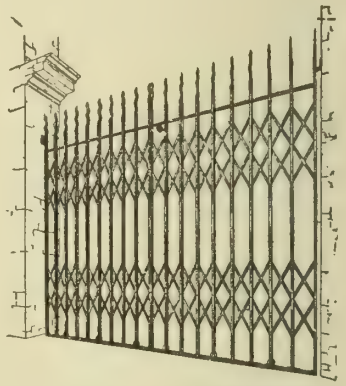
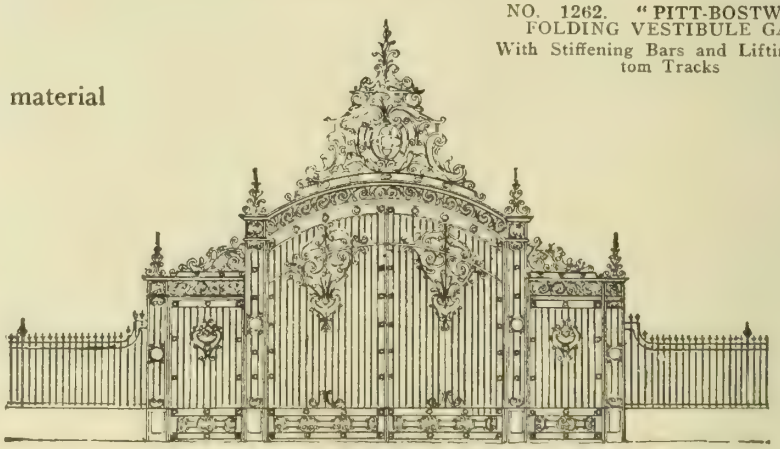


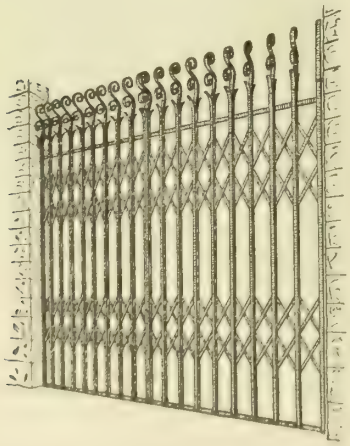
NO. 1303. PLAIN " PITT " FOLDING VESTIBULE GATE



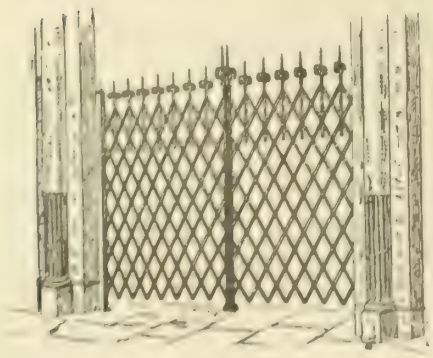
NO. 1262. " PITT-BOSTWICK " FOLDING VESTIBULE GATE
With Stiffening Bars and Lifting Bottom Tracks



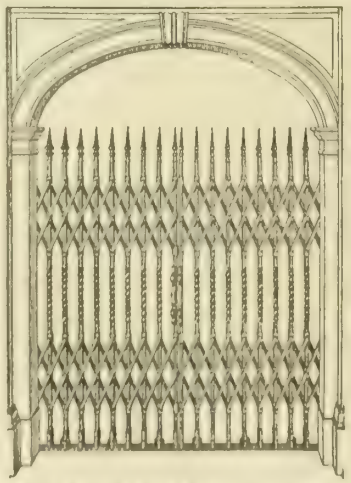
ORNAMENTAL DRIVEWAY GATE



NO. 1260. " PITT-BOSTWICK " FOLDING VESTIBULE GATE
With Stiffening Bars and Lifting Tracks



NO. 1254 " PITT " FOLDING VESTIBULE GATE



NO. 1248 COMPOSITE FOLDING VESTIBULE GATE
With Lifting Bottom Guides

NO. 1267 " PITT-BOSTWICK " STEEL FOLDING WINDOW GUARD
With Guides Top and Bottom

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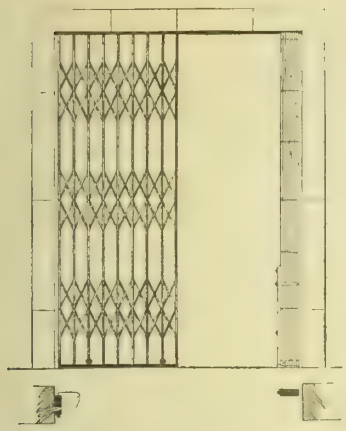
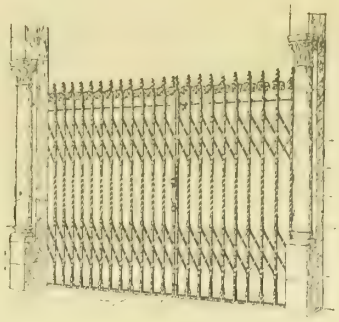
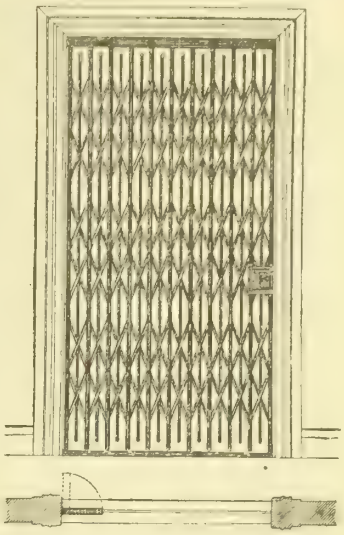


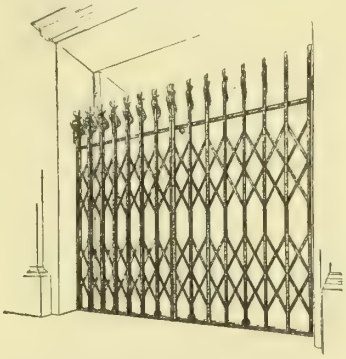
NO. 1284. "PITT-BOSTWICK" FOLDING VESTIBULE AND WINDOW GATE
With Stationary Top and Lifting Bottom Tracks



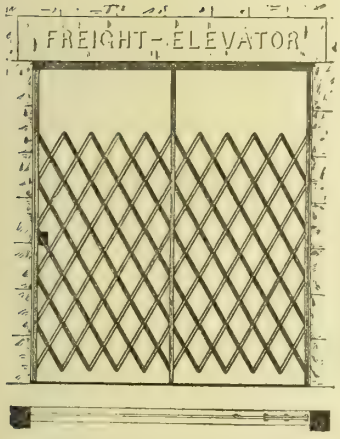
NO. 1252. COMPOSITE FOLDING VESTIBULE GATE
With Lifting Bottom Guides



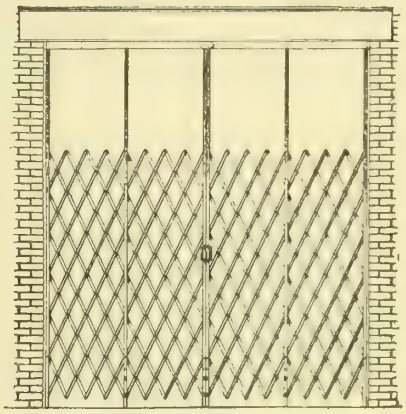
NO. 1245. CLOSE-MESH "PITT-BOSTWICK" FOLDING ELEVATOR GATE



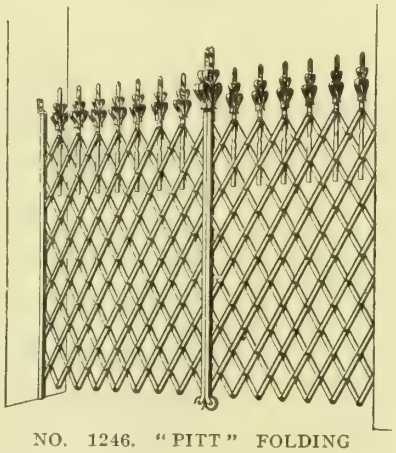
NO. 1259. "PITT-BOSTWICK" FOLDING VESTIBULE GATE
With Stiffening Bars and Lifting Bottom Tracks



NO. 1300. "PITT" FOLDING ELEVATOR GATE



NO. 1302. "PITT" FOLDING DRIVE-WAY ENTRANCE GATE



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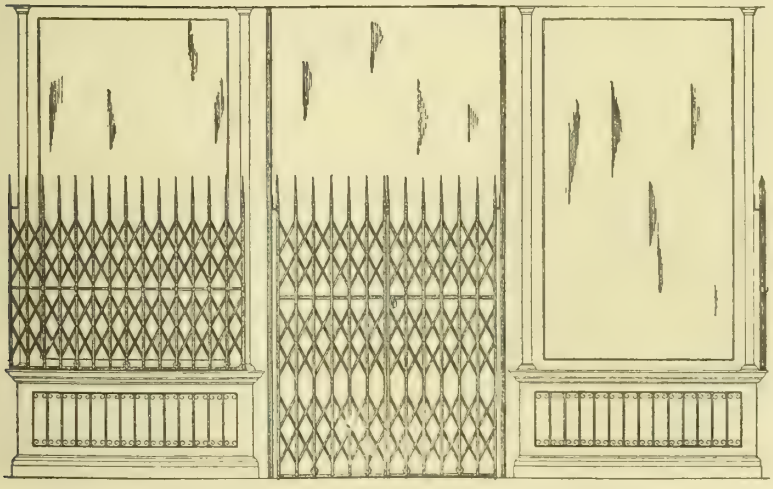
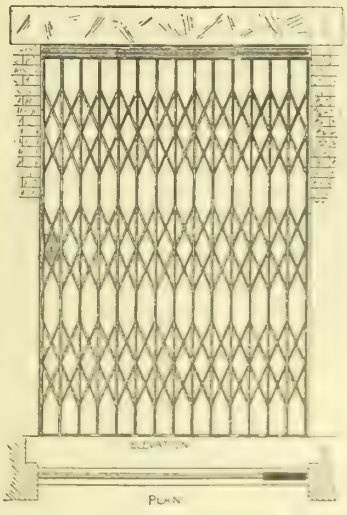


NO. 1273. "PITT-BOSTWICK" FOLDING GATE AND GUARDS
For Store Front



NO. 1261. "PITT-BOSTWICK" FOLDING ELEVATOR GATE

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W.B.Thompson Res.,Greystone,N.Y.	Carrère & Hastings
J. I. Blair Res., Tuxedo Park, N. Y.	Carrère & Hastings
T. F. Ryan Art Gallery, New York	Carrère & Hastings
Plaza, 59th St., 5th Ave., New York	Carrère & Hastings
Pan American Bldg., Washington	Kelsey & Cret, Associates
J. D. Rockefeller Res., New York	Wm. Welles Bosworth
Western Union Bldg., New York	Wm. Welles Bosworth
Astor Court Apartments, New York	Charles A. Platt
C.K.Billings Res.,LocustValley,N.Y.	Guy Lowell
F. A. Hutton Res., New York	C. P. H. Gilbert
C. E. F. McCann Res., New York	C. P. H. Gilbert
J. P. Donahue Res., New York	C. P. H. Gilbert
Cathedral of St. John, New York	Cram & Ferguson
H. T. Parsons Res., New York	Wm. Baumgarten & Co.
High School, Bridgeport, Conn.	James Gamble Rogers
Rose Mausoleum, Tarrytown, N. Y.	Kenneth M. Murchison
Baer Kaufmann Bldg., Pittsburgh, Pa.	Starrett & Van Vleck
Deshong Art Gallery, Chester, Pa.	Brazer & Robb
Union Gas Co., Brooklyn, N. Y.	Frank Freeman
D. Good Conservatory, Buffalo, N.Y.	Lord & Burnham Co.
N. Y. American Bldg., New York	Charles E. Birge
Union Station, Macon, Ga.	Alfred Fellheimer
U. S. Post Office, Pasadena, Cal.	Oscar Wenderoth
U. S. Post Office, Corry, Pa.	Oscar Wenderoth
N. Y. State Capitol, Albany, N. Y.	Lewis F. Pilcher
Shoe & Leather Bldg., New York	D. Everett Waid
Thirty-one Different Banks	Hoggson Bros.
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Bankers Trust Co., New York	Trowbridge & Livingston
Brooklyn Trust Co., Brooklyn, N. Y.	York & Sawyer
Guaranty Trust Co., New York	York & Sawyer
First Nat'l Bank, Bridgeport, Conn.	Tracy & Swartwout
Mechanics & Metals Nat'l Bank, 50 Wall Street, New York	Palmer & Hornbostel
20 Nassau Street, New York	Delano & Aldrich
Chase Nat'l Bank, 83 Cedar St.	Walker & Gillette
Chase Nat'l Bank, 57 Broadway	Kimball & Roosa
Highland B'k, Highland Pk., Mich.	Albert Kahn
Murchison Bank, Wilmington, N. C.	Kenneth M. Murchison
Wayne County Bank, Detroit, Mich.	Donaldson & Meier
Corn Exch. Bank, 126 E. 86th St.	Harrie T. Lindeberg
Corn Exch. Bank, 7 E. 42nd St.	Harrie T. Lindeberg
Central Trust Co., New York	Buchman & Fox
Essex Co. Nat'l Bank, Newark, N. J.	Clinton & Russell
Merchants Nat'l B'k,New Haven,Ct.	Dennison & Hirons
Amoskeag Sav.B'k,Manchester,N.H.	Hutchins & French
Marine Nat'l Bank, Buffalo, N. Y.	Green & Wicks
Lehigh Trust Co., Allentown, Pa.	Ruhe & Lange
German Bank, Louisville, Ky.	D. X. Murphy & Bro.
Nat'l Bank of Cuba, Havana, Cuba	Purdy & Henderson
Savings Bank, Poughkeepsie, N. Y.	Mowbray & Uffinger
Jefferson Trust Co., Hoboken, N. J.	Crow, Lewis & Wickenhoefer
Northern Nat'l Bank, Toledo, Ohio	Mills, Rhines, Bellman & Nordhoff

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BRONZE CHECK DESK

BRONZE TABLET

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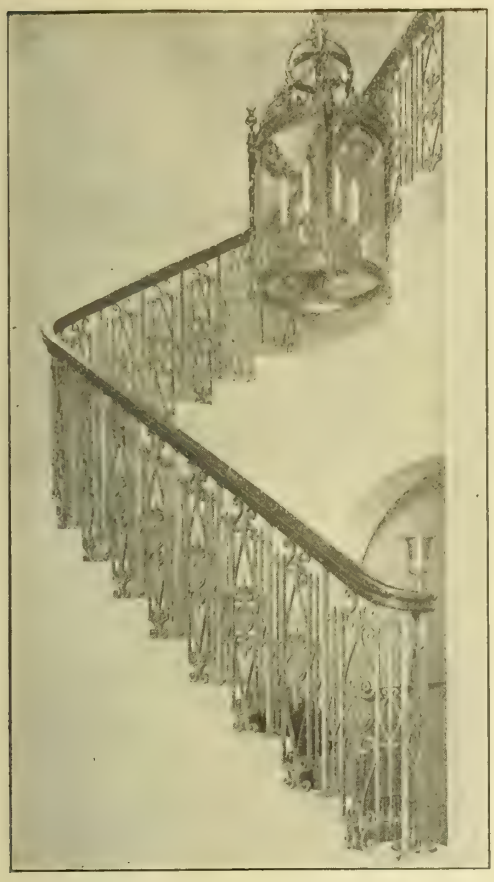

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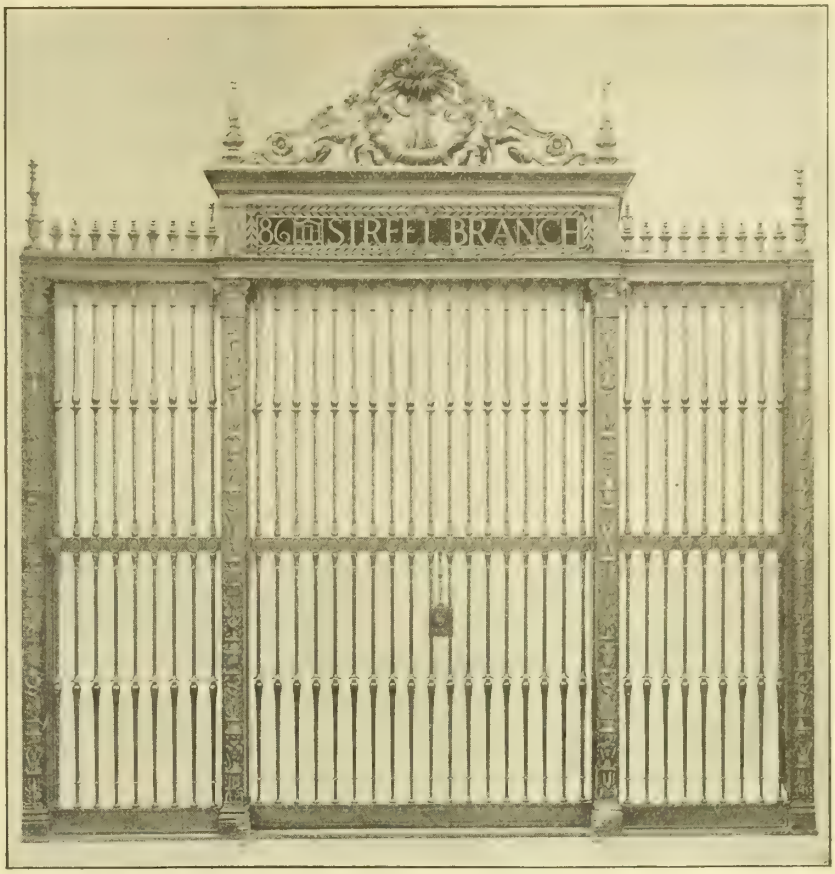
C. K. G. BILLINGS' RESIDENCE, LOCUST VALLEY, NEW YORK
Guy Lowell, Architect



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86TH STREET BRANCH, CORN EXCHANGE BANK, NEW YORK
Harrie T. Lindeberg, Architect

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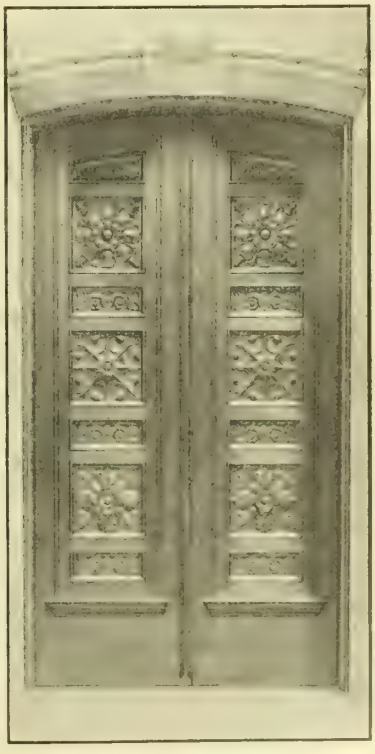

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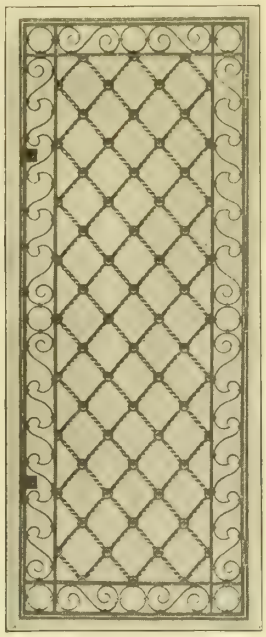
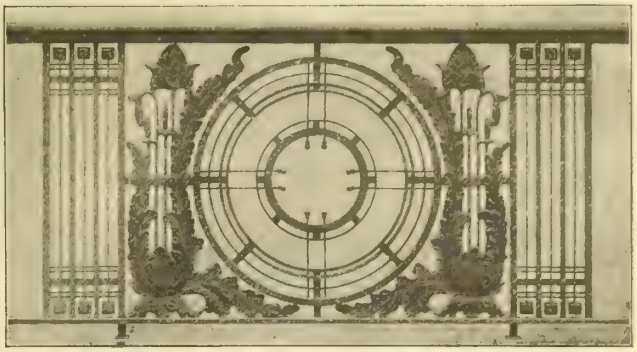
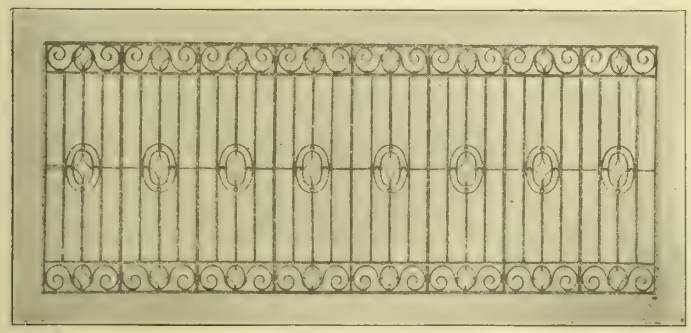


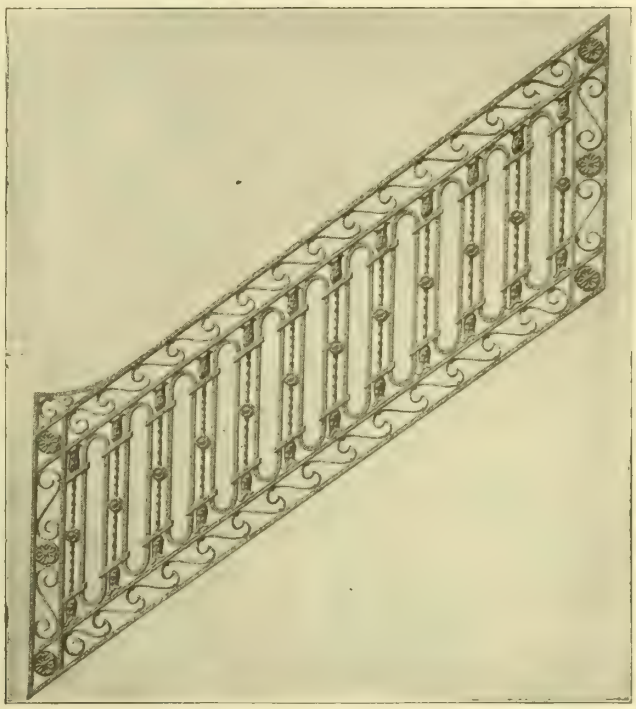
DOOR GRILLE



BALCONY RAILING



LEVEL RAILING



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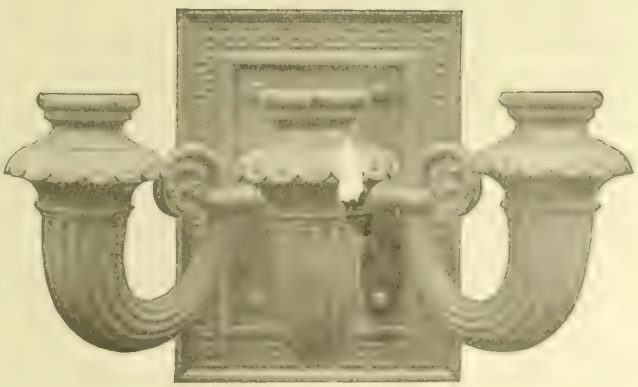
STAIR WORK, RALSTON HOTEL, COLUMBUS, GA.



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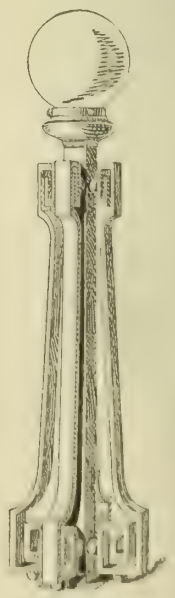

NO. 3544
ORNAMENTAL
LAMP
STANDARD

Continued on next page

References.

The following is a partial list of buildings in which representative installations of our work have been made:

BUILDING, LOCATION AND ARCHITECT

Monroe Building, Chicago, Ill., Holabird & Roche
Chicago Savings Bank, Chicago, Ill., Holabird & Roche
Rand-McNally Co. Building, Chicago, Ill., Holabird & Roche
National Life Insurance Co., Chicago, Ill., Jenney, Mundie & Jensen
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Advertising Building, Chicago, Ill., W. C. Zimmerman
Borland Building, Chicago, Ill., Charles S. Frost
Webster Building, Chicago, Ill., A. S. Alschuler
Farmer's Security Bank Building, South Bend, Ind., Perkins, Fellows & Hamilton
Harris Trust Building, Chicago, Ill., Shepley, Rutan & Coolidge
Crane Company Office Building, Chicago, Ill., Holabird & Roche
Sharpe Building, Kansas City, Mo., H. R. Wilson
The Stewart Building, Houston, Tex., Jonas & Rue
Harper Memorial Building, University of Chicago, Chicago, Ill., Shepley, Rutan & Coolidge
Sisters of Providence, College and Music Buildings, St. Mary's, Ind., D. A. Bohlen & Son
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U. S. Naval Training Station (fifteen buildings), Lake Bluff, Ill., Jarvis Hunt
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City Hall and Superior Court Building, Elkhart, Ind., E. Hill Turnock
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Iowa State College, Central Building, Ames, Iowa, Proudfoot & Bird
Y. W. C. A. and Y. M. C. A., Nashville, Tenn., Shattuck & Hussey
Y. M. C. A. College Building, Chicago, Ill., Emery Stanford Hall
Cook County Infirmary Buildings, Oak Forest, Ill., Schmidt, Garden & Martin
Annie W. Durand Hospital, Chicago, Ill., Charles S. Frost
Chicago Lying-In Hospital, Chicago, Ill., Schmidt, Garden & Martin
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The Commonwealth-Edison Co., N. W. Station, Chicago, Ill., Holabird & Roche
Kansas City Power-House, Kansas City, Mo., Ford, Bacon & Davis
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Montgomery Ward & Co., Chicago, Ill., R. E. Schmidt, Garden & Martin
Chicago Daily News Building, Chicago, Ill., J. A. Rogers
Mishawaka Woolen Manufacturing Co., Mishawaka, Ind., Albert Kahn
Banco de San Luis Potosi, San Luis Potosi, Mex., Henri E. M. Guindon
Blackstone Hotel and Theater, Chicago, Ill., Marshall & Fox
Bancroft Hotel, Saginaw, Mich., Richard E. Schmidt, Garden & Martin
Hotel Sherman, Chicago, Ill., Holabird & Roche
Fort Dearborn Hotel, Chicago, Ill., Holabird & Roche
Gaynor Hotel, Chicago, Ill., Davis & Davis
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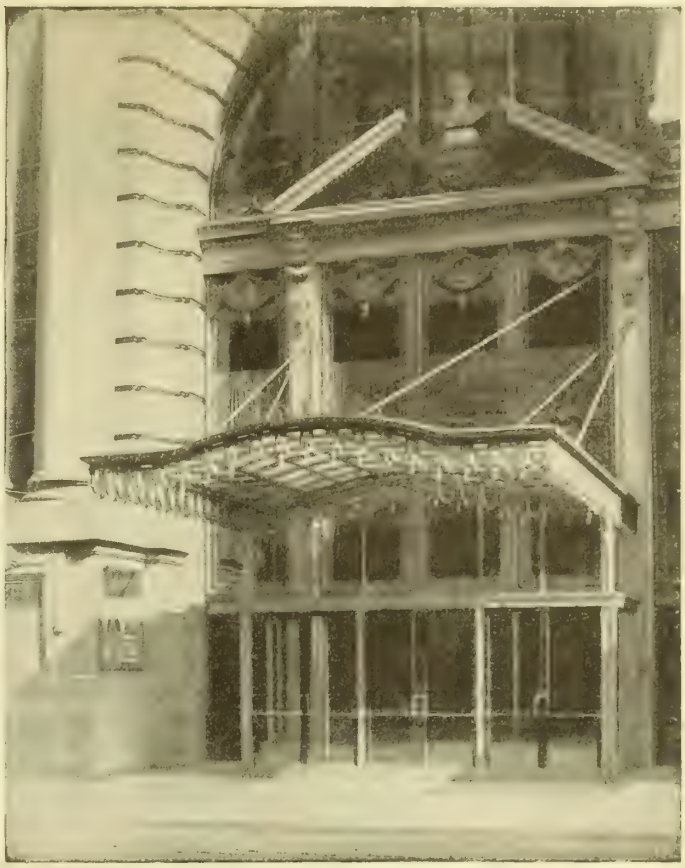
Illinois Theater, Chicago, Ill., Wilson & Marshall
The Star and Garter Theater, Chicago, Ill., Dodge & Morrison
Schubert Theater, St. Paul, Minn., Marshall & Fox
The Cleveland Hippodrome Building, Cleveland, Ohio, Knox & Elliott
Chicago Federal Ball Park, Chicago, Ill., Davis & Davis
"The Breakers" Apartments, Chicago, Ill., Marshall & Fox
Garden Apartments, Chicago, Ill., Richard E. Schmidt, Garden & Martin
McClurg Apartments, Chicago, Ill., Marshall & Fox
Chandler Apartment Building, Chicago, Ill., R. E. Schmidt, Garden & Martin
Goodman Apartments, Chicago, Ill., Wm. Ernest Walker
B. A. Eckhart Residence, Chicago, Ill., Marshall & Fox



MARQUISE AND VESTIBULE FOR COLONIAL THEATRE, CHICAGO, ILL.
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JOHN T. WINDRIM, Architect

References.

We have furnished metal work for some of the most important buildings in the United States, and have recently installed high-class work in the following:

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Wilkinsburg National Bank, Wilkinsburg, Pa., Mowbray & [illegible]
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Soldiers' and Sailors' Memorial, Pittsburgh, Pa., Palmer & [illegible]
The Perry Belmont Residence, Washington, D. C., Horace Trumbauer
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[illegible] Technical School, Pittsburgh, Pa., Palmer, Hornbostel & Jones
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[illegible] Company Building, Schenectady, N. Y., Harris & Richards
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Manufacturers' Club, Philadelphia, Pa., Simon & Bassett
Garden Pier, Atlantic City, N. J., Simon & Bassett
Spear Residence, Pittsburgh, Pa., Palmer, Hornbostel & Jones
Commercial National Bank Building, Raleigh, N. C., P. Thornton Marye
Vending Hotel, Philadelphia, Pa., Eschwein & Johnson
Corn Exchange Bank Building, Philadelphia, Pa., Horace Trumbauer

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Forest Hill, Long Island, N. Y.
Roland Park, Baltimore, Md.
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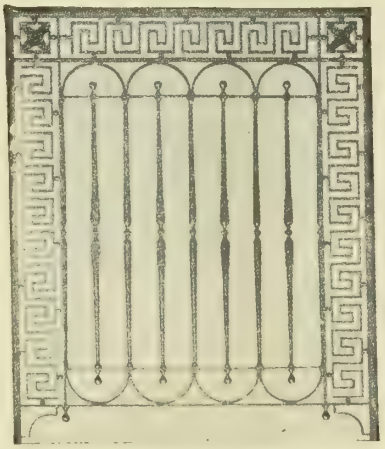
Services and Facilities.

This organization is thoroughly equipped for the highest grade construction and installation of its products, either according to its own designs or those of the Architect. Contracts, when size warrants, will be executed in any part of the United States, or, when preferred, goods will be shipped with full directions for erection by others.



IRON WICKET, U. S. POST OFFICE, MURPHYSBORO, ILL.
BRASS WICKET, U. S. POST OFFICE, EDWARDSVILLE, ILL.

STAIRCASE, U. S. POST OFFICE, WALLA WALLA, WASH.
Oscar Wenderoth, Supervising Architect

MARQUISE, ODEON BUILDING, ST. LOUIS, MO.
Gustave P. Wiesel, Architect

ELEVATOR ENCLOSURE, NICHOLAS BUILDING, ST. LOUIS, MO.
N. Petticrew, Architect

FOUNDED 1849

THE SNEAD & CO. IRON WORKS, INC.

MANUFACTURERS OF

Cast-Iron Railing Panels, Machine Molded

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Products and Services.

Architectural and Ornamental Iron Castings, Railing Members, Fascias, Floor Plates, Trench Covers, Panels, Pilasters, Placques, Grilles, Balusters, Doors, Frames, Brackets, Risers, Treads, Posts, Moldings, Cornices, Ornaments, Greenhouse Sections, "Macdonald Roller Ramming and Pattern Drawing Molding Machines" for Foundries, etc.

We are ready to furnish architects with expert advice on conditions governing the practical, economical and artistic production of Iron Castings. Cooperation at time of making designs saves labor and leads to improved quality, substantial construction and low cost. We can show how to produce beautiful designs in an inexpensive manner.

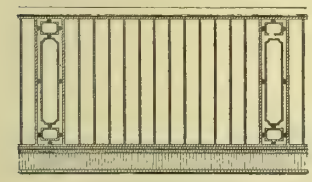
For Metal Bookstacks, Steel Shelving, Metal and Glass Museum Cases, see our name in General Index.

Facilities.

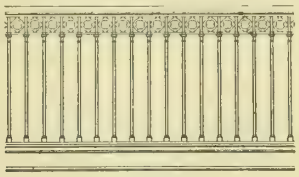
High Quality, Rapid Output, Low Cost—Our large foundry is equipped with "Macdonald Roller Ramming and Pattern Drawing Molding Machines," electrically operated; corresponding outfits of perfectly matched iron flasks, with adjustable bars and planed joints; simple and efficient sand-handling appliances; air hoists and overhead tracks for conveying flasks, pattern plates, etc.—all arranged so as to reduce loss of time, energy and motion to a minimum. Besides giving maximum production with minimum cost, this equipment insures better castings than can be produced by the most skilled hand molding. The molds are clean, sharp, uniformly rammed and require no hand-tucking. Patterns, either loose or held rigidly in position, are perfectly protected from injury. Castings are true to pattern, exactly matched, and free from scabs, blow holes, sand pits and other imperfections common to ordinary methods. Descriptive pamphlet, "Machine Molded Castings," sent on request. Our pattern department makes original patterns in plaster, composition, metal or wood, or it works from patterns or models furnished.

Railing Panels.

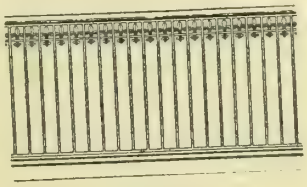
The accompany illustrations show some of our stock designs of cast-iron Railing Panels, Balusters and Ornaments. Castings are furnished merely cleaned and sand blasted or completely fitted. Special designs, made to order where quantity warrants, cost a minimum when there is much repetition from same patterns.



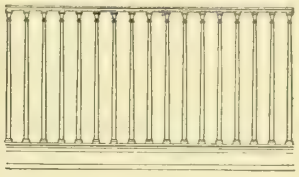
Ornamental Bar



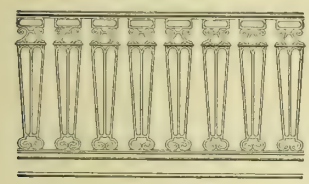
Spanish



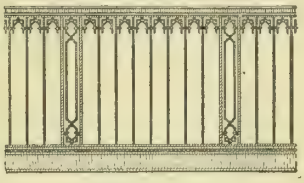
French



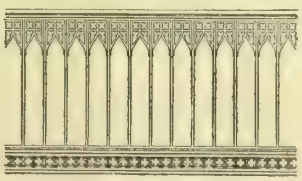
Colonial



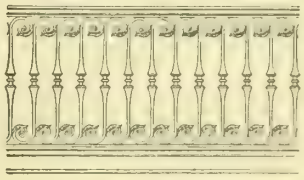
Louis XVI



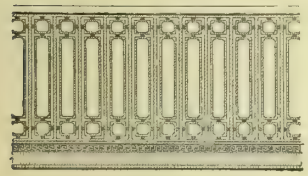
Secular Gothic



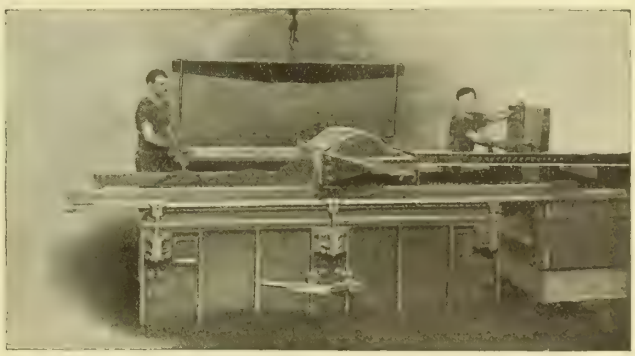
English Gothic



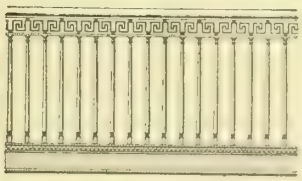
Roman



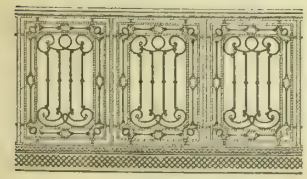
Renaissance



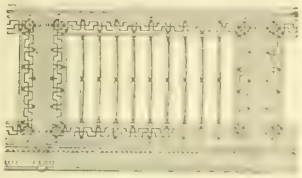
Ramming a Mold with "Macdonald Roller Ramming and Pattern Drawing Molding Machine"



Classic



Louis XV



Empire

VIEWS OF ROLLER RAMMING MACHINE AND SNEAD STANDARD DESIGNS OF PLAIN AND ORNAMENTAL RAILINGS AND FASCIAS

TIFFANY STUDIOS

Ornamental Bronze and Iron, Tiffany Favrile Glass, Leaded Glass, Lighting Fixtures, Interior Decorations

Madison Avenue and Forty-Fifth Street
NEW YORK, N. Y.

Products.

Ornamental Bronze and Iron: Entrance and Vestibule Doors, Gates and Archways, Marquises, Candelabra, Bank Screens, Check Desks, Tablets, Clocks, Stair Railings and Facias, Elevator Fronts and Cars, Andirons, Statuary Bronze.

Mosaic Work: Mantel Facings, Radiator Hoods and Inlay Work for Public Buildings and Private Residences.

Leaded Glass: Favrile Glass Windows, Lamp Shades, Domes and Globes.

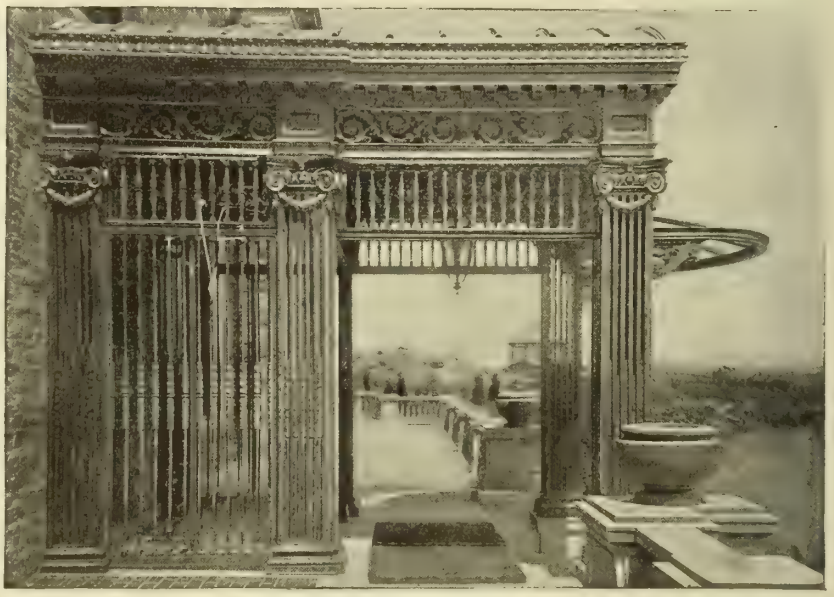
Fine Woodwork, including Cabinet Work and Trim.

Church Furnishings: Memorial Windows, Frescoes, Altars, Fonts, Sanctuary Lamps, Lecterns, Reredos, Pulpits, Altar Crosses, and Rood Screens.

Interior Decorations, including Furniture, Rugs, Fabrics, Wall Papers, etc.

Lighting Fixtures: Chandeliers, Newel Lamps, Wall Brackets, Special Lamps, Entrance Torchères, Ceiling Discs and Tiffany Favrile Lighting Glassware.

Mausoleums and Out-of-Door Memorials.



BRONZE ENTRANCE

Bronze Factory.

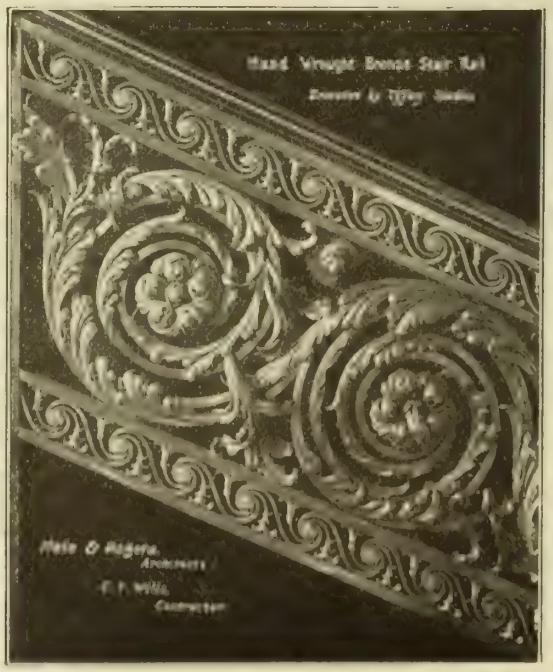
Our Bronze Factory is equipped with up-to-date appliances and machinery, which, together with an organization of expert artisans, places us in a position to execute the requirements of architects and sculptors in Ornamental Bronze, Statuary Bronze, Tablets and Wrought Iron.

Prices.

We solicit an opportunity to estimate, in proof that our prices are as reasonable as others charge for less satisfactory and artistic work.

Estimates and Contracts

We are prepared to undertake contracts for the complete Interior Finish, Decorations, and Furnishings of banks, hotels, churches, residences, etc.

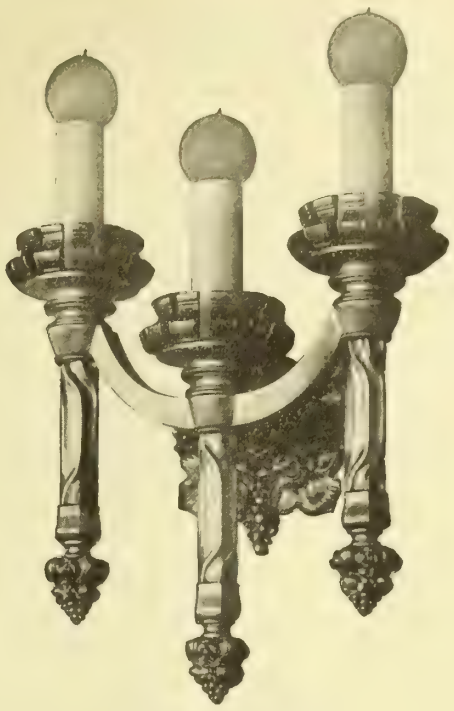


HAND WROUGHT BRONZE STAIR RAIL

Estimates from Architects' drawings will be promptly submitted on interior equipment.

Continued on next page

FAVRILE LIGHT



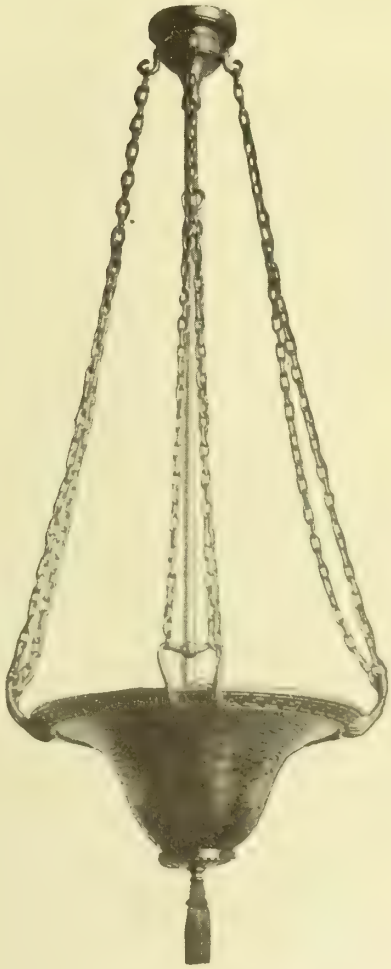
3-LIGHT FIXTURE

Lighting Fixtures.

Tiffany Chandeliers, Brackets and Lamps combine superiority of design with excellent construction and finish.

Made in any desired metal and finish, for hotels, public buildings and private residences. Our fixture products include Candelabras, Entrance Torchères, Ceiling Discs, Wall Brackets, Newell Lamps—Tiffany Favrile Glass Shades and Globes.

Tiffany Favrile Glass is made to meet conditions of every character—not the least among these is its application to lighting. Tiffany Favrile Glass is equal to any lighting glassware. It combines with efficiency the beauty of any color scheme desired. It can be made in diffusive glassware for semidirect lighting, or in very deep tones of color with an intensely white inner reflecting surface. Mounted in a simple single stem hanger or an elaborate bronze fixture, its quality blends with the character of the metal work of the fixture or the decorative scheme. It eliminates entirely the so-called "contrast brightness." Tiffany Favrile Glass is hand-made, with qualities obtained only by natural, instead of mechanical, aids.



FAVRILE LIGHT

THE W. S. TYLER COMPANY

CLEVELAND, OHIO

NEW YORK, 200 Fifth Avenue PITTSBURGH, Bessemer Building

THE STANDARD-TYLER COMPANY

2436 W. 15th Street, at Western Avenue

CHICAGO, ILL.

Designers, Founders and Manufacturers of Tyler Ornamental Iron and Bronze

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Products.

Ornamental Iron and Bronze for Entire Building Contracts:

Entrances, Corridors, Store Fronts, Marquises, Porte-Cochères, Elevator Enclosures, Elevator Cars, Elevator Gratings, Tablets, Stairways, Lamps, Lamp Standards, Bank and Office Railings, Bank Counter Screens, Bank Cages, Bronze Doors, Gates, Grilles, Fences.

Also, Balustrades, Louvres, Wire Guards, Wire Machinery Guards, Stall Guards, Signs, Window Frames, Tool Room Partitions, Thresholds, Sidewalk Lights, Sidewalk Doors, Coal Chutes, Ceiling Lights, Iron Ladders, Bulletin Boards, etc.

Showing extensive light area by daylight

Showing extensive light area by illumination at night

MODERN APPLICATION OF ORNAMENTAL IRON CONSTRUCTION FOR BUILDING FRONTS, DEPARTMENT STORES, ETC.

THE UNION METAL MANUFACTURING CO.

Union Metal Columns, Lighting Standards, Garden Fixtures

CANTON, OHIO

REPRESENTATIVES THROUGHOUT THE UNITED STATES

CANADIAN UNION METAL, LIMITED, GALT, ONTARIO, CANADA

Products.

UNION METAL COLUMNS and PILASTERS (patented) for exterior and interior architectural use on porches, pergolas, façades, mantels, conservatories, etc.

UNION METAL LAMP STANDARDS (patented) of pressed steel, pressed copper, and bronze, for streets, parks, boulevards and building entrances.

UNION METAL GARDEN FIXTURES, NEWELS, WALL BRACKETS, etc., for general decorative use.

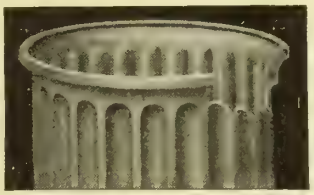
UNION METAL COLUMNS
TRADE-MARK

Union Metal Columns.

These columns are offered to the architectural profession as a means of overcoming splitting, checking, rotting, warping and other troubles which are common to wood columns. They are designed in such a way as to meet every demand for architectural correctness, strength and economy.

Entasis and Stopped Flutes.

These characteristic features of the classical column are strictly observed in Union Metal Columns (see illustration). The machinery and dies for fluting and tapering the steel shafts are patented, and can be used only by THE UNION METAL MANUFACTURING CO.



DETAIL OF STOPPED FLUTES AND END OF SHAFT

Designs.

Union Metal Columns adhere strictly to classic proportions, except where special structural requirements may necessitate modifications in height, etc.

The all-steel design No. 240 is made in standard stock sizes to meet a popular demand for a simpler metal column where economy is essential.

Construction.

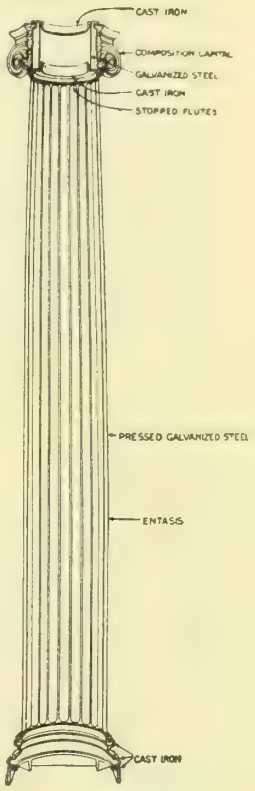
The accompanying illustration shows the construction details of Union Metal Columns having capitals. The bearing members are made entirely of metal. The capitals on designs 212, 230, 237, 222, 213, 219 and 224 bear no weight whatever, and are made of composition.

The shafts are made from the best grade of open-hearth steel, galvanized especially for this purpose. Shafts up to and including a base diameter of 14 inches are made of one-ply No. 22-gauge galvanized steel. All shafts over 14-inch base diameters are made of two-ply No. 22-gauge galvanized steel pressed and fluted together.

The steel is rolled especially for this purpose, and is tight coated with spelter. The spelter adheres perfectly to the metal under all conditions, thereby fully protecting it from the action of the elements.

As a further protection, all steel shafts are given an application of galvanized iron primer. The cast-iron parts of the columns are coated with high-grade metalastic paint before leaving the factory. This treatment insures against the peeling off or cracking of the finishing coats of paint.

The seams of Union Metal Column shafts are securely locked, and are always turned on the inside of the shaft.



CROSS-SECTION UNION METAL COLUMNS
Construction details

Advantages.

(1) Architecturally correct.

(2) Have entasis and stopped flutes.

(3) Will not split, check, rot, warp or open up at the joints—faults which are absolutely certain to mar all wood columns sooner or later.

(4) The strongest porch columns manufactured.

(5) Made from best-grade open-hearth steel. Fluted and tapered by our patented process.

(6) Clean cut, highly ornamental and stately.

(7) Not experimental, but used on thousands of representative buildings in the U. S. and abroad.

(8) Indestructible, and last a lifetime; suitable for all climates and temperatures.

Specifications.

The fluted columns and pilasters used in this building shall be Union Metal Columns with entasis and stopped flutes, manufactured by THE UNION METAL MANUFACTURING CO., Canton, Ohio. The design number and size of columns to be used is indicated on drawings.

RESIDENCE

CHURCH

HOSPITAL

Continued on next page

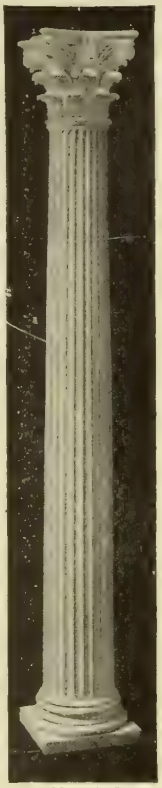
DETAILED SPECIFICATIONS UNION METAL COLUMNS
STANDARD SIZES

Design No.	Type	Diam. Base of Shaft, Ins.	Diam. Top of Shaft, Ins.	Size of Base Ins. Sq.	Height Over All
212	Roman Corinthian	8	6½	10⅝	Every
		10	8	13¾	foot
		12	10	16	from
		14	12	18⅝	five
		16	12	20¼	feet
		18	14	23	to
		20	16	27½	thirty-
		22	18	28¾	two
		24	20	32⅛	feet
		26	22	34½	
		28	22	37	
		30	24	39	
		32	26	41½	
		34	28	43	
		36	30	45½	
230	Greek Ionic (Erechtheum)	Same as above	Same	Same	Same
237	Modern Ionic	"	"	"	"
222	Italian Renaissance Ionic (Scamozzi)	"	"	"	"
213	Temple of the Winds (Cor.)	"	"	"	"
219	Italian Composite	"	"	"	"
224	Roman Doric (Diocletian)	"	"	"	"
200	Plain Doric	"	"	"	"
700	Greek Doric	10	7½	12¼	Every
		12	9	14⅝	foot
		14	11	16⅝	from
		16	12	18⅞	five
		18	14	20⅛	feet
		20	15	23⅝	to
		22	17	25½	thirty-
		24	18	27½	two
		26	20	30	feet
		28	22	32½	
		30	24	35	
		32	24	37	
		34	28	39¼	
		36	28	42	
240	All Steel (Doric)	8	6½	11	Every
		10	8	13¼	Six in.
		12	10	16	five ft.
		14	12	18½	to 10 ft.

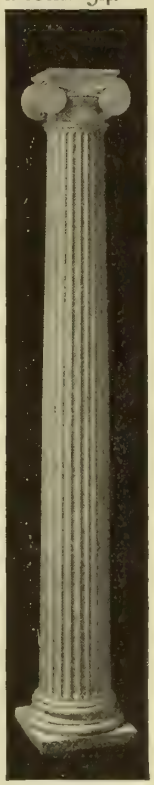
Half round columns, three quarter columns, square pilasters, and corner pilasters are made in all sizes to match the different column designs listed herein, except that square pilasters are not furnished to match all-steel design No. 240

Catalogue.

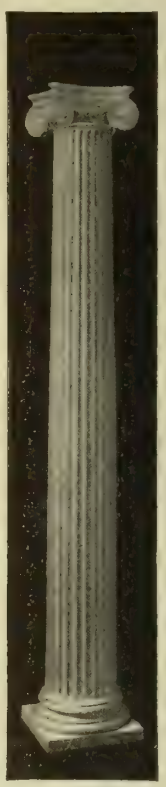
Our portfolio of designs and installations gives full particulars concerning the construction of Union Metal Columns, and shows many buildings where they have been used. It is of value to the architect in showing his clients the effects obtainable by the use of columns. Ask for bulletin 54.



No. 212
ROMAN CORINTHIAN
Composition Capital, Attic Base (Cast Iron), Steel Shaft (Corinthian Flute)

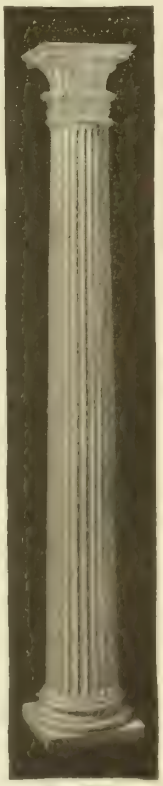


No. 230
GREEK IONIC (ERECHTHEUM)

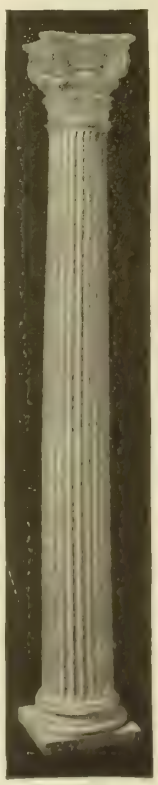


No. 237
MODERN IONIC

No. 222
ITALIAN RENAISSANCE IONIC (SCAMOZZI)
Composition Capital, Attic Base (Cast Iron), Steel Shaft (Corinthian Flute)

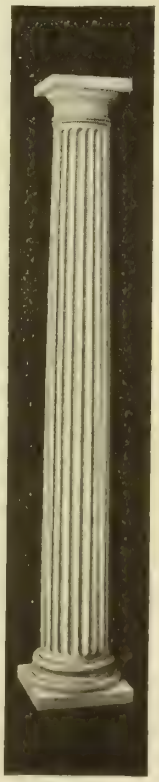


No. 213
TEMPLE OF THE WINDS (CORINTHIAN)
Composition Capital, Attic Base (Cast Iron), Steel Shaft (Corinthian Flute)



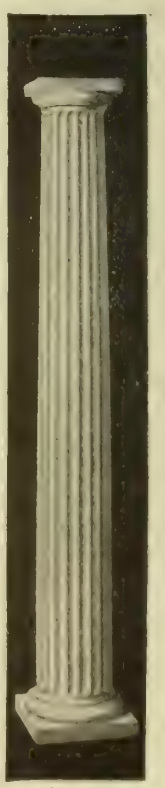
No. 219
ITALIAN COMPOSITE
Composition Capital, Attic Base (Cast Iron), Steel Shaft (Corinthian Flute)

No. 224
ROMAN DORIC (DIOCLETIAN)
Composition Capital, Attic Base (Cast Iron), Steel Shaft (Doric Flute)



No. 200
PLAIN DORIC
Cast-iron Capital, Attic Base (Cast Iron), Steel Shaft (Doric Flute)

No. 700
GREEK DORIC CAPITAL
Including Top Square (Cast Iron), Square Base Member (Cast Iron), Steel Shaft (Doric Flute)

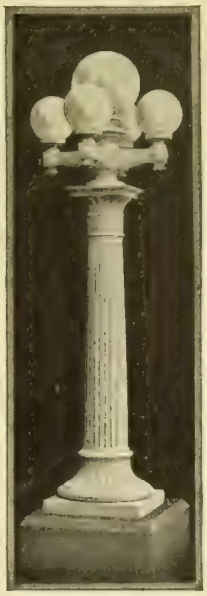


No. 240
ALL STEEL DORIC
Capital and Base, Steel Shaft (Doric Flute)

Continued on next page

Design No. 811—3 Lights
Design No. 754—5 Lights

Design No. 735—7 Lights

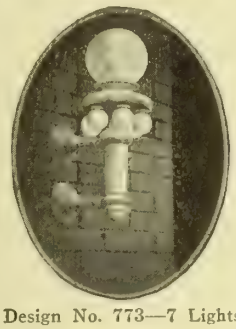


Design No. 838—3 Lights
Design No. 749—5 Lights
Design No. 727—1 Light

Design No. 721—9½″ Shaft
Design No. 837—7″ Shaft

Design No. 723—1 Light
Design No. 813—3 Lights
Design No. 750—5 Lights

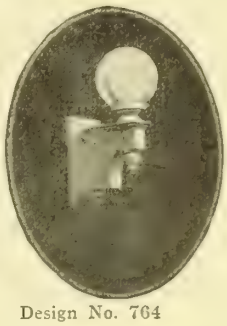
Design No. 78—2 Lights
Design No. 820—3 Lights



Design No. 773—7 Lights

Design No. 775

Design No. 768



Design No. 764

LAMP STANDARDS AND BRACKETS

DATA, LAMP STANDARDS, BRACKETS AND NEWELS

Design No.	Number of Lights	Size of Base at Ground Line, Ins. Sq.	Size of Wall Plate, Ins.	Diam. of Shaft, Bottom, Ins.	Diam. of Shaft, Top, Ins.	Spread of Globes on Centers, Ins.	Spread from Wall to Central Globe, Ins.	Size of Globes and Fitters, Side, Ins.	Size of Globes and Fitters, Central, Ins.	Size of Door Opening, Ins.	Standard Height Over All, Ft.	Standard Height Over All, Ins.	Approx. Shipping Weight, Lbs.
811	3	25½	....	9½	6½	25½	....	12x6	16x 8	.....	10	0	435
754	5	25½	....	9½	6½	25½	....	12x6	16x 8	.....	10	0	475
735	7	18	....	9½	6½	15½	....	6x3¼	18x10	.....	8	1	320
838	3	20	....	9½	6½	23	....	10x5	14x 6 6¾ & 9¼x6		7	10	260
749	5	20	....	9½	6½	23	....	10x5	14x 6 6¾ & 9¼x6		7	10	285
727	1	20	....	9½	6½	....	....	....	16x 8 6¾ & 9¼x6		7	2	175
721	1	13¾	....	9½	6½	....	....	....	16x 8	.....	6	2	120
837	1	9¼	....	7	5	....	....	....	12x 6	.....	4	7	90
723	1	18	....	8	5	....	....	....	16x 8	.....	6	9	175
813	3	18	....	8	5	22½	....	10x5	14x 6	.....	7	5	220
750	5	18	....	8	5	22½	....	10x5	14x 6	.....	7	5	230
78	2	....	11x14	...	...	31½	13¾	12x6	.....	.....	.....		150
820	3	....	11x14	...	...	31½	13¾	12x6	16x 8	.....	.....		145
76	4	....	11x14	...	...	31½	13¾	12x6	16x 8	.....	.....		165
*773	7	....	12x12	...	...	15½	17	6x3¼	18x10	.....	.....		295
775	1	....	10x17	...	...	.....	26⅜	.....	16x 8	.....	.....		125
768	1	....	10x17	...	...	.....	26⅜	.....	16x 8	.....	.....		135
764	1	....	10x17	...	...	.....	12	.....	12x 6	.....	.....		75
696	5	11	.....	...	...	23	....	10x5	14x 6	.....	2	5	115
823	3	11	.....	...	...	23	....	10x5	14x 6	.....	2	5	90
766	1	18	.....	...	...	.....	.....	.....	16x 8	.....	2	1	90
833	.	13¼	.....	10	8	....	....	....	.....	.....	3	3	75
†827	.	21	.....	...	...	....	....	....	.....	4¼ & 8⅞x9¼	3	0	420
829	.	16	.....	8	5	....	....	....	.....	7¾ & 4¼x2½	5	11	380

* Wall plate circular.
† Base octagonal.

Design No. 696
5 Lights
Design No. 823
3 Lights

Design No. 766

EXTERIOR NEWELS

Design No. 833
Pedestal with Cast Bronze Sun-dial

Design No. 827
Flower Bowl

Design No. 829
Flower Bowl

GARDEN FURNITURE

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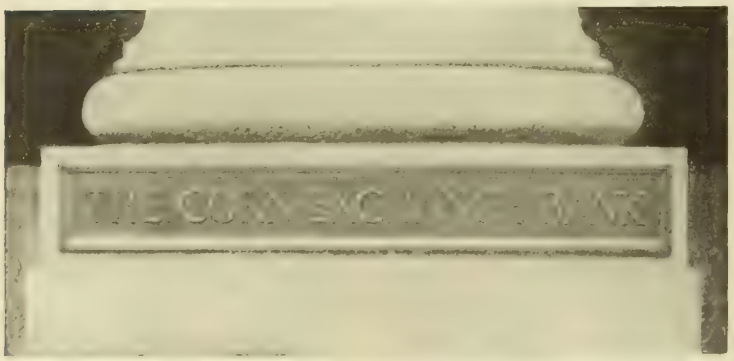

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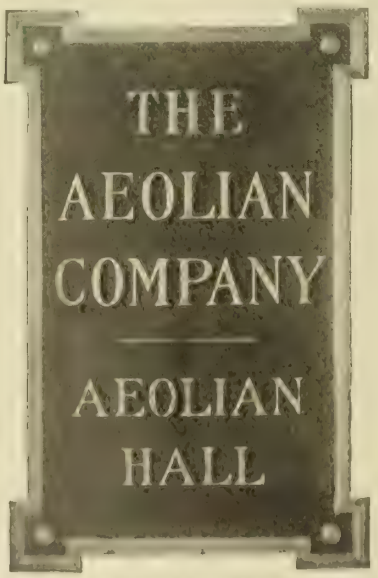

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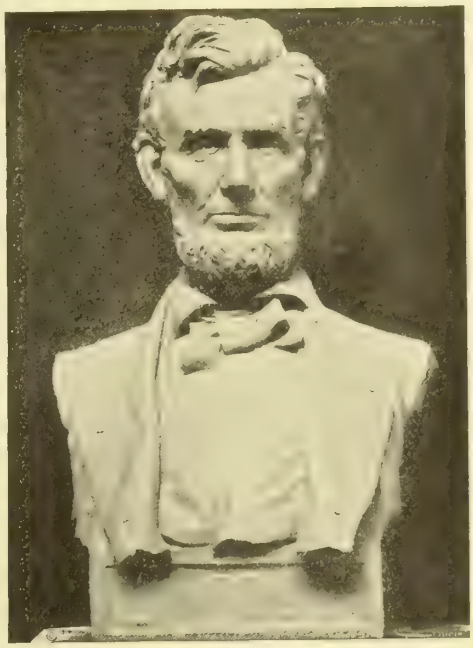

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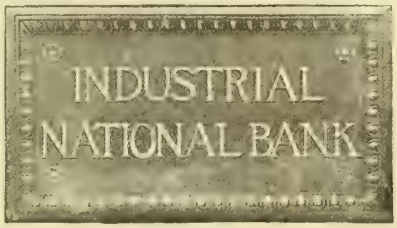

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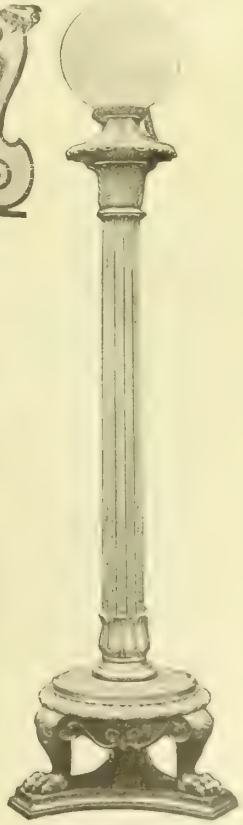
Designed by THOMAS BRUCE BOYD, INC., Equipment Engineers
Bronze Work by JNO. WILLIAMS, INC.



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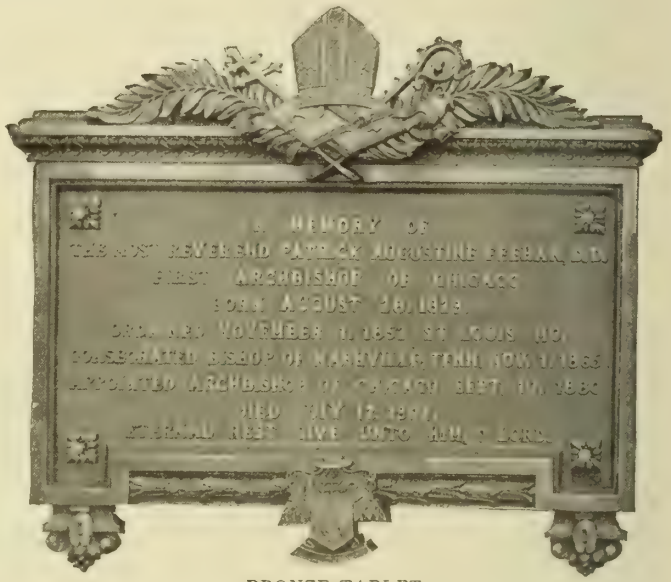
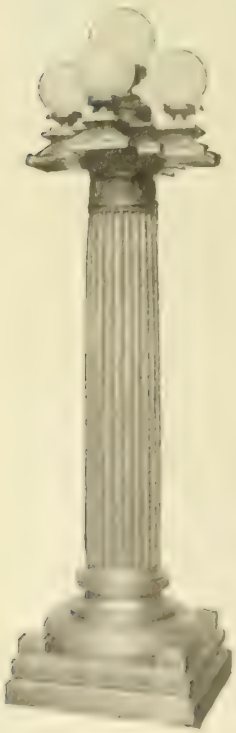
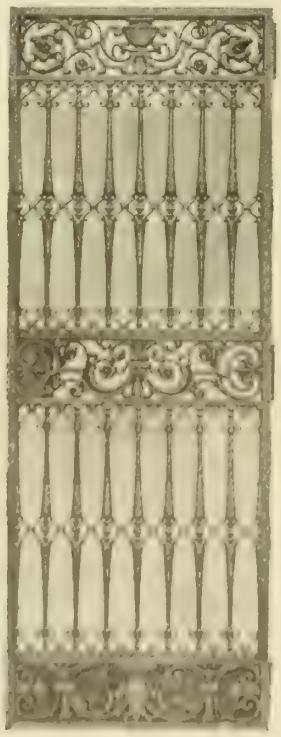


BRONZE TABLET



ELECTROLIER



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IRON and WIRE FENCES for all purposes; UNCLIMBABLE FENCES for country places, parks, playgrounds, institutions, factories, mills, railroads and water companies.

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We will give estimates for our products delivered and set complete in any part of the country. We employ a large force of experienced men who have been trained particularly to erect our work. Where we supply material only, we furnish full instructions and drawings, so that our fences and gates can be placed in position by local mechanics.

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We are at all times ready to furnish architect, contractor, or owner, with sketches, designs, and full information as to sizes and weights of material. If desired, we will make our own surveys for grades and measurements, and take entire charge of the work.

PLATE NO. A-4402. GATEWAY, BAYSHORE, L. I., N. Y.
From designs by CARL L. OTTO, Architect
Made and erected by ANCHOR POST IRON WORKS
There is no branch of iron work that requires greater skill than the making and setting of iron gates. A gate, especially if it is large and massive, is always subject to strain. Unless the framework is properly proportioned and well put together it will eventually sag, causing needless trouble and expense to correct the fault

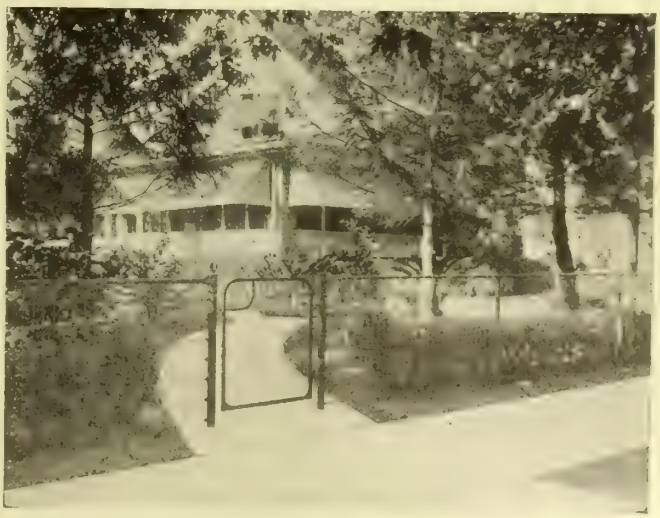


PLATE NO. A-3502. WOVEN WIRE LAWN FENCE
Other designs shown on second succeeding page
The fabric of this fence is made of heavy, crimped galvanized wire bound together by twisted cables. The size of the mesh is 3 by 6 inches. This fabric is also made in closer mesh with the vertical picket wires spaced 1¾ inches apart, thus giving greater protection against small animals

Continued on next page

PLATE NO. A-4573. ENTRANCE GATE, PORT WASHINGTON, L. I.
Designed by RALPH M. WEINRICHTER

A well-built entrance gate is an improvement to a country place, and is often the most prominent feature. We make a specialty of gates of this character. Gates built by us are correct in design, properly proportioned and well executed in every detail

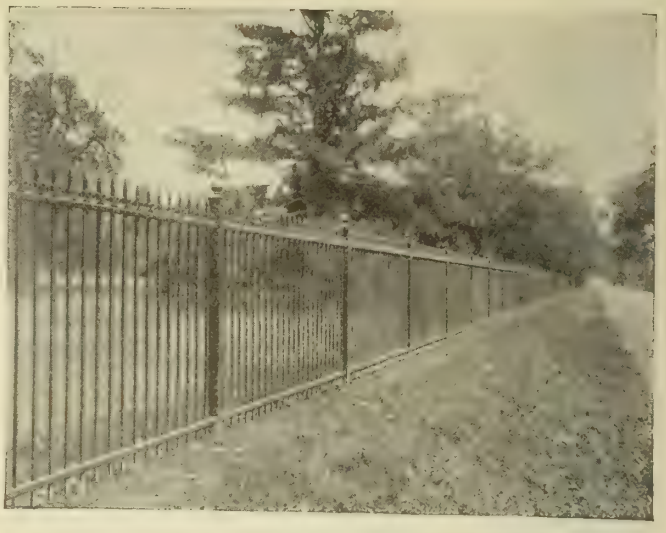
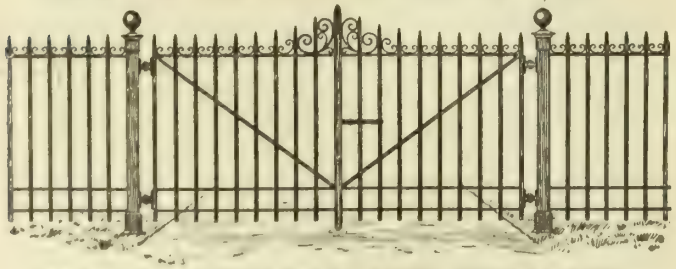


PLATE NO. A-4548. RAILING ON PRIVATE ESTATE AT BRYN MAWR, PA.

This railing is 6 feet in height, and the posts are Galvanized Anchor Posts, the anchorage having a spread below ground of 4 feet. We build this railing in any height up to 8 feet, to set in the ground or on stone or concrete wall

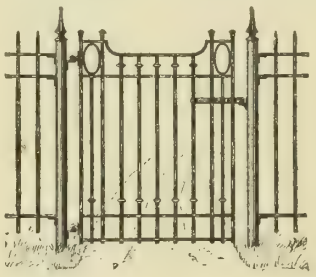
Post No. A-23. Double Gate No. A-4537

Post No. A-23. Double Gate No. A-4504. Railing No. A-4479

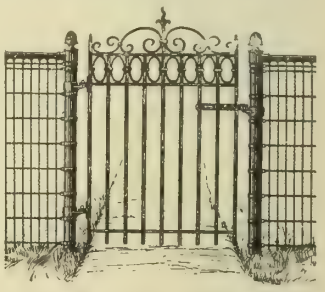


Post No. A-100. Double Gate No. A-4498. Railing No. A-4497

Post No. A-112. Double Gate No. A-4501. Railing No. A-4500



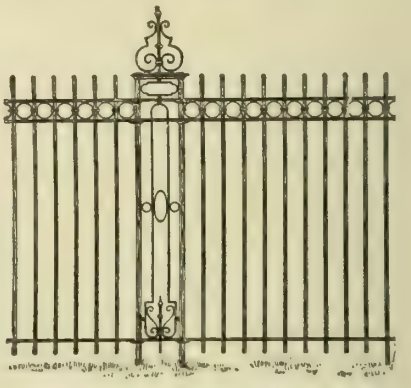
Post No. A-109. Single Gate No. A-4505. Railing No. A-4479



Post No. A-21. Single Gate No. A-4538

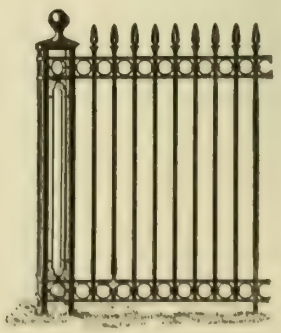
Made in many other stock designs

Post No. A-115
Railing No. A-4540



Post No. A-119. Railing No. A-4544

Post No. A-117
Railing No. A-4542



Post No. A-106. Railing No. A-4445

RAILINGS AND GATES

Can be furnished in heights from 3 feet up to 6 feet, and of any size picket desired, from ½ inch to ¾ inch, round or square

Continued on next page

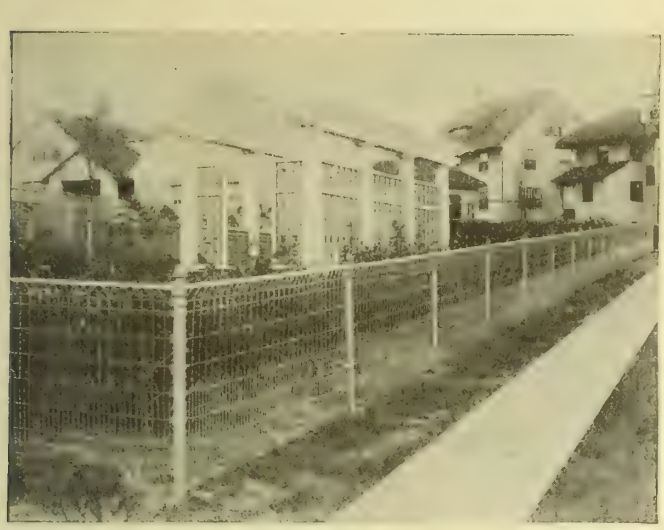


PLATE NO. A-3538. WOVEN WIRE FENCE, 3 FEET 6 INCHES HIGH, AT SPRINGFIELD, MASS.

The construction details are similar to those of the fence in Plate No. A-3444 illustrated below

PLATE NO. A-3539. CHAIN LINK WOVEN STEEL FENCE, 6 FEET HIGH, ON PRIVATE ESTATE AT GREAT NECK, L. I., N. Y.

The construction details are similar to those of the fence in Plate No. A-3446 illustrated below

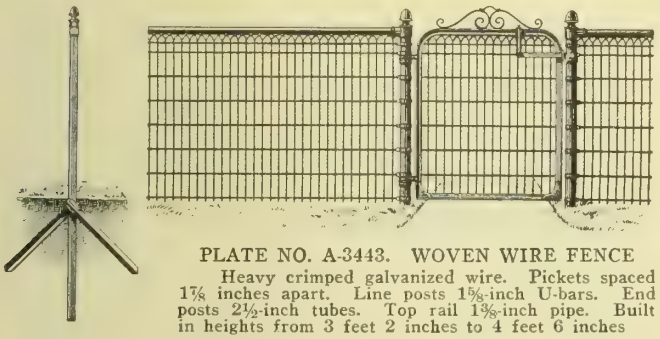


PLATE NO. A-3443. WOVEN WIRE FENCE

Heavy crimped galvanized wire. Pickets spaced 1⅞ inches apart. Line posts 1⅝-inch U-bars. End posts 2½-inch tubes. Top rail 1⅜-inch pipe. Built in heights from 3 feet 2 inches to 4 feet 6 inches

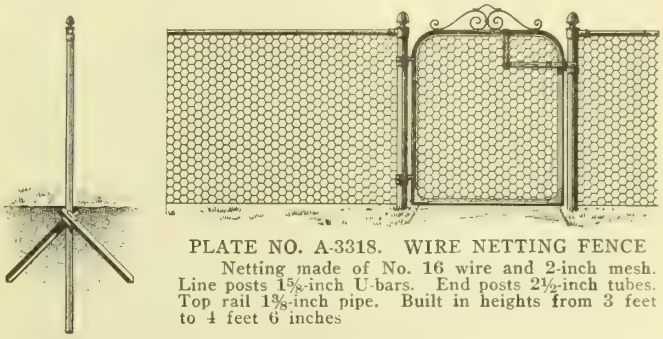


PLATE NO. A-3318. WIRE NETTING FENCE

Netting made of No. 16 wire and 2-inch mesh. Line posts 1⅝-inch U-bars. End posts 2½-inch tubes. Top rail 1⅜-inch pipe. Built in heights from 3 feet to 4 feet 6 inches

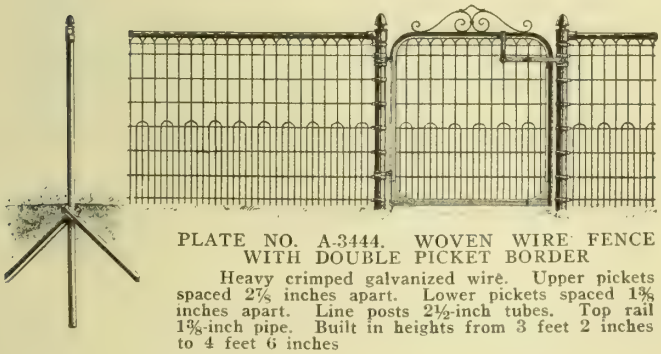


PLATE NO. A-3444. WOVEN WIRE FENCE WITH DOUBLE PICKET BORDER

Heavy crimped galvanized wire. Upper pickets spaced 2⅞ inches apart. Lower pickets spaced 1⅜ inches apart. Line posts 2½-inch tubes. Top rail 1⅜-inch pipe. Built in heights from 3 feet 2 inches to 4 feet 6 inches

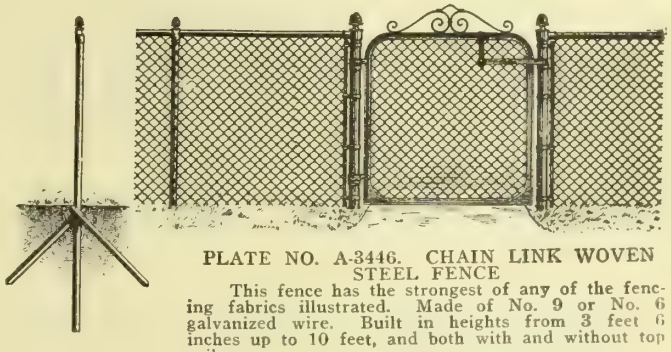


PLATE NO. A-3446. CHAIN LINK WOVEN STEEL FENCE

This fence has the strongest of any of the fencing fabrics illustrated. Made of No. 9 or No. 6 galvanized wire. Built in heights from 3 feet 6 inches up to 10 feet, and both with and without top rail

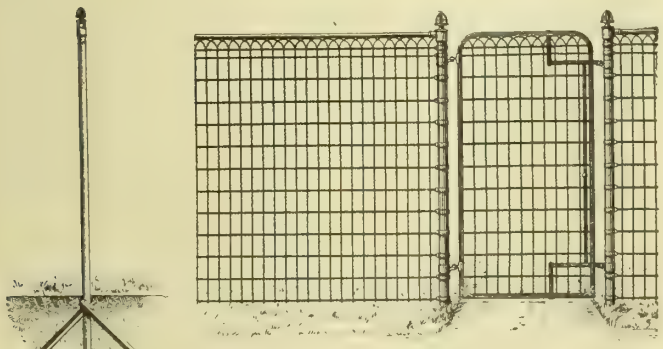


PLATE NO. A-3305. HIGH WOVEN WIRE FENCE

Heavy crimped galvanized wire. Pickets spaced either 1⅞ inches or 3 inches apart. Line posts 2⅛-inch U-bars. End posts 2½-inch tubes. Top rail 1¾-inch pipe. Built in heights from 5 feet to 8 feet. Can be furnished with or without top arms and barbed wire

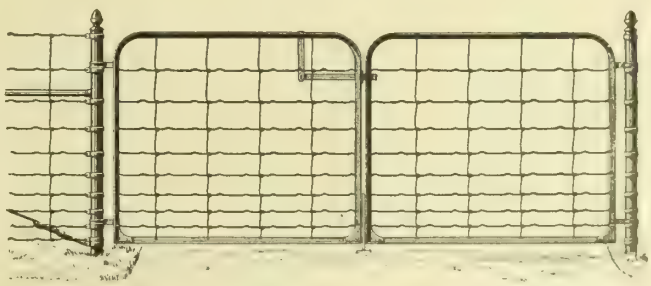


PLATE NO. A-3459. FARM AND PASTURE FENCE

The posts are Anchor Posts, sizes No. 1 or No. 2. The straining posts at ends, corners and gates are of galvanized steel tubing. Fabric square mesh No. 9 galvanized steel wire, so woven together that no stock can get through it. Built in heights from 3 feet 6 inches to 7 feet. Double gates are made with a 10-foot opening and single gates with 3½-foot opening

Continued on next page

PLATE NO. A-3540. TENNIS COURT ENCLOSURES AND BACK-STOPS

Have been installed on many club and private courts, and are constantly growing in favor. The first cost is a little higher than for an enclosure with wood posts; but as they are very much more durable, this extra expense is compensated for by the reduced cost of upkeep

PLATE NO. A-3541. WATER BIRD ENCLOSURE

A netting fence enclosing a lake on a private estate at Germantown, Pa. The lake is devoted to the breeding of ornamental water birds, and is intended to keep the birds within bounds

PLATE NO. A-3328. KENNEL YARDS

The yards illustrated consist of twenty separate runs, besides a large exercising yard. We make a specialty of work of this kind and gladly cooperate with the architects in the preparation of plans

PLATE NO. A-3393. POULTRY RUNS ON PRIVATE ESTATE

Our poultry fences, pigeon cages and aviaries are better and last two or three times as long as those built with wooden framework. Our method of rat-proofing gives absolute protection against rats and weasels. Plans and specifications showing correct size and arrangement of yards furnished on application

PLATE NO. A-3400. PIGEON CAGE

This is a part of a group of 12 cages, each 19 feet wide and 32 feet long. We make a specialty of building enclosures for all varieties of birds and animals

PLATE NO. A-3315. FARM FENCE ON PRIVATE ESTATE

On the farm a good fence is a necessity. This one is of No. 9 galvanized steel wire, so strong and so woven together that no stock can get through it

Continued on next page

PLATE NO. A-3494. CHAIN LINK WOVEN STEEL FENCE
Fence 9 feet high, 1,600 feet long, surrounding the Federal Glass Company's plant at Columbus, Ohio. See Plate No. A-3536 on following page for construction details

PLATE NO. A-4574. MAIN ENTRANCE GATES AND RAILING
Railing 8 feet high at the General Electric Company's plant, Lynn, Mass.

PLATE NO. A-3440. TRI-MESH FENCE ON GALVANIZED ANCHOR POSTS
We erected 2,300 feet of this fence, 8 feet high, for the New York, Westchester & Boston Railroad. See Plate No. A-3537 on the following page for construction details

PLATE NO. A-4485. SPECIAL IRON RAILING
Iron Railing 7 feet 6 inches high on concrete wall at the plant of the General Electric Company, Schenectady, N. Y.

PLATE NO. A-3542. SQUARE MESH FENCE
Square Mesh Fence 8 feet high, 6,000 feet long, erected at Harvey's Lake, N. Y.

PLATE NO. A-4575. ANGLE PICKET RAILING
Erected at plant of East Hampton Rubber Thread Works. See Plate No. A-4571 on following page for construction details of railing

Continued on next page

Chain Link Woven Steel Fences.

Chain Link Woven Steel is woven of the best quality galvanized steel wire of No. 9-, No. 6- or No. 4-gauge, No. 6 being the size most used. Made in any width up to 10 feet. The mesh is so small it affords no foothold for fence climbers; and as an additional protection three or more strands of barbed wire are fastened to inwardly inclined arms attached to the tops of posts.

We furnish fence with or without top rail of galvanized pipe. Posts and all fence parts are galvanized by hot dip spelter process. Under conditions where protection is of utmost importance, we make these fences 10 feet in height, and attach diagonal arms and barbed wire to both front and back of posts; the spread across the top is about 2 feet. The gates are as unclimbable as the fence.

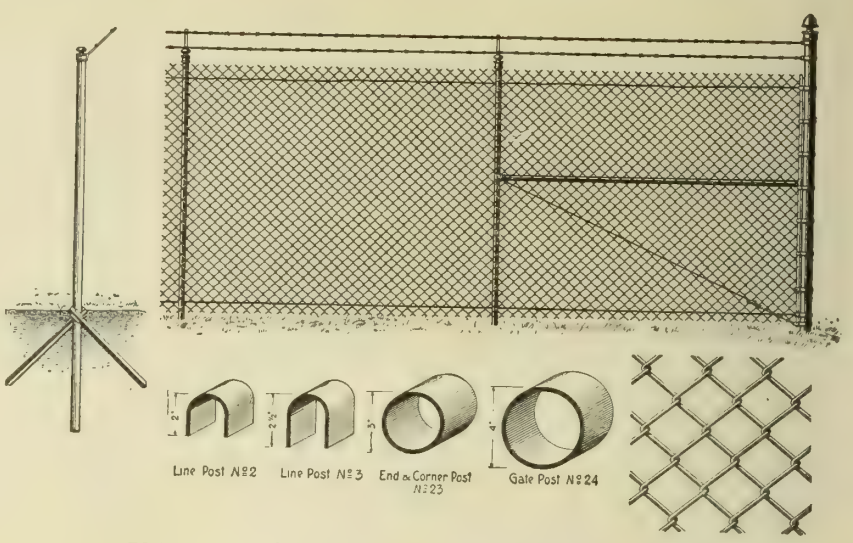


PLATE NO. A-3536. CHAIN LINK WOVEN STEEL FENCE

Fabric.....Chain Link Woven Steel—Wire No. 6-Gauge
Line Posts....Galvanized Anchor Posts, Size No. 3, 2½-inch Steel U-Bar, set 8 feet on centers
End and Corner Posts.....3-inch Steel Pipe
Gate Posts.....4-inch Steel Pipe

Triangular Mesh Fences.

To meet conditions which do not demand the heavier Chain Link Fence, we build an unclimbable fence of moderate cost but of great strength and durability.

The posts are regular Anchor Posts, size No. 2, set 8 to 10 feet apart. Fence is made in heights from 4 feet up to 8 feet. Triangular mesh fabric is of two-ply cables, 4 inches apart; the upright wires are 2 inches on centers; No. 12½ wires are used for both. Inclined inward from the post tops are steel arms, on which are stretched two or more strands of barb wire. Posts, fittings and fabric of this fence are thickly galvanized.

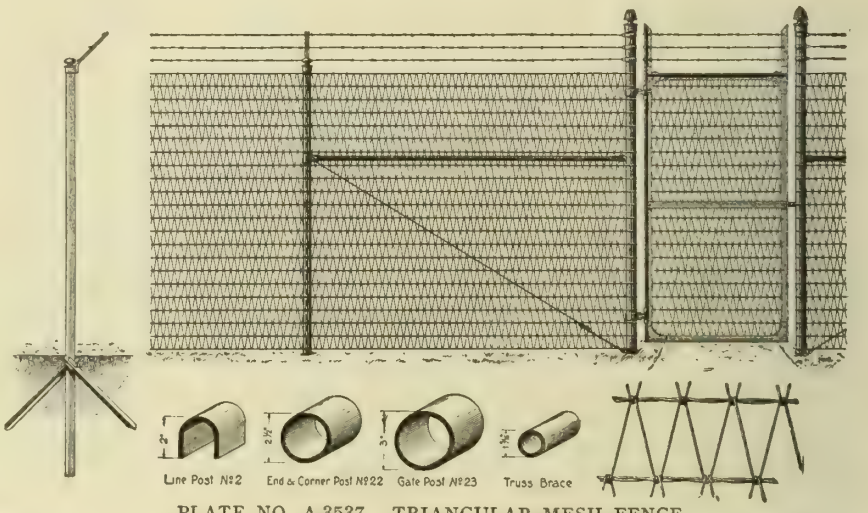


PLATE NO. A-3537. TRIANGULAR MESH FENCE

Fabric.....Triangular Mesh, No. 12½ Wire
Line Posts.....Galvanized Anchor Posts, size No. 2, 2-inch Steel U-Bar, set 10 feet on centers
End and Corner Posts.....2½-inch Steel Pipe
Gate Posts.....3-inch Steel Pipe

Galvanized Angle Picket Railing.

This railing is simple in design, easy to erect, and combines the essential elements of strength, maximum durability, minimum upkeep and moderate cost. The posts are of two types: (1) for concrete footings; (2) fitted with extra size drive anchors for setting in earth. The rails of deep channel are very rigid and will carry a heavy overload without deflection. Pickets are high carbon steel angle; or if preferred, solid pickets of ¾- or ⅞-inch square may be used. We furnish railing either painted or galvanized. In the latter case each panel is assembled complete and then galvanized by the hot dip spelter process. The posts and all other parts of the fence are also galvanized both above and below ground.

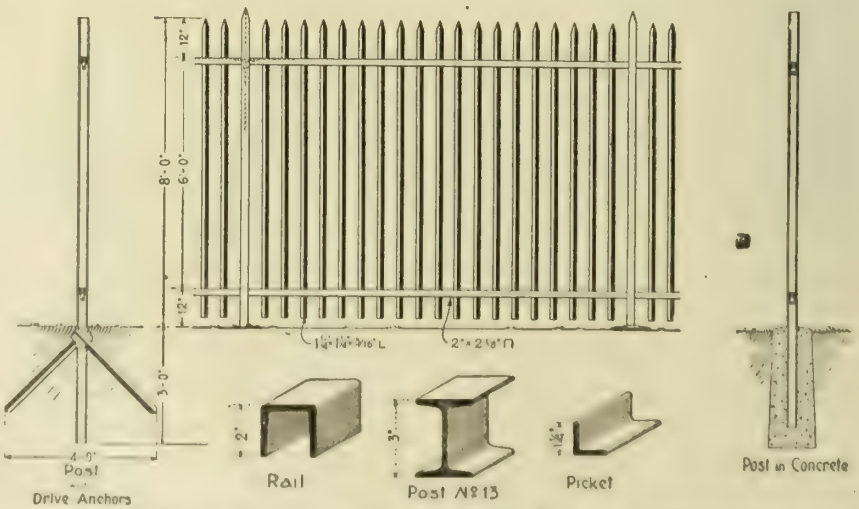


PLATE NO. A-4571. GALVANIZED ANGLE PICKET RAILING

Pickets.....1¼ x 1¼ x 3/16 inch Steel Angles, set on 6 inch centers
Rails.....2 x 2⅝ inch Steel Channels
Posts.....3 inch Standard I Beam, weight 5½ pounds per foot
Panels....Standard length 10 feet, special lengths to suit measurements. Height 6, 7 or 8 feet

Continued on next page

PLATE NO. A-3390. VINE ARBOR, PORT WASHINGTON, N. Y.
Height, 8 feet; width, 10 feet; length, 340 feet. Made with flat arches connected with round rods; made any height or width desired; either galvanized or painted

PLATE NO. A-3472. ROSE ARBOR, AT RUMSON, N. J.
From designs by Ferrucio Vitale, Landscape Architect
This photograph was taken only a few months after the arbor was finished. It is made entirely of galvanized iron, and is thus impervious to rust. We build all kinds of arbors, trellises and espaliers

PLATE NO. A-3511. ANCHOR POST PLAYGROUND ENCLOSURES OF CHAIN LINK WOVEN STEEL
Being used with complete satisfaction on many public playgrounds. The chain link fabric is woven in such a manner that it provides no foothold for climbing children; it also acts as a stop for baseballs or other playthings used in children's games

NOTABLE INSTALLATIONS OF IRON RAILINGS AND GATES

Woodlawn Cemetery, Woodlawn, N. Y., 10,000 feet of railing, 7 ft. high; two gateways, 20 ft. wide, 12 ft. high.

Department of Parks, New York City, 16,000 feet of railing around Broadway grass plots, 15,000 feet of railing around Seventh Avenue grass plots.

Duke's Farm, Somerville, N. J., six ornamental entrance gates, each 20 ft. between piers.

Lowell Cemetery, Lowell, Mass., gateway, 19 ft. wide, 14 ft. high.

Louis Bossert, Bayshore, L. I., N. Y., 1,000 feet of railing, 6 ft. 6 in. high; elaborate gateway, 21 ft. high.

Col. A. R. Kuser, Bernardsville, N. J., 1,700 feet of railing, 7 ft. 6 in. high.

"Castle Gould," Port Washington, L. I., N. Y., 2,000 feet of railing, 9 ft. high.

Daniel G. Reid, Irvington-on-Hudson, N. Y., two elaborate entrance gates and 3,300 feet of railing, 6 ft. high.

St. John's Cemetery, Brooklyn, N. Y., 6,800 feet of railing, 7 ft. high.

Brookside Cemetery, Watertown, N. Y., gateway, 13 ft. wide, 21 ft. high; 1,600 feet of railing, 8 ft. high.

NOTABLE INSTALLATIONS OF WIRE FENCES

Rumson Club, Rumson, N. J., 2,650 feet of tennis fence, 10 ft. high.

Mrs. O. H. P. Belmont, Hempstead, L. I., N. Y., 5,000 feet of woven wire fence, 6 ft. 10 in. high.

Thomas N. McCarter, Rumson, N. J., 22,000 feet of woven wire fence, 4 ft. 6 in. high.

Howard Willets, White Plains, N. Y., 42,000 feet of lawn fence, 4 ft. 2 in. high; 37,000 feet of farm fence, 4 ft. high.

W. H. Macy, Harrison, N. Y., 36,500 feet of lawn fence, 4 ft. high.

N. F. Palmer, Port Chester, N. Y., 8,300 feet of netting fence, 8 ft. high.

Estate of J. F. Dryden, Bernardsville, N. J., 8,600 feet of farm fence, 4 ft. and 5 ft. high.

Howard Gould, Port Washington, L. I., N. Y., 32,000 feet of netting fence, 4, 6 and 8 ft. high; 5,000 feet of poultry fence, 7 ft. high.

John D. Rockefeller, Pocantico Hills, N. Y., 7,700 feet of netting fence, 6 ft. and 7 ft. high.

John S. Phipps, Westbury, L. I., N. Y., 7,000 feet of woven wire fence, 6 ft. 10 in. high.

Isaac Guggenheim, Port Washington, L. I., N. Y., 12,000 feet woven wire fence, 6 ft. 8 in. high.

NOTABLE INSTALLATIONS, IRON RAILINGS AND UNCLIMBABLE WIRE FENCES

American Locomotive Co., Richmond, Va., 2,500 feet of chain link fence, 7 ft. high.

American Net & Twine Co., Anniston, Ala., 1,800 feet of wrought iron railing, 7 ft. high.

J. & P. Coats, Ltd., Pawtucket, R. I., 4,600 feet of chain link fence, 9 ft. high.

Bristol Patent Leather Co., Bristol, Pa., 4,600 feet of chain link fence, 7 ft. high.

City of Columbia Water Works, Columbia, S. C., 2,900 feet of close mesh fence, 8 ft. high.

Consolidated Gas Co., New York, N. Y., 1,100 feet of wrought iron railing, 8 ft. high.

Crocker-Wheeler Co., Ampere, N. J., 3,200 feet of chain link fence, 8 ft. high.

New York, New Haven & Hartford RR., Pawtucket, R. I., 12,000 feet of iron railing, 5 ft. high.

General Electric Co., Pittsfield, Mass., 8,200 feet of chain link fence, 7 ft. high.

General Electric Company, Schenectady, N. Y., 9,300 feet of chain link fence, 8 ft. high.

Montreal Locomotive Works, Montreal, Canada, 7,100 feet of chain link fence, 7 ft. high.

Virginia-Carolina Chemical Co., Charleston, S. C., 8,600 feet of chain link fence, 7 ft. high.

Union Metallic Cartridge Co., Bridgeport, Conn., 1,425 feet of iron railing, 6 ft. high.

Fayette R. Plumb, St. Louis, Mo., 2,036 feet of chain link fence, 7 ft. high.

N. Y., Westchester & Boston R.R. Co., New York City to White Plains, N. Y., 120,000 feet of wire fence, 5 ft. and 8 ft. high.

WRIGHT WIRE COMPANY

MANUFACTURERS OF

Wire and Wire Products

WORCESTER, MASS.

BRANCH OFFICES

BOSTON, 256 Franklin Street
NEW YORK, 256 Broadway
CHICAGO, 33 West Austin Avenue
PHILADELPHIA, 410 Commerce Street
SAN FRANCISCO, 111 Townsend Street

Products.

Wire Lathing, Wire Rope, Wire Cloth, Wire Fencing, Iron and Steel Wire, Staples, Poultry Netting, Screen Cloth; and Ornamental Metal Work of Iron, Brass, or Bronze, such as Elevator Cabs, Gratings, Railings, Window Guards, Gates, Bank Fixtures, Excelsior Rust-Proof Fences.

Also, all Kinds of Grille Work, Wire Partitions, Stock and Tool Room Enclosures, Machinery Guards, Stable Fittings, Clothes Lines, Picture Cord, Coal and Sand Screens, and Foundry Riddles.

Wire Lathing.

Advantages — The superiority of Wright Wire Lathing to lath of wood or of expanded, sheared or punched metal is due, first, to the superior strength of the drawn steel wires, and, second, to the wide and even mesh in which they are woven. Metal which has been punched and then expanded loses much of its inherent strength in the process, and presents a very large percentage of raw surface to the action of the elements. The individual wires woven into Wright Wire Lathing possess relatively high strength for their diameters, and on account of their smooth and hard finish are better protected against corrosion. They are then woven accurately into a fabric, the meshes of which are such that the area of the metal is a relatively small percentage of the total area of the fabric. This is important, because it gives the plaster greater opportunity to pass through the openings between the wires and form on the back a perfect key, which prevents it from being shaken loose. A coating of plaster properly applied on Wright Wire Lath will completely cover all the wires, thereby keeping them from corrosion and protecting them absolutely against the ravages of a fire. This is not always the case in lath of expanded metal or wood, where the fire frequently gets access to the back, and by burning the wood or expanding the metal forces off the plaster.

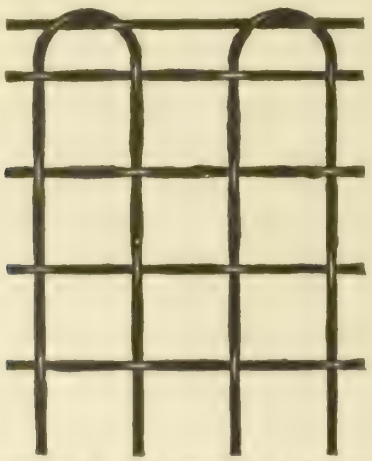


Fig. 1. WRIGHT WIRE LATHING, JAPANNED FINISH
2 x 2 Mesh, No. 19

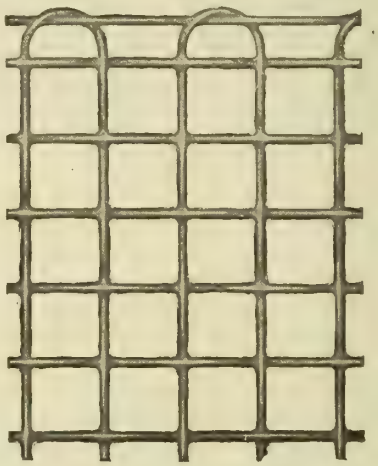


Fig. 2. WRIGHT WIRE LATHING, GALVANIZED FINISH
2½ x 2½ Mesh, No. 20

The late Frank E. Kidder, in his Architect and Builders' Hand Book, made the statement that heavy wire lath tightly stretched over metal furrings forms the most fireproof lath on the market. The reason is explained above, namely, that the lath can be more thoroughly protected with the plaster coating than can any other form of lath. Wright Wire Lath, moreover, being less susceptible to expansion and contraction than other types of metal lathing, is more certain to keep the plaster smooth and free from cracks.

Owing to its comparative lightness and ease of handling, Wright Wire Lath affords the architects the easiest and most satisfactory medium for obtaining effects in plaster, such as ornamental cornices and mouldings, columns and similar shapes. It is capable of being stretched substantially upon comparatively simple framework and assures a smooth and durable finish to the plaster, thereby enhancing the decorative effect.

Styles—Wright Wire Lathing is supplied in rolls fifty yards long and one yard wide, with fabric plain or stiffened. There are three finishes: Plain, where the wires are in their natural state; Japanned, shown in Fig. 1, where they are coated with a protective varnish; and Galvanized, shown in Fig. 2, where the fabric is dipped in pure melted zinc *after weaving*. This process greatly stiffens the fabric by soldering every intersection, and imparts increased durability.

Stiffened Lathing.

Wright Stiffened Lathing is reinforced by V-ribs of sheet steel placed across the web, eight inches apart, and securely attached by steel clips. These ribs pre-

Continued on next page

vent the lath from bagging between supports and serve to hold the web away from flat surfaces so the plaster may form a perfect key.

Illustration (Fig. 4) shows how perfectly Wright Wire Lathing accomplishes this. Here the plaster was purposely put on thin to reveal the outline of the lath; but in actual practice the plaster would have come through and completely covered all the wires. A glance at the illustration will show what a splendid protection wire lathing makes against fire. Standard V-rib stiffeners are one half inch high; but we furnish them three quarters or one inch high when desired.

Directions for Use.

In attaching lathing of No. 20 wire and lighter, studs or furring strips should be not over nine inches apart; and for No. 18 or No. 19 wire not over twelve inches apart. One pound of ¾- or ⅞-inch lath staples will fasten 12½ yards of lathing.

LIST OF MESHES AND SIZES OF WIRE

Mesh, per Inch	Size of Mesh	Number of Wire	Decimal Size of Wire	Decimal Opening
2 x 2	½-inch	18	.047	.453
2 x 2	½-inch	19	.041	.459
2 x 2	½-inch	20	.035	.465
2½ x 2½	⅜-inch	18	.047	.353
2½ x 2½	⅜-inch	19	.041	.359
2½ x 2½	⅜-inch	20	.035	.365
2½ x 2½	⅜-inch	21	.032	.368
2½ x 2½	⅜-inch	22	.028	.372

Prices quoted on application

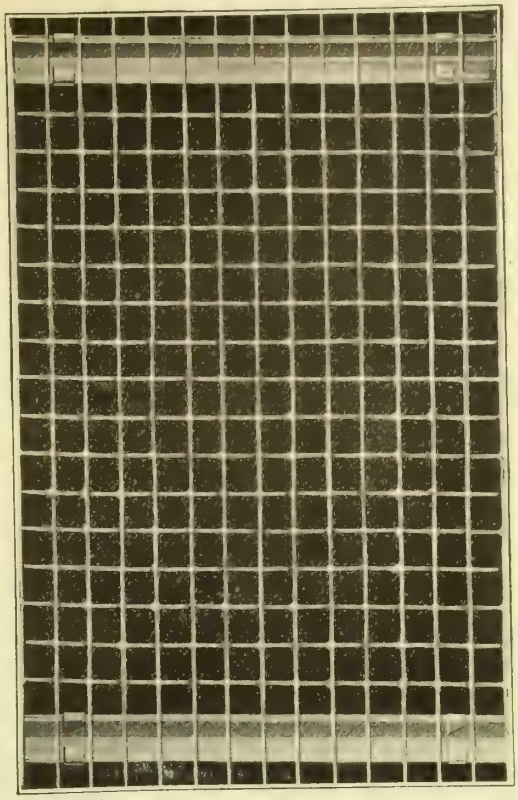


Fig. 3. WRIGHT STIFFENED STEEL WIRE LATHING
Showing Galvanized Finish

Wright Wire Lathing Installations.

The strength and durability of Wright Wire Lathing and its value as a fire preventative has led to its extensive use in the construction of the most modern fireproof buildings.

The following is a list of a few of the modern buildings in which our lathing has been used:

Aeolian Hall, New York, N. Y.
The Municipal Office Building, New York, N. Y.
The Grand Central Terminal, New York, N. Y.
The Woolworth Building, New York, N. Y.
The Flower Hospital, New York, N. Y.
The German Hospital, New York, N. Y.
The Staff House of Kings County Hospital, Brooklyn, N. Y.
The Journalism Building of Columbia College, New York, N. Y.
The Telephone Building, New York, N. Y.
The Telephone Building, Brooklyn, N. Y.
The Consolidated Gas Co.'s Building, New York, N. Y.
The Strand Theater, New York, N. Y.
The Astor Apartments, New York, N. Y.
Pier of the Central R.R. of N. J., 11 North River, New York, N. Y.
Bird House at Franklin Park Zoo, Boston, Mass.
Saco Petti Machine Shops, Newton Lower Falls, Mass.
Dormitory for Mill Hands, Newton Lower Falls, Mass.
The Travelers Insurance Co. Building, Hartford, Conn.
The New City Hall, San Francisco, Cal.
The St. Francis Hotel, San Francisco, Cal.
The Children's Hospital, San Francisco, Cal.
Mendocino State Hospital, Ukiah, Cal.
The Preston School of Industry, Ione, Cal.
Ebbets' Field Grand Stand, Brooklyn, N. Y.
The dome in the rotunda of the Ebbets' Ball Field building is 84 feet in diameter, and is the largest dome ever erected entirely of iron furring and wire lath in the world. Wright Galvanized Wire Lath was used throughout this dome.

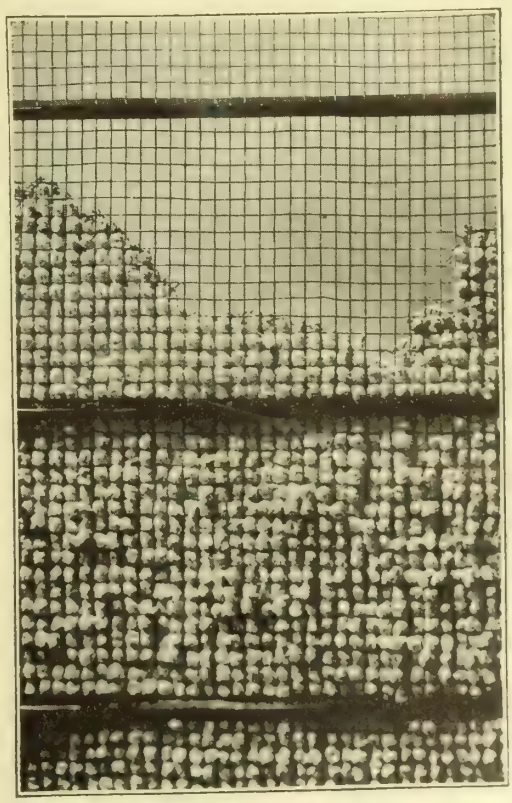


Fig. 4. BACK VIEW OF WRIGHT STIFFENED WIRE LATHING WITH PLAIN FINISH
Shows perfect key secured by plaster

Continued on next page

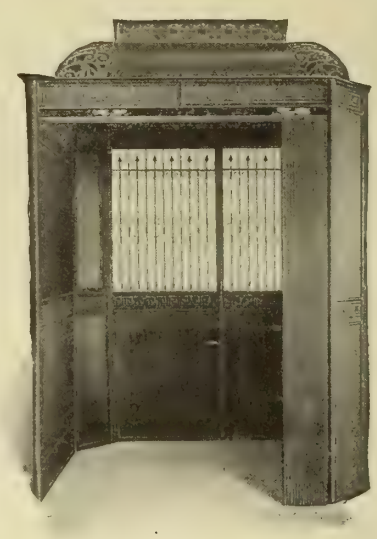
Ornamental Metal Work.

Showing a few of the many designs of grille work we manufacture: Bank and office railings, elevator cabs and enclosures, window guards, wire work for enclosing tool rooms, partitions for stock rooms, protection guards for gears and machinery of all kinds.

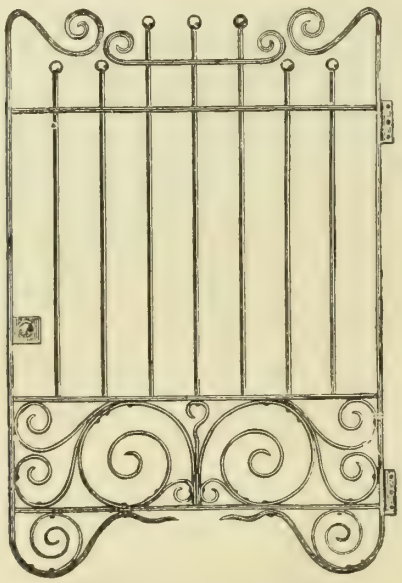
We manufacture ornamental grilles in wrought iron, cast iron, or steel painted, or in steel electro plated; in brass or bronze metal, natural or antique finish; brass or bronze rails for protecting show windows; door rails, foot rails, and kick plates.

We manufacture folding gates, fire-escapes, iron stairs, and light ornamental iron work of all kinds.

We will figure on architects' plans or furnish our own designs.

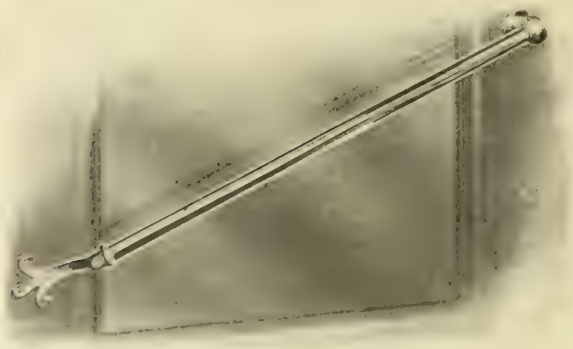


ELEVATOR CAB. NO. 600



WICKET. STYLE NO. 4

WINDOW GUARD WITH CHANNEL IRON FRAME



GUARD FOR GLASS PANEL DOOR

ELEVATOR DOOR. NO. 1...

GUARD PROTECTING GLASS SHOW WINDOW

Continued on next page

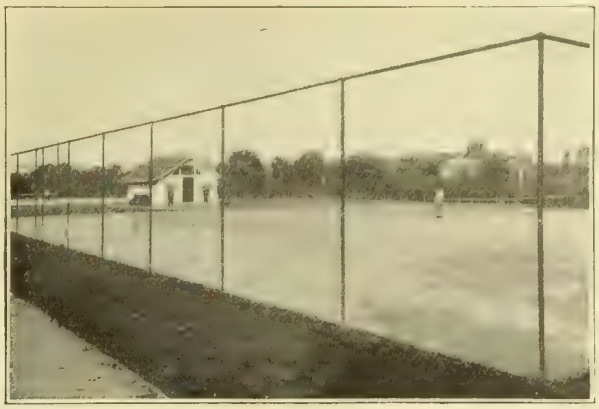
Excelsior Rust-Proof Fences.

These fences are made of smooth wires, No. 9 lateral and No. 8 vertical, with every intersection rigidly held by our patent steel clamp, which makes an immovable joint. The fabric is made rust-proof by galvanizing it, *after making,* in pure melted zinc, which insures exceedingly long life.

We furnish also tennis-court fences, heavy chain-link fences for all purposes, and iron fences in a wide variety of styles.

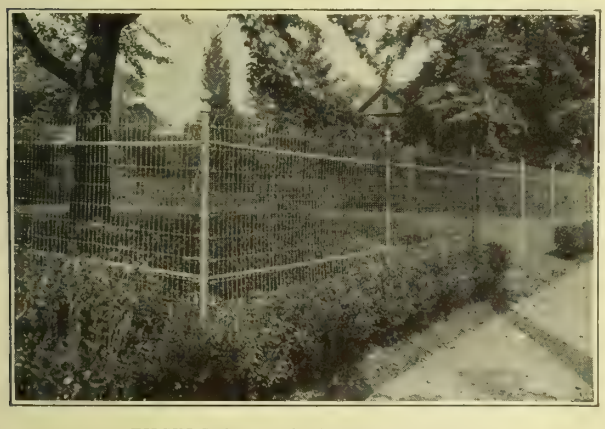
We erect fences when desired. Among our notable installations are:

Mount Hope Cemetery, Boston, Mass.
Evergreen Cemetery, Chestnut Hill, Mass.
Franklin Park, Boston, Mass.
George E. Keith Co. (Walkover Shoes), Brockton, Mass.
U. S. Government Arsenal, Watertown, Mass.
Blackstone Mfg. Co., Blackstone, Mass.
Lincoln Mills, Fall River, Mass.
Stevens Mfg. Co., Fall River, Mass.
Crompton & Knowles Loom Works, Worcester, Mass.
Graton & Knight Mfg. Co., Worcester, Mass.
Norton Co., Worcester, Mass.
Royal Worcester Corset Co., Worcester, Mass.
Arnold Square Playground, Providence, R. I.
Prairie Avenue Playground, Providence, R. I.
Davis Park, Providence, R. I.
Roger Williams Park, Providence, R. I.
Tennis Courts and Fence around the grounds, Longwood Cricket Club, Brookline, Mass.
Fence at Mont Merici College, Waterville, Me.
Hendee Manufacturing Company, Springfield, Mass.
The Fiberloid Company, Indian Orchard, Mass.
Woonsocket Machine and Press Company, Woonsocket, R. I.
Meade-Morrison Company, East Boston, Mass.
Lowell Electric Light Co., Lowell, Mass.
E. H. Clapp Rubber Company, Hanover, Mass.

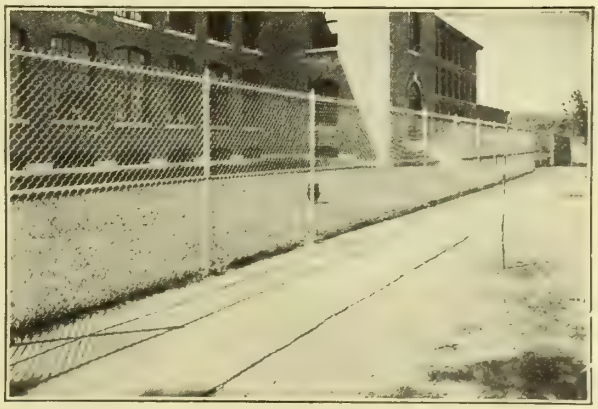


TENNIS COURT FENCE

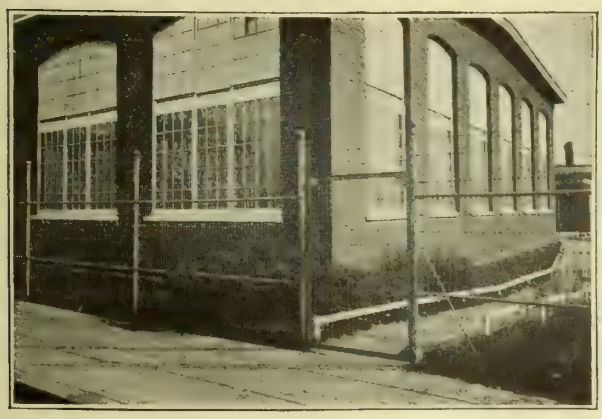
IRON FENCE
All Styles



EXCELSIOR RUST-PROOF FENCE
Furnished in any height



CHAIN LINK FACTORY FENCE



EXCELSIOR RUST-PROOF FACTORY FENCE WITH BARB WIRE OVERHEAD

CHAIN LINK FACTORY FENCE
8 Feet High

W. A. SNOW IRON WORKS, INC.

21 Portland Street
BOSTON, MASS.

SHOPS
CHELSEA, MASS.

Products.

IRON and WIRE FENCES and RAILINGS; ENTRANCE GATES; ORNAMENTAL IRON WORK; UNCLIMBABLE FENCES for Parks, Cemeteries, Playgrounds, Factories, Schools, Institutions, Water-Works and Mills.

ALSO, IRON STAIRS, FIRE-ESCAPES, FOLDING GATES, IRON SPIRAL STAIRS, WINDOW GUARDS and IRON BALCONIES, TENNIS COURT ENCLOSURES.

Estimates.

We are always pleased to furnish estimates for work erected complete, all of which is done by experienced men.

We make special sketches and drawings to meet special requirements and are prepared to submit drawings of appropriate design at short notice. If desired can furnish, survey and do the entire work complete.

Catalogues.

Catalogues of any of our work sent on application.

PLATE 2027. ENTRANCE GATES, ESTATE OF WILLIAM H. MOORE, PRIDES CROSSING, MASS.
Width between piers 14 feet; height at center of gates 6 feet

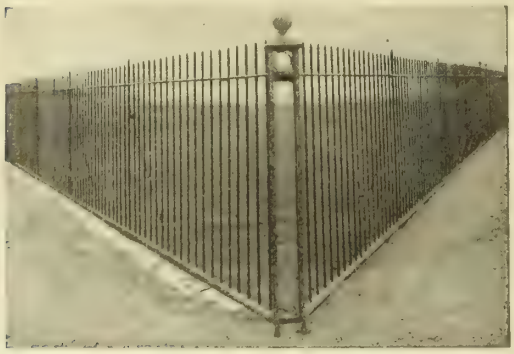


PLATE 2037. RAILING, BEACH BLUFF, SWAMPSCOTT, MASS.
Railings made from 4 feet to 6 feet high. Pickets ⅝ or ¾ inch square, rails 2 x 1⅛ inch channel. Sections 9 feet long and secured by cast-iron anchors

PLATE 2018. ENTRANCE GATES, ESTATE OF FRANCIS SKINNER, DEDHAM, MASS.
GUY LOWELL, Architect
Width between piers 16 feet, height at center 16 feet

PLATE 2012. IRON RAILING, ESTATE OF LARZ ANDERSON, BROOKLINE, MASS.
Height, 8 feet 6 inches. Panel post 20 inches wide, placed 14 feet apart

PLATE 2009. WROUGHT IRON FENCE, CATHEDRAL OF HOLY CROSS, BOSTON, MASS.

Continued on next page

PLATE 2039. UNCLIMBABLE CHAIN LINK FENCE WITH BARBED WIRE ATTACHMENTS, FAIRBANKS SCALE CO., ST. JOHNSBURY, VT.

Height, 7 feet. Netting 2-inch mesh, No. 6 wire; posts set in concrete with pipe top rail; made any height from 4 to 10 feet
7,000 lineal feet furnished to city of Cambridge, Mass., without barbed wire attachments, for schools and parks
The strongest wire fence made. Used extensively for factory purposes

PLATE 2047. WOVEN WIRE FENCE

Desirable for lawns and country estates. Height, 3 to 6 feet; mesh, 1¾, 2¼ or 3 inches by 6 inches
Gives complete protection, and is a very satisfactory fence

PLATE 2017. RAILING, FOREST HILLS CEMETERY, JAMAICA PLAIN, MASS.

Height, 7 feet from grade. Pickets, ¾-inch square, made in 9-foot sections. Panel post, 12 inches wide and 40 feet apart. Length of fence, 8,000 feet

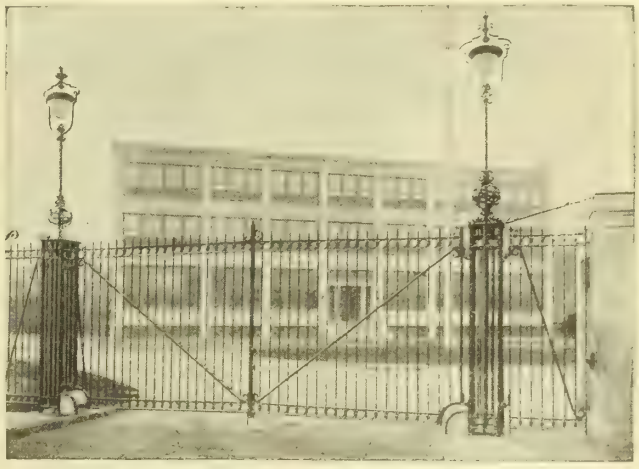


PLATE 2034. ENTRANCE GATES, EDISON ELECTRIC LIGHT CO., BOSTON, MASS.

Bigelow & Wadsworth, Architects
Width between piers, 18 feet; height, 8 feet 6 inches

NOTABLE INSTALLATIONS

Cemeteries

Forest Hills Cemetery, Jamaica Plain, Mass., 8,000 feet heavy iron railing
Harmony Grove Cemetery, Salem, Mass., 7,000 feet fence and entrance gates
Forest Glade Cemetery, Somersworth, N. H., 4,500 feet heavy iron fence

Private Estates

Henry Clay Frick, Prides, Mass., 8,000 feet heavy iron railing and entrance gates
J. M. Longyear, Brookline, Mass., 3,000 feet heavy iron railing and gates
A. W. Preston, Swampscott, Mass., 6,000 feet heavy iron fencing and entrance gates

Lawn Tennis Enclosures

Young Men's Christian Association, Huntington Avenue, Boston, Mass.
Henry Clay Frick, Prides, Mass.
A. W. Preston, Swampscott, Mass.
William A. Paine, Swampscott, Mass.
Samuel Lawrence, Medford, Mass.

Playgrounds

City of Cambridge, Mass., 7,000 feet chain link fence
City of Newton, Mass., 1,200 feet chain link fence
City of Beverly, Mass., 1,400 feet diamond double-strand fence

Public Works

Metropolitan Park Commission of Massachusetts, 20,000 feet of heavy iron railing
City of Boston Park and Recreation, 15,000 feet of heavy iron railing
City of Auburn, Me., Water Works, 750 feet of iron fencing
City of Revere, Mass., Water Works, 900 feet of iron fencing

Factories

Edison Electric Illuminating Co., Massachusetts Avenue, Boston, Mass., 3,500 feet wrought-iron fence
United Drug Co., Boston, Mass., 1,200 feet of iron fence and gates
Fairbanks Scale Co., St. Johnsbury, Vt., 4,000 feet of chain link fence with barbed wire attachments
Holtzer Cabot Electric Co., Boston, Mass., 3,000 feet of iron fence
Bates Mfg. Co., Lewiston, Me., 1,200 feet of chain link fence

CHATTANOOGA ROOFING & FOUNDRY COMPANY

MANUFACTURERS OF

Sheet Metal, Ornamental Wrought and Cast-Iron Work

CHATTANOOGA, TENN.

Products.

We manufacture METAL SHINGLES, METAL ROOFING, SKYLIGHTS, VENTILATORS, SHEET METAL FIREPROOF WINDOWS, MARQUEES, GALVANIZED ORNAMENTAL FRONTS, CAST-IRON and STEEL FIREPROOF STAIRWAYS, ENTRANCE GATES, ARCHITECTURAL SHEET METAL WORK, CORNICES.

Also METAL CEILING, FLAGPOLES, METAL AWNINGS, FINIALS and METAL ROOF TRIMMINGS, CAST-IRON WINDOW FRAMES and SPANDRELS, WROUGHT-IRON GRILLE WORK, ELEVATOR ENCLOSURES, FIRE-ESCAPES, WINDOW GUARDS, SIDEWALK DOORS, WIRE WORK, CAST-IRON COLUMNS, BASES, WHEEL GUARDS, COAL CHUTES, MANHOLES and STRUCTURAL IRON of Every Description.

Facilities and Experience.

During the past thirty-five years our capacity and facilities for maintaining a reputation for quality, price and service have steadily grown, until today our factory is over one thousand feet in length and covers several acres. Prompt shipments guaranteed.

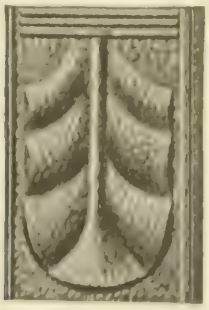
Metal Shingles.

Made from the best terne plate, finished by the dipping process after shingle is formed, thereby making sure that the paint or galvanizing will cover every part of the shingle. No cracking of coating. They are easily and quickly laid without skilled labor. Are waterproof, fireproof and lightning-proof; will not rot, crack, split nor break.

Metal Shingles are the most economical roof covering for residences, churches, stores, schools and public buildings, as the fireproof qualities entitle buildings on which they are placed to the lowest insurance rates.

The side-locking device, a strong, patented feature, is the same height on both sides, making it impossible for the rain to beat through from any direction. The shingles slip together easily when being laid, and ample allowance is made for contraction and expansion, also for shrinking and settling of new buildings. When properly placed they are absolutely water-tight.

The embossing strengthens and stiffens the shingle, taking every particle of buckle out of the metal, and forming a continuous passage for the free circulation of air underneath, which serves to keep the roof cool and the underside of the shingle dry, preventing rusting. Water is carried away from the locks and joints by deep troughs.



"NEW CENTURY" METAL SHINGLE

"OLD ENGLISH TILE" METAL SHINGLE

"New Century"—Our well-known standard shingle which is now covering more than eleven million square feet of roof space. Made in two grades: Hand-dipped galvanized tin, and painted tin.

"Old English Tile"—Fills the new demand for rigid simplicity of style. Embossing is square at bottom as well as top. Three grades: Hand-dipped galvanized tin, special galvanized sheets, and painted tin.

Sizes.

Metal shingles made in three standard sizes, namely, 7 x 10, 10 x 14 and 14 x 20 inches, stamped with the trade-mark "Nooga," are always carried in stock.

Architectural Sheet Metal Work.

Estimates made from Architect's drawings on all Sheet Metal Work required for buildings.

Metal Windows.

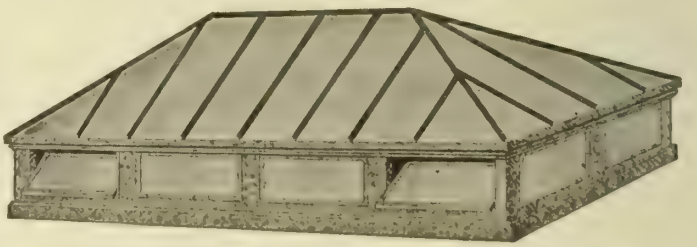
Details of "Nooga" Sheet Metal Fireproof Windows mailed to architects and builders on application.

Galvanized Store Fronts.

We have a number of attractive stock designs of Galvanized Fronts, designed especially for motion picture theaters. Write for catalogue and prices.

Putty-less Skylights.

Our Galvanized Putty-less Skylight is so constructed that it is absolutely fireproof and water-tight, durable and inexpensive. Catalogue and details furnished on request.



HIPPED TURRET SKYLIGHT, WITH SASH LOUVRE

Ventilators.

"Nooga" Ventilators can be used both as a ventilator and skylight. The top is made of wired glass. It cannot leak, the secret gutters carry off any moisture due to condensation or the cause. Furnished with or without base.

GLASS TOP "NOOGA" VENTILATOR

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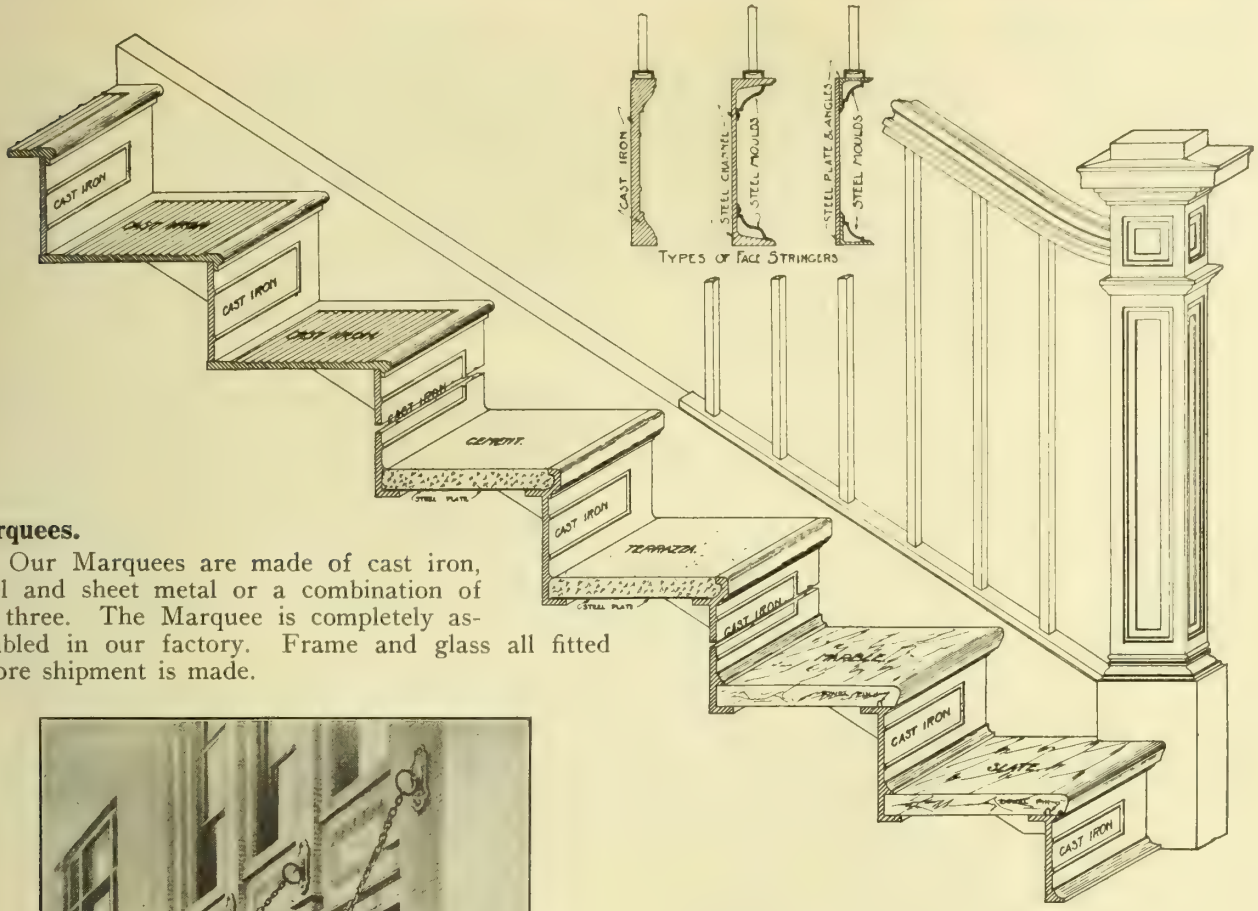
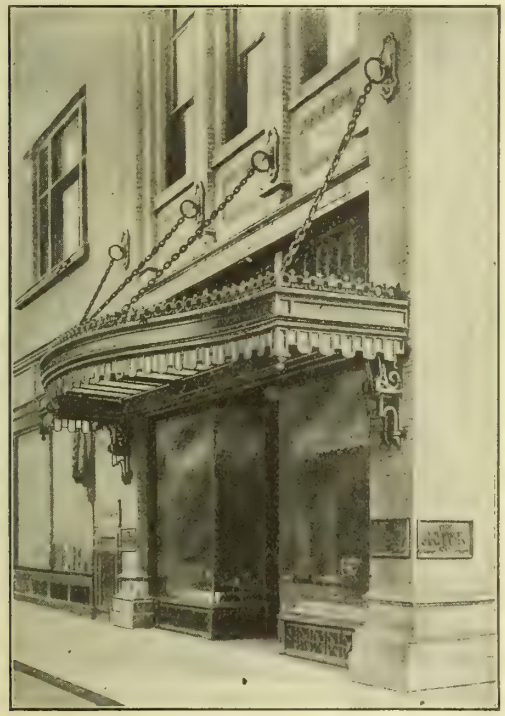


DETAILS OF STANDARD STAIRWAY CONSTRUCTION

Marquees.

Our Marquees are made of cast iron, steel and sheet metal or a combination of the three. The Marquee is completely assembled in our factory. Frame and glass all fitted before shipment is made.



A DISTINCTIVE MARQUEE

Factory and Stock.

Our Foundry, Machine Shop, Pattern Shop and Ornamental Iron Assembling Room, fully equipped with latest machinery, are worked as a unit; and being devoted entirely to Architectural Iron Work, aided by a large stock of Bars and Small Shapes, enables us to furnish complete Cast and Steel Ornamental Iron Work in the least possible time.

Galvanizing and Plating.

Our plant is equipped with hot galvanizing pots and electro-plating system that enables us to furnish Cast and Steel Ornamental Iron Work, galvanized or electro-plated. The only manufacturers in the South equipped to furnish this class of work from their own plant.

Designs and Estimates.

Estimates furnished from Architects' plans and specifications. Our Designing and Estimating Departments are at all times at the disposal of Architects. Special and stock designs will be submitted upon request.

Territory.

Our location enables us to furnish and erect work in all the Southern States.

Catalogue.

Our General Catalogue No. 30, illustrating stock designs of Cast, Steel and Sheet Metal Work, will be mailed to Architects and Contractors on request.

ORNAMENTAL IRON GATE

THE EDWARDS MANUFACTURING COMPANY

INCORPORATED 1901

Sheet Metal Building Material

CINCINNATI, OHIO

BRANCH OFFICES AND WAREHOUSES

NEW YORK, N. Y., 81-83 Fulton Street
DALLAS, TEX., 1635-37-39 Pacific Avenue
PITTSBURGH, PA., 1501 Oliver Building
SAN FRANCISCO, CAL., 315-19 Monadnock Building

Products.

"The Edwards" Metal Ceilings and Walls, Metal Shingles, Metal Spanish Tile, Patented Pressed Standing Seam Corrugated Steel Roofing.

Also, "Reo" Cluster Shingles, Metal Door and Window Frames and Sash, Metal Lockers, Metal Culverts, Metal Garages, Portable Buildings, Metal Wall Coverings, Metal Lath, Corrugated Iron Roofing and Siding, Steel Imitation Brick and Stone Siding, Galvanized Iron Cornice, Skylights, Ventilators, Eaves Trough, Conductor Pipe, Cellular Metal Fireproofing and "Keyridge" Reinforcement and Lath, "Edmanco Tightcote" Fire Resisting Paint.

For Rolling Doors and Shutters, see our pages in General Index.

AN ATTRACTIVE DINING ROOM COVERED WITH "EDWARDS" METAL CEILING AND SIDE WALLS

"The Edwards" Metal Ceilings and Walls.

Metal Ceilings are no longer a luxury—they may almost be said to be a necessity. Where formerly they were used almost exclusively in churches, stores, halls and other buildings, they are now extensively used also in private residences. There are a number of excellent reasons for this growing popularity. From every viewpoint the metal ceiling is the ideal ceiling.

In the first place, it is unusually attractive. With the wide variety of patterns, which comprise "The Edwards" line, to choose from, any architectural effect can be obtained. Nor do the advantages of a metal ceiling end with its beauty and attractiveness. It is economical, the first cost being slight, and, with proper care, no subsequent expense for repairs. It is the most sanitary and easiest to keep clean of any ceiling; is absolutely proof against fire, moisture and vermin; makes the room cool in summer and warm in winter; and eliminates danger from falling plaster.

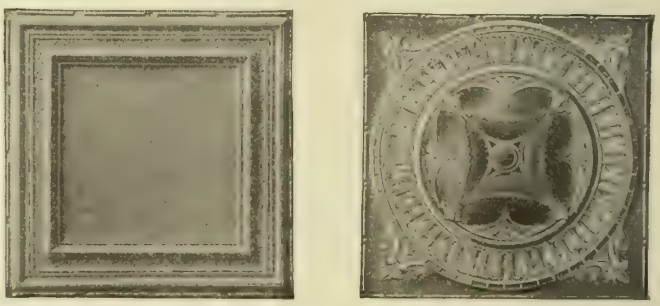


Plate No. 1735 Center, No. 2312

"EDWARDS" FRENCH RENAISSANCE METAL CEILINGS

"The Edwards" Metal Shingles and Metal Spanish Roofing Tile.

Are made from best quality terne plate, furnished painted or "Tightcote" galvanized, also in copper.

Their exceedingly attractive appearance is only one of the numerous advantages which commend them to builders and architects. They are proof against fire, lightning, rain, snow and wind; do not warp nor rot as wooden shingles do; and when laid according to the simple directions, will last a lifetime.

All Edwards Metal Shingles and Metal Spanish Tile are made with a patented side lock. Their interlocking device permits of a tight interlocking of each shingle or tile with the one lying next to it, so that, when the entire roof is laid, it is practically the same as one solid sheet of metal, without a crack or crevice anywhere through which a drop of water can seep. Although the seams are absolutely water tight, the lock is so devised as to allow for expansion and contraction

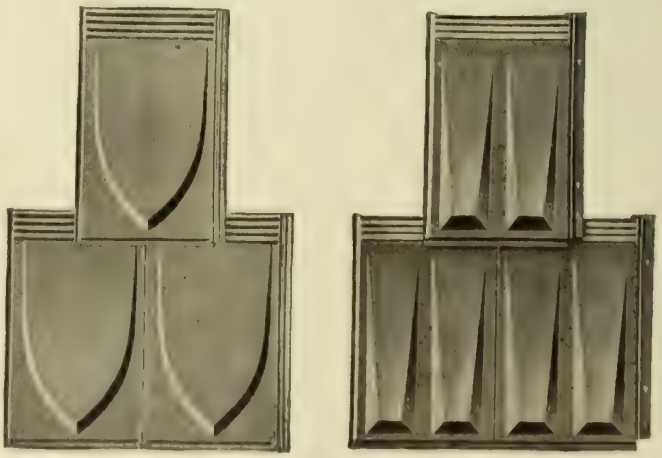


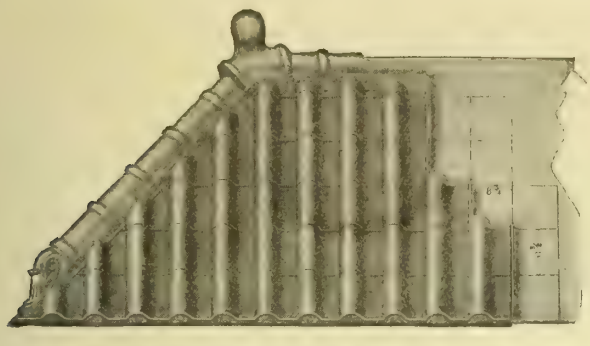
Fig. 157 "Queen Anne" Size 10 x 14 inches

Fig. 211 "Roman" Size 10 x 14 inches

"EDWARDS" METAL SHINGLES

Sheet's Catalog

Continued on next page



Method of Applying Tile and Fixtures

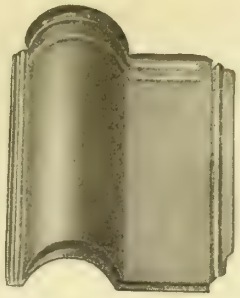


Fig. 367. Tile for main part of roof

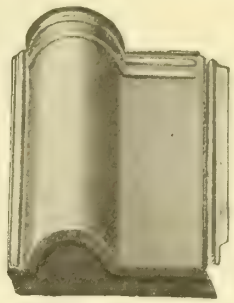


Fig. 369. Tile Starter or Eave Tile, with closed end for edge of roof at gutter.

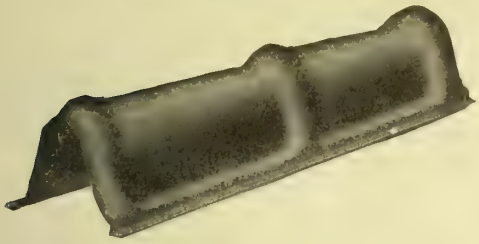
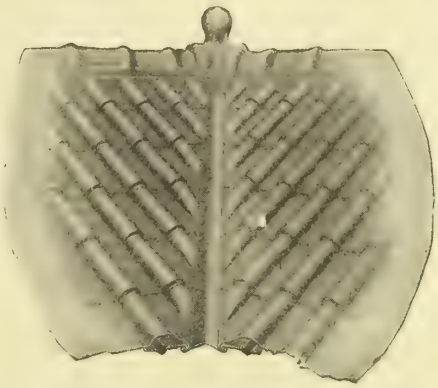


Fig. 414. Hip or Ridge Finish. Height, 6 inches; width, 7 inches; length, 28 inches

Fig. 409. Ridge Flashing, nailed to 2 x 4 strip on ridge. Ridge Finish fastened to flashings with cleats, 10-foot lengths



Method of Locking Valley Tile into Valley

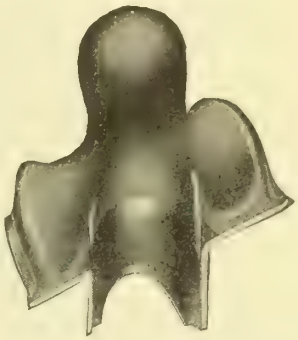


Fig. 397. 3-Way Finial, 2 hips, 1 ridge; height, 17 inches; width, 17 inches.

DETAILS "EDWARDS" METAL SPANISH ROOFING TILE

of the metal due to heat and cold, and thus there is never any danger of the roof buckling, warping and springing leaks.

Patented Pressed Standing Seam Corrugated Steel Roofing.

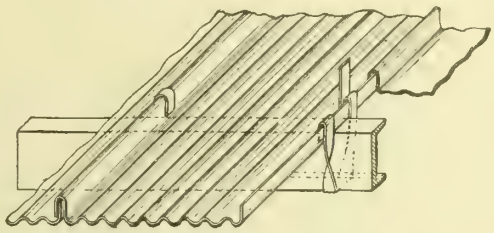
"Edwards" Patented Pressed Standing Seam Corrugated Steel Roofing is especially adapted for use on structural steel buildings, as will be seen by the accompanying details. This roof has perfectly tight seams and can be applied directly to the purlins without rivets of any kind. Made in Nos. 16- to 28-gauge, painted or galvanized.

In the use of this new roofing a saving of eleven per cent can be effected on side seams alone, and a much tighter side lock is assured. The method of cleating makes the cleats absolutely tight and at the same time allows for vibration. It makes a fifty per cent more water-tight job.

It has another advantage in that it can be placed on the roof and worked entirely from above, no scaffolding of any kind being necessary; and an entire roof can be put on without puncturing the sheets in the least, preserving the galvanized coating intact.

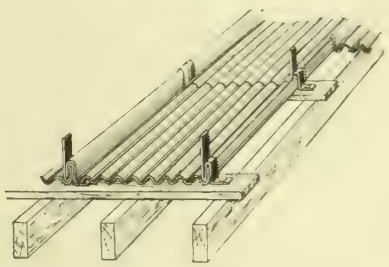
While the cost of this material is somewhat more than the regular corrugated sheets, the saving in side laps and application more than makes up for the difference.

This roofing has been applied to a number of large buildings in various parts of the country and is giving absolute satisfaction. One roof, put on five years ago, covers a single building requiring over a thousand squares.

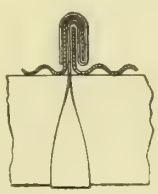


Applied to Steel Purlins

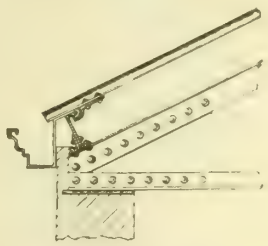
Cleat after Sheet is Applied



Applied to Wood Sheathing



Section through Cleat



Finishing out Eaves when Gutters are used

DETAILS "EDWARDS" PATENTED PRESSED STANDING SEAM CORRUGATED STEEL ROOFING

THE BERGER MANUFACTURING CO.

Manufacturers of Steel Ceilings

CANTON, OHIO

BRANCHES

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PHILADELPHIA, PA., Corner 16th Street and Washington Avenue
SOUTH BOSTON, MASS., 160-166 Broadway Extension
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., 16 South Tenth Street
MINNEAPOLIS, MINN., 300-312 10th Avenue South
SAN FRANCISCO, CAL., 1120 Mission Street

Products.

BERGER'S "CLASSIK" STEEL CEILINGS.

See our name in General Index for Concrete Reinforcement, Corner Beads, Steel Cores, Sidewalk Lights, Metal Lumber, Steel Building Materials, etc.

"BERGER'S Classik" STEEL CEILINGS
TRADE-MARK

Estimates and Drawings for Steel Ceiling Work.

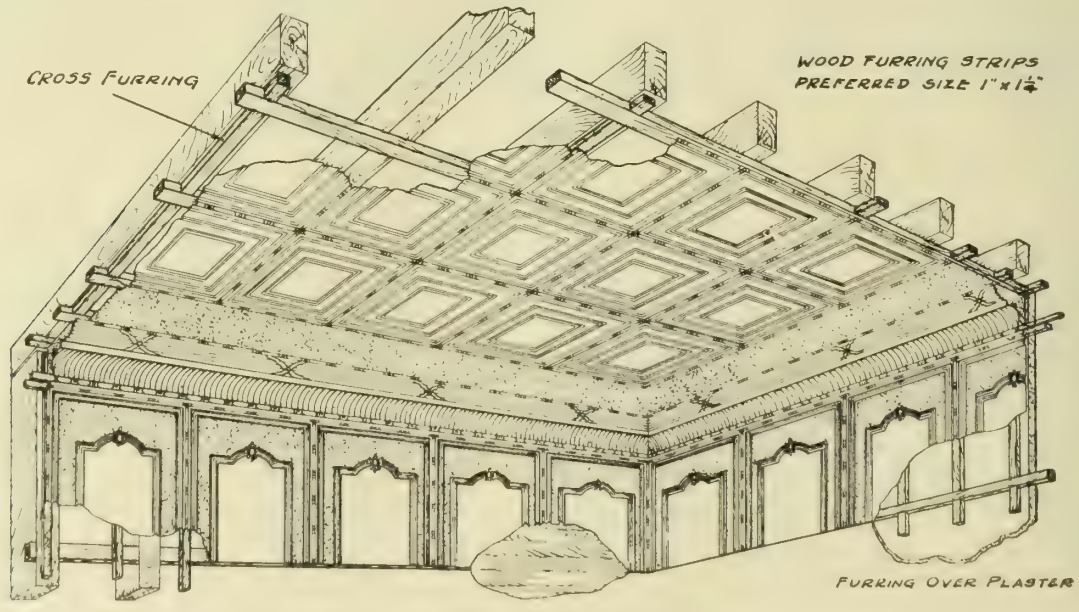
Architects are invited to avail themselves of the services of our estimating department in preparing suggestive drawings free of cost and estimates on contemplated Steel Ceiling and Sidewall work.

Send sketch and accurate dimensions of room; state height of ceiling; indicate preferences as to style or design of ornamentation desired, with any other information helpful in determining a practical, effective and appropriate treatment to comply specifically with the ruling conditions.

Description.

Berger's "Classik" Steel Ceilings comprise twelve distinct architectural classes: Stucco, Greek, Roman, Romanesque, Gothic, Moorish, Italian Renaissance, German Renaissance, French Renaissance, Rococo, Empire, Colonial—each elaborated in a great variety of patterns to meet the requirements of various sizes and shapes of rooms. The ceilings give a handsome, decorative, embossed finish, retaining artistic harmony in the effects throughout.

The construction is planned to facilitate erection, reduce number of pieces to handle and to minimize number of joints.



"BERGER'S "CLASSIK" STEEL CEILING—METHOD OF CONSTRUCTION

DETAIL OF BEAD, SHOWING NAILING BUTTON
Patent Pending

New Feature.

The bead is made extra long and in shape of half an oval, reinforcing the ceiling plates at joints, fitting snugly over underlapping bead, making a tight and perfect fitting joint.

The top of nailing button is countersunk, forming a self-centering, self-guiding, never-slip nailing point, preventing the nail from slipping while driving, and acting as a guide for the erector in placing the nail at the correct nailing point.

These two features alone permit a wonderful saving in erection.

Architectural Catalogue.

Architects are invited to send for our new Catalogue No. 21-S illustrating "Classik" Steel Ceilings.

MILWAUKEE ARTISTIC METAL CEILING CO.

MILWAUKEE, WIS.

BRANCH AT KANSAS CITY, MO.

Products.

"Invisible Joint" Steel Ceilings and Side-Walls, "Nu-Air" Ventilators.

Also, "Torpedo" Ventilating Skylights, Galvanized Embossed Cornices.

"Invisible Joint" TRADE-MARK

STEEL CEILINGS TRADE-MARK

"Invisible Joint" Steel Ceilings.

Our line in this material is the largest and most complete in the different classes of design of any made, therefore we can best supply the requirements for all classes of building interiors.

All the designs embody the best thought and skill of the most experienced designers and artisans in ornamental metal.

"Invisible Joint" Steel Ceilings are furnished with repressed bead and die-cut nail holes, thereby eliminating one third the cost of the erection, as each plate fits perfectly. The punched nail holes eliminate the necessity of driving nails through four thicknesses of steel on the corners of the plates.

The "Invisible Joint" greatly simplifies the erection and is absolutely tight—no calking required.

All plates are trimmed on four sides by an automatic process, which leaves the corners rounded instead of square, eliminating bending or turning in handling. Our plates are positively the most perfect made.

We have designs suited for interiors of any size or shape, and the decorative possibilities of our steel ceilings are unlimited.

"Invisible Joint" Steel Ceilings are given a priming coat of "Kuehno" Priming Paint, an especially prepared metal paint with a heavy body, and require only one coat of paint after erection. An important feature of "Kuehno" Paint is that it effectively protects the back of the ceiling from corrosion.

The sanitary, enduring and artistic qualities of "Invisible Joint" Steel Ceilings are equally important.

Steel Ceiling Plans.

Our facilities for furnishing complete detailed plans of steel ceilings and side walls for all kinds of building interiors are unsurpassed. We are at all times prepared to execute quickly plans for any building interior, showing how the different steel plates of a design are distributed over the ceilings and side walls to fit exactly the spaces to be covered.

Steel Ceiling Catalogue.

Our large Steel Ceiling Catalogue "O" shows complete designs in Residence, L'Art Nouveau, Colonial, Gothic, French Renaissance, Louis XIV, and Romanesque, and describes applications, etc., in detail. The first part of the book is devoted exclusively to illustrating and describing our new designs in stucco combinations.

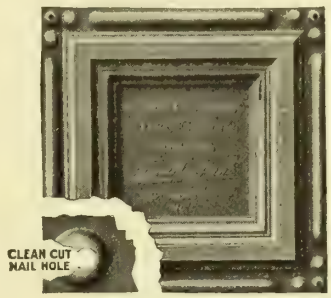
A copy will be sent on request.

"Nu-Air" Ventilators.

"Nu-Air" Ventilators are a combination of practical construction and scientific principles—the acme of perfection. Strong, yet simple in appearance, they will outlast the building. Galvanized iron is the material used in the construction of the "Nu-Air" Ventilator, and it is so formed that wind, weather, rain, snow or storm cannot effect its shape or injure its efficiency.

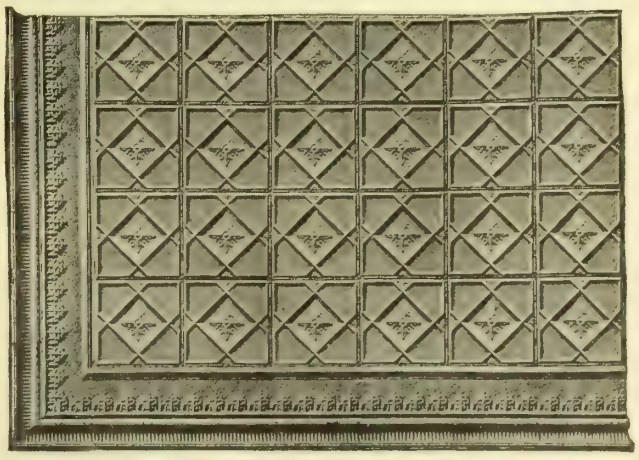
The "Nu-Air" Ventilator has a greater air capacity than any other ventilator.

The important and superior features of the "Nu-Air" Ventilator are fully covered by patents.

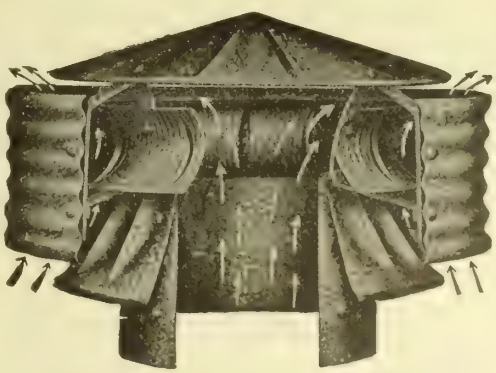


"INVISIBLE JOINT" STEEL CEILING PLATE
One plate exactly fits another

REPRESSED BEAD SHOWING DIE-CUT NAIL HOLES



CEILING DESIGN NO. 2267



"NU-AIR" VENTILATOR WITH STEEL TOP
Patented

WHEELING CORRUGATING COMPANY

MANUFACTURERS OF

Sheet Metals and Sheet Metal Products

WHEELING, W. VA.

BRANCH OFFICES AND WAREHOUSES

NEW YORK, N. Y., 16 Desbrosses Street
ST. LOUIS, MO., 1006 Spruce Street
CHICAGO, ILL., 168 N. Clinton Street
PHILADELPHIA, PA., 1224 Hamilton Street
CHATTANOOGA, TENN., Main and Boyce Streets
KANSAS CITY, MO., 218 W. Third Street

Products.

"Corco" Metal Ceilings and Side Walls; Metal Tile, Wainscoting and Base-Boards; Counter Fronts; Shingles and Hip Shingles.

Special attention is also given to the following: "Whitaker" Old-Style Roofing Terne Plates; Black and Galvanized Sheets; Steel Roofing, Galvanized or Painted; Tin Roofing, Valley and Gutter in Rolls; Special Analysis Iron Products.

Open-Hearth Sheets, Black and Galvanized, Plain, Corrugated and Beaded; Long Terne or Kalamined Sheets.

Also, Formed Roofings, Sidings, Pilasters, Corner Finish and Weather-Boards, Galvanized or Painted; Metal Lath; Roll Roofings, Tin, Terne, Iron and Steel, Galvanized or Painted; Galvanized Box and O G Roof Gutters; Angle Cap, Ridge Roll, Coping, Crestings, Tiles and Finials; Flashings, Roofing Buttons, Cement, Paint, Lead Washers and Solder.

Eaves-Trough, Miters, End Pieces, Caps, Outlets and Hangers; Conductor Pipe, Elbows, Shoes, Strainers, Rain Water Cut-Offs and Hooks; Stamped and Formed Black and Galvanized Ware for Building and Household Purposes; Janitors' Cans, Oily Waste Cans; Fire Buckets and Tanks; Rubbish Burners.

TRADE-MARK
Reg. U. S. Pat. Off.

"Corco" Metal Ceilings.

Made in the largest and most complete factory of the kind in existence, from first-class steel, iron, zinc or copper sheets, with artistic and appropriate designs stamped by the heaviest of machine-tooled steel dies, handled by men experienced in Metal Stamping.

Every sheet is inspected before and after embossing so as to insure perfect material, design and workmanship. Each and every plate, panel, filler, cornice, miter, mould or fitting of any kind is made with the finished ceiling in mind; the purity of architectural style is assured. The outside or nailing beads are re-pressed in dies that are true to the one-thousandth of an inch and the nail-holes are die-cut.

Re-pressing and nail-hole cutting dies are accurately milled to mechanically perfect lines. Each bead is exactly like all other beads in size, shape, depth and alignment. In laying a thousand sheets the plates can not run off the furring strips. They lap true and tight, no variation to right or left, up or down, forward or back. No open joints, so objectionable to architects and owners. The nail holes register true every time, eliminating the driving of nails through two or more thicknesses of metal.

These advantages save fully 25 per cent of the time of erection. On certain patterns we have also the interlocking joints, should they be desired.

Adaptability—Suitable for buildings of all kinds, sizes, shapes, styles and classes of construction and for rooms designed for any commercial, official, religious, scholastic, or charitable purpose; entertainment, club, or public institutions; residences; in fact, for any room in any building.

Advantages—Fire-, dust- and vermin-proof; permanent, perfect fitting and economical; artistic, attractive, sanitary and easily cleaned. No future trouble from falling ceilings or dilapidated appearance and no inconvenience or worry from nor expense for repairs. Once up, always up.

Facilities—Large stocks of patterns are carried at the factory and at all warehouses. No order is too small for our best attention, and no order is too large for our capacity or shipping facilities.

Estimates, Prices and Catalogues—Prices per square or estimates on completed contracts will be named on request, and drawings showing arrangement of metal ceilings suitable for rooms of any size, shape or use will be made without charge on receipt of plans or sketches showing measurements.

"Corco" Metal Shingles.

Six kinds, styles or brands, in four sizes.

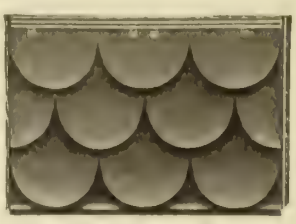
Made from Prime Common Terne Plates or Old-Style Ternes, and galvanized or painted after stamping, leaving no raw edges. They are also made of copper. Some brands are stamped from galvanized sheets, if so specified.

Brands—Dixie and Virginia, 7 x 10, 10 x 14 and 14 x 20 inches.

Wheeling and Tennessee, 10 x 14 inches only.

Ohio Cluster, 20 x 28 inches only.

Packed in boxes containing sufficient quantity to lay one square to the weather.



Ohio Cluster

Wheeling

TWO TYPES OF "CORCO" METAL SHINGLES

Continued on next page

Table of Weights—Shipping weights and number of shingles made from Terne Plates required per square:

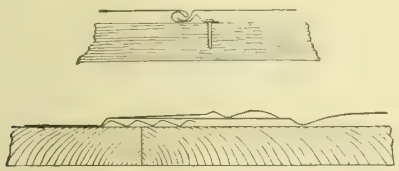
	7 x10	10 x 14	14 x20	20 x 28
Painted	86 lbs.	78 lbs.	77 lbs.	72 lbs.
Galvanized	88 lbs.	82 lbs.	81 lbs.	76 lbs.
Number per square...	312	143	68	32

Weights of shingles made from other material vary slightly from the above.

Adaptability—Suitable for all roofs of one fourth or greater pitch, and particularly adapted to bay windows, dormers, gables, mansards, porches, towers, etc., and in fact any place where slate or wood shingles can be laid. Also suitable for siding.

Advantages—Absolutely water-, weather-, fire- and lightning-proof. Easily applied, no soldering being necessary; economical and ornamental, but not gaudy. Make a permanent light-weight roof which can not blow off and does not need constant repairs. They can be taken off and laid again. Contraction and expansion are fully provided for by our improved side locks and end laps. A trial will prove all claims.

Prices and Special Catalogue—Prices per square will be named on application. Special catalogue of Metal Shingles is ready for distribution.



SECTIONAL DETAILS SHOWING END LAPPING OF METAL SHINGLES

Guarantee.

Every sheet of "W. C. Co." Old-Style Plates, Common Terne Plates, and Genuine Old-Style Charcoal Iron Palm Oil Finish Terne Plates is stamped with brand or name, gauge and weight of coating, and guaranteed to carry full coating claimed.

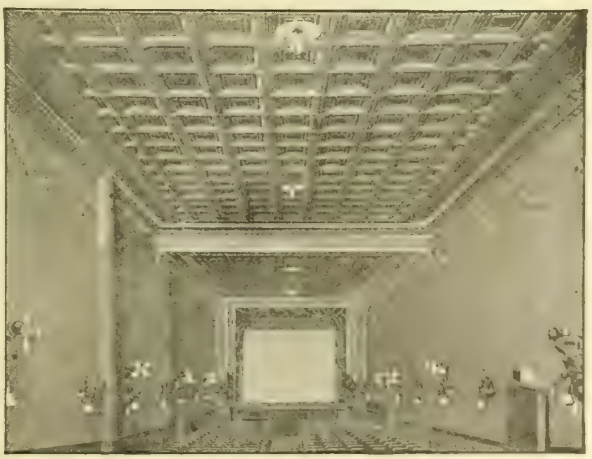
Catalogues.

Catalogues, general or on specific lines, with prices, will be sent free, on request.

Design No. 8138

Design No. 8240

Design No. 7052



Design No. 8252

VARIED EXAMPLES OF METAL CEILING DESIGNS

WHITAKER-GLESSNER COMPANY

Manufacturers of Rust-Resisting Portsmouth Iron

PORTSMOUTH WORKS
PORTSMOUTH, OHIO

SALES OFFICES

CHICAGO, 959 Monadnock Block
ST. LOUIS, 1722 Wright Building
LOUISVILLE, 514 Keller Building
RICHMOND, 502 Va. Ry. & Power Building
CHATTANOOGA, 824 James Building
CINCINNATI, 404 Johnson Building
TOLEDO, 910 Ohio Building
NEW ORLEANS, 207 Q. & C. Building
DETROIT, 929 Ford Building
FORT WORTH, 1011 First National Bank Building
SAN FRANCISCO, 22 Battery Street
LOS ANGELES, Washington Building
SEATTLE, 1812 Smith Building

Products.

PORTSMOUTH IRON in practically all Sheet Metal Articles for building purposes. From our own mills are furnished BLUE ANNEALED and BOX ANNEALED SHEETS, FLAT GALVANIZED and GALVANIZED CORRUGATED SHEETS, for every purpose where a Sheet Metal of most reliable durability and working qualities is desired.

PORTSMOUTH IRON
TRADE-MARK

Portsmouth Iron is also furnished in a variety of FORMED ROOFINGS, Painted or Galvanized, namely, CORRUGATED, PRESSED STANDING SEAM, 2-, 3-, 4-, 5-, and 6-V CRIMP, SELF-CAPPING ROLL, ROLL and CAP ROOFING, RIDGE ROLL, EAVES TROUGH, CONDUCTOR PIPE, BOX and ROOF GUTTERS, MITERS, FORMED VALLEYS, etc.

Construction.

Portsmouth Iron is one of the first products of its kind developed from the open-hearth furnace. It resulted after years of experiment with various formulæ used in the manufacture of iron and steel. The necessity of producing an iron that would afford at once the workable qualities of mild steel and the permanency of old fashioned wrought iron, was emphasized by utter failure of Bessemer and open-hearth steel on some projects. For instance, in metal roofings the newer and modern steels were not lasting under exposure more than a few years.

Exhaustive tests under every possible condition shows that the construction of Portsmouth Iron approaches very close to the ideal in meeting modern needs.

Portsmouth Iron is manufactured with the sole idea of putting into it the requisites for long life; not for any particular or individual use, but for all purposes, without destroying its ductility, and such qualities that make it easy for fabrication.

It is just as pure as a commercial iron can afford to be. Were it purer, it would lose much of its value as a serviceable metal for universal use. What few impurities exist in its structure are evenly distributed by special heat treatment, preventing segregation, the principal cause of inceptive corrosion. It can, as well, combat successfully the effects of the elements and withstand time and wear to a very unusual extent.

The furnaces in which Portsmouth Iron is made are operated by experts exclusively. The same is true from the selection of the ore to the packing and shipping of finished sheets and formed products.

The materials used in its manufacture are the best that can be obtained, consisting of carefully culled No. 1 pig iron stock of known analysis, and scrap, largely from our own crop ends, which must conform to a very high standard of analysis. These materials are reduced in open-hearth furnaces fired exclusively by natural gas, a fuel containing little or no sulphur, which also accounts considerably for the high purity of Portsmouth Iron.

The body of Portsmouth Iron is homogeneous, fibrous and clean, containing no slag or cinder. Expert rolling puts a finishing touch to the uniformity and evenness of its structure.

A small amount of copper is added to Portsmouth Iron while the metal is in a molten state. This copper is diffused throughout the heat and enlarges the iron's factors of resistance to rust and corrosion, a practice which has been universally advocated. This has been our practice for several years, and the results obtained from Portsmouth Iron, bear out our earlier discovery.

In short, Portsmouth Iron fits well into every requirement for a durable and workable iron, and has never failed to give entire satisfaction for all sheet metal work.

Ranges of Use for Portsmouth Iron.

Portsmouth Iron, because of its durable and workable qualities, has many uses which experienced metal workers will readily recognize. The following are a few of the large number of articles in the manufacture of which Portsmouth Iron has demonstrated itself as exceptionally practical and desirable:

Roofing	Metal Sash and Casings
Siding	Metal Doors
Metal Shingles	Elevators
Metal Ceilings	Furnaces
Eaves Trough	Stoves
Conductor Pipe	Stacks
Cornices	Tanks
Skylights	Standpipe
Ventilators	Metal Garages

Tests.

Portsmouth Iron stands every practical structural test; and the results of some of these made by manufacturers, users, and disinterested laboratories will be furnished, as desired, to interested architects.

Gauges and Sizes.

Portsmouth Iron is manufactured in all standard United States gauges Nos. 14 to 29, inclusive; and in lengths up to 144 inches and widths up to 42 inches, black or galvanized.

References.

Numerous testimonials to the quality and durability of Portsmouth Iron for various uses are in our files, and copies will be furnished to reliable parties who desire them. Write for our literature, which explains in detail the manufacture of this modern iron and reasons for its preference among architects who "build for the future."

GRAND RAPIDS FOUNDRY CO.

Manufacturers of Roenius Coal and Wood Chutes

GRAND RAPIDS, WIS.

Products.

ROENIUS COAL AND WOOD CHUTES.

Adaptability.

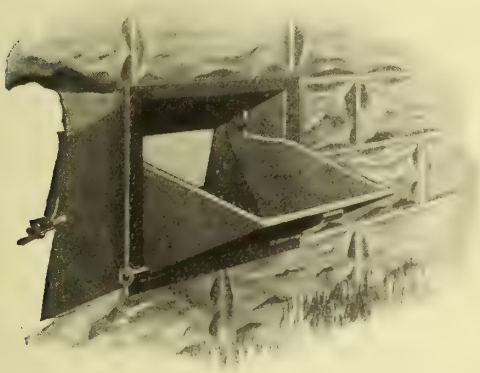
Wherever fuel or vegetables are stored in cellars Roenius Chutes are adaptable, as they are designed and constructed to efficiently do their work and stand the abuse that all chutes are subjected to. They can be installed in any foundation, whether the construction be frame, brick, stone, solid concrete, or concrete blocks.

Square Cast-Iron Chutes.

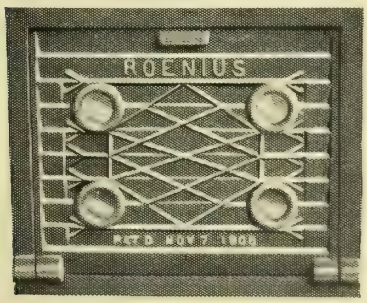
Style A—A chute that is neat in appearance, durable, convenient, so constructed that it will stand the wear and tear that all chutes are subjected to, and absolutely burglar-proof. Hopper is hinged so that a large opening is afforded when chute is in use, and angle of hopper surface is greater than angle of repose for all substances, as coal or wood. No danger of clogging.

The 16 by 20 inch size (130 pounds) and the 16 by 24 inch size (140 pounds) have 11 inches on top and 14 inches on bottom side for anchorage.

Style B—This chute is used in such cases where the only available light must pass through the coal chute. The general construction of this style is the same as that in Style A, the essential difference being in the four heavy bull's-eye discs furnished to supply light. These discs are 2½ inches in diameter and are countersunk back from the inner face of chute hopper, being protected in this way from all wear and tear. Efficiently designed to combine light with durable construction. Two sizes, as in Style A.



STYLE A. OPEN AND READY FOR USE
Size A—16 by 20 inches square, 130 pounds
Size B—16 by 24 inches square, 140 pounds



STYLE B. CLOSED
Size A—16 by 20 inches square, 130 pounds
Size B—16 by 24 inches square, 140 pounds

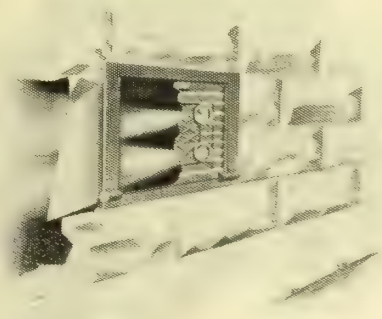
Round Steel Chutes.

This is a chute that will stand an unlimited amount of abuse. It is also used as a residence chute. The 26-inch diameter, 36 inches long, is especially intended for boiler rooms, schoolhouses, barracks, factories, office buildings, churches, etc.

"Roenius" Round Chutes are made of heavy sheet steel, with cover at each end, making the enclosure a dead-air space—the best insulation against heat and cold.

Made in three sizes, 18 by 26 inches, 80 pounds; 18 by 36 inches, 100 pounds; and 26 by 36 inches, 200 pounds.

STYLE C. CLOSED AND LOCKED
Size A—18 by 26 inches round, 80 pounds
Size B—18 by 36 inches round, 100 pounds
Size C—26 by 36 inches round, 200 pounds



DETAIL STYLE B
Showing entrance of light rays to cellar, through chute

ESTABLISHED 1878

THE BURR COMPANY

Engineers, Founders and Machinists

OFFICE AND WORKS

CHAMPAIGN, ILL.

Products.

Manufacturers of STRUCTURAL STEEL and ORNAMENTAL IRON WORK, for all classes of Building Construction; STAIRWAYS and STRINGS; FIRE-ESCAPES.

COAL DOORS, for Cellar Wall; COAL-HOLE RINGS and COVERS; CISTERN RINGS and COVERS; CELLAR WALL GRATES; CATCH-BASIN INLETS; CATCH-BASIN RINGS and COVERS; SEWER RINGS and COVERS; CURB INLETS; GUTTER and CROSSING PLATES; AREA GRATES; HITCH POSTS.

ASH-PIT DOORS; GRATE BASKETS; ANDIRONS.

ORNAMENTAL LAMP POSTS and STANDARDS, in single and multiple lamp designs.

Structural Steel and Iron.

Having a very modern and completely equipped structural plant, foundry and machine shop for all varieties of building construction and ornamental iron work, with high-class engineers and draftsmen, we are prepared to make detail drawings and execute contracts, both plain and difficult.

FIG. 1. ANDIRONS

All wrought iron 1" square bars. Standard height, 22"
List price, $10.00 per pair
Discount, 40 per cent

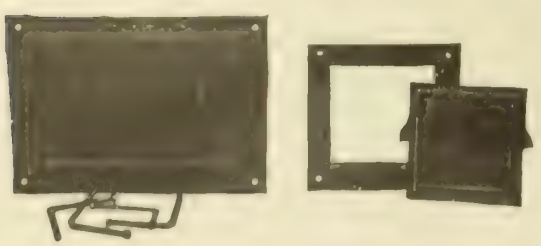


FIG. 2. ASH PIT DOORS

Door rests in back on frame, much better than hinges; never stick; no breakage

SIZES AND PRICES

8 x 8", $1.00; 8 x 12", $1.20; 12 x 12", $1.40; 10 x 16", $1.60; including anchors

Discount, 25 per cent

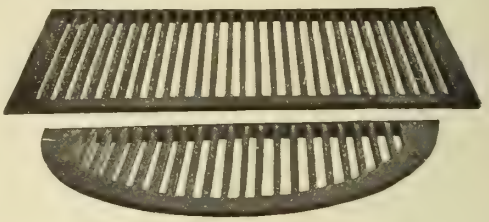


FIG. 3. CAST-IRON AREA GRATES

Either wrought or cast iron. Wrought bars standard construction, ¼ x 1½", with 1", 1¼", or 1½" spacing
List price, wrought or cast, 80c. per square foot
Discount, 25 per cent

FIG. 4. COAL DOOR FOR CELLAR WALL

Cast door and frame with anchors. Door hooks on frame. No hinges to break or get out of order. Disappearing handle. Sill to protect wall. Locking device on inside. Best and most durable

SIZES AND PRICES

Number	Width	Opening	Price
1	22"	20"	$6.00
2	20"	18"	4.50
3	26"	24"	9.00
4	30"	23"	10.50

Discount, 25 per cent

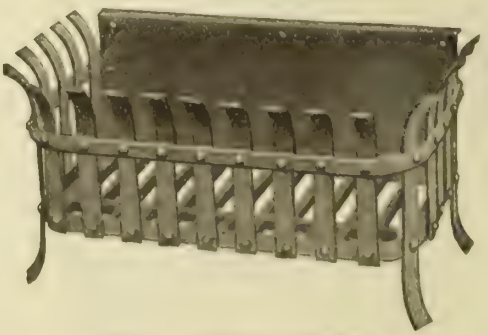


FIG. 5. GRATE BASKET

Cast back and grate. Wrought frame. Made any length. Very neat design. Price, 10c per inch in length
Discount, 25 per cent

Catalogues.

Send for catalogues illustrative of each of above products.

Continued on next page

Stairways and Strings.

Dimensions and Prices—As shown in the illustrations, these stairways and strings are of iron construction with oak treads and pine risers, $4.00 per riser. Platform, $1.50 per square foot. Diamond top iron treads and no risers, $5.00 per step; with iron riser, $5.70 per step. Platform with diamond top iron floor, $2.00 per square foot. Cast-iron strings, 8-in. rise and 9-in. tread (not over 8 risers), 50 cents per riser for each string plus 50 cents for each foot in length of top landing not over three feet. Discount, 25 per cent.

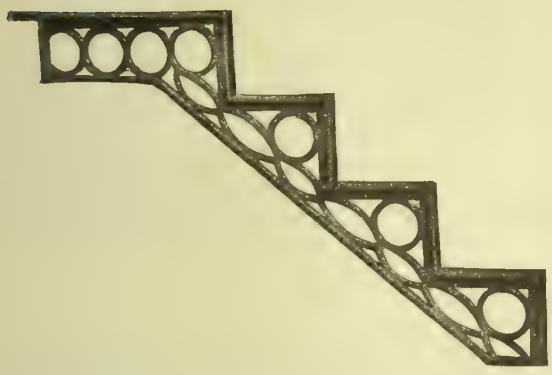


FIG. 9. SINGLE OUTSIDE STRING

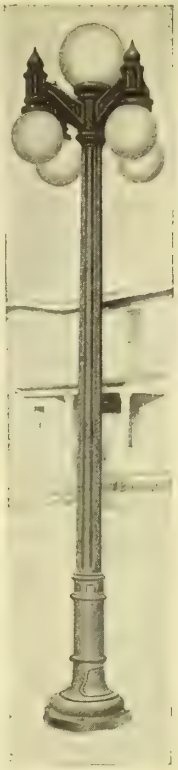


FIG. 6. LAMP STANDARD
5 Lights

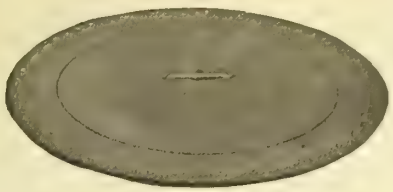


FIG. 7. CISTERN RING AND COVER

Cast-iron with drop handle; good heavy pattern, always in stock.

Prices: Opening 16″, $2.00; 18″, $2.50; 20″, $3.00; 22″, $3.50; 24″, $4.00

Discount, 25 per cent

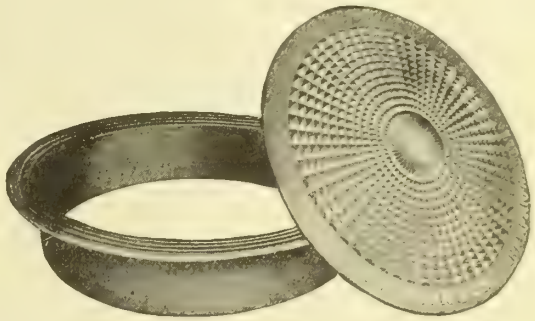


FIG. 8. COAL-HOLE RING AND COVER

For use in sidewalks and other places

Prices: Rim 3″ deep, $5.50; 6″ deep, $6.50; locking bar, 50c. net, extra. Opening 24″

Discount, 25 per cent

Fire-Escapes.

Spiral and standard Fire-Escapes of all kinds, a specialty with us. Spiral, $7.50 per foot of height. Landings as shown, $2.00 per square foot, center standard of 4-in. pipe. Ladder Fire-Escapes, 80 cents per foot for 20-in. ladder, ¾-in. rungs, 12-in. centers. Landings, $2.00 per square foot. Discount, 25 per cent.

FIG. 10. STANDARD FIRE-ESCAPE

FIG. 11. HITCH POST
Cast iron, octagon or rustic, $4.00

FIG. 12. SPIRAL FIRE-ESCAPE

THE COLUMBIA IRON & WIRE WORKS COMPANY

Designers and Manufacturers of Builders' Iron, Wire, Brass and Bronze Work

CANTON, OHIO

Products.

Coal Chutes; Coal-Hole Frames and Covers; Sidewalk Ventilators; the new Columbia Safety Sidewalk Door; the new Columbia Sidewalk Light Construction; the Columbia Panic Bolt.

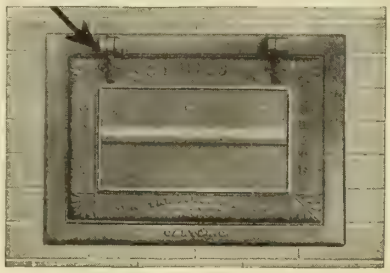
Also, Fire-Escapes, Balconies, Iron Fences, Iron Ladders, Iron Shutters, Iron Stairs, Iron Gates, Area Grates, Elevator Cars, Elevator Enclosures, Window Guards, Tool Room Enclosures, Skylight Guards, Door Bolts, Grilles, Wickets and Railings, Bank and Office Work, Bronze and Brass Railings, Wire Enclosures and Signs, Fire Extinguishers and Gongs, Metal Work for Rubber Tire Manufacturers, etc.

The Columbia Window Coal Chute.

Door locks automatically. When open, door locks in vertical position, protecting building above hopper. When not in use hopper sets at top of chute in the dry and out of the way, so that window can be used for other purposes. When open for use, hopper revolves automatically in position to receive coal or other material being unloaded and protects lawn. Metal shield for protecting glass operates automatically, which obviates the necessity of poking the shield with the hand as the door is closed.

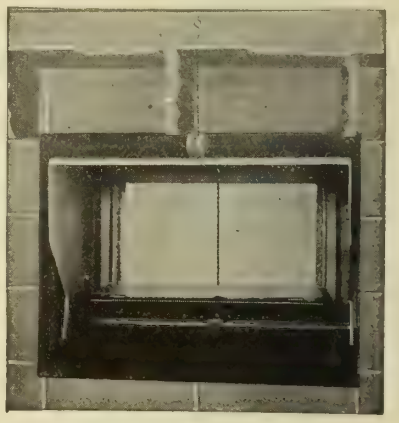
The object of the coal man is to get the coal off the wagon, and not to clean out the chute; therefore, a hopper and glass shield that lie on the bottom of chute rest on wet coal and will soon rust and also obstruct the light.

The frame of the Columbia Window Coal Chute is made of gray cast iron; hopper, No. 12 steel; shield, No. 16, and Chute, No. 14 plate iron, all parts well painted. The door of the Columbia Window Coal Chute is always in order. Hinges are cast on frame, having neither bolts nor rivets. Has locking device that will positively lock



SOLID DOOR

Glass shield can be inserted in two minutes if glass is broken



INSIDE VIEW OF DOOR

Showing increased light due to greater glass surface

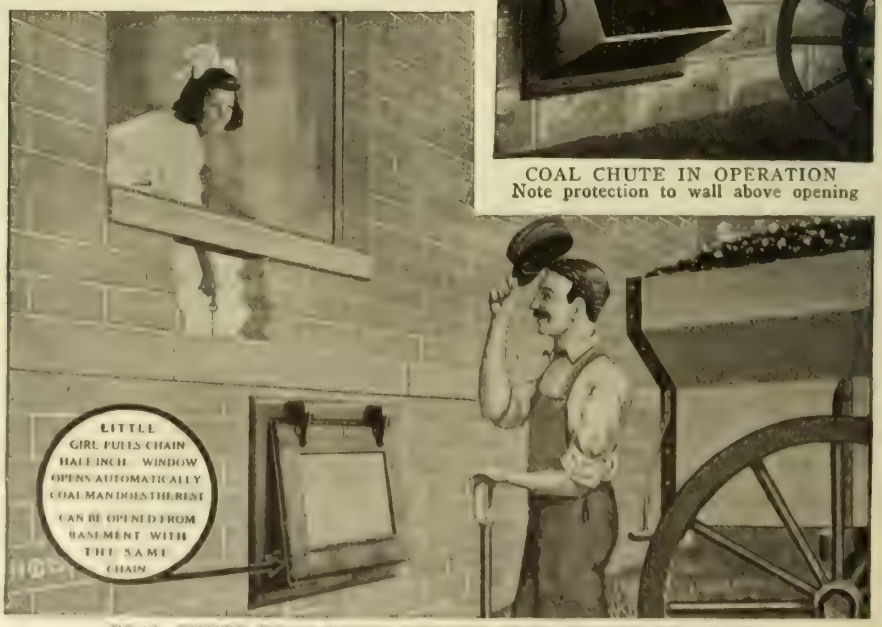
COAL CHUTE DOOR CLOSED

FRAME, HOPPER AND DOOR BEFORE INSTALLATION

COAL CHUTE IN OPERATION

Note protection to wall above opening

AUTOMATIC GLASS SHIELD



COAL CHUTE DOOR BEING OPENED FROM INSIDE OF HOUSE

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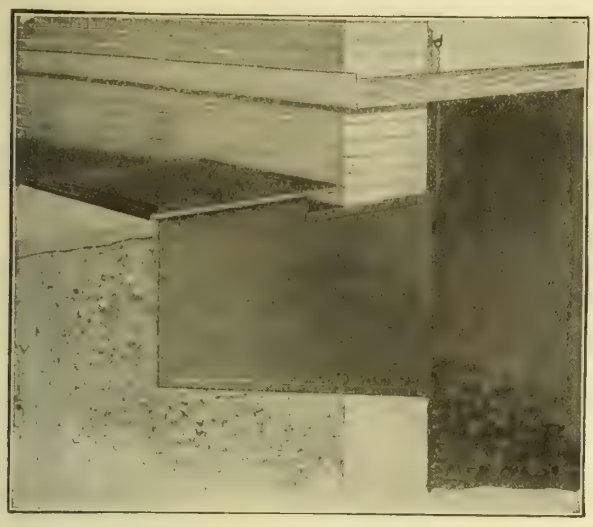
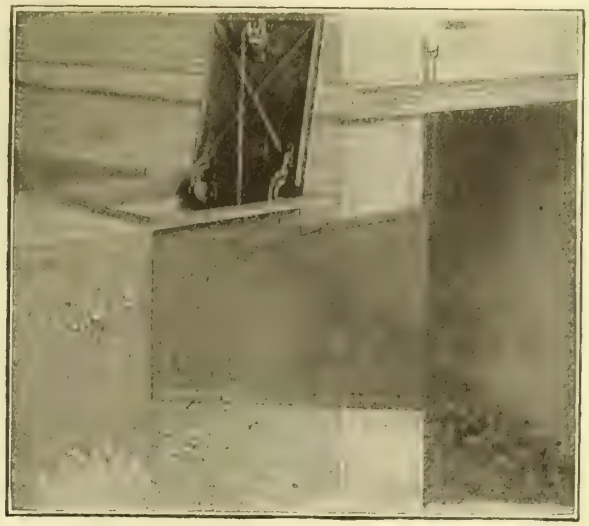


Closed



Open

GRADE LINE CHUTE

Showing flush hinge and handle. Locks automatically when closed, opens from inside by lifting chain one-half inch from first floor of basement

when the coal man closes door. Unlocks by pulling a chain on the inside of the house. Wire Glass ¼ inch in door. Burglar-proof and weather-proof.

Illustrated Coal Chute Booklet gladly sent on request.

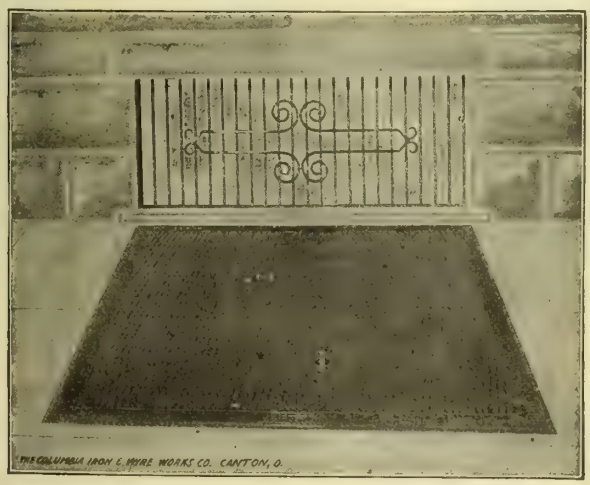
DIMENSIONS AND PRICES

Columbia Window Coal Chute	No. 1 For Residences		No. 2 For Residences		No. 3 For Public Buildings	
	Wide, inches	High, inches	Wide, inches	High, inches	Wide, inches	High, inches
Out of Frame	25	19	28¼	20¼	36	28
Out of Chute at front	22	16¼	24	17	32	24
Out of Chute at rear	22	19	24	19	32	28
Wall Opening required	22½	16½	25	17	32	24
Depth of Chute	12	....	12	....	18	..
Door Opening	21¾	16	24	16	32	24
Glass Opening	16	10	18	10	24	16
Hopper Opening	20½	14½	23	14½	31	21
Description	Weight, pounds	Price	Weight, pounds	Price	Weight, pounds	Price
Complete with Glass Door	100	$10.00	120	$12.00	175	$16.50
Complete with Solid Door	90	9.00	110	11.00	165	15.00
Without Hopper Glass Door	80	8.00	100	10.00	157	14.00
Without Hopper Solid Door	75	7.00	95	9.00	147	12.50

No. 4 Grade Line Chute	Size, inches	Weight, pounds	Price	
Door Opening	20x20	182	$18.00	.....
Door Opening	27x27	300	24.00	.....

The Columbia Safety Sidewalk Door.

The Columbia Safety Sidewalk Door is the original, absolutely flush hinge and handle, wrought steel, diamond-top sidewalk door, with improved hinge and handle (patent applied for). Invisible hinges are encased in oil and cannot rust, bind or break, because they do not rotate on a pin. Taper fit handle. Easy lift, winter and summer. Water-tight—that is, water-tight in the fit, not in the receptacle to catch water. Catalogue No. 10, "Iron Work for the Sidewalk," sent on request. Also, large picture book of fire-escapes we have erected sent on request.



COLUMBIA SAFETY SIDEWALK DOOR

STOCK SIZES AND PRICES OF SIDEWALK DOOR

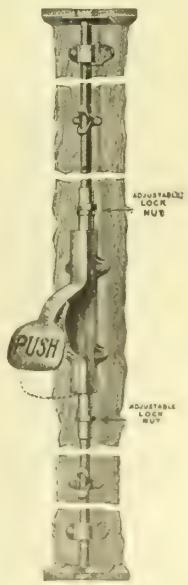
Width out to out of frame, inches	Width of Doors, inches	Length out to out of frame in inches: 54	58	62	66	70	74	78
		Length of Doors, inches — Double Doors: 48	52	56	60	64	68	72
42	36	$39	$40	$42	$43	$45	$48	$49.00
46	40	40	42	44	46	48	50	52.00
50	44	43	44	47	49	51	53	55.00
54	48	45	47	49	52	54	56	58.00
56	50	..	48	51	53	55	58	60.00
60	54	..	..	53	56	58	61	63.00
62	56	..	..	55	57	60	62	65.00
66	60	..	..	..	60	63	66	68.00
78	72	..	..	..	..	..	75	78.00
		Single Doors						
36	30	28	29	31	32	34	35	37.00
42	36	31	33	34	36	38	40	41.00

The Columbia Panic Exit Door Bolt.

The use of the Columbia Panic Exit Door Bolt makes it unnecessary to keep exit doors open or unbolted. While Columbia Bolts securely lock doors from intruders on the outside, they insure perfect safety in case of panic from the inside, as they never fail to operate at the crucial moment. A slight pressure of the push-plate instantly releases the bolts at top and bottom and the doors swing open.

The Columbia Bolt is neat in appearance, can easily be applied to any door, has adjustable nuts, enabling the lengthening or shortening of the rods; case made of solid brass or bronze, the rods of cold-rolled steel, electroplated in any finish desired.

Prices range from $7.00 to $8.50 each, according to finish. Furnished in Bronze, Brass and Copper Finishes; and either polished, oxidized, etc., as desired.



COLUMBIA PANIC EXIT DOOR BOLT

THE SAMUEL J. CRESWELL IRON WORKS

Manufacturers of Architectural Wrought and Cast-Iron Work, Structural Steel, and General Foundry Work

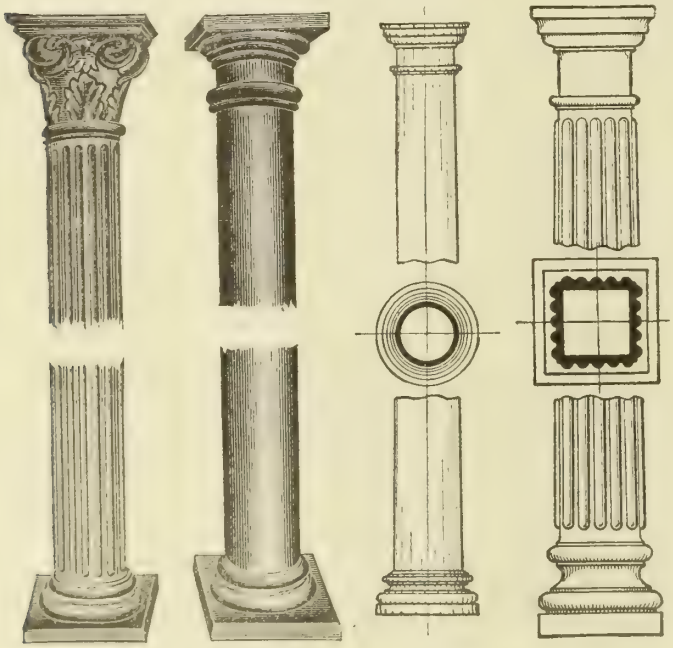
Twenty-Third and Cherry Streets
PHILADELPHIA, PA.

Products.

We manufacture ARCHITECTURAL WROUGHT and CAST-IRON WORK, STRUCTURAL STEEL WORK, CAST-IRON COLUMNS, POST CAPS and JAMB BOXES, IRON STAIRS, SPIRAL STAIRS, ELEVATOR ENCLOSURES; RAILINGS, GATES, GRILLES; VAULT LIGHTS; STABLE FITTINGS; LAMP BRACKETS, LAMP-POSTS (Gas and Electric); WHEEL GUARDS; HITCHING-POSTS; MANHOLE DOORS, ASH-PIT DOORS, COAL-HOLE COVERS; UNDERPINNING WEDGES; IRON GRATINGS and FRAMES for Park and Roadway Drainage; TRENCH COVERS and FRAMES, and BLOW-OFF TANKS.

Facilities.

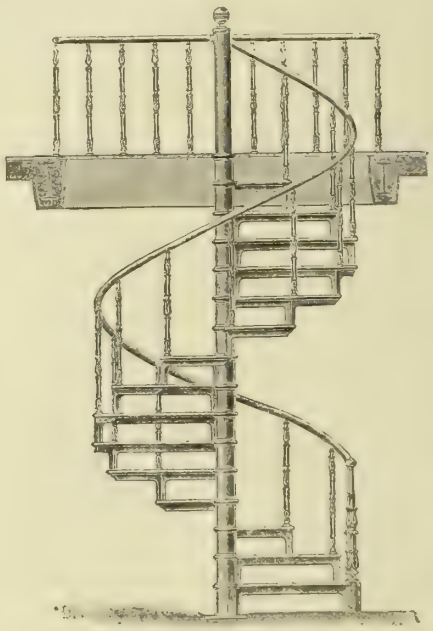
We have the largest and best equipped plant in the vicinity of Philadelphia for manufacturing all of the various kinds of wrought and cast-iron work mentioned above, and are prepared to give estimates, at short notice, for large or small buildings. Special designs for Ornamental Work will be furnished on request.



NO. 2 NO. 4 NO. 8 NO. 5

PLAIN AND ORNAMENTAL COLUMNS

Furnished from patterns as shown, or from Architects' Designs



SPIRAL STAIRWAY

3′ 6″ Diameter	4′ 6″ Diameter	5′ 6″ Diameter
4′ 0″ Diameter	5′ 0″ Diameter	6′ 0″ Diameter

Stock patterns of the above sizes. Can be made any height.

NO. 201
LAMP BRACKET
Price, $30.00

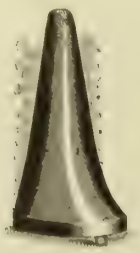
NO. 1
LAMP STANDARD
Price, $90.00

NO. 15

NOS. 16 AND 17

NO. 22

CAST-IRON FENDERS OR WHEEL GUARDS FOR DRIVEWAYS



NOS. 1, 5, 6, 8, 9

NO. 15

Length	Projection	Height	Price
9″	9″	[illegible]	$11 00
12″	9″	[illegible]	13 50
18″	9″	[illegible]	18 00
24″	9″	3′ 5″	22 00
24″	9″	[illegible]	24 00

Note.—These fenders can be made of any thickness of wall up to 2 inches.

NOS. 16 AND 17

Design	Width	Projection	Height	Price
No. 16	18″	9″	3′ 5″	$9 00
No. 17	18″	9″	[illegible]	7 50

NO. 22

Projection	Height	Price
8″	1′ 6″	$7 50
8″	1′ 9½″	8 00
8″	0′ 11″	5 00
8″	1′ 9″	5 00
6″	2′ 1″	7 50
6″	1′ 2″	5 50
8¼″	1′ 6″	7 50
8″	1′ 9″	8 50
9″	1′ 6″	8 00
9¼″	1′ 7″	9 00

NOS. 4, 5, 6, 8, AND 9

Design	Width	Projection	Height	Price
No. 4	11½″	7″	2′ 0″	$1 60
No. 5	5¾″	8″	2′ 1″	2 25
No. 6	8″	8″	2′ 1½″	2 25
No. 8	10″	10″	2′ 2″	3 00
No. 9	9¼″	7¾″	2′ 2″	2 00

Continued on next page

General Foundry Work.

In addition to Architectural Work, we are equipped to make Special Castings of every description, and do general Foundry Work.

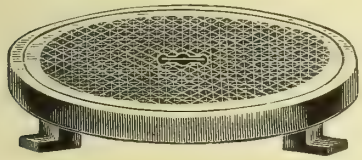
Stock Specialties.

The accompanying illustrations show a few of our specialties which we carry in stock. The prices quoted are f. o. b. Philadelphia. Write for discounts. Catalogue showing full line furnished on application.

MANHOLE DOORS AND FRAMES
ARCH TOP. DESIGN NO. 1

WIDTH	HEIGHT	PRICE
36″	72″	$70.00
36″	36″	30.00
33″	49″	30.00
24″	48″	20.00
24″	36″	12.50
24″	30″	11.75
24″	24″	11.00
20″	24″	10.00
18″	24″	8.50

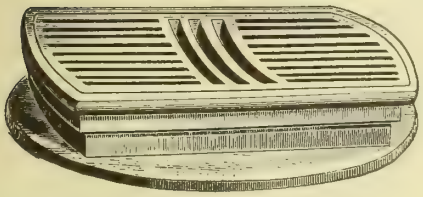
All manhole doors and frames have return flanges 4 inches deep



VAULT PLATE OR GRATING AND FRAME
FOR BRICK PAVEMENT
DESIGN NOS. 1 AND 2

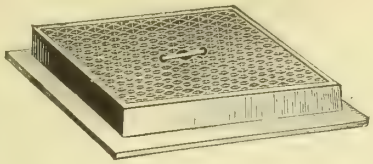
SIZE	PRICE
14″ Plate and frame	$3.00
16″ " " "	3.25
18″ " " "	5.00
20″ " " "	6.50
24″ " " "	8.75
36″ " " "	20.00

Depth of frame, 3 inches



ROADWAY GRATES AND FRAMES
DESIGN NO. 10

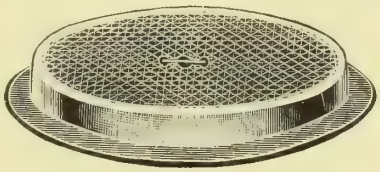
SIZE OF GRATING	PRICE
13¼″ x 24½″	7.00
12″ x 18″	6.00



VAULT PLATE OR GRATING AND
FRAMES FOR CEMENT PAVEMENT OR SOIL
DESIGN NOS. 7 AND 8

SIZE	PRICE
36″ x 36″	$27.00
30″ x 30″	18.00
24″ x 24″	10.00
20″ x 20″	8.50
18″ x 18″	7.50
16″ x 16″	6.50
12″ x 12″	3.00
7½″ x 7½″	2.00
18″ x 24″	8.50
18″ x 30″	10.00
18″ x 36″	12.50
24″ x 30″	13.50
24″ x 36″	18.00
24″ x 42″	20.00

Depth of frame, 3 inches



VAULT PLATE AND FRAME FOR
CEMENT PAVEMENT
DESIGN NOS. 3 AND 4

SIZE	PRICE
16″ Plate and frame	$5.00
18″ " " "	6.00
20″ " " "	7.00
24″ " " "	9.50
30″ " " "	22.00
34″ " " "	25.00

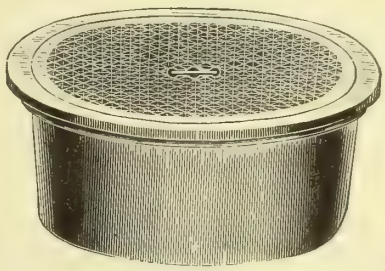
Depth of frame, 3 inches

ASH-PIT DOORS AND FRAMES
DESIGN NO. 7

SIZE OF OPENING	PRICE
16″ x 20″	$4.50
12″ x 17″	3.50
10″ x 12″	1.75
8″ x 10″	1.50
6″ x 8″	1.25
4″ x 6″	1.00

MANHOLE DOORS AND FRAMES
SQUARE TOP. DESIGN NO. 3

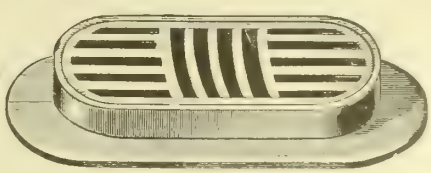
WIDTH	HEIGHT	PRICE
24″	24″	$11.00
18″	33″	10.00
18″	24″	8.50
18″	18″	7.50
16″	24″	8.00
16″	20″	7.25
16″	10″	4.50
12″	16″	4.50
12″	10″	3.50
12″	8″	2.50



VAULT PLATE OR GRATING AND DEEP
FRAME. DESIGN NOS. 5 AND 6

SIZE	PRICE
14″ Plate and frame	$4.00
18″ " " "	7.25
20″ " " "	9.00
24″ " " "	10.00
30″ " " "	15.00
36″ " " "	30.00

Depth of frame, 9 inches



ROADWAY GRATES AND FRAMES
DESIGN NO. 11

SIZE OF GRATING	PRICE
11″ x 22½″	$6.00
8¼″ x 17¼″	4.00

ILLINOIS FLOWER BOX COMPANY

180 North Dearborn Street
CHICAGO, ILL.

TELEPHONE, CENTRAL 5630

FACTORY
846-850 SOUTH CANAL STREET
Telephone, Wabash 1669

"ILLINOIS" SELF-WATERING FLOWER BOXES
TRADE-MARK

Products.

"ILLINOIS" SELF-WATERING METAL FLOWER BOXES (Patented Jan. 29, 1907; June 22, 1909), fifty-six stock sizes; special sizes made to order; SELF-WATERING METAL LINERS for Wood, Cement or Wicker Containers; CEMENT VASES and BOXES with Self-Watering Liners; RADIATOR SHIELDS in combination with Air Moistener and Dust Collector; GENERAL SHEET METAL SPECIALTIES.

Self-Watering Metal Flower Boxes.

Construction—Boxes are made of heavy galvanized iron, very strongly reinforced around top, and ends are crimped in by special machinery, carefully soldered and each box thoroughly tested for leakage before leaving our factory.

Sub-irrigating and self-watering device consists of galvanized false bottom "D," through which extend sponges "C C," which touch extreme bottom of box and by capillary attraction draw up the water "E" in reservoir and convey it to the roots of the plants where it should be for best effects. Water is supplied to reservoir through convenient tube in corner of box. (See illustration of porch box.)

Drainage—A drainage hole reinforced with brass eyelet is provided at line of false bottom, permitting all water above capacity of reservoir to flow off.

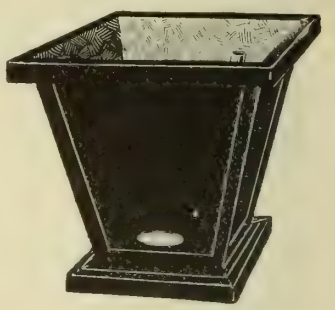
Installation—Brass eyelets are provided in ends through which wire or chain may be attached to woodwork of window frames.

Aeration—The porous sponge conveys air, as well as water, to roots of plants, and the surface of the soil does not become hardened or baked, but remains mealy and loose.

Guarantee—We guarantee all boxes against rot, rust, or leakage for five years, and sponges to last three years. We guarantee a thriftier growth of plants than in any kind of surface watered device.

DATA, PLANT TUBS

No.	Top, Ins.	Price
212	12 x 12	$2.00
214	14 x 14	2.50
216	16 x 16	3.00



PLANT TUB

"Illinois" Radiator Shield.

Saves walls from the dirty streak over the radiator. Saves draperies from being ruined. Saves coal by concentration of heat and directing it into room instead of to the ceiling.

Air moistener is back of radiator and is filled from top of radiator shield, an indicator showing when it is full.

Dust collector of fine pearl wire is immediately above radiator and is easily removed for cleaning.

"ILLINOIS" RADIATOR SHIELD
With Air Moistener and Dust Collector

Radiator shield rests on floor at back of radiator and is held securely in place by means of adjusting screws in front of radiator between the coils.

Finished in gold bronze or aluminum.

Prices—Add height (in inches) of coils only to length of coils only and multiply by seven, if the radiator is less than ten inches across. If more than ten inches across, multiply by nine.

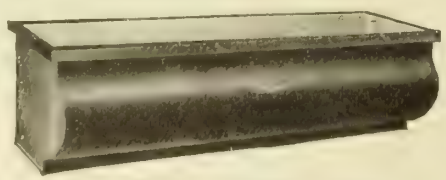
EXAMPLE

A radiator is 40 inches high, 40 inches long, 9 inches across. 40 plus 40 is 80: times 7 is $5.60.

A radiator 40 inches high, 30 inches long, 12 inches across. 40 plus 30 is 70: times 9 is $6.30.

WINDOW BOXES, MAHOGANY FINISH, O. G. FRONT
Width, 8 inches; Depth, 8 inches

No.	Length, Ins.	Price
300	26	$2.60
400	28	2.80
500	30	3.00
600	32	3.20
700	34	3.40
800	36	3.60
900	38	3.80
1000	40	4.00



O. G. FRONT WINDOW BOX

PORCH BOXES, STONE GREY OR DARK GREEN ENAMEL
Width, 12 inches; Depth, 9 inches

No.	Length, Ins.	Price
21	37	$3.00
22	41	3.40
23	45	3.75
24	49	4.00
25	53	4.25

PORCH BOX

WINDOW BOXES, STONE GREY OR DARK GREEN ENAMEL
Width, 9½ inches. Depth, 8 inches

No.	Length, Ins.	Price	No.	Length, Ins.	Price
1	23	$1.60	6	33	$2.10
2	25	1.70	7	35	2.20
3	27	1.80	8	37	2.30
4	29	1.90	9	39	2.40
5	31	2.00	10	41	2.50

Extra long boxes made in sections of about 36 ins., interlocked in such a manner as to appear as one continuous box when installed.
Window Boxes, 90 cents per lineal foot
O. G. Front Window Boxes, $1.20 per lineal foot
Porch Boxes, $1.00 per lineal foot

Catalogue.

Write for our complete catalogue, showing cement vases and boxes, reed and willow ware, etc.

REFERENCES

Wm. Leslie Welton, Birmingham, Ala
Luther Twitchell, Tacoma, Wash.
Chatten & Hammond, Chicago
Oswald C. Herring, New York
J. E. R. Carpenter, New York
Childs & Smith, Chicago
Marshall & Fox, Chicago
W. L. Stoddard, New York
Ottenheimer, Stern & Reichert, Chicago

IRVING IRON WORKS COMPANY

W. Irving Hand-Forged Wrought Iron

Third and Creek Streets,
LONG ISLAND CITY, N. Y.

Products.

W. Irving Hand-Forged Wrought Iron Specialties; Colonial, Antique, Rough-Hammered and Tudor Finish Shutter and Door Hardware; Andirons, Fire Tools, Frizzlers, Dujabs and Jabbers; Lamps; Shoe Scrapers; Bells; Weather Vanes; Well Canopies; Well-Sweep Irons; Leader Heads and other unusual fixtures.

TRADE-MARK

W. Irving Hand-Forged Ironwork.

W. Irving Hand-Forged Ironwork includes those usual and unusual "new-old" creations of our designers and craftsmen, which call forth the unstinted praise of architects and lovers of art who have seen them. Years of travel, research, study and practice have given us the ability to interpret the subtleties of craftsmanship which give charm to the ironwork of earlier days.

This is a "special" line, impossible of "standardization." No two creations of hand-forged ironwork can be exactly alike, though developed from the same model by the same craftsman. We do not even attempt it. We prefer to co-operate with the architect by bringing to the interpretation of his design our artistic sympathy and rare craftsmanship, of which we are justly proud. We can help you put into solid iron the message which will link your own with future generations.

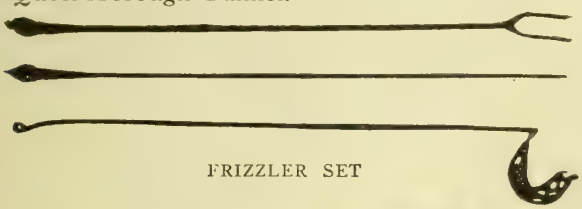
No catalogue is possible with the most of this work. The requirements are different in every case.

A few items we make up in quantity for general sale, though, even with these, each is still an independent hand-wrought product. Some of these articles are shown here. Send for Booklet GIA.

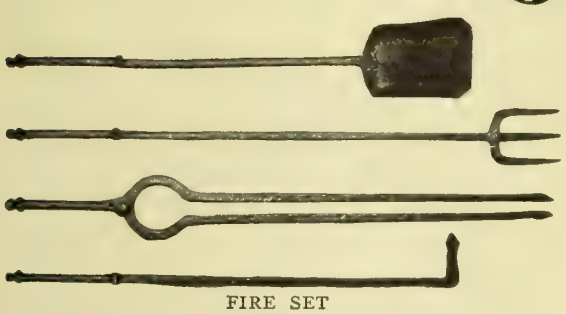
The bulk of our work, such as Colonial Shutter and Door Hardware, Lamps, Well Canopies, etc., we prefer to furnish only through the architect's specification.

Your free-hand sketch of requirements, in any instance, if sent to us, will secure at once a sketch or print chosen from our many designs to suit your needs.

If in New York City, visit our plant and showroom, Third and Creek Streets, Long Island City. Take the Queensborough Tunnel.



FRIZZLER SET



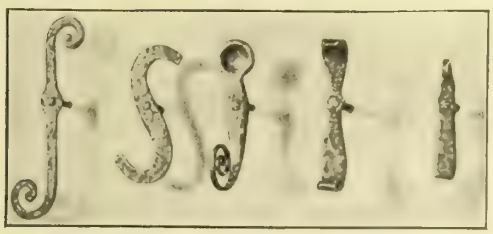
FIRE SET

EXAMPLE OF W. IRVING HAND-FORGED IRONWORK

HAND-FORGED NAIL HEADS

SHOE SCRAPERS KNOCKERS

BELL LANTERNS KNOCKERS



SHUTTER FASTENERS

LANTERN

WATERTITE DRAIN & SCUPPER COMPANY, INC.

Hooded Warehouse Scuppers

351 Lexington Avenue
NEW YORK, N. Y.

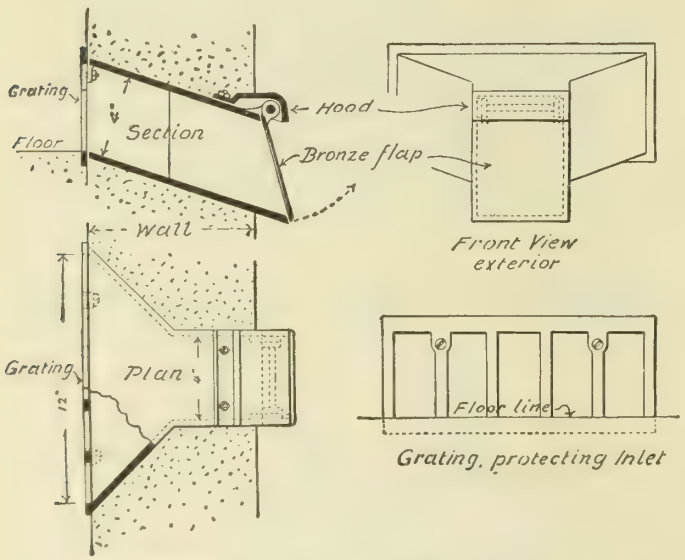
TELEPHONE, MURRAY HILL 1340

Products.

HOODED SCUPPERS; INTERIOR SCUPPER SYSTEM: "ANTICLOG" FLOOR DRAINS.

Hooded Scuppers.

Underwriters make a substantial reduction in the rate of insurance on mills, factories, warehouses, lofts, etc. (especially sprinklered buildings), when scuppers are installed, because the risk of damage by water is thereby greatly reduced, the scuppers affording a ready and quick escape for the water from sprinkler heads or hose. As the underwriters virtually pay for the scuppers in the lower rate of insurance, the architects should specify a scupper that meets their requirements and is approved by them. Our scuppers are approved by all underwriters.



HOODED SCUPPERS, TYPES A AND B
Patented November 18, 1913

Underwriters' Requirements.

The National Fire Protection Association, at their 1915 convention, recommended and embodied in their report as follows: "The outlet (of the scupper) should project a sufficient distance beyond the wall to protect it from becoming sealed by ice. The outer end should be of such design that it will not readily be clogged with ice and snow." The Hood, which is a feature of our scupper exclusively, accomplishes this object in the only practicable way, and also prevents the clogging of the valve and hinge by mortar during construction.

The National Association also recommended that the inlet be screened by vertical bars not over two inches nor less than one inch apart. This requirement also is met by the grid at the inlet of our scupper, preventing the entrance into the scupper of any large object that might choke it, but leaving the interior of the scupper open to view from the room.

Wind-Proof.

Our scuppers have a cast-bronze valve at the outer end, so hung and set that it is practically wind-proof and air-tight. It is hinged with a copper or brass pin with bushed bearings to prevent corrosion.

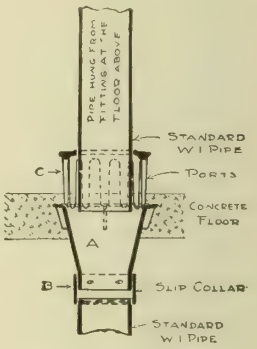
Specification.

Set, in the exterior walls at each floor level where shown or directed (not less than one scupper to each 1000 square feet of floor surface), cast-iron scuppers (inlet 12" x 4", outlet 4" x 4"), with cast-bronze gravity valve; valve to be entirely outside the wall line and protected by a cast-iron hood as made by the WATERTITE DRAIN & SCUPPER COMPANY, INC., 351 Lexington Avenue, New York.

Interior Scupper System—Patented.

A continuous vertical line drawing the water from any floor to an exit at first story. Approved by underwriters and installed in New York City.

Send for catalogue, showing this system and giving authentic information complete as to requirements of underwriters for both exterior and interior scuppers.



INTERIOR SCUPPER SYSTEM
Patented June 22, 1915

PRICE LIST OF SCUPPERS
Subject to discount

Thickness of Wall in Inches	Type A		Type B	
	Painted	Galvanized	Painted	Galvanized
6, 7, 8	$4.25	$5.00	$3.75	$4.50
9, 10, 11	4.50	5.25	4.00	4.75
12, 13, 14	4.75	5.75	4.25	5.25
15, 16, 17	5.00	6.00	4.50	5.50
18, 19, 20	5.25	6.25	4.75	5.75
21, 22, 23	5.50	6.50	5.00	6.00
24, 25, 26	5.75	6.75	5.25	6.25

NOTE—Type A is ⅜" metal cast in one piece. Type B is the type usually used and is ¼" metal, with cover and grid cast separate.

Installations.

A few installations are as follows:

Sixteen story Loft Building at 406 West 31st Street, New York
Bush Terminal Buildings, Brooklyn, N. Y.
Hill Publishing Company, New York
American Ever-Ready Co., Long Island City, N. Y.
Reymann Abattoir and Packing House, Wheeling, W. Va.
Mica Insulator Company Building, Schenectady, N. Y.
American Cigar Company Factory, Hartford, Conn.
Illuminating Building, Cleveland, Ohio
Fulton County Silk Mills, Gloversville, N. Y.
Diamond Match Company Building, Oshkosh, Wis.
Bradley Building, Worcester, Mass.
Addressograph Company Building, Chicago, Ill.
Rigby Furniture Company Building, Baltimore, Md.
Holtzer-Cabot Building, Cambridge, Mass.
Ralston Purina Company Building, Buffalo, N. Y.
Keystone Leather Company, Philadelphia, Pa.

WINDSHIELD SCUPPER CO.

16 Warren Street

NEW YORK, N. Y.

AGENTS

BUFFALO, N. Y., Jones Iron Works, 312 Terrace St.
CINCINNATI, O., The Brick Sales Co., 705-6 St. Paul Bldg.
CLEVELAND, O., McWatters & Co., The 1900-Euclid Bldg.
DETROIT, MICH., L. T. Ollesheimer, 616 Free Press Bldg.
INDIANAPOLIS, IND., The F. O. Duvall Co., Fletcher American Bank Bldg.
KANSAS CITY, MO., Builders Material Supply Co., Republic Bank Bldg.
MINNEAPOLIS, MINN., Hydraulic-Press Brick Co., 211 So. 4th St.
NASHVILLE, TENN., Geo. W. Ruth, 6 Noel Block
NORFOLK, VA., Denby-Ford-Wilbur Co., West 24th St., near DeBree Ave.
PHILADELPHIA, PA., Builders Iron Work Co., 324 N. American St.
PITTSBURGH, PA., Fort Pitt Hardware Co., 807 Liberty Ave.
PORTLAND, OREGON, F. T. Crowe & Co., 45 Fourth St.
UTICA, N. Y., J. C. Breen, 1 Waverly Place
RICHMOND, VA., T. A. Archer, Old Dominion Loan & Trust Bldg., East Main St.
ROCHESTER, N. Y., American Clay & Cement Corp.
ST. PAUL, MINN., Corning Brick Co., 626 Ryan Bldg.
SEATTLE, WASH., F. T. Crowe & Co., 420 Globe Bldg.
SPOKANE, WASH., F. T. Crowe & Co., 164 Madison St.
TACOMA, WASH., F. T. Crowe & Co., 1177 Dock St.

Products.

Windshield Scuppers.
Also, Sash Pulleys.

Windshield Scuppers.

These devices are installed in the walls of factory, warehouse and loft buildings, and are used to drain off excess water in case of fire, it being demonstrated that more damage is usually done by water than by fire.

Value of the Windshield (Patented).

As ordinary scuppers cause drafts which seriously hamper employees in their work, there is a tendency to stuff them with waste material which naturally defeats their purpose and renders them useless.

Windshield scuppers positively prevent drafts, as the slightest current of air closes the windshield.

Reduced Insurance Rates.

Buildings equipped with these scuppers are subject to a reduction in insurance rates from two to five per cent. (See article 377 of Insurance Schedule Form No. 115.)

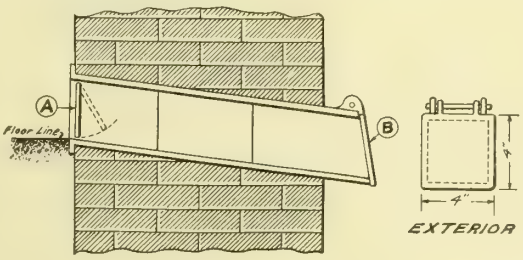
This great saving is far out of proportion to the small initial cost of the scuppers.

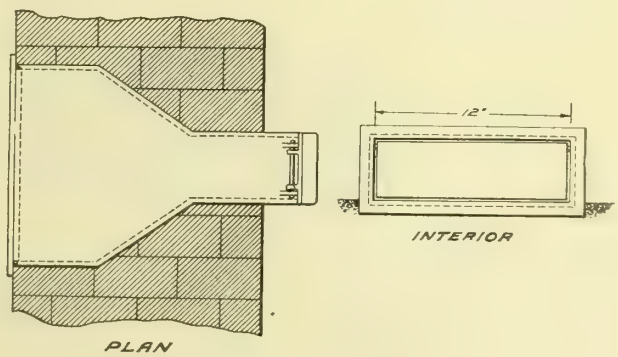
PRICES AND SIZES

Thickness of Wall	Type K	Type L	Type M	Type N
6 to 8 in.	$3.80	$3.55	$2.90	$2.00
9 to 11 "	3.95	3.70	3.15	2.20
12 to 14 "	4.30	4.00	3.40	2.40
15 to 17 "	4.52	4.25	3.65	2.60
18 to 20 "	4.75	4.50	3.90	2.80
21 to 23 "	5.06	4.80	4.15	3.10
24 to 26 "	5.24	5.00	4.40	3.20

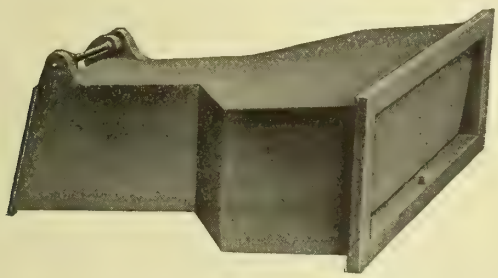
Type K, of heavy ⅜-inch metal, with windshield.
Type L, of heavy ¼-inch metal, with windshield.
Type M, of heavy ¼-inch metal, with grating (no windshield).
Type N, Straight 4x4 (not flared), of ¼-inch metal, without windshield or grating.

Note—All equipped with exterior bronze valves and brass hinge pins. For polished brass windshield, add 75c each, net. For copper windshield, add 50c each, net.





DETAILS OF WINDSHIELD SCUPPERS
A shows patented windshield. B shows external storm gate



INSIDE VIEW OF WINDSHIELD SCUPPER

REFERENCES

Underhill Building, New York City
Austin Nichols Co. Building, New York City
Chelsea Warehouse, New York City
Lord & Taylor Building, New York City
Fulton Bag & Cotton Mills, Brooklyn, N. Y.
National Casket Co., Brooklyn, N. Y.
Baker Shoe Co., Brooklyn, N. Y.
Standard Oil Co., Long Island City, N. Y.
Studebaker Building, Long Island City, N. Y.
Walker & Gibson Building, Albany, N. Y.
Sauquoit Toilet Paper Co., Utica, N. Y.
Robertson Cataract Electric Co., Buffalo, N. Y.
Brewster-Gordon Warehouse, Rochester, N. Y.
Endicott-Johnson Co., Lestershire, N. Y.
Colgate & Co., Jersey City, N. J.
Premier Briar Pipe Co., Jersey City, N. J.
Banister Shoe Co., Newark, N. J.
General Electric Co., Harrison, N. J.
American Cigar Co., Garfield, N. J.
Crown Mfg. Co., Valley Falls, R. I.
Victor Talking Machine Co., Camden, N. J.
Naumkeag Steam Cotton Mills, Salem, Mass.
Merchants Terminal Warehouse, New Bedford, Mass.
Packard Motor Co., Chicago, Ill.
Missouri Can Co., Kansas City, Mo.
American Can Co., San Francisco, Cal.

THE KRAMER BROS. FOUNDRY CO.

Manufacturers of Hardware Specialties

DAYTON, OHIO

Products.

Full line of HARDWARE SPECIALTIES, including GEM COAL CHUTE DOOR, FIREPLACE DOME DAMPER, GARBAGE RECEIVER COVER, METAL FLOWER VASES, GEM VAPOR PAN, WEILER IMPROVED DRAIN TRAP, "CLEAN EASY" GARAGE DRAIN, LO-CO SHAKING and DUMPING GRATE, MCGINTY GRATE, LAMP STANDARDS, CISTERN COVERS, SASH WEIGHTS, SALAMANDERS, CESSPOOLS, DRAINS; CONTRACTORS', PLUMBERS' and BUILDERS' SUPPLIES; SEWER CASTINGS, etc.

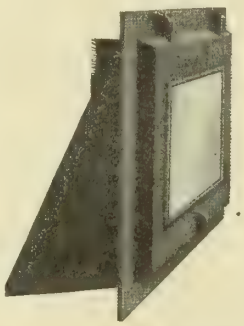
Sewer Castings, etc.

We are the largest manufacturers of Sewer Castings in the United States. Dependable products throughout our entire line.

Detail catalogues sent promptly on request.

Gem Coal Chute Door.

A safe and convenient cellar entrance for coal, wood, etc. Automatically locked by strong inside catch, which is operated by a chain. No climbing over coal pile. No worn fastenings or frames. Burglar-proof. Light through unbreakable quarter-inch wire glass. Made of cast iron and will last indefinitely.



GEM COAL CHUTE DOOR

No. 1.—Opening: 16" high, 20" wide. Iron Door. Weight, 75 lbs. Price, $5.00.
No. 1.—Opening: 16" high, 20" wide. Glass Door. Weight, 75 lbs. Price, $6.00.
No. 2.—Opening: 18" high, 24" wide. Iron Door. Weight, 120 lbs. Price, $8.40.
No. 2.—Opening: 18" high, 24" wide. Glass Door. Weight, 120 lbs. Price, $9.60.

Fireplace Dome Damper.

Positively solves problem of smoky rooms from open fireplaces. Unusual height of dome draws all the smoke up the chimney. Damper controlled by ratchet, making possible any desired adjustment.

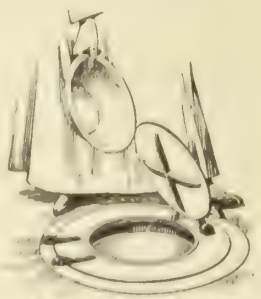
FIREPLACE DOME DAMPER

Prices: 24 inches, $6.50; 30 inches, $7.00; 36 inches, $7.50; 42 inches, $8.50; 48 inches, $9.50; 54 inches, $10.50.

Garbage Receiver Cover.

Rests flush with ground over well containing ordinary garbage can. Opening for can, 19 inches. Lid (tripped with foot), 12 inches. Heavy cast iron. Protects garbage from animals and insects and improves appearance of alley and yard.

Price, cover complete, $3.00.



GARBAGE RECEIVER COVER

Kramer Metal Flower Vases.

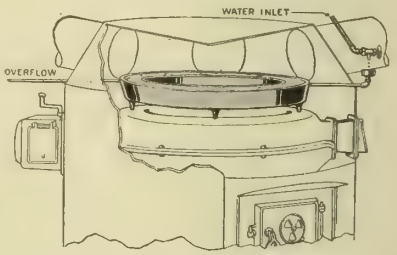
We are the largest manufacturers of Metal Flower Vases in the United States. Our line contains a great number of different styles. The one shown here is Athens No. 1, one of our latest and most beautiful designs.

Our new vase catalogue, sent on request, gives pictures and descriptions of our whole line.

KRAMER METAL FLOWER VASE—ATHENS NO. 1

Gem Vapor Pan.

Fits all standard makes of furnaces. Placed on top of fire-chamber immediately in front of all pipe openings. Correct design and construction, presenting a large surface of water, positively maintains moisture in heated air.

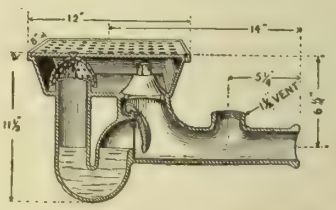


GEM VAPOR PAN

No. 1—Diam. at legs, 15" on center; outside diam., 20"; height, 2¾"; capacity, 1 gallon. Price, pan only, $4.00.
No. 2—Diam. at legs, 24" on center; outside diam., 28"; height, 5"; capacity, 3 gallons. Price, pan only, $5.00.

Weiler Improved "Water Seal" Drain Trap.

Practical, easily installed water seal and back-water trap. One caulked joint, at waste pipe. Water enters basin through grate and then trap through bell shaped screen with large holes. Back-water held in waste pipe by check valve. Vent in top of waste pipe permits vent pipe to be carried under floor in any direction. Brass cleanout plug gives free access to trap and waste pipe. Complies with Health Laws. Recommended by leading architects.



WEILER IMPROVED "WATER SEAL" DRAIN TRAP

No. 2A—2 inches through entire trap. Pan, 8" x 12". Price, $10.00
No. 3A—3 inches through entire trap. Pan, 9" x 15". Price, 15.00
No. 4A—4 inches through entire trap. Pan, 10¼ x 18½". Price, 20.00

Kramer "Clean Easy" Drain Trap.

Practical and efficient. Wastings enter through top grating and fall into deposit pot. Sediment and solids settle to bottom. Oil and grease float on top. Openings will not clog. Deposit box easily cleaned as shown.

KRAMER "CLEAN EASY" DRAIN TRAP

No. 1—19½" x 19½" x 12½". Outlet, 4½". Price, $15.00
No. 2—12½" x 12½" x 9". Outlet, 2¾". Price, 9.00

ESTABLISHED 1888

LOETSCHER-RYAN MFG. CO.

Coal Chutes and Hardware Specialties

130 Salina Street

DUBUQUE, IOWA

Products.

JULIEN COAL CHUTES; BASEMENT WINDOWS; COLUMN BASES, and other METAL PRODUCTS.

Basement Window and Coal Chute.

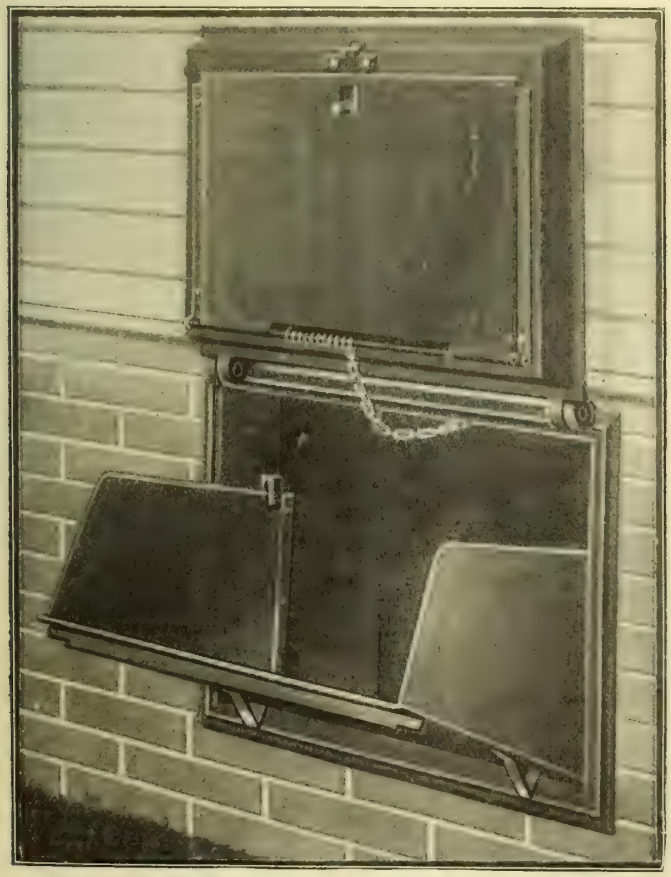
The Julien Coal Chute is a combination basement window and coal chute that should be installed in every building where coal, wood or vegetables are stored.

It is Burglar-Proof.

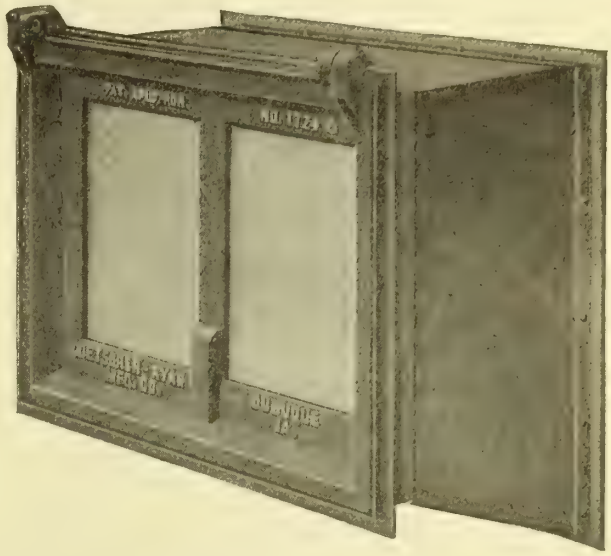
The Julien Coal Chute not only protects the building on the sides and above the opening, but in addition it is burglar-proof, and will last a lifetime. The door and frame are made of strong gray iron, and the hopper and sides are made of steel. The door is made in two styles: with cast panel, and with wire-glass lights.

Door Opens only from the Inside.

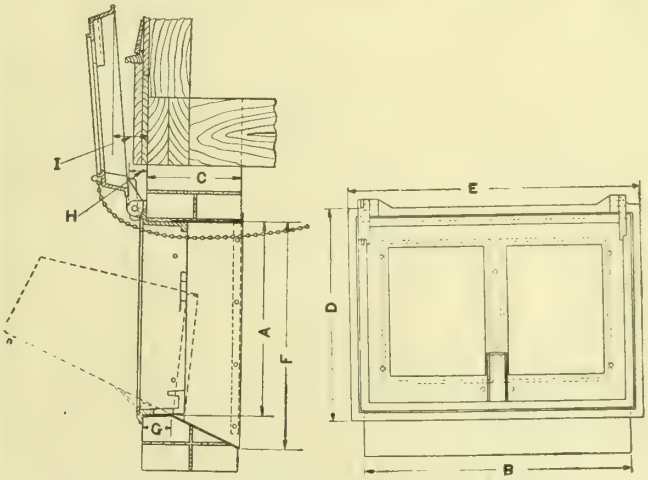
The door opens only from the inside and, when closed, locks automatically from the outside. A chain is attached to the lock, so that it is not necessary to climb over the coal to open. Also, the door locks open and protects the building directly above the hopper, where protection is most needed.



THE JULIEN COAL CHUTE
Showing installation in building with wire-glass door locked open and hopper extended
Note protection afforded building above opening by door



COAL CHUTE DOOR AND FRAME BEFORE INSTALLATION



INSTALLATION DIAGRAMS JULIEN COAL CHUTE

TABULATED DIMENSIONS, INCHES

Size	A	B	C	D	E	F	G	H	I	Glass
17 x 24	17	24	8½ to 13	19	26	19½	2¼	1¾	3½	9 x 12
22 x 33	21½	30	13 to 18	24½	33	25½	1¾	1¾	3½	12 x 16

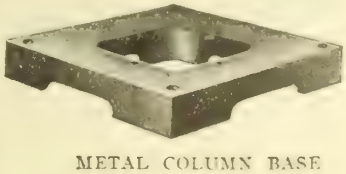
PRICE-LIST

No. 1724G	with	Hopper	Wire Glass Lights	$10.00
No. 1724G	without	"	" " "	8.00
No. 1724	with	"	Cast Panel	9.00
No. 1724	without	"	" "	7.00
No. 2233G	with	"	Wire Glass Lights	16.50
No. 2233G	without	"	" " "	14.00
No. 2233	with	"	Cast Panel	15.00
No. 2233	without	"	" "	12.50

Discounts on application.

SIZES REQUIRED

Size of Column, Ins.	Size of Base, Ins.
6 x 6	9 x 9 x 1¾
8 x 8	11 x 11 x 1¾
10 x 10	13 x 13 x 1¾



METAL COLUMN BASE

THE MAJESTIC COMPANY

Manufacturers of Building Specialties

HUNTINGTON, IND.

DISTRIBUTORS

NEW YORK, N. Y., E. A. Jackson & Bro., 50 Beekman Street
CHICAGO, ILL., Fred Liebrich, 1102 Monadnock Block
CHICAGO, ILL., Angert Wire & Iron Co., 6024 Grove Avenue
KANSAS CITY, MO., Townley Metal & Hardware Co.
ST. LOUIS, MO., P. A. Haradon, 613 Fullerton Building, and Shapleigh Hardware Co.
SAN FRANCISCO, CAL., Sherman Kimball & Co.
EL PASO, TEX., Rathbun Mix Co.
DALLAS, TEX., Gaines & Dewees
CLEVELAND, OHIO, Donley Bros.
COLUMBUS, OHIO, M. S. Seibert & Co.
MINNEAPOLIS, MINN., Fowler & Pay
DENVER, COLO., Queen City Wire & Iron Works
SALT LAKE CITY, UTAH, Salt Lake Hardware Co.
SEATTLE, WASH., Kohler Supply & Tiling Co.
DES MOINES, IOWA, Century L'b'r Co.
BOSTON, MASS., Waldo Bros.
PHILADELPHIA, PA., Murta, Appleton Co.
CHATTANOOGA, TENN., Eureka Supply Co.
NEW ORLEANS, LA., A. Baldwin Co.
INDIANAPOLIS, IND., Ewald Over Foundry

Products.

Foundation Coal Chutes; Built-in Garbage Receivers; Underground Garbage Receivers; Milk and Package Receivers; Metal Basement Windows; Metal Plant Boxes.

Also Ash-Pit Doors; Ash Dumps; Cellar Wall Grates; Porch Column Bases; Warm-Air Furnaces; Duplex One-Register Heating System, etc.

Majestic Residence Coal Chute.

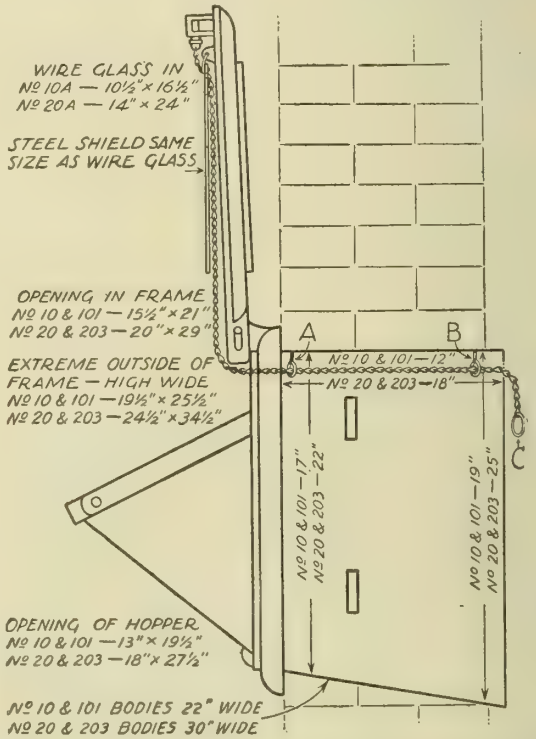
Nos. 10 and 20 models, "A" and "C" styles, have wire glass panel for light. Glass is protected by steel shield when door is open. In the "B" and "D" styles this shield is used as panel instead of glass. "A" and "B" styles have hoppers; "C" and "D" are without hoppers.

Nos. 101 and 203 models have solid cast doors, and no provision is made for glass panel. This is a most popular model where light in coal bin is not required. Style "B" is furnished with hopper; Style "D" without hopper.

The illustration in lower right corner shows Nos. 10 and 20 "A" style open, with door protecting wall, and hopper in position for receiving coal. The Majestic patented gravity latch makes an automatic, burglar-proof lock. The steel protecting shield, hopper, and slotted self-locking door hinges are all exclusive patented Majestic features. Chain attachments for opening gravity latch are furnished on all models. Door and frames are made of high-grade cast semi-steel giving great strength. Hoppers and bodies are heavy blue annealed steel.

SIZES AND PRICES

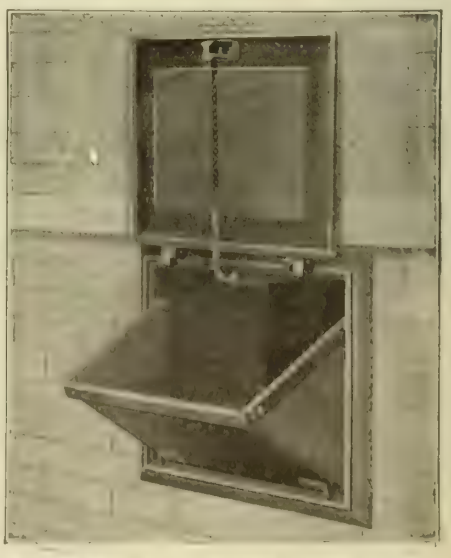
No.	Style	Description	Width, Ins.	Height, Ins.	Depth, Ins.	Weight, Lbs.	Price
10	A	With Glass and Hopper	24	17	13	95	$10.00
10	B	Without Glass	24	17	13	80	9.00
10	C	Without Hopper	24	17	13	85	8.00
10	D	Without Hopper or Glass	24	17	13	65	7.00
20	A	With Glass and Hopper	33	22	18	180	16.50
20	B	Without Glass	33	22	18	145	15.00
20	C	Without Hopper	33	22	18	150	14.00
20	D	Without Hopper or Glass	33	22	18	125	12.50
101	B	With Hopper	24	17	13	85	8.00
101	D	Without Hopper	24	17	13	70	6.00
203	B	With Hopper	33	22	18	155	15.00
203	D	Without Hopper	33	22	18	135	12.50



SECTIONAL DETAIL MAJESTIC COAL CHUTE INSTALLATION

MAJESTIC NO. 10 COAL CHUTE, WITH GLASS PANEL

MAJESTIC NO. 101 COAL CHUTE



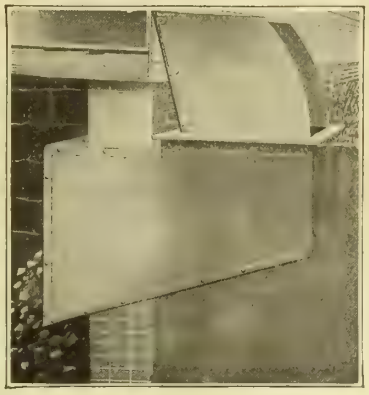
MAJESTIC COAL CHUTE, WITH DOOR OPEN

Sweet's Catalogue

Continued on next page

Grade Line Chute.

Very low foundations and, in some cases, no foundation above the grade line are responsible for the introduction of this type of chute.



Open

Coal Chute, for Store Buildings.

This Majestic coal chute is designed and built especially for store and office buildings, and does away with the unsightly dangerous coal hole in the sidewalk. It was designed by a prominent Chicago architect, to protect property owners from possible damage suits, and to eliminate the necessity of putting up a bond for the protection of pedestrians.

Closed

SECTIONAL VIEWS SHOWING INSTALLATION GRADE LINE CHUTE

EXTERIOR VIEW STORE BUILDING CHUTE, CLOSED

SECTIONAL VIEW STORE BUILDING CHUTE, OPEN

The same chute is made so that the coal can be put either under the sidewalk or in the basement, and is called the Duplex store chute.

SIZES AND PRICES GRADE LINE CHUTE

No.	Size, Door, Ins.	Wall Opening Ins. Wide	Wall Opening Ins. High	Length, Ins.	Weight, Lbs.	Price
16	18 x 24	25	24	36	180	$18.00
18	24 x 30	31	31	42	280	24.00

SIZES AND PRICES STORE CHUTE

No.	Size of Door Ins. Wide	Size of Door Ins. High	Total Height, Ins.	Opening at Grade, Ins.	Weight, Lbs.	Price	Without Hopper
12	22	20	48	24 x 16	180	$20.00	$18.00
15	30	24	52	30 x 20	235	25.00	22.00
*120	22	20	48	24 x 16	200	24.00	22.00
*150	30	24	52	30 x 20	250	30.00	27.00

* Duplex Store Chute

Milk Bottle and Package Receiver.

The Majestic milk bottle and package receiver is placed in the kitchen wall for receiving milk bottles and packages from the outside, insuring them against theft.

This receiver consists of two cast-iron frames and doors connected by a steel body adjustable to the varying thickness of walls in which it is placed. There is a gravity lock on the outside door which can be unlocked from the inside only.

The inside or kitchen side door is provided with a nickeled refrigerator latch and handle, and cannot be opened from the outside.

INTERIOR AND EXTERIOR VIEW MAJESTIC MILK BOTTLE AND PACKAGE RECEIVER

Sizes and Prices—The outside measurements of frames are 16¼ inches wide, 14 inches high.

The outside measurements of the body or wall opening are 14 inches wide, 11½ inches high.

The depth is equal to thickness of wall.

The receiver will hold six quart bottles in 6-inch wall; more in thicker wall.

Made in two different depths of adjustable body, 5 to 8 inches and 8 to 14 inches.

No. 1—Adjustable from 5 to 8 inches, $5.00.

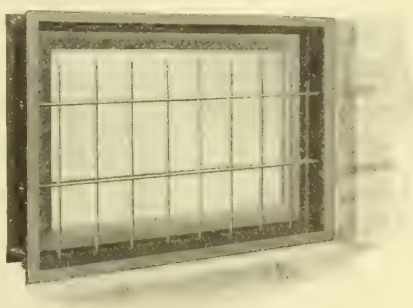
No. 2—Adjustable from 8 to 14 inches, $5.00.

Shipping weight, 40 pounds; code, Bigan.

Approved by Good Housekeeping Institute

Burglar-Proof Basement Window.

The Majestic burglar-proof basement window consists of a sectional cast semisteel frame, wrought iron guard and galvanized iron sash.



MAJESTIC BURGLAR-PROOF BASEMENT WINDOW

SIZES AND PRICES

No.	Glass Size, Ins.	No. Lights	Wall Opening, Ins.	Shipping Weight, Complete, Lbs.	Frame	With Metal Sash	With Wood Sash
100	26 x 12	One	32 x 16	70	$3.00	$4.25	$5.50
110	26 x 20	One	32 x 24	75	3.50	4.75	6.00
125	14 x 12	Two	35 x 16	73	3.20	4.60	5.75
130	14 x 20	Two	35 x 24	88	3.60	5.00	6.25
136	10 x 12	Three	38 x 16	79	3.25	4.90	6.25
139	10 x 20	Three	38 x 24	86	4.00	5.65	7.00

Continued on next page

Built-in Garbage Receiver.

This garbage receiver consists of a cast-iron front and back joined by a steel body adjustable to the thickness of the wall in which it is placed. The front or kitchen side is oval in shape, with an adequate door opening directly over the garbage pail inside the steel body. This door is very close fitting and locks with a refrigerator-type latch. A ventilating flue may be used as shown.

Dimensions are as follows: The inside and outside castings are each 20½ inches wide and 31 inches high, the body or size of opening in wall is 19 inches wide and 29 inches high. The body is adjustable, for 8- to 12-inch walls. For narrower walls, use casing on each side.

SECTIONAL VIEW MAJESTIC BUILT-IN GARBAGE RECEIVER

MAJESTIC BUILT-IN GARBAGE RECEIVER INSTALLED

PRICES

No. 5K Receiver, 12 gal. can.....$15.00
No. 7K Receiver, also underground container for extra can, 2-12 gal. cans..... 22.50
No. 9A Apartment Receiver (can removed through doors on inside)..... 12.00

Underground Garbage Receiver.

A sanitary method of caring for garbage. No flies; no odor; no unsightly garbage can.

SECTIONAL VIEW MAJESTIC UNDERGROUND GARBAGE RECEIVER

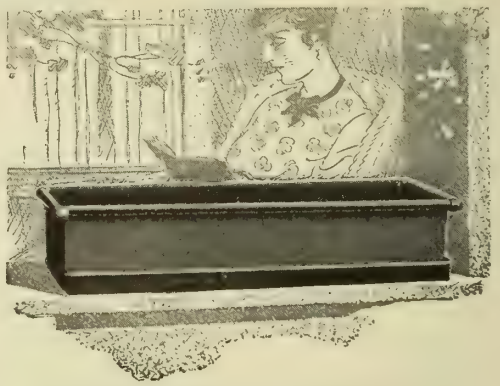
SIZES AND PRICES, UNDERGROUND GARBAGE RECEIVER

No.	Shell Diam., Ins.	Shell Depth, Ins.	Can Capacity, Gal.	Weight, Lbs.	Price
18	16	18	9	55	$5.00
22	16	22	11	60	6.00
26	16	26	15	65	7.50
28	19	28	20	110	10.00
30	19	30	25	120	11.00

Approved by Good Housekeeping Institute

All-Metal Flower Boxes.

Made of heavy galvanized iron, cast-iron corner beads, ventilating trough. Finished in Majestic gray enamel.



MAJESTIC ALL-METAL FLOWER BOX

SIZES AND PRICES

Sizes	Shipping Weight Per Doz.	Price
18 ins. long, 10½ ins. wide, 6½ ins. high	75	$1.40
24 ins. long, 10½ ins. wide, 6½ ins. high	90	1.50
30 ins. long, 10½ ins. wide, 6½ ins. high	100	1.60
Inside 10 ins. square, outside 13½ ins. square	100	1.50
Inside 12 ins. square, outside 15½ ins. square	110	1.60
Inside 15 ins. square, outside 18½ ins. square	120	1.75

Duplex One-Register Heating System.

A most efficient type for five- to eight-room houses of the modern type of open architecture. Fuel economy is one of the strongest points in favor of this system. The duplex register can be installed in partition between two rooms, in colonade, or under window. Extra pipe can be run to "hard-to-heat" rooms. This register is the only single-register type which has the full capacity of the heating pipe. It is clean, safe, sanitary. An excellent proposition for stores, installed as part of counter.

We make a full line of high class all cast furnaces. Duplex systems complete, $110 and $125. Send for catalogue.

SECTIONAL VIEW INSTALLATION OF MAJESTIC DUPLEX ONE REGISTER HEATING SYSTEM

EMIL W. RITTER COMPANY

Coal Window Chutes and Building Specialties

OFFICE AND FACTORY
221-223 West Austin Avenue
CHICAGO, ILL.

Products.

BUILDING SPECIALTIES: COAL CHUTES; RITTER COAL CHUTE, "1916 MODEL"; "THE WINDOW CHUTE"; "HOLLAND" COAL CHUTE; "PROTEXLITE" COAL WINDOW.

Also, "IDEAL" CAST-IRON PORCH COLUMN BASE; STEEL POST CAPS and BASES; ASH HOISTS, SIDEWALK HOISTS, GARBAGE INCINERATORS.

Improved Ritter Coal Chute.

The "1916 Model" Ritter Chute is a radical departure from all previous coal-chute construction.

Architecturally, it fulfils every requirement. In outward appearance it follows the conventional lines of window construction so closely that the average passer-by would never distinguish it from a window.

The chute with the glass front is particularly adapted to the prevailing practice of utilizing the space under flat porches for coal bins.

Structurally, the design of the various parts and the material used for them are such as years of experience in making and selling various kinds of coal chutes have demonstrated to be the best for the respective functions. The "1916 Model" embodies every desirable feature of any coal chute on the market. It avoids the defects and weaknesses which actual use has shown inherent in other makes.

Essential Features.

Wall-box—Sets back from face of wall to allow a margin of masonry to show at top and jambs, "just like a window." It is self-anchoring in the wall.

Steel Hopper—Of "structural" and "plate," designed specially heavy to withstand the hardest usage. *It cannot be broken.* The hopper closes in beyond the face of wall frame, just as a sash sets in from the face of frame in ordinary window construction.

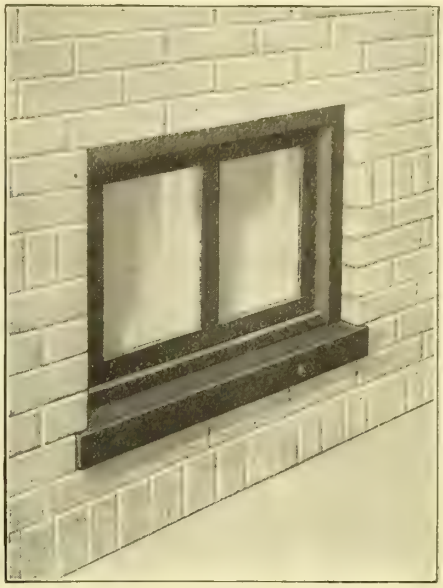
Wall Protection—When hopper is open for receiving coal, a steel plate of ample size protects the wall above the opening from flying particles of coal and dust.

Automatic Locking—The chute locks automatically when the hopper is pushed shut. Unlocks from the inside only, by raising the locking bar. This can be operated with a broom or stick, or by a cord and pulley on the ceiling, so it is not necessary to climb on to the coal pile or get dirty in opening this chute.

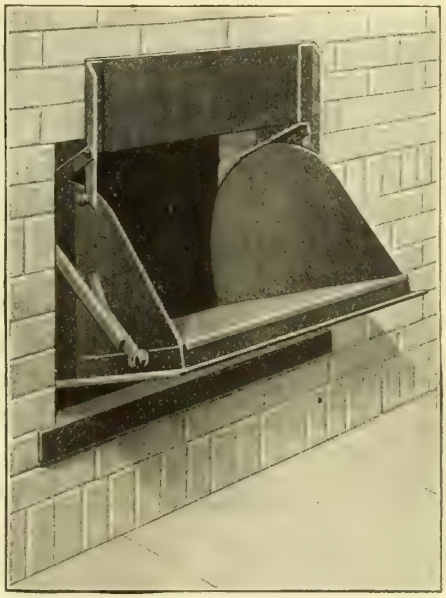
Glass Front or Solid Front.

Where Light is Wanted in the Basement—Following the lines of the ordinary window, the front dimensions of the frame and hopper are such as to give practically the same sizes of glass as an ordinary window for the same wall opening. In this respect it differs from other chutes which have a comparatively small glass area. Chutes are glazed with ¼-inch ribbed wire-glass. When open for receiving the coal, a very heavy steel plate, permanently hinged at top edge of hopper, is supported more than an inch above the glass, completely covering the glass and protecting it from injury. When hopper is pushed shut, this plate is *automatically* lifted to a horizontal position at the top of chute frame, allowing the unobstructed passage of light into the basement. It is absolutely impossible for this plate to come in contact with the glass, and the steel hopper frame is amply strong to stand the rough handling which will invariably break a cast-iron hopper and buckle or otherwise damage the ordinary steel chute.

Where Glass Feature is not Wanted—The chute is supplied with heavy steel front, but the general lines of ordinary window construction (masonry reveal, sill, frame and sash lines) are retained. In fact, a glass front can be changed to a solid front by merely substituting the solid plate for the glass, and vice versa.



Closed



Open

IMPROVED RITTER COAL CHUTE
Patented in United States and Canada

DIMENSIONS AND PRICES

Size Number	Normal Size Width	Normal Size Height	Wall Opening Width	Wall Opening Height	Wall Thickness	List Price
10S Solid Front	24 in.	17 in.	27 in.	21 in.	Adapted for any wall thickness. Suitable for masonry or frame construction.	$ 9.00
10G Glass Front	24 in.	17 in.	27 in.	21 in.		10.00
15S Solid Front	24 in.	22 in.	27 in.	23 in.		11.50
15G Glass Front	24 in.	22 in.	27 in.	23 in.		12.50
20S Solid Front	33 in.	22 in.	36 in.	23 in.		15.00
20G Glass Front	33 in.	22 in.	36 in.	23 in.		16.00
25S Solid Front	33 in.	17 in.	36 in.	21 in.		14.00
25G Glass Front	33 in.	17 in.	36 in.	21 in.		15.00
30S Solid Front	36 in.	30 in.	36 in.	30 in.		24.00
30G Glass Front	36 in.	30 in.	36 in.	30 in.		25.00

SMITH-MATTHEWS FOUNDRY CO.

Manufacturers of Coal Chutes, Fireplace Dampers and Dumps; Steel and Cast Iron Foundry Products

656-662 Bellevue Avenue
DETROIT, MICH.

TELEPHONE, Ridge 3008

Products.

Coal Chutes; Fireplace Dampers and Dumps; Salamanders; Manhole Covers and Rings; Wheel Guards; Vent Grates; Ash-Pit Doors; Garage Grates; Stanchions; Bell Traps; Doors for Ash and Garbage Receptacles; Heavy Cesspools; Provision Cabinets.

Smith-Matthews Coal Chute.

This chute is built in the foundation wall of a building. If the foundation is of concrete, it can be built in as a window frame. No window frame or sash is required. The frame and the door of the chute are made of cast iron of the best quality. The door has a self-locking device on the inside, which fastens the door as soon as it is closed and makes it absolutely burglar-proof. The door can be opened only from the inside, where the lock is within easy reach. The inner body is of galvanized steel and cannot rust. It will stand the hardest usage without breaking. If desired, the door will be furnished with a wire-glass window to light the coal bin.

SMITH-MATTHEWS COAL CHUTE

Advantages—The Smith-Matthews Coal Chute makes unnecessary the battering and breaking of windows and the mutilation of sills. It also saves the foundation wall of the house from injury by careless coal deliverers. Coal is not scattered on the lawn or on the walk. The door of the chute closes so tightly that the inside is always dry.

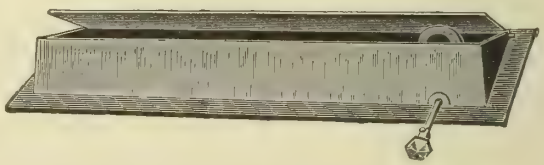
Sizes—The chute is made in two sizes, with opening in wall 15 x 19 inches or 18 x 24 inches.

The Smith-Matthews Fireplace Damper.

The Smith-Matthews Fireplace Damper is built on scientifically accurate lines. It is made of cast iron of the best quality and will withstand both heat and weight. Its front flange easily supports the brickwork above it. It presents a smooth surface, to lead the smoke into the smoke-chamber.

Advantages — The Smith-Matthews Fireplace Damper is easy to set or regulate, easy to clean, and is adapted to all conditions of construction. It is easily operated by the turning of a handle.

Perfect construction is necessary where the fire opening joins the flue, for that is the most important point in the fireplace. The Smith-Matthews damper assures such construction.



SMITH-MATTHEWS FIREPLACE DAMPER

Smith-Matthews Fireplace Dump.

This dump shows the same kind of workmanship as the fireplace damper described above. It has the same smoothness of surface and does not collect dirt and dust. Its lids fit snugly and do not project above the surface of the hearth.

Smith-Matthews Provision Cabinet.

The door and the frame of this cabinet are of cast iron, of neat design. The door has a nickelplated lever handle. The body of the cabinet is of galvanized steel, japanned, and is adjustable to different thicknesses of walls. Its size is 9 by 12½ inches. It will hold four quart milk bottles.

SMITH-MATTHEWS PROVISION CABINET

Smith-Matthews Salamanders.

These are made with 18 x 18 inch body, with grate and ash-pan. They are easily portable.

Manhole Covers and Rings.

These manholes have a handle in upper surface of the cover for lifting, and a staple on the under side for securing the cover inside.

Wheel Guards.

Wheel guards are made of the best cast iron, and can be fitted and fastened to any corner or post. They are 16 inches in diameter and 18 inches high.

THE H. W. COVERT COMPANY

Manufacturers of Fireplace Specialties

351 Lexington Avenue
NEW YORK, N. Y.

Products.

Covert Patent Iron Fireplace Throat and Damper; Iron Coal Windows; Cleanout Doors; Ash Dumps; Iron Plinths for Porch Columns.

Also, Texture Brick Fireplaces complete.

Covert "Improved" Fireplace Throat and Damper.

Illustration shows proper construction of fireplace to secure best results. The wind-shelf is important for checking down-drafts which are liable to occur under certain atmospheric conditions.

This damper is good for fireplaces where the height is three feet or over, and may be used up to twenty-four inches deep. For deeper fireplaces use "Old Style" dampers shown in our catalogue.

The slope of the back should be started well down in the fireplace, as shown, and should be a straight, and not a curved line.

Note—The Covert Steel Smoke-chamber Former should be used in connection with the damper, insuring a properly shaped and smooth connection from throat to flue, reducing friction, increasing flue power twenty-five per cent, and making it practically impossible for a careless workman to "queer" the fireplace.

The operating device is under the arch at the front, but in an inconspicuous position. Any mechanical device showing on the arch or face of the fireplace is an architectural blemish.

Its lines are so designed as to induce the flow of the smoke and gases of combustion into the flue and not into the room.

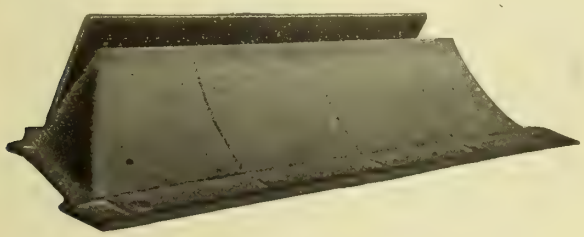
The valve plate is readily removable.

Perfect control of the draft is assured, by means of the ratchet handle.

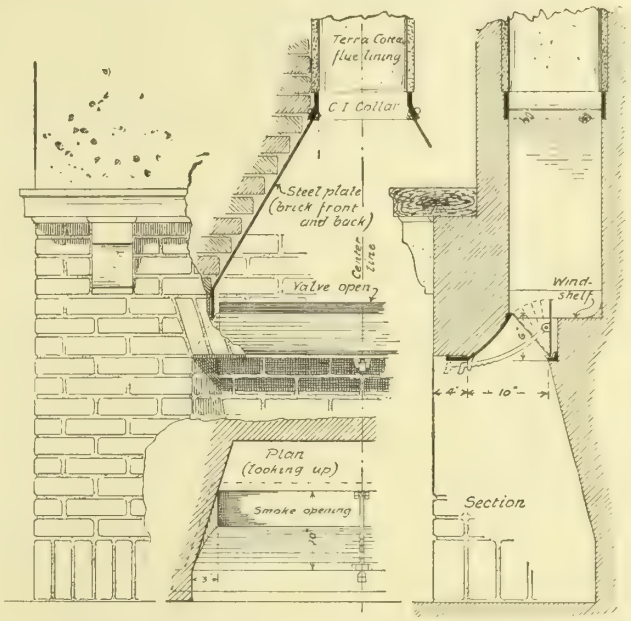
Its strength as a lintel is guaranteed. We have sold thousands, and have never known one to fail.

Specification.

"Every fireplace to have a Covert 'Improved' Iron Throat and Damper built in over the fireplace, same acting as a lintel. To be built as shown on detail drawings or as illustrated in the printed matter of The H. W. Covert Company, New York. Form wind-break or shelf at the level of the upper edge of the throat, and connect the iron throat with the flue by setting a Covert Steel Smoke-chamber Former with cast-iron collar of proper size."



PERSPECTIVE VIEW OF IMPROVED DAMPER



CONSTRUCTION OF FIREPLACE WITH IMPROVED DAMPER AND STEEL SMOKE-CHAMBER FORMER

PRICE LIST

Improved Throat and Damper				Steel Smoke Chamber Former		
Damper Number	Front Width of Fireplace, Inches	Telegraphic Code-Word	Price	Proper Flue Lining Exterior Dimensions, Inches	Code-Word	Price
524	24	Intro	$3.75	8½ x 8½	Force	$2.25
530	30	Impart	4.25	8½ x 8½	Freak	2.50
532	32	Impel	4.50	8½ x 13	Face	2.75
536	36	Inert	4.75	8½ x 13	Frond	3.00
542	42	Infer	5.25	13 x 13	Fold	3.25
548	48	Impost	6.00	13 x 13	Friend	3.50
554	54	Incur	6.75	13 x 18	Fleece	4.00
560	60	Impale	7.75	13 x 18	Field	4.50

Catalogue.

Send for catalogue and booklet "Hints on Fireplace Construction."

References.

The following is a partial list of the architects who specify our products for fireplace construction:

McKim, Mead & White
Clinton & Russell
Warren & Wetmore
Carrère & Hastings
Grosvenor Atterbury
John Russell Pope
Rutan & Russell
Bragdon & Hillman
Kirby, Petit & Green
Beatty & Stone
George A. Freeman
F. G. Hasselman
Walter Leslie Walker
Wilson Brothers and Co.
Cope & Stewardson
Frank Miles Day & Bro.
Charles Barton Keen
Wilson Eyre
Stearns & Castor
William Warren Sabin
Delano & Aldrich
Davis, McGrath & Kiessling
John Cox, Jr.
Jackson & Rosencrans
Radcliffe & Kelly
A. E. Barlow

COLONIAL FIREPLACE COMPANY

4644 West Twelfth Street
CHICAGO, ILL.

Products and Services.

The Improved Colonial Head Throat and Damper for Fireplaces.

Brick Fireplaces, our own designs.

Brick Fireplaces from Architects' designs.

Grinding Arches and Special Brick Work.

Fireplace Trimmings, Fenders, Grates and Andirons.

Special Brass and Wrought Iron Work for Fireplaces.

Also, Quarry Tiles and Fire Clay Linings.

Colonial Fireplaces, Stock Designs.

Our own Fireplaces are furnished complete, detailed. Arches and intricate work ground. All necessary materials for each fireplace packed carefully in barrels, including selected face brick, selected fire brick, tile or brick for front hearth, or wrought iron fender for raised hearths, the Colonial Head Throat and Damper (described below), angle bar, ash trap, color for mortar, anchors, full-sized detail and one-inch scale drawing.

Fig. 1. DESIGN NO. 21

Improved Colonial Head Throat and Damper for Fireplaces.

The draft is controlled from outside by a key placed either in the front or the end of the fireplace (see illustrations on following page). For end control the fireplace must stand at least 7 inches into the room. *By means of this external key, the damper may be adjusted to any weather condition,* because it can be opened or closed a fraction of an inch at a time.

The Improved Colonial Head Throat and Damper is cast in sections and built to stand *heat* and *weight.* It is constructed of the best gray iron castings reinforced with a steel angle iron (D). *This construction provides automatically for expansion and contraction, thus avoiding any possibility of cracking the face of the fireplace.* When backing up with common brick, the center rib or ledge (D) forms a footing and prevents settling and pushing the facing outward. The Colonial Head Throat and Damper is easy to set and adapts itself to all conditions of construction.

Simplicity.

By using the Colonial it is impossible for an inexperienced mason to make a mistake at the most vital point of the fireplace, and the work is vastly superior in durability and efficiency to ordinary construction. It is easily operated, impossible to get out of order, and *is easily accessible for cleaning at any time.*

Economy.

The Improved Colonial Head Throat and Damper is the most economical throat damper made. *It saves its entire cost in the labor saved in building the fireplace.*

Advantages.

The Improved Colonial Head Throat and Damper is the result of fifteen years' experience in the construction of fireplaces and the development of practical ideas along scientific lines. Nothing is so important as to have perfect construction where the fire opening joins the flue, and *the Colonial makes faulty construction at this place impossible.*

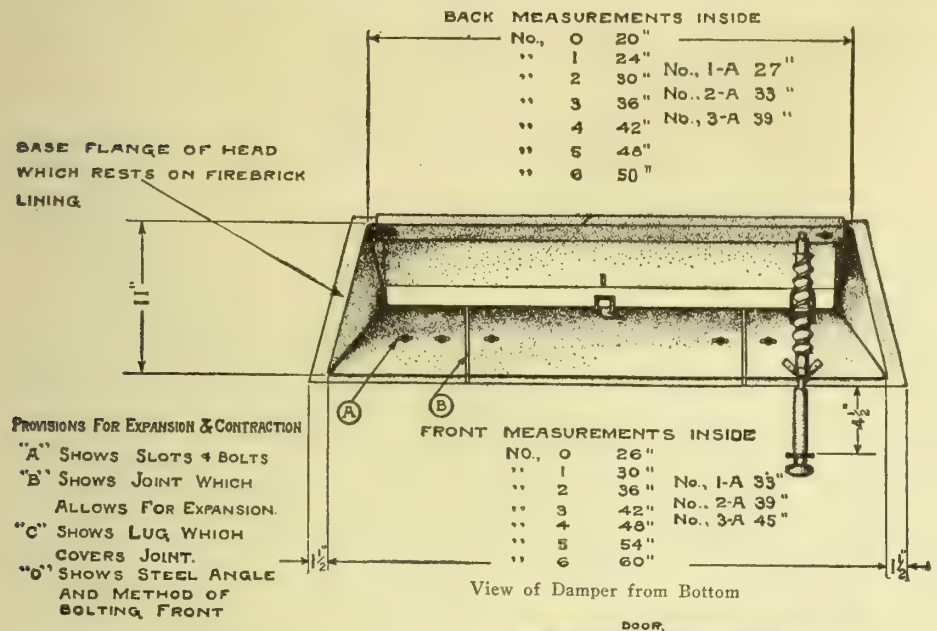
It meets all conditions of construction and provides automatically for *expansion* and *contraction,* in itself an important feature, which *prevents warping of castings when heated,* and also *cracking of fireplace facing from expansion.*

The position of damper door, when open, *prevents* down-drafts. It is *easily* operated; adjustment can be made to a *fraction* of an inch, assuring perfect draft control.

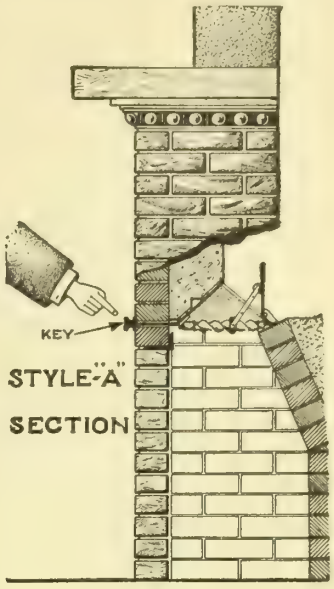
The simplicity of its shape and construction insures the architect of a fireplace properly built at the most vital part, even by incompetent workmen.

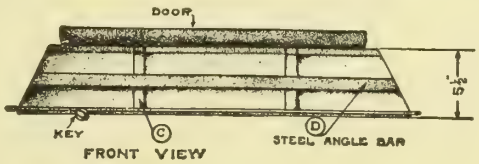
Fig. 2. DESIGN NO. 14

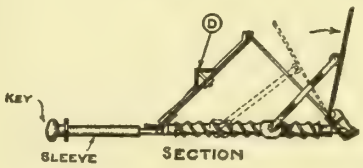
Continued on next page

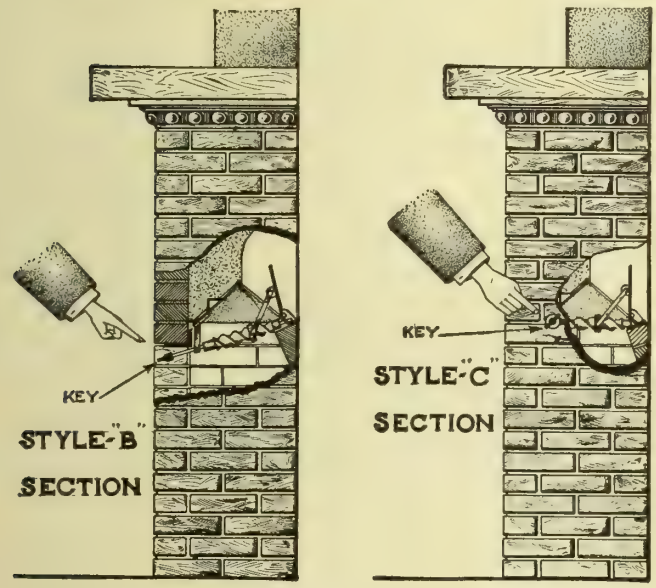


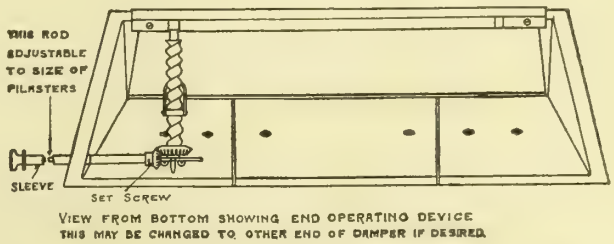
View of Damper from Bottom



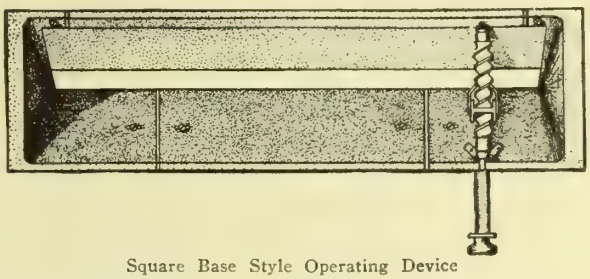








Style "C" End Operating Device



Square Base Style Operating Device

SECTIONAL DETAILS OF IMPROVED COLONIAL HEAD THROAT AND DAMPER

NOTE—Section Style "A" shows operation from face of fireplace; Section Style "B" shows operation from just below top of opening and behind face of fireplace; and Section Style "C" shows operation from end or side of fireplace

Materials.

Every Colonial Fireplace is accompanied by a full-sized detail; also, one-inch scale drawing. Fireplace materials are selected and made up to fit the detail. Brick arches are ground, molded brick are fitted, tile laid out and iron work made up to fit. Colonial Fireplaces are shipped ready to set up. The labor of installing is simplified as much as possible.

Catalogue.

Our handsome Colonial Portfolio of Fireplace Designs has been prepared especially to meet the needs of architects. When writing, request Edition "S."

Blue-print details of the Colonial Head Throat and Damper sent on application.

SIZES OF FIREPLACE AND FLUE OPENING

No.	Fireplace Opening Width, Ins.	Proper Size of Flue, Ins.		Code Word
0	24 to 28	8 x 8	One-Piece Head	Duke
1	29 to 32	8 x 12	Built in Sections for Expansion	Prince
1A	33 to 35	8 x 12	" " " " "	Valet
2	36 to 38	8 x 12	" " " " "	Regent
2A	39 to 41	8 x 16	" " " " "	Butler
3	42 to 44	8 x 16	" " " " "	Queen
3A	45 to 47	8 x 16	" " " " "	Page
4	48 to 52	12 x 12	" " " " "	King
5	52 to 58	12 x 12	" " " " "	Rex
6	58 to 64	12 x 16	" " " " "	Czar

All sizes except No. 0 may be obtained with square base for square linings, if wanted. Larger sizes made to order.

Architects' Special Fireplace Designs.

We are glad to quote on material complete or in part.

PEERLESS MANUFACTURING CO., INC.

Fireplace Fixtures

LOUISVILLE, KY.

Products.

We make all Kinds of Dampers, including No. 1 Tip and Slide with Ratchet; Nos. 15 and 16-B Dome, operated with a Hook or Poker; and No. 12 Dome, operated in center by Turnbuckle and Rod. We specialize our No. 17 Dome Damper.

Dome Damper No. 17.

A perfect Dome Damper of cast iron which regulates the opening of the throat at the top of the fireplace, the height of the throat, the slant given, and the size of the opening into the chimney. It leaves a smooth lining to the throat; is the shape of and covers the full size of the fireplace, insuring a perfect draft.

So constructed that the door automatically locks itself at any desired opening while operating the handle.

Requires but three-quarter turn of handle to open or close the door, and handle will always indicate position of door.

The mechanism is exposed inside of dome so as to be able to adjust the damper rod to proper position after face of fireplace is completed.

The door can be removed and replaced at will without removing any screw or works, permitting of free access to flue when building or cleaning the flue.

DIMENSIONS OF PEERLESS NO. 17 DOME DAMPER

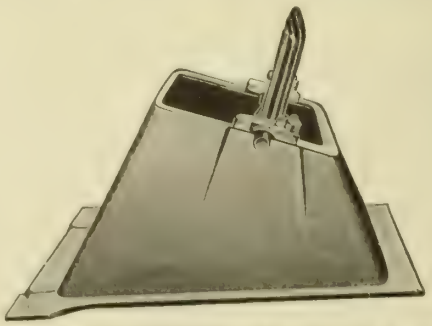
OUTSIDE			DOME		
Front	Back	Depth	Front	Back	Depth
No. 17 Damper					
28	20¾	15½	24	18½	12½
32	28	15½	28	22	12½
34	26¼	15½	30	24	12½
37	33	15½	33	27	12½
40	32	15½	36	30	12½
43	39	15½	38	33	12½
46	38	15½	42	36	12½
52	44½	15½	48	42	12½
58	50¾	15½	54	48	12½
64	59½	17½	59½	53½	12½
No. 17B Damper					
28	20½	13	22½	18	10
31½	25½	13	27½	23	10
34	26	13	28	24	10
40	32	13	34	30	10
46	37½	13	40	35	10

Outside width of back can be increased at an additional cost, if desired.

PEERLESS DOME DAMPER NO. 17

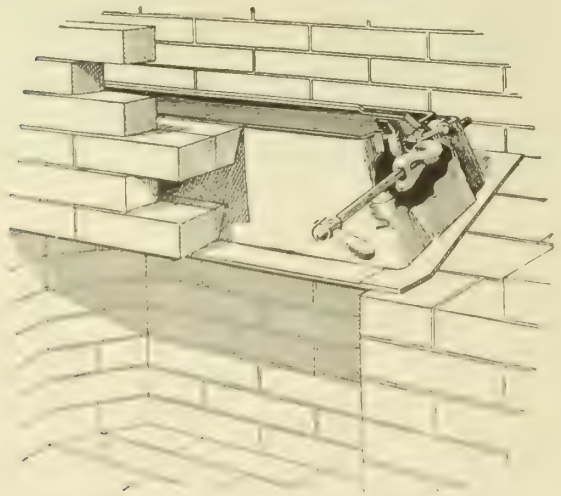
Patented December, 1911

Sloping top, splayed ends, removable solid door, operated from face of fireplace by handle and rod through tile or brick



CORRECT CONSTRUCTION OF A DOME DAMPER

Door hinged in center of top opens both front and back, not interfering with full draft of chimney



GENERAL VIEW OF NO. 17 DAMPER INSTALLED IN FIREPLACE

Operating Chain and Rod

ESTABLISHED 1862

STOVER MFG. CO.

MANUFACTURERS OF

Fireplace Fixtures and Other Builders' Hardware

746 East Street

FREEPORT, ILL.

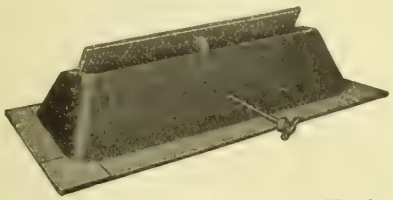
Products.

DOME DAMPERS; ASH TRAP DOORS.

Also, CLEAN-OUT DOORS, CHIMNEY THIMBLES, ANDIRONS, FIRE BASKETS, SCREENS, SPARK GUARDS, FIRE SETS, WOOD HOLDERS, DOOR KNOCKERS, GAS LOGS, DOUBLE-ACTING SPRING HINGES, FLOOR HINGES, DETACHABLE SCREEN DOOR HINGES, DOOR LATCHES, PULLS, HARNESS HOOKS, FOOT SCRAPERS, COAT HOOKS, and a general line of KITCHEN HARDWARE, STOVE TRIMMINGS, WINDMILLS, FEED MILLS, ENSILAGE CUTTERS and GASOLINE ENGINES.

Dome Dampers Nos. 16, 17 and 18.

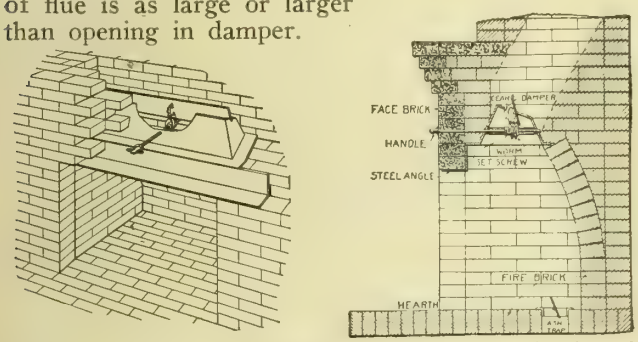
This dome damper has many advantages. The length of rod can be adjusted by loosening a set screw in the worm. No cutting necessary. Rod is right height to pass betwen the brick. Handle is brass and has wide flange to cover opening in wall. Sides of frame are wide, so the walls of fireplace can be given any angle. It is easy to install and operate.



DOME DAMPER NOS. 16, 17 AND 18

Installation.

We recommend that fireplaces be built wider than high, as deep as possible, with slanting side walls and curved back. Use largest damper possible and set it as high and as far forward as possible. Be sure area of flue is as large or larger than opening in damper.

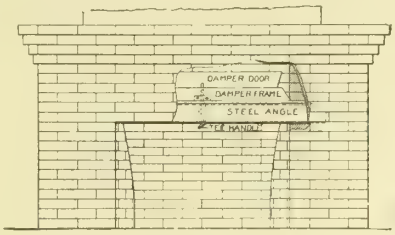


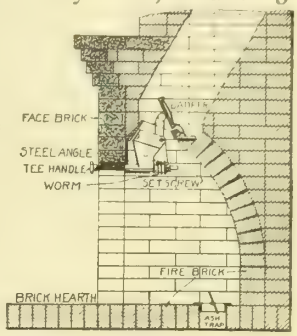
DOME DAMPERS, SHOWING PROPER INSTALLATION OF NOS. 16, 17 AND 18

	Front Length, Ins.	Rear Length, Ins.	Depth, Ins.	Base of Dome: Front, Ins.	Base of Dome: Rear, Ins.	Base of Dome: Depth, Ins.	Weight, Each, Lbs.	Price, Each
No. 16	34	29	13¾	28½	25	10	34	$7.50
No. 17	38½	33½	13¾	33	28½	10	39	8.50
No. 18	44½	39½	13¾	39	35	10	44	9.50

Dome Dampers Nos. 6, 7, 8, 11, 12 and 13.

This damper has lever extending under the brick, making it very easy to install. Has brass handle with large flange. Length of rod is adjustable by loosening set screw in the worm. Styles 11, 12 and 13 require four- by four-inch steel angle; styles 6, 7 and 8 have cast angle as part of frame.





SHOWING PROPER INSTALLATION OF NOS. 6, 7, 8, 11, 12 AND 13

	Front Length, Ins.	Rear Length, Ins.	Depth, Ins.	Base of Dome: Front, Ins.	Base of Dome: Rear, Ins.	Base of Dome: Depth, Ins.	Weight, Each, Lbs.	Price Each,
No. 6	34¼	30½	*16	26	22	7½	73	$10.25
No. 7	36¼	34½	*16	30	26	7½	80	11.25
No. 8	43½	40	*16	35	31	7½	89	12.25
No. 11	33	30½	11	26	22	7	32	8.00
No. 12	37¾	34¼	11	30	26	7	37	8.80
No. 13	40¼	40	11	36	32	7	44	9.30

* This measurement includes the angle, which is 3⅝ inches wide.

	Steel Angles		
Inches	Inches Long	Weight	Price
4 x 4 x ¼	40	22 lbs. each	$1.30
4 x 4 x ¼	46	25 lbs. each	1.50
4 x 4 x ¼	52	28 lbs. each	1.70

No. 25 Special Damper for Extra Large Fireplace.

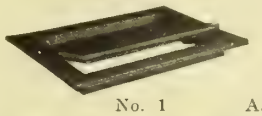
This damper is sent out with a steel angle bolted to the bracket and extending six inches beyond each end of the frame. The angle is removed from illustration to show the principle of construction. Cover has adjustable slide. The crank or lever is nickel-plated and removable.

NO. 25. SPECIAL DAMPER

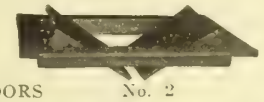
Size—Front length frame, 58 inches. Rear length frame, 54 inches. Depth frame, 14 inches. Length base dome, 50 inches. Depth base dome, 10¾ inches. Weight with angle steel, 230 pounds. Steel angle is 4 x 4 x ¼ inch by 5 feet 10 inches Price, complete, $40.00.

Ash Trap Doors.

These Ash Trap Doors are exceptionally well counterbalanced, and made of smooth castings.



No. 1



No. 2

ASH TRAP DOORS

	For Floor Opening, Ins.	Outside Dimensions of Plate, Ins.	Weight, each, Lbs.	Price, Each
No. 1 Single Cover	5x8	7x10	3	$0.75
No. 2 Duplex Cover	4½x8¼	6x9¾	2¾	0.75

Catalogue.

Catalogue, with complete details, sent on request. Please mention "SWEET'S CATALOGUE" when writing.

THE BESSLER MOVABLE STAIRWAY CO.

AKRON, OHIO

Product.

The Bessler Ceiling-Suspended and Folding Stairway.

Description.

The Bessler ceiling-suspended and folding stairway is designed to give convenient access to attics, lofts, roofs, etc., with maximum economy in floor space. It consists of a strong, well built flight of stairs, which is indirectly hinged to the end trimmer of opening in the ceiling beneath the room or other place to be reached. This stairway is so counterbalanced by spring-wound cables that a slight push is all that is necessary to swing it up through the ceiling opening and out of the way when not required; when needed again a light pull on a suspended chain brings the stairway down easily, complete with hand-rail ready for use.

The neatness with which opening in ceiling is closed by hinged panel on which stairway slides, when not in use, the ease in operation, the effective economy in floor space and the simplicity of the whole arrangement are the essential features which should commend this stairway to the architect.

Adaptability.

The Bessler stairway is adapted for (1) service in connection with attics, lofts or storage floors; (2) a fire-escape when arranged from porch to porch; (3) a stairway to roof gardens and church steeples; (4) bungalows, garages, school-houses and hospitals.

It is also of advantage for installations where this stairway arrangement provides not only an economical means of access, but also offers opportunity for ready ventilation of rooms not frequently used.

Fig. 1. BESSLER STAIRWAY OPEN

Brief Directions for Installing.

To install the Bessler stairway make an opening in floor 3/16 inch larger than stair panel (E) and attach the panel to trimmer (X) by hinges. This panel is fitted with spring barrels (A), cable holders (B) and guide brackets (C). The stairway fits between guide brackets (C), and lugs (F) of spring barrel. On the floor each side of stair opening, pulley brackets (D) are attached, 13 inches from trimmer (Y). The cables from spring barrels (A) are passed over their respective pulley brackets (D) down to cable holders (B).

After installing, the spring barrel is adjusted to proper tension so as to perfectly counterbalance the stairway. When stairway is slid up to position indicated in Fig. 6, a slight push causes it to automatically swing into position shown in Fig. 3, thus putting it out of view, and simultaneously neatly sealing up the opening with panel (E).

Complete detail directions for installing furnished with all shipments.

Fig. 2. CEILING PANEL, STAIRWAY FOLDED

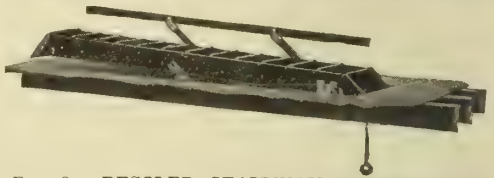


Fig. 3. BESSLER STAIRWAY FOLDED INTO CEILING
Out of the way; no waste floor space

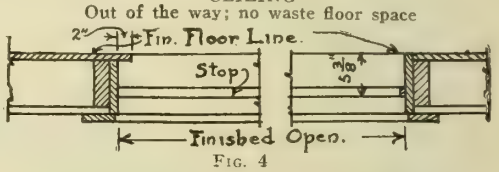


Fig. 4

FINISHED OPENING BETWEEN JAMBS, FIG. 4

7 ft. 0 in.	Ceiling	2 ft. 6 in. x 5 ft. 10 in.
7 ft. 6 in.	"	2 ft. 6 in. x 5 ft. 10 in.
8 ft. 0 in.	"	2 ft. 6 in. x 5 ft. 10 in.
8 ft. 6 in.	"	2 ft. 6 in. x 6 ft. 0 in.
9 ft. 0 in.	"	2 ft. 6 in. x 6 ft. 4 in.
9 ft. 6 in.	"	2 ft. 6 in. x 6 ft. 8 in.
10 ft. 0 in.	"	2 ft. 6 in. x 6 ft. 11 in.
10 ft. 6 in.	"	2 ft. 6 in. x 7 ft. 3 in.
11 ft. 0 in.	"	2 ft. 6 in. x 7 ft. 6 in.
11 ft. 6 in.	"	2 ft. 6 in. x 7 ft. 9 in.
12 ft. 0 in.	"	2 ft. 6 in. x 8 ft. 1 in.
12 ft. 6 in.	"	2 ft. 6 in. x 8 ft. 4 in.

DISTANCE FROM FRONT EDGE OF STAIR-HORSE TO LANDING WHEN STAIR IS DOWN ON FLOOR, FIG. 5

7 ft. 0 in.	Ceiling	6 ft. 8 in.
7 ft. 6 in.	"	7 ft. 0 in.
8 ft. 0 in.	"	7 ft. 4 in.
8 ft. 6 in.	"	7 ft. 7 in.
9 ft. 0 in.	"	8 ft. 1 in.
9 ft. 6 in.	"	8 ft. 5 in.
10 ft. 0 in.	"	8 ft. 9 in.
10 ft. 6 in.	"	9 ft. 1 in.
11 ft. 0 in.	"	9 ft. 7 in.
11 ft. 6 in.	"	9 ft. 11 in.
12 ft. 0 in.	"	10 ft. 3 in.
12 ft. 6 in.	"	10 ft. 7 in.

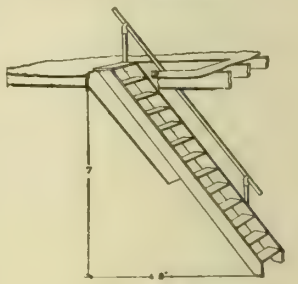


Fig. 5

MEASUREMENT FROM LANDING TO END OF STAIR-HORSE, FIG. 6

7 ft. 0 in.	Ceiling	4 ft. 5 in.
7 ft. 6 in.	"	4 ft. 11 in.
8 ft. 0 in.	"	5 ft. 4 in.
8 ft. 6 in.	"	5 ft. 8 in.
9 ft. 0 in.	"	6 ft. 1 in.
9 ft. 6 in.	"	6 ft. 6 in.
10 ft. 0 in.	"	6 ft. 11 in.
10 ft. 6 in.	"	7 ft. 1 in.
11 ft. 0 in.	"	7 ft. 6 in.
11 ft. 6 in.	"	7 ft. 10 in.
12 ft. 0 in.	"	8 ft. 1 in.
12 ft. 6 in	"	8 ft. 4 in.

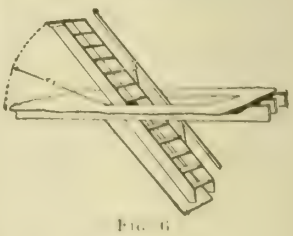


Fig. 6

PRICES

F. o. b. Akron, Ohio

Ceiling	Yellow Pine	Oak
7 ft. 0 in.	$35 00	$37 50
7 ft. 6 in.	35 50	38 00
8 ft. 0 in.	36 00	38 50
8 ft. 6 in.	36 50	39 00
9 ft. 0 in.	37 00	39 50
9 ft. 6 in.	37 50	40 00
10 ft. 0 in.	38 00	40 50
10 ft. 6 in.	38 50	41 00
11 ft. 0 in.	39 00	41 50
11 ft. 6 in.	39 50	42 00
12 ft. 0 in.	40 00	42 50
12 ft. 6 in.	40 50	43 00

THE CANTON FOUNDRY AND MACHINE CO.

CANTON, OHIO

Products.

Manufacturers of Sidewalk Doors, Conductor Connections and Boots and "Canton" Improved Coal Chutes.

Also, Coal Hole Rings and Covers, Area Gratings, Sidewalk Gutter Boxes, Sidewalk Ventilators, Crosswalk Gutter Plates, Water Meter Covers, Corner and Jamb Wheel Guards, Ash-Pit and Stack Doors, Cast-Iron Columns, House Movers' Jacks, Catch Basin and Manhole Covers, Valve Covers for street and inside use, and other Street Castings. For Automobile Turntables refer to General Index for our other pages.

Sidewalk Doors.

These doors comply with all City Ordinances and Regulations. They present *absolutely flush and checkered* surfaces throughout. They are substantially built, having wrought steel leaves and solid one-piece frames. Having continuous water drain around four sides, with two outlets at foot tapped for pipe, they are as nearly waterproof as flush doors can be made.

Made in fifty sizes and also in illuminated style.

Ask for Catalogue B-S, and prices.

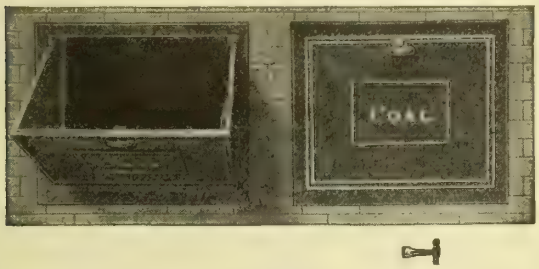
"Canton" Improved Coal Chutes.

A practical and sensible self-locking, burglar-proof chute. Locks automatically when the hopper is closed. Also has independent outside locking device operated only by special key furnished. No necessity for crawling over the coal pile to unlock this chute.

STANDARD SIZES

Size	Outside of Frame	Outside of Rim	Price
"A"	21¾" wide x 16"	high—24½" x 18½"	$10.00
"D"	25½" wide x 21¾"	high—27¾" x 24"	12.50
"G"	32" wide x 24"	high—34½" x 26½"	15.00

Ask for Catalogue B-S, and discounts.



THE "CANTON" IMPROVED COAL CHUTE

PRICE LIST OF "UNIVERSAL" CAST-IRON CONDUCTOR CONNECTIONS AND BOOTS

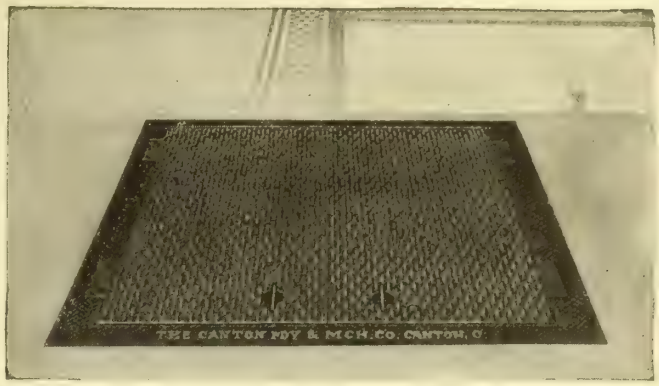
All 4½ feet long. Quotations will be made on any special lengths desired.

Size Galvanized Pipe	Style H and G, each	Style D and C, each	Style F and E, each	Inside Top Measurements, Style F and E
3 inch	$3.00	$3.20	$3.60	2¾ x 3½ inches
4 inch	3.75	4.20	4.50	3¼ x 4½ inches
5 inch	4.75	5.00	6.00	4¼ x 5½ inches
6 inch	5.50	6.00	6.75	5¼ x 6½ inches

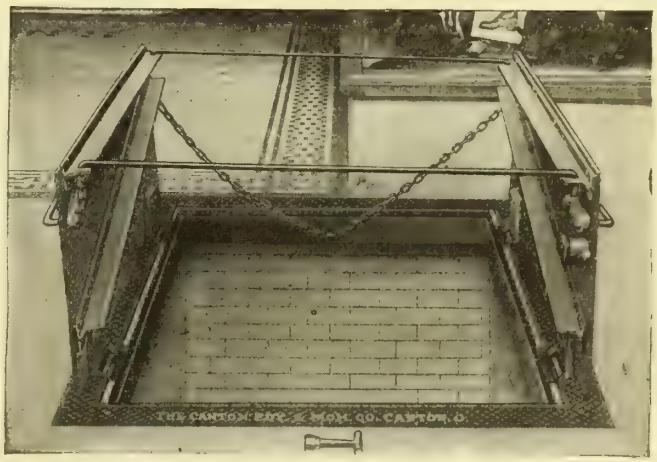
The sizes listed are the sizes of standard galvanized conductors that fit into these cast connections at bottom of tapered bell. There is ¼-inch clearance all round at top of tapered bell.

No charge for Wall Brackets. 1½-inch from wall regularly furnished; 2-, 2½- or 3-inch if required.

Ask for Circular A-S, and discounts.

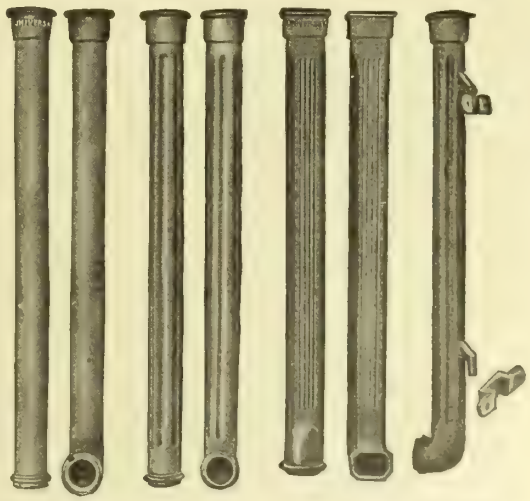


Closed—Showing Flush and Checkered Surface. No slipping or tripping



Open—Showing Water Drains, Stay Rods, Chains, and Reinforced Steel Leaves. Locks and unlocks from outside, unless otherwise specified

CANTON SIDEWALK DOORS



No. H G D C F E Descriptive

"UNIVERSAL" CAST-IRON CONDUCTOR CONNECTIONS AND BOOTS

DECATUR CORNICE & ROOFING CO., INC.

MANUFACTURERS OF

Structural Steel, Iron and Sheet Metal Work

NEW DECATUR, ALA.

GENERAL AGENCY: DALLAS, TEX., Gaines & Dewees

Products.

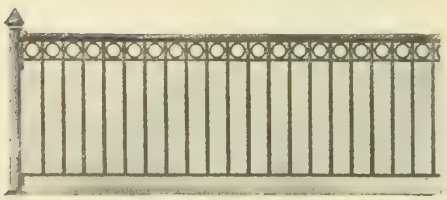
Wrought Iron and Wire Elevator Enclosures, Window Guards, Balcony and Stair Railings, Cast- and Wrought-Iron Stairways, Marquises, Fire-Escapes, Cast-Iron Columns, Lintels and Sills, Steel Girders, Beams and Trusses, Folding Gates, Spiral Stairs, Pipe Railing, Sidewalk Gratings, "Dixie" Coal Chutes.

For Sheet Metal Products, see our name in General Index.

Marquises.

Glass can be furnished in many color designs. Special designs made to order.

MARQUISE, MADE FOR HOWLEY'S PHARMACY, CHARLOTTE, N. C.



NO. 3130. WROUGHT IRON RAILING
Many other stock designs also made to order

Iron Spiral Stairway.

Standard diameter, five feet; other sizes furnished.

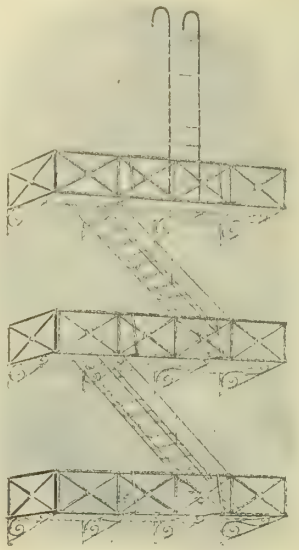
A plain, neat and substantial design, suitable for all purposes.

Furnished for U. S. Post Office Buildings at Blackwell, Okla.; Canton, Miss.; Bryan, Tex.; Oxford, N. C.; Thomasville, Ga.

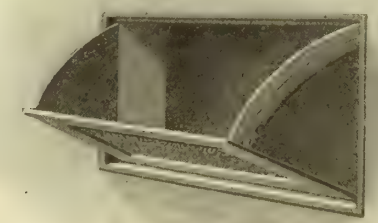
IRON SPIRAL STAIRWAY

Fire-Escape.

In addition to standard fire-escapes special designs will be manufactured to suit requirements.



NO. 3320. FIRE-ESCAPE



"DIXIE" FOUNDATION COAL CHUTE
Cast-iron door and frame, with heavy steel plate chute

No.	Size of Door		Outside of Rim		List Price
	Width	Height	Width	Height	
1	22 in.	15 in.	23½ in.	16½ in.	$10.00
2	25 in.	21 in.	26½ in.	22½ in.	12.50
3	32 in.	24 in.	33½ in.	25½ in	15.00

Equipment.

We are splendidly equipped for the manufacture of all kinds of Ornamental Iron Work for buildings, from our own or architects' details.

DOW WIRE AND IRON WORKS

Manufacturers of Fire-Escapes

OFFICE AND FACTORY

Franklin and Buchanan Streets

LOUISVILLE, KY.

SALESROOMS: 217 West Market Street

Products.

Fire-Escapes.

Gravity and Power Conveyors.

Also Ornamental Iron and Bronze, including Elevator Enclosures and Cabs, Stairways, Cast-Iron Entrances and Store Fronts, Railings, Gates, Fences, Bank and Office Railings and Grilles, Wire and Iron Window Guards.

Facilities.

The Dow plant is well equipped in every particular. Its organization includes skilled artisans, under the direction of an experienced mechanical engineer, who are prepared to execute work to architects' designs, or to furnish special sketches to meet particular requirements or tastes.

Kirker-Bender Patent-Slide Fire-Escape.

This fire-escape, made entirely of steel, consists of a spiral enclosed in a cylinder six feet in diameter. There are no steps to cause stumbling and falling. No rain, snow, fire, or smoke can enter. The fire-escape is covered by eight patents.

Operation.

Simply jump in and—you're out.

Advantages.

(1) It is impossible to get hurt, either by accident or fire.

(2) Its use requires no effort or intelligence.

(3) It is a pleasure, not a terror.

(4) It will empty a building more quickly than any other fire-escape.

Guarantee.

The Dow Wire and Iron Works will erect the Kirker-Bender fire-escape on any building in the United States, and give a written guarantee to take it away and not charge a cent, if at a public exhibition the superior merits claimed for it are not proved.

Distribution.

Contracts are executed, and escapes erected complete, in any State of the United States or Canada.

Where Used.

The Kirker-Bender fire-escape is in use on institutions of forty odd States, hundreds of public schools, hospitals, asylums, factories and hotels. It has been adopted by the United States Government.

KIRKER-BENDER FIRE-ESCAPE

ESTABLISHED 1840

HOPKINS & CO.

Steel Subway Sidewalk Ventilating Gratings

TELEPHONE: FRANKLIN { 3782 / 3783

199-201 Franklin Street
NEW YORK, N. Y.

Products.

HOPKINS PATENTED SIDEWALK VENTILATING GRATINGS, PLAIN and ORNAMENTAL IRON, BRASS, BRONZE and WIRE WORK of all description, WIRE CLOTH, BANK CAGES and GRILLES, WINDOW GUARDS, FOLDING GATES, WIRE PARTITIONS for Stock and Tool Rooms.

Uses.

These superior, non-slipping, non-dirt-collecting gratings are used to cover areas, vaults, and surface openings in public places; also, for platforms and stair treads in power-house, engine- and boiler-rooms and other similar places.

Facilities.

No contract is too large for us to handle promptly.

Our plant is adjacent to New York City, covers over four acres, and consists of a large concrete and steel building equipped with special and substantial machinery for turning out high-grade gratings, in large quantities.

Our large output permits us to sell these attractive, reliable and costly types of gratings at the cost of cheaper makes.

The material used is the best quality of open-hearth steel, subject to rigid specifications and scientific tests before its acceptance by us.

Subway Gratings.

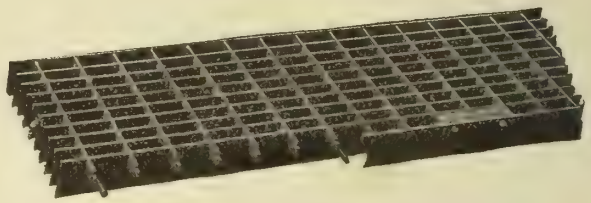
Our patent gratings were designed to meet the demand of engineers so as to improve and simplify the construction of sidewalk gratings as well as to be strong, reliable, efficient, and give a maximum of light and ventilation. The ventilating spaces are designed to prevent them from becoming clogged with dirt, and the surface prevents pedestrians from slipping and small (baby) carriages from catching.

Our gratings were immediately approved by the New York Public Service Commission. Since they have been in use, on fifteen contracts of the New York dual subway system and elsewhere, they have been highly mentioned by the engineers and other authorities for their strength and neat, attractive appearance. The safe load on these gratings is over 950 pounds per square foot in a five-foot span.

One important feature is that there are no bent bars forming acute angles to catch and hold dirt or prevent proper painting. There are no small rivets to work loose or rust out.

Catalogue.

A Catalogue, describing our product and patterns in detail, will be sent on request.



Type A

Type B

HOPKINS PATENTED VENTILATING GRATINGS
Patented, Oct. 13th, 1914

7TH AVENUE SUBWAY, NEW YORK, N. Y.
UNITED STATES REALTY AND IMPROVEMENT CO., Contractor

Wirework.

Reference to the city directory will show that since 1850 we have been manufacturing many of the following lines of wirework, and that patents were issued to us as early as 1851 for the style of crimped and interlocked wirework now universally used.

Some of our specialties in brass, bronze, copper and iron are elevator cars and enclosures, wire office enclosures, wire fences, folding gates; tree, skylight, stall and window guards; office, bank and kitchen partitions; brass and bronze railings; wire cloths in brass, copper, galvanized and iron; poultry, fly and mosquito netting; coal, sand and window screens; metal mats, window grilles, elevator gratings, handrails, tablets, etc.

F. D. KEES MFG. CO.

Metal Building Corners and Siding Clips

BEATRICE, NEB.

Products.

"Kees" Metal Building Corners and Siding Clips for Lap Siding and Shingles.

TRADE-MARK

Metal Building Corners.

"Kees" Metal Building Corners are used in place of corner boards to finish the corners of lap siding and form a finish similar to mitered siding.

These corner pieces are made of galvanized iron, shaped to fit the beveled corner formed by the siding, pierced with nail holes and treated so that they can be painted the same as wood. After the building is painted the metal corners can scarcely be noticed. If the building is painted when it needs it, the metal corners will always be protected, and will last as long as the building itself.

Octagon or Bay Window Outside Corners Inside Corners or Angles

APPLICATION OF "KEES" METAL BUILDING CORNERS

Perfect Miter Corners—By using "Kees" Metal Building Corners, a perfect miter corner is secured with an immense saving in labor. The corner is stronger, more durable and better looking than if the ends of the board are beveled in the usual way. A corner like this will never open.

Compared with the old-style corner board construction, there is a saving in both time and material.

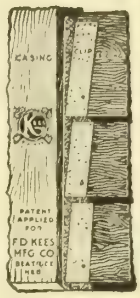
Durability—Buildings finished in this way over ten years ago show the metal corners in as good condition as when they were put on.

"Kees" Siding Clips.

These are used to make tight and weatherproof joints where beveled lap siding joins door- and window-casings or corner strips.

Description—Each clip consists of a piece of galvanized iron about ¾-inch wide, which covers the end of the siding. A flange is bent down to fit the lower edge of the siding and another flange fits against the edge of the casing. Held in place by two nails as shown in the illustration.

Advantages — Saving in labor, the siding need not be fitted accurately. The joint is tight and true and is not affected in any way by the shrinking or swelling of the lumber.



THREE LEFT-HAND SIDING CLIPS APPLIED

Styles and Sizes.

BUILDING CORNERS

For siding laid 3½ inches or less to the weather:

No. 4-0 for outside square corners. No. 4-A for inside angles. No. 4-B for bay-window corners, octagons, etc.

For siding laid 5 inches or less to the weather:

No. 6-0 for outside corners, square or bay-window. No. 6-A for inside angles.

For wide bungalow siding and shingles:

Corners and angles can be furnished to order for any exposure to the weather up to 12 inches, and for siding of any specified thickness at the lower edge.

SIDING CLIPS

No. 34-R and No. 34-L for narrow siding laid three inches or less to the weather.

No. 56-R and No. 56-L for wide siding laid five inches or less to the weather.

The clip that goes on the right-hand end of the board as you face the building is *right*, and the clip that goes on the left-hand end of the board is *left*.

Distribution.

Sold by dealers in building material or direct from the factory.

Prices and Samples, etc.

Prices, samples and views of buildings finished in this way will be furnished upon request.

A Few Installations.

A. R. Jones, 1259 Monadnock Building, Chicago, Ill.; Gagnon & Co., Billings, Mont.; Edw. L. Ames, 496 Norwood Street, East Orange, N. J.; Wiscassett Mills Co., Albemarle, N. C.; Raleigh Coal & Coke Co., Raleigh, W. Va.; Geer-Harrison Co., Grand Island, Nebr.; T. B. Koch & Son, Pottsville, Pa.; John T. Pontrich, Rome, Ind.; Jackson Construction Co., Rupert, Idaho; M. L. Peters, Roanoke, Va.; A. E. Hummel, Sheridan, Wyo.; H. Jarvis, Winsted, Conn.; H. H. Howland, Kalamazoo, Mich.; Paul Bath, Mayville, Wis.; J. E. McClary, Menlo, Iowa; Wm. Schneider, Millbank, S. Dak.; T. R. Bell, Moberly, Mo.; The Riddle Co., Nashville, Tenn.

RESIDENCE OF CARL STROEBEL, EAST JORDAN, MICH.
ALFRED ROGERS, Architect

EIGHT ROOM MODERN RESIDENCE
Designed and built by the Modern Construction Co. at Wamego, Kan.

COUNTRY HOME F. J. ZIMMERMAN, NEAR NEWFANE, N. Y.
Designed and built by GEORGE L. TAYLOR

SEXAUER & LEMKE

LONG ISLAND CITY, N. Y.

THE HUGHES-KEENAN CO.

MANSFIELD, OHIO

Ornamental Iron Work, Steel Stairs, etc.

Products.

Manufacturers of ORNAMENTAL IRON WORK, including "S & L" PATENT FIREPROOF STEEL STAIRS, and STEEL FRAMES for Doors and Partitions, ATLAS STEEL SASH and FRAMES.

Also, General IRON and STEEL STAIRCASE CONSTRUCTION, and IRON GRILLES, RAILINGS, ENTRANCE DOORS, MARQUEES, ELEVATOR ENCLOSURES, STORE FRONTS, GRATINGS, FIRE-ESCAPES, FUR RACKS for Cold Storage Plants, etc.

TRADE-MARK

Facilities.

The plants are complete in every respect and equipped with the most modern types of machinery and tools, enabling this organization to meet promptly and efficiently all demands for their products.

Co-operative Service.

The thoroughly equipped estimating and draughting departments are at the service of architects, and will gladly submit estimates and suggestive working details, on request.

Sexauer & Lemke ("S & L") Patent Steel Stair.

Simple, strong, rigid, exceptionally light and easily erected, this patented steel stair lends itself admirably to every type of public, office, warehouse, hospital, school and factory building construction.

It is formed, primarily, of rolled steel stringers and continuous bent plate-steel risers and treads, securely bolted together, as shown in line details herewith. The stairs can be furnished in any length and width, and the steps are bent from one sheet of steel, according to height and depth of step.

The strings are formed with inward projecting flanges, on which the continuous riser and tread construction rests, and to which the latter is bolted. The construction is firmly reinforced by tie rods, one to each step, which run under the nosing angles from stringer to stringer as shown on next page. The fitting of the stairs between the stringers is so firm that the construction is practically water-tight, before any paint is applied.

The assembled stair forms a mass which is practically free from vibration under loading stress, both vertically and sideways. This strength of construction, with its great resistance to torsional stress (see Test Reports), insures the highest limit of efficiency against damage or failure by fire.

"S & L" STAIRCASE IN BOYS' DORMITORY, UNIVERSITY OF WOOSTER, WOOSTER, OHIO

"S & L" STAIRCASE IN APARTMENT BUILDING, NO. 1 LEXINGTON AVENUE, NEW YORK, N. Y.

SEE 1913 CATALOGUE

Continued on next page

Design.

The " S & L " stair can be built plain, or may be ornamented to any extent, to suit architectural requirements and design, with railings and newels to match. The risers may be plain, or panelled and ornamented; and the treads can be arranged for either slate, marble, wood, cement, composition, ribbed steel, or safety treads of any manufacture. This permits of their adoption for any class of building requiring fireproof stairways.

For cement or composition treads a patented nosing and re-entrant construction is provided, which form a pocket or lock for the treads and provide a sanitary cove treatment to the risers, see detail drawing below.

The soffits of stairs are left open for painting, and present a neat finished appearance, but can also be arranged for plaster finish, if desired.

Installation.

These stairs are particularly easy to erect, as each run is manufactured and shipped complete in itself, ready to set up. This feature insures quick and economical installation; and also permits of the stair being erected with the framework of the building, thus insuring immediate serviceableness, before the installation of the finish treads.

General Cost and Estimates.

This stairway, furnished complete with railing and newel (with concrete treads), is practically as low in cost as stairways of concrete construction with iron railings, and have the advantage of providing a neater and durable installation. They permit, moreover, a saving in cost of structural supports, on account of their special lightness.

The thickness of metal employed, depth of strings, and so forth, are governed by the size of stair, loading conditions and so on. If general layout of stair together with memoranda of requirements is furnished, the estimating departments will be pleased to submit specifications and estimates.

Tests.

On this page are given report and illustrations of tests made on two " S & L " staircases under the supervision of an engineer from the New York Bureau of Buildings and this organization's consulting engineer.

NEW YORK, 39 Cortlandt Street,
December 29th, 1908.

MESSRS. SEXAUER & LEMKE,
Astoria, L. I.

DEAR SIRS:

I beg to report the results of the tests made by me with Mr. Schwartz of the Building Department on the two flights of your sheet steel stairs at your shop on December 21st.

The stairs were made from your drawings No. 1753 and No. 1754, which show clearly the dimensions and construction of the strings and risers.

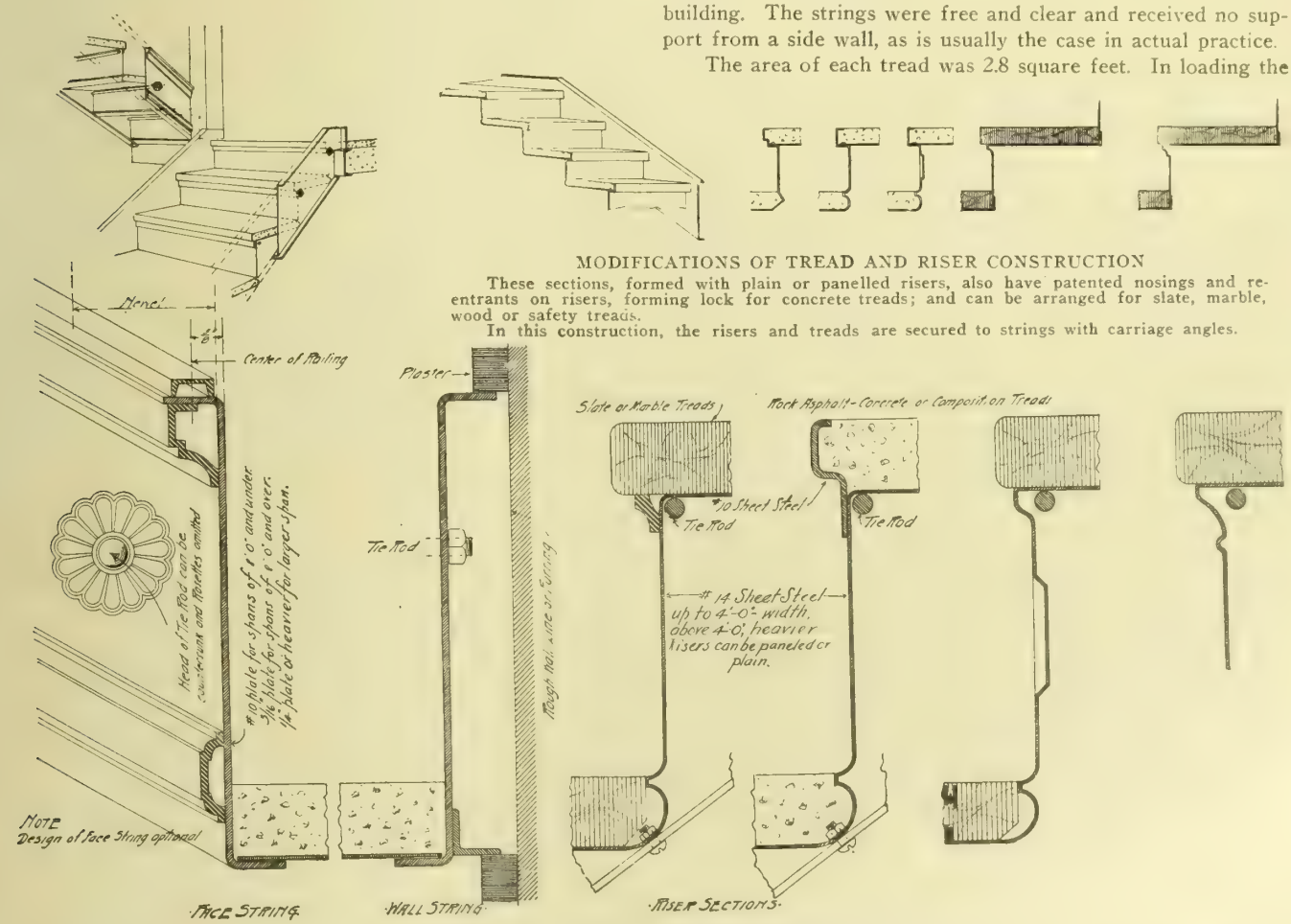
Both flights were set up in the shop, supported at the bottom on the floor and at the upper end on vertical angle irons resting on the same floor and placed against the wall of the building. The strings were free and clear and received no support from a side wall, as is usually the case in actual practice.

The area of each tread was 2.8 square feet. In loading the

MODIFICATIONS OF TREAD AND RISER CONSTRUCTION

These sections, formed with plain or panelled risers, also have patented nosings and re-entrants on risers, forming lock for concrete treads; and can be arranged for slate, marble, wood or safety treads.

In this construction, the risers and treads are secured to strings with carriage angles.



DETAILS OF SEXAUER & LEMKE STAIRCASES

Continued on next page

Tests —(Continued)

stairs, 280 pounds of pig iron, by weight, were applied to each tread, beginning at the bottom and working up to the top, when the total load on the stairs was 100 pounds per square foot. This was repeated four times and then additional weights were applied, making the total load 470 pounds per square foot on one flight and 456 pounds per square foot on the other flight.

The load on the smaller, or 8-foot, flight was applied in the morning and left on for two hours. The load on the larger, or 12-foot, flight was applied in the afternoon, left on during the night and removed the next day about noon. In both flights the strings returned to their original condition after the load was removed, showing no permanent deflection.

STAIRS FROM DRAWING NO. 1753:

Horizontal Span—8 feet.
Width of tread—3 feet, 6 inches.
String-steel plate—12 inches x ⅛ inch, flanged top and bottom.

Stairs loaded to 100 lbs. per sq. ft.	deflection	1/32 inch
Stairs loaded to 200 lbs. per sq. ft.	deflection	1/16 inch
Stairs loaded to 300 lbs. per sq. ft.	deflection	3/32 inch
Stairs loaded to 400 lbs. per sq. ft.	deflection	⅛ inch
Stairs loaded to 470 lbs. per sq. ft.	deflection	9/64 inch

Total Load 13,160 lbs.

STAIRS FROM DRAWING NO. 1754:

Horizontal Span—12 feet.
Width of Tread—3 feet, 6 inches.
String-steel plate—14 inches x 3/16 inch, flanged top and bottom.

Stairs loaded to 100 lbs. per sq. ft.	deflection	1/32 inch
Stairs loaded to 200 lbs. per sq. ft.	deflection	3/32 inch
Stairs loaded to 300 lbs. per sq. ft.	deflection	5/32 inch
Stairs loaded to 400 lbs. per sq. ft.	deflection	7/32 inch
Stairs loaded to 456 lbs. per sq. ft.	deflection	¼ inch

Total Load 19,175 lbs.

METHOD OF TESTING FLIGHTS OF SEXAUER & LEMKE STAIRCASES

Span of eight feet. Test made at "S. & L." Works, on Dec. 21st, 1908, in two stairways, under supervision of an engineer from the New York Bureau of Buildings and our consulting engineer.

METHOD OF TESTING FLIGHTS OF SEXAUER & LEMKE STAIRCASES

Span of twelve feet

The loads to which these stairs were subjected were at least five times the live load which would ever come upon them in use, and the limit of loading which the stairs were capable of sustaining was not by any means reached in these tests, as was evident by their behavior while under load. They were very rigid and showed hardly any vibration either to vertical pressure or pressure applied sideways, and the deflection was insignificant.

I would call attention to the construction of these treads and risers. These being made from one piece of sheet steel, and, being continuous, furnish excellent bracing horizontally to the strings, which are also further strengthened by the wrought iron mouldings, applied in such a way as to become a part of the top and bottom flange of the strings.

In my opinion, these stairs stood a very severe and satisfactory test and have been proven sufficient to meet any requirement of actual service.

Yours very truly,
(Signed) St. John Clarke,
Civil Engineer.

Steel Door Frames.

These frames can be formed to meet requirements of all classes of fireproof partition construction and finished as shown by illustration. They are formed of No. 14- or No. 12-gauge steel, and the mitres and connections are all welded, making a one-piece frame.

These frames can be furnished with or without transoms and to fit any size partition or style of door; also, if desired, furnished with plinth blocks or sanitary cove base particularly suited for hospitals. The frames are provided with anchors on each side for the purpose of building into walls or partitions.

All provisions for securing hardware are made in accordance with samples furnished.

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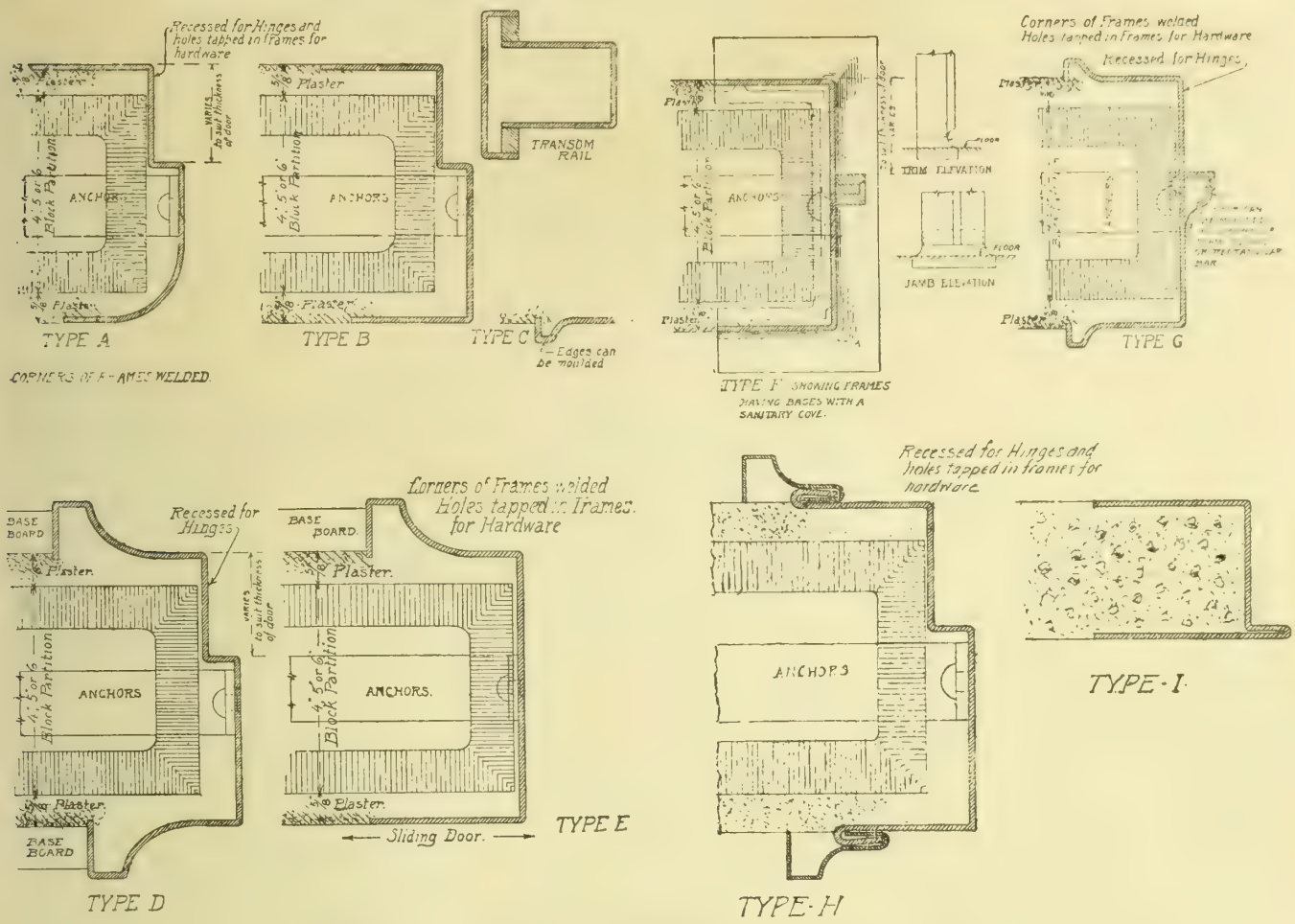


DETAILS OF SEXAUER & LEMKE WROUGHT IRON DOOR FRAMES

Atlas Solid Rolled-Steel Windows.

Made of solid rolled-steel shapes, plain or ornamental, ⅛-inch thick or heavier, according to requirements. Furnished in any finish desired.

Muntins.

Sole manufacturers of "Atlas Lock Bar" Construction (A. Busse, Patentee). Two patents cover unique methods to unite intersecting tee bars to form a rigid unit.

Where ornamental muntins are desired, specially rolled sash bars of various sizes are used, according to dimensions of glass required.

All types of steel sash, either with or without muntins, are manufactured.

Stop Bars for Glass.

While the plainer types of steel sash are usually back puttied, light angle or moulding stop bars are furnished for the more expensive types.

Ventilators.

Have either single or double continuous weathering. Ventilator frames are built of either one or several steel shapes, according to height and width. This construction is adapted for the largest casements and ventilators, either with or without muntins, giving strong and perfectly rigid results.

Frames and Mullions.

Are made in narrow or wide effects, either plain or ornamental.

Locking Devices.

Locking Devices of iron or bronze of our standard designs are furnished, or special devices as called for are adapted.

Adaptability.

The adaptability of the different constructions is such as to permit their ready application to any design the architect may choose in the construction of steel windows or frames.

The standards of each type are interchangeable, and by the use of steel mullions one or more units can be combined, for any desired space, such as would be suitable for factory or manufacturing buildings.

Illustrations on next page show the Atlas Sash installed in the tower of the Charles building, New York, illustrating to what advantages the construction can be used in buildings of this type; and also installed in the largest laundry building in New York, and sets forth the adaptability of the construction for factories, foundries, hospitals, schools, garages and stables.

How Shipped.

The sash is supplied primed with one coat of lead paint, with bolts or lugs ready to build in, and all necessary hardware, mullions and glazing pins.

Continued on next page

Installations.

Partial list of Atlas installations:

Palace Theater, 47th Street and Broadway, New York, N. Y., large casements, Michael J. Garvin and Kirchoff & Rose, Associate Architects

New Passenger Station, D., L. & W. Ry. Co., Elmira, N. Y., large arched windows, pivoted vents, Kenneth M. Murchison, Architect

Vassar College, Poughkeepsie, N. Y., elevator shaft, including doors, etc. Our design approved by State Fire Marshal

Church of Our Lady of Good Counsel, Far Rockaway, N. Y.

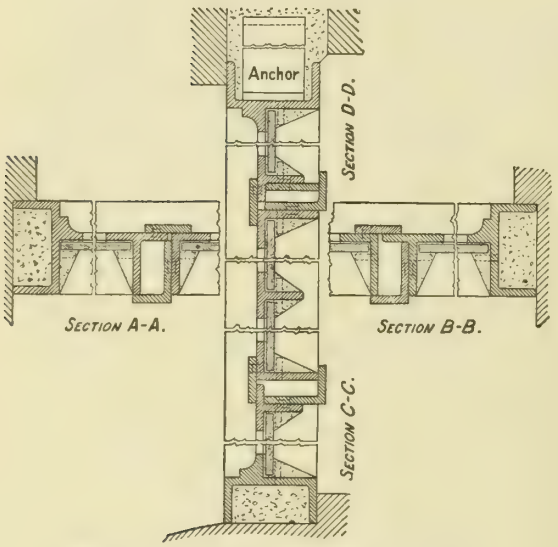
Residence of Mrs. Alfred Mitchell, New Haven, Conn., sliding entrance doors and windows, Ewing & Chappel, Architects

St. Matthew's Church, Brooklyn, N. Y., various types, the majority being over 20 feet in height, McKenzie, Voorhees & Gmelin, Architects

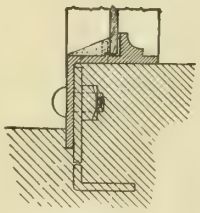
City Hall, New York, elliptical type, pivoted, Grosvenor Atterbury, Architect

Mt. Vernon Hospital, Mt. Vernon, N. Y., special sash for operating room, Milton See & Son, Architects

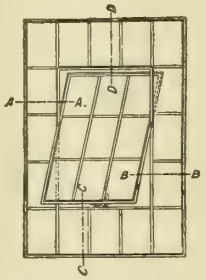
Taylor Building, Louisville, Ky., casements, Brinton B. Davis, Architect



METHODS OF ATLAS CONSTRUCTION



FRAME CONSTRUCTED OF CHANNELS OR ANGLES



OUTSIDE VIEW OF ATLAS SASH

TOWER OF CHARLES BUILDING, 43RD STREET AND MADISON AVENUE, NEW YORK, N. Y.

PILGRIM STEAM LAUNDRY, BROOKLYN, N. Y.

THE NATIONAL GLASS DISTRIBUTORS' ASSOCIATION

HEADQUARTERS OF SECRETARY
505 Arch Street
PHILADELPHIA, PA.

THE MEMBERSHIP COMPRISES THE LEADING MANUFACTURERS AND DISTRIBUTORS OF GLASS

Services.

This Association, composed of the leading manufacturers and distributors of glass throughout the country, exists for the purpose of adhering to the highest traditions in the art of glass production, and to establish and maintain standards in the manufacture and sale of glass.

Literature.

The Association has issued and copyrighted a booklet, "Glass and Glazing," 1915, to present to the users of glass a standard or guide for the architect, owner or contractor, by which the material may be better known and more readily understood, specified and used. Copies furnished by Secretary upon request. The following are extracts from the booklet:

Plate Glass.

Sizes are usually given in inches. Plate glass can be made by the present improved methods in extreme sizes up to 250 square feet, and in such measurements as 10 by 21 feet (or 120 by 252 inches); 13 by 19 feet (or 156 by 228 inches), containing 247 square feet.

Polished plate glass is manufactured in thicknesses ranging from ⅛ to 1½ inches; the standard product varying from ¼ to $\frac{5}{16}$ inch full. The other thicknesses (whether thicker or thinner) are made specially, and at an increased cost.

Grading.

The quality of plate glass is designated by trade names: "Glazing Quality" and "Special Quality." When not otherwise specified it is assumed that ordinary commercial quality, known as "Glazing Quality," is to be used.

To avoid misunderstandings, THE NATIONAL GLASS DISTRIBUTORS' ASSOCIATION requests architects to designate the quality of all glass in specifications.

"Glazing Quality"—In the finished product there are some defects, which in no way impair the value, beauty, or durability of the glass for usual purposes; such as small seeds or bubbles, short-finish reams or surface scratches, which are accepted as contingent with the regular run of quality, and even an open bubble (or "shot-hole" not entirely through both surfaces) is passed in standard "Glazing Quality," provided the plate is comparatively free from other defects, and is of good color and finish.

"Special Quality"—When glass of some particular quality is desired, a special selection is necessary. This requires expert grading and selection, and invariably necessitates cutting down larger sizes to minimize the number of defects, and adds a proportionate extra cost for the cutting waste involved and the added expense of selection.

Beveled Plate.

The standard width of bevel is 1½ inches, and all beveled plate glass or beveled plate mirrors are furnished with 1½-inch bevel, unless otherwise specified.

Window Glass.

The quality of window glass or sheet glass, also termed "blown" or "cylinder glass," has been improved by the modern methods of production, and much has been expended in the effort to make perfect blown cylinder glass. Yet there are still inherent waves and general defects which must necessarily be accepted in all window glass, due to the process of making, which differs entirely from that of cast and polished plate.

The glass is blown in cylinder form, and flattened by reheating which gives it a slight bend or bow, a possible variation in thickness in the larger sizes, and surface flaws, and the flattening process does not thoroughly flatten it.

The selection of the various grades is a matter of expert judgment. The sheets of the full size as produced, and as they come from the flattening ovens, are cut to such stock sizes as will to the greatest extent eliminate and distribute the inherent defects above referred to, and will sort to three grades known as "AA," "A," and "B"; and this grading is wholly dependent upon the individual judgment of the cutter, of standards recognized by the skilled workers for the three designated grades.

Window glass, in double strength or heavier, is made as large as 30 by 90 inches or 38 by 86 inches or 48 by 80 inches. It is inadvisable to use such glass in these measurements, on account of the liability of breakage and distorted vision due to waves, etc. The grading likewise applies to sizes of single strength, which can be made up to 24 by 60 inches or 30 by 54 inches or 36 by 50 inches.

Crystal Sheet Glass.

This is a heavier and more expensive grade of blown glass, made by the same process as ordinary window glass and subject to the same inherent defects. Graded in "AA," "A," or "B" quality, and made in various thicknesses: 26 ounce (approximately ⅛ inch thick), 29 ounce, 34 ounce and 39 ounce ($\frac{3}{16}$ inch thick), all graded by the same rules as window glass.

Wire Glass.

Is made in sheets as large as 60 inches wide and 130 inches long, and in several thicknesses—¼ inch is standard thickness for general use, and approved by the National Board of Fire Underwriters.

Thinner wire glass is obtainable, $\frac{3}{16}$ and ⅛ inch being made for special purposes; but the universal demand is for ¼ or ⅜ inch or heavier, and no wire glass under ¼ inch thick is accepted as a fire-retardant, under the rules of the Fire Prevention Bureaus or the National Board of Fire Underwriters.

Glazing.

It is especially desirable that all glass specified for a building be placed in one heading in the architect's specifications under the heading "Glass and Glazing."

NOTE—Always specify width first.

HIGHLAND GLASS COMPANY

WASHINGTON, PA.

BRANCH OFFICE: CHICAGO, ILL., 186 North La Salle Street

Products.

Rolled Glass, including Hammered Cathedral and Smooth Cathedral in plain colors and combination of colors; Ripple Glass in white and colors; Figured Glass in Colonial, Florentine, Moss, Mystic and Peerless in white and plain colors. Prism Glass, and Rough and Ribbed Skylight Glass.

Wire Glass in Liberty, Colonial, Florentine, Moss, Prism, Rough and Ribbed.

Polished Glass in Ideal and Wire Glass.

Production.

We have the largest assortment of any Rolled Glass manufacturer in the United States.

Adaptability.

Highland White Figured Glass with its smooth surface is especially desirable on account of its bright and attractive appearance in all places where the maximum of light is required in combination with obscurity of vision.

The perfection of imprint and surface gives exceptional brilliancy in Door Panels, Interior Partitions, Transoms, etc.

Advantages.

Highland White Glass will not change color when exposed to the sun.

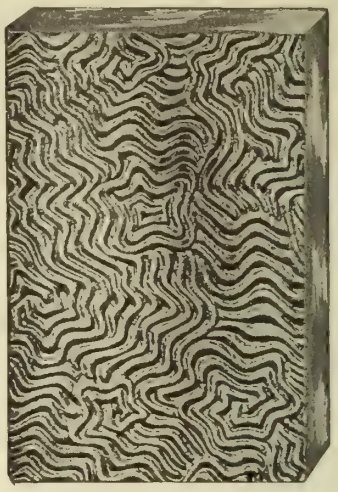
Highland products are recognized the country over for their superiority in brilliancy, color, durability, good cutting quality, and all that goes to make up a superior article at no greater cost than inferior products.

Where an especially rich and attractive effect is desired, we strongly recommend Liberty, or Liberty Wire Glass, Colonial, or Colonial Wire Glass.

Wire Glass Sizes.

Liberty, Colonial, Florentine, Rough and Ribbed in ¼" and ⅜" thicknesses; widths, up to and including 44"; lengths: Figured, up to 110"; Rough and Ribbed, up to 144".

Prism Wire Glass in scant ⅜" thickness; widths, up to and including 42"; lengths, up to 144".



COLONIAL FIGURED GLASS

White Figured Glass Sizes.

In ⅛" and $\frac{3}{16}$" thicknesses; widths, up to and including 44"; lengths, up to 120".

Prism Glass Sizes.

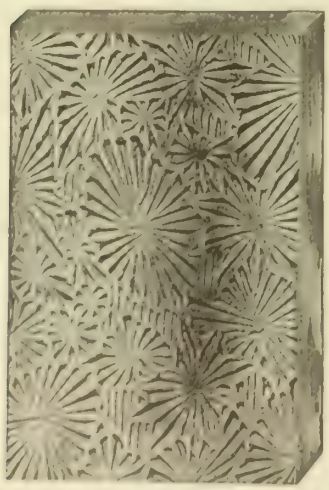
Up to 60" high; lengths, up to 138".

Rough and Ribbed Skylight Glass Sizes.

In ⅛", $\frac{3}{16}$", ¼" and ⅜" thicknesses; widths, up to and including 44"; lengths, up to 144".

Cathedral Glass Sizes.

In leading thickness; widths, 30"; lengths, up to 90".



FLORENTINE FIGURED GLASS

MOSS FIGURED GLASS

MYSTIC FIGURED GLASS

Continued on next page

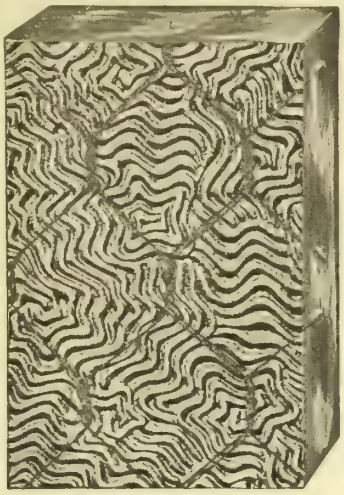
Official Endorsement.

Our Wire Glass has been thoroughly tested and approved by the National Board of Fire Underwriters, and information to this effect can be found on file at the different offices of the Underwriters' Bureaus.

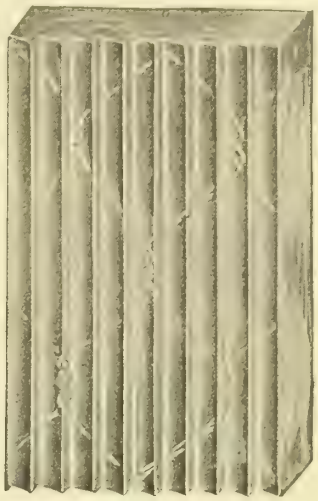
Where Obtainable.

Highland products may be secured from any of the leading jobbers throughout the United States, Canada and Mexico.

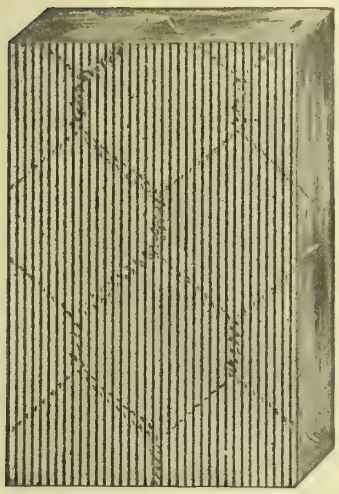
LIBERTY WIRE GLASS



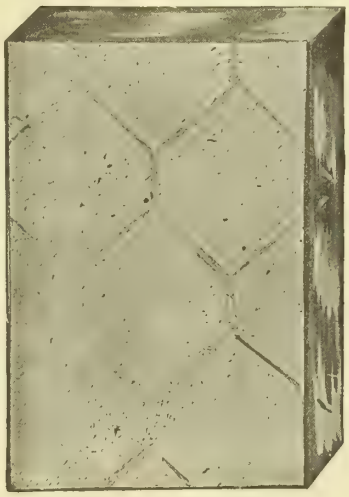
COLONIAL WIRE GLASS



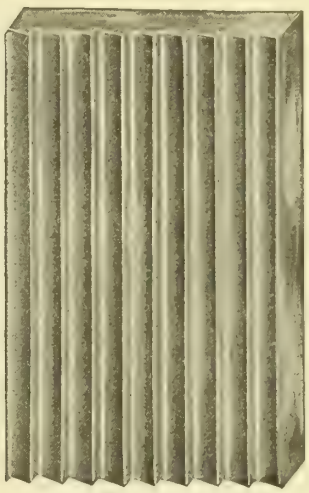
PRISM WIRE GLASS



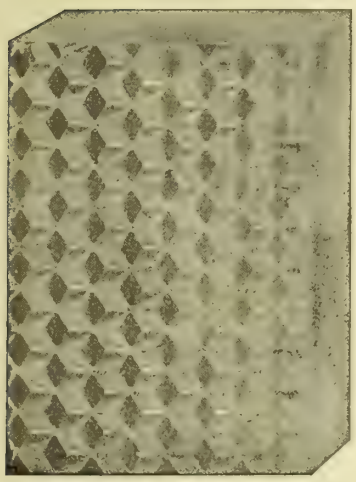
RIBBED WIRE GLASS



ROUGH WIRE GLASS



PRISM GLASS



POLISHED IDEAL GLASS

MYSTIC WIRE GLASS

RIPPLE GLASS

KEPPLER GLASS CONSTRUCTIONS, INC.

Pavement-, Vault-, Floor-, Roof-, and Train Shed Lights, Skylights, Fireproof Windows, Glass Partitions, and Crystal Ceilings

Architects Building, 101 Park Avenue

NEW YORK, N. Y.

Products.

KEPPLER
Glass Constructions N Y
TRADE-MARK

KEPPLER ALL-GLASS UNDERSURFACE FLOOR-, ROOF-, PAVEMENT-, VAULT-LIGHT, TRAIN-SHED and SKYLIGHT CONSTRUCTIONS—unit formation; steel-reinforced cement ribs; no maintenance.

KEPPLER TRANSLUCENT GLASS PARTITIONS—unit construction; steel-reinforced cement cores; both surfaces practically all glass; fireproof; no maintenance.

KEPPLER FIREPROOF WINDOWS—unit construction; steel-reinforced cement cores; both surfaces practically all glass; translucent; no maintenance.

KEPPLER TRANSLUCENT CRYSTAL CEILING CONSTRUCTIONS—unit assembly; electro-glazed.

Glass Constructions.

Glass constructions are used to secure daylight for dark interiors. Yet these constructions are usually sold at so much per square foot. The emphasis is almost entirely upon the material, instead of upon the light. Yet the daylight is what you really want.

Keppler Glass Constructions place the emphasis upon the light and transmit an average of 40 per cent more daylight than ordinary construction.

Keppler Vault Lights, Pavement Lights, Roof Lights, Skylights, Train Shed Lights, and Floor Lights.

These constructions are composed of three stock parts: glass units, reinforcing rods, and cement.

More Light—The top surface is large, plenty of light is admitted. The units widen into an all-glass undersurface and most of the light passes through to the space below, without striking the cement ribs.

The light which strikes the concaved sides of the units next to the ribs is reflected below with very little absorption, due to the shape of the unit.

Better Light—Because the undersurface is almost all glass and because the sides of the units are treated with an elastic light-reflecting coat, the construction appears from below as one large light source—the ribs are almost invisible.

Better Appearance—The top surface is even and lies in the same plane as floor, pavement or roof. The all-glass undersurface gives the advantages and attractive appearance of a glass panel (instead of a number of small units) and the feeling of substantial masonry.

Fireproof—Reinforcing rods are imbedded in concrete—only thick glass and cement are exposed.

Waterproof—No place for water or dirt to collect. Guaranteed waterproof.

No Maintenance—No painting or other upkeep is required. We will take care of any maintenance for one year free, and for a longer period, if desired, at a nominal cost per year.

Some Keppler installations have been in use over five years without a cent spent for repairs or upkeep of any kind, and without a single unit breaking.

Single units if broken can be replaced easily without disturbing any other units.

Properly designed expansion joints run through the entire depth of the plate instead of only running an inch or two below the surface.

Strength—The 4-inch unit supports a load of 300 pounds to the square foot, with a factor of safety of four, up to four feet between supports. The 6-inch unit will support 70 pounds per square foot, with a factor of safety of four, up to five feet between supports.

Adaptability—Keppler All-Glass Undersurface Constructions are used where light and appearance are equally important and where low maintenance is also an important consideration. Fifty thousand square feet of Keppler All-Glass Undersurface Constructions are being used for the Buffalo train shed of the Lehigh Valley Railroad, because of lighting efficiency, attractive appearance, and absence of maintenance cost.

Weight and Sizes—Average weight 20 pounds per square foot. Sizes of units, 4 by 4 inches and 6 by 6 inches. Thickness, 1¾ to 2¾ inches.

FIG. 1. VIEWS OF 4 INCH KEPPLER VAULT LIGHT UNIT
With 4 inch glass area on top surface

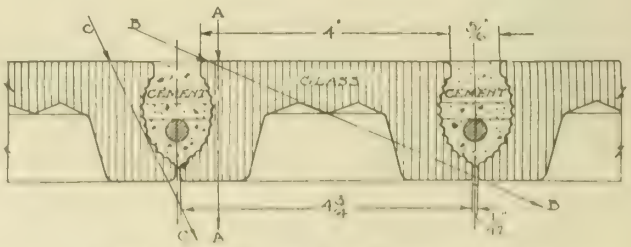


FIG. 2. DETAIL VIEW OF CONSTRUCTION

A and B light rays show large area available for direct transmission of light. C shows one of many rays transmitted through Keppler Vault Light. Sides of units next cement ribs are painted white to reflect rays. Very little light is absorbed or shut off.

The undersurface is almost all glass, ⅛ inch being allowed between units for expansion. The effect from below is that of one large light source, instead of a number of small units.

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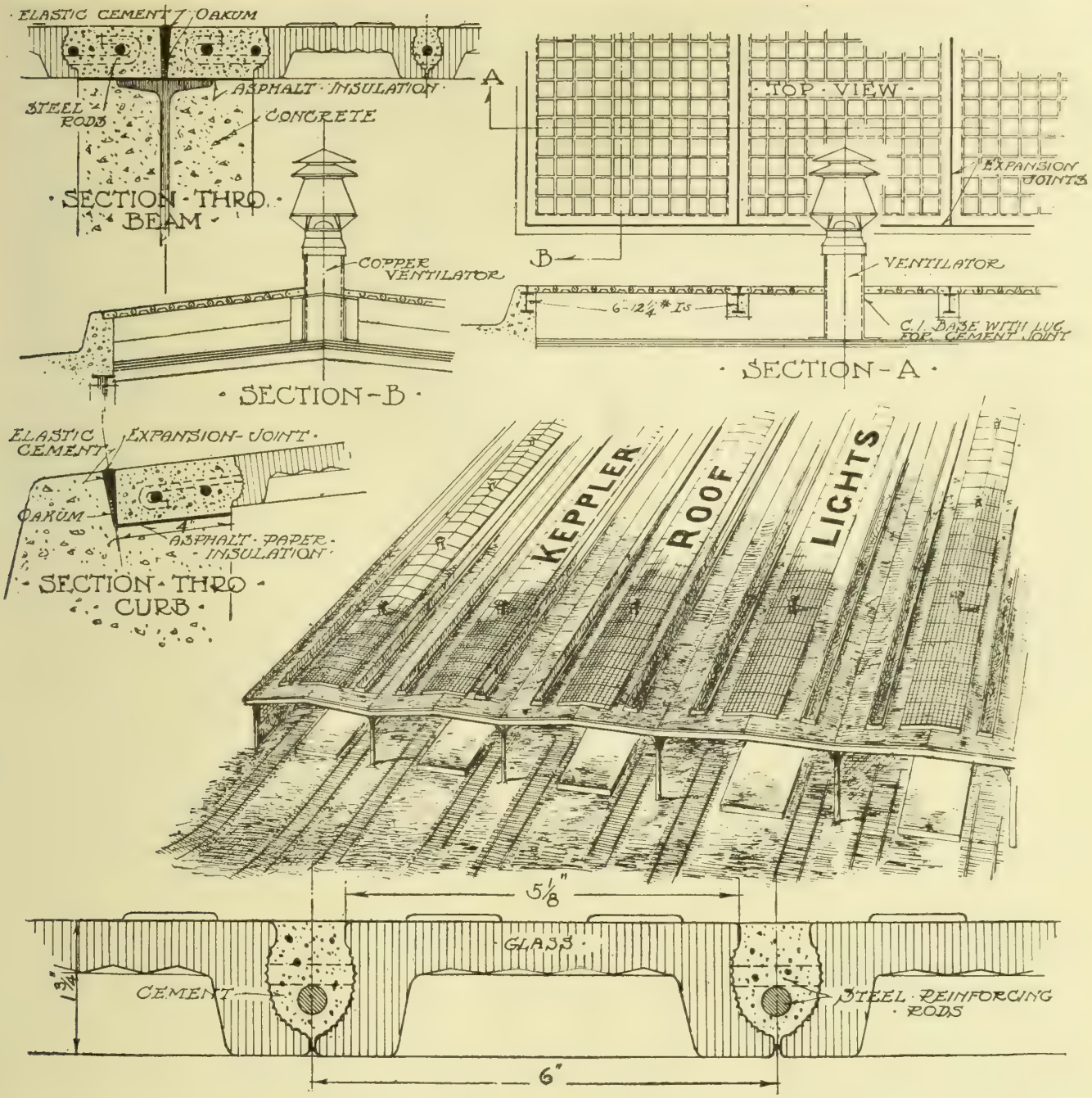

FIG. 3. KEPPLER ROOF LIGHTS, LEHIGH VALLEY R. R., BUFFALO, N. Y., USING 6-INCH UNITS

Fifty thousand square feet of Keppler Glass Construction are being used in this terminal because of lighting efficiency, attractive appearance and guaranteed low maintenance

These constructions are built to sustain any of the usual loads required in industrial buildings, strength being varied by the size of unit and of panel.

Immediate Delivery—All parts are stock parts. No special framework is needed.

Installation—We install the constructions or furnish the materials, as desired. Installation is simple.

Specification—Floor, roof, vault, and pavement lights and skylights shown on plans shall be Keppler All-Glass Undersurface Constructions. They shall be of unit construction with steel reinforced cement ribs. The top surface shall be even, without any place for water or dirt to collect. Undersurface shall be almost all glass—$^{1}/_{16}$ inch being allowed between units at the bottom for expansion.

The units shall be of clear glass made translucent by design to diffuse and distribute the light. The sides of the units shall compose a series of bonding ribs, over which shall be applied an elastic light-reflecting cushion to prevent shaling and increase light reflection.

Expansion joints extending through the entire depth of the panels shall be provided to take up compressional strain and temperature stresses.

No metal parts shall be exposed to fire or rust. The entire construction shall be fireproof and waterproof and shall be guaranteed against any maintenance for one year, free.

Continued on next page

Fig. 4. Keppler Partitions transmit light from one room to another, and are an actual source of light for rooms without windows. Translucent, soundproof, fireproof, and ensure privacy

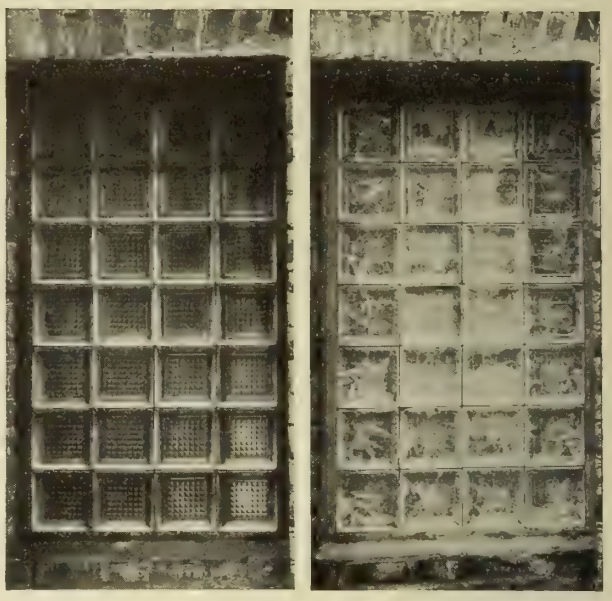

Fig. 5. Before and after Fire Test of Keppler Windows: Heat raised to 1800° Fahr. in half hour and maintained for next half hour; construction then subjected to a force of water from fire hose and stood test intact

KEPPLER TRANSLUCENT GLASS PARTITIONS AND FIREPROOF WINDOWS

Keppler Glass Partitions, Fireproof and Translucent.

Composed of glass units and steel-reinforced cement cores. Units are clear glass, made translucent by design, transmitting the daylight and yet forming a perfect screen.

More Light—They transmit light from one room to another, instead of shutting it off as masonry does, and are a source of light for rooms without windows or skylights.

Appearance—Both surfaces are glass. They have the substantial appearance of masonry and the cement cores are almost invisible, due to the white coat applied to the four sides of the units next to the cores.

Fireproof and Soundproof—They have had thorough fire tests in actual contact with the flames (Fig. 5). Partitions are soundproof, affording privacy.

Adaptability—Because of lighting value, appearance and adaptability, they are available for both permanent and temporary partitions in office buildings, department stores, factories, lofts and other buildings with interiors removed from windows.

No Maintenance—No painting or other upkeep.

Easy to Install—Any bricklayer or tile setter can install these constructions. We furnish the materials or install them complete.

Immediate Delivery—Constructed of stock parts.

Weight, Size and Cost—Weight, 15 pounds per square foot. Size of units, 6 by 6 inches by 2 inches thick. Cost, $1.20 to $1.50 per square foot, in place.

Specification—Partitions shall be Keppler Glass Constructions, composed of all-glass units with steel reinforced cement cores. Units shall be clear glass made translucent by design, ensuring absolute privacy. Concave sides of units next to the cement cores shall be painted white, to increase reflection. Both surfaces shall be almost all glass, $\frac{1}{16}$ inch being allowed between units for expansion.

The entire construction, including doors, picture mouldings, clear ends and surfaces, shall be fireproof.

Keppler Fireproof Translucent Windows.

Composed of glass units and steel-reinforced cement cores. Units are clear glass made translucent by careful design, giving the advantage of maximum diffusion with minimum absorption. Employees can not waste time—windows are non-transparent. Both surfaces are almost all glass—$\frac{1}{16}$ inch being allowed for expansion.

Fireproof—Tested up to 1800° Fahr. Then subjected to force of water from fire hose and remained intact.

Expansion and Contraction—Provided for by properly designed expansion joints.

Installation—Any bricklayer or tile setter can install, or we will install complete.

Weight, Sizes and Cost—15 lbs. per sq. ft. Size of units, 6 by 6 ins.; thickness, 2 in. Cost, $1.20 to $1.50 per sq. ft., in place.

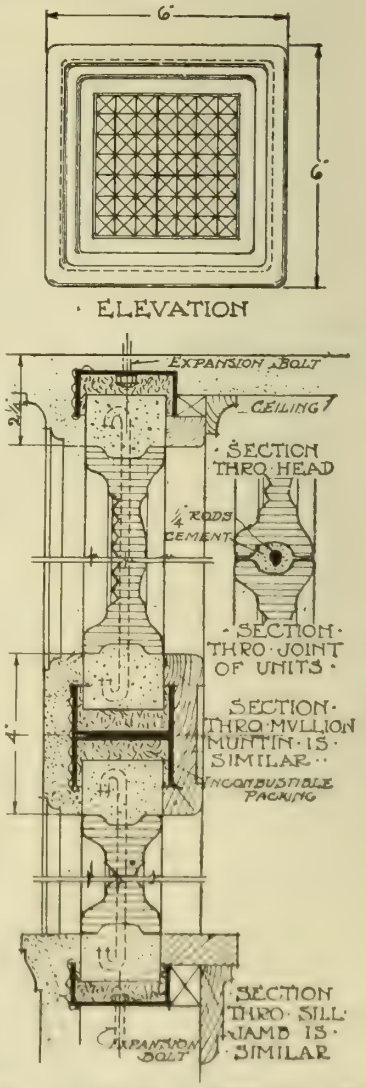

Fig. 6. DETAIL OF WINDOW AND PARTITION CONSTRUCTION

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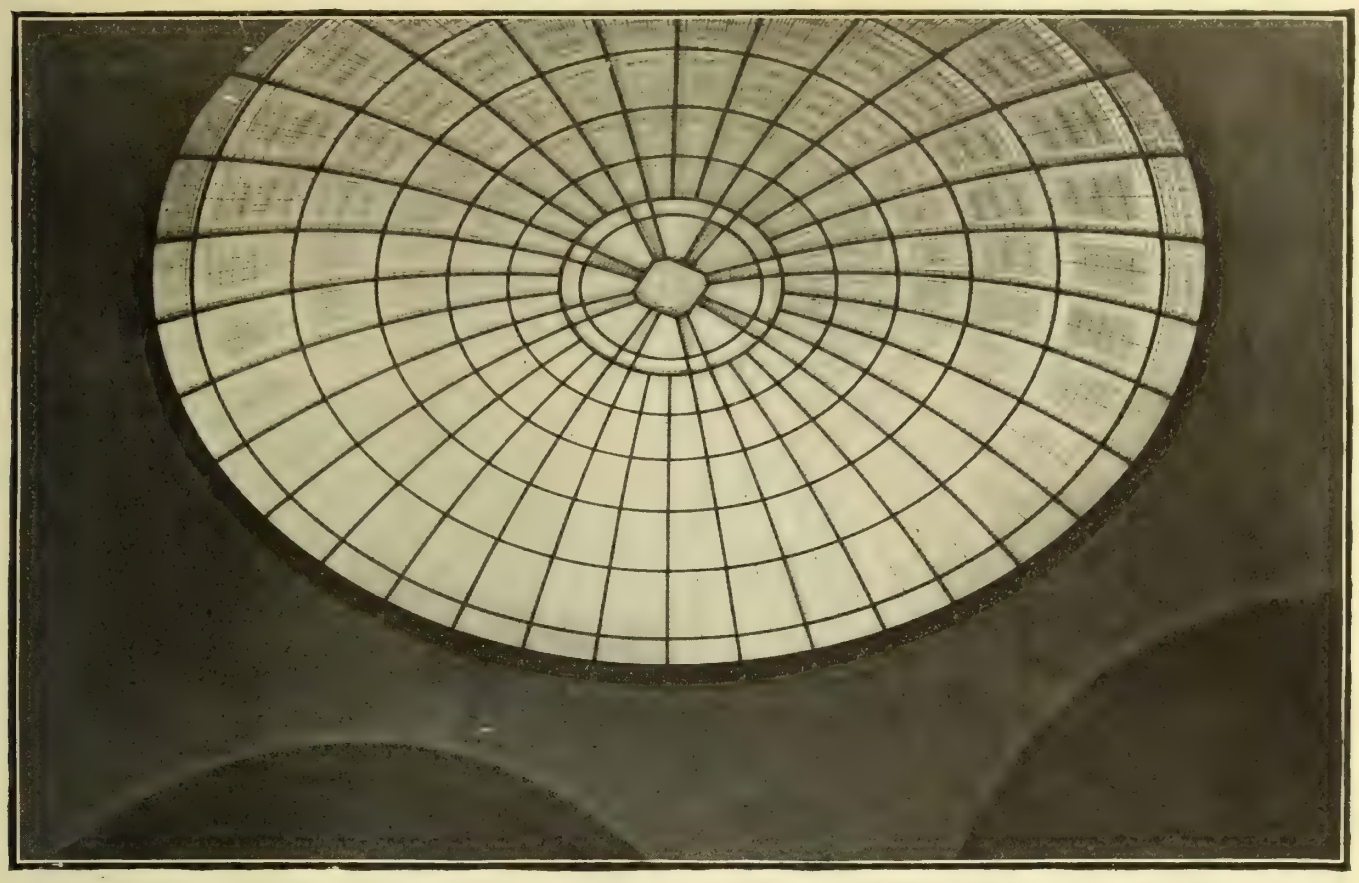


FIG. 7. KEPPLER TRANSLUCENT CRYSTAL CEILING

Made by repetition of small panels composed of glass units ornamented in relief. Keppler Crystal Ceilings can be designed to carry out or harmonize with any architectural style or idea. Strong, thoroughly substantial in appearance, giving the feeling of masonry rather than glass

Immediate Delivery—Keppler Windows are made of stock parts. No delays.

Specification—Fireproof windows shown in plans shall be composed of glass units with steel-reinforced cement cores. Both surfaces shall be all-glass, except for 1/16 inch space between units to allow for expansion. The elastic light-reflecting cushion shall be applied around the four concave sides of the glass. Ample provisions shall be made for expansion and contraction by properly prepared cushions around the four sides of the windows. The construction shall be fireproof and waterproof and guaranteed against any maintenance for one year.

Keppler Translucent Crystal Ceilings.

Keppler Crystal Ceilings are constructed of clear or amber glass units ornamented in relief, making them translucent. Units are copper-electro glazed together in panels at the factory and these panels are installed on iron or concrete frame-work at the building.

These ceilings are thoroughly substantial looking and give the impression of masonry rather than glass. They harmonize with the architecture day and night.

More Light—They transmit an evenly diffused light, and reduce the need of artificial light by day.

Decorative and Ornamental—The ceilings are highly decorative. There are one hundred and fifty different units which can be assembled by us into a multitude of different designs, to carry out any architect's desires. Suggestive sketches submitted upon request, or special units will be made to carry out individual designs.

Adaptability—This method of construction can be used wherever light, beauty, and strength are desired in glass constructions, in appearance as well as in reality, particularly in banks, department stores, hotels, libraries, railway stations, and fine residences. Over five hundred installations have been made in the leading cities of Europe.

Strength—A man can walk upon them, when cleaning. With large spans, small T and I beams are worked into the design.

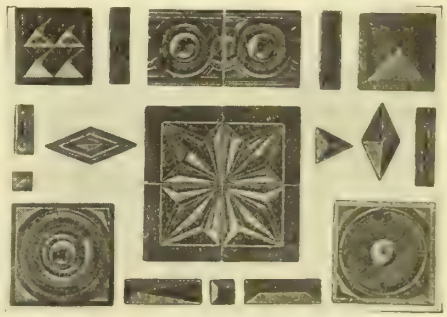


FIG. 8. KEPPLER CRYSTAL CEILING UNITS

Some of the units used in Keppler Crystal Ceilings. Units are of clear and amber glass and are electro-glazed together. They are ornamented in relief, making them translucent and thoroughly substantial in appearance

Fire Resistance—Numerous tests have proved them as resistant as the best wire-glass.

Weight and Cost—Average weight, nine pounds per square foot. Cost, from two dollars per square foot up, depending on the design and size of the work.

Further Information about Keppler Construction.

Photographs, detail drawings, and complete data with Keppler bulletins will be sent upon request.

MISSISSIPPI GLASS CO.

220 Fifth Avenue
NEW YORK, N. Y.

TELEPHONE, Madison Square 9370

BRANCH OFFICES
CHICAGO, ILL., 7 West Madison Street
ST. LOUIS, MO., 4070 North Main Street

Products.

The best quality of Figured Building Glass and Standard Rough and Ribbed Glass for Skylights.

Description.

Apex is a very high quality Figured Glass with the smooth surface polished, making it most brilliant and desirable for high-class work. All other patterns are figured rolled glass with a natural smooth surface.

Adaptability.

Our various patterns make it possible while erecting a building to install a Figured Glass which correctly conforms with any style of architecture.

Advantages.

Brilliance, strength, true cutting surface, power of light diffusion, uniformity of color, originality of design and excellence of manufacture, combined with moderate cost.

Light Diffusion.

The experiments conducted by Prof. Charles L. Norton of the Massachusetts Institute of Technology, on behalf of the Associated Factory Mutual Insurance Companies of New England, demonstrated that a proper combination of glass surfaces insures for a given floor area a vastly increased efficiency of light over that to be had by plain glass. Our Ribbed, Maze, and other figured surfaces of glass are designed in accordance with the basic requirements developed by Professor Norton's experiments.

DATA, FIGURED BUILDING GLASS AND STANDARD ROUGH AND RIBBED GLASS

Type	Thickness, Inches	Maximum Width, Inches	Maximum Length, Inches	Approximate Weight per Sq. Foot
Polished Figured Glass				
Apex.....about	1/4	50	100	4 Lbs.
Plain Figured Glass				
Romanesque	1/4	48	110	2 Lbs.
Romanesque	3/16	60	110	2½ "
Maze.....	1/4	48	110	2 "
Maze.....	3/16	48	110	2½ "
Florentine	1/4	48	110	2 "
Florentine	3/16	48	110	2½ "
Syenite.....	1/4	48	110	2 "
Syenite.....	3/16	48	110	2½ "
Muranese...	1/4	42	110	2 "
Ondoyant...	1/4	30	100	1¾ "
Fig. No. 2	1/4	42	110	2 "
Fig. No. 2..	3/16	42	110	2½ "
Rough	1/4	48	130	2 "
Rough	3/16	48	130	2½ "
Rough	1/4	48	130	3¼ "
Rough	3/8	48	130	5¼ "
Rough	1/2	48	130	7½ "
Ribbed	1/4	48	130	2 "
Ribbed.....	3/16	48	130	2½ "
Ribbed ...	1/4	48	130	3¼ "
Ribbed ...	3/8	48	130	5¼ "
Ribbed....	1/2	48	130	7½ "
Pentecor	1/4	44	130	2 "
Pentecor ...	3/16	44	130	2½ "

Large Corrugated

LARGEST PRODUCER OF ROUGH ROLLED GLASS
MISSISSIPPI
GLASS COMPANY
220 FIFTH AVE.
NEW YORK

IDENTIFICATION LABEL

12D STREET AND MADISON AVENUE BUILDING, NEW YORK
All Corridor Doors and Partitions Glazed with Mississippi "Apex" Glass

Specifying.

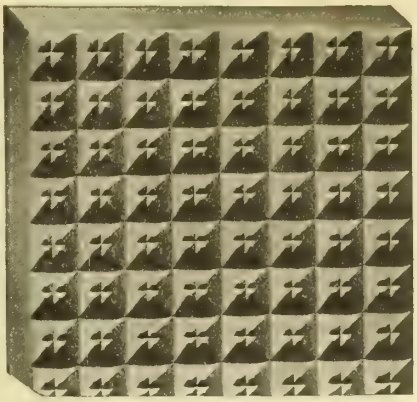
By specifying any of the following patterns manufactured by the Mississippi Glass Co., you insure yourself against the substitution of inferior glass.

Continued on next page

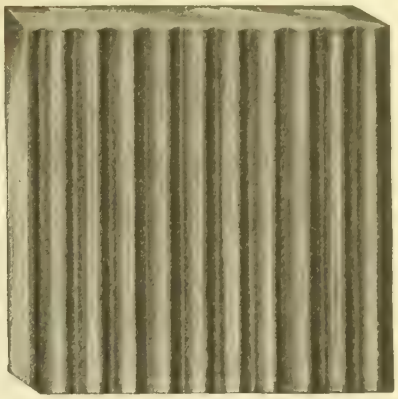
Ordering.

Glass being one of the last materials to go into a building, it is often not ordered far enough ahead to give the manufacturer time to cut the glass to sizes and make shipment in time to enclose the building, by the date desired. It is therefore advisable to give this point consideration in due time, as the tremendous demand for figured glass necessitates orders taking their turn as they are received.

In ordering, always specify width first.



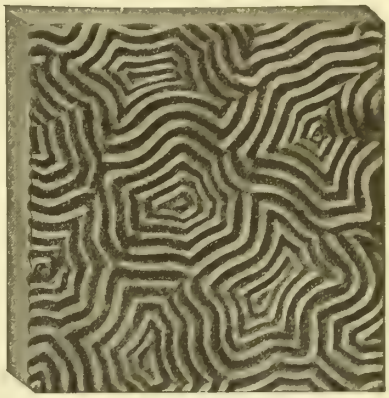
Width
APEX GLASS



Width
PENTECOR GLASS

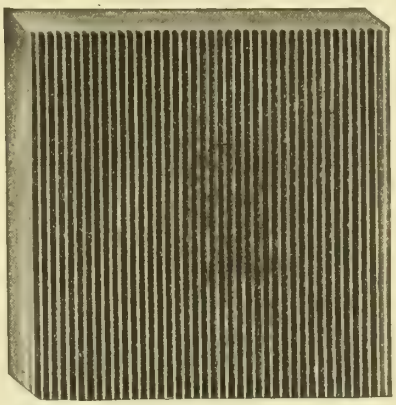
Width
ROMANESQUE GLASS

Width
ROUGH GLASS

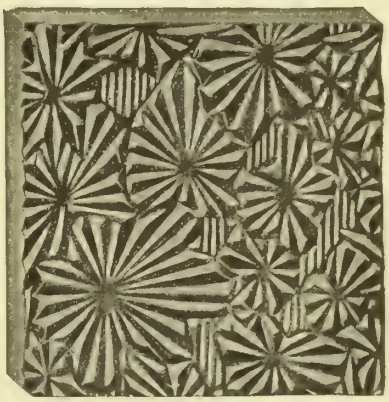


Width
FIGURE NO. 2 GLASS

Width
MURANESE GLASS



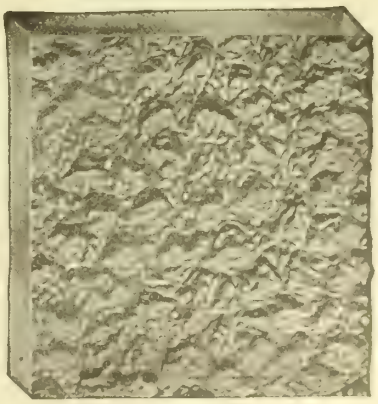
Width
RIBBED GLASS



Width
FLORENTINE GLASS

Width
ONDOYANT GLASS

Width
MAZE GLASS



Width
SYENITE GLASS

MISSISSIPPI WIRE GLASS CO.

220 Fifth Avenue
NEW YORK, N. Y.
TELEPHONE, 9370 MADISON SQUARE
BRANCH OFFICES
CHICAGO, ILL., 7 West Madison Street
ST. LOUIS, MO., 4070 North Main Street

Products.

"WIRE GLASS"; VAULT LIGHTS.

Mississippi "Wire Glass."

The MISSISSIPPI WIRE GLASS COMPANY is the original manufacturer of Solid "Wire Glass," and its product is universally recognized as the Standard "Wire Glass," being the material upon which the Underwriters' standard was based in 1899.

By our process of manufacture, Standard "Wire Glass" is cast solid, and has an average of less imperfections than any sub-standard product on the market.

"Wire Glass" is rolled plate glass having a wire netting imbedded equidistant from either surface. This process is automatically effected while the glass is in a molten state and, therefore, insures homogeneous and solid wire glass.

The quality of metal and process of manufacturing Standard "Wire Glass" produces the very highest quality, with a tensile strength second to none.

Adaptability.

The object of "Wire Glass" is to afford perfect and constant fire protection at a minimum cost, at the same time admitting and diffusing the light. It is particularly suitable for use in windows, doors, transoms, monitors, skylights and all places where fire or breakage protection is required.

Advantages.

When employed as above mentioned, "Wire Glass" may be fractured by severe heat or sudden shock, but the wire mesh will hold the shattered pieces in place, preventing their falling and causing serious injury or loss of life. It will also prevent draught and hold a fire within the bounds of its origin.

Light Diffusion.

The light may be increased in a room 30 feet or more deep to from 3 to 15 times its present effect by using Maze, Syenite, Romanesque, Muranese or Ribbed "Wire Glass," instead of plain glass in the upper sashes.

Underwriters' Requirements, Extract from Rules—1906.

(2) *Size of Glass*—(*a*) The unsupported surface of the glass allowed shall be governed by the severity of exposure and be determined in each case by the Underwriters having jurisdiction, but in no case shall it be more than 48 inches in either dimension or exceed 720 square inches. (*b*) The glass to be of such dimensions, after selvage is removed, that the bearing in the groove or rabbet is not to exceed ⅛ inch less than the full depth called for in rules 7 and 8. (*c*) The glass to be retained by the structural part of the frame or sash independently of the material which may be used for weatherproof purposes. Only non-inflammable material to be used in setting glass in the sash.

Advantageous Sizes of Glass.

In considering the above extract, it is well to bear in mind the following sizes when planning window, door and partition openings, to be glazed with Standard "Wire Glass," as these are the most advantageous sizes where glass is not to exceed 720 square inches:

15 × 48 18 × 40 20 × 36 24 × 30

THIS LABEL (PRINTED IN RED) APPEARS ON EVERY PIECE OF STANDARD "WIRE GLASS"

THICKNESSES, MAXIMUM SIZES AND APPROXIMATE WEIGHTS OF MISSISSIPPI "WIRE GLASS" AND VAULT OR FLOOR LIGHTS

Type	Thickness, Inches	Maximum Width, Inches	Maximum Length, Inches	Approximate Weight per Square Foot
"WIRE GLASS"				
Polished	1/8	48	130	4 Lbs.
Polished	3/8	46	130	8 "
Maze	1/4	48	130	5 3/4 "
Maze	3/8	48	130	5 1/4 "
Romanesque	1/4	48	130	5 3/4 "
Syenite	1/4	48	130	5 3/4 "
Muranese	1/4	42	110	5 3/4 "
Rough	1/4	48	130	5 3/4 "
Rough	3/8	48	130	5 1/4 "
Ribbed	1/4	48	130	5 3/4 "
Ribbed	3/8	48	130	5 1/4 "
Pentecor	..	..	..	...
VAULT OR FLOOR LIGHTS				
Rough "Wire Glass"	3/4	12	12	9 3/4 Lbs.
Ribbed "Wire Glass"	3/4	12	12	9 3/4 "
Ground "Wire Glass"	3/4	12	12	9 3/4 "

MISSISSIPPI "WIRE GLASS" IN THE ASCH BUILDING FIRE

In the Asch Building (N. Y. C.) destroyed by fire, as here shown, contrast the condition of fire escape and window openings of common glass, as compared with the "Wire Glass" and metal frames in the adjacent building, which, though severely exposed, acted as a barrier, behind which the firemen stood and fought the fire in the Asch Building by forcing their hose nozzles through the holes here seen

Continued on next page

NEW YORK TELEPHONE CO. BUILDING, NEW YORK, N. Y.

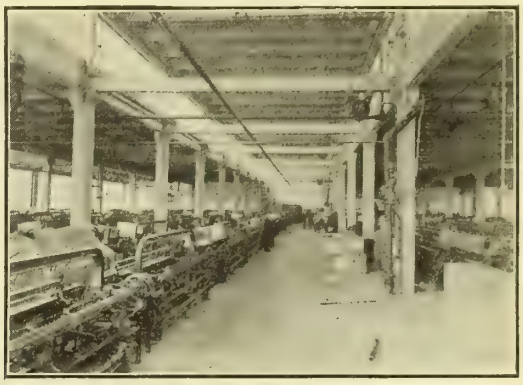
Mississippi "Wire Glass" Installed in Approved Metal Frames. Also, Mississippi Polished "Wire Glass"

RAILWAY EXCHANGE BUILDING, ST. LOUIS, MO.

Has the greatest floor area of any building in the world, and, excepting the ground floor, is completely equipped with Mississippi products Interior partitions, doors and transoms, Mississippi $^{3}/_{16}$ in. Romanesque. All windows above ground floor, Mississippi Polished "Wire Glass" and Rough "Wire Glass"

VIEW OF INTERIOR ROOM FORMED BY USE OF METAL AND GLASS PARTITIONS

Note amount of light obtained by using a Prismatic Figured Pattern of Mississippi "Wire Glass"

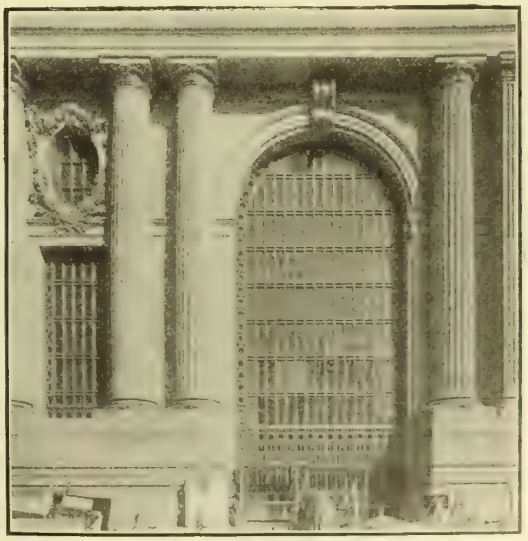


POSTEX COTTON MILLS, POST, TEX.

An example of modern fireproof mill construction. Substantially built of reinforced concrete and metal frames in which Mississippi "Wire Glass" is installed

WOOLWORTH BUILDING, NEW YORK, N. Y.

Mississippi Polished "Wire Glass" and Mississippi ¼-inch Maze "Wire Glass" installed



GRAND CENTRAL STATION, NEW YORK, N. Y.

Magnificent detail in one of the large windows. Frame is of cast-iron reinforced by steel framework and glazed with Mississippi Polished "Wire Glass," which was given preference over all sub-standard products submitted.

Samples.

Sent on application, or full line of our Samples may be seen at office of Architects Samples Co., Park Avenue and 40th Street, New York, N. Y.

Mississippi Evidence of Quality.

The fact that Mississippi "Wire Glass" is installed in all the better class buildings, like these here shown, is unquestionable evidence of its superior quality and uniformity of color. Our factory facilities enable us to do the glazing without unnecessary delay. At all times we are prepared to give prompt service.

Continued on next page

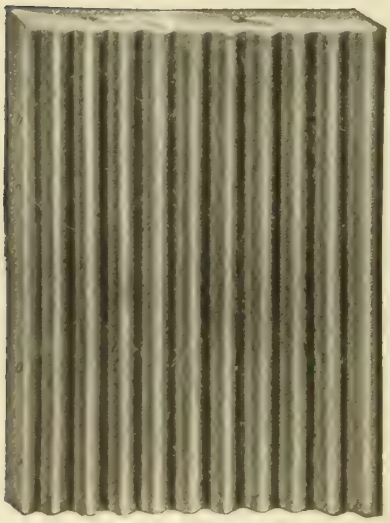
Ordering.

Glass being one of the last materials to go into a building, it is often not ordered far enough ahead to give the manufacturers time to cut the glass to sizes and make shipment in time to enclose the building by the date desired. It is therefore advisable to give this point consideration in due time, as the tremendous demand for Standard "Wire Glass" necessitates orders taking their turn as they are received.

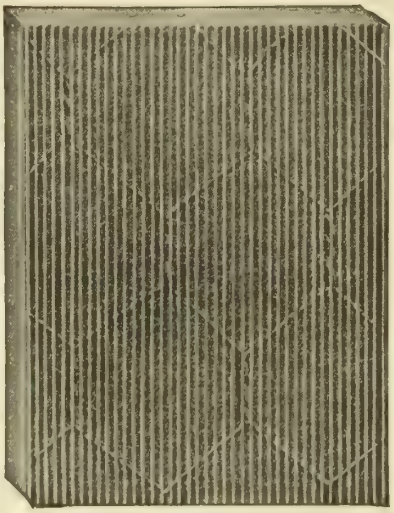
In "Wire Glass," the twist of the wire runs with the length of the sheet and should be set vertically. In ordering always specify width first.

—Width—
POLISHED "WIRE GLASS"

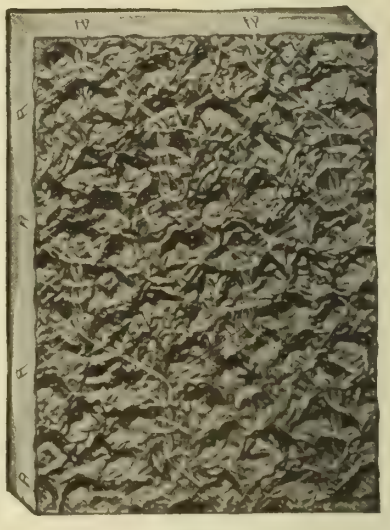
—Width—
ROUGH "WIRE GLASS"



Width
PENTECOR "WIRE GLASS"

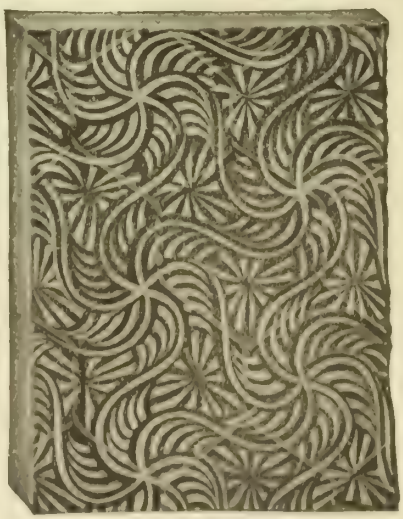


—Width—
RIBBED "WIRE GLASS"



—Width—
SYENITE "WIRE GLASS"

—Width—
MURANESE "WIRE GLASS"



Width
MAZE "WIRE GLASS"

—Width—
ROMANESQUE "WIRE GLASS"

Continued on next page

How to Specify.

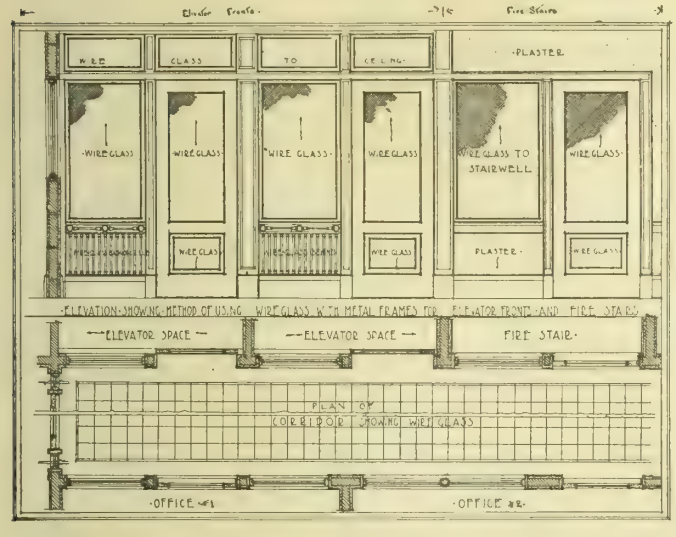
"Wire Glass" shall be installed in [specify location] and in all places marked "W. G." on plans and elevations.

The "Wire Glass" to have a thickness of at least ¼ inch at thinnest point. Wire mesh to be not larger than ⅞ inch, and no wire used for such mesh to be smaller than No. 24, B. and S. gauge. Plane of the wire mesh to be practically midway between the two surfaces of the glass.

Selvage shall be removed from glass before framing.

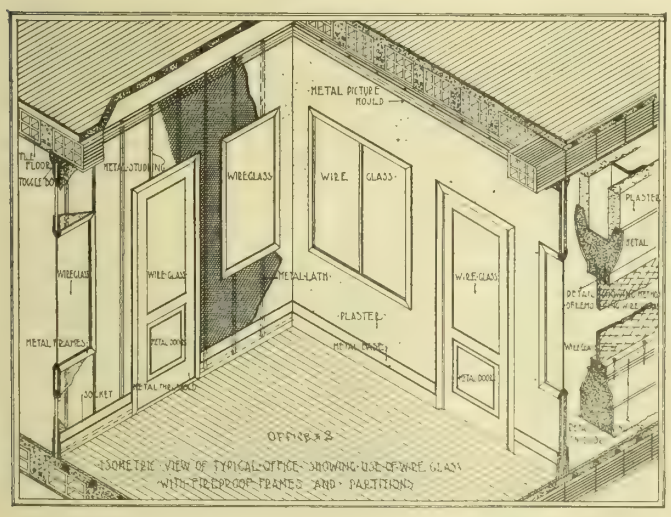
[State here type or types of glass to be used and where.]

NOTE—Where the recognized standard and perfected product is required, specifications should call for "'Wire Glass,' the product of MISSISSIPPI WIRE GLASS CO."



TYPICAL EXAMPLE OF ELEVATOR FRONTS AND CORRIDOR ENTRANCE TO FIRE STAIR

Of Hollow Tile and Plaster, Metal Frames and "Wire Glass"



CORRIDOR WALL AND PARTITION WALL BETWEEN OFFICES

Constructed entirely of Non-Combustible Materials; namely, I-Beam Studdings, Metal Lath and Plaster, Metal Doors and Window Frames, in which "Wire Glass" is installed

This type of partition can be erected very economically

References.

The following are a few of the many prominent buildings equipped with recognized Standard "Wire Glass," made by the MISSISSIPPI WIRE GLASS COMPANY:

OWNER, TYPE OF BUILDING AND ARCHITECT

OAKLAND, CAL.

City of Oakland, City Hall, Palmer, Hornbostel & Jones
Hotel Oakland, Hotel, Bliss & Faville
Kahn Bros. Dry Goods Co., Department Store, C. W. Dickey

SAN FRANCISCO, CAL.

Adler Building, Sanitarium, MacDonald & Applegarth
First National Bank, Bank, D. H. Burnham & Co.
Ferry Building
Hewes Building, Reid Bros.
Humboldt Bank, Bank, Meyer & O'Brien
Pacific Building, C. F. Whittlesey

WASHINGTON, D. C.

S. W. Woodward, Office, Harding & Upman
Frank A. Munsey, Office, McKim, Mead & White
Penn. & B. & O. R. R., Union Station, D. H. Burnham & Co..

CHICAGO, ILL.

Butler Brothers, D. H. Burnham & Co.
Chicago & N. W. R. R., Northwestern Station, Frost & Granger
Chicago Telephone Co., Bell Telephone Building, Holabird & Roche
C. C. Heisen, Transportation, Purdy & Henderson
The Drake Hotel Co., Blackstone Hotel, Marshall & Fox
Insurance Exchange Building, D. H. Burnham & Co.
The People's Gas Co., D. H. Burnham & Co.
J. P. Smith Shoe Co., H. R. Wilson & Co.

ALBANY, N. Y.

Hudson Hotel Co., Hotel, Frank M. Andrews & Co.
New York State, Educational, Palmer & Hornbostel

BUFFALO, N. Y.

The Larkin Co., Warehouse, R. J. Reidpath & Son
Marine National Bank, Bank, Green & Wicks
New York Telephone Co., Office, McKenzie, Voorhees & Gmelin

NEW YORK, N. Y.

Brewster & Co., Manufacturing, Stephenson & Wheeler
Adams Express Co., Office, F. H. Kimball
Aeolian Co., Office, Warren & Wetmore
Bankers' Trust Co., Office, Trowbridge & Livingston
City New York, Municipal, McKim, Mead & White
City Investing Co., Office, F. H. Kimball
Gimbel Brothers, Department Store, D. H. Burnham & Co.
Guaranty Trust Co., Bank and Office, York & Sawyer
Metropolitan Life, Office, N. Lebrun & Sons
Penna. R. R., Terminal, McKim, Mead & White
N. Y. C. R. R., Grand Central Station, Reed & Stem and Warren & Wetmore Ass'n.
N. Y. C. R. R., Biltmore Hotel, Reed & Stem and Warren & Wetmore Ass'n.
Singer Manufacturing Co., Office, Ernest Flagg
A. G. Vanderbilt, Hotel, Warren & Wetmore
West Street Building, Office, Cass Gilbert
F. W. Woolworth, Office, Cass Gilbert

PITTSBURGH, PA.

Pittsburgh Athletic Association, Club House, Janssen & Abbott
First National Bank, Office, D. H. Burnham & Co.

SEATTLE, WASH.

Burns Lyman Smith, L. C. Smith Building, Gaggin & Gaggin

PHILADELPHIA, PA.

Curtis Publishing Co., Publishing, C. Roberts & Co. and E. V. Seeler

BROOKLYN, N. Y.

Bush Terminal Co., Warehouse, Wm. Higginson

NEWARK, N. J.

L. Bamberger & Co., Department Store, Jarvis Hunt
Kinney Estate, Office, Cass Gilbert

HOBOKEN, N. J.

North German Lloyd, Piers, W. F. Whittemore, Engr.

SPRINGFIELD, MASS.

City, Municipal, Pell & Corbett

BALTIMORE, MD.

Johns Hopkins, Phipps Clinic, G. Atterbury

ATLANTA, GA.

Southern Railroad, Depot and Office, D. W. Lum
Texas Oil Co.

HARTFORD, CONN.

Travelers' Insurance Co., Office, Donn Barber

NEW HAVEN, CONN.

City, Court House, Allen & Williams

WINNIPEG, CAN.

Can. Northern R. R., Terminal, Warren & Wetmore

ROSSFORD, OHIO

Ford Plate Glass Co., Factory, Devore & McGormeley Co.

RICHMOND, VA.

Virginia Railway & Power Co., Office, A. C. Bossom

THE WESTERN GLASS COMPANY

MANUFACTURERS OF

Figured and Wire Glass

STREATOR, ILL.

Products.

FIGURED GLASS; WIRE GLASS, Plain and Figured; ROUGH and RIBBED GLASS; SHEET PRISM GLASS.

Figured Glass.

This is designed for use in hallways, areas, interior partitions, and similar constructions, where the admission of light without transparency is desired.

Made of the best materials obtainable and moulded in attractive patterns, it adds materially to the decorative effects of such installations.

Its distinctive advantages for this service have given it an established reputation.

Designs.

Our Figured Glass is made up in a large number of designs, some of which are illustrated in the accompanying cuts. This glass can be supplied to match any style of architecture and to conform to architect's or builder's requirements.

Sizes and Weights.

Figured Glass is made in thicknesses of 1/8, 3/16 and 1/4 inch, to meet various building conditions and specifications.

It can be furnished in all widths up to 48 inches inclusive, to suit special demands.

Packed for shipment, our rolled glass, whether rough, ribbed, figured, or wire glass, weighs per square foot as follows:

Thickness—inches	Weight—pounds
1/8	2 1/2
3/16	3 1/2
1/4	4 1/2
3/8	6
1/2	8
3/4	11

Wire Glass.

We can furnish Wire Glass in any of the regular figured designs or in polished transparent sheets, as desired; and in all thicknesses, in sizes up to and including 48 inches wide by 132 inches long.

It is made by a single-pour process and the reinforcement is a special wire fabric of our own design, with three twists and five loops at the vertical strand.

By our method of manufacture, this fabric is incorporated in the sheet of molten glass while it is being rolled. This makes the finished product better able to stand severe strains and sudden temperature changes.

The wire strand used is so thin that it does not obstruct the light and is scarcely noticeable under ordinary conditions.

Fire and Accident Prevention.

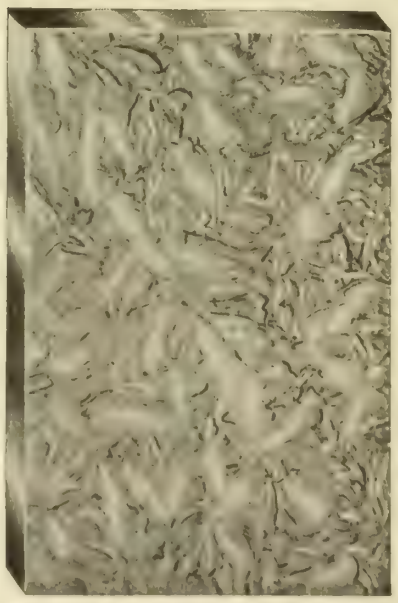
The main reason for using wire glass is the reduction of the fire and accident hazards.

Properly installed, wire glass furnishes an effective barrier to the spread of flames through exposed windows.

In this connection our product has stood the severe tests imposed by the Underwriters' Laboratories and has been fully approved by the Fire Underwriters' Association. Each sheet bears the identification mark of the Underwriters' Laboratories.

In windows subject to heavy wind pressures or liable to injury from carelessness or from flying bodies, the installation of wire glass insures against injury to pedestrians from falling glass and against the resulting damage suits.

MOSS FIGURED GLASS



CARNATION FIGURED GLASS

COMET FIGURED GLASS

Sweet's Catalogue

Continued on next page

Sizes.

Standard wire glass is made as near as possible to $\frac{5}{16}$-inch thick. We furnish all kinds of wire glass in the standard ¼ and ⅜ inch thicknesses, not to exceed 720 square inches in area nor 48 inches in either dimension.

Rough and Ribbed Glass.

This product is made in all thicknesses, and is especially adapted for heavy service in skylights, partitions and factory windows.

Sheet Prism Glass.

Where it is desired to project daylight well back into an interior, our sheet prism glass is an effective glazing medium for producing the maximum lighting efficiency.

Extreme Sizes Manufactured.

FIGURED GLASS

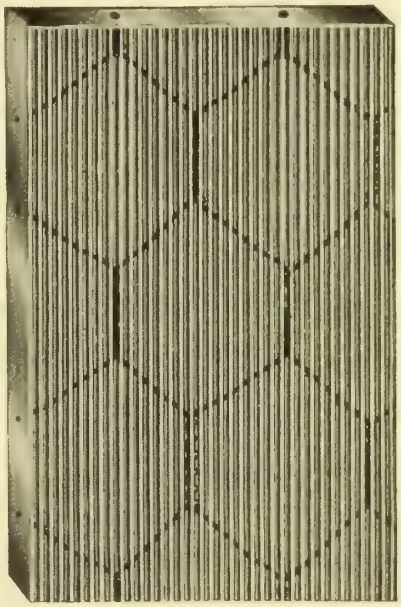
Thickness—inches	Area—inches
⅛	48 x 120
$\frac{3}{16}$	48 x 132
¼	48 x 142

ROUGH AND RIBBED GLASS

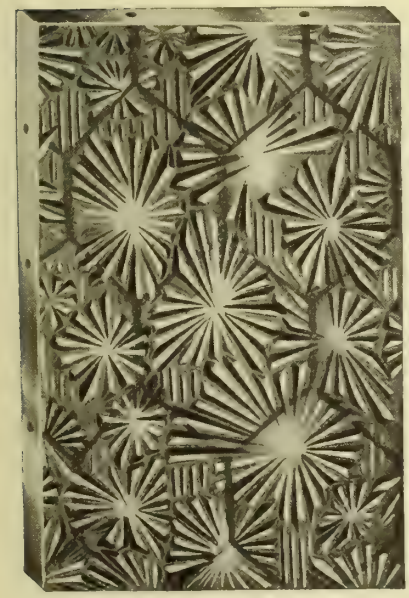
Thickness—inches	Area—inches
⅛	48 x 120
$\frac{3}{16}$	48 x 132
¼	48 x 132
⅜	48 x 132
½	48 x 132

POLISHED WIRE GLASS

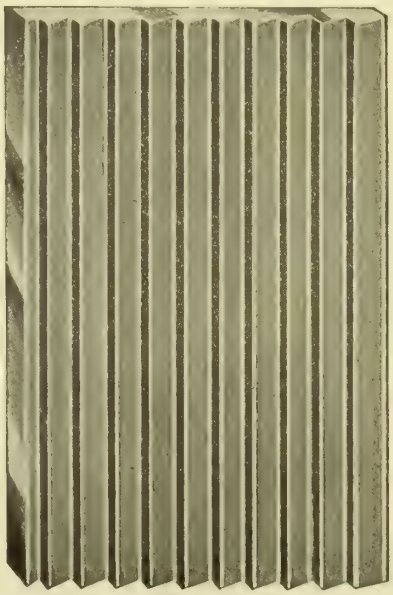
HOLLY WIRE GLASS



RIBBED WIRE GLASS



RADIANT WIRE GLASS



SHEET PRISM GLASS

ROUGH WIRE GLASS

WALTER COX, President

PENNSYLVANIA WIRE GLASS COMPANY

CABLE ADDRESS:
"Wire Glass, Philadelphia"

EXECUTIVE OFFICE
Pennsylvania Building
PHILADELPHIA, PA.

WORKS
DUNBAR, PA.

NEW YORK OFFICE, 70 Fifth Avenue. E. S. Hand, Special Representative

Products.

Wire Glass, in thicknesses from ⅛ inch to 1 inch, with surfaces Rough, Ribbed, Cobweb and Florentine; and from ¼ inch to 1 inch with surfaces Polished, Aqueduct and Vuelux.

Also, Plain Glass (without wire), in thicknesses from ⅛ inch to 1 inch, with surfaces Florentine, Cobweb, Rough and Ribbed, and from ¼ inch to 1 inch Aqueduct. Special requirements satisfied.

TRADE-MARK

Process.

Solid Wire Glass, made by the *continuous process*, is formed complete with the wire incorporated in one pouring and one rolling. Among the evidences of superiority, this is the *only* process which is *capable* of making Solid Wire Glass and thin wire glass such as ⅛- and $\frac{3}{16}$-inch thicknesses. The only process eliminating all internal stresses. One of the best evidences as to the superiority of our make, as has been shown by unsolicited tests, is that Solid Wire Glass has nearly double the strength of the "Sandwich" process. (Test sheets on application.)

Comparison of Strengths of the Types referred to:

¼ inch (Old Process) "Sandwich" breaks at 84⅔ pounds.
¼ inch (Our Process) Solid Wire Glass breaks at 145½ pounds.

Functions.

For Glazing Light Openings in Outside Walls, where same are subject to attack by fire from within or without. For Glazing all Skylights, unless it is desirable that same shall be broken by excessive heat for purpose of outlet for smoke or flame.

For Glazing all Light openings in all interior Fire-Retarding Doors, Partitions, and other cut-offs, especially in Elevator and Stair Enclosures.

Identification.

"Underwriters' identification mark consists of a strand of the wire mesh made by twisting two No. 27-gauge wires together, and spacing such distinctive Cabled Strand approximately 10 inches apart," thereby making our wire glass, ¼ inch and over in thickness, *fully approved* by the National Board of Fire Underwriters.

Special.

Eighth-inch and three sixteenth-inch Wire Glass is admirably fit for Transoms, Partitions, Doors, Cellar Windows, Canopies, Marquises, Vestibules, Conservatories and Greenhouses.

"Aqueduct."

"Aqueduct," our new skylight wire glass, possesses maximum capillary attraction and delivers condensation without dripping. "Aqueduct" Wire Glass, by reason of heavy reinforcing ribs or webs, is much stronger than other kinds of wire glass.

Guarantee—We will supply f.o.b. factory, without charge, all "Aqueduct" wire glass broken from any cause whatever, either in transit or installation, within one year from date of shipment.

"Cobweb."

"Cobweb," our new figured wire glass, possesses remarkable diffusive quality and extraordinary tensile strength. The pattern has the added advantage that it practically conceals or eclipses the wire mesh.

Engineering Department.

We maintain, in our New York Office, an engineering department where we solve for our friends problems relating to the diffusion of light, the hazards of broken glass and the limiting of the spread of fire. There is no charge in connection with this consultation, and all problems submitted to us will receive our best and immediate attention.

AQUEDUCT WIRE

RIBBED WIRE

COBWEB WIRE

POLISHED WIRE

AMERICAN LUXFER PRISM COMPANY

Luxfer Prisms for Lighting Buildings with Daylight

MAIN OFFICE
29 EAST MADISON STREET
CHICAGO, ILL.

CHICAGO, ILL.

FACTORY
37TH AND MORGAN STREETS
CHICAGO, ILL.

BRANCH OFFICES

CHICAGO, Heyworth Building
BOSTON, 49 Federal Street
CLEVELAND, 917 Citizens' Building
DALLAS, Builders Exchange
DETROIT, Builders Exchange
DULUTH, 310 West Michigan Street
KANSAS CITY, 909 New York Life Building
LOS ANGELES, 1835 South Main Street
NEW ORLEANS, 904 Hennen Building
NEW YORK, 507 West Broadway
PHILADELPHIA, 411 Walnut Street
ROCHESTER, 38 Exchange Street
SAN FRANCISCO, 1113 Hearst Building

Products and Service.

We are the sole manufacturers of all the original LUXFER PRODUCTS which are used in daylighting every sort of building in accordance with the LUXFER DAYLIGHTING SYSTEM.

LUXFER PRISM PRODUCTS comprise LUXFER PRISM TRANSOMS and WINDOWS; LUXFER PRISM CANOPIES and EXTENSION SKYLIGHTS; LUXFER PRISM FLOOR, CEILING and ROOF LIGHTS; LUXFER VAULT LIGHTS; LUXFER SHEET PRISMS; LUXFER PRISM REINFORCED CONCRETE SIDEWALKS; LUXFER READY-TO-SET SIDEWALK LIGHT SLABS, and LUXFER "CRYSTOLUX" NON-SLIP SIDEWALK FINISH.

Luxfer Co-operation.

Luxfer expert co-operation aids the architect to solve his daylighting problems, by pointing out the possibilities and cost of each specific daylighting job, and by accurately prescribing for same, which is an important factor in producing the maximum daylighting efficiency in every building where Luxfer is installed.

The extensive research work and experiments carried on by this company for nearly a quarter of a century have definitely established the absolute necessity of the application of scientific principles to every daylighting problem. The service of the Luxfer Daylighting corps of experts is rendered without cost or obligation to the architect.

The Luxfer System and Adaptability.

The principle of the Luxfer System is based fundamentally upon the natural laws of refraction, whereby rays of light coming from the sky are received and controlled by the prisms and directed by them into

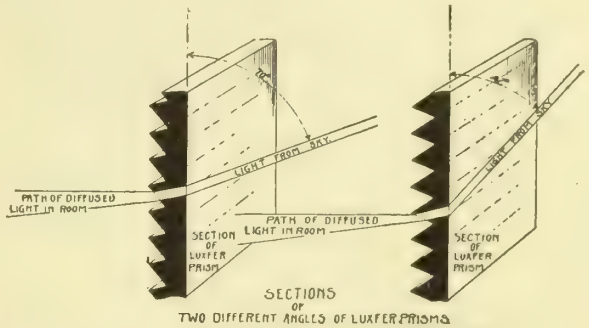


FIG. 2. SECTIONS OF LUXFER PRISMS

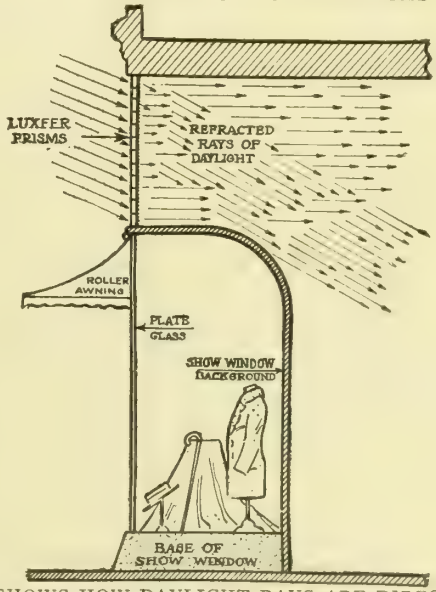


FIG. 3. SHOWS HOW DAYLIGHT RAYS ARE DIRECTED INTO STORE. INTERIOR AT VARYING ANGLES

FIG. 1. SIMPLE PRISM SQUARE
Note angles on surface

FIG. 4. LUXFER TRANSOMS, VENTILATORS AND SIGN

Continued on next page

dark places, the direction of the refracted light being determined by the angles of the prisms. In the application of this principle Luxfer Prism glass in square unit, or tile form, is used. It is so designed that over one hundred different angles of refraction comprise the Luxfer System, so as to conform with the varying angles at which the light ray strikes the prism, thus making possible the refraction of daylight into every part of a building.

Every job is measured by its specific requirements, no haphazard method entering into the Luxfer Service. Each installation is treated in accordance with its needs, determined by a careful analysis of existing sky conditions, after which a correct angle of prism is prescribed to meet these requirements.

Luxfer Prism Transoms.

Luxfer Prism Transoms not only improve the outside appearance of a store or building, but reflect abundant daylight into it. They are installed in the upper part of the sash above roller awning, in the same manner as plate glass and in the same arrangement of sash and frames, as shown in Fig. 4, eliminating entirely the necessity of skilled labor.

Ventilators and Screens.

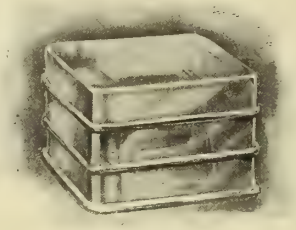
When desired the panels can be equipped with pivoted self-closing ventilator and screen, which amply answer the ventilation problem.

Specifications—The store front transoms and upper sash of windows, as shown on plans, shall be Luxfer Prisms of 4-inch pressed tile electro copper-plated bar and ornamental border with ventilators, screens and ornamental signs as manufactured by the AMERICAN LUXFER PRISM COMPANY.

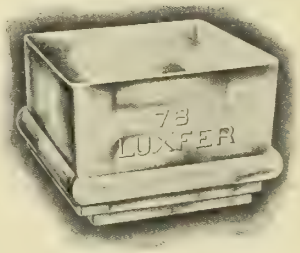
The ventilators are our own special type of manufacture, and are the best that it is possible to produce for the purpose. They are constructed on solid lines; are durable and attractive in appearance; are pivoted—so balanced as to be absolutely self-closing—and are held open at any degree by cord. Furnished with or without screens. Screens are quickly detached; made of metal, non-rusting copper finish, uniform with vent and panel.

No. 65 Round Blank Lens
2¾" diameter

No. 60 Sidewalk Prism
2½" x 2½"



No. 68 Square Blank Lens
2½" x 2½"



No. 78 Square Blank Lens
2¾" x 2¾"

No. 76 Sidewalk Prism
2¾" x 2¾"

FIG. 6. VARIOUS FORMS OF LUXFER SIDEWALK LIGHTS

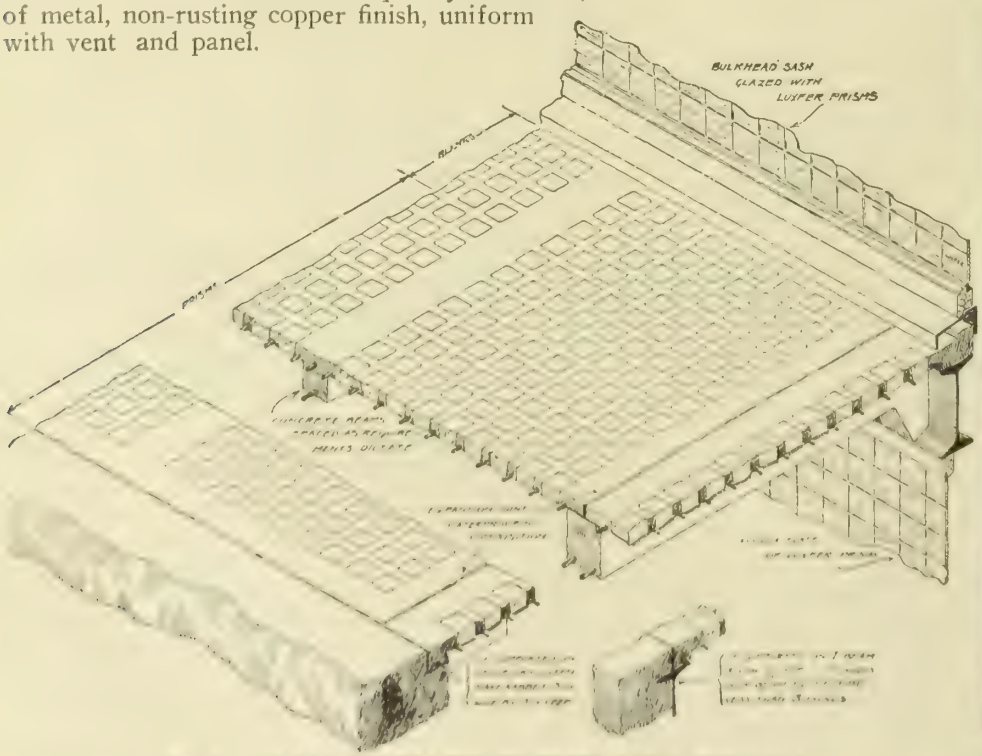


FIG. 5. LUXFER REINFORCED CONCRETE PRISM SIDEWALK

FIG. 7. PUBLISHER'S BASEMENT DAYLIGHTED BY LUXFER PRISMS

Continued on next page

Ornamental Signs.

Attractive Art Signs of ornamental colored glass, embodied in prismatic panels as shown in Fig. 3, are a valuable addition to a store front, being both ornamental and economical, as they are equally efficient by both day and night. The letters are from ten to sixteen inches in height.

Luxfer Reinforced Concrete Sidewalk Lighting.

Every feature of service, appearance, durability, maximum glass area, and ease of installation are embodied in the Luxfer System of Reinforced Sidewalk and Vault Lights. They are composed of glass prisms or lenses imbedded in concrete 1⅞ inches thick, reinforced by longitudinal and transverse ¼ inch square, twisted steel tension rods placed between the glass units, thus forming a mesh of great rigidity, capable of supporting any weight. (Fig. 5.)

These form panels of glass and concrete are supported upon retaining walls and beams, and have stiffeners of steel I-beams or concrete trusses placed at proper intervals. The joints are properly calked and made water-tight; and, by being placed properly at intervals, they provide for expansion and contraction of the mass. The top surface makes an excellent wearing pavement. The under surface can be plastered flush with bottom of the lenses. Luxfer System is very well known for this quick setting. The materials are always ready and can be assembled without making patterns and castings. The daylighting service is recognized as superior in every respect.

How to Specify—Sidewalk or Prismatic Lights shall be of the American Luxfer Prism Company's make of Reinforced Concrete. The body of the concrete to be composed of one part of approved Portland cement and two parts of torpedo sand.

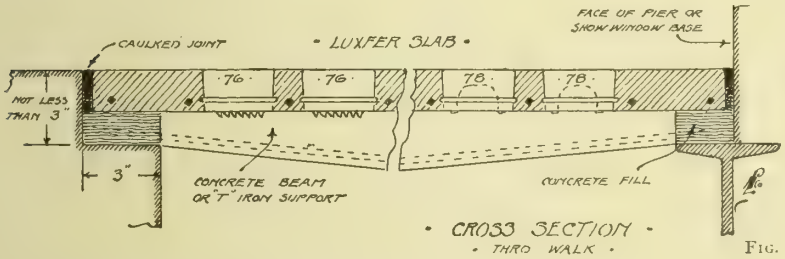


Fig. 8. LUXFER REINFORCED CONCRETE SIDEWALK LIGHT

Construct supports at building and curb as above, with cross or transverse beams spaced to support slabs of twenty to thirty square feet surface area, figured from center to center of supports

All reinforced with cold twisted steel tension rods separating the glass and running longitudinally and transversely across the opening. Top surface to be finished with equal parts crushed granite and Portland cement, or to have standard Luxfer "Crystolux" non-slip surface. All glass to be non-shaleable, type provided with expansion cushion and to be Luxfer No. 76 Prism or No. 78 Lens, or a combination of these two types. All of this work to be executed by the American Luxfer Prism Company's own skilled mechanics.

Note—We strongly recommend our No. 76 Prism for a wide distribution of the light in the basement, and our "Crystolux" finish on sloping surfaces where slipping is to be guarded against.

Note—For Ready-to-Set Slabs, specify:

Luxfer Reinforced Concrete Slabs made up complete at factory, containing Luxfer Prism No. 76 [or Lens No. 78] and, if desired, "Crystolux" Surfaced.

Note—For Perfect Non-slip Surface specify:

Work to be "Crystolux" Surfaced.

Adaptability—The Luxfer System of Daylighting is adaptable to all sidewalk installations as well as for roof lights, skylights, transom lights, ceiling lights, floor lights, vault lights, etc.

Luxfer Ready-to-Set Slab.

Consists of Luxfer Prism Sidewalk Lights made up at the factory, glazed complete, with any style of prism or lenses, from blue-prints or sketches showing the size of openings. These are used wherever contractor prefers to undertake his own installation. We send full setting directions. (Fig. 9.)

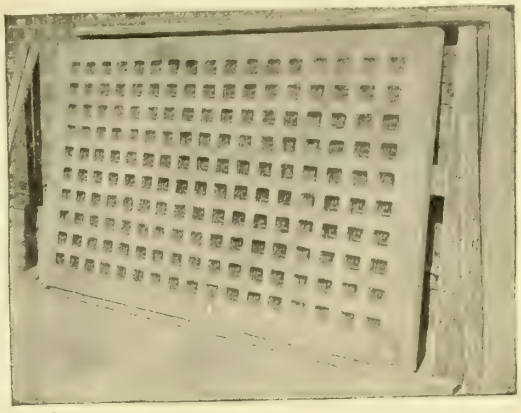


Fig. 9. LUXFER READY-TO-SET SLAB
Showing Method of Crating and Shipping

Cushion Protected Sidewalk Light.

This form of sidewalk construction represents the solution to the problem of shaling and breaking of the glass lights. Each light of glass is surrounded with a special protective waterproof composition coating, and expands and contracts with the concrete, relieving the glass light of all pressure. Set at the building by our own skilled workmen, or sent in ready-to-set slabs.

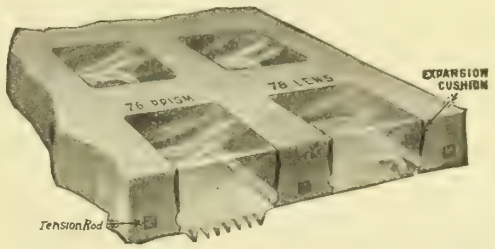


Fig. 10. LUXFER CUSHION PROTECTED SIDEWALK LIGHT
Patented Sept. 14, 1909

Luxfer "Crystolux" Non-Slip Sidewalk.

This form of Luxfer Sidewalk construction does away with the slippery surface represented in the ordinary sidewalk. Instead of the concrete being left smooth, it is purposely finished rough with mineral crystals in the top dressing. These minerals possess great abrasive and lasting qualities, and will not lose any of their non-slip properties through wear. (Fig. 11).

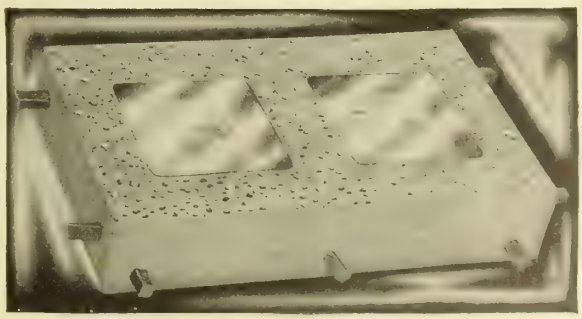


Fig. 11. "CRYSTOLUX" SURFACED NON-SLIP SIDEWALK

Continued on next page

Luxfer No. 98 Reinforced Concrete Roof Light, Floor Light and Skylight.

This is another Luxfer Product which combines the maximum load carrying capacity with a 70 per cent glass area. It is composed of heavy crystal glass units, 6½ inches square by 1¼ inches thick, set in reinforced concrete, with twisted tension steel rods running longitudinally and transversely. (Fig. 12.)

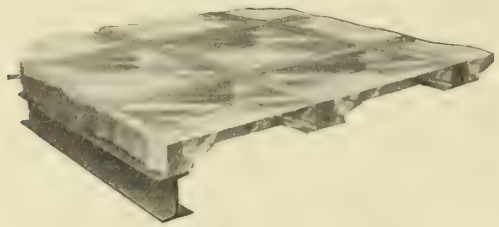


Fig. 12. LUXFER NO. 98 FOR ROOF LIGHT, FLOOR LIGHT OR SKYLIGHT CONSTRUCTION

Luxfer Prism Canopies.

Placed over windows at the rear, sides, and in the light wells of buildings, over store fronts, and wherever the direct admission of light is obstructed by high adjoining structures. These canopies are furnished in iron frames of revolving, stationary, or folding types, and are made plain or ornamental, as required.

Mill and Factory Daylighting.

The daylighting benefits of Luxfer for terminals, manufacturing plants, and warehouses are well known. Luxfer cuts down twenty-five to fifty per cent in the use of artificial light, and improves the working conditions considerably. Installed in ordinary window-sash as is plain glass. It is furnished cut to proper size, and may be installed in half or whole sash, as desired.

Luxfer Expanded Metal Lath.

Luxfer Expanded Metal Lath is a perfect finished product, made from open-hearth steel, full weight, heavy strand, and is most economical in use. It provides a stiff, rigid and even surface for the application of mortar with a perfect key or clinch. The sheets are 24¼ inches wide by 97 inches long, but are only charged for on the basis of 24 by 96 inches, giving the plasterer extra material for lapping in both directions.

Specify as follows: Metal Lath shall be Luxfer Expanded Metal Lath manufactured by the American Luxfer Prism Company, Chicago.

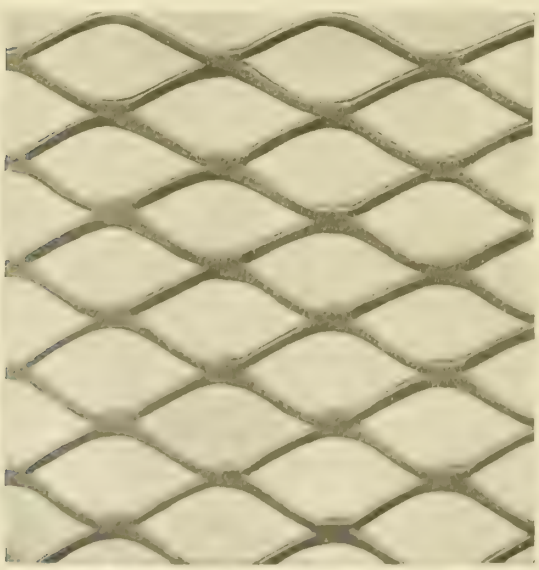


Fig. 13. LUXFER EXPANDED METAL LATH

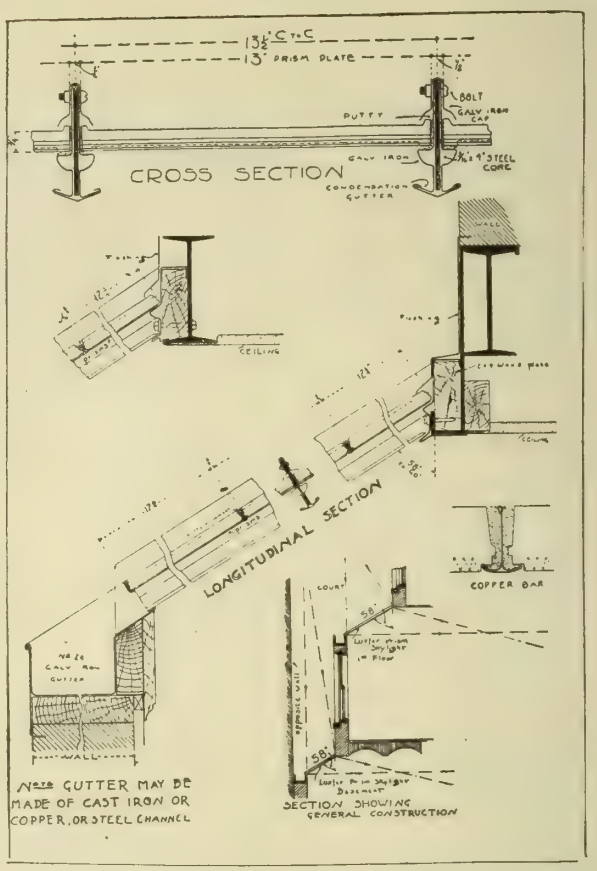


Fig. 14. DETAIL OF LUXFER PRISM EXTENSION SKYLIGHT CONSTRUCTION

Specifications—The contractor shall furnish and set No. 525 Skylight Prisms in all extension skylights where shown on plans. The construction shall be in accordance with the American Luxfer Prism Company's details for same, and shall be of galvanized iron [or copper].

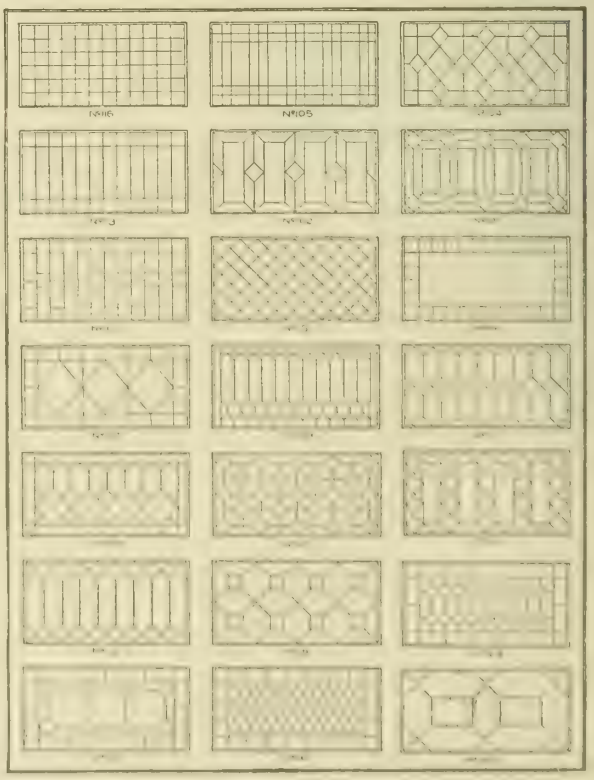


Fig. 15. LUXFER PRISMS GLAZED IN DESIGN

AMERICAN 3-WAY PRISM CO.

Distributers of Daylight

MAIN OFFICE AND FACTORY
LA PORTE, IND.

WESTERN OFFICE
CHICAGO, ILL.

EASTERN OFFICE AND FACTORY
NEW YORK, N. Y.

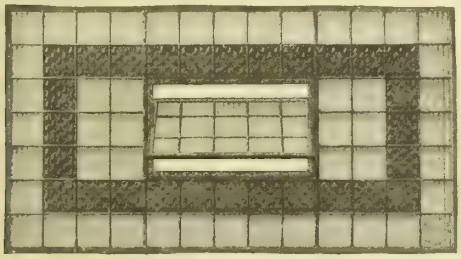
BRANCH OFFICES AND REPRESENTATIVES IN ALL LARGE CITIES

Products.

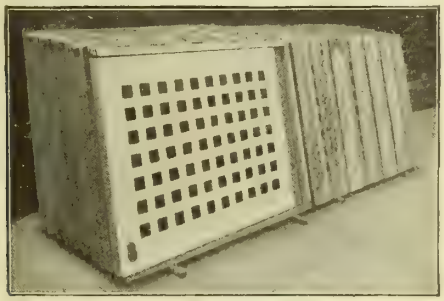
Prism Glass, including 3-Way Pressed Prism Tile, Flat-Back Pressed Prism Tile, Flat-Back Sheet Prism, Wired Sheet Prism, Glazed Tile Transom Lights with Plain or Colored Ornamental Border, Glazed Sheet Prism in Ornamental Designs, Transom Ventilators with and without Screens, Canopies of Pressed Prism Tile, Diffusing Sash of Pressed Prism Tile or Sheet Prism; Sidewalk Lights, Floor Lights and Skylights, including Fresnel Simplex, Screw Glass Simplex, Standard Simplex Vault-Light and Skylight Constructions, Paschall Interlocking Vault-Light and Skylight Constructions, Ransom Reinforced Concrete Sidewalk Lights and Floor Lights, Cast-Iron Vault-Light Constructions, Extension Skylights; Doors and Specialties, including Flush Water-Tight Sidewalk Doors, Coal Hole Covers, Vent Doors, Sidewalk Grating and other Cast-Iron Paving and Sidewalk Specialties.

Adaptability and Service of 3-Way Prism Products.

The efficiency of 3-Way products has been demonstrated by the many thousands of installations embodying millions of square feet. Our many years of experience have equipped us to successfully solve the most difficult daylighting problems.

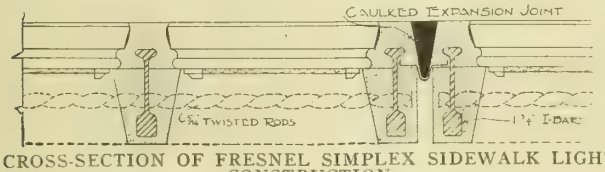


GLAZED 3-WAY, 4-INCH PRESSED PRISM TILE WITH ORNAMENTAL BORDER AND TRANSOM VENTILATOR



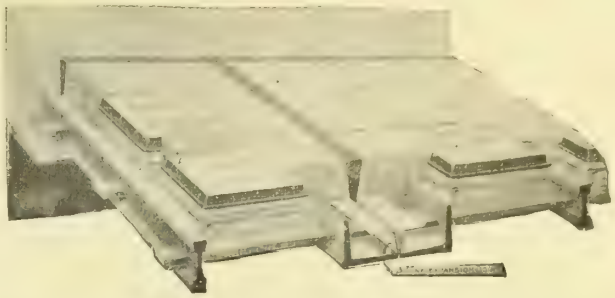
FACTORY-FINISHED REINFORCED CONCRETE SIDEWALK LIGHTS

Crated and received on job ready to set over openings. Furnished plain lens, 3-way prism, multi-prism and pendent prism



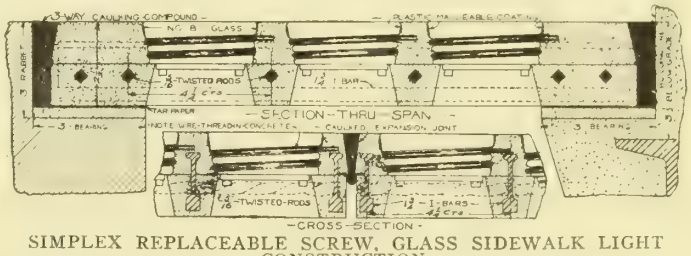
CROSS-SECTION OF FRESNEL SIMPLEX SIDEWALK LIGHT CONSTRUCTION

Showing I-bar reinforcing and method of making water-tight joints between sections. Maximum surface light area, 71 per cent greatest of any known



PASCHALL INTERLOCKING VAULT LIGHT CONSTRUCTION

Made in plain lens, 3-way prism and pendent prism 2⅞" square. For skylights and floor lights made with glass in 6" square



SIMPLEX REPLACEABLE SCREW, GLASS SIDEWALK LIGHT CONSTRUCTION

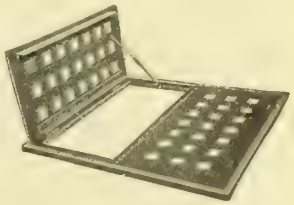
Strongest construction made, installed complete for $1.50 per sq. ft.; guaranteed for 5 years

Simplex Sidewalk Light Construction.

All glass made *replaceable* in round glasses 3⅛ and 3⅜ inches in diameter; also, in square glasses 3⅛ and 4 inches, and for floor lights and skylights in 6⅛ inches. (Send for new details.)

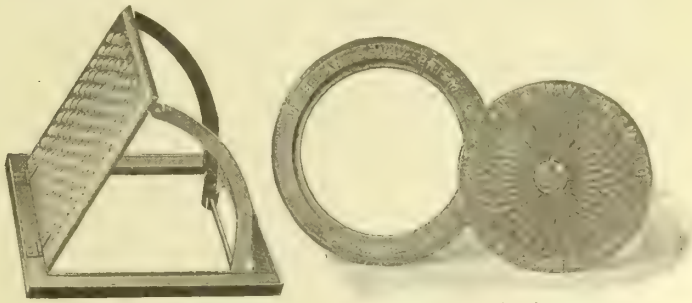
All glass made in both plain and prism of "Tanex" quality, specially annealed and guaranteed not to turn pink. All sidewalk light and skylight glass coated with plastic malleable compound to protect against expansion and contraction.

Sidewalk Doors.



TYPE "D" WATER-TIGHT SIDEWALK DOOR

Illustration shows 3-Way Type "D" flush water-tight sidewalk door with illuminated top, provided with brass hinges, flush ring lift, one cross bar, automatic hook locking device; gutter drilled and tapped for drain pipe connection. Also made in plain and diamond top.



Sidewalk Ventilator — Coal Hole Cover

SHOWING TWO OF OUR MANY STYLES

Catalogues and Service.

Special catalogues, blue-print details, price-lists, etc., sent on request. Large modern plant insures prompt execution of the largest orders.

PRESSED PRISM PLATE GLASS COMPANY

"Imperial" Prism-Plate Glass, "Imperial" Prism-Plate Ornamental Glass, "Imperial" Skylight Prism Plates and Special Designed "Imperial" Prismatic Glass

FACTORY

MORGANTOWN, W. VA.

SALES OFFICES

CHICAGO, ILL., 25 North Dearborn Street NEW YORK, N. Y., 44 East Twenty-Third Street

Products.

We are manufacturers of large polished plates of PRISM GLASS for exterior use, and of PRISM-PLATE ORNAMENTAL GLASS, both semi-obscure and transparent, for interior use. These are as far superior in brilliancy of finish to Rolled Glass, either Prism or Ornamental, as Plate Glass is to Window Glass.

We also manufacture large plates (unpolished) of SKYLIGHT PRISM GLASS, 18 by 60 inches with ½-inch backs.

Description and Advantages of Our Prism-Plate Glass.

Our large lights of Prism-Plate Glass, for windows and transoms, are ground and polished on one side like plate glass, and the prisms are sharp and smooth. This glass is supplied in all angles in cut sizes up to 82 by 72 inches; large enough to fill most sash openings in one piece. Any glazier can set it.

There are few corners to catch the dirt, and no wires to obstruct light, and it is easily cleaned. Its polished outside surface adds to the appearance of building. For these and other reasons it is far superior to Rolled Sheet Prism Glass, or small prism plates 4 or 5 inches square. (See Fig. 1.) This glass weighs 4 pounds to the square foot. Rabbets in sash should be made ½ inch deep.

"Ideal Windows."

Our "Ideal Windows" are used in modern office buildings, having one light of "Imperial" Prism-Plate Glass in their upper sash. (See Fig. 3.)

The new eighteen-story Woodmen of the World Building, Omaha, Neb., has installed "Ideal Windows" in all of its office windows on both streets, and is one of the best-lighted office buildings in the United States.

By beveling the edges of the prism side, or inside of the glass, the prisms can be cleaned almost as quickly as the polished glass.

Do you use prisms the new or old way?

Ground Backs.

We sometimes, upon request, put a satin ground surface on the back of our Prism Plates, instead of the polished back. This softens the sunlight and still preserves a fine prismatic effect.

Large Skylight Prism Plates.

Our Skylight Prism Plates, not ground or polished, are made in units 18 in. wide and 60 in. high, with backs ½ in. thick, and a smooth border around the prisms about ½ in. wide. They can be cut to smaller sizes if desired. Owing to the small number of joints, the possibility of leakage in the use of these large plates and the cost of metal construction in which they are placed is reduced to a minimum.

They are the best product on the market for lighting deep stores, for roofs of railway stations, sheds, factories, etc. Can be used horizontally, but give best effects when set at an angle of from 30 to 45 degrees. This glass weighs 8 $^{8}/_{10}$ pounds to the square foot.

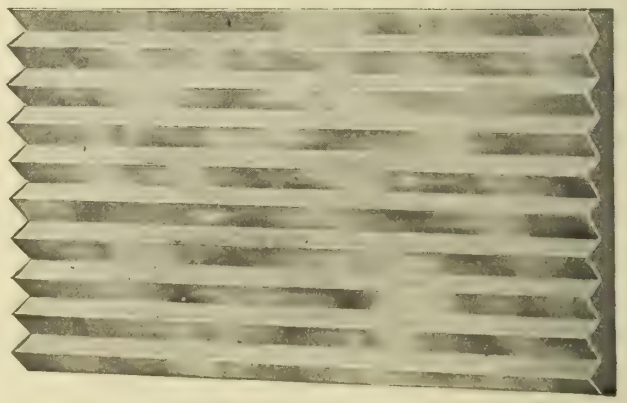


FIG. 1. "IMPERIAL" PRISM-PLATE GLASS

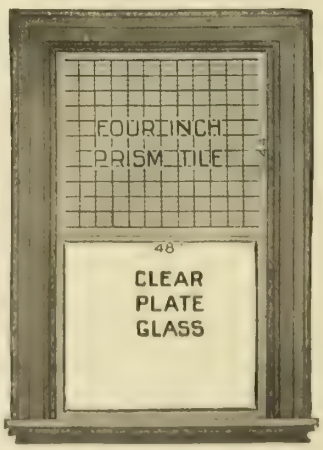


FIG. 2. OLD-STYLE PRISM TILE WINDOW

1056 corners and wires to catch dust

FIG. 3. AN "IDEAL WINDOW"

The new way: No wires; eight corners only to catch dust

Continued on next page

Large Lights, Ornamental Glass.

One of our new products is "Imperial" Prism-Plate Ornamental Glass, made in five stock patterns in cut sizes up to 70 by 82 inches, with ground and polished backs, and brilliant, sharp and clear patterns. (See Figs. 4, 5, 6, 7 and 8.) This plate glass product must not be confused with cheaper grades of glass that are rolled. The cuts below show full size of patterns.

This glass is used for office partitions, door lights, vestibule doors, and ornamental ceiling lights; for bank and other street windows, where semiobscurity is desired; and for any place where clear, white light is wanted, with ornamental design. It weighs 3½ pounds to the square foot.

Special Designs.

Special and exclusive designs furnished, if order is large enough to justify expense.

Special Designed "Imperial" Prismatic Glass is ground and polished on one side, and can be furnished with raised border lines, monogram centers, crests, raised letters, trade-marks, emblematic figures, etc. It is desirable for any use where a large number of lights or plates of one size and design are required.

Prices and further information furnished upon application.

Specifications.

To insure no imitation of our products, specify:
"Imperial Prism-Plate Glass."
"Imperial Prism-Plate Ornamental Glass."
"Imperial Plate Skylight Prism Glass."
"Imperial Prismatic Glass," Specially Designed.
Made by the Pressed Prism Plate Glass Company, of Morgantown, W. Va.

Prices.

Our Prism products cost slightly more than ordinary polished plate glass, and our Ornamental Glass is about the same price as chipped plate glass.

Territory and Facilities.

Our products are manufactured by patented methods and machinery, and are in use throughout the United States and Canada, and have been exported in large quantities to Europe. We carry a large stock of manufactured glass, and upon reasonable notice have facilities to fill orders of any size.

We solicit correspondence from architects, owners, and tenants. Send for our booklet, samples, and prices. Our glass can be procured from and is for sale by jobbers everywhere.

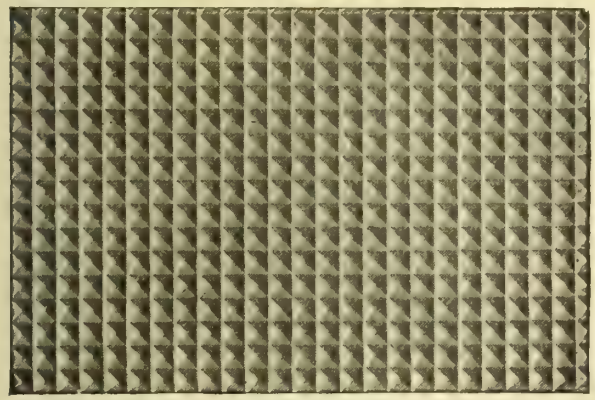


Fig. 4. (Semiobscure) Style O-1
"IMPERIAL" PRISM-PLATE ORNAMENTAL GLASS

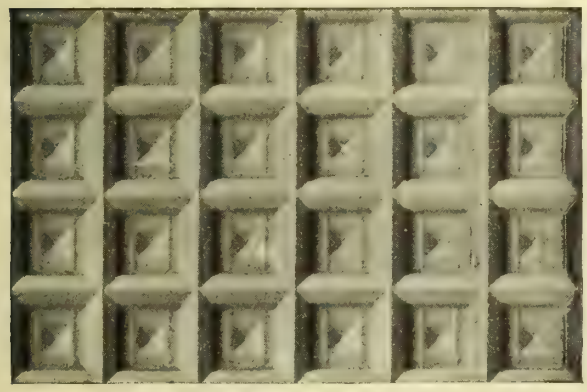


Fig. 5. (Semiobscure) Style O-2

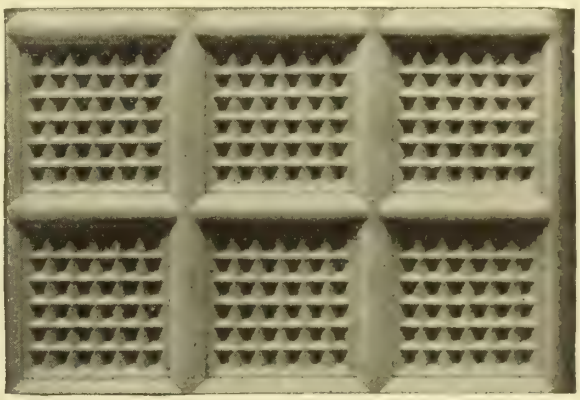


Fig. 7. (Semiobscure) Style O-4
"IMPERIAL" PRISM-PLATE ORNAMENTAL GLASS

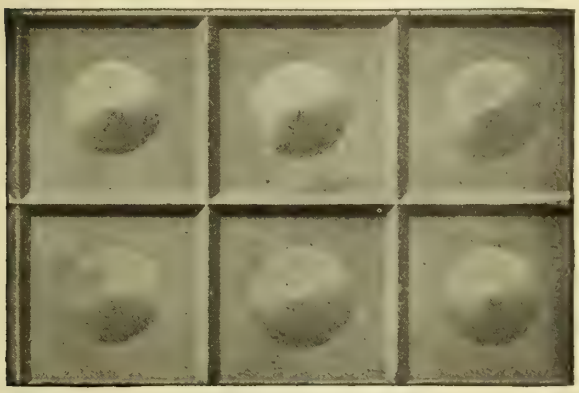


Fig. 6. (Transparent) Style O-3

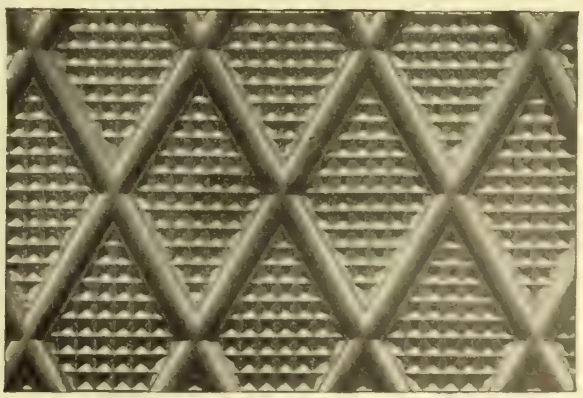


Fig. 8. (Semiobscure) Style O-5
"IMPERIAL" PRISM-PLATE ORNAMENTAL GLASS

THE BERGER MANUFACTURING CO.

MANUFACTURERS OF

Berger's "Raydiant" Sidewalk Light Construction and a General Line of Pressed Steel Building Specialties

CANTON, OHIO

BRANCHES

NEW YORK, N. Y., S. E. Corner 22nd Street and 11th Avenue
PHILADELPHIA, PA., Corner 16th Street and Washington Avenue
SOUTH BOSTON, MASS., 160-166 Broadway Extension
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., 16 South Tenth Street
MINNEAPOLIS, MINN., 300-312 Tenth Avenue, South
SAN FRANCISCO, CAL., 1120 Mission Street

AGENTS IN ALL PRINCIPAL CITIES

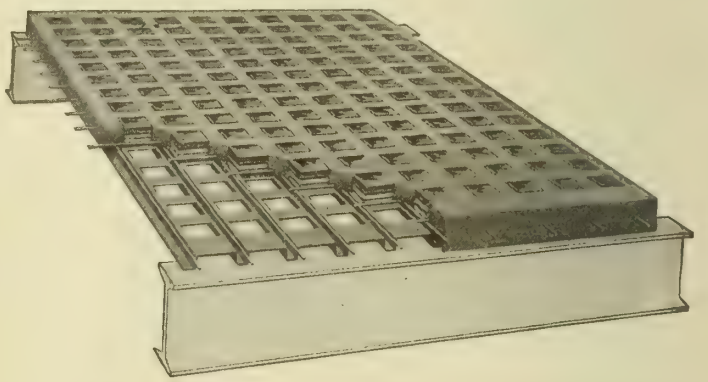
Products.

BERGER'S "RAYDIANT" VAULT, FLOOR, ROOF and SIDEWALK LIGHTS.

BERGER'S Raydiant
TRADE-MARK

Also, DOORS and VENTILATORS; COAL HOLE RINGS and COVERS.

See our name in General Index for Steel Ceilings, Corner Beads, Steel Cores, Metal Lumber, Pressed Steel Building Materials, Concrete Reinforcement, etc.

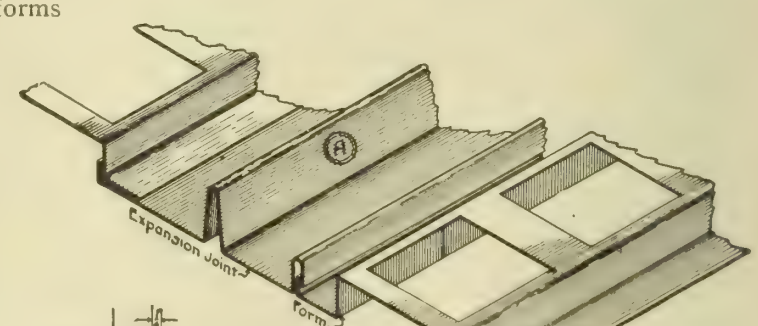


CONSTRUCTION DETAIL OF "RAYDIANT" SIDEWALK LIGHTS

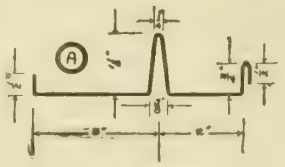
"Raydiant" Construction.

The "Raydiant" System is essentially a reinforced concrete system of Vault, Floor, Roof and Sidewalk Lights. It is doubly reinforced by both the steel forms and reinforcing rods and, due to this, is capable of carrying loads greatly in excess of the required sidewalk load.

The heavy galvanized forms are laid directly onto the bearings, after which the glass is inserted into the holes; the reinforcing rods are then laid and concrete is poured. Rods, forms and glass are thereby permanently bonded together by the application of the concrete, as shown by construction detail herewith.



ISOMETRIC PERSPECTIVE SHOWING USE OF EXPANSION JOINT-A



CROSS SECTION OF EXPANSION JOINT-A

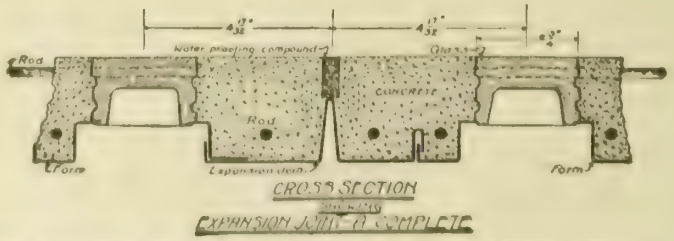
Expansion Joints.

Due to expansion and contraction of concrete slabs, an important feature in sidewalk light work is the provision of Expansion Joints properly spaced to absorb the movement of the slab.

Illustration opposite shows the detail of our standard expansion joint construction.

Joint runs parallel to and interlocks with forms, giving absolute water-tight joints.

They are spaced at intervals so that not over thirty square feet of surface is in one panel, with a less area where possible.



CROSS SECTION EXPANSION JOINT-A COMPLETE

DETAIL SHOWING STANDARD EXPANSION JOINT CONSTRUCTION

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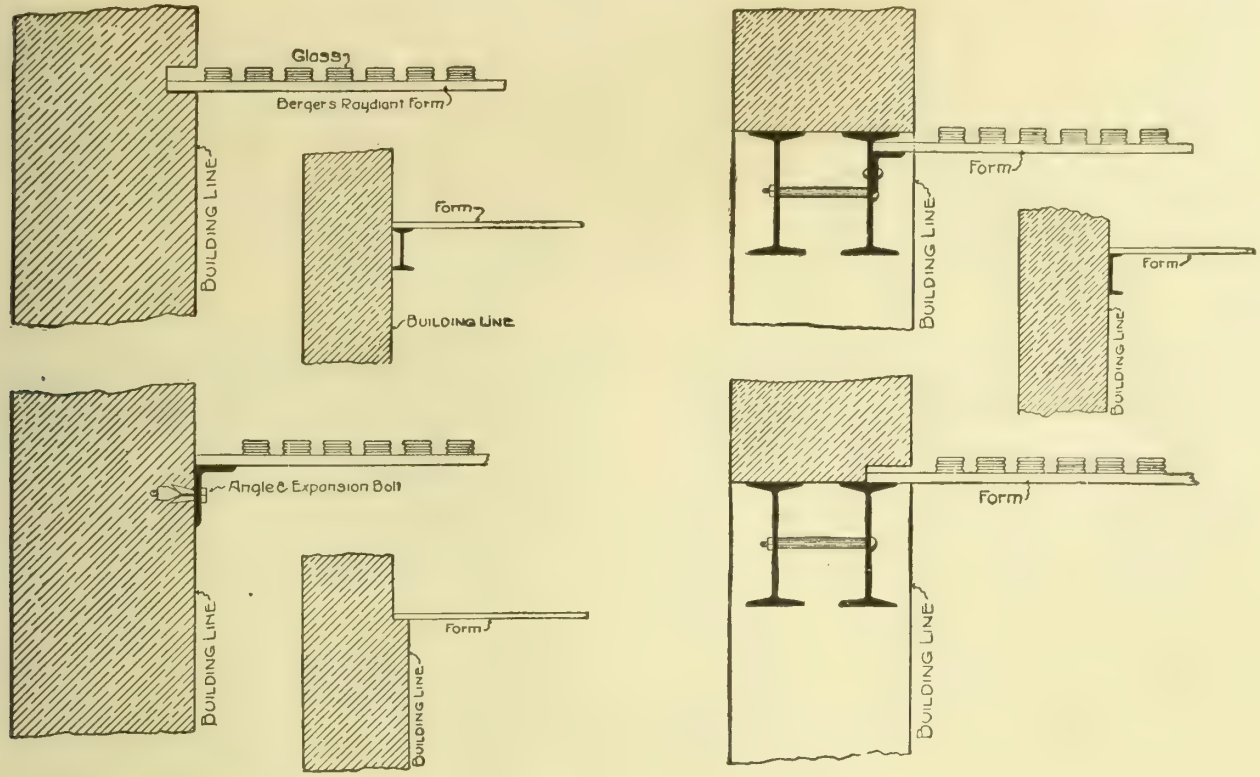


DETAILS SHOWING VARIOUS WAYS OF PROVIDING BEARING AT BUILDING LINE

Construction Details.

The above details show a few of the many ways bearing is secured at the building line.

In all cases where the sidewalk light construction secures bearing on the outside of building line, a joint ¼ inch to ½ inch wide through depth of slab should be left at that point and filled with expansion compound.

Furthermore, all outside edges of the vault light slab should be separated from the other portion of the walk by a ¼- to a ½-inch wide joint through to bearing, calked with expansion compound.

By separating the slabs in this way, opportunity is given for the action of the slab in contracting and expanding; and, furthermore, a water-tight job is assured.

TABLE OF SAFE LOADS FOR BERGER'S "RAYDIANT" SIDEWALK AND FLOOR LIGHTS—SAFETY FACTOR OF FOUR

Load in pounds per square foot uniformly distributed. Deflection in one sixty-fourths of an inch

SIDEWALK LIGHTS

Clear Span in Feet and Inches	DEPTH OF FORMS					
	1-Inch		1½-Inch		2-Inch	
	Load	Defl.	Load	Defl.	Load	Defl.
3–0	910	2	1060	2	1200	1
3–6	620	3	710	3	800	2
4–0	450	3	530	3	580	3
4–6	340	4	415	4	450	4
5–0	265	5	335	5	365	4
5–6	215	5	282	5	305	5
6–0	175	6	240	6	260	6
6–6	150	7	205	7	225	6
7–0	125	9	175	8	195	7
7–6	110	10	157	9	175	8
8–0	95	12	140	10	157	8
8–6	82	14	125	11	142	9
9–0	75	18	115	12	132	10
9–6	70	23	110	13	125	12

FLOOR LIGHTS

Clear Span in Feet and Inches	DEPTH OF FORMS		
	1-Inch	1½-Inch	2-Inch
	Load	Load	Load
3–0	270	600	800
3–6	210	465	615
4–0	165	345	450
4–6	130	270	340
5–0	100	220	275
5–6		180	230
6–0		150	190
6–6		130	170
7–0		115	135
7–6		100	120
8–0			100

NOTE—For the safe loads herewith the maximum deflection is *in no case* greater than $\frac{1}{16}$ inch.

Select the proper depth of form, recognizing the table of safe loads; and specify the style of glass desired to diffuse or refract the light to the desired distance.

Continued on next page

Tanex Glass, Malleable-Coated.

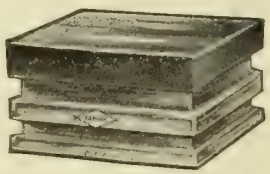
Appreciating the fact that a sidewalk light system is no stronger nor more durable than the glass used, we have spent a great deal of time, effort and money in perfecting a glass which today, we feel confident, is as close to perfection as the system itself.

In manufacturing Tanex Glass, special care is used in the annealing and in the selection of materials to produce permanent brilliancy, toughness and resiliency, which is so important to durability and long life.

Each glass is coated with a cushion compound applied around the sides near the top for the purpose of protecting the glass from the action of the slab when contracting and expanding, caused by temperature changes. This coating also gives absolute cohesion between the glass and concrete, thus providing a watertight, dependable and permanent job.

The different styles of glass are designed to scientifically diffuse or refract the light rays to various distances, and none of the styles are exactly alike or give the same results.

No. 5. Glass—Berger's No. 5 is the standard plain, square glass used for diffusing light to space directly below and immediately adjacent thereto. Being square, it presents the largest light area, gives greatest diffusion and is the most popular glass for general service. It is 2¾ inches square and 1½ inches deep.



NO. 5. PLAIN, SQUARE GLASS

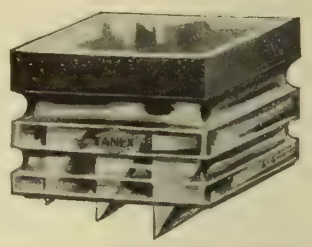
No. 6 Glass—Berger's No. 6 is the standard plain, round glass used for the same purpose as No. 5, but, being round, it presents less light surface. It is 2¾ inches in diameter and 1½ inches deep.

NO. 6. PLAIN, ROUND GLASS

No. 7 Glass—Berger's No. 7 is the standard square, pendant prism glass for refracting the light downward and back into deep basements. It is 2¾ inches square and 1½ inches deep, and has a deep pendant capable of refracting light at a great distance.

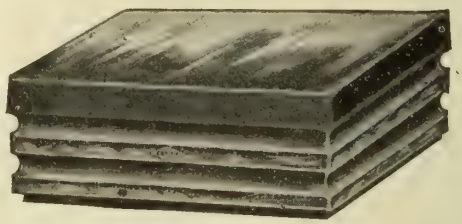
NO. 7. PENDANT PRISM GLASS

No. 8 Glass—Berger's No. 8 is the standard square, three-point prism glass for refracting the light downward and back into shallow basements. It is 2¾ inches square and scientifically designed on the multi-prism principle with a series of three prisms set at different angles to give the best results.



NO. 8. THREE-POINT PRISM GLASS

No. 9 Glass—Berger's No. 9 is the standard plain, square glass for roof, floor and skylight construction. It is 5½ inches square and 1½ inches deep.



NO. 9. FLOOR AND SKYLIGHT GLASS

Designed especially for the purpose mentioned where the loads are not so heavy and the light area must be of the greatest percentage possible. This size of glass is particularly well adapted for floor-light usage. Construction is built upon the Berger Steel Forms, the glass being spaced 6½ inches on center in either direction.

Depth of Bearings.

The depth that bearings should be located below the finished walk level is as follows:

2½ ins. when the 1 in. form is used.
3 ins. when the 1½ in. form is used.
3½ ins. when the 2 in. form is used.

Specifications.

"Sidewalk Lights shall be of the 'Raydiant' System, manufactured by The Berger Manufacturing Co. of Canton, Ohio. They shall consist of permanent galvanized steel forms ..... deep (see table of safe loads); Berger's No. ..... glass (see description of various styles), and one quarter inch reinforcing rods. After having been properly assembled, concrete together with one part first-class Portland cement to two parts clean, sharp sand. The work shall be completed in a workmanlike and satisfactory manner in accordance with manufacturers' directions."

Continued on next page

Points of Advantage.

The "Raydiant" System is doubly reinforced by permanent steel forms and reinforcing rods.

The "Raydiant" System is one of the strongest vault and floor light systems made.

The "Raydiant" System will span a greater distance, therefore provides an uninterrupted light area.

The "Raydiant" System provides the maximum amount of light, and glass is of the celebrated Tanex quality, malleable-coated.

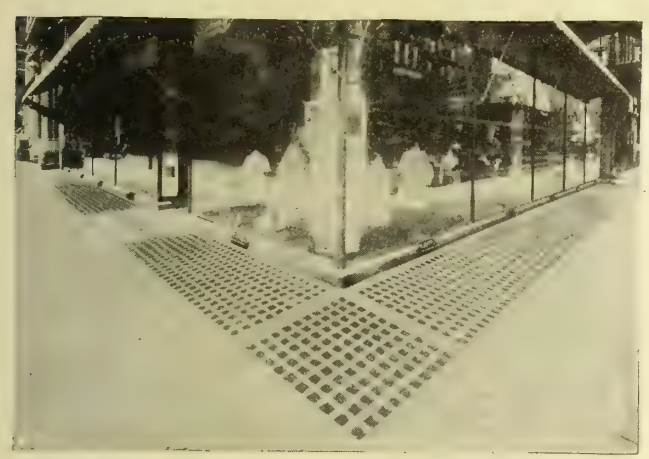
The "Raydiant" System requires bearing on two sides only.

The "Raydiant" System does not require false work or centering.

The "Raydiant" System is simple in design, therefore quickly and easily installed at a minimum expense.

The "Raydiant" System is absolutely waterproof.

The "Raydiant" System is competitive in price with other systems possessing a lesser degree of merit.

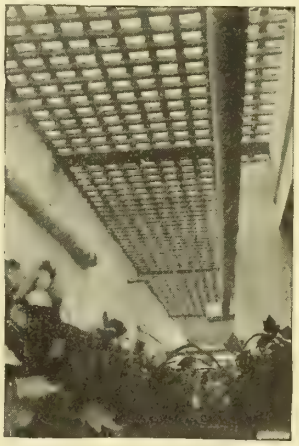


KAHN DRY GOODS STORE, PHILADELPHIA, PA.

VAULT LIGHTS INSTALLED IN FRONT OF MERCHANTS NATIONAL BANK BUILDING, INDIANAPOLIS, IND.

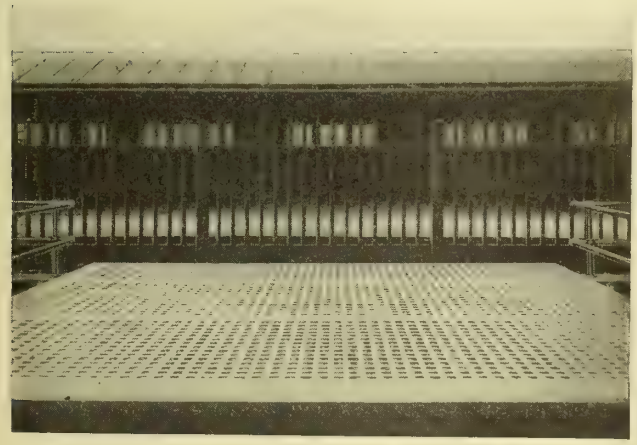
WHALLEN BUILDING, LOUISVILLE, KY.

BROWN-MARX BUILDING, BIRMINGHAM, ALA.

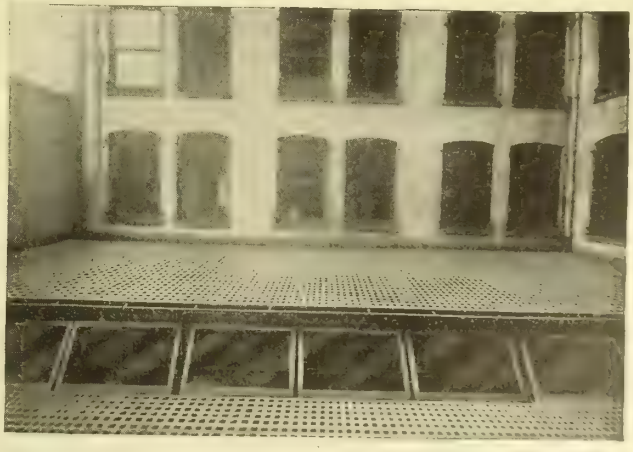


LYRIC THEATER BUILDING, RICHMOND, VA.

MUNICIPAL BUILDING, SEATTLE, WASH.



LIGHTS OVER TUNNEL, PENN R. R., E. PITTSBURGH, PA.
View from above



"RAYDIANT" SKYLIGHTS ABOVE COURT, FIRST NATIONAL BANK BUILDING, BIRMINGHAM, ALA.

P. M. BRUNER GRANITOID CO. ALBERT GRAUER & CO.

Frisco Building
ST. LOUIS, MO.

216 Columbia Street, East
DETROIT, MICH.

MANUFACTURERS AND BUILDERS OF

The " Bruner " System of Reinforced Concrete Specialties

BRANCH OFFICES AND AGENCIES

AKRON, OHIO, Flower Mantel Co.
ATLANTA, GA., Strafford R. Hewitt
BUFFALO, N. Y., Albert Grauer & Co.
CLEVELAND, OHIO, McWatters & Co.
ERIE, PA., W. J. Carson
FORT WAYNE, IND., Jocquel-Schulz Co.
LANSING, MICH., W. T. Britten
LIMA, OHIO, Lugabill Fuel & Builders Supply Co.
GRAND RAPIDS, MICH., Frank L. Dykema Co.
MONTREAL, CAN., Window Strip & Supply Co.
NEW YORK, N. Y., Albert Dahlman
PITTSBURGH, PA., J. B. Booth & Co.
ROCHESTER, N. Y., American Clay & Cement Corporation
SYRACUSE, N. Y., Paragon Plaster Co.
TOLEDO, OHIO, Building Products Co.
TORONTO, ONT., CAN., Scott, Hammond & Pratt
WASHINGTON, D. C., Southern Fire Proofing Supply Co.
YOUNGSTOWN, OHIO, Lau Iron Works Co.

Products.

The " Bruner " System of Reinforced Concrete Sidewalk Lights, Skylights and Floor Lights, used in Sidewalks, Floors, Vestibules, Roof Gardens, Fireproof Porch Floors, Tunnels, Subways, etc.

Also, Flush Plain and Illuminating Doors, with concealed hinges; Coal-Hole Covers and Rings; Vent Doors.

For Dustless Cement Floor Finish, see our name in General Index.

Method of Construction.

Fig. 1 shows a cross-section of the construction. The lights are carried on temporary metal forms assembled on the job, which are removed after the concrete has set, leaving only concrete and glass exposed below. The glass slab is carried by reinforced concrete ribs, spaced 4⅝ inches on centers, and 3½ inches or more in depth, according to the span, and set in the direction of desired light refraction. Wire hangers place the main reinforcing rods where they will give the best results and prevent exposure and serve also to tie the ribs to the slab.

This method allows the laying out of the work at the place of installation and produces the best results all around.

Expansion Joint.

Waterproof joints of tested reliability and durability are placed as required, usually twelve to fifteen feet on centers (Fig. 1).

Glass.

The glass used in the " Bruner " System is made for us by well-known manufacturers exclusively. It is thoroughly annealed and meets every requirement of strength, efficiency and durability.

Plain Glass No. 47 (3¼ inches square), indented slightly to increase efficiency, admits light direct without deflecting rays.

Multiprism No. 52 (3¼ inches square) is made with four prisms, each at a different angle, to effect the widest possible distribution of light from each, without directing it to the next prism in front.

Triple Angle Prism No. 46 (3¼ inches square) concentrates the light back into deep basements.

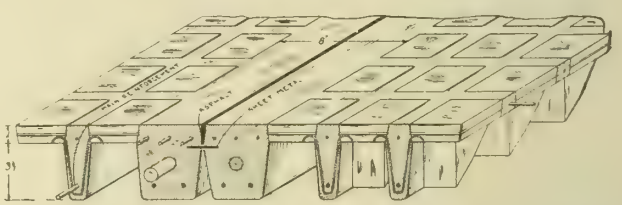


Fig. 1. CROSS-SECTION OF SIDEWALK LIGHTS, SHOWING EXPANSION JOINT

Bearings.

If possible, a rabbet four by four inches should be provided on four sides; yet the flange of a beam at the building and three or four inches on the area wall will suffice.

Wide Span without Beams.

The concrete ribs of the " Bruner " System can span sixteen feet in clear; lights and slab can be made in one span without extra support which would eliminate the light at those points, be unsightly and reduce head-room (Fig. 7).

Thin Slabs.

The " Bruner " System is based on a slab one inch thick, which allows free passage of oblique rays of light into basement, even without the use of prisms. This also facilitates annealing, and the flat surface below can be easily cleaned. A thick slab requires a thick glass that is harder to anneal, and if the glass is hollow below,

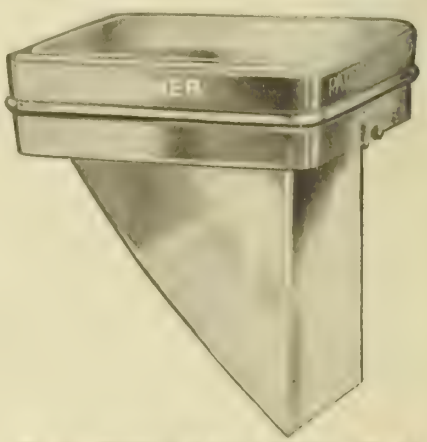


Fig. 4. TRIPLE ANGLE PRISM NO. 46

Fig. 2. PLAIN GLASS NO. 47

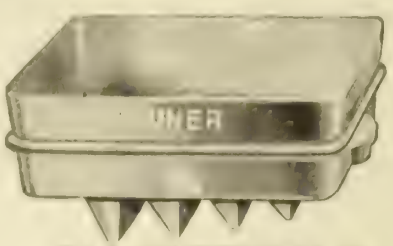


Fig. 3. MULTIPRISM NO. 52

Continued on next page

dust collects in this cavity. Also it can not throw light obliquely, but admits perpendicular rays only.

Loads.

Even more important than its light distributing efficiency is the strength of an installation of sidewalk lights. The "Bruner" System provides strength without sacrificing lighting efficiency. It weighs approximately forty pounds per square foot and is constructed to carry an evenly distributed load of three hundred pounds per square foot, twice the usual requirement.

Buckling and Sagging.

Buckling and sagging are obviated by depth of ribs. Our standard ribs extend three and one half inches below the glass, with proper reinforcing.

"Bruner" Skylights.

Figs. 5, 6 and 11 show the "Bruner" Skylight Construction recently placed on the market. Like other "Bruner" products it surpasses anything previously attempted in this line, and is rapidly replacing all older forms of metal skylights. Spans are made up to eighteen feet without auxiliary supports. This construction is admirable for roofs, porches, etc., and is sufficiently strong to be walked on when the span does not exceed twelve feet. Specify Glass No. 10.

Fig. 5. "BRUNER" SKYLIGHT CONSTRUCTION

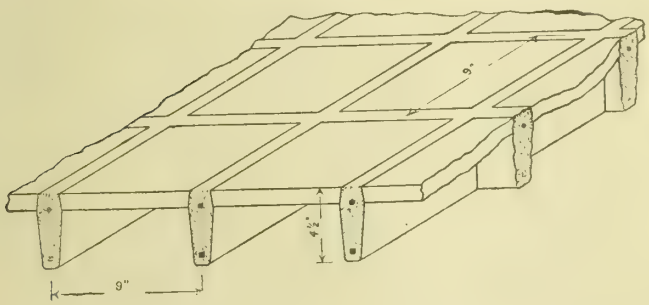


Fig. 6. DETAIL OF "BRUNER" SKYLIGHT CONSTRUCTION

Basement Lighting.

The "Bruner" System gives the greatest possible effectiveness in basement lighting, unlike the tendency observable among some other manufacturers to lessen cost at expense of efficiency by reducing glass area to a minimum. Many installations at the present time possess a lighting efficiency in the basement fifty per cent less than that of the "Bruner" System, while the cost of same shows a reduction of only twenty per cent; and, at their reduced prices, the purchaser undoubtedly paid about forty per cent more than its efficiency merits.

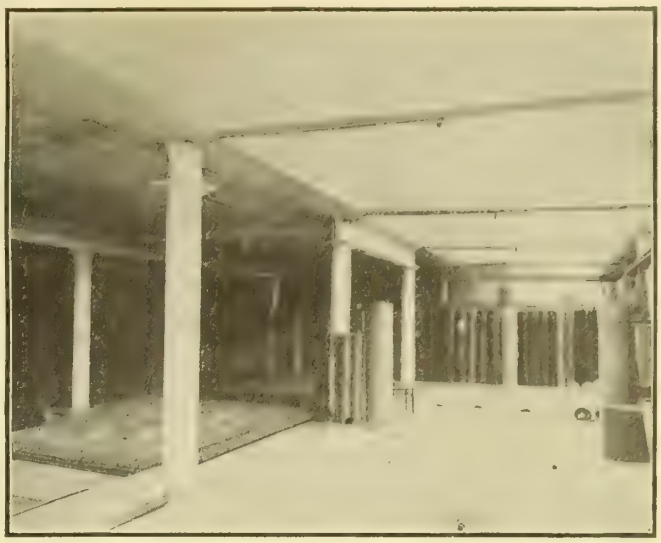


Fig. 7. BASEMENT ILLUMINATION FROM 13 FT. WIDTH OF GLASS NO. 46
Total span between supports, 16' 0"

When some of these inferior constructions are specified in company with the "Bruner" System of Construction it is impossible for us to compete successfully. The latter construction has been and always will be made to secure great strength and durability, combined with the maximum lighting efficiency that science can produce, irrespective of price. We give the greatest value for the money expended.

"Bruner" Floor Lights.

Figs. 8 and 10 give an idea of "Bruner" Floor Light Construction. We have placed large areas of these lights in the roofs of mausoleums designed by the leading architects of the country. On account of the monumental character of these buildings the "Bruner" System was selected from among competitors because it is designed to be as near everlasting as the other parts of the building.

The accompanying illustrations show the adaptability of the "Bruner" Floor Lights for effective use as skylights or roofs of various types.

Spans are made up to ten feet, without auxiliary supports. Specify Diffusing Glass No. 88 or Plain Glass No. 89.

No-Slip Plug.

Fig. 9 shows top of a glass in which is inserted a non-slipping abrasive plug. This is placed in the center of the glass where it is most effective, but cuts out not

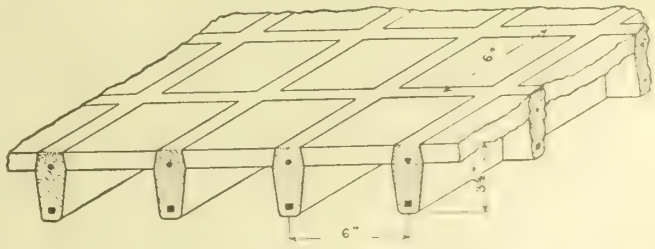


Fig. 8. DETAIL OF "BRUNER" FLOOR LIGHT CONSTRUCTION

Continued on next page

over two per cent of the light. Plugs are firmly set, but are easily replaced where worn. Specify Prism No. 90, Multiprism No. 96, or Plain Glass No. 97.

Fig. 9. PLAIN GLASS NO. 97
No-Slip Surface

Patented Repairing Feature.

Glass may become injured by hard usage or accident, but our system is so designed that we can renew the glass readily and the construction is not injured thereby, nor is the appearance of the work affected. This method is patented by us. We repair other makes of lights by our method.

Record.

The "Bruner" System has seen practical use and given satisfactory service for a period of over twenty years.

Installation.

Installations of the "Bruner" System are made in all parts of the United States and Canada, by our own skilled workmen, insuring perfect workmanship. We also make up complete ready-to-set panels to any specification, at any of our workshops.

Prices.

Catalogues and prices are gladly furnished on request.

The cost of an installation is determined by the quantity, the span and location and the style of glass selected. Our prices are scheduled and do not fluctuate. They are always lower than others when the lighting results and service are considered.

Specifications.

(1) Vault lights shall be constructed according to the "Bruner" System. The glass shall be "Bruner" No. ..... (In case reflecting lights are wanted, say: "The prism part shall be entirely below bottom of concrete slab. The paving shall be capable of carrying a uniform load of 300 pounds per square foot without injury to pavement.")

Glass shall be guaranteed for two years, and construction shall be guaranteed against leakage or defects of workmanship and material, or

(2) The vault lights shall be constructed of reinforced concrete and no metal shall be exposed above or below. The construction shall consist of a flat slab with ribs below, between rows of glass in one direction. The glass shall be one inch thick, flat; four point prism; triple angle pendant. (State which is wanted.) The glass shall not be made hollow below; the reflecting part of prisms shall be entirely below bottom of slab. The main reinforcement shall be held in suspended wire yokes; the reinforcement perpendicular to ribs shall be round rods placed between rows of glass. The concrete shall consist of one part of first-class Portland Cement and one and one half parts of sharp, clean sand, or its equivalent.

Co-operative Service.

As originators of Reinforced Concrete Sidewalk Lights, we offer, without charge, the benefit of our twenty-three years experience in the design of such installations. We have designed work for the largest railroad companies and for architects which was quite impossible with any other system.

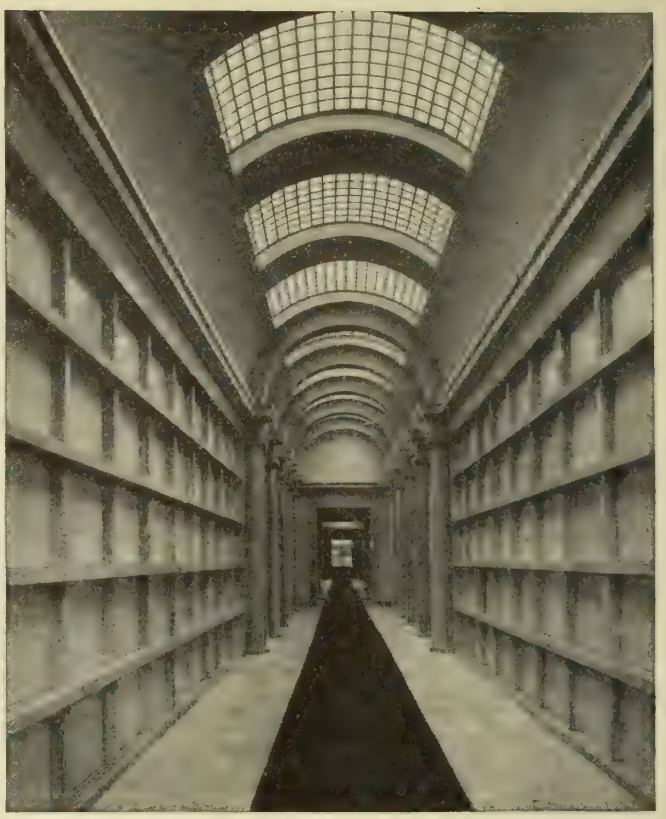


Fig. 10. "BRUNER" FLOOR LIGHT CONSTRUCTION

Fig. 11 SKYLIGHTS NO. 10, TECHNICAL HIGH SCHOOL, BUFFALO, N. Y.

Guarantee.

Every installation is guaranteed to remain waterproof and in first class condition for two years.

INTERNATIONAL VAULT LIGHT SUPPLY CO.

232 East Forty-second Street
NEW YORK, N. Y.

TELEPHONE, MURRAY HILL 1958

Products.

VAULT LIGHTS, FLOOR LIGHTS, SKYLIGHTS.

Construction.

A cast-iron vault light construction in units. Each glass is set in a separate cast-iron cup, and is surrounded with sulphur cement. This makes an absolutely water-tight job. Also, it prevents the glass from shaling or breaking through expansion and contraction. The cups are set in reinforced concrete, but no concrete touches the glass.

A Permanent System.

Many systems of vault light construction are not permanent, but require replacing after three to five years or less, entailing great expense and annoyance. The International System is a permanent system, with maintenance cost reduced to a minimum. This system has been thoroughly tried out. During three years of heavy wear and tear on busy thoroughfares none of our construction has ever leaked or required repairs.

The only practical system where a glass can be replaced without disturbing the surrounding concrete. Also, the replacing can be done at a very low cost and without the employment of skilled labor. Simply break out the glass, set a new one in the metal cup, pour hot sulphur around it, and the job is finished and without any patches.

All glass could be taken out and concrete platform would still remain intact.

Lens-holders shipped anywhere with glass, complete, ready to be placed in position.

Finish.

A distinctive and very valuable feature of this system is the under-finish. The metal cups spray off with flanges joining each other, forming a finished iron ceiling. No concrete or cement is seen. The cups may be painted with white enamel, but for high-grade work white baked porcelain finish is specified. This gives an elegant tiled ceiling effect, which is not only highly decorative but also perfectly sanitary. In addition, the white enamel increases the light to a marked degree there being no exposed concrete to cast shadows or absorb light.

Specifications.

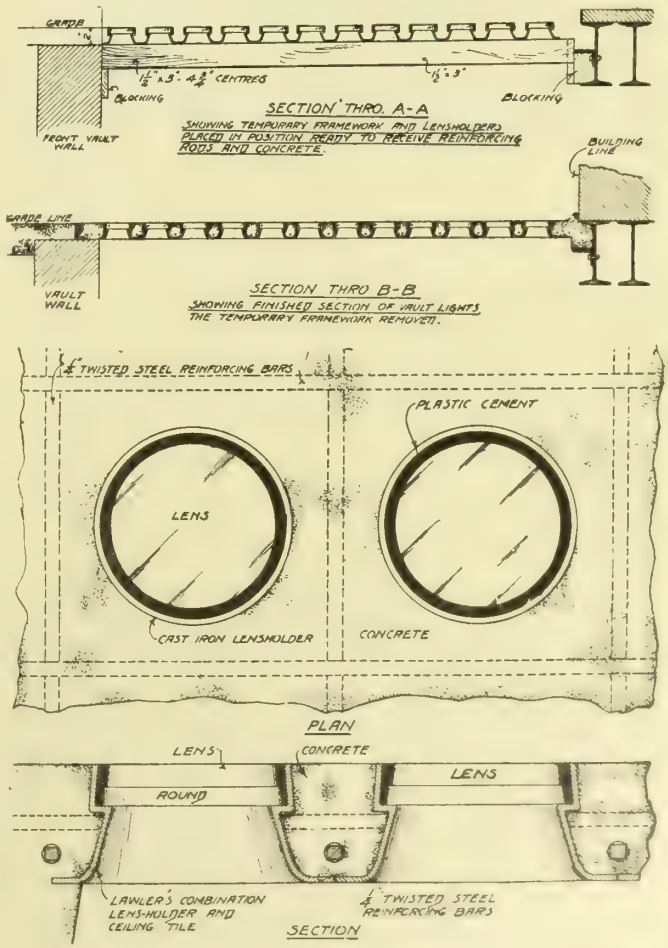
The Vault Light shall be a combination of reinforced concrete with a Cast-Iron Vault Light Lens-Holder for supporting and protecting the glass from expansion and contraction, as manufactured by the INTERNATIONAL VAULT LIGHT SUPPLY CO.

The Lens-Holder to be cast in one piece, and sprayed off at bottom to allow free access of light, with flanges joining each other, so as to form a tile effect on the underside. These lens-holders to be either porcelain enameled or painted on the underside, and to be set in reinforced concrete with ¼-inch reinforcing bars, running horizontally and transversally between each row of lens-holders.

References.

A few of the buildings where the unit cast-iron vault light system has been installed:

BUILDINGS AND LOCATION	ARCHITECTS
Jas. J. Hearn Department Store, 30 West 14th Street, New York, N. Y.	J. B. Snook's Sons
Post & Flagg Building, 38 Wall Street, New York, N. Y.	George B. Post & Sons
John D. Rockefeller Residence, Pocantico Hills, N. Y.	Wm. Welles Bosworth
Kingston Avenue Hospital Brooklyn, N. Y.	Clinton & Russell
Goelet Building, 402-404 Fifth Avenue, New York, N. Y.	Warren & Wetmore
New York Telephone Building, Albany, N. Y.	McKenzie, Voorhees & Gmelin
Long Island R. R. Co., Flatbush Avenue Station, Brooklyn, N. Y.	Company's Engineer
U. S. Capitol Building, Washington, D. C.	Government Engineer
Schermerhorn Building, 43-47 West 23rd Street, New York, N. Y.	H. J. Hardenbergh
Realty Trust Building, Washington, D. C.	Milburn & Heister
First National Bank, Durham, N. C.	Milburn & Heister
Halle Bros. Department Store, Cleveland, Ohio	Henry Bacon
Mayer & Frank Department Store, Portland, Ore.	Doyle & Patterson



DETAILS OF CONSTRUCTION VAULT LIGHT UNITS

IDEAL REPLACEABLE VAULT LIGHT CO.

Manufacturers of Vault Lights

SHEFFIELD, PA.

Product.

IDEAL REPLACEABLE VAULT LIGHT.

Description.

Metallic holders linked together in slab form. Links facilitate the fabrication of the slab, giving perfect alignment without the trouble and expense of templets. The links at the same time distribute concentrated loads and reinforce the slab.

The casting and link arrangement not only makes the assembling very simple, but permits, in addition, changes in grade without breaking the slab. Further, this system is adapted to curved or conical surfaces,

METALLIC HOLDERS LINKED TOGETHER AS THEY APPEAR IN REGULAR SLAB

doors, coal holes, etc., requiring no skilled men or complicated templets, a feature not known in any other system.

See illustration on opposite page, showing method of changing grade with Ideal Replaceable Vault Lights.

Simplicity.

The simplest construction and most practical system known. No previous experience necessary to assemble the Ideal.

Materials.

Highest grade of materials used throughout.

Glass—Ideal glass contains one and one half to two per cent of lead and no manganese, giving a tough glass and a fixed color. Guaranteed first quality in every respect.

Castings—All first quality malleable iron, made by one of the largest and best malleable iron companies operating to-day. Cast iron is much cheaper, but malleable iron is used to give greater strength and durability.

Connecting Links—Flanged out of A grade open hearth steel. Open hearth because of its toughness; identically the same quality as is used for steel bridges and buildings.

Sand and Cement—Only clean sand and the best cement used.

Full specifications and directions furnished when slabs are made outside our factory.

Strength.

Any concentrated load is distributed throughout the whole system due to each individual light being linked together.

Further, the links serve as reinforcement for the slab, and, where desired, rods may be used, making the system doubly strong.

By actual test the bare links and metallic rings supported a uniform load of 240 pounds per square foot. No other system built will sustain such a load without glass reinforcing or concrete.

Method of Replacement of Light.

To make a replacement the only supplies necessary are glass, extracting tool and waterproofing cement.

First step consists in removing old cement with hook end of extracting tool (Fig. 1).

Second step, insert knob of extracting tool in groove of old glass and lift broken light out.

Next, drop new glass into place and the shape of the opening makes the seat self-centering, assuring the same alignment as when originally placed.

Finally the waterproofing is placed, which can be done in any kind of weather (a feature not known to other systems). This completes the operation which can be done in a fraction of the time necessary with other systems.

FIG. 1. REMOVING ELASTIC CEMENT WITH EXTRACTING TOOL

FIG. 2. TAKING OUT OLD LENS WITH EXTRACTING TOOL

FIG. 3. DROPPING IN NEW LENS

Advantages.

Replaceability—This word is very often misleading when used in connection with a sidewalk or roof con-

Continued on next page

struction in concrete and glass. For example, the property owner or the contractor may assume that the glass in all replaceable sidewalk or roof systems is easily replaceable. Further investigation, however, proves that this is not true in all cases and too much care can not be given to decide on the proper system to install.

In the Ideal System the replacements are not only possible, but very practical—exceedingly simple and inexpensive.

In no other system is it possible to have anybody make the replacements, thereby eliminating all the cost of skilled labor, making the replacement for the actual cost of the glass only.

No skilled concrete workers required, neither in the first construction, nor in the replacements.

One man only is necessary to make replacements and he remains on the outside. Other systems require two, one man on top and one man underneath.

No scaffold necessary, as all replacements are made from the outside as stated above. This one advantage in the case of train shed roofs and deep cellars results in an immense saving of time and money.

Not necessary to remove everything from under your sidewalk to replace a new glass, if you have the Ideal installed.

One size of glass for original work or for replacements, thereby eliminating the possibility of confusion.

With fewer sizes of glass a smaller stock on hand results in an advantage of importance.

With the Ideal, replacements can be made in any kind of weather, which means that the cost of the sidewalk can be saved by being able to replace a cracked or broken glass as soon as the defect occurs and before the cellar is flooded and goods destroyed.

Because of the ease and simplicity of the Ideal System, repairs are made as they are needed, which results in a walk or roof in good condition at all times at a material saving to the owner, adds years to the life of structures and is a good advertisement.

Length of Life—In the Ideal System replacements do not disturb the concrete and it is only reasonable that the life of the slab will be much longer than it would be where many patches appear and as many different men have mixed all kinds of materials and no two mixtures alike.

Glass Temper—Because of the smaller amount of glass in the Ideal and its circular shape, we get better temper than is possible with other forms. In addition to the above advantage, we have specially constructed lehrs which prove by test to be the most efficient made.

Shape of Glass—This feature makes it possible to get a more homogeneous mass, and, further, the thin lens reduces the dead load on the slab, allowing just that much additional live load.

Waterproofing.

This material not only makes a perfect seal, guarding against leaks, but also acts as a cushion to take care of the expansion and contraction of the glass due to atmospheric changes.

It is a well known fact that expansion and contraction cause at least 95 per cent of the breaks in sidewalks and roof construction. This can be attributed to the failure in most systems to provide a cushion to take care of the additional volume and to take up the stress caused by expansion. To merely dip the glass will not provide for the expansion.

In the Ideal a band of elastic waterproofing one eighth inch thick extends around the whole light. To provide for such part of this cushion as might be forced out by expansion and worn away by the traffic on the slab in the case of a sidewalk, an additional or auxiliary cavity is filled with this elastic waterproofing. The shape of this cavity is such that the elastic cement remaining gradually drops to the lowest level, filling and sealing the space between the glass and the casting.

Form for Shipment.

Finished slabs shipped direct from the factory; or where the freight rate is prohibitive, we will furnish the glass, metallic rings and links. Fabrication to be done by the property owner or by local contractor, thus avoiding the freight expense on sand and cement which can be readily purchased from any local dealer.

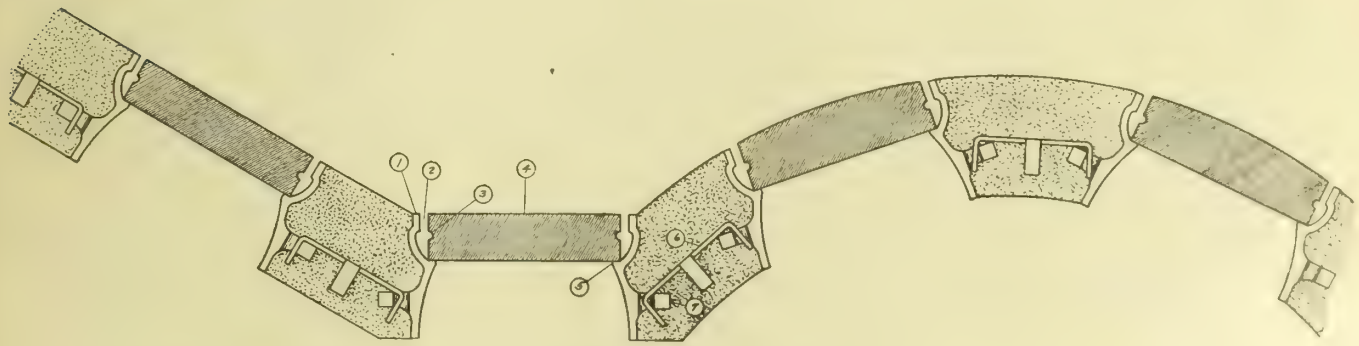
The simplicity of construction makes it practically impossible to make a mistake. Certainly there is no way to avoid perfect alignment, and the self-centering castings take care of the position of the glass and they are automatically centered. Castings could not be placed upside down, as the links would not connect them, showing at once something was wrong.

Information.

Prices and further information furnished on application.

References.

C. H. Smith Co. and Sheffield National Bank, Sheffield, Pa.



METHOD OF CHANGING GRADE WITH IDEAL REPLACEABLE VAULT LIGHT SYSTEM

1. Malleable Holder Ring
2. Opening for Elastic Cement.
3. Groove to facilitate extracting lens
4. Replaceable Ideal Lens
5. Supporting Shoulder
6. Connecting Link
7. Connecting Link Lug

MULLEN REPLACEABLE VAULT LIGHT CO.

GENERAL OFFICES
Fulton Building
PITTSBURGH, PA.

Products.

MULLEN "REPLACEABLE VAULT LIGHTS" for Floors, Sidewalks and Skylights.

TRADE-MARK

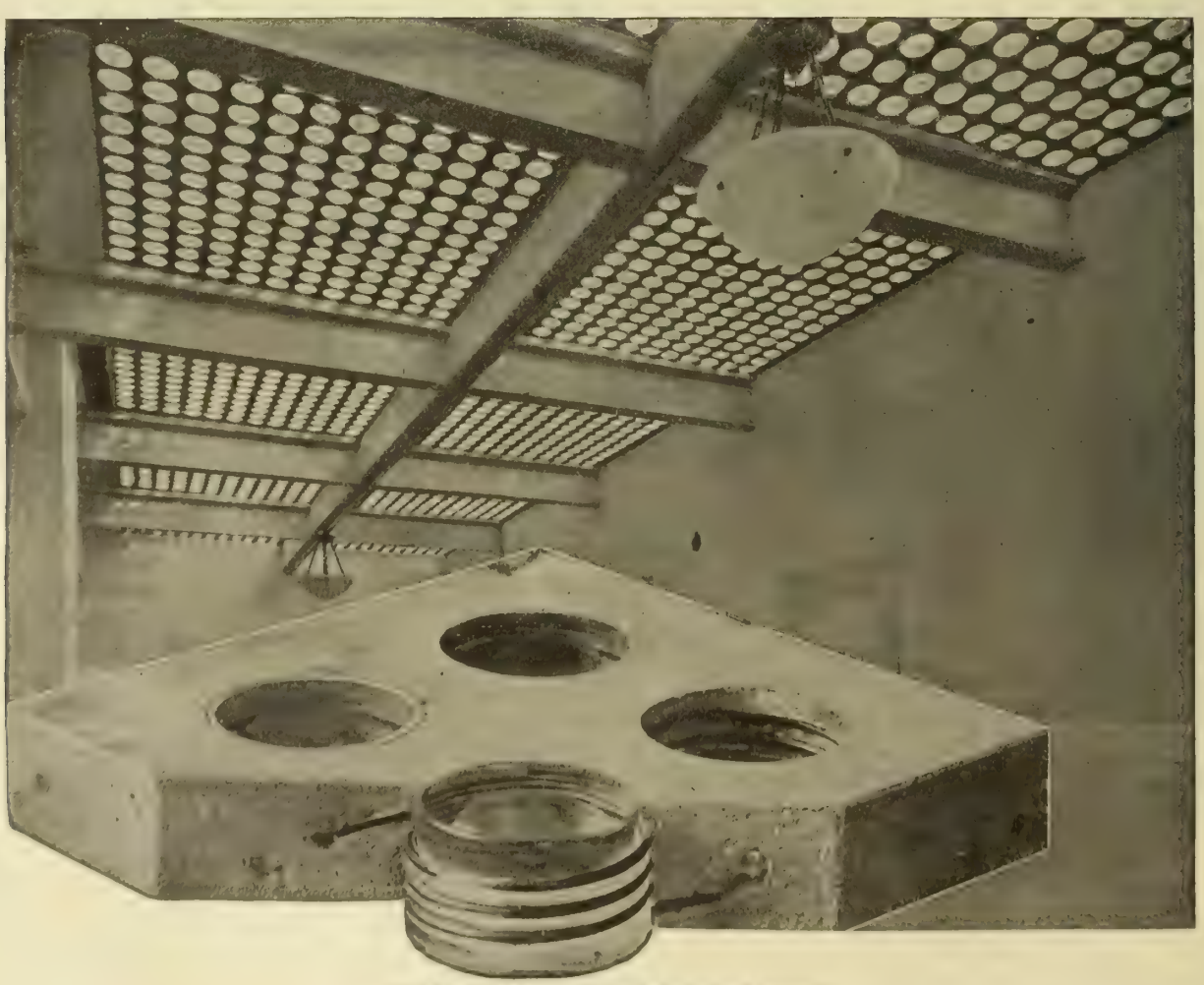
Description.

The Mullen "Replaceable Vault Light" was produced and placed on the market to provide a vault light which would not only give the best results in light, strength of construction, pleasing appearance and durability, but would also provide the buyer with a perfect means by which broken glass could be easily replaced, adjusted and made perfectly water-tight in a few moments' time without injuring the durability or neat appearance of the walk in which they are installed.

This vault light consists of a circular, threaded glass, with a wire spring screwed into and following the threads that are cast in the circumference of the glass. The wire terminates at each end in an arm, which is given an upward and downward turn in order to make the anchorage in the concrete more secure. The glass with the wire spring around it, as shown by accompanying illustrations, is placed in the walk and the concrete poured in and worked down in the usual way. When a glass becomes broken it can be knocked out, leaving the wire firmly cast in the concrete to form a clean, smooth thread into which the "Replacement" glass may be turned after the sleeve has been coated or buttered with a thin layer of waterproofing paste.

Method of Inserting Glass.

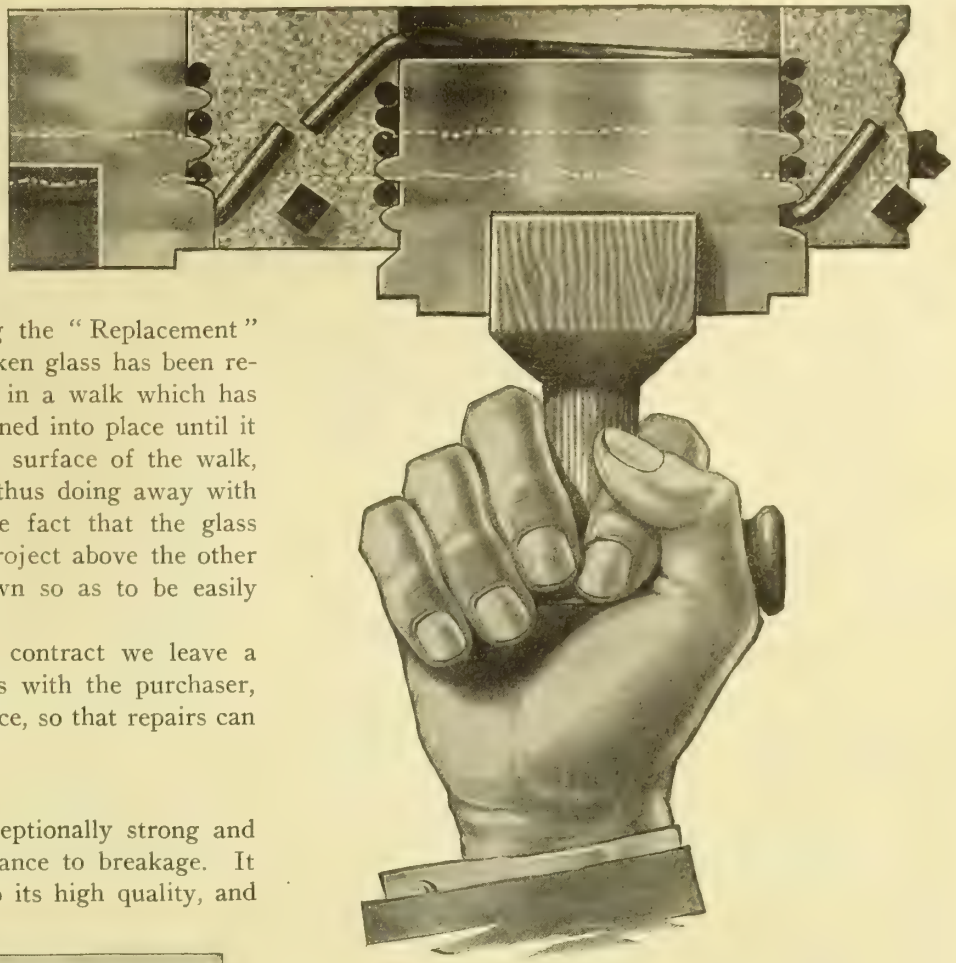
The illustration below, from photograph, is a good example of the light admitted where the Mullen system of "Replaceable Vault Lights" is used. The insert of slab containing four glasses shows how neatly glass can be broken out and replaced. One glass remains in place as originally installed and one has been removed to show how the spiral wire forms a thread to receive "Re-



MULLEN "REPLACEABLE VAULT LIGHTS"
Shows method of inserting glass

Continued on next page

placement" glass. The glass to the left has been replaced and the one in the immediate foreground is shown partly in section to illustrate how firmly the wire is imbedded in the slab.



METHOD OF REPLACING BROKEN GLASS

Replacing Broken Glass.

The accompanying illustration shows method of turning the "Replacement" glass into place after the old broken glass has been removed. When installing a glass in a walk which has become worn down, it can be turned into place until it comes flush with the worn-down surface of the walk, and can be left in this position, thus doing away with the heretofore very objectionable fact that the glass replaced in an old walk would project above the other glass that had become worn down so as to be easily kicked out of place or broken.

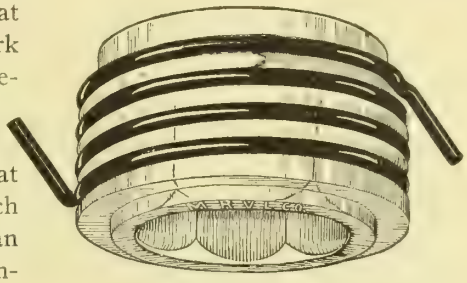
On the completion of each contract we leave a quantity of "Replacement" glass with the purchaser, and key for turning same into place, so that repairs can be quickly made if necessary.

Glass.

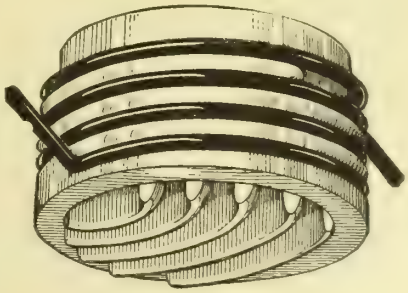
The glass used is made exceptionally strong and tough to offer the greatest resistance to breakage. It is perfectly transparent, owing to its high quality, and admits the daylight so completely that by its use dark and useless basements are turned into cheerful sunshiny rooms that are often much better lighted than those having windows fronting on the street.

THE ROSENBAUM CO.'S DEPARTMENT STORE, PITTSBURGH, PA.

JARVIS HUNT, Architect JAMES L. STUART, Contractor
Mullen Replaceable Vault Lights and Roof Lights used



PLAIN LENS GLASS NO. 1-0



PRISM GLASS NO. 2-0

How to Specify.

For vault lights, if the latest and most improved construction is desired, one which will give the maximum amount of light, strength and durability and at the same time provide the owner with a quick and convenient means of replacing broken glass, specify the Mullen "Replaceable Vault Light," stating what type of glass is desired.

For further information write for catalogues and details.

RICHARDS & KELLY MANUFACTURING COMPANY

Manufacturers of Prismatic Lights

309-311 West Twenty-Third Street

CHICAGO, ILL.

Products.

We are manufacturers of Cast-Iron Sidewalk Lights, Reinforced Concrete Sidewalk Lights, Floor Lights, Cast-Iron Skylights; Sidewalk Doors; Sidewalk Gratings; Coal-Hole Covers.

Cast-Iron Sidewalk Lights.

These lights are constructed of cast-iron panels set in cast-iron framework. The panels are glazed with glass set in concrete, or with the old-style knob or Hyatt Light, in which the glass is set with brimstone cement.

Floor Lights.

Floor Lights are constructed of cast-iron panels glazed with either four-inch or six-inch square glass.

Reinforced Concrete Sidewalk Lights.

These lights are constructed of a body of concrete 1⅞ inches thick, reinforced with ¼-inch steel bars, with four-inch centers, in which the glass is set.

Glass.

(1) Cast-Iron Construction:

2-in., 2½-in., 3-in. diameter, 3 by 3-in., 2½ by 3½-in. Plain Lenses; 2-in. and 3-in. diameter Pendent Lenses; 2½ by 3½-in. Double Pendent Lens; Knob Light Glass 1⅝-in. diameter, Plain and Pendent Lenses.

(2) Reinforced Concrete Construction:

2¾ by 2¾-in. Plain Lens, Multi-Prism Lens, Pendent Lens; 3-in. diameter Plain Lens.

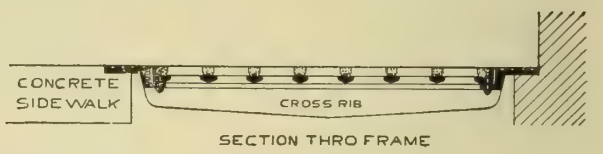
All glass for reinforced concrete construction has elastic coating.

Sidewalk Doors.

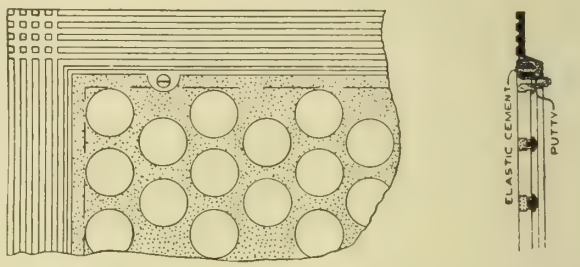
We manufacture doors of plain or diamond steel, or of cast iron glazed with plain or refracting lens glass set in concrete or brimstone cement. Doors are fitted with hooks to hold open, with lift rings, brass hinges, and slide bolts to lock from under side. On flush doors the frames have a gutter around inside edge to carry off water which seeps through the joints between the frame and the door. Doors can be furnished with worm gears if required.

Coal-Hole Covers.

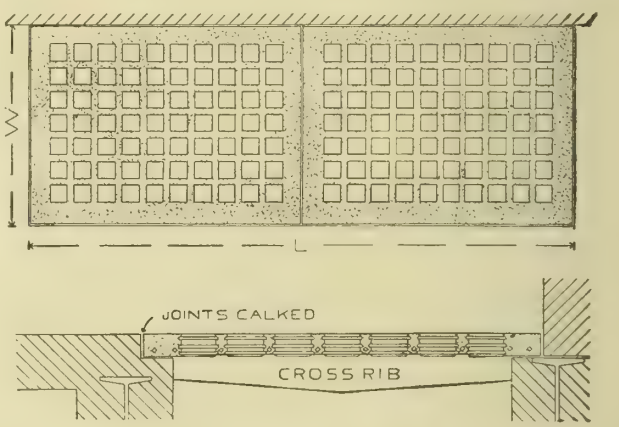
We manufacture and carry in stock a complete stock of Covers and Grates, 16, 18, 20, 24, 26 and 28 inches in diameter, plain or with glass. We also carry rings and thimbles to fit the various covers and grates.



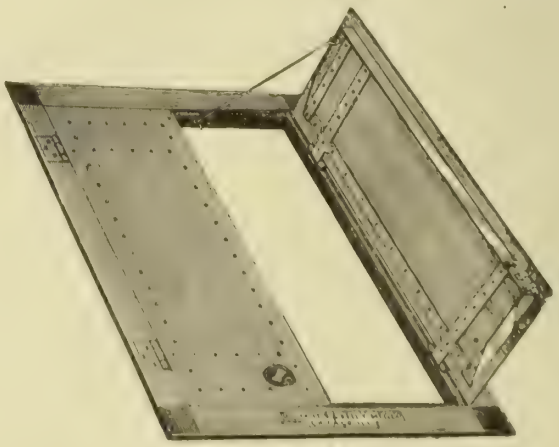
SECTION THRO FRAME



DETAILS SHOWING CONSTRUCTION OF CAST-IRON SIDEWALK LIGHTS, CONCRETE SETTING



DETAILS SHOWING CONSTRUCTION OF REINFORCED CONCRETE SIDEWALK LIGHTS



SIDEWALK DOORS

Sketches and Prices.

Send sketches or dimensions of work required and estimates will be furnished promptly. Prices given f.o.b. cars or set in place at building.

HEINIGKE & SMITH

Stained and Leaded Glass and Glass Mosaic

24-26 East Thirteenth Street

TELEPHONE, STUYVESANT 762

NEW YORK, N. Y.

M. GRAY CARREL, MANAGER

REPRESENTATIVE

WASHINGTON, D. C., THOMAS A. BRIGHT, Commercial National Bank Building

Products.

Manufacturers of STAINED, PAINTED and LEADED GLASS, and GLASS MOSAIC.

General.

Materials are available to all manufacturers of leaded glass alike and skilled mechanics are plentiful. Superior results are attained only through scholarly and thoughtful design and selection of material, and the adherence to standard and safe methods.

Stained and Leaded Glass Design.

The types of ornament, whether in small panels or covering the entire window, may be classified as conventional, pictorial, symbolic, heraldic and figure. The cost is from $1.50 to $100.00 per square foot, depending upon the amount and quality of labor and material, and the time and ability required for designing and research. Where unusual problems in tradition, symbolism and heraldry are involved, the expense of research is naturally greater.

Leaded Panes.

The simplest and least expensive form of leaded glass is the diamond, or rectangle, pattern. Its cost increases as the size of the pane decreases, and as the width of the lead came increases. It is impossible to cover the question of price, but $1.00 per square foot for 5½ by 8 inch panes with ⅜-inch cames is a safe approximate estimate, where a good quality of double thick window glass, or domestic makes of obscure glass in crystal or color, are used.

Construction.

No leaded glass should be erected without the support of "wiring," "stiffening" or "saddle" bars for both mechanical and æsthetic reasons.

The frame or sash, of whatever material, should be made in the same manner as when ¼-inch plate glass is to be accommodated.

Where leaded glass is to be set directly into stone grooves, the grooves should be ½ by ½ inch on one side and ½ by ¾ inch on the other.

Glass Mosaic.

Best results in this work are obtained by a combination of several kinds of material, because where one excels in the quality of its reds, another affords better blues, etc. Depth and vigor are the chief elements of superiority of mosaic over pigment for mural decoration. Another advantageous feature is that mosaic is absolutely permanent and can be renovated with a wet cloth.

The ideal construction is obtained with a masonry base and a Portland Cement bond, but some of the most prominent authorities have recently endorsed metal lath. If the latter be used it is economy to provide that the mason contractor finish to ½ inch below the required face of the finished mosaic with a rough coat of cement mortar. The method of casting a surface in sections and assembling them in place has also been largely resorted to.

How to Specify.

The specification form which has given most satisfactory results to every one concerned is in general as follows:

The general contractor shall pay to a manufacturer selected by the architect, $..... per square foot, for furnishing and erecting the leaded glass in (a list of openings). The glass here specified shall be wind- and water-proof in both fabric and erection, for one year from the date of erection, under usual service.

This eliminates the middleman, who reaps a harvest by sub-letting at one half or one third the specified price. If no defects develop in a year the work is well done and will last indefinitely.

Co-operation.

When circumstances make it necessary to hold an open competition, a schedule carefully made, in the following form, would elicit the closest possible figures. We are prepared to furnish such technical information and advice as may be necessary for the preparation of such a schedule.

SPECIFICATION DATA

Location Room	Window Number	Width	Height	Kind of Glass	Came	Price	Design *

*The design may be specified as "Quarry," "Simple Geometric," "Elaborate Geometric," etc.; or by reference to a detail drawing; or reference to existing examples accessible in themselves or by reproduction.

Notable Heinigke & Smith Installations.

Stained and Painted Windows—Chapel of All Saints, Old Trinity Church, New York, Thomas Nash, Architect; St. Thomas Church, New York, Cram, Goodhue & Ferguson, Architects; Lowe Memorial, Christ Church, Bay Ridge, N. Y.; The Simons and Watson Memorials, St. Agnes Church, West 92nd Street, New York; Ceiling Lights over stairs and bank, Woolworth Building, New York, Cass Gilbert, Architect; Bank of Montreal, Winnipeg, Man., McKim, Mead & White, Architects; Municipal Building, Waterbury, Conn., Cass Gilbert, Architect; Side Windows of the sanctuary, Holy Trinity Church, Ossining, N. Y., Renwick, Aspinwall & Tucker, Architects; Jay Memorial, Livingston Hall, Columbia University, New York.

Glass Mosaic—Ceiling of the foyer of the Woolworth Building, New York, Cass Gilbert, Architect; Panels in the peristyle in front of the chancel of the Cathedral of St. Louis, St. Louis, Mo., Barnett, Haynes & Barnett, Architects.

Leaded Panes—Mrs. Whitelaw Reid's residence, Purchase, N. Y., McKim, Mead & White, Architects; Stuart Duncan's residence, Newport, R. I., John Russel Pope, Architect; Frank A. Seiberling's residence, Akron, Ohio, Geo. B. Post & Sons and Charles S. Schneider, Architects; Central Dormitory Building, Wellesley College, Wellesley, Mass., Coolidge & Carlson, Architects; Administration Building, Mt. Holyoke College, South Hadley, Mass., Putnam & Cox, Architects; Frederick Junius Sterner's residence, New York.

THE G. DROUVÉ COMPANY

Manufacturers of "Anti-Pluvius" Puttyless Skylight, "Straight-Push" Sash Operator, "Lovell" and other Sash Operating Devices

50 Tulip Street

TELEPHONE, 540 BRIDGEPORT, CONN. WESTERN UNION CODE

BRANCH OFFICE: CHICAGO, ILL., 180 North Dearborn Street

Products.

"Anti-Pluvius" (Steel, Fireproof) Puttyless Skylight (Trade-Marked and Patented); "Straight-Push" (Patented), "Lovell" (Patented) and other Sash Operators.

Also, Drouvé Torsion Device and Drouvé Ventilators.

Experience and Facilities.

Drouvé products are made by men with long training and experience. Details and improvements have been progressively modified to meet all building and climatic conditions. A skilled estimating department will give every assistance in preparing any specification.

"Anti-Pluvius" Puttyless Skylight.

The "Anti-Pluvius" Puttyless Skylight and Continuous Clip (Patented) can be erected on any style of roof by any workman. A framework of special rolled-steel channels bridges the skylight opening from curb to curb with or without intermediate supports.

The special features of "Anti-Pluvius" Puttyless Skylights are:

The Channel—A high carbon rolled-steel bar member $\frac{1}{8}$ inch thick throughout. The deep, wide trough carries off all condensation freely.

The Stirrup—A pressed steel member $\frac{3}{16}$ inch thick, 1¼ inches wide. It supports the glass and distributes any weight put on the bridge to the channel rib.

The Felt Guides—The guides carry the non-rotting cowhair felt cushions on which the glass is bedded. They are of No. 18-gauge galvanized, rust-resisting (copper-bearing) steel.

The Caps—The caps protect the upper felt cushion. Either 16-ounce copper or galvanized, rust-resisting (copper-bearing) steel is used, according to architect's specifications.

The Studs—The studs (Tobin Bronze ⅜ inch in diameter) are secured into the stirrups and project above the cap sufficiently to carry the Phosphor Bronze Spring 1⅝ inches high.

The Springs—Phosphor Bronze Springs are placed over the neck of the stud and are held in place by nuts. The springs take up vibration, expansion and contraction and any upward movement of draught pressure.

The Bridge—A distinctive feature of the "Anti-Pluvius" design, insuring accessibility to the skylight surface without endangering men working above or below. Weight is carried through shoulders on the studs to channels below without contact with or pressure on the glass. Made of 16-gauge galvanized, rust-resisting (copper-bearing) steel.

Installations—Over 3,000,000 square feet of "Anti-Pluvius" Puttyless Skylights are in use in the United States, Mexico, Panama, Germany and Belgium. There are single installations of over 100,000 square feet.

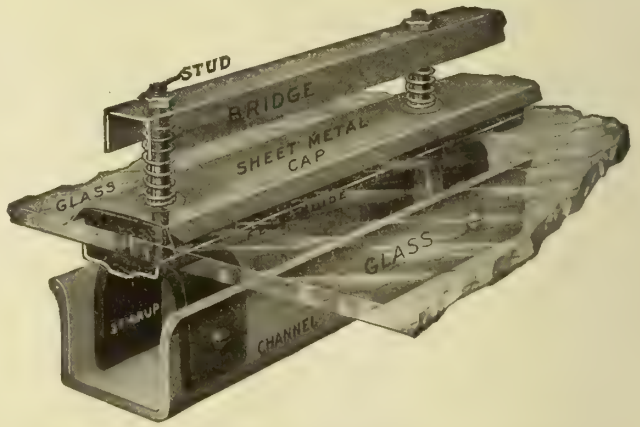
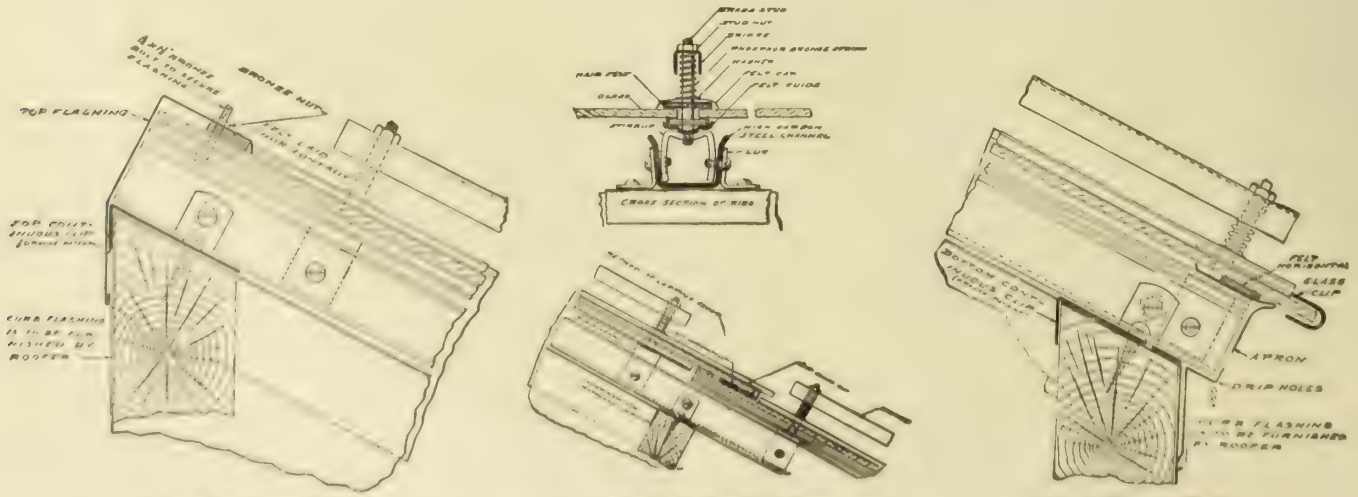


Fig. 1. CROSS PHANTOM SECTION "ANTI-PLUVIUS" PUTTYLESS SKYLIGHT



Finish at Upper Curb — Method of Lapping Glass — Finish of Lower Curb

Fig. 2. DETAILS OF "ANTI-PLUVIUS" SKYLIGHT

Continued on next page

Information Required for Estimating.

State type of skylight required, give size or sizes and number wanted. State trimmings desired. These cover outside exposed portions of skylight and include caps and flashings and may be of copper, copper-bearing or other rust-resisting galvanized metal. Mention whether rough, hammered, ribbed, plain or wire glass is wanted and whether of ¼- or ⅜-inch thickness.

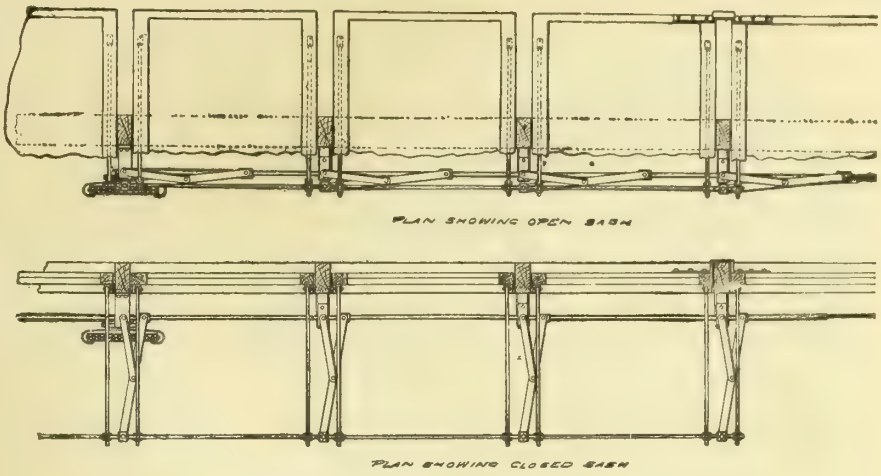


Fig. 3. PLAN OF THE "STRAIGHT-PUSH" SASH OPERATOR

"Straight-Push" Sash Operator.

This operator is designed for mill, factory and power-house service to withstand all manhandling and unexpected conditions. It operates all types of sash but the double-hung.

Power—A spur gear mechanism is used, as this requires least power to operate and will stand hardest service without failing. The operating gear is composed of cut gears, pinions and a steel rack and is worked from any desired point by a chain over a grooved wheel secured to the shaft.

Transmission—A ¾-inch pipe line, dowel pin connected, moved forward and backward by a spur gear mechanism—powerful as a chain hoist; the shaft being supported every six feet by brackets. The guide rolls in each bracket are mounted on brass pins to prevent rusting. Each bracket has a scissors lever arm composed of angles attached. One triangular portion is fastened to the rigid bracket, the other to the movable shaft, the third carries a chair to support a ½-inch horizontal rod to which two arms for each sash are fastened. All working parts have brass to iron connections. The sweep of the levers keeps the flat surfaces clean.

Leverage Force—The leverage force applied is uniform throughout the length of the line, insuring an equal opening and closing to all sash. This is a feature that differentiates "Straight-Push" from all other devices. The power to start the opening is vital and the toggle action taking place in the closing movements is only second in importance. Tight sashes are made possible.

Price—"Straight-Push" is sold at a standard price per lineal foot with one operating station to each one hundred feet. The standard price insures a square deal all around.

Erection—Any workman can install this operator with the directions and erecting blue-prints sent. We, however, have erecting crews, in position to handle almost any job anywhere, and, with the large number of agencies, can give prompt and speedy service.

Specification—Furnish and erect the "Straight-Push" Sash Operator made by The G. Drouvé Company, Bridgeport, Conn.

Installations—Send for list. Some are no doubt near you and can be seen in actual operation under service conditions.

"Lovell" Sash Operator.

The "Lovell" is the pioneer of push-and-pull mechanisms of the type best exemplified to-day in the "Straight-Push." It held its own without competition for years and is still in large demand.

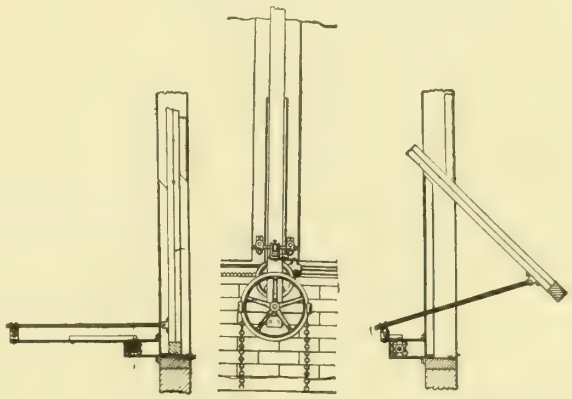


Fig. 4. DETAILS OF "STRAIGHT-PUSH" SASH OPERATOR

"Improved Lovell Dreadnought Type."

This design, with its sweeping movement, gives large openings to heavy top-hung sash. All parts made extra heavy, with phosphor bronze working joints.

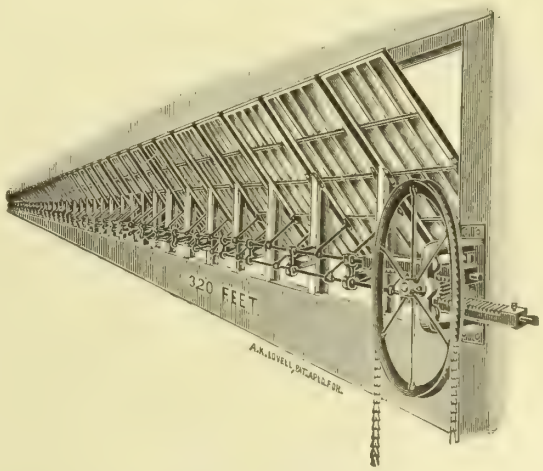


Fig. 5. "LOVELL" DEVICE APPLIED

The Improved (Dreadnought Type) "Lovell" opens pivoted sash to 90 degrees and top-hung (3′ 0″ to 4′ 0″ heights) to 60 degrees. Extra heavy and special designed with phosphor bronze working joints. A 45-inch opening can be secured with 36-inch arm and a 56-inch opening with a 48-inch arm on 3, 4, 5 and 6 ft. top-hung sash

THOS. W. IRWIN MFG. CO.

Manufacturers of Skylights

307 Cremo Street

NORTH SIDE, PITTSBURGH, PA.

Products.

We manufacture and erect IRWIN'S IMPROVED SKYLIGHTS, also a SPECIAL PUTTYLESS SKYLIGHT, built of STRUCTURAL IRON BARS, GALVANIZED IRON or COPPER BARS, and a full line of VENTILATORS.

Also, GUTTERS, CONDUCTORS, RIDGE ROLL, CORNICE, BLAST-PIPE, SASH and other similar products.

Irwin's Improved Skylights.

Irwin's Improved Skylights meet every engineering requirement. Standard construction throughout. Simplify and economize building plans. Insure watertight, secure, and compact roofs.

They are standardized to meet every roofing requirement from heaviest to light construction. They can be specified and adopted with a surety of prompt deliveries, and no deviation from style of architecture or plans will be necessary.

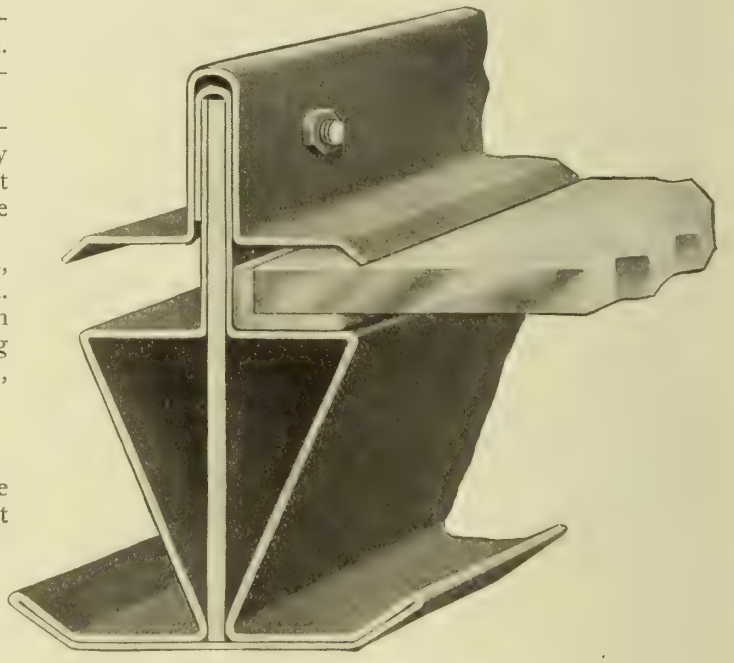
The Irwin System admits of unlimited extensions, and is adapted to buildings of every sort or description. Nearly 2,000,000 square feet of Irwin Skylights are in the most prominent train sheds and manufacturing plants throughout the United States, Mexico, Japan, and the European countries.

Carnegie Skylight Bar.

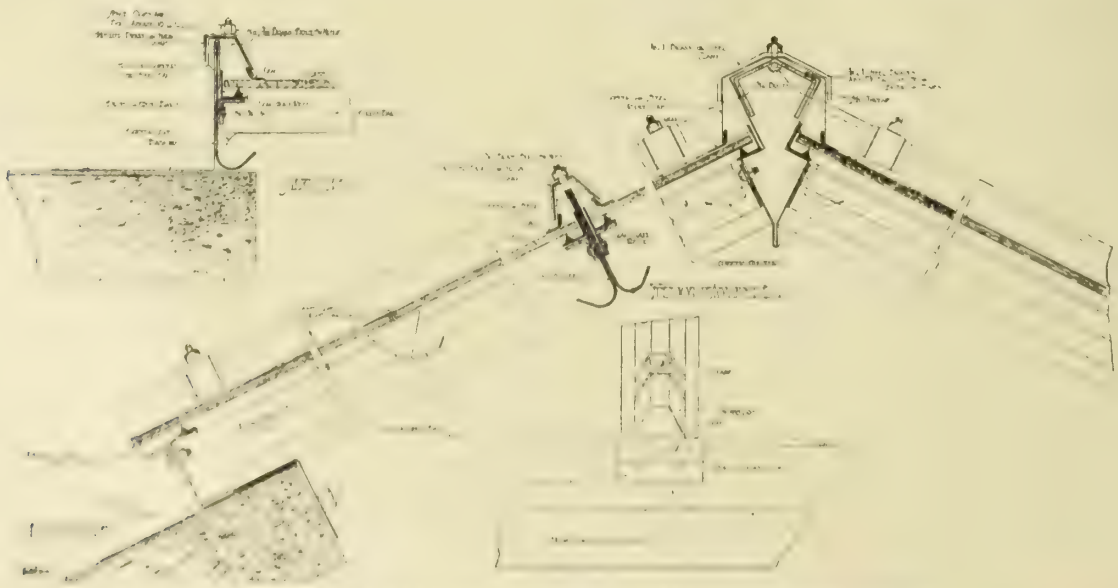
This Bar received its name from the Carnegie Library, Pittsburgh, Pa., where over 143,000 square feet of our design of skylight area was constructed. It is made of 16-ounce cold-rolled copper with ⅛-inch black iron core-plate painted. This bar is also furnished in No. 22 and No. 24 galvanized iron, with core-plates of black iron, and having core-plates only when purlins are eight feet or more apart.

Estimates, etc.

Architects and builders are invited to send specifications; and we will gladly forward an estimate, for which we need to know: (1) Style of bar. (2) Style of skylight (comb, hipped or flat). (3) Length. (4) Width. (5) Thickness and kind of glass (rough, ribbed or wire). (6) Erected or f.o.b.



CARNEGIE SKYLIGHT BAR



CROSS SECTIONS OF SKYLIGHT, SHOWING DETAILS OF CONSTRUCTION

See Catalogue

Continued on next page

Irwin's Improved Puttyless Skylights (Patented Jan. 18, 1916).

The Irwin Improved Puttyless Skylight is the only perfect puttyless skylight in the market—so considered by architects and engineers, and approved by the United States Government. It is a well-known fact that many so-called puttyless skylights are not a success, on account of no provision being made to form a perfect rest for the glass, owing to the unevenness in many of the lights which causes breakage from wind, pressure and heavy snowfalls.

The Irwin Skylight Construction has entirely overcome the above difficulty by reason of having solid lead prisms which conform perfectly to the uneven surface of the glass and at the same time form a solid foundation, making broken glass a thing of the past, as the lead prism is not a permanent fixture to the bar, but moves with the glass when expansion and contraction take place, thereby preventing the glass from becoming unseated.

The structural parts are composed of No. 10 or No. 14 O. H. full cold-rolled re-annealed iron (lead-coated, if preferred), with ¾- by ¾- by ⅛-inch angles securely riveted to them. Large condensation gutters, which project well past the glass line, but not to the extent of cutting off any of the light, leave ample space for cleaning out the gutters and painting.

The caps, curbs and cross-bars are made of 16-ounce cold-rolled copper or galvanized iron. Brass bolts are used exclusively throughout the construction. On sizes up to twelve feet an intermediate purlin is not necessary.

The top, bottom and side curbs will be built in accordance with the roofing details. The skylight will be flush with the roof, and erected in the same manner as our well-known product of the putty type.

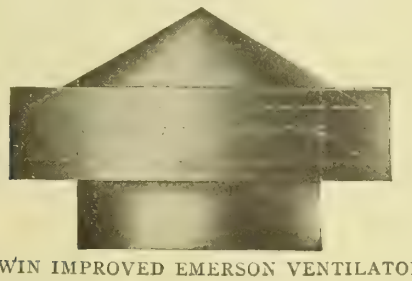
Suggested Specification—The Skylights to be of Puttyless Type Steel Construction, composed of No. 14 O. H. full cold-rolled re-annealed iron (lead-coated if preferred), with ¾- by ¾- by ⅛-inch angles securely riveted to them. To have large condensation gutters not to project past glass line to the extent of cutting off any light, leaving ample space for cleaning out gutter and painting. Glass to rest on solid lead prisms, the lead to extend one half inch along the center part of the bar so as to form a gauge for the glass. The caps, cross-bars and curbs to be made of 16-ounce cold-rolled copper (or galvanized iron), brass bolts to be used throughout construction. The bar caps to be stayed with the Irwin patent bar clips. Lead flanges to be grooved to bar cap so as to conform to uneven surface of glass.

Guarantee.

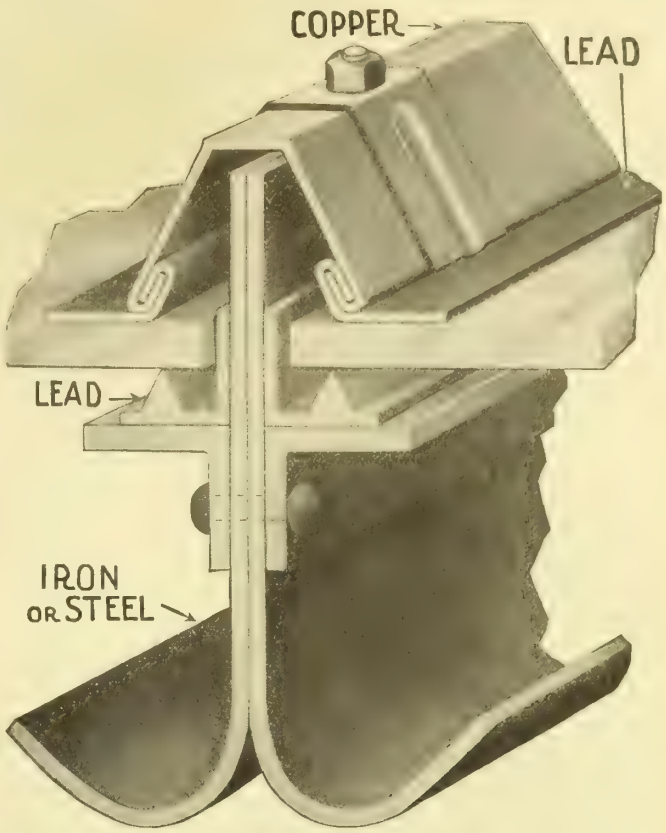
All work is guaranteed to represent the highest standard of quality, material, construction and workmanship; and when these skylights are erected by ourselves, they will be absolutely water-tight and satisfactory in every respect. A written guarantee for any reasonable number of years will be given.

Emerson Ventilator.

The Irwin Improved Emerson Ventilator is one of the oldest ventilators in the country. It was an old English patent, and manufactured by a Pittsburgh firm



IRWIN IMPROVED EMERSON VENTILATOR



IRWIN IMPROVED PUTTYLESS SKYLIGHT BAR

over fifty years ago; and it has always proved stormproof. The Thos. W. Irwin Mfg. Co. has made an improvement on it, and can safely guarantee it to produce the same results as many of the so-called patent ventilators, and at a cost of one half less. It is built throughout of O. H. Steel, Ingot Iron, Toncan Metal and Copper, with or without dampers or glass tops. Any style of base to suit the building construction.

All we ask is an opportunity to demonstrate the above facts.

Specifications, Plans, etc.

Full specifications and plans, preliminary or final, will be furnished for complete or partial installation for any operation. Inquiries and communications of any nature will receive best engineering suggestions, advice, and prompt attention.

On request, we will send our handsome illustrated Catalogue showing detail sections of the Irwin Skylight Bars and Skylight construction, with numerous illustrations of prominent large plants and buildings so roofed.

References.

A partial list of representative concerns for whom our Skylights have been installed:

Allis-Chalmers Co., Cincinnati, Ohio
Allis-Chalmers Co., West Allis, Wis.
American Bridge Co., Ambridge, Pa.
American Steel & Wire Co., Cleveland, Ohio
Baltimore & Ohio R. R. Co. Roundhouse, Glenwood, Pa.
Baltimore & Ohio R. R. Co. Freight Station, Pittsburgh, Pa.
Colorado Fuel & Iron Co., Pueblo, Colo.
Firth-Sterling Steel Co., Uniontown, Wash.
Lorain Steel Co., Johnstown, Pa.
Michigan Alkali Co., Wyandotte, Mich.
Midvale Steel Co., Philadelphia, Pa.
National Tube Co., McKeesport, Pa.
Pittsburg Reduction Co., New Kensington, Pa.
Pittsburg Reduction Co., Massina Springs, N. Y.
Pressed Steel Car Co., McKees Rocks, Pa.
Riter-Conley Manufacturing Co., Pittsburgh, Pa.

A. H. JETER & COMPANY, INC.

Manufacturers of Jeter's Patent Puttyless Steel Skylights

GENERAL OFFICE AND WORKS

91-95 Webster Avenue

TELEPHONE, Astoria 1688 LONG ISLAND CITY, N. Y.

Products.

Puttyless Steel Skylights, Sheet Metal Skylights, Turrets and Louvers, Architectural Sheet Metal Work of every description.

Also, Metal, Tile, Slate Roofing, etc.

Special Features of Skylights.

The sash bar of Jeter's Patented (Pat. No. 1001646, Pat. No. 1119829) Steel Skylights is composed of an upper and a lower channel. The upper channel or glass rest is held in position by means of stirrups connected by tap bolts to the lower channel. The combination of these two channels forms the complete sash bar; and, as they are held apart by stirrups, the arrangement is such that adequate ventilating space is provided in the bar, thus drying out any condensation which might otherwise accumulate. The metal caps are held in position by means of brass bolts which go through the stirrups and also hold the top channel in position. A continuous steel angle runs along the bottom of the skylight and is punched at intervals of about 20½-inch centers to allow the sash bar to run through. Over each piercing in this angle is provided a malleable iron housing with inverted shoulders which engage both flanges of the bottom channel of the sash bar. This arrangement of the housings at the bottom, together with the slotted holes in the ridge clip at the top, allows for free expansion and contraction. A lead ferrule is placed over each brass cap bolt, to prevent the edges of the glass plates from coming in contact with them, thus reducing to a minimum the cracking of the glass caused by vibration.

Adaptability.

Jeter's Patented System of Puttyless Steel Glazing is adaptable for use on railroad terminals, museums, schools, factories, machine shops, etc. The very simplicity of construction enables any mechanic to readily erect this system.

Estimates and Services.

Our estimating and drafting department is at the disposal of engineers, architects and owners, and we will gladly give estimates, suggestions, specifications and plans for our products on request.

J. W. BLISS ORDNANCE FACTORY, BROOKLYN, N. Y.
Walter Peaseley, Engineer
Showing about 25,000 square feet of glazing out of a total area of 150,000 square feet in the entire operation

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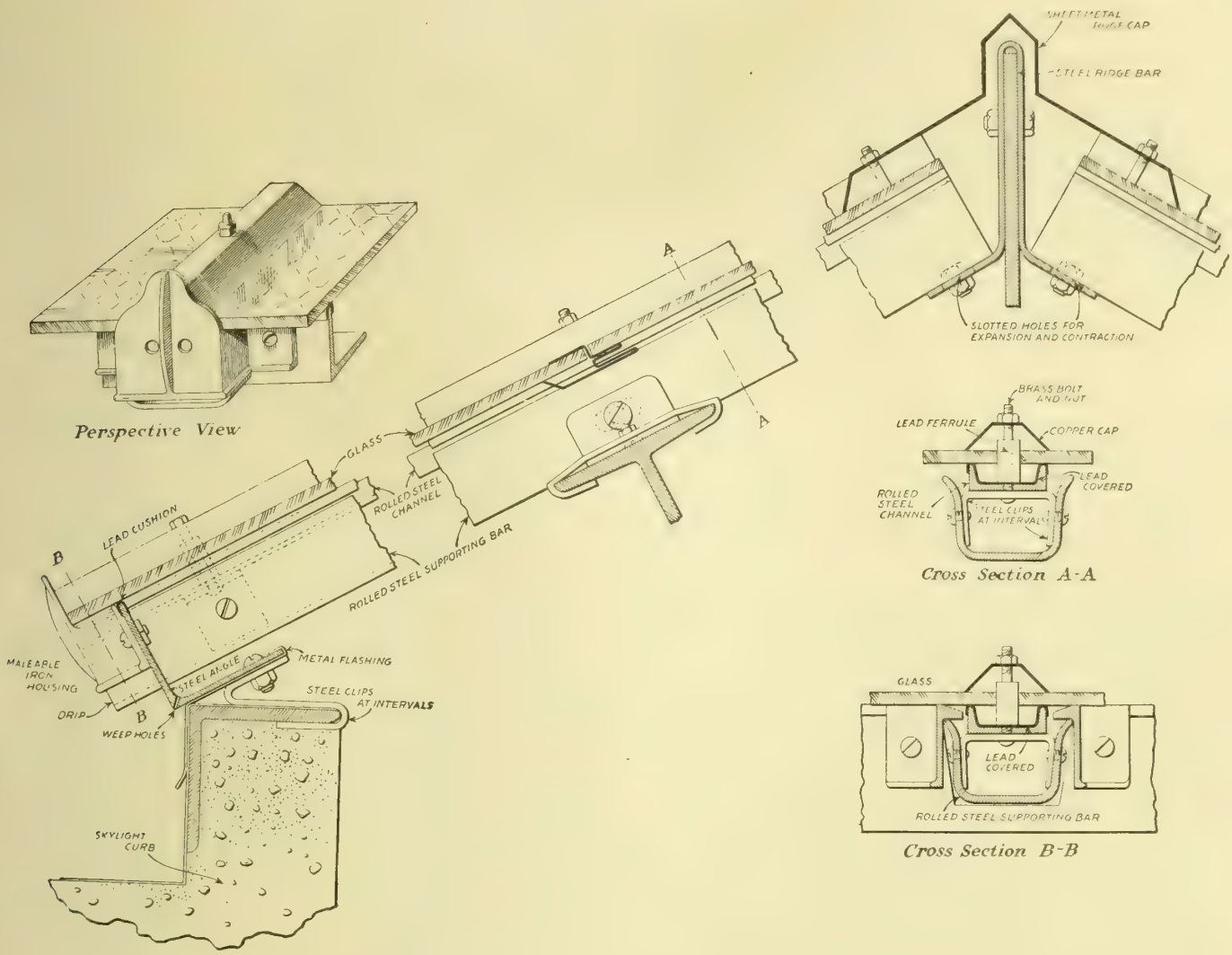


REDUCED CROSS-SECTION DETAILS OF JETER'S PATENT PUTTYLESS STEEL SKYLIGHT CONSTRUCTION

We employ a large force of experienced men who have been carefully trained to erect our products. When we supply material only, we furnish complete instructions and drawings.

Facilities.

Our factory is situated in Long Island City, near the Long Island Railroad and also the Brooklyn Eastern District Terminal. This gives a direct shipping to any point in the world, either by railroad or water.

Special Note.

After fabrication of all material entering into the construction of the skylight and prior to the assembling of the parts, each and every part is thoroughly galvanized. The top channel is then covered with sheet lead. This process in manufacturing produces an indestructible skylight.

Specifications.

All skylights shall be of rolled steel, of a type to allow for free expansion and contraction, and made tight without the use of paint, cement or putty.

The sash bar shall be composed of a combination of channels not less than ⅛ inch in thickness. These channels shall be elevated one above the other, and firmly held apart by means of wrought iron stirrups secured by tap bolts let through sides of bottom channel. A copper bolt shall be placed through each stirrup and also through top channel of sash bar. A lead ferrule shall be placed over each cap bolt, to keep the edges of the glass plate from coming directly in contact with the rigid cap bolt, thus reducing the cracking of the glass to a minimum. A continuous steel angle shall be provided along the curb of the skylights. This angle shall be punched at intervals of 20½-inch centers to allow the sash bar to run through. Over each of the holes punched in the continuous bottom angle, secure with brass bolts a malleable iron housing having inverted shoulders which will engage the side flanges of the bottom channel of sash bar, holding same firmly in position. The top edge of this continuous bottom angle shall be covered with lead, which shall act as a cushion for the glass. The upper channel of sash bar shall also be covered with sheet lead. This sheet lead must fit snugly around this channel and be turned over edges of same about ⅜ inch. All parts of the skylights, including sash bars, bottom angles, housings, stirrups, etc., shall be hot galvanized after fabrication and prior to assembling. Glaze all skylights with ¼-inch ribbed wire glass. All caps, combings, and trim shall be [specify copper, zinc, or galvanized iron].

NATIONAL SKYLIGHT AND VENTILATOR CO.

MANUFACTURERS OF

The "National" System of Steel Puttyless Skylights

ROCHESTER, N. Y.

Products.

"National" System of Steel Puttyless Skylights; Ventilators, Solid Steel Sash, Fireproof Doors and Windows, and Sash-Operating Apparatus. (Patents allowed and pending.)

Special Features of the "National" System.

We enumerate as follows:

Rolled-Steel Supporting Bars, combining maximum strength with minimum weight.

Expansion Clips, allowing the steel supporting bars to expand and contract and to move freely when affected by expansion or vibration, thus obviating the breakage of glass.

Cross Condensation Gutters, furnishing a dust-proof spring joint between each lap of glass, as well as providing permanently flexible and yielding bearings for the glass and delivering the water of condensation into the supporting bars.

Setting of the Glass, so that each light is independent of every other, and left wholly free to move whenever affected by either expansion, contraction, or vibration.

Spring Surface-Bearing Caps, providing a broad surface bearing upon the glass in a resilient or spring-like manner, and forming a waterproof contact.

Puttyless Glazing, being wholly free from the use of putty, roof cement, or any other filling substance which would bind the glass, causing breakage, and which must of necessity crack and disintegrate in time, causing leakage and expensive repairs.

Adaptability.

The special features of the "National" System of Steel Puttyless Skylights adapt them to be used with perfect results in factories, machine-shops, foundries, warehouses, railway terminals, libraries, dormitories, halls, museums, theaters, etc., and buildings of every kind.

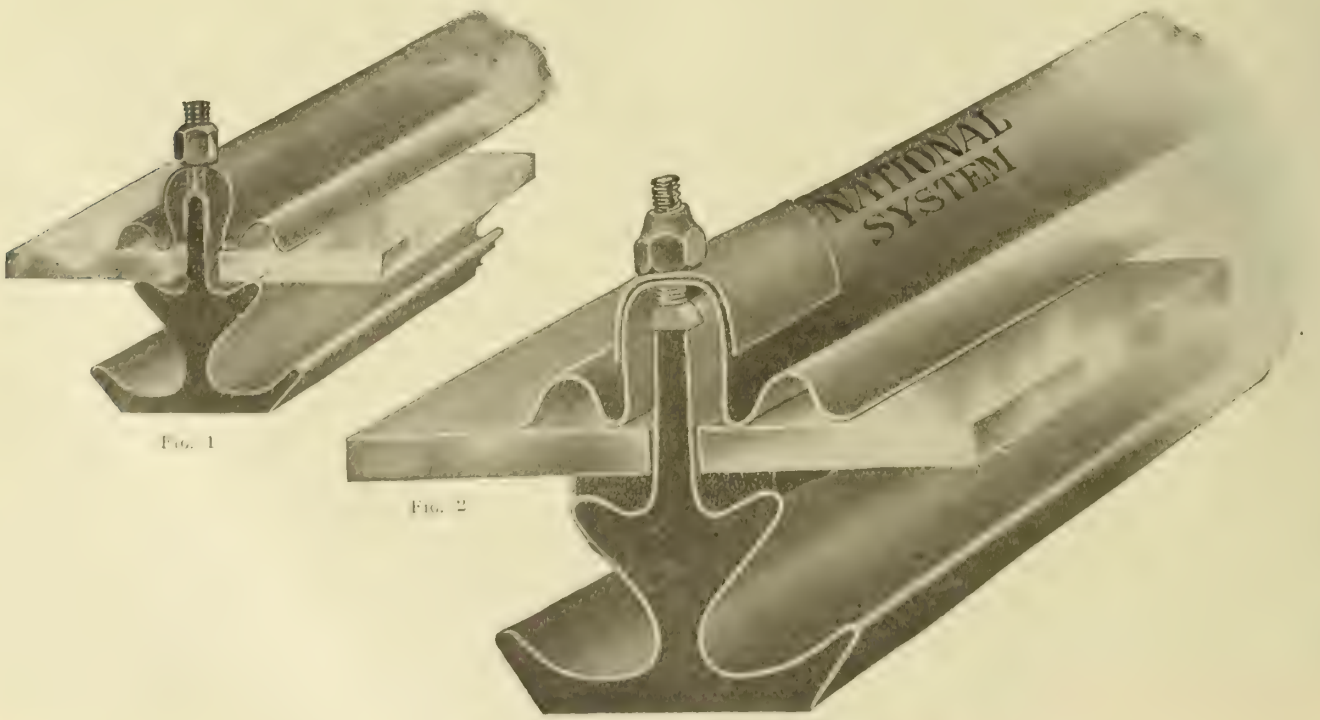


Fig. 1

Fig. 2

TION OF "NATIONAL" SKYLIGHT

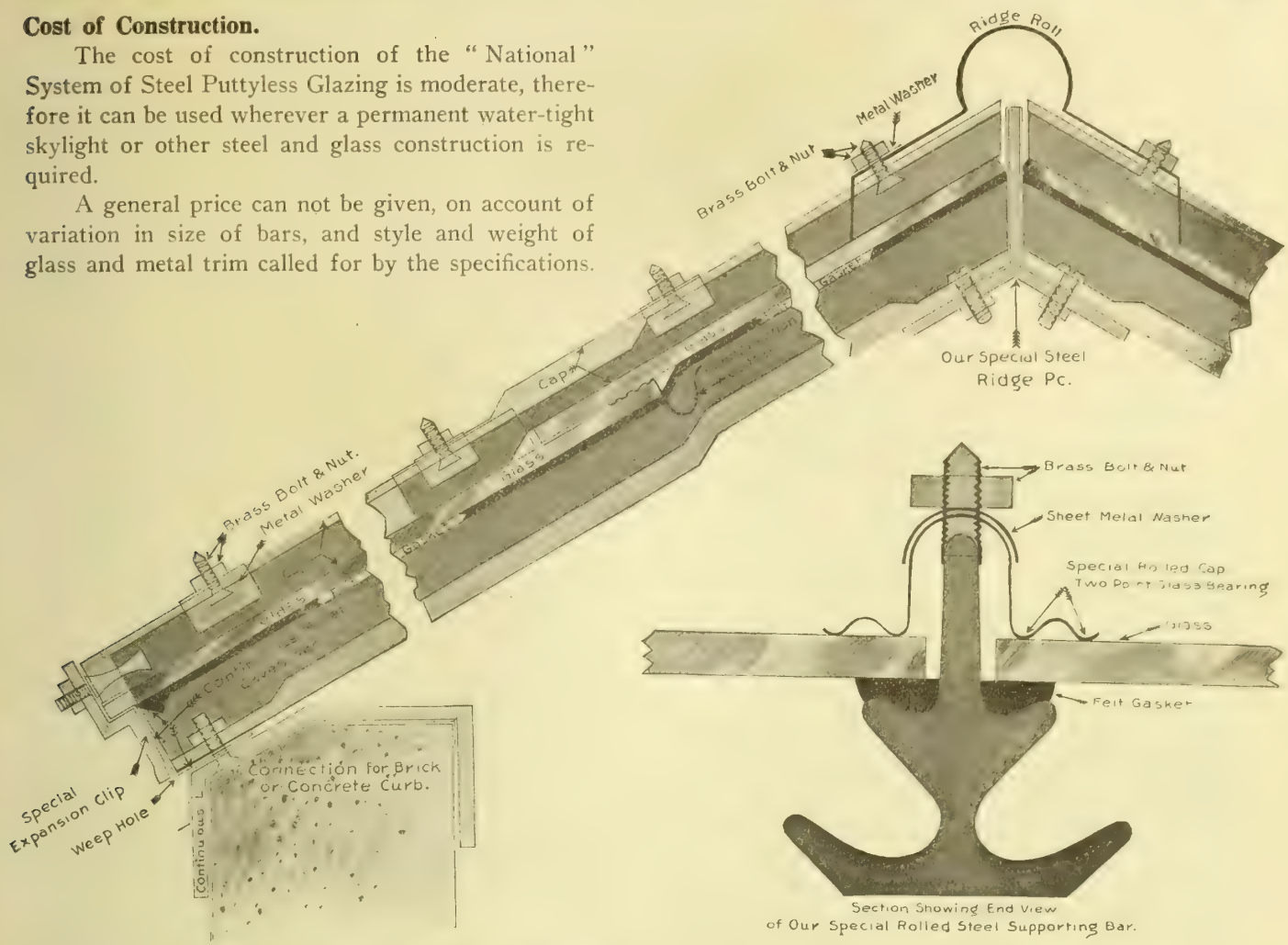
The supporting bar shown is supplied in any weight required by the span

Continued on next page

Cost of Construction.

The cost of construction of the "National" System of Steel Puttyless Glazing is moderate, therefore it can be used wherever a permanent water-tight skylight or other steel and glass construction is required.

A general price can not be given, on account of variation in size of bars, and style and weight of glass and metal trim called for by the specifications.



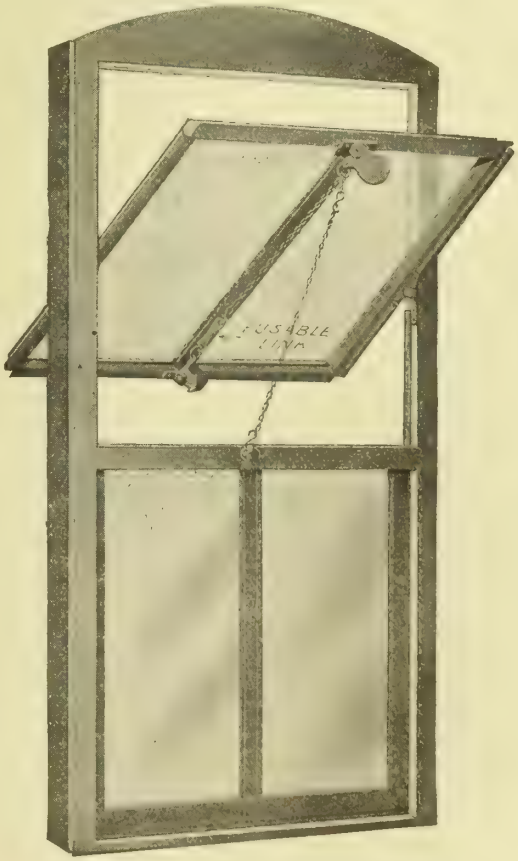
STANDARD DETAIL, SHOWING SECTIONS OF THE "NATIONAL" SYSTEM OF STEEL PUTTYLESS GLAZING CONSTRUCTION

Co-operative Service.

Estimates and sketches are at all times submitted, upon request.

Fireproof Windows and Doors.

Our Fireproof Windows and Doors meet all the requirements of the National Fire Underwriters' Association, and are made in all styles as specified. The Windows are all automatic in their action, closing in case of fire by the melting of a fusible link.



STANDARD AUTOMATIC PIVOTED WINDOW

STANDARD DOUBLE-HUNG WINDOW

Continued on next page

"National" Steel Sash.

They are made of solid rolled-steel bars, with interlocked and welded joints. Ventilators are equipped with extra strong adjustable and removable butts, and are so constructed as to provide double-contact weathering, preventing the admission of draughts and driving rains.

"National" Steel Sash are adaptable for use in all types of buildings; are unusually strong, and low in price.

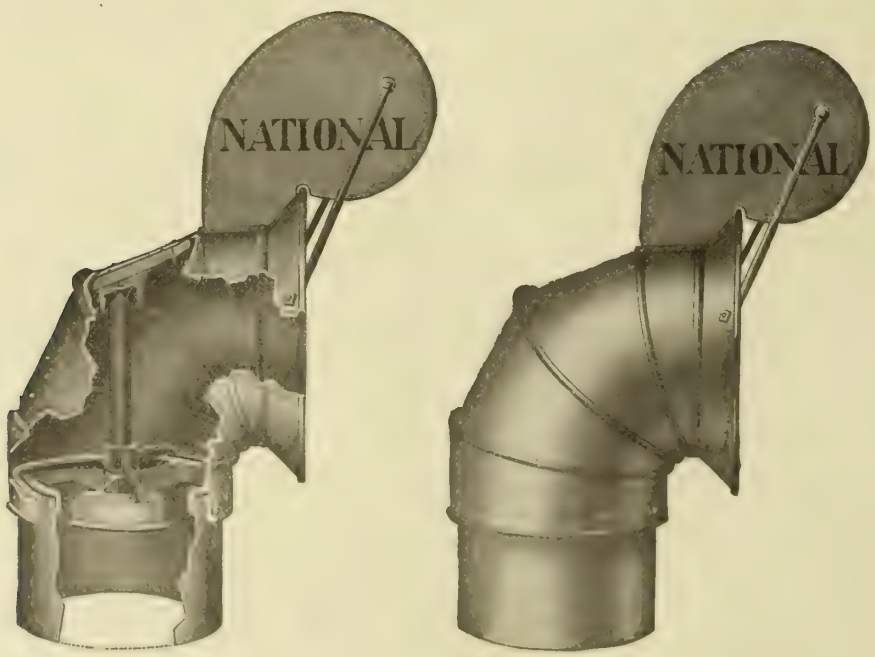
Automatic Ventilators.

The "National" Automatic Ventilators are built in types for all purposes where ventilators are used, in the following styles: Stationary and revolving roof ventilators, window ventilators, etc. They are automatic in their action and can be opened and closed at will, either in part or in their entirety. We build the standard sizes of best quality galvanized iron, gage varying with size; also to order, in copper, of any weight desired.

References.

We have erected our construction in Mexico, Canada, Japan, China, the Philippine Islands, Isthmus of Panama, Argentine Republic, England, Germany, Egypt, etc., and number among our clients the following concerns:

United States Steel Co.
Standard Oil Co.
Pullman Car Co.
General Electric Co.
International Harvester Co.
Union Pacific Railroad Co.
Southern Pacific Railroad Co.
Southern Pacific of Mexico Railroad Co.
Eastman Kodak Co.
Newport News Shipbuilding & Dry Dock Co.
American Woodworking Machinery Co.
American Laundry Machinery Co.
Central Railroad Co. of New Jersey
Delaware, Lackawanna & Western Railroad Co.
Cleveland, Cincinnati, Chicago & St. Louis Railroad Co.
Buffalo, Rochester & Pittsburgh Railroad Co.
Rochester Railroad & Light Co.
Gleason Works
Rome Locomotive Co.
Mora Motor Car Co.
Boston & Maine Repair Shops
New York, New Haven & Hartford Repair Shops
Boston & Albany Railroad Co.
Field Museum, Chicago
U. S. Government Buildings
Southern Railroad Co.
Queen and Crescent Railroad
Cincinnati, New Orleans and Texas Pacific Railway
Ford Motor Co.
International Paper Co.



Showing Inside Construction — Exterior View

"NATIONAL" REVOLVING VENTILATORS

With a guaranteed capacity three times as great as that of any stationary ventilator of equal size, with but a moderate additional cost. Made in sizes of 6 inches to 6 feet

NATIONAL VENTILATING COMPANY

MANUFACTURERS OF THE

Multi-Unit System of Puttyless Skylights

GENERAL OFFICE AND FACTORY

337-339 East 26th Street

NEW YORK, N. Y.

TELEPHONE:
MADISON SQUARE, 387-388

(*Copyright 1911 by the National Ventilating Company*)

Products.

MULTI-UNIT PUTTYLESS SKYLIGHTS, SIDE LIGHTS, OPERATING SASH, and NATIONAL VENTILATING DEVICES.

Adaptability.

Skylights for railway terminals, power-stations, machine-shops, factories, foundries, libraries, museums, art galleries, and all other buildings whereon permanent water-tight skylights of large area are required.

Advantages and Distinctive Features.

Referring to Fig. 3, following page, the bar and upper lights are supported in a fixed manner by the purlin thereunder, while the lower bar, supporting the lower lights, is secured by the same purlin in a loose manner, permitting it to expand freely.

This construction, being repeated at each purlin, permits movement, all in same direction, due to expansion, contraction, or vibration (along the slope of the skylight) of the cap, glass and bar of each unit or tier of glass, independently of every other unit or tier.

Along the longitudinal line of the skylight the steel frame of the building and the entire length of the glass are each taken as separate units, and the difference,

GROUP OF MULTI-UNIT SKYLIGHTS OVER CONCOURSE OF PENNSYLVANIA TERMINAL, NEW YORK, N. Y.
Area of this group, about 50,000 square feet. Total area on the Terminal, 83,000 square feet

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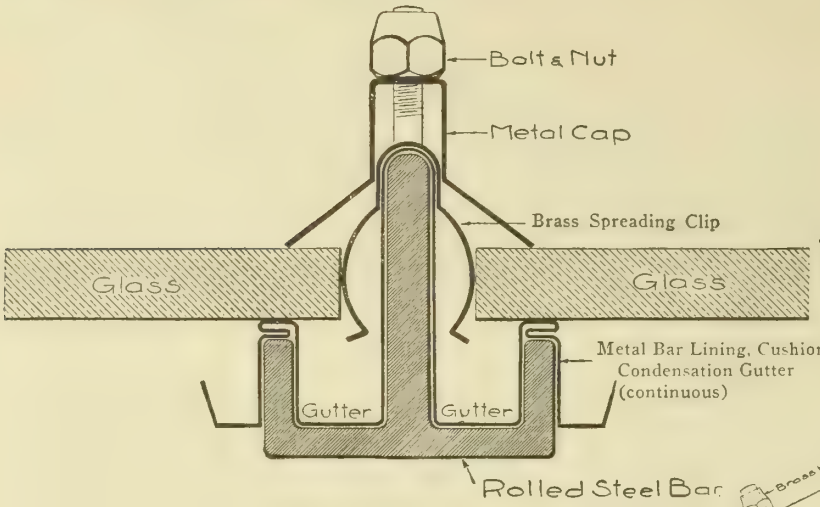


FIG. 1. FULL-SIZED TRANSVERSE SECTION AT SKYLIGHT SUPPORTING BAR
(Patents applied for)

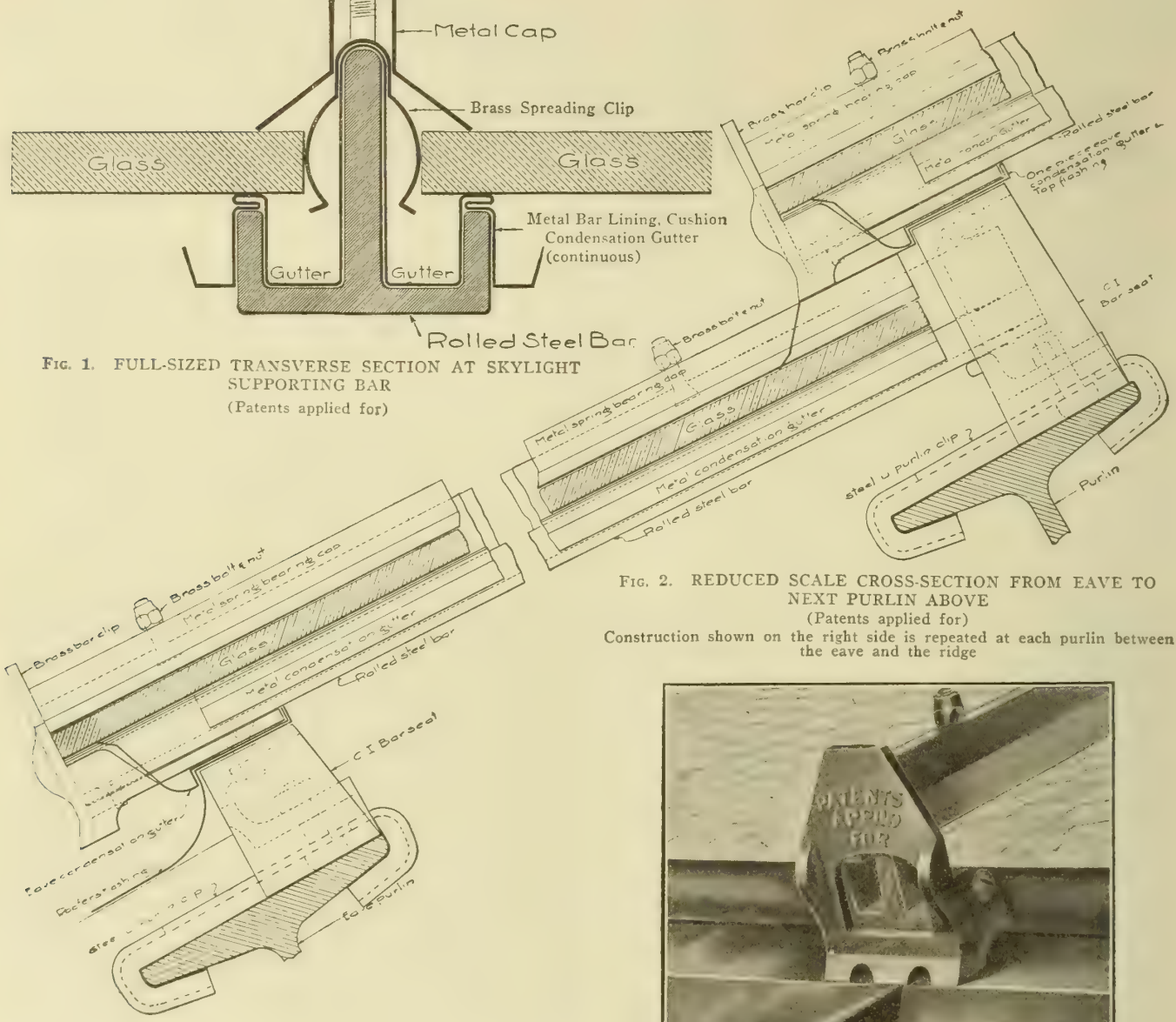


FIG. 2. REDUCED SCALE CROSS-SECTION FROM EAVE TO NEXT PURLIN ABOVE
(Patents applied for)
Construction shown on the right side is repeated at each purlin between the eave and the ridge

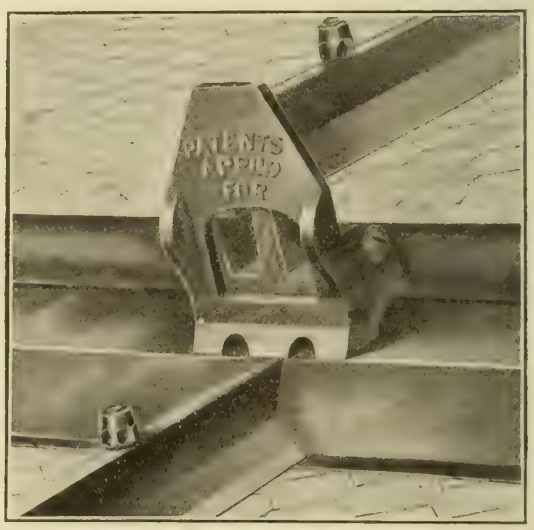


FIG. 3. HALF-SIZED PERSPECTIVE
Showing Exterior View over each purlin between the eave and the ridge

nearly one hundred per cent, in the expansion and contraction of these materials (glass and steel) is likewise thoroughly taken care of by the brass spreader clips shown in transverse section at supporting bar (Fig. 1). These spreader clips are placed over each cap bolt, spaced about 12 inches along each skylight bar, and incidentally they serve also to better secure in place the brass bolts for holding the caps.

The cap is strong and yet resilient. Its upper half is of an inverted "U" shape, which provides strength and rigidity, while the lower half, especially at the lower extremities, is resilient, so as to conform thoroughly, when secured in position, to the surface of the glass.

All gutters and parts that are non accessible without removing the glass, are of non-corrosive material. The entire top of the bar is covered with eight ounce copper, the same being applied while the last coat of bar-paint is still wet; and a flexible bearing for the glass is formed, which adjusts itself to any warps or irregularity of the glass along its bearing line.

We are equipped to cover the bottom of the bar also. Both the top and bottom bar covers are made by special dies and both fit the bar snugly.

No packing or filling substance of any kind is required, and no material is used other than glass and metal.

Standard Specification, Multi-Unit System Puttyless Skylights.

All curb and roof flashings shall be included under heading "Sheet-Metal Work." They must be well connected, ready to receive the skylight work, and must include all necessary counter flashing, well secured to roof flashings and made water tight.

The skylights shall be of the puttyless type, of a design to allow for free expansion and contraction, or movement due to vibration, of the glass and supporting bars in line with the pitch of roof, *all in the same direction.*

Continued on next page

Each light of glass shall be entirely independent of every other light, so that one light can not support another; and the glass shall be held laterally in a manner to prevent its coming in contact with any rigid part.

The bearing for the glass shall be flexible, so as to adjust itself to any warps or irregularities of the glass along its bearing line.

The caps shall be spring-bearing, in order to thoroughly conform along the lines of contact, when secured in position, to the surface of the glass.

All gutters shall be of copper and all exposed parts other than sheet metal shall be of brass.

The supporting bars shall be of rolled steel and shall be held in a loose manner at the upper end, and in a fixed manner at the lower end.

Packing, filling substance of whatever kind, or material other than glass and metal, shall not be used.

All skylight sheet-metal work shall be (specify copper, zinc, or galvanized iron).

The glass shall be ⅜ inch thick (specify whether wire, plain or ribbed).

Adopted by Leading Railroads.

The Pennsylvania Railroad Company, after carefully examining all other types of puttyless skylights in actual service, adopted the construction herein shown and described for its new New York & Long Island Railroad Passenger Station, 31st to 33d Streets and 7th and 8th Avenues, New York City, on which building we completed, about six years ago, the erection of 83,000 square feet of skylight, embracing nearly every known variety, such as hipped, ridge, flat, barrel-roof, sawtooth with bowed ridges, circular, elliptical, etc., all constructed with flat glass.

The Central Railroad of New Jersey has also adopted this system of skylights for its new Terminal at Jersey City, N. J., where 116,000 square feet of this construction have just been installed.

The New York Central Railroad Co. also has this construction on its new Grand Central Terminal at 42nd Street, New York City; on its New York City Power House at 50th Street and Lexington Avenue; Power Stations at Yonkers and Port Morris, New York; Boiler Shops at West Albany, New York, Reed & Stem, Architects, and for their new Passenger Station at Utica, New York, Stem & Fellheimer, Architects.

Result of Thorough Investigation.

The above described system of skylight construction is the result of experience and investigations made by us in this line over a period of more than twelve years.

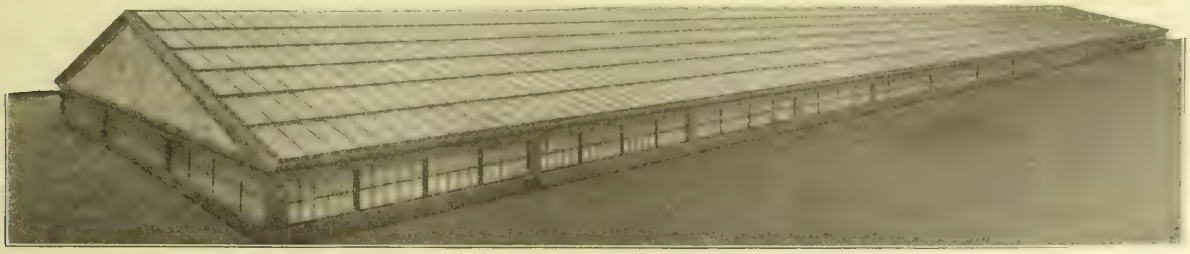
Our efforts during this time have been directed to producing, not the cheapest, but the best construction. As to skylights, true economy does not consist in buying the cheapest.

Public Buildings and Other Notable Installations.

We refer to the following, among many installations made by us during the past nine years; in some cases replacing other work with the new and improved system above described:

BUILDING, LOCATION AND ARCHITECTS

New Walters Art Gallery, Baltimore, Md., Delano & Aldrich
New Library Building, Bar Harbor, Maine, Delano & Aldrich
Sun Parlor for E. Parmalee Prentice, New York, N. Y., Delano & Aldrich
International Paper Company Mills at Niagara Falls, Palmer, Fort Edward, N. Y., and at Rumford Falls and Chisholm, Maine
Sage Art Gallery, Menands, N. Y., Wm. H. Miller
Buffalo, Rochester & Pittsburg R. R. Office Building, Rochester, N. Y.
Maryland Institute, Baltimore, Md., Pell & Corbett
Auditorium Building, Springfield, Mass., Pell & Corbett
Municipal Building, Springfield, Mass., Pell & Corbett
New York Edison Company's New Waterside Power Station, New York, N. Y.
U. S. Navy Yards at Norfolk, Va., Charlestown, Mass., and Pensacola, Fla.
Brooklyn Rapid Transit Co. Shops, Maspeth, L. I.
American Steel & Wire Company's Mill, Worcester, Mass.
C. K. G. Billings Residences, New York City, and Locust Valley, L. I.
N. Y., N. H. & H. R. R. Locomotive and Machine Shops, Readville, Mass.
Norfolk Terminal Passenger Station, Norfolk, Va., Reed & Stem
New York Stock Exchange Building, New York, N. Y.
New U. S. Post Office Building, New York, N. Y., McKim, Mead & White
New U. S. Post Office Belt Conveyor Building, New York, N. Y., McKim, Mead & White
New Municipal Building, New York, McKim, Mead & White
Royal Trust Co. Building, Montreal, Can., McKim, Mead & White
Metropolitan Museum of Art, New York, N. Y., Conrad Hewitt, Supt.
New Hampshire National Bank Building, Portsmouth, N. H.
Munsey Building, Washington, D. C., McKim, Mead & White
First National Bank Building, Boston, Mass.
Brockton Library, Brockton, Mass.
New York, Westchester & Boston R. R., Quaker Ridge Station, New Rochelle, N. Y., Stem & Fellheimer
New York, Westchester & Boston R. R. 180th St. Station, New York, N. Y., Stem & Fellheimer
Proctor Endowment Field House, Peoria, Ill., Hewitt & Emerson
United Electric Light & Power Co. Power House, 201st St. Station, New York, N. Y.
U. S. Post Office, Charleston, W. Va.
Julius Kayser & Co. Loom Building, Brooklyn, N. Y., Wm. Higginson
Institute of Fine Arts and Sciences, Brooklyn, N. Y., McKim, Mead & White
Greenpoint Hospital, Brooklyn, N. Y., Frank J. Helmle
The Beaver Companies' Mill, Thorold, Ontario
Geraldyn Redmond Residence, New York, N. Y., McKim, Mead & White
Museum of Fine Arts, Minneapolis, Minn., McKim, Mead & White
Administration Building, Balboa, Canal Zone, Panama
School of Applied Design, New York, N. Y.
People's National Bank, Lynchburg, Va., Stem & Fellheimer
Laboratory Building, Brooklyn, N. Y., McKim, Mead & White
Metropolitan Museum of Art Building, sections "J and K," New York City, McKim, Mead & White
Standard Arcade Building, New York City, Severance & Van Alen
Robert Brewster's Enclosed Tennis Court at Mount Kisco, New York, Walter D. Blair
The Enclosed Pastime Tennis Court, Long Island City, N. Y., Walter D. Blair
Brooklyn Rapid Transit Sub-Station, Ozone Park, Long Island
Ford Motor Company Service Building, Long Island City, N. Y.
Union Passenger Station, Macon, Ga., Alfred Fellheimer



MULTI-UNIT SKYLIGHTS ON STANDARD OIL CAN FACTORY, DEVOE WORKS, BOROUGH OF QUEENS, NEW YORK, N. Y.
Area about 30,000 square feet

NONPAREIL SKYLIGHT COMPANY

MANUFACTURERS OF

The Nonpareil Puttyless Skylight

MAIN OFFICE

2609-2611 Pennsylvania Avenue, N. W.

WASHINGTON, D. C.

Product.

The NONPAREIL PUTTYLESS SKYLIGHT (patented November 1, 1910; October 3, 1911; October 14, 1913).

Advantages.

(1) It can not leak; lasts indefinitely; simple in construction, and not expensive. Approved by the United States Government.

The Nonpareil Puttyless Skylight is a decided and practical innovation in skylight construction. It solves all the difficulties of the old style, unsatisfactory putty affairs. Once erected it takes care of itself—the first cost being the only cost.

(2) *Lead Glazing Cushion*—No materials but metal and glass enters into its construction, and of the metal parts one of the most important is the lead glazing cushion, indicated in Fig. 1, detail 5. This cushion has parallel vertical walls that will conform perfectly to the uneven surface of skylight glass and is detachable and reversible, which permits of its being applied after all of the field work except the glazing has been done. This is important to the contractor who desires to get satisfactory results and a water-tight skylight, since it prevents injury to the cushion while the rest of the skylight is in process of construction. Being flexible it is capable of being straightened by our special glazing tool and is immediately ready to conform to the irregularities of *new* glass.

(3) Should it happen that part of this cushion is torn or cut away, it can be removed and reversed, thus giving double service without additional cost. This cushion fits absolutely tight and permits of no space between the glass and cushion, even when very long lights are used.

Since there are two vertical walls to each cushion and two cushions on each bar it makes an absolutely water-tight joint, and it is inconceivable that the water could get by both of these walls and the *air* space between them. However, we have arranged gutters (see Fig. 1, detail 7) to take care of any water that might get through.

To test the perfection of these cushions we have purposely omitted the caps (Fig. 1, details 3 and 4), leaving the skylight exposed during several severe storms, and never in a single instance has a leak or an imperfection of any kind developed.

(4) *Bar Constructions*—Fig. 1, detail 7, shows the principal part of the bar, the lower edges of which are bent out and up to form condensation gutters. The extreme depth and width of these bars give them great strength, but in addition they are reinforced and strengthened by the bent metal, detail 6, which supports the cushion and glass and forms extra gutters to prevent leakage. These gutters are on each side of the metal cushion and are of ample size to perform their function.

(5) These bars are made of both galvanized and lead-coated steel, and when desired can be made of black steel and covered with copper. We do not, however, recommend the latter, as steel under such conditions would rapidly corrode. Being cold pressed, the quality of steel in these bars is far superior to that of the hot-rolled T bar. When our skylights are made of *lead coated* steel and copper trimmed they remain 100 per cent strong indefinitely.

NONPAREIL SKYLIGHTS ON CAPITAL TRACTION COMPANY'S NAVY YARD CAR BARN, WASHINGTON, D. C.

The large light is 22 x 100 feet, of Standard Bar, and no superstructure supporting it. A third light on this same building does not appear in cut

Continued on next page

(6) Hipped skylights, especially in small sizes, cost more than double pitch, without giving a corresponding benefit. Why not use double pitch?

Nonpareil Caps.

Fig. 1, detail 3—These are made both plain and with a lead flange, as shown in detail 4. When the flanges are used they are grooved water-tight to the sheet metal cap and the lead can be pressed down to conform to the uneven surface of the glass, insuring a perfectly tight and close fit. It is impossible for the flanges to get out of position, as do the loose ones.

Cost.

The cost of this skylight is not excessive, and contractors will find it to their advantage to correspond with us with reference to price, delivery, etc.

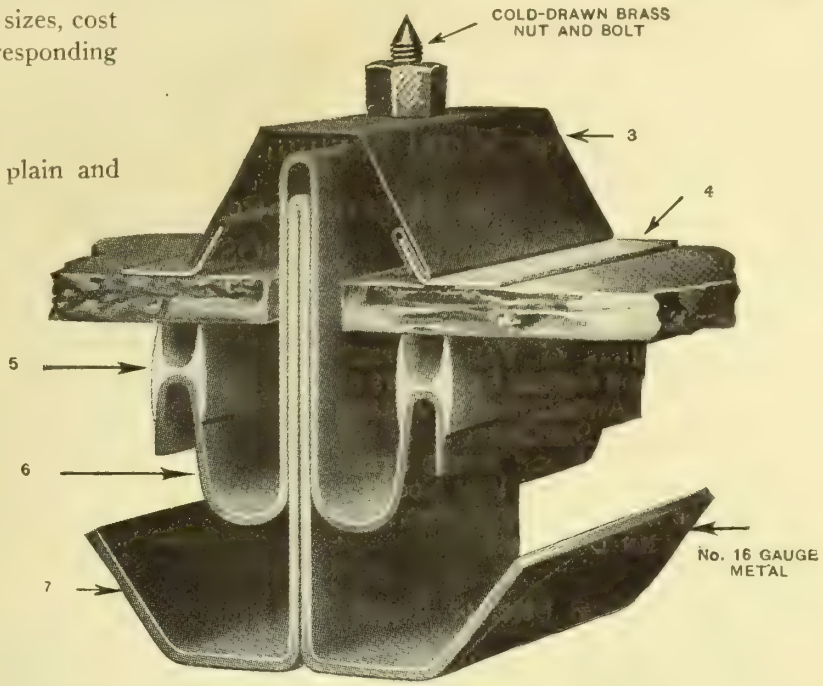


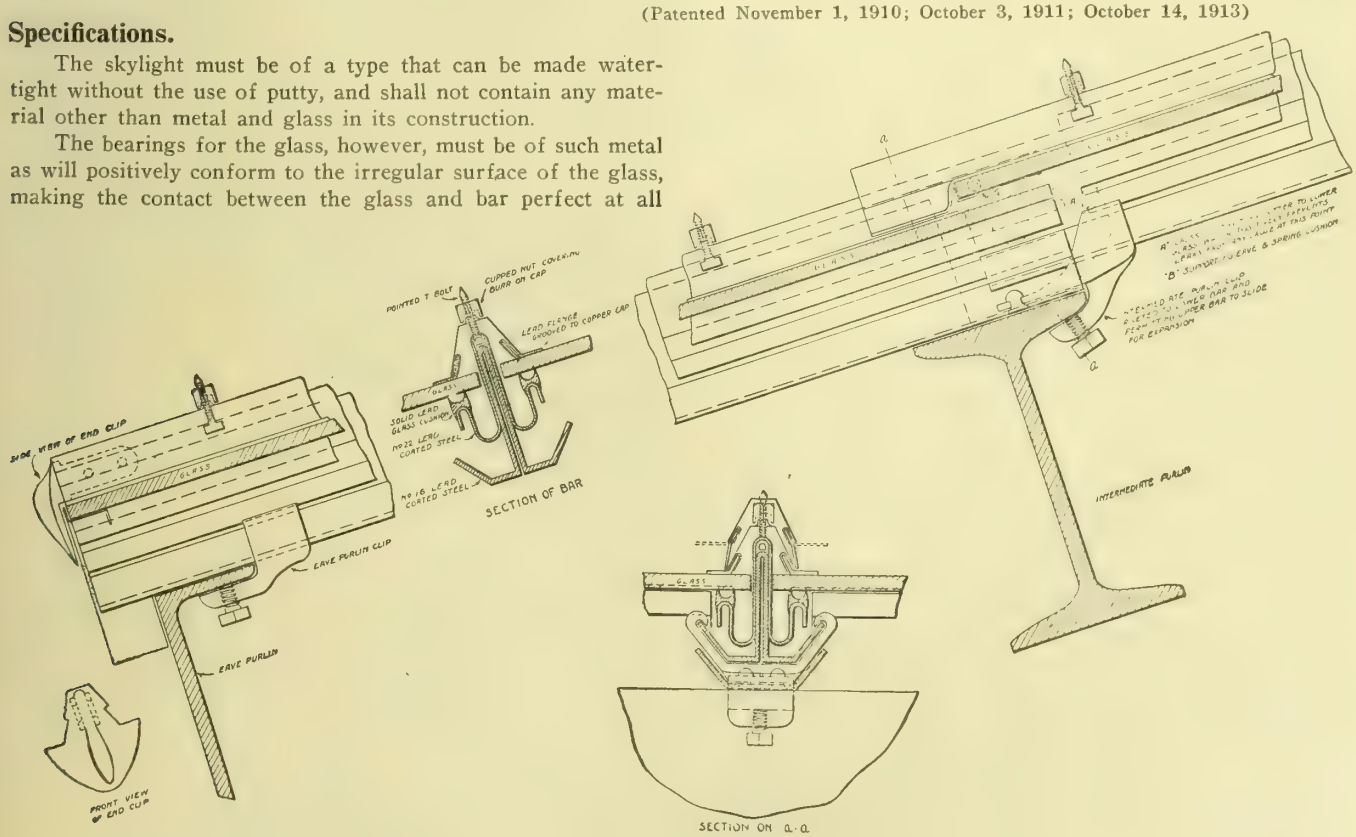
FIG. 1. COMPLETE BAR ASSEMBLED, SHOWING THE GLASS AND DETAILS OF CONSTRUCTION

(Patented November 1, 1910; October 3, 1911; October 14, 1913)

Specifications.

The skylight must be of a type that can be made water-tight without the use of putty, and shall not contain any material other than metal and glass in its construction.

The bearings for the glass, however, must be of such metal as will positively conform to the irregular surface of the glass, making the contact between the glass and bar perfect at all points. It shall have condensation gutters of ample size, and the ends of the caps must be closed with stormproof hoods; all parts constructed to allow for expansion and contraction. Caps to have lead flanges.



SECTION DETAILS OF FLEXIBLE OR SHINGLE TYPE CONSTRUCTION

References.

United States Hospital for the Insane (Boiler House), Washington, D. C.
United States Navy Yard Building, No. 41, Washington, D. C.
United States Treasury Building, Washington, D. C.
United States Post Office, St. Louis, Mo.
Biograph Building, New York, N. Y.
Canadian Pacific Railway, Montreal, Can.
United States Post Office, Hot Springs, Ark.
New York Central Terminal, New York, N. Y.
New York Central Depot, Watertown, N. Y.
Capital Traction Company, Power House and Car Barns, Washington, D. C.
Vitagraph Building, Brooklyn, N. Y.
Park & Tilford Building, New York, N. Y.

ESTABLISHED 1873

E. VAN NOORDEN & COMPANY

Sheet Metal Skylights, Rolled Steel Puttyless Skylights

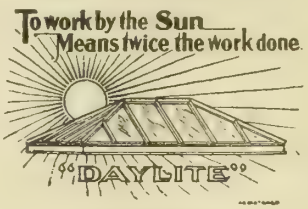
100 Magazine Street, near Massachusetts Avenue

TELEPHONE, Roxbury 3040 BOSTON, MASS.

Products.

Manufacturers of Van Noorden Sheet Steel and Copper Skylights of every type, "Anchor-Bar" Rolled Steel Puttyless Skylights.

Also, Van Noorden Sheet Steel or Copper Windows and Van Noorden Galvanized Steel or Copper Ventilators, Kalamein Doors, etc.



TRADE-MARK

Van Noorden Sheet Steel or Copper Skylights.

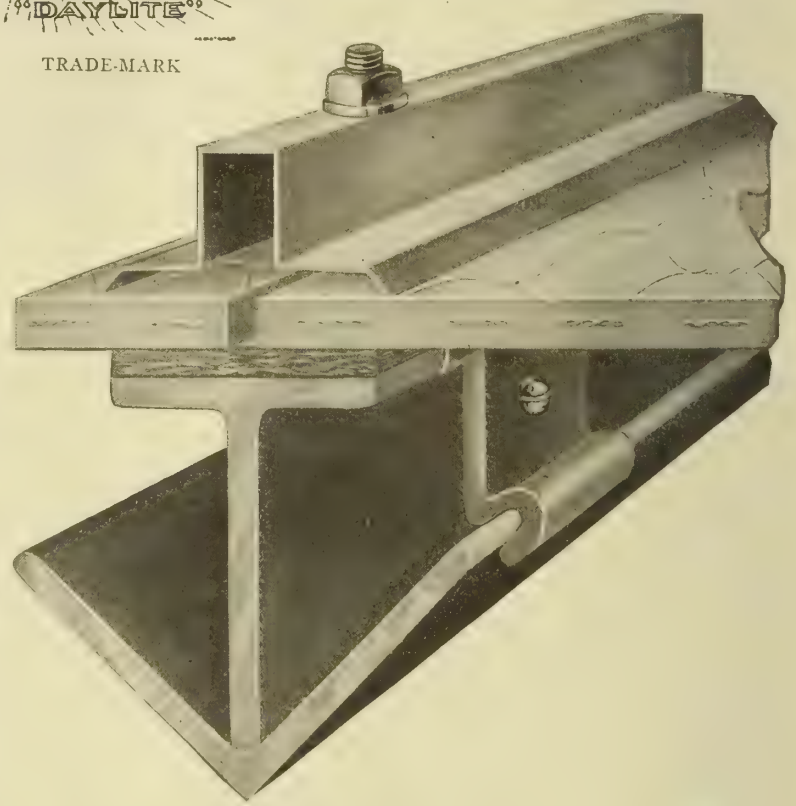
Van Noorden Skylights, which are applicable wherever overhead light is desired, have stood the test of time, the severest of all tests. We can show many skylight installations ranging over a period of twenty-five to forty years without renewal. Bars are formed of sheet metal, riveted and soldered, combining maximum strength with little weight. Expansion and contraction are allowed for. Ample provision is made for the egress of condensation.

Rolled Steel Puttyless Skylights, "Anchor-Bar" Type (Patent No. 931638).

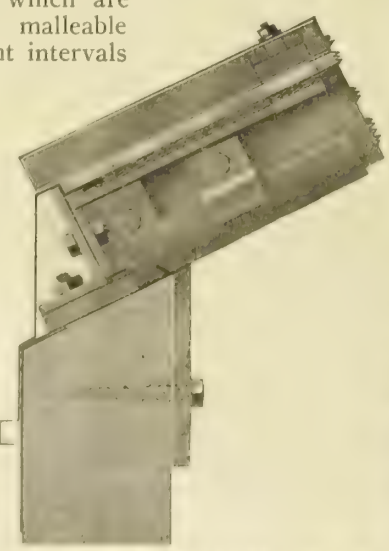
The "Anchor-Bar" Rolled Steel Skylight is designed for large areas where the bar length exceeds eight feet. The structural parts of rolled steel and the trim of sheet metal (generally copper) form a combination which cannot be surpassed, to wit: steel for strength, copper for weather protection.

Bar—The bar proper consists of two structural members, a 2 x 1½ inch tee, and 1¾ x 1¾ inch angle, which are secured together with malleable iron clamps at sufficient intervals to insure proper strength and rigidity. The angle member serves as gutter for condensation. Glass rests on flange of tee on a bed of pure wool felt.

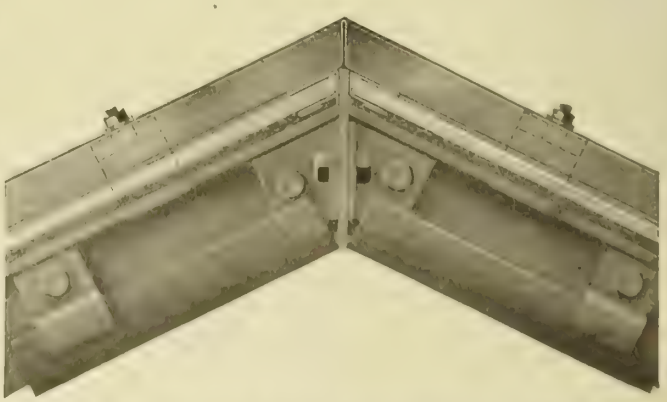
Curb — Especial attention is called to method of securing skylight to curb. A continuous angle, 2 x 1½ inches, is secured to curb by means of clamps lag-screwed on the inside. The base angle sets up from curb ¼ inch resting on the clamps and bolted to same. Bolt heads are countersunk, so that they do not extend through copper apron. The raised position of the base angle permits the escape of condensation under same. The thrust of skylight is directly against this member, which cannot give way while the curb holds. Compare this feature with other so-called "improved" types of skylight construction, which are largely weak at the curbs. The "Anchor-Bar" Sky-



SECTION OF BAR, VAN NOORDEN "ANCHOR-BAR" SKYLIGHT



SECTION THROUGH CURB, "ANCHOR BAR" SKYLIGHT



SECTION THROUGH RIDGE, "ANCHOR BAR" SKYLIGHT

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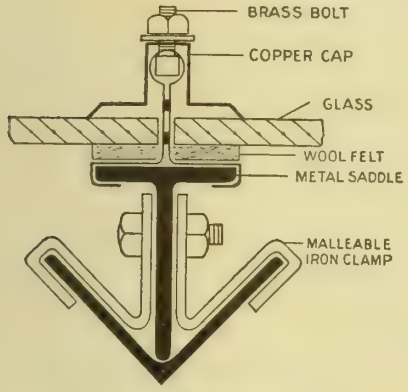
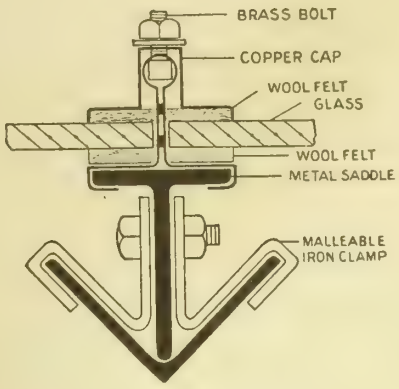
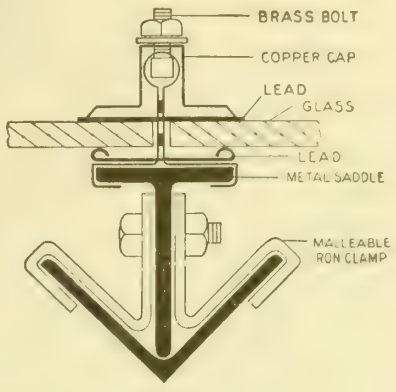


STANDARD "ANCHOR-BAR"



"ANCHOR-BAR" SPECIAL "A"



"ANCHOR-BAR" SPECIAL "B"

light is the only standard type of rolled steel skylight which has reinforcement in the base. The relative position of tee flanges and base angle forms a shoulder which prevents any possibility of the sliding of glass (an important feature in large skylights).

Cap—"Anchor-Bar" caps are 16-oz. cold-rolled copper or galvanized iron. Caps are secured by means of brass bolts to 20-gauge non-corrosive metal saddles, which are spaced on bar about three feet on centers.

Apron—Copper, galvanized iron or other metal aprons protect base angle from weather, also prevent snow from percolating through condensation outlets.

Method of Glazing—Glass rests on flange of tee on a bed of pure wool felt. Caps are applied after glazing. Successive lengths of glass are butted with cross gutters of copper between the lights to convey condensation to main bars and thence to roof.

Expansion and Contraction—Owing to the fact that sheet metal parts of "Anchor-Bar" Skylights are independent of rolled steel parts, expansion and contraction are amply provided for. Glass sets loosely on the cushion of wool felt. Thus there is no possibility of breakage due to expansion and contraction.

Accessibility for Repainting—A feature to be recommended in "Anchor-Bar" Skylights is the ease and accessibility for repainting the rolled steel portions when necessary. The sheet metal portions, being preferably of copper, are impervious to weather conditions.

"Anchor Truss Bar" (Patent No. 1140909).

"Anchor Truss Bars" are used where bar length is over 10 feet (except when intermediate purlins are provided).

The tee member of the bar in this case forms the top cord of a simple angle truss, the angle member forms the lower cord. The two are secured with clamps and struts at proper intervals.

Special details of "Anchor Trussed Bar" Construction may be had on application. "Anchor-Bar" Skylights are recommended for all purposes where the cost of all-copper skylights is prohibitive, or where our regular hollow bar would require heavy reinforcement. Inquiries should state overall length of outside of curb, bar length, pitch of skylight (5 inches to foot or over) and distance between intermediate purlins.

"Anchor-Bar" Specials.

"Anchor-Bar" Specials are simple modifications of our standard "Anchor-Bar" Skylight to meet the requirements of engineers who desire slight variations from our standard construction.

Special "A" varies from our standard bar only in the additional feature of a cushion layer of saturated wool felt, which is inserted continuously under the cap. This is drawn snug to the glass by means of the cap bolts. The oil saturation renders the felt impervious to weather conditions.

Special "B" is similar to Special "A," except that sheet lead is used for a glass bed, also under cap. The lead of glass bed has double rolled edges to provide additional cushioning. This type of construction is approved for government buildings.

BUILDING 64, GENERAL ELECTRIC COMPANY, LYNN, MASS.

Anchor-Bar Skylight, 60 x 800 feet. The above is the largest individual skylight in New England. Erected in 1913. Old work was removed by us and new skylight installed in eight weeks without the loss of a single hour's time in the operation of the plant below, and without any damage to costly equipment and material

VAILE & YOUNG

Manufacturers of Skylights and Architectural Sheet Metal Work

216 North Calvert Street
BALTIMORE, MD.

Product.

Vaile & Young Patent Metallic Puttyless Skylights.

Description.

The Vaile & Young Patent Metallic Puttyless Skylight is made of galvanized sheet metal or copper, the bars being constructed with two open tubular gutters and a tubular strengthening rib inserted between these, all well riveted together, as shown in Fig. 1. In spans less than four feet the strengthening rib is omitted and in spans over eight feet, where additional strength is required, steel strengthening cores are inserted as shown.

Tubular condensation gutters are provided on inside of skylight at eaves. These conduct condensation to outlet holes at junction of eaves and bar gutters.

Bars are capped on outside with V-shaped caps, in each side of which is inserted a strip of heavy sheet lead; this is pressed closely to the glass, the cap being held firmly in place by heavy copper cleats, making the skylight absolutely water-tight.

Advantages.

The Vaile & Young system combines strength and rigidity with lightness of construction and is neat in appearance.

The elasticity of the outside hood or cap and of the tubular glass rest entirely overcomes the dangers of expansion and contraction and of vibration, consequently the breakage of glass is reduced to a minimum. The readiness with which broken glass can be replaced is apparent, it being only necessary to loosen the copper cleats and remove the cap.

Adaptability.

Vaile & Young Skylights are adapted to any form of building construction, and are in use in all sections of the United States; also, in Canada, Mexico, and many foreign countries. They have been erected on buildings of all classes—residences, schools, public buildings, railroad stations and shops, factories, mills, foundries, etc.

Prices.

Prices will be quoted for delivery to any point, f.o.b. Baltimore or destination, or including erection.

Facilities.

This organization is prepared to execute contracts promptly, as its methods and factory equipment are strictly modern. It has been making these skylights for many years.

Co-operative Service.

The thoroughly equipped draughting department will gladly co-operate in the study and planning of any skylighting problem.

Details of Vaile & Young Puttyless Skylights adapted to any form of construction will be furnished.

REFERENCES.

United States Patent Office Building, Washington, D. C., James F. Gill, Superintendent
York Trust Co., York, Pa., James A. Dempwolf, Architect
Johns Hopkins University, Homewood, Md., Parker, Thomas & Rice, Architects.
M. S. Levy & Sons, Inc., Baltimore, Md., Joseph Evans Sperry, Architect
Johns Hopkins Hospital, Baltimore, Md., Archer & Allen, Architects
Court of Appeals, Annapolis, Md., Baldwin & Pennington, Architects
United States Naval Academy, Annapolis, Md., Ernest Flagg, Architect
Baltimore & Ohio Railroad Co., Baltimore, Md., M. A. Long, Architect
Westport Power House, Westport, Md., Otto G. Simonson, Architect
Louisville & Nashville R. R. Co., Nashville, Tenn.
New York Ship Building Co., Camden, N. J.
Atlantic Terra Cotta Co., Perth Amboy, N. J.
Ridgeway Dynamo & Engine Co., Ridgeway, Pa.
Maryland Steel Co., Sparrows Point, Md.

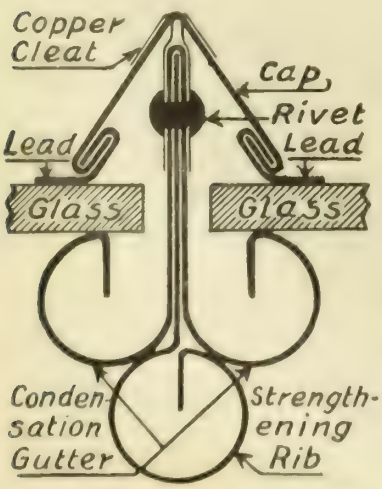
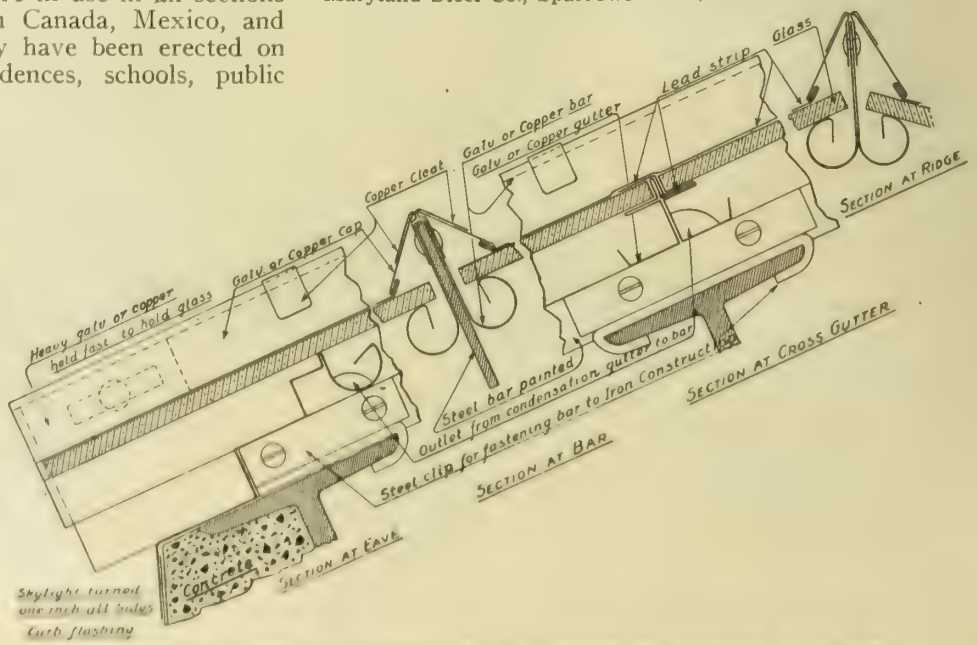


Fig. 1. Full Size Section of Skylight Bar with Cap



Sectional Detail, Showing Construction of Pitched Skylight

BRASCO MANUFACTURING CO.

Metal Store Fronts

CHICAGO, ILL.

Products.

Kalamein Covered Work.

Kick and Push Plates.

Metal Work, Brass, Architectural or Ornamental.

Metal Work, Bronze, Architectural or Ornamental.

Metal Mouldings.

Mouldings, Metal Covered.

Poles, Metal.

Posts, Metal.

Railings, Theater.

Sash and Frames, Hollow Metal.

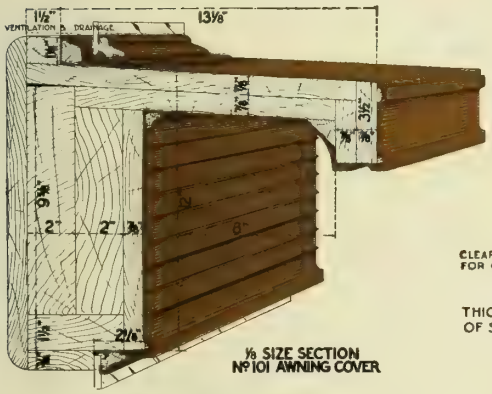
Sheet Metal Work.

Store Front Construction.

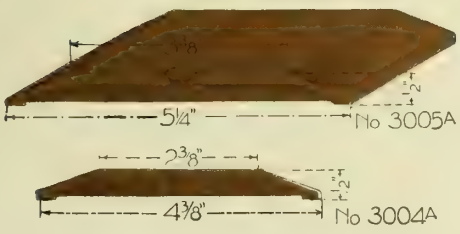
Tablets, Memorial and Sign.

Trim Wood-Patent Cover.

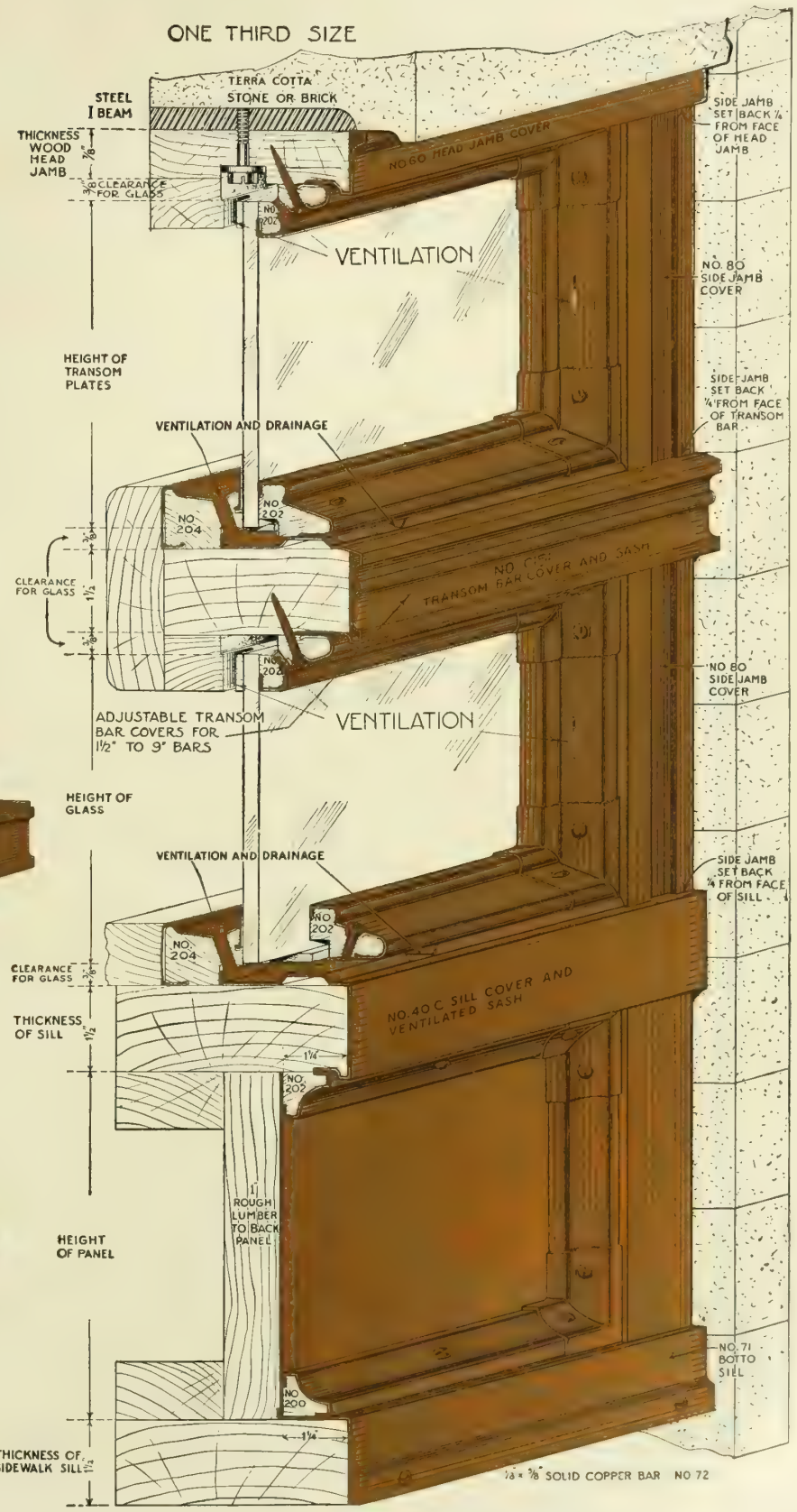
Doors, Mausoleum.



CROSS-SECTION AWNING COVER



SECTIONS OF THRESHOLDS



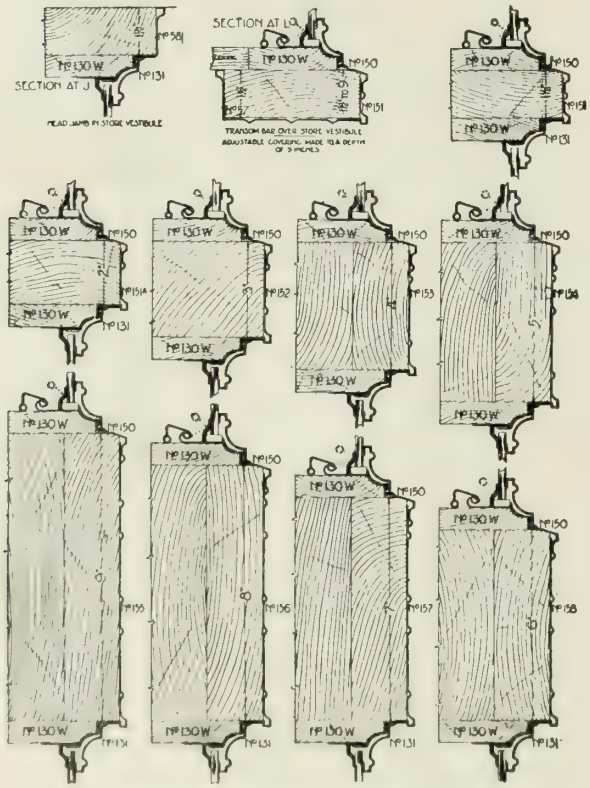
SECTION BRASCO STORE FRONT CONSTRUCTION

HESTER MANUFACTURING COMPANY

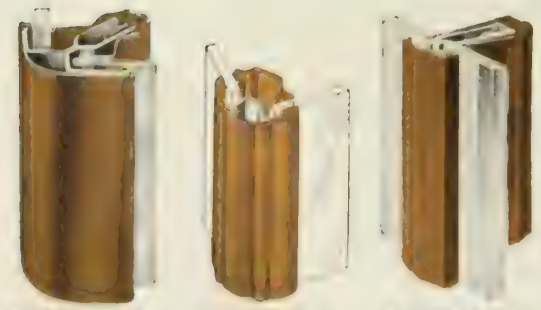
Metal Store Fronts
CHICAGO, ILL.

Products.

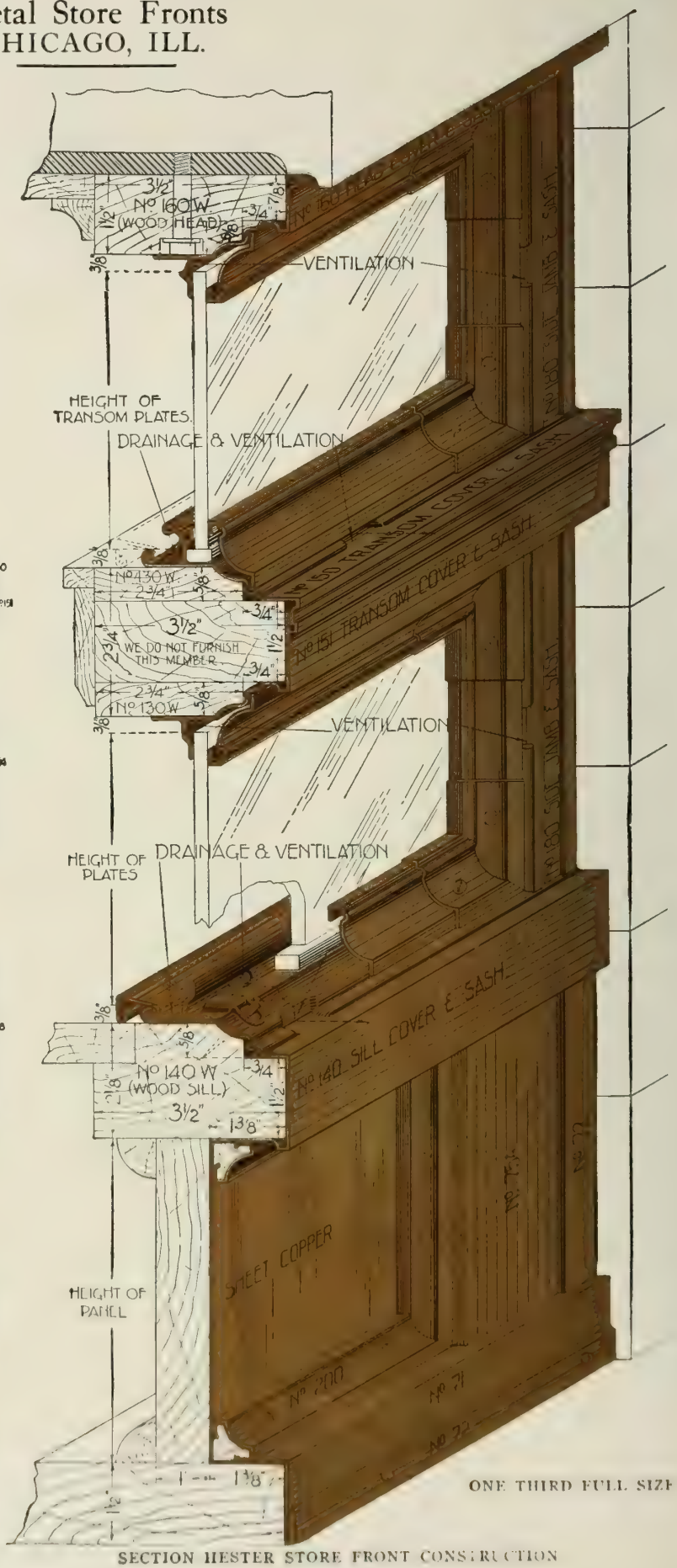
KICK and PUSH PLATES
METAL WORK, BRASS and ARCHITECTURAL or ORNAMENTAL
METAL WORK, BRONZE and ARCHITECTURAL or ORNAMENTAL
METAL MOULDINGS
MOULDINGS, METAL COVERED
POLES, METAL
POSTS, METAL
RAILINGS, THEATER
SASH and FRAMES, HOLLOW METAL
SHEET METAL WORK
STORE FRONT CONSTRUCTION
TABLETS, MEMORIAL and SIGN
DOORS, MAUSOLEUM



ADJUSTABLE TRANSOM BAR COVERS
For Bars 1½ to 9 inches deep



CORNER BAR NO. 8 | CORNER BAR NO. 10 | DIVISION BAR NOS. 17, 18 AND 19



ONE THIRD FULL SIZE

SECTION HESTER STORE FRONT CONSTRUCTION

JOHN PETZ, President and Superintendent HERBERT MALOTT, Secretary-Treasurer

DETROIT SHOW CASE CO.

"Petz" Patent Metal Store Front Construction

DETROIT, MICH.

Products.

Manufacturers of "Petz" Patent Metal Store Front Construction; "Petz" Patent Sash, Posts and Bars, for Setting Plate Glass (John Petz, Patentee); "Almetal" Store Front Construction.

For Show Cases, Interior Store Fixtures, etc., see our name in General Index.

TRADE-MARK

"Almetal" Copper Store Front Complete.

"Almetal" store front construction is made and designed along the most approved architectural lines. The several shapes harmonize perfectly with the modern styles of store front construction. It is made of pure, heavy gauge copper, and is complete in every detail.

"Almetal" Line Complete.

The "Almetal" line of store front construction is complete in every detail, including ventilated sash, glass stops, division bars, corner bars, three-way bars, reverse corner bars, sill coverings, transom bar coverings, bulk head constructions, copper panel work, kick plates, thresholds, etc.

Simplicity.

The simplicity of "Almetal" store front construction is one of its strongest points. It is made in but two pieces, an inner and outer member, and is glazed easily from the outside. The outer member is made of No. 16 B & S gauge copper; the inner of No. 20 B & S gauge copper.

ELEVATION OF DETROIT SHOW CASE CO.'S MODERN STORE FRONT DESIGN

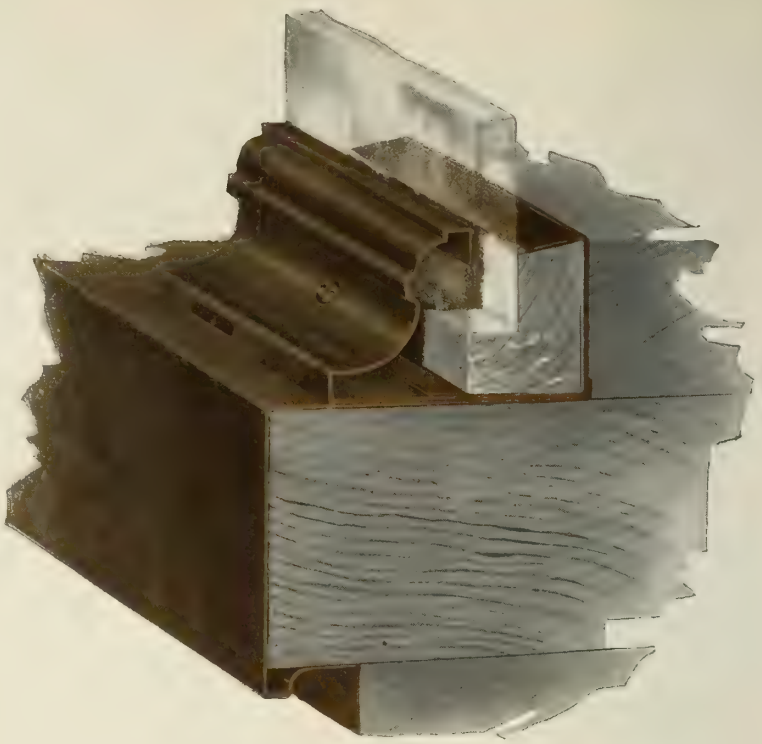
Continued on next page

Ventilated Sash Construction.

The ventilated sash is made to hold the glass firmly in a deep rabbet and to take care of any expansion or contraction of the glass. The glass setting blocks are of creosoted cypress, about six inches long, and are set well apart so as to give ample freedom to ventilation and drainage. Air has free access through the "Almetal" sash; and store fronts, when properly backed, are always free from fog or frost when "Almetal" sash is used at top and bottom of the glass.

Corner Bars.

The corner bar is made in but two pieces, an inner and outer member, held together by concealed brass bolts fitted with sleeve nuts, made to install easily to fit any angle desired and to hold the glass in a firm, strong grip.



"ALMETAL" SILL CONSTRUCTION NO. 1801
Using No. 180-N Sash and No. 120 Sill Covering

Division Bars.

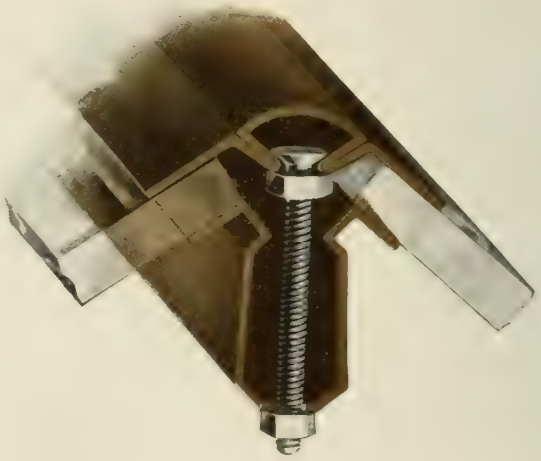
The division bars are made in two pieces, an inner and outer member, held together by concealed brass bolts fitted with sleeve nuts, easy to install and providing adjustment to the thickness of the glass. Equal pressure is exerted by both the inner and outer members.

Rabbets.

The rabbets in "Almetal" construction are extra deep to allow for excessive wind pressure, contraction and expansion of glass.

Metal Coverings.

Sill covers, transom covers, side and head jamb covers and sheet metal coverings are made of pure 20-gauge copper. Special coverings can be furnished in any designs or shapes wanted.



CORNER POST NO. 182

DIVISION BAR NO. 183

"Petz" (wood core) Metal Store Front Construction.

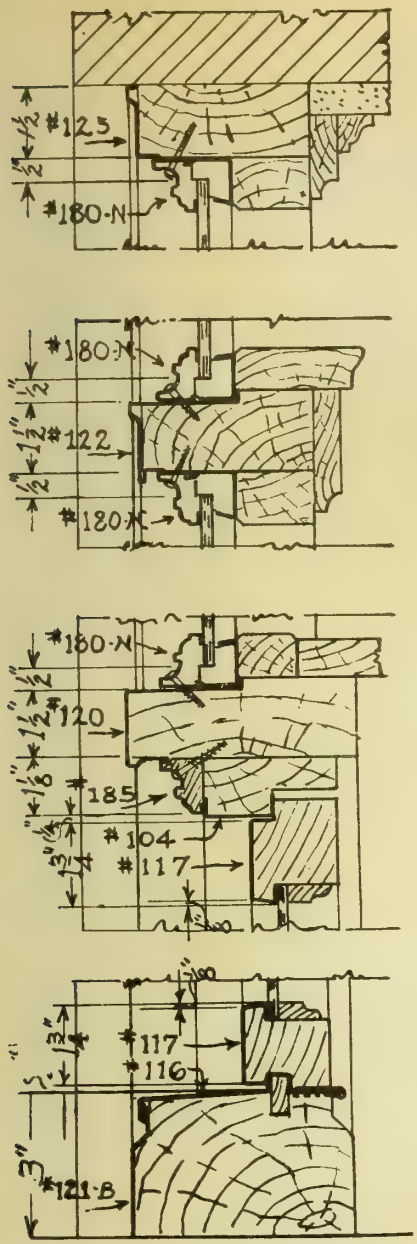
We also make the "Petz" construction, which consists of No. 25-gauge metal drawn and firmly clinched over a core of oily red cypress, "the eternal wood."

The "Petz" is furnished in plain copper, oxidized copper, brass, bronze, German silver or gun-metal finishes.

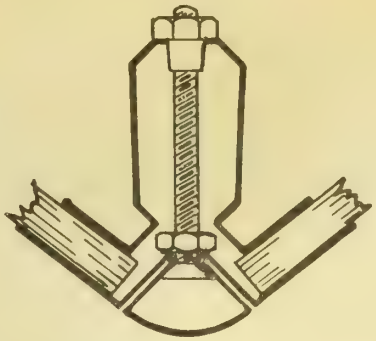
This line is complete in every detail required for modern metal store fronts. From the "Petz" mouldings we can furnish practically any kalamine moulding required.

Catalogue and detail sheet furnished.

Continued on next page



Cross-Section showing detail of bulk head, sill transom and head jamb construction using "Almetal" copper sash and coverings

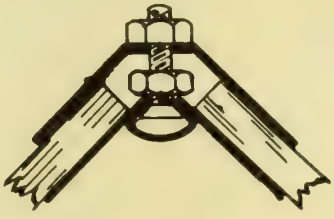


No. 182. Corner Bar

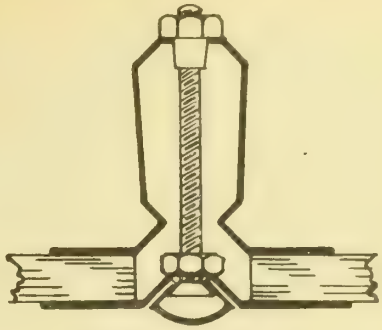
No. 282. Corner Bar

No. 382. Corner Bar with Kalamine Core

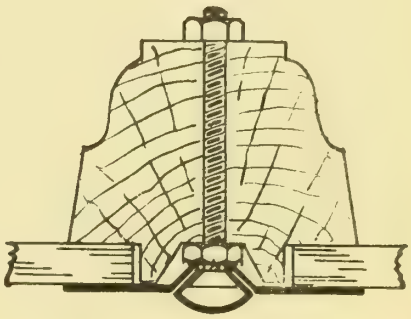
No. 482. Corner Bar



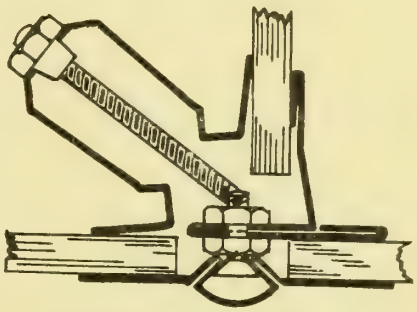
No. 184. Inside Corner Bar



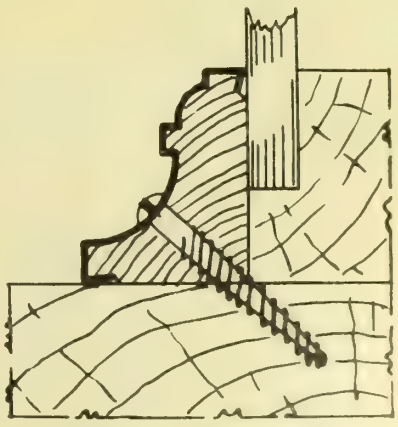
No. 183. Division Bar



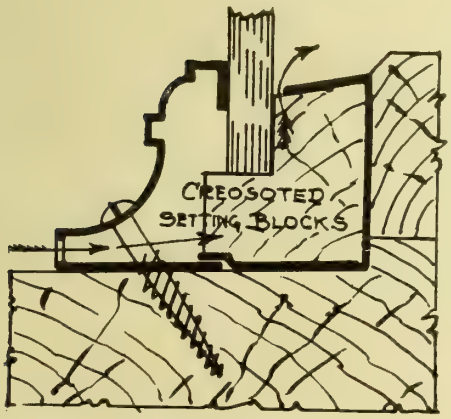
No. 483. Division Bar



No. 186. Three-way Division Bar



No. 185. Kalamine Sash Bar



No. 180-N. Copper Sash

CONSTRUCTION DETAILS "ALMETAL" STORE FRONT

J. W. COULSON & CO.

SOLE OWNERS AND MANUFACTURERS OF

The Coulson Patent Store Front Construction

95-107 West Spring Street

COLUMBUS, OHIO

Products.

The COULSON PATENT STORE FRONT CONSTRUCTION and DRAWN METAL MOULDINGS of COPPER, BRASS and ALUMINUM.

Original Patentee.

J. W. COULSON & Co., pioneer Store Front Manufacturers, have the original patents for modern store front construction, patents having been granted before any of the other present manufacturers were in business.

Several store front manufacturers are involved in patent infringement litigations, and owners of buildings and contractors are being threatened if they use certain constructions.

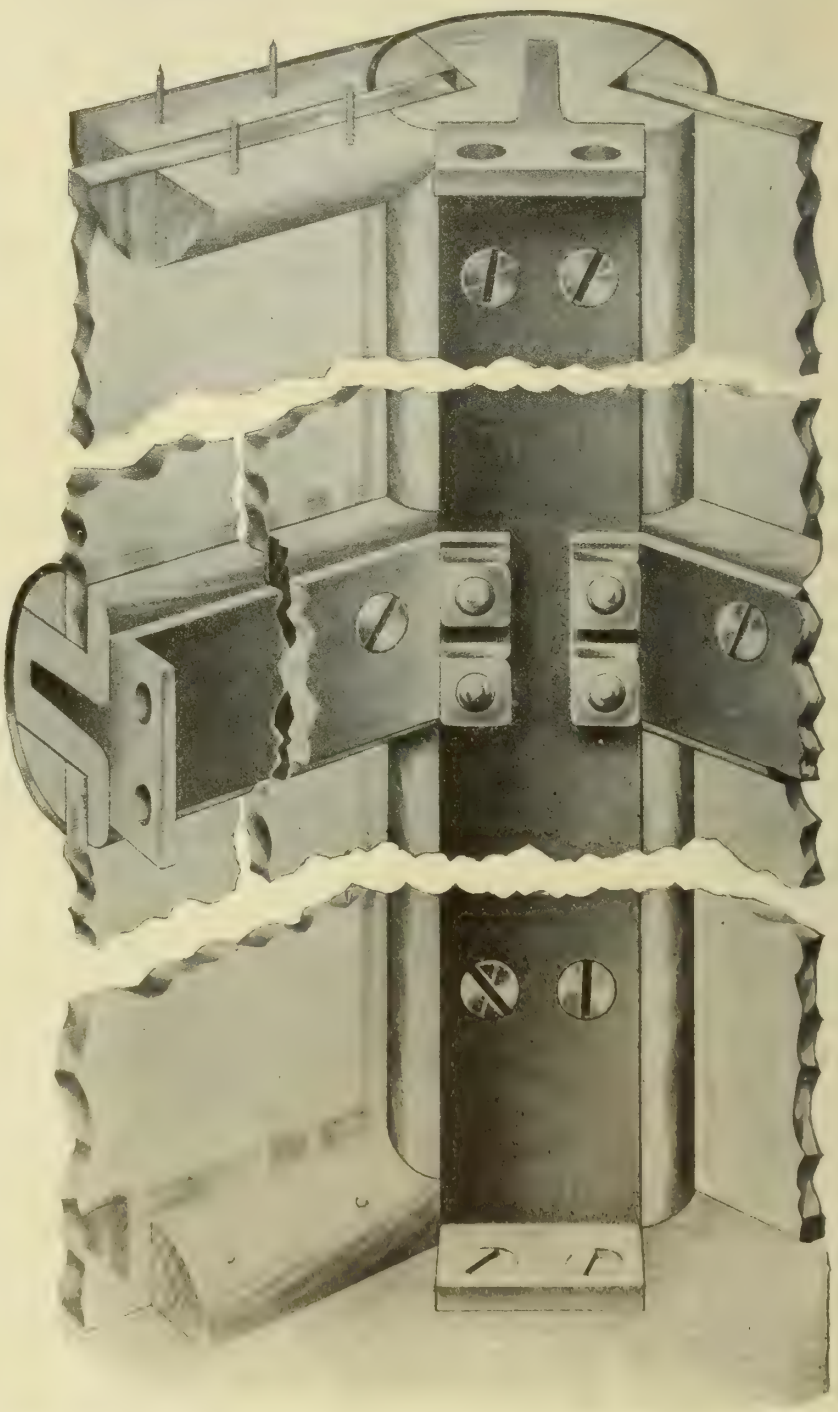
All this trouble is avoided if you specify "Coulson."

Description.

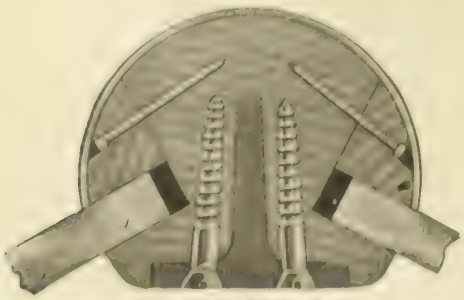
This construction is gotten out in the factory cut to the required lengths. Steel T's in the corner posts, division and transom bars are provided with lugs by which they are fastened with screws to the base, lintel and jamb casings, and door posts, and where they intersect are bolted together. This makes a strong steel framework which is encased in wood that has been creosoted, to prevent decay. All glass is set from the outside and held in place with wood stops nailed in with brass nails. All outer exposed surfaces are covered with metal, drilled and provided with screws, ready to put in place.

Ventilating System.

The ventilating and drainage sill is of wood, covered with metal in one piece, allowing no moisture to penetrate the woodwork of the base. It is shaped so as to form a gutter on the inside. Brass pipes are brazed in the gutter extending to outside. This takes care of all moisture, also allows the cold air to pass into the show window and pass out through the ventilating openings in the transom bar, obtaining a circulation of cold air in the show window and preventing the glass from frosting and sweating.



REAR VIEW OF NO. 13 CORNER POST AND NO. 12 TRANSOM BARS, SHOWING FRAMING, FULL-SIZE



NO. 13 CORNER POST
Full Size Section

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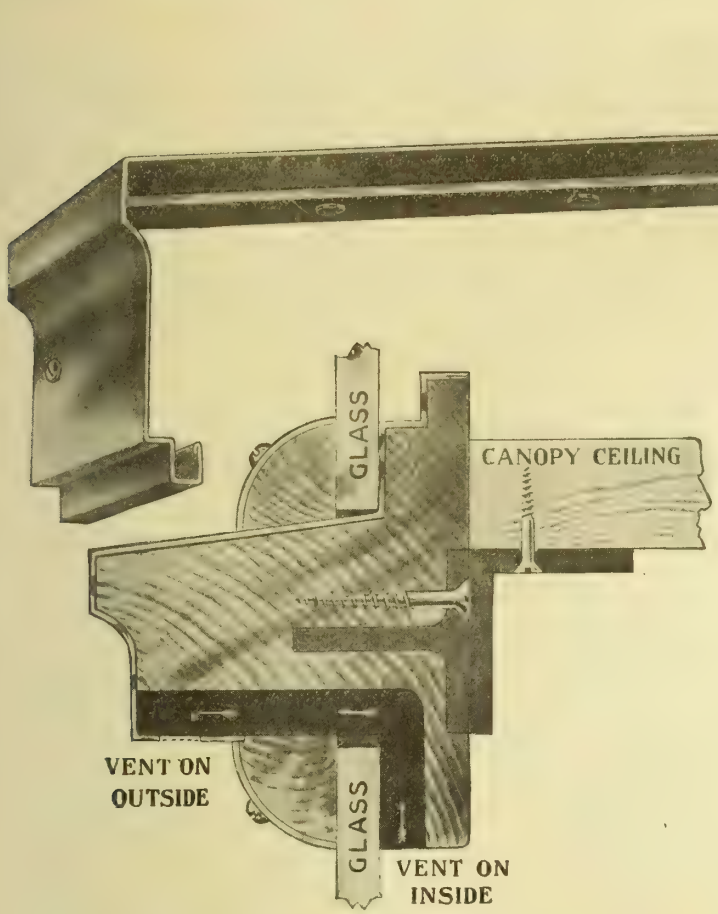
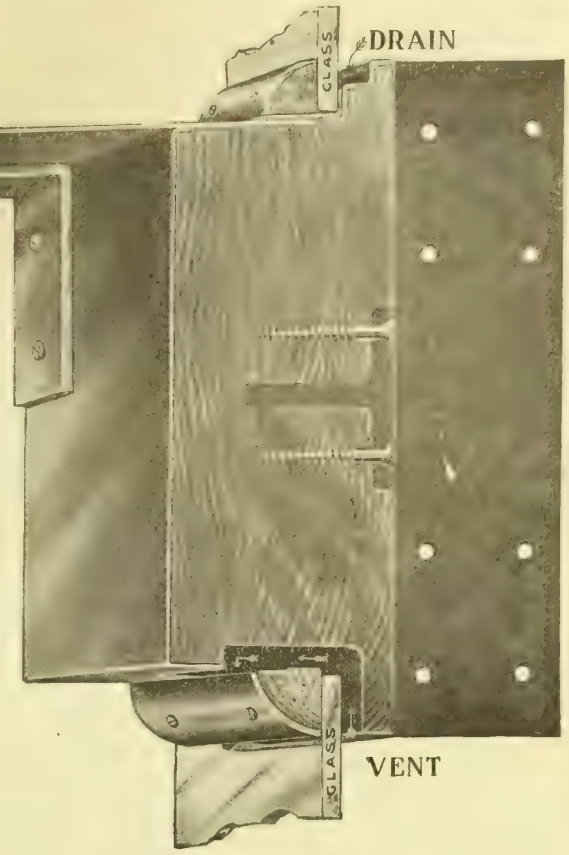
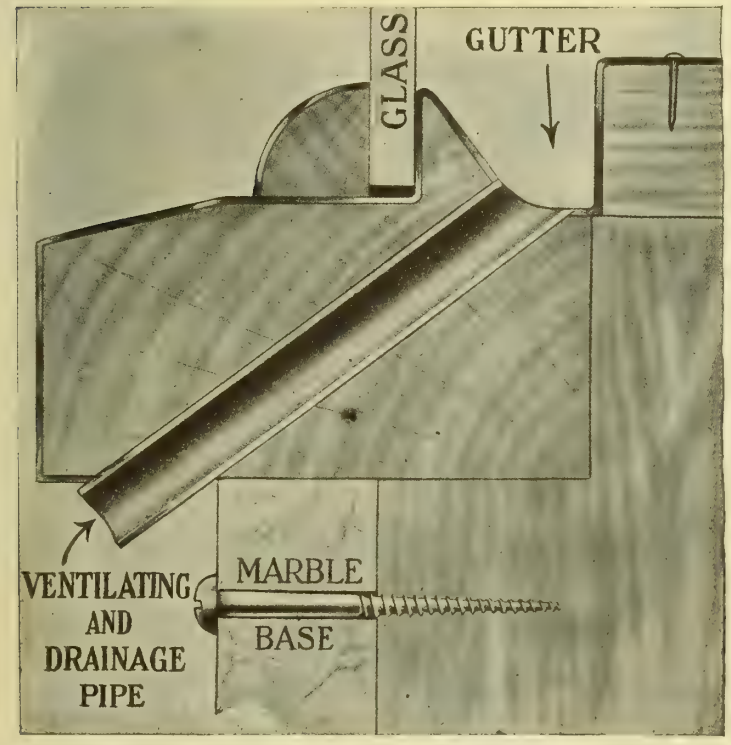


Sectional View
COULSON VENTILATING NO. 23 TRANSOM BAR, FULL-SIZE



COULSON AWNING HOOD AND HEAVY TRANSOM BAR



COULSON VENTILATING AND DRAINAGE SILL, FULL-SIZE

Special Features.

This System of Store Front Construction makes a nice appearing, substantial and durable store front and does not cause glass breakage, and furnishes a safe and practical setting for the glass. It is highly endorsed by the Insurance Companies, and insured at the minimum rate.

Awning Provisions.

Awning Hood and Transom Bar for support and protection of awning, furnished complete with wood reinforced with steel T's and having lugs to fasten to jamb casings; or metal covering only for transom bar with hood and metal covered steel brackets furnished.

Awning lugs, when required, attached to the corner posts to which the awning fixtures are secured.

AWNING LUGS ON COULSON CORNER POST

Metal Coverings.

Metal Mouldings and Coverings for jamb and lintel casings and base of various designs furnished. Also Kick Plates and Extruded Brass Thresholds.

Coverings for construction and mouldings made of copper, brass and aluminum metal, polished; or finished in spotted oxidized copper, statuary copper, gun-metal, or nickel-plate on brass or copper.

Specifications, etc.

Specify Coulson Patent Store Front Construction, sizes recommended by manufacturer. Complete Catalogue and full-size Detail Sheet will be sent on request.

KAWNEER MANUFACTURING CO.

Metal Store Fronts, Architectural Mouldings, Steel Sash for Industrial Buildings

NILES, MICH.

FACTORIES: NILES, MICH., BERKELEY, CAL., GUELPH, ONT., CAN.

BRANCH OFFICES

CHICAGO, ILL.	PITTSBURGH, PA.	BOSTON, MASS.	NEW GLASGOW, N. S.
NEW YORK, N. Y.	ATLANTA, GA.	INDIANAPOLIS, IND.	SEATTLE, WASH.
KANSAS CITY, MO.	PHILADELPHIA, PA.	LINCOLN, NEB.	SPOKANE, WASH.
DETROIT, MICH.	MINNEAPOLIS, MINN.	MONTREAL, QUE.	LOS ANGELES, CAL.
ST. LOUIS, MO.	DES MOINES, IOWA	TORONTO, ONT.	SAN DIEGO, CAL.

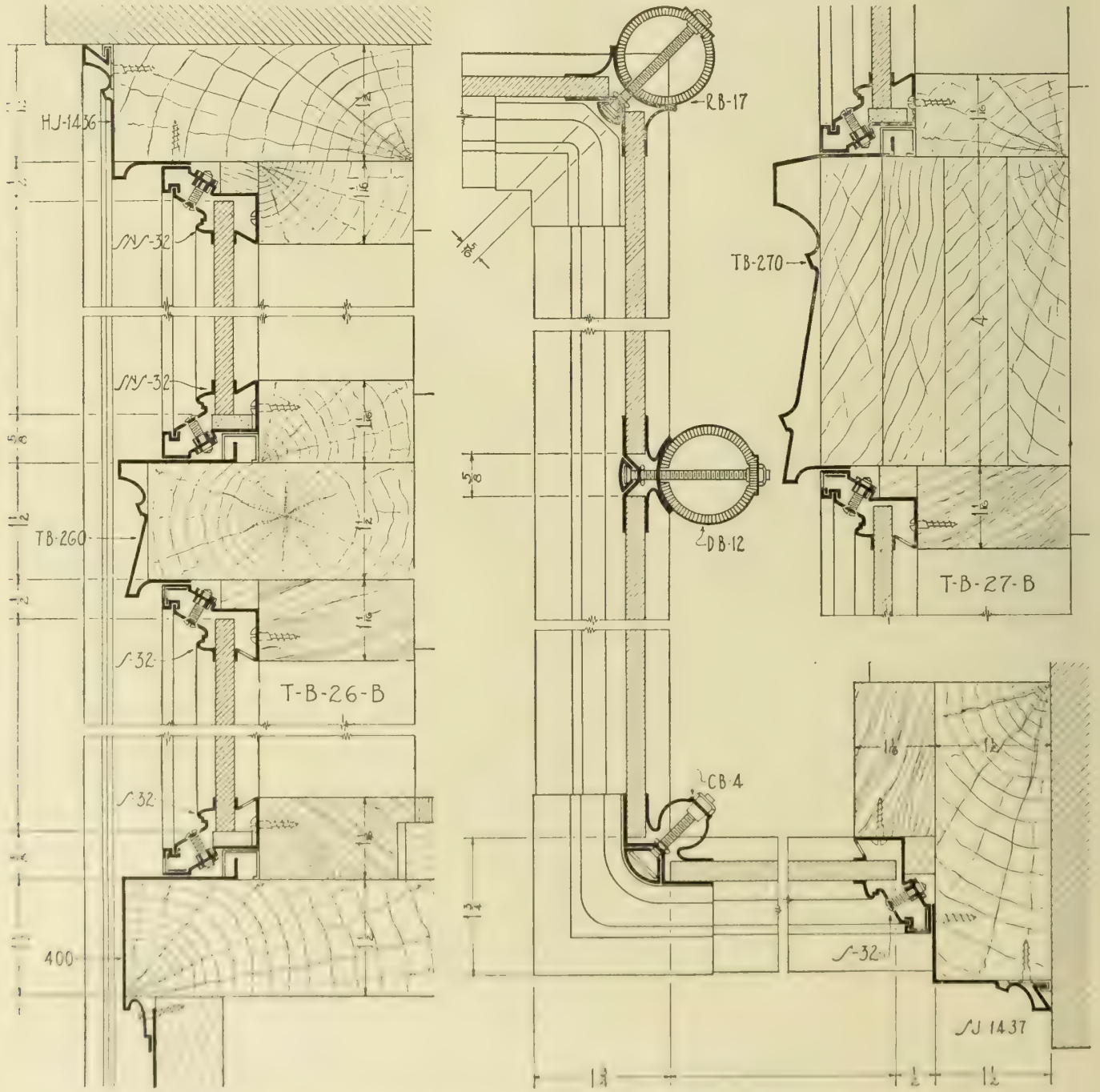
AGENCIES IN MOST LARGE CITIES IN THE UNITED STATES AND CANADA

Products.

"Kawneer" Solid Metal Store Fronts in Copper and Bronze; Architectural Metal Mouldings; Steel Sash for Industrial Buildings.

Kawneer Store Fronts Kawneer Products

TRADE-MARKS



HALF FULL SIZE DETAILS OF "KAWNEER" STORE FRONT CONSTRUCTION

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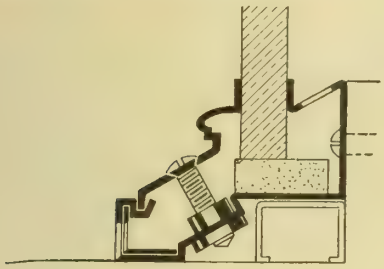
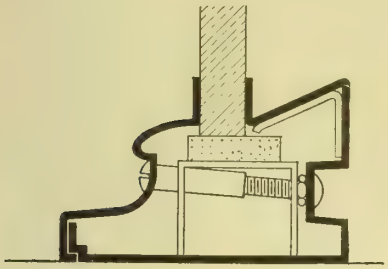
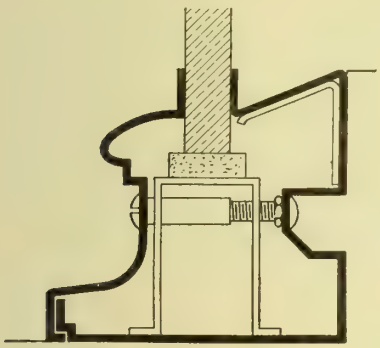


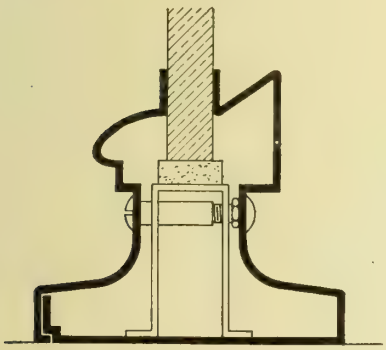
S 32 ~ SASH



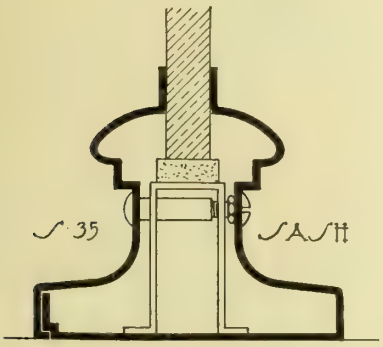
S 36 ~ SASH

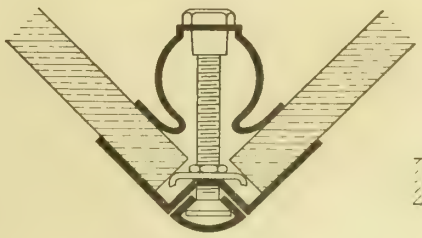


S 31 ~ SASH

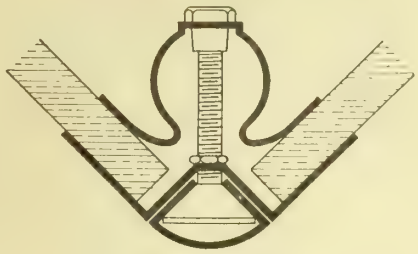


S 33 ~ SASH

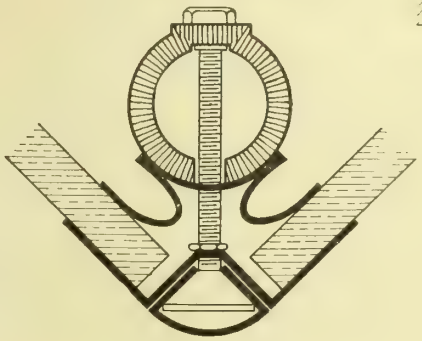




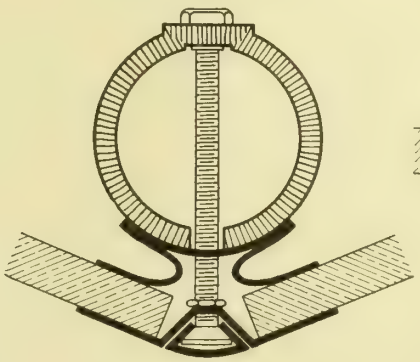
C B 3 ~ LIGHT



C B 4 ~ MEDIUM



C B 6 ~ HEAVY



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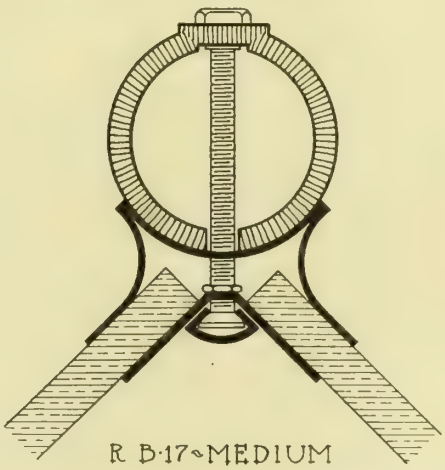
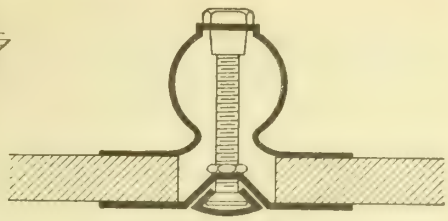
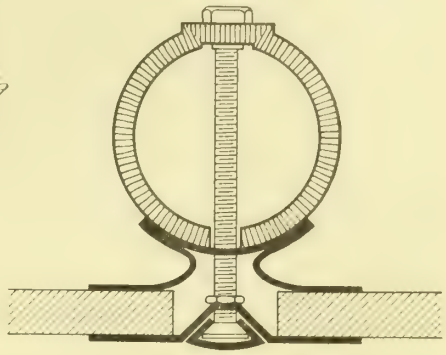


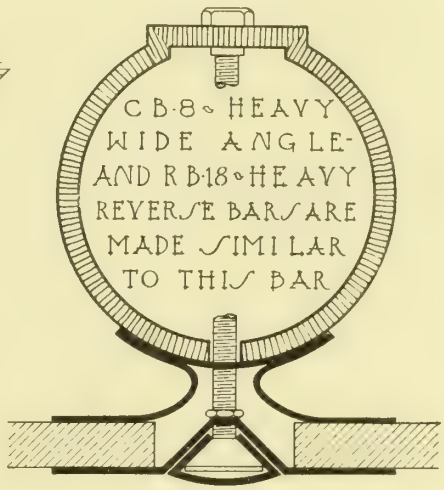
R B 17 ~ MEDIUM



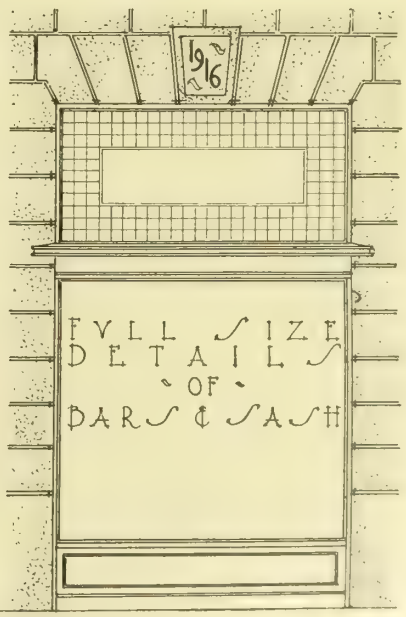
D B 11 ~ LIGHT



D B 12 ~ MEDIUM



D B 13 ~ HEAVY



FULL-SIZE DETAILS OF "KAWNEER" STORE FRONT CONSTRUCTION

LOVE BROTHERS, INCORPORATED

Store Front Construction; Ornamental and Architectural Iron

AURORA, ILL.

Products.

We are manufacturers of LOVE BROTHERS FROST-PROOF STORE FRONTS (patented).

Also, ORNAMENTAL IRON and BRONZE ENTRANCES, ELEVATOR ENCLOSURES, MARQUISE, ELEVATOR CARS, OFFICE RAILING, BANK RAILING, STAIRS, STAIR RAILING, STORE FRONTS, LAMPS and STANDARDS, FENCES and GRILLES, CANOPIES, GUARDS, COLUMNS, SILLS, PULLEYS, ANCHORS, SHUTTERS, I-BEAMS, CHANNELS, ANGLES, SIDEWALK LIGHTS, FIRE-ESCAPES, SIDEWALK DOORS, WHEEL GUARDS, HITCHING POSTS, JOIST HANGERS, STABLE GUTTERS, STALL MANGERS, HAY RACKS, CESSPOOL COVERS, FIRE DOORS, POST CAPS, POST BASES, TURN BUCKLES, COAL-HOLE COVERS, CAST and BRONZE CASTING of all Kinds.

Store Front Construction.

Scope—Our cast-iron fronts are designed to meet all modern improvements in store front construction. They are applicable to both old and new construction. These fronts merit the approval of both architect and owner as they are adaptable to all styles and plans of store front construction, and as the material from which they are made is the best grade of cast iron. Cast iron eliminates the trouble and continuous expense incurred by using any other materials, as it will not rot or corrode as is the case with wood metal covered, steel, or copper construction.

These are our own exclusive designs which we have worked out during an experience of over twenty-five years specializing in this line of manufacture.

Advantages.

Our store and building fronts possess the following advantages:

First—It is the simplest all cast-iron front (not steel which corrodes) on the market, being made in the fewest number of sections possible.

Second—No wood, steel, or any other material is used in its entire construction.

Third—No copper gutter is necessary, as the water from washing or condensation escapes through the bulkhead or transom bar directly to outside of building.

Fourth—Perfect and thorough ventilation can be had for display window, and frosting of display window prevented.

Fifth—Awnings can be fully protected from the elements.

Sixth—All glass is set from the outside, so as to enable any one to set a new plate glass, in case one should be broken, without the necessity of tearing out any of the interior fixtures or disturbing the display of merchandize.

Seventh—We make this store front material entirely from the best grade of cast iron or bronze, thereby insuring its durability and eliminating the necessity of reconstructing the store front every few years, which is necessary when wood, steel, wrought iron, copper or sheet brass is used.

Co-operative Service.

Our engineering department will gladly render aid to prospective builders in designing the most suitable building fronts for their requirements. We can advise what columns or beams are necessary to support buildings above front, and can also furnish this material.

Prices.

Our prices are as reasonable as can be associated with high-grade workmanship. Plans and specifications entrusted to us will invariably receive careful and prompt attention.

Scope of Products.

We manufacture small and large fronts, as well as other ornamental iron, and have sufficient capacity to handle orders for any size. The designs given here and which are shown in our catalogue, which will be sent on request, are intended mainly to describe and illustrate the ready application of our store and building fronts to all building construction. We shall be glad to submit special designs and prices on request. In Fig. 1 we show a front view and two plans, half size, of about as simple and as neat a store front as one could design. This entire design is made of cast iron, the sections of which are shown in Fig. 2. The sash bar at transom in this design is the smallest as well as the most substantial awning protection made. It is provided with drain openings for the top glass as well as opening for ventilation of lower show windows.

Frost-Proof Store Fronts.

We make these fronts in what has proven to be the only perfectly ventilated store front system made, as the ventilation and drainage openings are of ample size to allow thorough circulation of the air through the bars without danger of their being at any time clogged up, as will be noticed by examining the details as shown in the following figures. It must be borne in mind when desiring to guard against frosting of windows that the show or display window must be tightly inclosed at the top, bottom, back and sides so as to exclude all moist and warm air. This is necessary so as to keep the temperature of the air in the show window the same as outside air, which is done by the circulation of air through the ventilation openings in store-front construction.

We also make this front without ventilation if desired, or can make fronts to conform to architect's details and plans where so desired.

Durability.

Our Store Fronts are made entirely of cast iron, well fitted up with all facias put on with brass screws, and are therefore virtually everlasting. Owing to the fact that our standard construction is made entirely of cast iron, it is the heaviest, strongest and most durable front to be had. We wish to impress on intended purchasers of store fronts that we can not sell this front to compete against so-called fronts which weigh about one tenth of this construction, in fact this is often merely a lining or covering for wood, and in many cases no better than a front entirely of wood construction. If cheaper store fronts are desired we can accommodate patrons by using cast-iron facia of any design shown in our catalogue, and fastening them to wood backing or making a front entirely of steel, but we do not recommend steel as this material corrodes badly.

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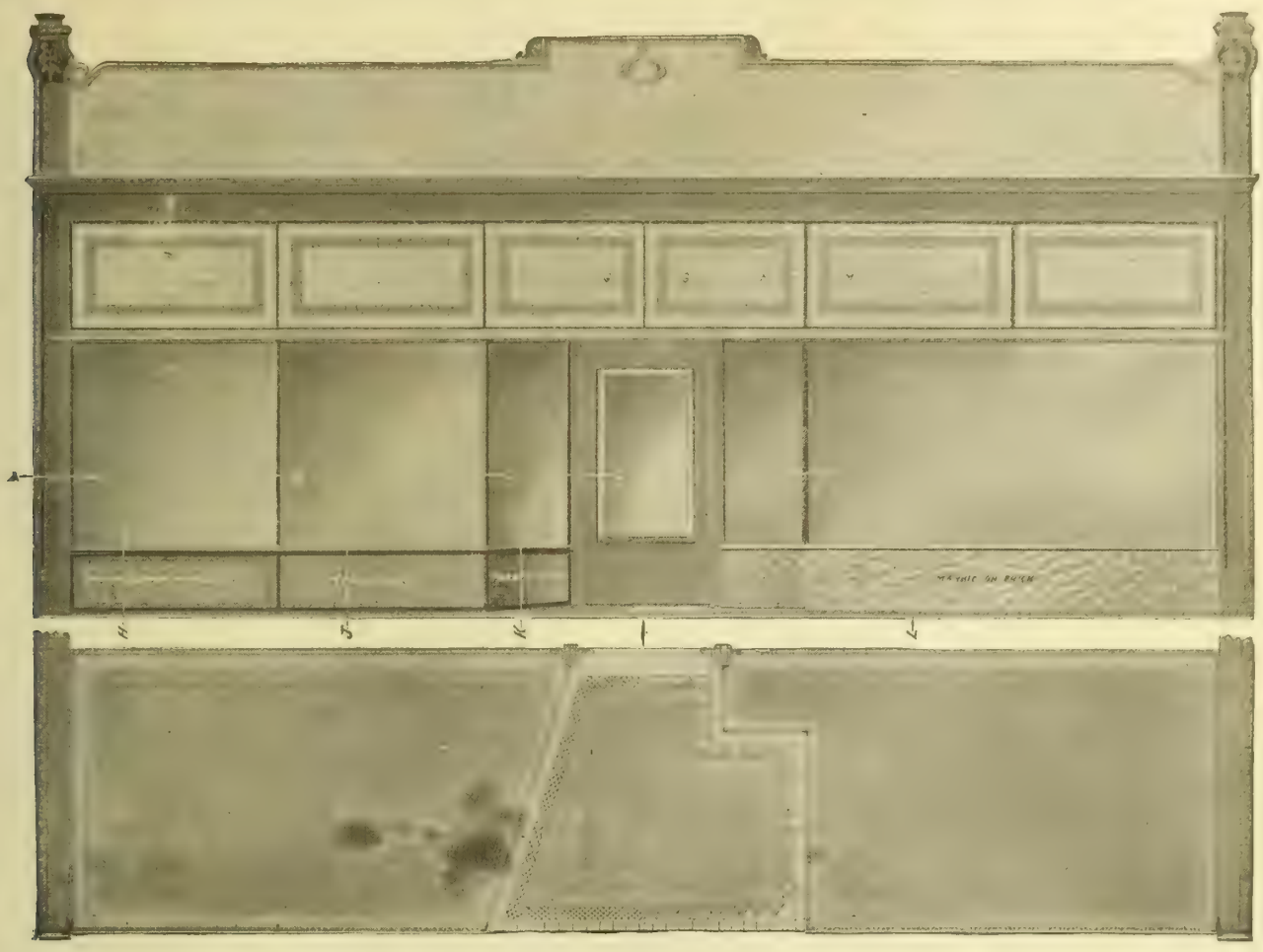


FIG. 1. ELEVATION AND PLAN OF FROST-PROOF STORE FRONT

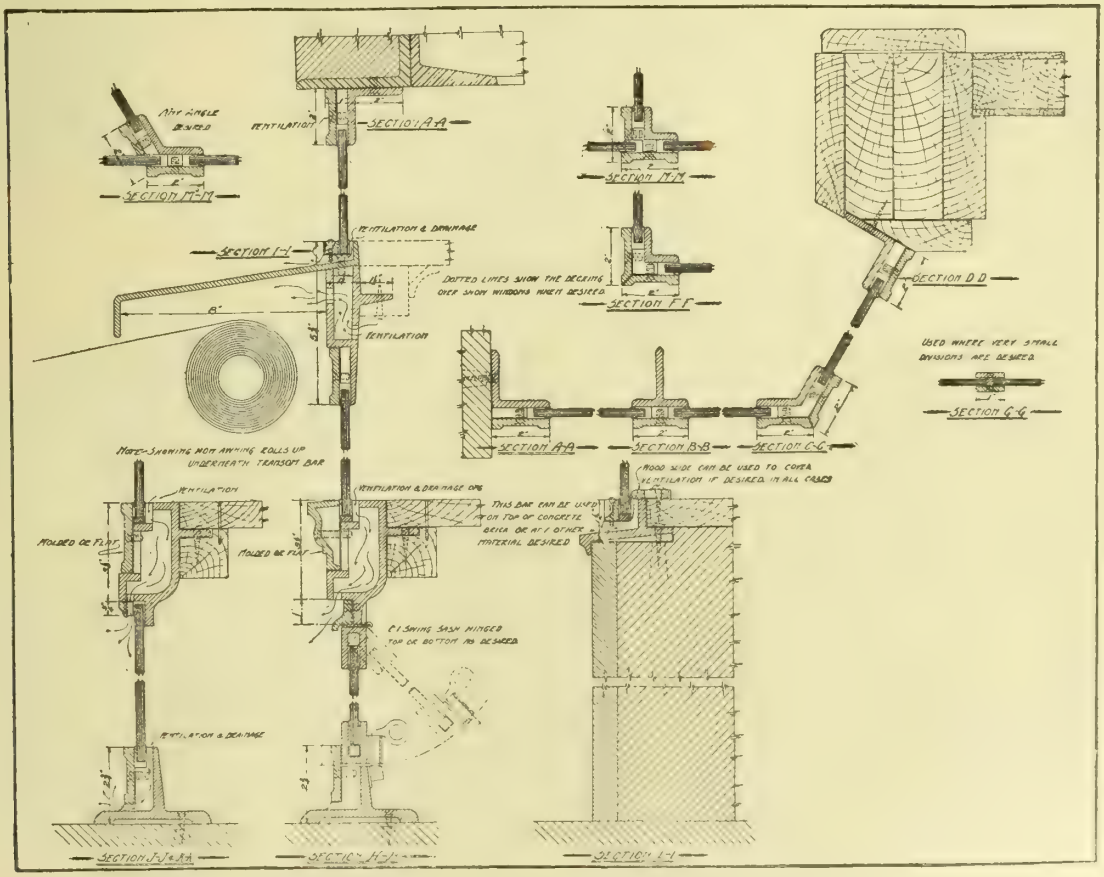
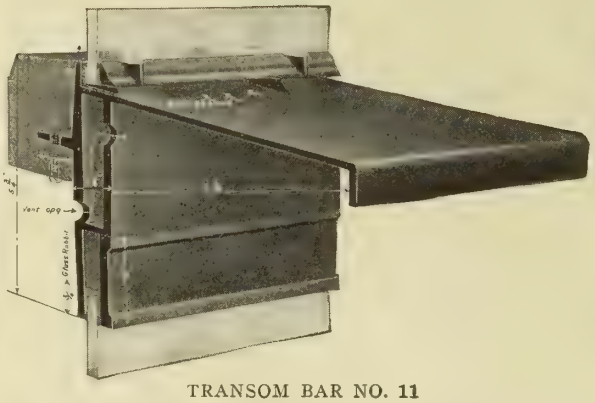


FIG. 2. SECTIONS AND DETAILS OF STORE FRONT CONSTRUCTION

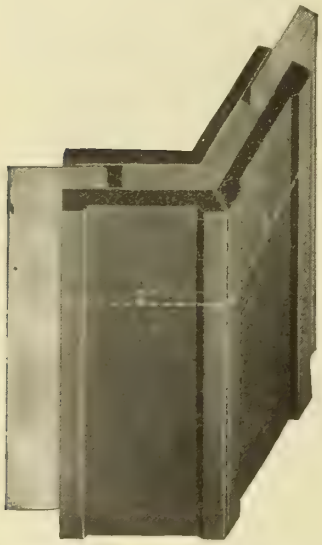
The various bars are in their relative positions as applied to plan and elevation of front shown above. Made entirely of cast iron; no steel in entire construction

ANGLE BAR NO. 1
To be used for Top and Sides
Made in (standard) 2", 2½" and 3" Sizes

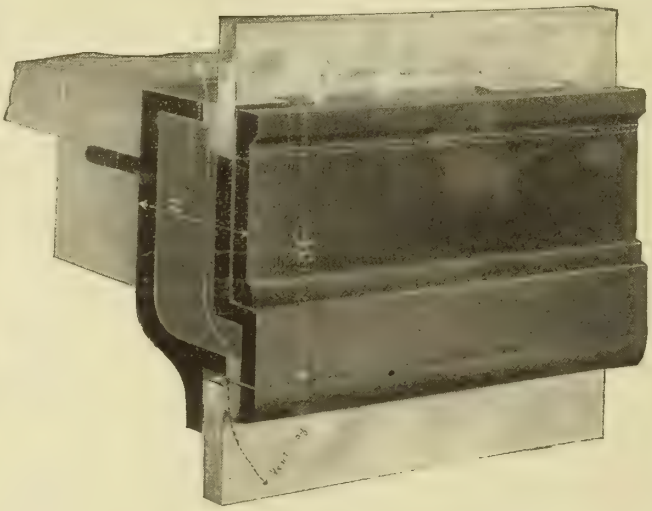


TRANSOM BAR NO. 11
Used at transom division where awning protection is desired

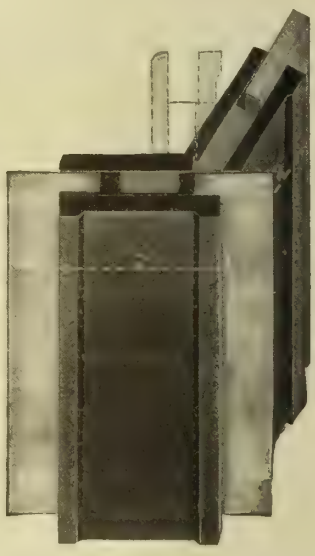
TEE BAR NO. 2
Can be used for all Vertical Divisions
Made in (standard) 2", 2½" and 3" Sizes



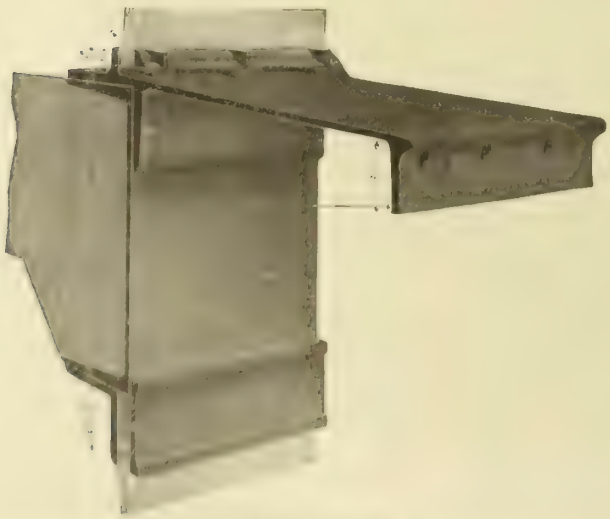
CORNER BAR NO. 9
Can be had in any Angle or Size, 1½", 2", 2½" or 3"



FLAT VENTILATED BULKHEAD BAR NO. 5
Used for main support of glass at Bulkhead. Cast entirely of one piece, with cored-out opening for ventilation, and Cast-Iron Facing for holding glass; is fastened to same with brass screws. Can be had also with Moulded Face, if desired



THREE-WAY BAR NO. 3
Used where Three Glasses are held at one joint
Can be had in any Size or Angle



TRANSOM BAR NO. 14
Showing how same is used in connection with channel support for

BULKHEAD BAR NO. 13
Used in connection with channel support to harmonize with transom bar below. Also showing construction underneath same where swinging cast iron sash are desired

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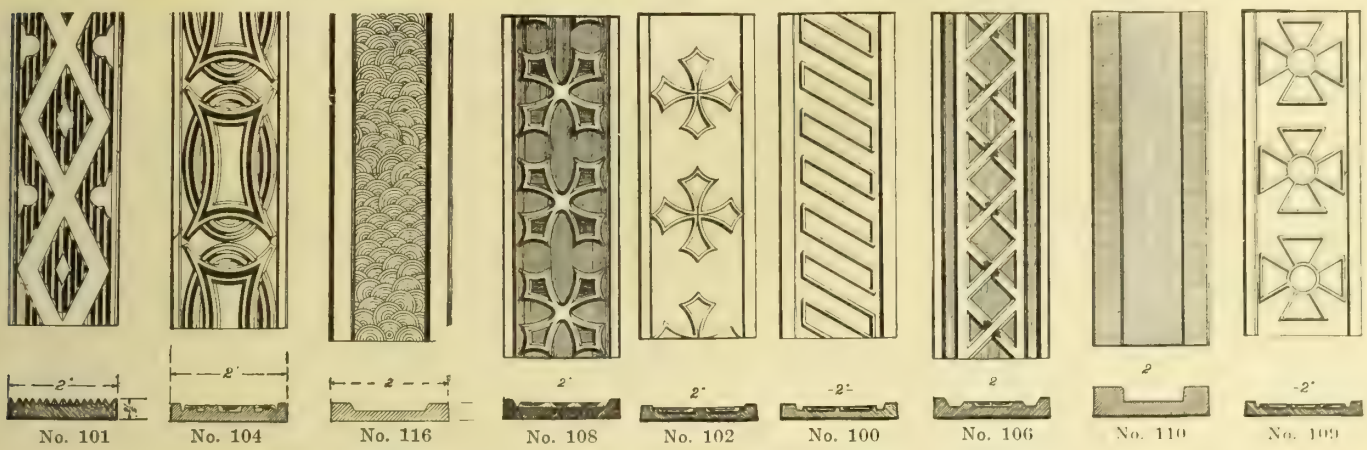
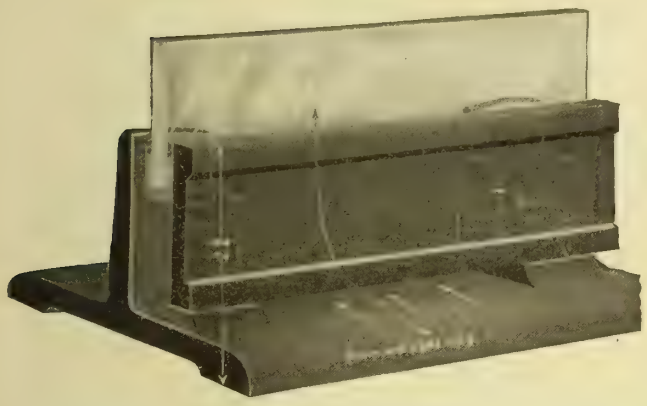
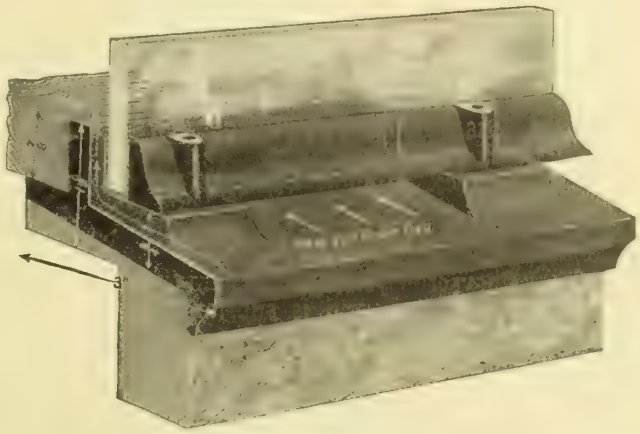


STOCK DESIGNS OF FACIAS FOR FROST-PROOF WINDOW FRONTS
Large number of designs in stock. Special designs furnished



BOTTOM OR SILL BAR NO. 4
Used in connection with our standard construction where glass or panels are desired to extend to sidewalk



SILL BAR NO. 6
Used at sill or bulkhead where no glass is desired under same

ST JAMES BUILDING JACKSONVILLE, FLORIDA SHOWING LOVE BROTHERS STORE FRONT IN POSITION
H. J. Klutho, Architect

PITTSBURGH PLATE GLASS CO.

Distributors of The "Easyset" System of Store Front Construction

MANUFACTURED BY THE RITZLER METAL MFG. CO., KANSAS CITY, MO.

WAREHOUSES

ATLANTA, GA., 56-60 West Alabama Street
BALTIMORE, MD., 310-314 West Pratt Street
BIRMINGHAM, ALA., 2nd Avenue and 29th Street
BOSTON, MASS., 99-103 Portland Street
BROOKLYN, N. Y., Third Avenue and Dean Street
BUFFALO, N. Y., 372-378 Pearl Street
CHICAGO, ILL., 801-811 South Wabash Avenue
CINCINNATI, OHIO, Broadway and Court Street
CLEVELAND, OHIO, 3849-69 Hamilton Avenue
DAVENPORT, IOWA, 410-416 Scott Street
DENVER, COLO., 1745-7 Arapahoe Street
DES MOINES, IOWA, East Fourth and Vine Streets
DETROIT, MICH., 53-59 Larned Street, East
GRAND RAPIDS, MICH., 39-41 North Division Street
HIGH POINT, N. C.
KANSAS CITY, MO., Fifth and Wyandotte Streets
MEMPHIS, TENN., 23 South Second Street
MILWAUKEE, WIS., 492-502 Market Street
MINNEAPOLIS, MINN., 500-516 South Third Street
NEW ORLEANS, LA., Girod and Commerce Streets
NEW YORK, N. Y., Hudson and Vandam Streets
OKLAHOMA CITY, OKLA., 210 West First Street
OMAHA, NEBR., 1101-1107 Howard Street
PHILADELPHIA, PA., Pitcairn Bldg., Arch and 11th Streets
PITTSBURGH, PA., 101-103 Wood Street
ROCHESTER, N. Y., Main and Exchange Streets
ST. LOUIS, MO., Corner 10th and Spruce Streets
ST. PAUL, MINN., 459-461 Jackson Street
SAVANNAH, GA., 745-749 Wheaton Street
TOLEDO, OHIO, Albion and Baxter Streets

Products.

Selling agents for the "EASYSET" SYSTEM of METAL STORE FRONT CONSTRUCTION.

Also, DISAPPEARING AWNINGS, AWNING COVERS, KICK-PLATES and THRESHOLDS.

For Simplex Window Fixtures see our name in General Index.

"Easyset" System of Store Fronts.

The "Easyset" System, as the name implies, is easily and readily installed, and is substantial and durable. It does not require skilled men or special framing to prepare store front openings for the metal sash. The system does not depend wholly for strength upon the outer covering, the inner reinforcement providing much additional strength. Besides this, the outer covering is drawn up to the glass under tension, thus providing a uniform and permanent bearing. This principle is employed in the corner and division bar, also the metal sash. While the glass is set from the outside, it is locked on the inside; only by loosening the tension screw (Fig. 6) can the glass be removed. This protects valuable goods in the show-window, for even though the outer covering is removed the reinforcement "H" still holds the glass securely in place.

The simplicity, strength and elegance of the "Easyset" System appeals to all who wish an all-metal store front, thoroughly up to date. It does away entirely with the periodical repairing or renovating of the store front, thus in a short time more than saving the first cost. In many cases a lower rate of insurance is obtained because of the all-metal construction. On account of the superior appearance and advertising feature, the tenant in most cases will gladly pay an additional rent.

Corner and Division Bars.

In our corner bars Nos. 4A and 4C (Figs. 1 and 2), note how the reinforcement fits inside the outer covering; thus, when the bar is installed and the nut is tightened, it draws the outside of the bar to the glass instead of forcing it away, as is the case with most bars. The glass is gripped some distance from the edge, thus preventing breakage from "pinching," and a small piece of wood fitted over the screw protects the edge of the glass. This bar is designed to take care of the variation in thickness of plate glass without bending or springing the metal.

Made of heavy gauge copper or bronze; special finishes, oxidized, nickel, gun-metal. Other special finishes if desired.

No. 4C corner bar is the same as No. 4A, but is 5/8 inch larger and steel reinforced, to be used where there is an unusual exposure to wind.

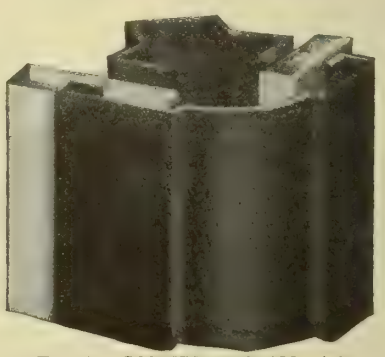


FIG. 1. CORNER BAR NO. 4-A
Full Size

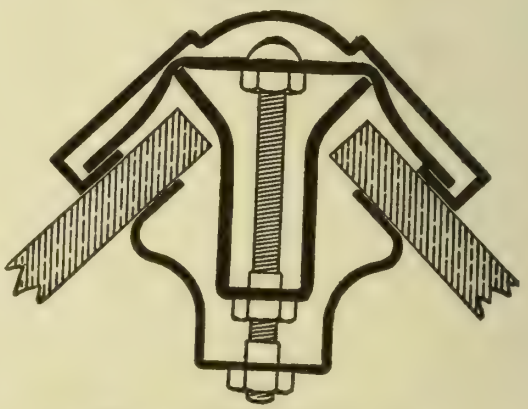


FIG. 2. CORNER BAR NO. 4-C
Sectional View Full Size

FIG. 3. DIVISION BAR NO. 15-A
Full Size

Continued on next page

The division bar No. 15A (Fig. 3) incorporates the same principles as the corner bar and is made of the same metals and finishes.

Metal Sash.

Metal sash No. 25B (Fig. 4) has ventilating and drainage system. Glass is set from outside and tension obtained from inside screws. No outside screws to mar the face of the sash or to work loose and release the tension. Glass rests on solid metal four-inch block, mounted with leather, which will prevent settling and avoid breakage and always keeps the glass in position shown.

It is a frost preventive when show windows are built air-tight, allowing only the air entering through the metal sash to circulate.

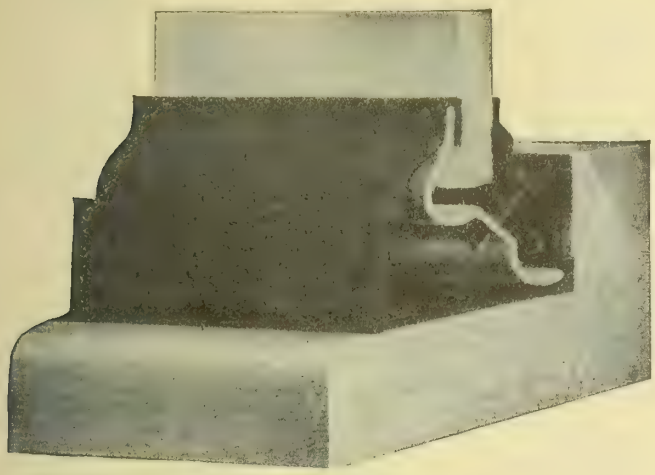


FIG. 4. METAL SASH NO. 25B
With ventilating and drainage system. Setting Block not shown. See Sectional View, Fig. 6, Full Size

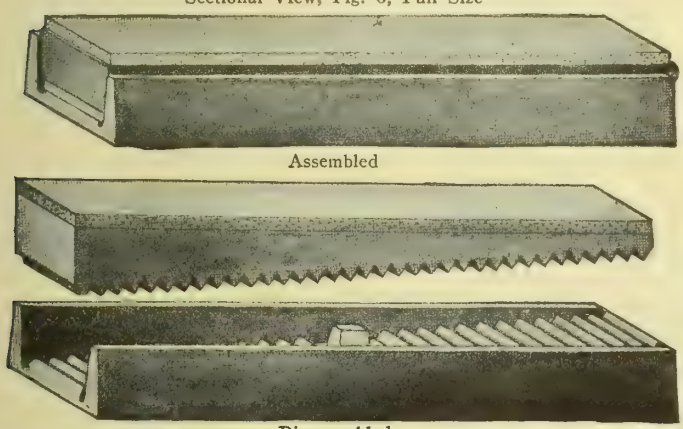


FIG. 5. SETTING BLOCK, WITH LEATHER TOP

Application.

Fig. 7 is a special arrangement for applying "Easyset" Construction to a steel sill where no wood backing is used. This sash rail is made of heavy No. 16-gauge metal and should be used for glass of unusual size.

Note that the bottom of outside or face plate interlocks with the horizontal edge of inner member. The glass rests on a leather-mounted metal setting block.

Transom Bar.

Fig. 8 shows our own special transom bar, which is a combination of metal sash No. 25B and moulding for transom cover No. 125. This is furnished with wood complete if desired. On lengths from fourteen to eighteen feet an eighth-inch steel reinforcement is inserted. On lengths eighteen feet and above, the steel reinforcement is one quarter-inch thick. We furnish iron rods to suspend transom bars where the length of the bar and construction of the building render it necessary.

Bar Coverings, Mouldings, etc.

All transom bar, sill, head and side jamb coverings, bulkhead and special mouldings are No. 20-gauge copper or bronze, or other special finishes when desired.

Estimates.

Estimates will be furnished on receipt of plans and specifications.

Co-operative Service.

Write to the warehouse of the PITTSBURGH PLATE GLASS COMPANY nearest you for any information not contained herein, and also for catalogues, etc.

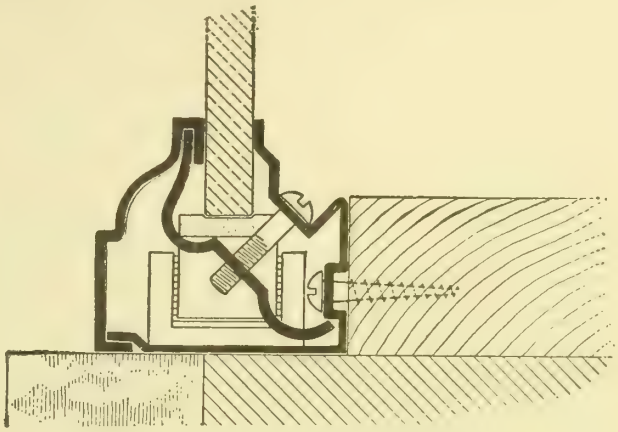


FIG. 6. METAL SASH NO. 25B
Sectional View, Full Size

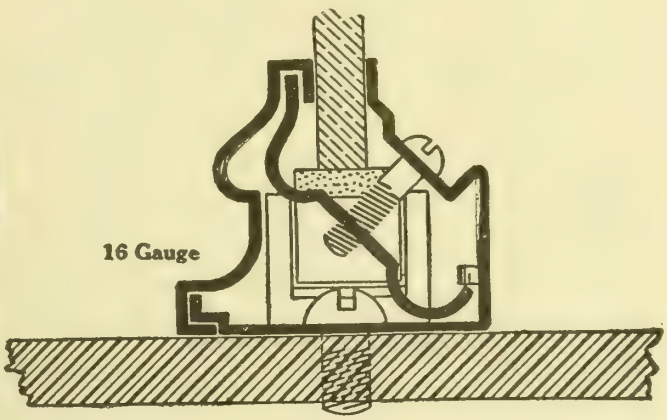


FIG. 7. APPLICATION OF "EASYSET" CONSTRUCTION TO STEEL SILL WITHOUT WOOD BACKING
Full Size

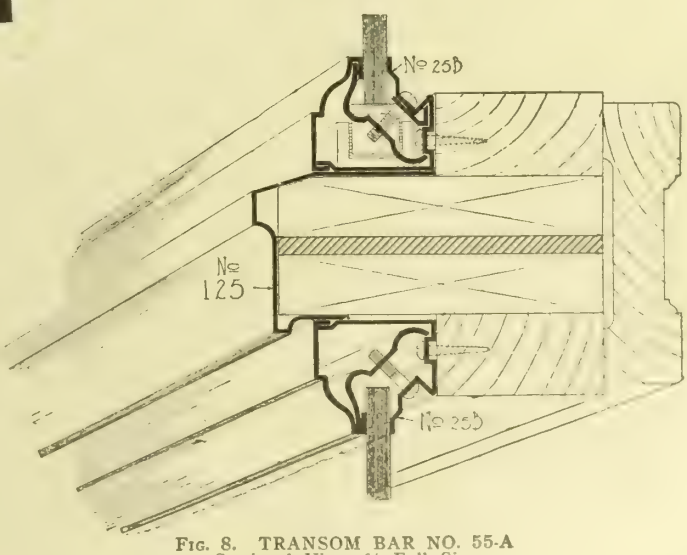


FIG. 8. TRANSOM BAR NO. 55-A
Sectional View, ½ Full Size

THE STORE IMPROVEMENT COMPANY

Shadow Box Store-Front Window Construction

1804 Finance Building, South Penn Square
PHILADELPHIA, PA.

Product.

Shadow Box or "Invisible" Show Windows. Patented in the United States and foreign countries.

Advantages.

Elimination of all reflections of sky, buildings, traffic, etc. Perfect display of merchandise of all kinds, insuring its appearance in all color details, texture or finish, or showing the whole interior of display rooms, if desired, exactly as if glass front were removed.

Construction.

Glass—Two plates of glass are used. The lower or "vision section" is a bent glass plate set horizontally, with the concave side toward the observer; the upper is the usual flat plate glass. The two plates are joined by a suitable metal bar or plain clamp joint.

The practical limit of length for single units is 16 feet, but they are preferably made shorter for convenience in installation and economy in cost, as plate glass increases rapidly in cost per square foot on larger sizes. Any number of units may be installed consecutively, by using a narrow mullion at the junction of sections for multiple units, thereby producing the same effect as a continuous run of glass.

The bend of the glass is to a fixed pattern, and the height at top of the bend is 6 feet 6 inches above the sidewalk line in all cases, as shown in diagram. The vertical measurement of the bent glass itself is controlled by the height of the show window floor or bulkhead on which lower end of bent glass rests, measured from sidewalk line.

In general, the height of the floor on which display stands will be controlled by the height of display itself; taller displays require lower floors, and vice versa. Where the floor is very low, the lower edge of the bent glass should rest upon the bulkhead not less than 16 inches in height above sidewalk line, in order to permit installation of the necessary sill, baffle plates, drainage system, etc., as shown on diagram.

The Barrier—The "barrier" or front rail is in all cases three feet high, measured from sidewalk line, and may be constructed of any opaque material to harmonize with building front design. The barrier must be perfectly flat on the inner surface and so placed that inner surface is in a plumb line below the flat glass above the bend.

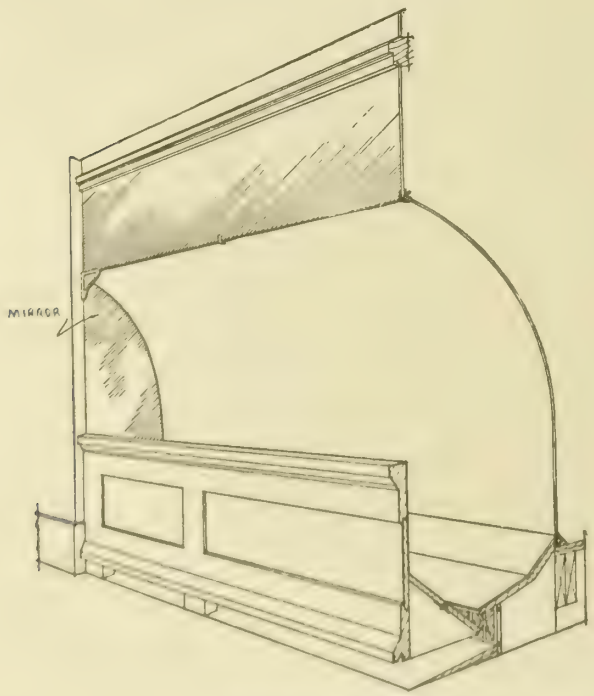
The distance between inner surface of barrier and bottom of the bent glass is twenty-seven and one-quarter inches.

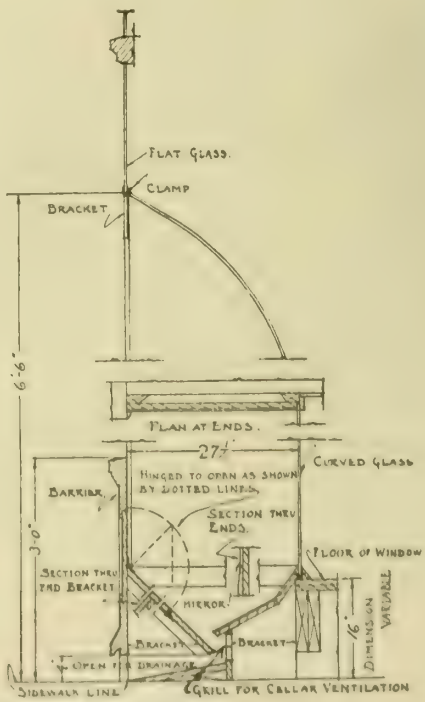
All inner surfaces of barrier, sills and baffle plates, etc., should be finished dead black, although sill may be glazed black. The ends of the Shadow Box are preferably made of plate glass mirror or black Argentine glass, and are cut to conform with the curve of inner surfaces of the bent glass.

Installation.

The Store Improvement Company will supply bent glass, brackets and clamps to the builder, but do not contract for other material required, nor for installation. All necessary details for installation on Architect's drawings will be furnished, and templets, specifications, etc., will be provided to the builder for his guidance in making installation.

Installations will be authorized by The Store Improvement Company (owners of the patents) on payment of fee based on running front feet of glass used.





ELEVATION AND SECTIONAL DETAIL SHADOW BOX SHOW WINDOW

ZOURI DRAWN METALS COMPANY

Manufacturers of Zouri Safety Store-Front Construction

GENERAL OFFICES AND FACTORY

CHICAGO HEIGHTS, ILL.

AGENTS IN PRINCIPAL CITIES OF UNITED STATES AND CANADA

Products.

Zouri Safety Key-Set Sash, Corner and Division Bars, Zouri Awning Bars, and Show Case Doors.

Patents.

This Company operates under Murnane and Marr Patents. Other patents pending.

Zouri Safety Key-Set Sash.

We request a careful examination of the safety features embodied in this Zouri Safety Key-Set Sash.

In setting plate glass, pressure is not only unnecessary, but dangerous. We have, therefore, adopted a key for setting our Sash, Corner and Division Bars, the power of which is limited and under control.

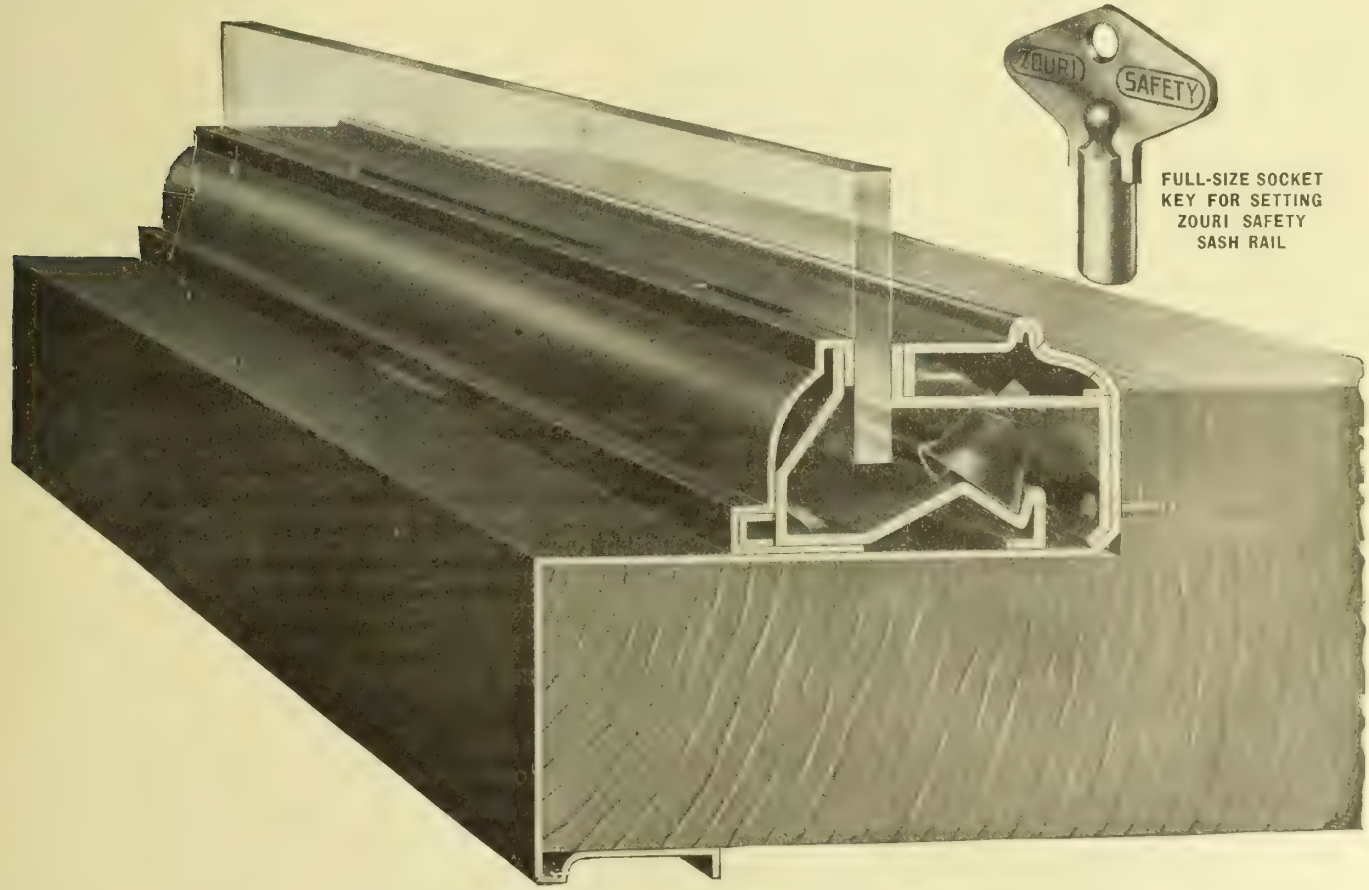
Setting plate glass in a metal sash, corner or division bar can be compared with the winding of a watch. Imagine the disastrous effect of doing so with a screwdriver or pliers. With a key we can feel and know when a watch is sufficiently wound. We know this only by our sense of touch. This, then, the human sense of touch, is what we claim for our key method of setting plate glass.

Note—When calling for competitive prices on metal store-front construction, insist on samples for a comparison of *mechanical construction, safety features,* and *weight of copper per lineal foot.*

Murnane Self-Adjusting Setting Block.

This self-adjusting setting block is a safety device designed to prevent breakage and facilitate setting by carrying the glass automatically into uniform contact with the rabbet when the outer moulding is placed against the glass and screwed or nailed to the sill.

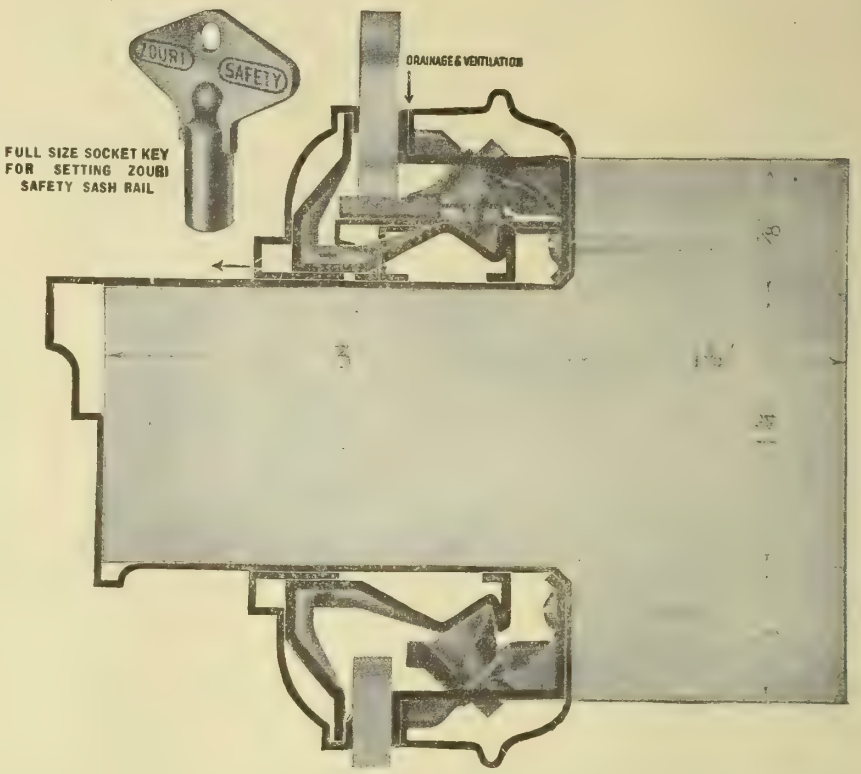
To appreciate the advantage of this self-adjusting setting block we must understand the method of setting plate glass on the old or stationary blocks, which is as follows:



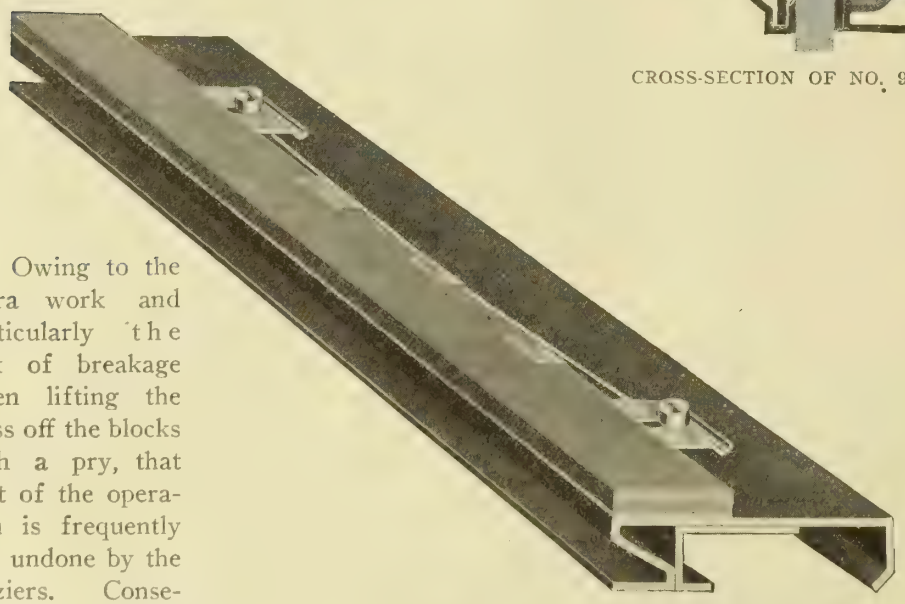
NO. 900 COMBINATION KEY-SET SASH AND UNION SILL COVERING (FULL-SIZE)

Continued on next page

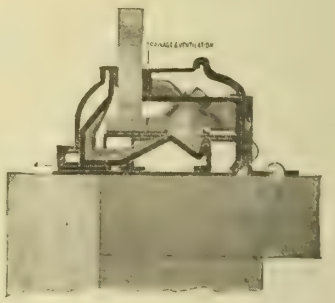
A plate of glass, 30 square feet or over, is lifted onto two blocks with straps, said blocks being placed about 14 inches from the ends of the plate. When the glass is set on the blocks by means of the straps it is away from the rabbet a distance equal to the thickness of the straps plus a small clearance to allow the withdrawal of the straps. It is then expected that the glazier will again lift the glass off the blocks by means of a pry and then force it back against the rabbet. To get the glass against the rabbet it must be lifted off the blocks, as the weight and friction of the glass is such that it cannot be made to move or slide on the stationary blocks.



CROSS-SECTION OF NO. 91-5 TRANSOM BAR



NO. 15 MURNANE SELF-ADJUSTING SETTING BLOCK



NO. 101 SAFETY KEY-SET SASH

Owing to the extra work and particularly the risk of breakage when lifting the glass off the blocks with a pry, that part of the operation is frequently left undone by the glaziers. Consequently, when the outside moulding is pressed against the glass by the screws or nails which hold this moulding in place the glass is sprung into contact with the rabbet on both sides of the blocks, which causes distortion of the glass at the points where it rests on the blocks. Through this distortion a very large amount of glass is broken annually.

The Murnane Self-adjusting Setting Block successfully prevents breakage from this source, as the glass is carried automatically into uniform contact with the rabbet when the outer moulding is applied.

No. 101 Safety Key-Set Sash.

The cross-section of No. 101 Zouri Safety Key-Set Sash shown here illustrates the Murnane Self-adjusting Setting Block in position; also the Helicoid Screw with which the outer member of the sash is drawn into contact with the glass.

This sash requires no back stop. A supporting cast bronze bracket is riveted to the inside edge. Designed for use against wood, iron, stone or terra cotta.

This illustration shows a marble bulkhead. Note that the weight of the glass is carried by the framework of the bulkhead. Where a marble bulkhead is used, we recommend that the weight of the glass be carried as shown.

When calling for competitive prices on metal store front construction, insist on samples for a comparison of *mechanical construction, safety features,* and *weight of copper per lineal foot.*

Catalogue and full-size transparent detail sheets furnished on request.

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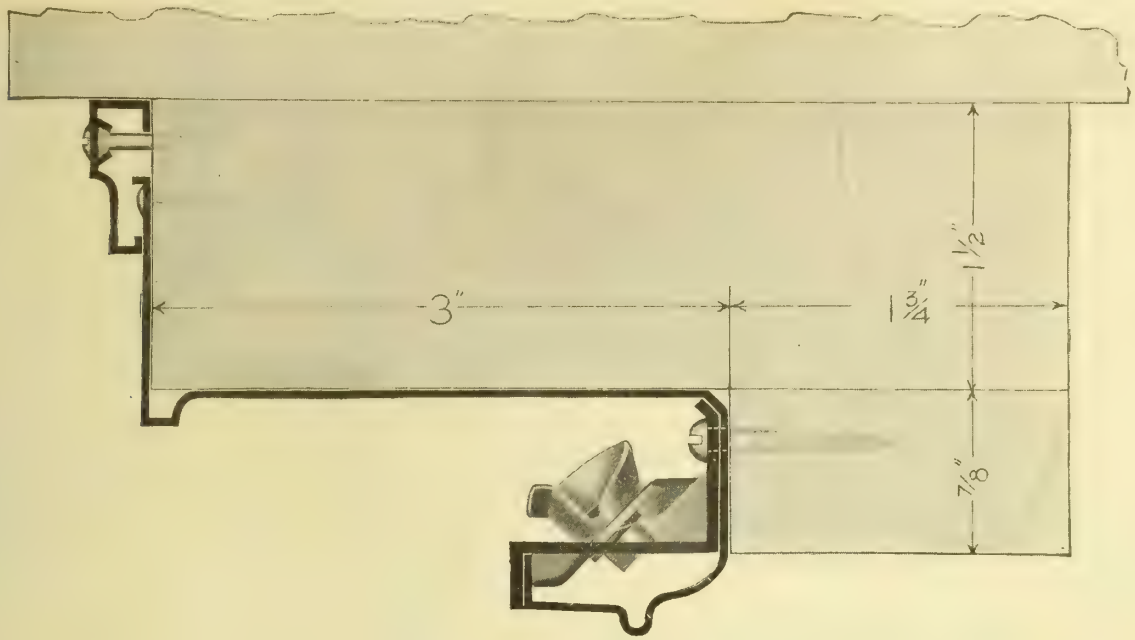


NO. 910 HEAD JAMB, A COMBINATION OF SASH AND UNION HEAD JAMB COVERING WITHOUT THE OUTER PART OF THE SASH
Shown to demonstrate the application of a Union Head Jamb Covering before the glass is set

Zouri Union Sill, Transom Bar, Side and Head Jamb Coverings.

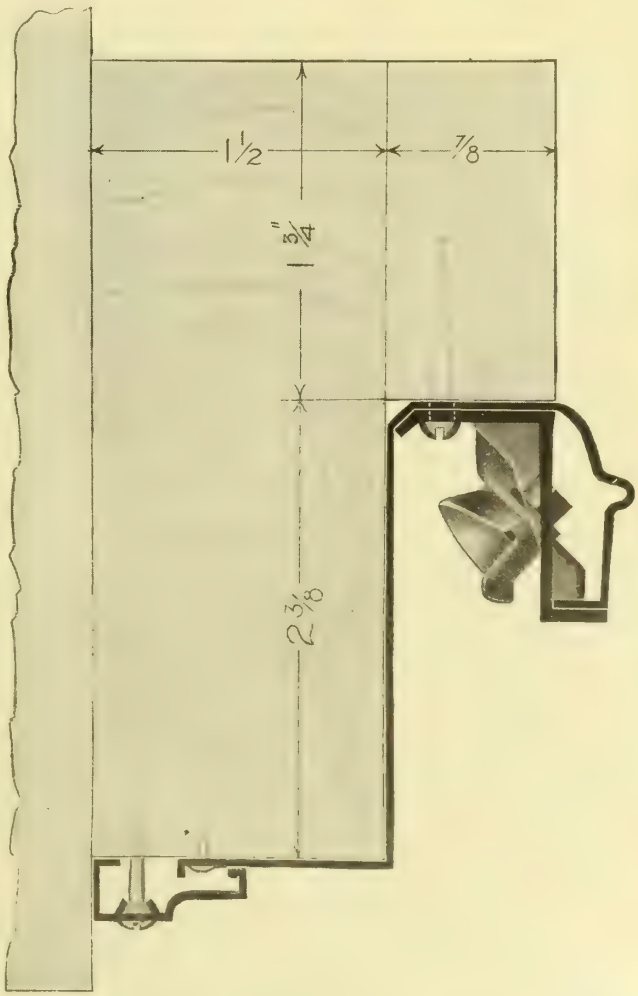
These Union Coverings are drawn from cold-rolled copper or bronze. They are a part of the back member of the sash, and afford absolute protection to the wood cores.

There are no perpendicular screws used in connecting Zouri Union Sill and Transom Bar Coverings to the wood cores. It has been found where perpendicular screws, or screws driven at an angle, pass through the wood core of the sill or transom bar that moisture will follow, causing deterioration of the wood.

The specially designed Union Side Jamb Covering assures a perfect joint at the piers even though they are slightly out of plumb.

When calling for competitive prices on metal storefront construction, insist on samples for a comparison of *mechanical construction, safety features,* and *weight of copper per lineal foot.*

Catalogue and full-size transparent detail sheets furnished on request.



NO. 905 SIDE JAMB, A COMBINATION OF SASH AND UNION SIDE JAMB COVERING
Shown to demonstrate the application of a Union Side Jamb Covering before the glass is set

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The Safest and Most Modern Store-Front Construction.

We claim for our Zouri Safety Key-Set Sash, Corner and Division Bars "Safety First," with quality, distinctive beauty and simplicity of installation. It means an imperishable store front which does not require additional expense for painting or repairs.

Considering its safety features and many other advantages, it is the lowest priced store front on the market.

The following illustration pertaining to breakage of glass, set in stationary blocks and with direct screw pressure metal sash, corner and division bars, will be found of interest.

The question is frequently asked, "How does it happen that a plate of glass, apparently in sound condition when left by the glaziers, is found a short time thereafter with a crack, or run, near the edge, usually starting from a screw point of contact?"

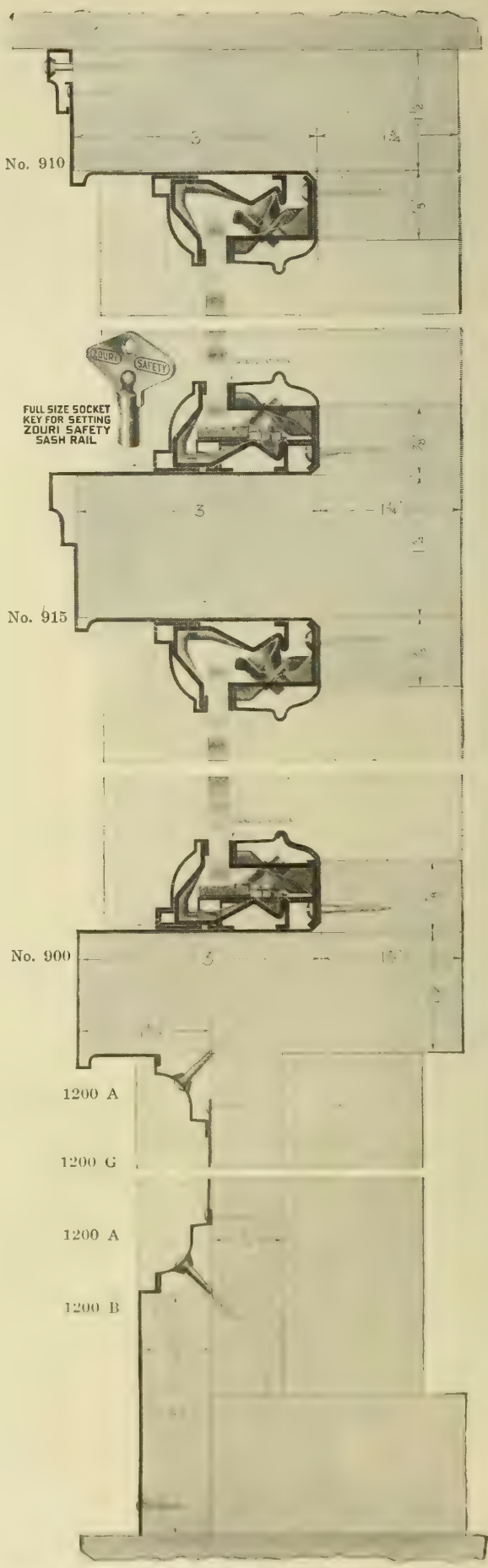
The answer is, that when driving home the screws too much pressure was exerted, causing a crack or run in the edge. This damage was invisible at the time, being concealed by the sash or bars, but developed as soon as the glass was subjected to wind pressure or the vibration of the building.

A plate of glass 10 by 14 feet, set in a direct screw pressure sash, requires 56 screws driven home from the outside at right angles to the glass. It is very difficult to avoid exerting more pressure on one or more of these screws than the glass can resist, particularly when the glass is supported on the opposite side with a resilient or yielding rabbet, as this principle of rabbet will yield to a greater degree directly at the screw point of contact than at intermediate points, thereby causing breakage.

Patents—Operating under Murnane and Marr patents. Other patents pending.

Note—When calling for competitive prices on metal store-front construction, insist on samples for a comparison of *mechanical construction, safety features,* and *weight of copper per lineal foot.*

Catalogue and full-size transparent detail sheets furnished on request.



VERTICAL SECTION OF ZOURI SAFETY KEY SET STORE FRONT CONSTRUCTION, UNION COVERINGS AND MURNANE SELF ADJUSTING SETTING BLOCKS

Continued on next page

Zouri Safety Key-Set Corner and Division Bars.

In our Zouri Safety Key-Set Corner and Division Bars we offer a line of safety bars with these advantages:

(1) They are free from the danger of direct screw pressure.

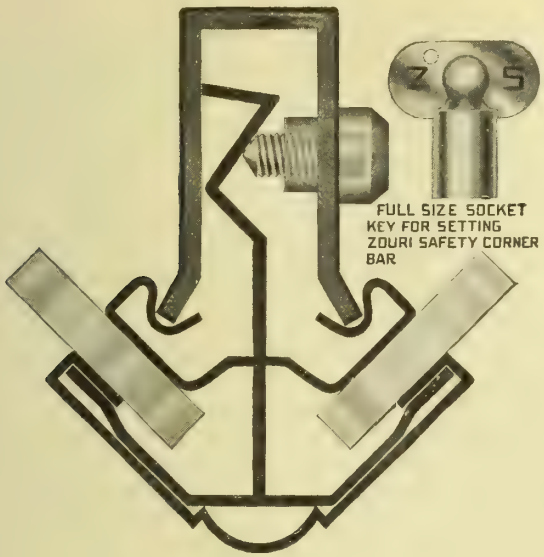
(2) They are proof against the carelessness of workmen.

(3) They can only be set with the small socket key shown, thereby eliminating the breakage so frequently caused through excessive pressure by tools used in the building line, the power of which is beyond control.

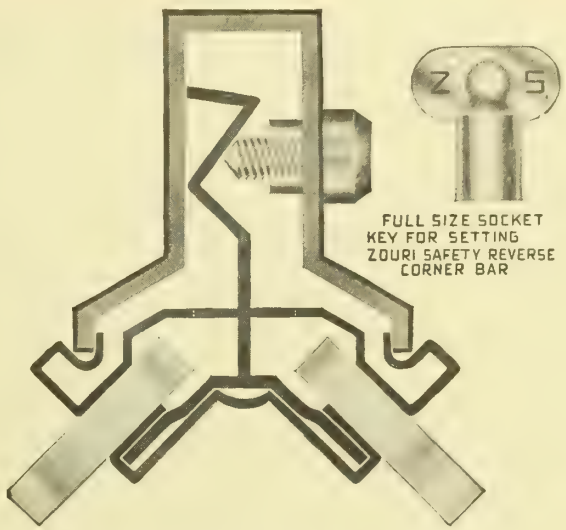
(4) All parts of these bars are manufactured in solid copper or bronze, excepting the heavy inner reinforcement, which is drawn from cold-rolled steel.

NOTE—When calling for competitive prices on metal store-front construction, insist on samples for comparison of *mechanical construction, safety features,* and *weight of copper per lineal foot.*

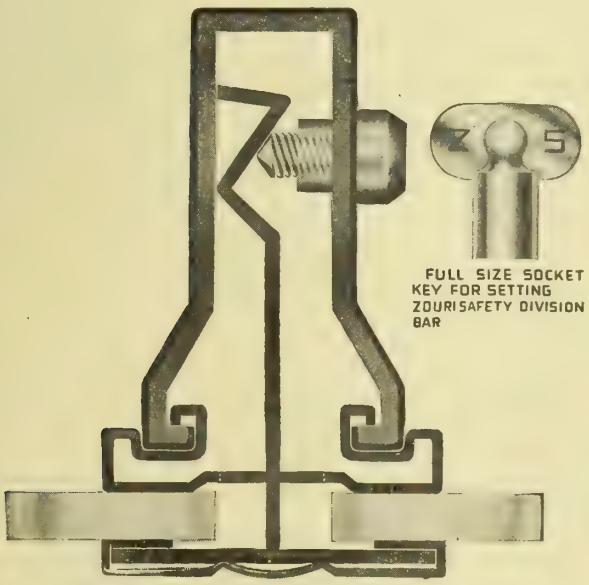
Catalogue and full-size transparent detail sheets furnished on request.



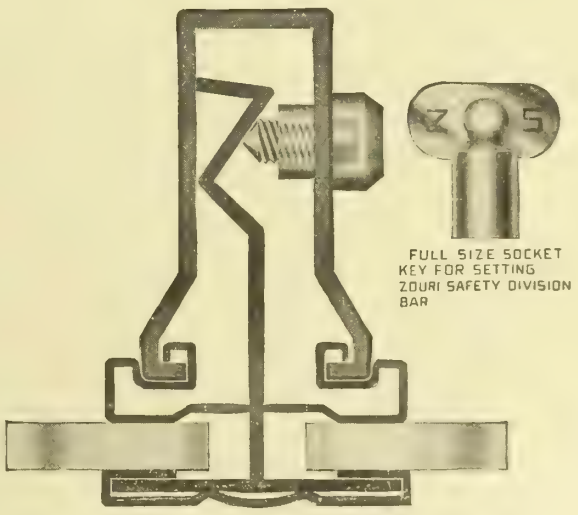
No. 200 Safety Key-Set Corner Bar
Recommended for glass *over* 108 inches high
Made in angles from 85° to 145° inclusive



No. 201 Safety Key-Set Reverse Corner Bar
Recommended for plate glass *over* 108 inches high
Made in angles from 85° to 145° inclusive



No. 300 Safety Key-Set Division Bar
Recommended for plate glass *over* 108 inches high



No. 301 Safety Key-Set Division Bar
Recommended for plate glass *up to* 108 inches high

ZOURI SAFETY KEY-SET CORNER AND DIVISION BARS
Operating under Murnane and Marr patents. Other patents pending

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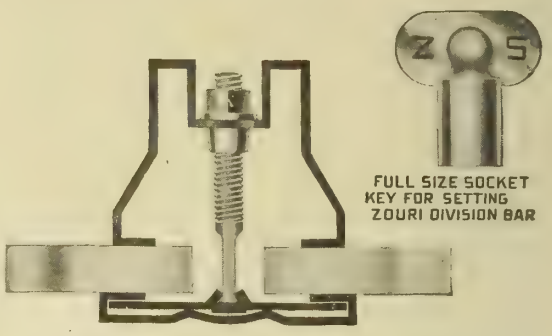
Key-Set Direct Screw Pressure Corner and Division Bars.

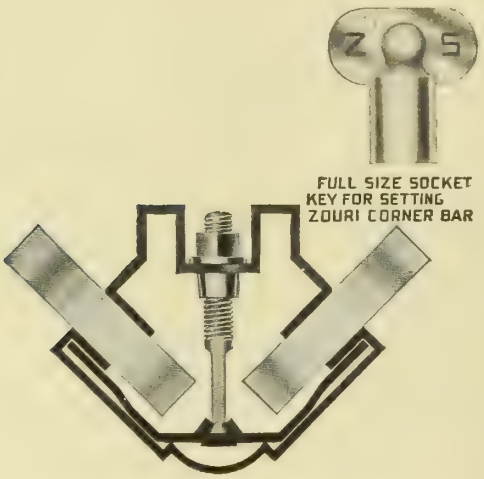
While these key-set bars are not as safe as the indirect screw pressure bars shown on the opposite page, they are much safer than other direct screw pressure bars set with tools used in the building line, the power of which is beyond control.

Note the shape of the connecting screws, which are only $\frac{1}{16}$ of an inch thick at that point which is in line with the edges of the glass. This allows a liberal clearance and prevents the edges of the glass from coming in contact with the screws even through settling of the building.

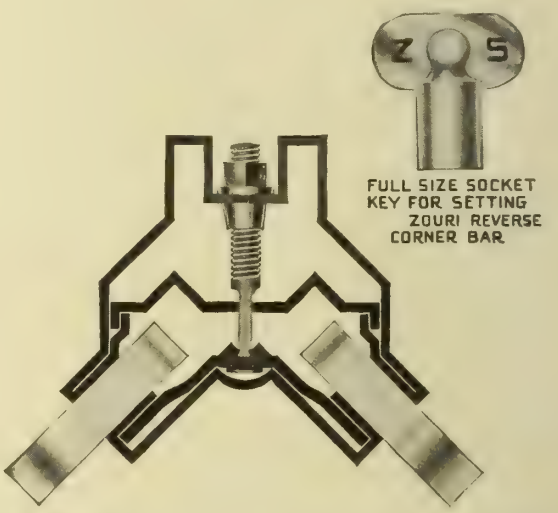
All parts of these bars are manufactured only in solid copper or bronze.



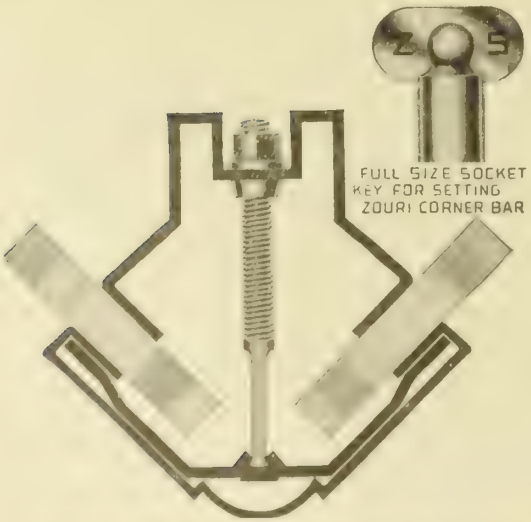
No. 302 Key-Set Direct Screw Pressure Division Bar
For transom lights and glass *up to* 78 inches high



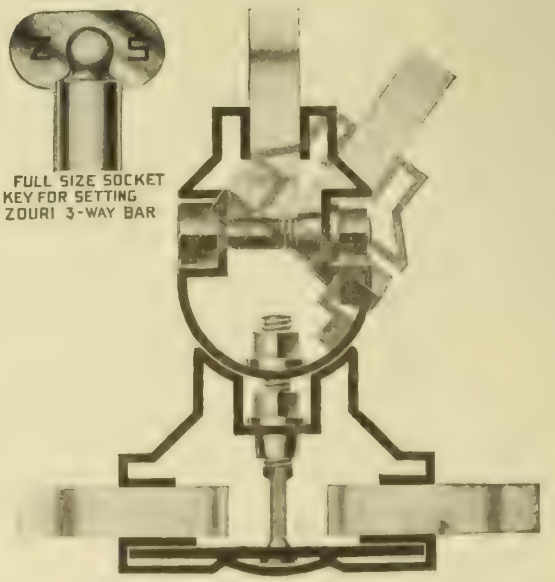
No. 202 Key-Set Direct Screw Pressure Corner Bar
For glass *up to* 96 inches high
Made in angles from 85° to 145° inclusive



No. 203 Key-Set Direct Screw Pressure Reverse Corner Bar
For glass *up to* 120 inches high
Made in angles from 85° to 145° inclusive



No. 204 Key-Set Direct Screw Pressure Corner Bar
For glass *up to* 120 inches high
Made in angles from 85° to 145° inclusive



No. 303 Key-Set Direct Screw Pressure Three-Way Bar
Adjustable to any angle

ZOURI KEY-SET DIRECT SCREW PRESSURE CORNER AND DIVISION BARS

Continued on next page

Zouri Awning Bar.

The Zouri Awning Bar is the most convenient and practical of its kind, being the result of a great deal of study and experiment. It embodies the combination of our Zouri Safety Key-Set Sash and Union Covering.

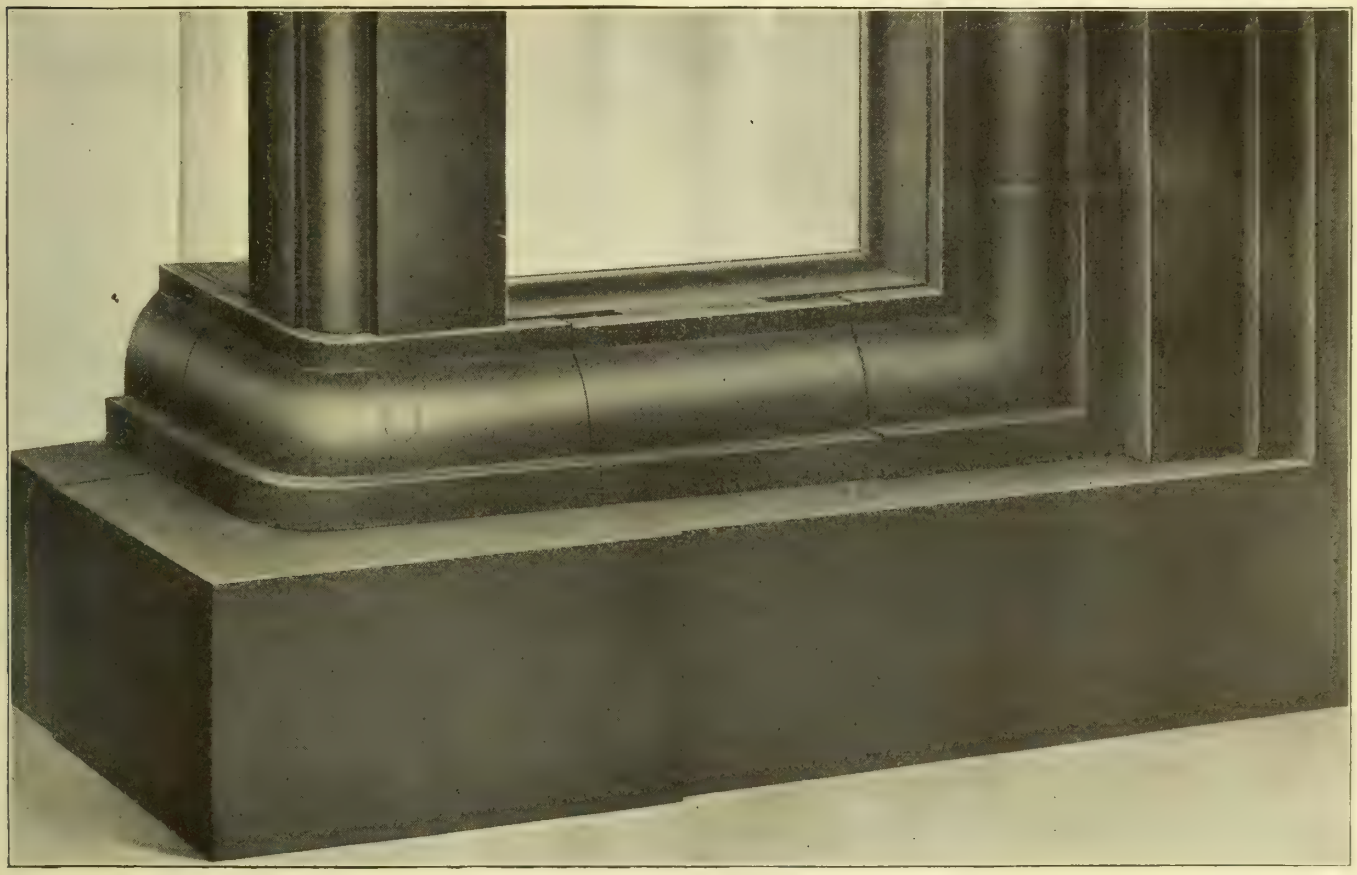
The awning and hood are supported with cast metal brackets placed at 26-inch centers. The operating gears and pinions are incased in a copper housing, so that they are completely concealed and protected against any foreign matter coming in contact with them.

The awning is raised and lowered from the inside of the store, obviating the necessity of connecting brackets on the piers of the windows, which is awkward under all circumstances. Besides, where terra cotta or face brick is used, the attaching of such brackets mars the appearance of the building. The Zouri Awning Bar overcomes all these objections.

Full details furnished on application.

NOTE—When calling for competitive prices on store-front construction, insist on samples for a comparison of *mechanical construction, safety features,* and *weight of copper per lineal foot.*

Catalogue and full-size transparent detail sheets furnished on request.



A COMPLETE ZOURI SAFETY INSTALLATION BELOW TRANSOM BAR

THE CAHILL IRON WORKS

Manufacturers of "Southern Beauty" Enameled Ware

GENERAL OFFICES
50 Fourteenth Street
CHATTANOOGA, TENN.

BRANCH OFFICES
NEW YORK PHILADELPHIA SAN FRANCISCO PORTLAND, ORE. HAVANA, CUBA

Products.

"Southern Beauty" Bath Tubs, Lavatories, Drinking Fountains, Kitchen Sinks, Slop Sinks, Laundry Trays, Sink and Laundry Tray Combinations, Closet Tanks, Urinals, etc.

Construction.

"Southern Beauty" enameled ware is made of cast iron, thoroughly covered with glossy, white porcelain enamel, insuring strength, beauty and durability. In practically all cases "Southern Beauty" lavatories, sinks, etc., are made in one piece. The overflow, soap cup, etc., are cast in the fixture, which is an assurance that the goods are absolutely sanitary.

Quality.

"Southern Beauty" enameled ware is recognized everywhere as having no superior in design and quality. We have originated more handsome and practical designs than any other manufacturer. The castings are smooth, the enamel is pure white, and the workmanship is unsurpassed.

Distribution.

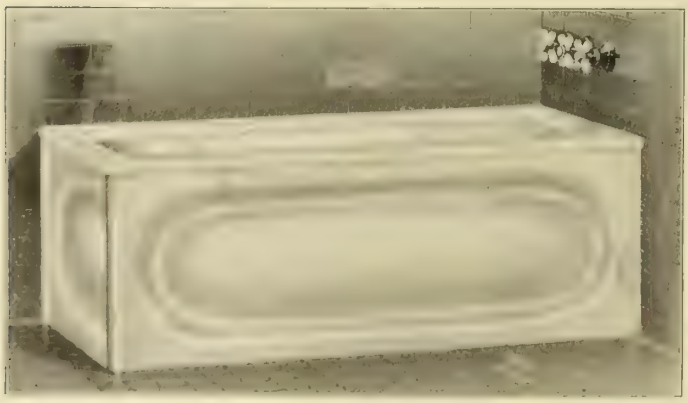
"Southern Beauty" enameled ware is carried in stock and sold by leading jobbers in all sections of the country, and when specified the goods can be secured without unnecessary delay.

Guarantee.

"Southern Beauty" enameled ware is absolutely guaranteed. Every piece has the name "Cahill" cast on the exterior, and bears our guarantee label, which fully protects against any defect in manufacture.

Catalogues.

Owing to limited space we show only a few fixtures herein. However, our new and handsome catalogue "H," illustrating over 250 additional designs, will be gladly mailed on request.



SUWANEE, PLATE H-526

"Southern Beauty" porcelain enameled Suwanee bath for right hand corner with 3" flat rim and right hand end outlet. Porcelain enameled plated on front and end. Fitted with concealed N.P. bottom bell supply and waste fitting as shown.

Suwanee baths are made to set away from wall, to tile in to wall at back, to tile in to wall at end, for both right and left hand corners, and for recess.

Height of regular pattern Suwanee bath 22", low pattern, 18". Made in three sizes, 4½', 5' and 5½'.

DIXIE, PLATE H-600

"Southern Beauty" porcelain enameled 3" roll rim Dixie bath for tiling in left hand corner with right hand end outlet. Fitted with bottom bell supply and waste fixture as shown.

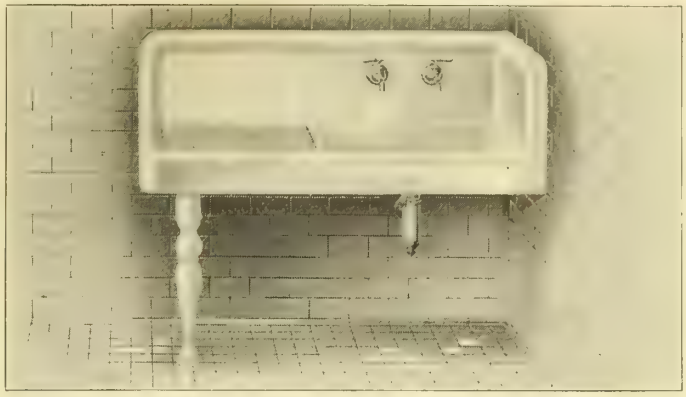
Dixie baths are made to tile into either right or left hand corner, each pattern being made with either right or left hand outlet.

Height, bottom of bath to top of rim, 18"; depth inside at outlet, 17". Made in three sizes, 4½', 5' and 5½'.

Continued on next page

TENNESSEE, PLATE H-2000 (PATENTED)

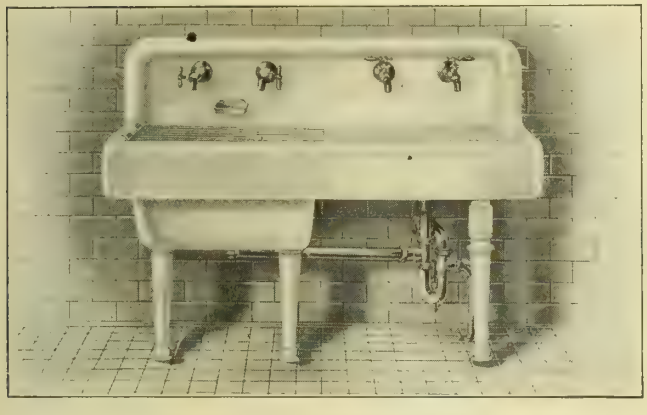
The "Tennessee" one-piece apron sink, with right and left hand drainboards. 22 x 34" sink, 12" recess back, 6" apron, and two 21 x 22" drainboards cast integral. Drainboards depressed 2½". Depth of sink, 7"; length over all, 72". Supported by concealed wall hanger, and adjustable enameled legs.



TENNESSEE, PLATE H-2090 (PATENTED)

The "Tennessee" one-piece sink with 12" recess back, 5" apron, right hand corner piece, and left hand drainboard cast integral. Drainboard depressed 2½". Supported by concealed wall hanger, and adjustable enameled leg.

"Tennessee" sinks are made with left hand corner piece and right hand drainboard, left hand corner piece and left hand drainboard, right hand corner piece and right hand drainboard, and flat back with either right or left hand drainboard.



PACIFIC, PLATE H-3000

The "Pacific" one-piece sink and laundry tray combination, sink on right and laundry tray on left hand side. Sink, laundry tray, 6" apron and 10" recess back cast integral. Length over all, 50"; width over all, 22". Furnished with ash drainboard fitting over laundry tray and draining into sink. Supported by concealed wall hanger, and three adjustable painted legs.

"Pacific" sink and laundry tray combinations are made with sink on left and laundry tray on right; also for both right and left hand corners.

CHATTANOOGA, PLATE H-2340

The "Chattanooga" one-piece sink combination with right hand Chattanooga drainboard. Sink with 12" recess back and 5" apron cast integral. The 24" drainboard and 5" back, also, cast in one piece. Both sink and drainboard supported by concealed wall hanger.

"Chattanooga" combinations can also be furnished with left hand drainboard only, or with both right and left hand drainboards; also made for both right and left hand corner.

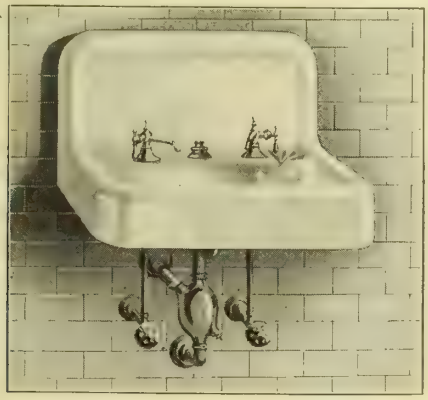


PLATE H-1301 LAVATORY

"Southern Beauty" lavatory with recess back, apron and oval bowl cast in one piece. Tumbler holder and soap dish in slab. Drilled for bi-transit waste. On concealed wall hanger.

"Southern Beauty" lavatories are made in various designs and sizes. The above is one of the most popular.

PLATE H-1420 LAVATORY

"Southern Beauty" lavatory with recess back, apron, overflow and oval bowl cast in one piece. With depressed soap cup. On concealed wall hanger.

Lavatory made without soap cup can be drilled for bi-transit waste.

SHERWOOD BRASS WORKS

MANUFACTURERS OF

"Maxco" Seat-Actuated Water-Closets and Aluminum Seats and Tanks

1167-1169 Jefferson Avenue East
DETROIT, MICH.

Products.

Manufacturers of the "MAXCO" SEAT-ACTUATED, SELF-FLUSHING WATER-CLOSET COMBINATIONS, for use in Public Toilets, Schools, Factories, Hotels, Railroad Stations, Hospitals, Public Comfort Stations, Association and Office Buildings, etc., and "SHERWOOD" POLISHED CAST ALUMINUM CLOSET SEATS and TANKS.

"Maxco" Seat-Actuated, Self-Flushing Water-Closets.

The "Maxco" Seat-Actuated Water-Closet Combination consists of: (1) a "Maxco" seat, equipped with a counter-weighting device which slowly raises the seat to a vertical position, when not in use; (2) a guaranteed first-class vitreous china bowl; (3) a high or low-down closet tank, designed for self-flushing installations and made in several designs, as illustrated. When preferred, the tanks and seats can be supplied in the special "Sherwood" polished cast aluminum construction, and seats can be equipped with simple counterweights which raise them only a few inches, or to a 45-degree angle, rather than to a vertical position.

"Maxco" outfits, of whatever combination specially selected to suit requirements, are guaranteed of best materials and workmanship and for long and efficient service. They are all carefully tested before shipment, and are marketed at the lowest prices consistent with their quality and care of manufacture.

Essential Details of "Maxco" Construction.

The nine details enumerated below are embodied in the construction of all "Maxco" seat-operating closets. The superiority of these closets lies in the fact that not one of these nine details may be safely eliminated without endangering the economical maintenance and ultimate efficiency of closets intended for promiscuous use.

(1) Each closet must be automatically flushed immediately upon being vacated, regardless of how quickly the seat be permitted to rise.

(2) It must be impossible to manipulate the closet seat or exposed fixtures in any way that would prevent the tank from filling.

(3) It must be impossible to flush the tank, either by manipulation of the seat or exposed fixtures, unless it contains enough water to siphon the bowl thoroughly.

(4) Each closet must be flushed automatically immediately after each use, regardless of what is the pressure in the service pipes (five to one hundred and fifty pounds), also regardless of any variations of pressure that may occur at different times of the day.

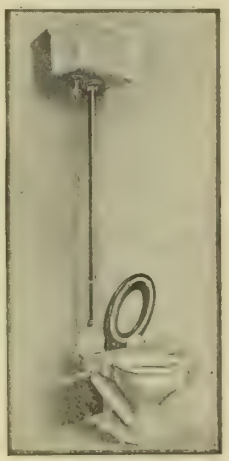
(5) The amount of flushing water must be ample to siphon the bowl thoroughly, regardless of any variations of water pressure, and regardless of the number of closets that may be flushed simultaneously.

(6) A proper seal must be provided in the bowl after each flush, of as great a depth of water as the bowl will contain.

(7) The closets must be without pull and chain, push-buttons, pull levers or other manual devices that admit of wasting water or flushing the tank when it does not contain enough water to siphon the bowl.

(8) The automatic device must be free from toggles, triggers, springs, eccentrics, or other devices that require specially skillful or accurate adjustment. Instead, this device must be limited to a single moving part, pivoted above the water line, and be operative only when the tank contains enough water to eject contents of the bowl. The construction of the automatic flushing device must furthermore be such that all tendency to become inoperative through wearing of parts, lost motion, etc., is automatically counteracted.

(9) All working parts of each closet must be made sufficiently strong to withstand severe use. No iron to be used for working parts in tanks, levers or other connections.



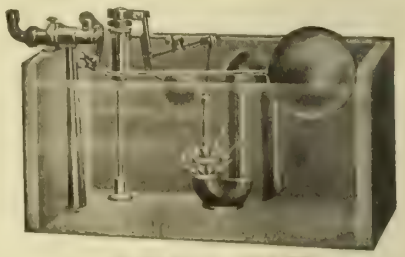
"MAXCO" LOW-DOWN CLOSET COMBINATIONS

"MAXCO" HIGH-TANK OUTFIT

Furnished with wood, galvanized iron, enameled iron or china tanks. Will fit all bowls. Prices quoted complete, with or without bowls

Operation of Flushing System.

A small float is movably pinned to top of operating rod, as can be seen in illustration, which lifts it when closet seat is occupied. When seat is vacated the float is drawn down, opening siphon-starting valve, and remaining open until tank is one third empty and bowl is completely flushed. No water can leave tank unless it contains sufficient to flush the bowl.



FLUSHING DEVICE

"SHERWOOD" POLISHED ALUMINUM CLOSET SEAT

One of many designs

THE JOHN DOUGLAS COMPANY

High-Grade Plumbing Fixtures

FACTORIES
CINCINNATI, OHIO

CINCINNATI, OHIO

POTTERY
TRENTON, N. J.

BRANCH OFFICES

PHILADELPHIA, PA., The John Douglas Company, 1220 Locust Street
SYRACUSE, N. Y., The John Douglas Company, 619 Walnut Avenue
ATLANTA, GA., The John Douglas Company, 1013 Candler Building
DETROIT, MICH., W. A. Stoneman, 98 Clairemount Avenue
WASHINGTON, D. C., The John Douglas Company, 821 Union Trust Building
PITTSBURGH, PA., The John Douglas Company, 3009 Jenkins Arcade Building
NEW ORLEANS, LA., The John Douglas Company, Title Guarantee Building
CLEVELAND, OHIO, The John Douglas Company, 915 James Street
LOS ANGELES, CAL., The John Douglas Company, 228-29 I. W. Hellman Building

Products.

A complete line of Vitreous China Sanitary Plumbing Fixtures, Porcelain Bath Tubs, Wood Seats, Nickel-Plated Brass Fittings and Trimmings.

Advantages.

Douglas Plumbing Fixtures are recognized by leading architects, engineers and plumbers to be the best. The original Douglas valve is used in our tanks, and, while some of the patents on the Douglas valve have expired, there still remain parts of the Douglas valve covered by patents. Therefore, do not be misled by anyone stating that they can furnish a Douglas valve —*they cannot.* All of the fixtures bear our name, and this is protection. Look for it on all our products.

Utility.

Douglas Plumbing Fixtures are used in bathrooms, toilets, kitchens, pantries, laboratories, operating rooms, etc., and architectural requirements as to style, size and conformity to plumbing codes are found in all Douglas Plumbing Fixtures.

Official Endorsement.

Douglas Plumbing Fixtures meet the requirements of all government, state and municipal bodies throughout the United States.

Provisions in Plans.

Measurements are given in connection with fixtures illustrated. Roughing-in measurements will be furnished on application to any of our branches.

Distribution.

Stock is carried in our factories at Cincinnati, Ohio, and at Trenton, N. J., as well as in the branches at Philadelphia, Pa., Cleveland, Ohio, and Los Angeles, Cal.

Facilities.

We manufacture in the factories at Cincinnati, Ohio, and at Trenton, N. J., all vitreous china, wood and brass fixtures shown in this catalogue.

Special Features.

All Douglas water-closet tanks are fitted with everlasting glass floats. Many of our closets are also furnished in "Junior" height. Reference to this is made in the descriptive matter below the illustration.

Prices.

Plumbing contractors throughout the United States can immediately furnish estimates and quote prices on all fixtures illustrated in this catalogue. Plate numbers and list prices are identical with those in our trade catalogues, which are extensively distributed, thus providing immediate service when required.

Guarantee.

We have but one grade of goods. The Douglas identification label is stamped on the vitreous ware, and also is stamped on all woodwork, brass fittings and trimmings.

Consequential Damages.

Any goods proving defective in use because of manufacturing defects will be replaced, but no claim for labor or damages will be allowed.

IDENTIFICATION LABEL

Specifications.

Complete specification wording is given with every fixture illustrated herein.

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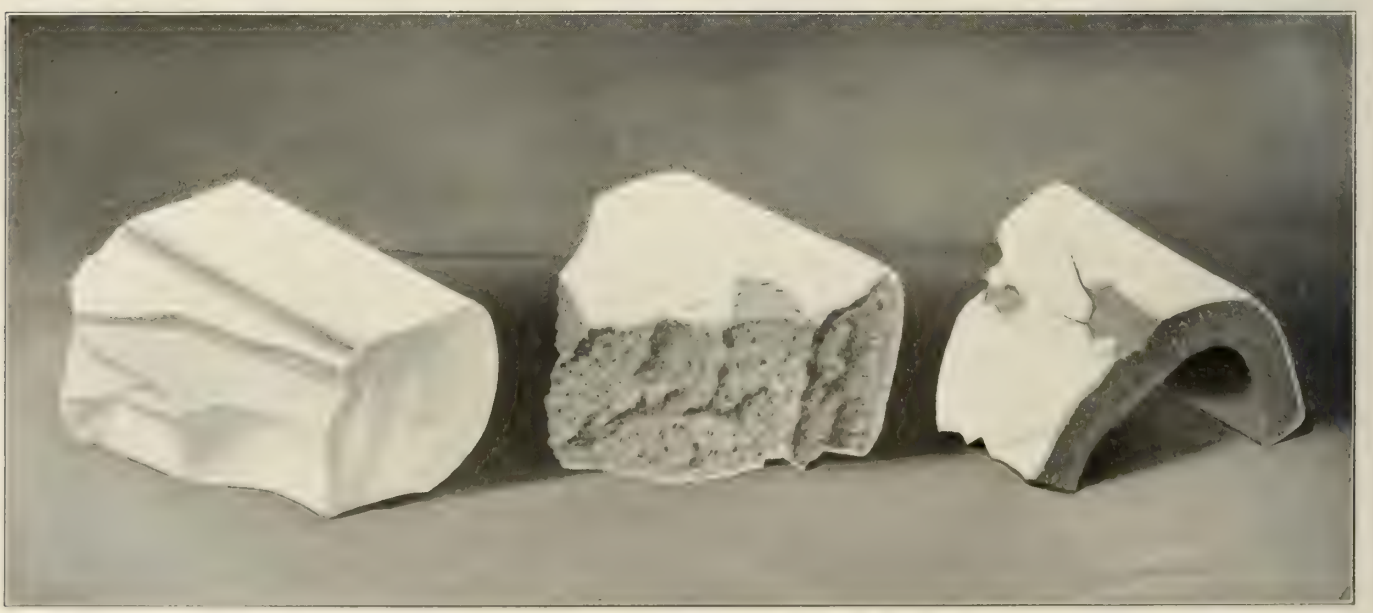
				4385-A	976					8237-A	996



In Douglas Vitreous China you will notice the pure white vitrified body throughout the piece—absolutely non-absorbent, germ proof and positively will not crack or discolor. Will withstand unusual rough usage. This is the only material of which plumbing fixtures are made that can be cleaned with any kind of soap or cleanser and still retain its beautiful, white, glossy appearance. "Douglas Vitreous China" are the first words in sanitation.

In Porcelain you will notice the thin white glaze covering a yellow, porous, absorbent body. The thin glaze that covers the porous body always becomes crazed, causing the piece to be very unsightly, with fine hair lines running in all directions over the article, which allows water and other liquids to penetrate the body, thereby causing the same to become contaminated and unsanitary. Experts will not permit the use of this material in high class buildings, as it is not sanitary.

Iron Enameled ware is used only because of the cheapness of the article. But since Douglas Vitreous China has become popular-priced and within the means of all, the sale of enameled iron is becoming less all the time. The body of the cast iron is covered with a thin white enamel. This enamel will not stand rough usage, as it will crack off and show the iron body of the piece, which will destroy the use of the article by getting full of rust and staining whatever comes in contact with it.

Continued on next page

PLATE 2001-A

"Yale" Low Tank Combination, with "Royal" Douglas Vitreous China Recessed Tank. Nickel-plated flush connection and Vitreous China spud flange; nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel-handle compression stop valve and flange; cherry mahoganized saddle seat and lid, with concealed heavy nickel-plated cast brass bar hinges; Douglas ventilated "Yale" Vitreous China syphon jet bowl with sanitary rim and Vitreous China vent flange.

List.....$62.25

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2004-A

"Yale" Low Tank Combination, with "Gloria" Douglas Vitreous China Round-cornered Tank. Nickel-plated flush connection and Vitreous China spud flange; nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel-handle compression stop valve and flange; cherry mahoganized saddle seat and lid, with concealed heavy nickel-plated cast brass bar hinges; Douglas ventilated "Yale" Vitreous China syphon jet bowl with sanitary rim and Vitreous China vent flange.

List.....$58.00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2020-A

"Lehigh" Low Tank Combination with "Gloria" Douglas Vitreous China Round-cornered Tank. Nickel-plated flush connection and Vitreous China spud flange; nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel-handle compression stop valve and flange; cherry mahoganized extended U-shaped seat, no lid, with nickel-plated cast brass box hinge; Douglas ventilated "Lehigh" Vitreous China syphon jet bowl with sanitary extended front and sanitary rim; Vitreous China vent flange.

List.....$65.00

All Douglas Ball Cocks are furnished with "Everlasting" glass floats

PLATE 2035-A

"Oxford" Low Tank Combination, with "Gloria" Douglas Vitreous China Round-cornered Tank. Nickel-plated flush connection and Vitreous China spud flange; nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel-handle compression stop valve and flange; quartered oak U-shaped seat, no lid, with nickel-plated cast brass hinge; Douglas ventilated "Oxford" Vitreous China syphon jet bowl with sanitary raised front and sanitary rim; Vitreous China vent flange.

List.....$57.50

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Continued on next page

PLATE 2069-A

"Royal" Low Tank Combination, with "Royal" Douglas Vitreous China Recessed Tank. Flush connection and Vitreous China spud flange; nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel-handle compression stop valve and flange; cherry mahoganized saddle seat and lid, with nickel-plated extra heavy cast brass bar hinges; "Royal" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$56.50

Bowl can be furnished Junior size, 13½ inches high.

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2076-A

"Gloria" Low Tank Combination, with "Gloria" Douglas Vitreous China Round-cornered Tank. Flush connections and Vitreous China spud flange; nickel-plated ¾-inch iron-pipe size supply pipe, with wheel-handle compression stop valve and flange; cherry mahoganized seat and lid, with nickel-plated extra heavy cast brass bar hinges; "Gloria" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$43.00

Bowl can be furnished Junior size, 13½ inches high.

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2090-A

"Avon" Low Tank Combination, with "Avon" Douglas Vitreous China Tank, complete with Douglas flush valve and noiseless ball cock. Vitreous China lever handle. Nickel-plated flush connection, with Vitreous China spud flange, nickel-plated ⅜ inch iron pipe size brass supply pipe, with flange, birch mahoganized seat and lid, with nickel-plated cast brass bar hinges and pillars, "Avon" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$30.20

Bowl can be furnished Junior size, 13½ inches high.

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2091-A

"Avon" Low Tank Combination, with Douglas Vitreous China Tank; complete with "Avon" Vitreous China bottom lever, genuine Douglas flush valve and noiseless elevated ball cock, nickel-plated ⅜ inch iron pipe supply, with stop valve and flange; nickel-plated flush connection with Vitreous China spud flange; antique oak seat and lid, with nickel-plated cast brass bar hinges and pillars, "Avon" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$32.35

Bowl can be furnished Junior size, 13½ inches high.

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Continued on next page

PLATE 2095-A

"Stratford" Low Tank Combination, with "Gloria" Douglas Vitreous China Low Tank; complete with Douglas flush valve and noiseless ball cock; Vitreous China lever handle. Nickel-plated flush connection, with Vitreous China spud flange; nickel-plated ⅜-inch iron-pipe size brass supply pipe, with flange and compression stop valve; cherry mahoganized extended U-shaped seat, no lid, with nickel-plated cast brass bar hinge and pillars; "Stratford" Douglas Vitreous China syphon jet bowl with extended front and sanitary rim.

List.....$46.00

PLATE 2097-A

"Stratford" Low Tank Combination, with "Avon" Douglas Vitreous China Tank; complete with Vitreous China bottom lever, genuine Douglas flush valve and noiseless elevated ball cock, nickel-plated ⅜-inch iron-pipe size supply pipe, with stop valve and flange; nickel-plated flush connection, with Vitreous China spud flange; quartered oak extended open front seat, less lid, with nickel-plated cast brass bar hinge and pillars; "Stratford" Douglas Vitreous China syphon jet bowl with extended front and sanitary rim.

List.....$38.15

PLATE 2123-A

"Capitol" Low Tank Combination with plain poplar stained tank with nickel-plated cast brass elbow and nickel-plated ⅜-inch iron-pipe size supply pipe behind partition, nickel-plated cast brass special curved lever handle with fulcrum and wall plate; quartered oak saddle seat, no lid, with nickel-plated cast brass reinforcing plate all around; "Capitol" Douglas vitreous china syphon jet bowl with sanitary rim, concealed back inlet and wall flange.

List.....$43 00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2124-A

"Empire" Low Tank Combination, with "Star" Douglas Vitreous China Tank. Flush connection and vitreous china spud flange; nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel handle compression stop valve and nickel-plated cast brass flange; cherry mahoganized saddle seat and lid, with nickel-plated cast brass bar hinges; "Empire" Douglas *extra heavy* Vitreous China syphon jet bowl with back outlet and sanitary rim.

List.....$65.50

PLATE 2150-A

"Star" Low Tank Closet Combination, with plain oak Tank. Nickel-plated flush connection; nickel-plated ⅝-inch seamless brass supply, with floor flange; plain oak seat and lid, with nickel-plated cast brass bar hinges and pillars; "Star" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$29.75

Bowl can be furnished Junior size, 13½ inches high.

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2180-A

"Acton" Low Tank Closet Combination, with "Leader" Douglas Vitreous China Tank. Vitreous China lever handle; Douglas valve; nickel-plated elbow connection to spud; noiseless bottom supply ball cock, with ⅜-inch iron-pipe size supply to floor, with flange; mahoganized wood seat and lid, with nickel-plated cast brass bar hinges and pillars; "Acton" Douglas Vitreous China reverse trap syphon washdown bowl with sanitary rim.

List.....$21.80

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2193-A

"Index" Low Tank Combination, with "Leader" Vitreous China Tank. Nickel-plated cast brass elbow, Vitreous China lever handle, and nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel handle compression stop valve and flange; oak U-shaped seat, no lid, with nickel-plated cast brass bar hinges and pillars; "Index" Douglas Vitreous China syphon jet washdown bowl with sanitary rim.

List.....$28.50

Bowl can be furnished Junior size, 13½ inches high.

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2196-A

"Leader" Low Tank Combination, with "Leader" Vitreous China Tank. Nickel-plated cast brass elbow, Vitreous China lever handle and nickel-plated ⅜-inch iron-pipe size supply pipe, with flange; birch mahoganized seat and lid, with nickel-plated cast brass hinges and pillars; "Leader" Douglas Vitreous China syphon washdown bowl with sanitary rim.

List.....$21.80

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Continued on next page

PLATE 2197-A

"Leader" Low Tank Closet Combination; "Leader" Douglas Vitreous China Tank, with nickel-plated elbow connection to spud, Vitreous China bottom lever handle, and nickel-plated ⅜-inch iron-pipe size supply and flange; plain oak seat and lid, with nickel-plated cast brass bar hinges and pillars; "Leader" Douglas Vitreous China syphon washdown bowl with sanitary rim.

List.....$24.00

PLATE 2200-A

"Jaydee" Low Tank Closet Combination; Douglas Vitreous China low tank; complete with Douglas flush valve and noiseless elevated ball cock, Vitreous China lever handle; nickel-plated flush elbow; nickel-plated ⅜-inch iron-pipe size supply with flange; birch mahoganized seat and lid, with nickel-plated hinges and pillars; "Jaydee" Douglas Vitreous China syphon washdown bowl with sanitary rim.

List.....$18.00

PLATE 2204-A

"Favorite" Special Low Tank Closet Combination, with plain oak tank; nickel-plated elbow connection to spud; nickel-plated ⅝-inch seamless brass supply pipe, with floor flange; plain oak seat and lid, with nickel-plated cast brass bar hinges and pillars; "Favorite" Douglas Vitreous China syphon washdown bowl, with sanitary rim.

List.....$21.60

PLATE 2376-A

"Yale" Low Tank Seat-action Combination, with "Gloria" Douglas Vitreous China round-cornered tank. "Direct" seat-action valve; nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel handle compression stop valve and flange; cherry mahoganized seat, no lid, with nickel plated cast brass box hinge, seat arm and pillars; Douglas ventilated "Yale" Vitreous China syphon jet bowl with sanitary rim and Vitreous China vent flange.

List.....$67.00

Tank can be specified behind partition on above fixture.
Bowl can be furnished Junior size, 13½ inches high.

Continued on next page

PLATE 2384-A

"Success" Low Tank Seat-action Combination, with "Gloria" Douglas Vitreous China Tank and "Direct" Seat-action Valve. Nickel-plated ⅜-inch iron-pipe size supply pipe, with wheel handle compression stop-valve and flange; cherry mahoganized seat, no lid, with nickel-plated cast brass box hinge, seat arm and pillars; Douglas "Success" Vitreous China syphon jet bowl with sanitary rim.

List.....$58.00

Tank can be specified behind partition on above fixture.
Bowl can be furnished Junior size, 13½ inches high.

PLATE 2401-A

"Leader" Low Tank Seat-action Closet Combination, with "Leader" Douglas Vitreous China Tank; nickel-plated ⅜-inch iron-pipe supply, with stop valve and flange; "Direct" seat-action valve, with elbow connection to spud; oak seat, less lid, with heavy nickel-plated cast brass reinforced hinge, seat arm and pillars; "Leader" Douglas Vitreous China syphon washdown bowl with jet and sanitary rim.

List.....$38.60

Tank can be specified behind partition on above fixture.
Bowl can be furnished Junior size, 13½ inches high.

PLATE 2409-A

"Avon" Low Tank Seat-action Closet Combination, with "Avon" Douglas Vitreous China Tank; nickel-plated ⅜-inch iron-pipe size supply, with wheel handle stop valve and floor flange; "Direct" valve, oak or mahoganized wood seat, no lid, with heavy nickel-plated cast brass reinforced hinge, seat arm and pillars; "Avon" Douglas Vitreous China syphon jet bowl with sanitary rim.

List $42.75

Tank can be specified behind partition on above fixture.
Bowl can be furnished Junior size, 13½ inches high.

PLATE 2412-A

"Yale" Low Tank Vented Seat-action Closet Combination, with "Avon" Douglas Vitreous China Tank; nickel-plated ⅜-inch iron-pipe size supply, with wheel handle stop valve and floor flange; "Direct" valve, oak or mahoganized wood seat, no lid, with heavy nickel-plated cast brass box hinge, seat arm and pillars; "Yale" Douglas Vitreous China ventilated syphon jet bowl with sanitary raised rear vent and sanitary rim; Vitreous China vent flange.

List $59.35

Tank can be specified behind partition on above fixture.
Bowl can be furnished Junior size, 13½ inches high.

Continued on next page

PLATE 2390-A

"Yale" Combination, with nickel-plated "Novel, Sr." push-button flush valve; nickel-plated elbow connection to wall, and nickel-plated cast brass flange; nickel-plated elbow connection to bowl, with Vitreous China flange; cherry mahoganized saddle seat and lid, with concealed heavy nickel-plated cast brass bar hinges; Douglas ventilated "Yale" Vitreous China syphon jet bowl with sanitary rim and Vitreous China vent flange.

List.....$44.00

This closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Bowl can be furnished Junior size, 13½ inches high.

Buckeye Valve as shown 7187-A, page 996, can be furnished on above Closet when specified.

PLATE 2392-A

"Lehigh" Combination, with nickel-plated "Niagara, Sr." flush valve; stop valve and coupling ring and flange; cherry mahoganized extended "U"-shaped seat, no lid, with nickel-plated cast brass box hinge; Douglas ventilated "Lehigh" Vitreous China syphon jet bowl with sanitary extended front and sanitary rim; Vitreous China vent flange.

List.....$49.00

Bowl can be furnished Junior size, 13½ inches high.

Buckeye Valve as shown 7187-A, page 996, can be furnished on above Closet when specified.

PLATE 2393-A

"Stratford" Combination, with nickel-plated "Novel, Sr." push-button flush valve; nickel-plated stop valve and nickel-plated cast brass flange; nickel-plated elbow connection to bowl, with Vitreous China flange; special quartered oak seat, no lid, with nickel-plated cast brass bar hinge; Stratford Douglas Vitreous China syphon jet bowl with extended front and sanitary rim.

List.....$35.00

Bowl can be furnished Junior size, 13½ inches high.

Buckeye Valve as shown 7187-A, page 996, can be furnished on above Closet when specified.

PLATE 2394-A

"Elite" Combination, with nickel-plated "Novel, Sr." push-button flush valve; nickel-plated elbow connection to wall and nickel-plated cast brass flange; nickel-plated elbow connection to bowl, with Vitreous China flange; quartered oak "U"-shaped seat, no lid, with nickel-plated cast brass bar hinge; "Elite" Douglas Vitreous China syphon jet bowl with sanitary raised front and sanitary rim.

List.....$32.50

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Bowl can be furnished Junior size, 13½ inches high.

Buckeye Valve as shown 7187-A, page 996, can be furnished on above Closet when specified.

PLATE 2395-A

"Gloria" Combination, with nickel-plated "Niagara, Sr." flush valve; with stop valve, coupling ring and flange; quartered oak seat and lid, with nickel-plated extra heavy cast brass bar hinges; "Gloria" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$33.00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Bowl can be furnished Junior size, 13½ inches high.

Buckeye Valve as shown 7187-A, page 996, can be furnished on above Closet when specified.

PLATE 2396-A

"Reliance" Combination, with nickel-plated "Niagara, Sr." flush valve; stop valve, coupling ring and flange; quartered oak seat and lid, with nickel-plated cast brass bar hinges; "Reliance" extra heavy Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$43.00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Bowl can be furnished Junior size, 13½ inches high.

Buckeye Valve as shown 7187-A, page 996, can be furnished on above Closet when specified.

Continued on next page

PLATE 3225-A

"Stratford" Combination with 7187-A nickel-plated "Buckeye" oscillating lever handle flush valve; nickel-plated loose-key stop valve and flanges. 7425-A "Divided" birch mahoganized seat, less lid, with heavy nickel-plated cast brass combined hinge and reinforce plate with bumpers and hinges, "Stratford" Douglas Vitreous China syphon jet bowl with sanitary extended front and sanitary rim.

List.....$37.50

PLATE 2397-A

"New Era" Combination with "Novel, Sr." push-button flush valve; nickel-plated elbow connection to wall and flange; nickel-plated elbow connection to bowl, with Vitreous China flange; quartered oak seat and lid, with nickel-plated extra heavy cast brass bar hinges; "New Era" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$32.50

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Buckeye Valve as shown 7187-A, page 996, can be furnished on above Closet when specified.

PLATE 2490-A

"Marcellus" Seat-action Closet Combination, with Martel valve; heavy oak open front seat, with heavy nickel-plated bar hinge, pillars, and strike plate; "Marcellus" Douglas Vitreous China syphon washdown bowl with jet, sanitary extended front and sanitary rim.

List.....$41.25

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

PLATE 2493-A

"Marcellus" Vented Seat-action Closet Combination, with Martel valve; heavy oak open front seat, with heavy nickel-plated hinges, rod, and strike plate; "Marcellus" Douglas Vitreous China ventilated syphon washdown bowl with jet, sanitary raised rear vent, extended front, and [illegible] China vent flange.

List.....$50.25

PLATE 2497-A

"Martel" Vented Seat-action Closet Combination, with Martel valve; heavy oak seat, with heavy nickel-plated hinges, bar, and strike plate; "Martel" Douglas Vitreous China ventilated syphon washdown bowl with jet, sanitary raised rear vent, and sanitary rim; Vitreous China vent flange.

List.....$47.75

PLATE 2500-A

"Martel" Seat-action Closet Combination, with Martel valve; heavy oak seat, no lid, with heavy bar hinge, pillars and strike plate; "Martel" Douglas Vitreous China syphon washdown bowl, with jet and sanitary rim.

List.....$38.75

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Continued on next page

PLATE 2428-A

"Gloria" Combination, with "Compact" Automatic Valve, oxidized finish; aluminum finish iron pressure tank and brackets; oxidized brass flush pipe and holder; birch mahoganized seat, no lid, with oxidized finish cast brass box hinge, seat arm and pillars; "Gloria" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$46.00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high.

PLATE 2441-A

"Lotus" Combination, with "Compact" Automatic Valve and elbow connection to spud; oxidized finish; aluminum finish iron pressure tank and brackets; oxidized brass flush pipe and holder; quartered oak seat, no lid, with oxidized finish cast brass box hinge, seat arm and pillars; "Lotus" Douglas Vitreous China syphon jet washdown bowl with sanitary rim.

List.....$40.25

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high.

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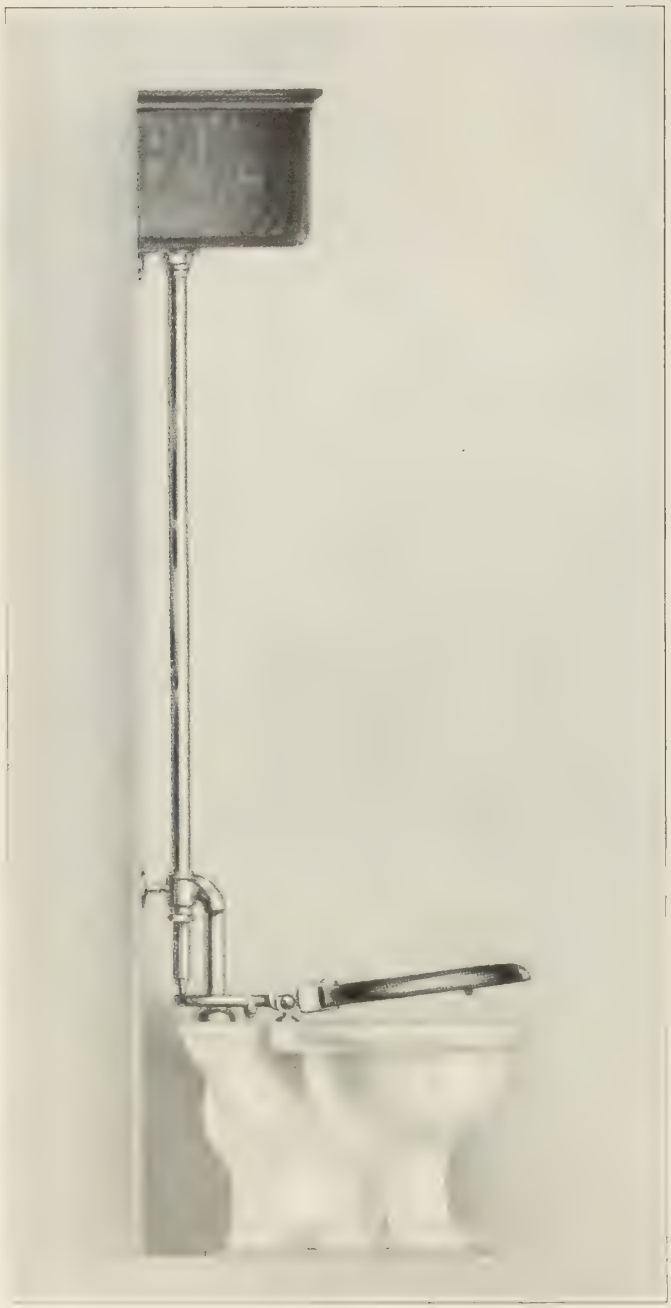

PLATE 2535 A

"New Era" Automatic Seat-action Combination; 19 x 11 x 11 inch Quartered Oak Tank, with genuine Douglas flush valve and noiseless ball cock, nickel-plated extra heavy cast brass angles and top clamps; 1¼-inch nickel-plated flush pipe, with concealed direct-action lift rod and connections; "Direct" seat-action valve; quartered oak seat, no lid, with nickel-plated heavy cast brass box hinge, with seat arm and pillars; "New Era" Douglas Vitreous China syphon jet bowl with sanitary rim; guaranteed to carry 2¼-inch ball.

Height of closet 14½ inches

List $44.75

With Vitreous China Tank

List $54.00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450 A, page 965.

Tank can be specified behind partition or above fixture.

Bowl can be furnished Closet Combination size, 13½ inches high

PLATE 2540 A

"Lotus" Automatic Seat-action Combination, with connection to 18 x 10 x 10-inch Douglas Vitreous China Tank, glazed inside and out, with genuine Douglas flush valve and noiseless ball cock; nickel-plated heavy cast brass angles and top clamps; 1¼-inch nickel-plated flush pipe, with concealed direct-action lift rod connections; "Direct" seat-action valve and elbow spud; quartered oak seat, no lid, with nickel plated heavy cast brass box hinge, with seat arm and pillars; "Lotus" Douglas Vitreous China syphon washdown bowl with jet and sanitary rim.

List $48.75

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450 A, page 965.

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high

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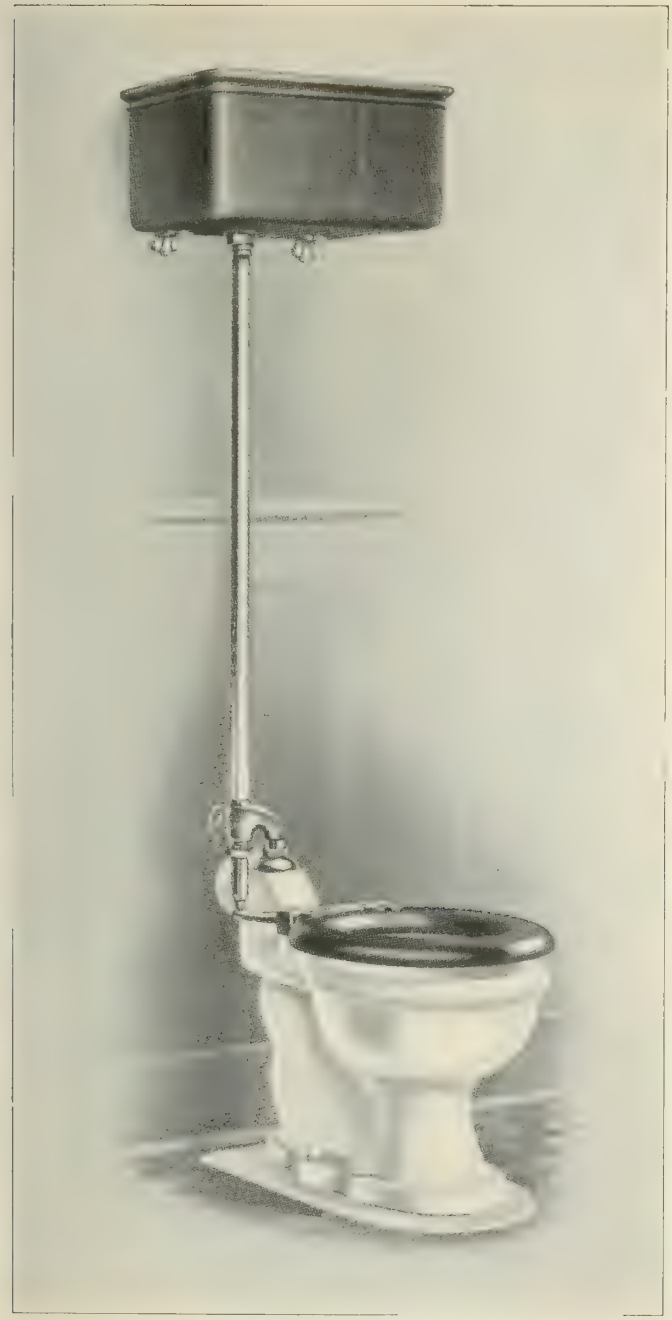

PLATE 2503-A

"Yale" Automatic Seat-action Combination, with 19 x 11 x 11-inch Quartered Oak Tank, with genuine Douglas flush valve and noiseless ball cock, nickel-plated cast brass angles, and top clamps; 1¼-inch nickel-plated flush pipe, with concealed direct-action lift rod and connections; "Direct" seat-action valve; quartered oak seat, no lid, with nickel-plated heavy cast brass box hinge, seat arm and pillars. Douglas ventilated "Yale" Vitreous China syphon jet bowl with sanitary rim and concave Vitreous China vent flange.

List.....$60.00

With Vitreous China Tank. List.....$69.50

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high.

PLATE 2722-A

"Elite" High Tank Combination; Quartered Oak Tank, with genuine Douglas flush valve and noiseless ball cock; nickel-plated heavy cast brass angles and top clamps; nickel-plated brass ring guide, rods and celluveneer ball pull; 1¼-inch nickel-plated flush pipe, with extension holder; quartered oak "U"-shaped seat, no lid, with nickel-plated cast brass hinge; "Elite" Douglas Vitreous China syphon jet bowl with sanitary raised front and sanitary rim.

List.....$39.00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high.

Continued at

PLATE 2702-A

"Yale" High Tank Combination; 18 x 10 x 10-inch Douglas Vitreous China Tank glazed inside and out, with genuine Douglas flush valve and noiseless ball cock, nickel-plated heavy cast brass angles and top clamps; nickel-plated brass ring guide, rods and Vitreous China pull; 1¼-inch nickel-plated flush pipe, with extension holder; mahoganized cherry seat and lid, with nickel-plated cast brass hinges; Douglas ventilated "Yale" Vitreous China syphon jet bowl with sanitary rim and Vitreous China vent flange.

List.....$65.00

The Closet can be [illegible] with "O. K." screw joint connection as shown on Plate 1609-X, page 961.

Tank can be specified behind partition or above fixture.

Bowl can be furnished Junior size, 13½ inches high.

PLATE 2715-A

"Lehigh" High Tank Combination; Quartered Oak Tank, with genuine Douglas flush valve and noiseless ball cock, nickel-plated extra heavy cast brass angles and top clamps; nickel-plated brass ring guide, chain and Vitreous China pull; 1¼ inch nickel-plated flush pipe, with extension holder; special quartered oak seat, no lid, with nickel-plated cast brass box hinge; Douglas ventilated "Lehigh" Vitreous China syphon jet bowl with extended front and sanitary rim; Vitreous China vent flange.

List.....$62.00

With Vitreous China Tank. List.....$72.00

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high.

Continued on next page

PLATE 2724-A

"Stratford" High Tank Combination; Quartered Oak Tank, with genuine Douglas flush valve and noiseless ball cock, nickel-plated heavy cast brass angles and top clamps; nickel-plated brass ring guide, rod and nickel-plated chain and China pull; 1¼-inch nickel-plated flush pipe, with extension holder; special quartered oak seat, no lid, with nickel-plated cast brass box hinge; "Stratford" Douglas Vitreous China syphon jet bowl with extended front and sanitary rim.

List.....$41.75

With Vitreous China Tank. List.....$48.75

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high.

PLATE 2751-A

"New Era" High Tank Combination; Quartered Oak Tank, with genuine Douglas flush valve and noiseless ball cock, nickel-plated extra heavy cast brass angles and top clamps; nickel-plated ring guide, rods and celluveneer ball pull; 1¼-inch nickel-plated flush pipe, with extension holder and Vitreous China spud flange; quartered oak seat and lid, with nickel-plated cast brass hinges; "New Era" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$36.00

With Vitreous China Tank. List.....$43.00

This Closet can be furnished with "O. K." screw joint connection as shown on Plate 7450-A, page 965.

Tank can be specified behind partition on above fixture.

Bowl can be furnished Junior size, 13½ inches high.

Continued on next page

PLATE 3448-A

"Linwood" Douglas Vitreous China Bidet with flushing rim and nickel-plated China indexed combination compression supply and standing waste fitting with individual control for flushing rim and spray with supplies from floor with flanges.

List.....$65.00

PLATE 2765-A

"Capitol" High Tank Combination; plain Poplar Stained Tank, with angles and iron top clamps behind partition and nickel-plated cast brass curved lever handle through partition; rough brass concealed flush pipe; nickel-plated cast brass extra long elbow, and wall flange; quartered oak seat and lid, with nickel-plated cast brass hinges; "Capitol" Douglas Vitreous China syphon jet bowl with sanitary rim.

List.....$37.25

This Closet can be furnished with "O. K." screw joint connection

PLATE 2379-A

"Yale" Low Tank Combination with plain wood "Gloria" tank and "Direct" seat-action valve behind partition, with nickel-plated cast brass seat-action arm through partition; nickel-plated cast brass double offset flush connection, quartered oak seat, no lid, with nickel-plated cast brass hex hinges, Douglas ventilated "Yale" Vitreous China syphon jet bowl with sanitary rim Vitreous china vent flange

List.....$61.50

Bowl can be furnished Junior size, 13½ inches high

Continued on next page

PLATE 3344-A

"Waldon" Douglas Vitreous China wall type syphon jet Closet with extended front, sanitary rim, concealed outlet and combined outlet and support; complete with "Novel, Sr." push-button flush valve behind partition, with nickel-plated push extending through partition with flange; loose-key stop valve and elbow connection to spud; 7425-A "Divided" oak seat with nickel-plated combined hinge and reinforce plate with bumpers and pillars.

List.....$55.50

PLATE 3341-A

"Waldo" Douglas Vitreous China wall type syphon jet Closet, with sanitary rim, concealed outlet and combined outlet and support; complete with "Novel, Sr." push-button, flush valve behind partition, with nickel-plated push extending through partition, with flange; loose-key stop valve and elbow connection to spud; 7425-A "Divided" mahoganized wood seat, less lid, with nickel-plated cast brass combined hinge and reinforce plate with bumpers and pillars.

List.....$51.50

PLATE 7425-A

Douglas divided seat, quartered oak or mahoganized wood with heavy nickel-plated cast brass bar hinge with integral reinforcing plate with rubber bumpers.

List.....$4.75 each
If with lid..... 6.30 "

PLATE 7425-A

Divided seat. View showing seat down

PLATE 7450-A

"O. K." screw joint connection complete, with floor thimble, which can be used with most of our bowls. List.....$5.00

This screw joint connection is caulked directly to the closet outlet or horn, with lead. The lead is well caulked to a depth of 1½ inches, which makes the brass connection not only practically an integral part of the closet, but positively non-removable, except by breaking the closet.

This closet is screwed into the threaded connection until the base rests on the floor. It may be removed at any time by simply unscrewing it, the same as other similar connections. The same thimble is used for lead or iron pipe.

Note—Our "O. K." screw connection does away with all exposed bolts through the base of the water closet; in fact, there are no bolts of any kind in connection with same.

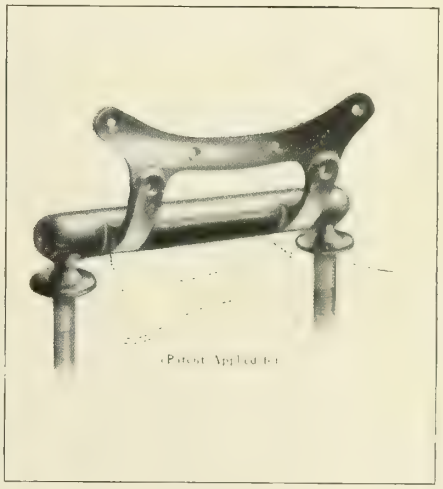

PLATE 7471-A

Douglas nickel-plated self-raising spring hinge.

This hinge keeps seat in upright position when not in use, allowing use of closet for urinal. It is of extra strength and will stand hardest usage for years, being made of best cast brass and phosphor bronze. Price on application.

Continued on next page

PLATE 3718-A

"Windsor" Modern Porcelain White Glazed Stall Urinal, 18 inches wide, with integral drip receptor; quartered oak tank, with nickel-plated ring guide, rods and celluveneer pull, nickel-plated heavy cast brass angles and top clamps; nickel-plated flush pipe; cast brass inlet connection and spreader; nickel-plated cast brass outlet strainer and connection.

Each urinal, list	$55.00
Add for each 24-inch wide urinal	8.50
Add for Vitreous China tank	7.25
Add for bottom vent on urinal, with integral hood	3.00
Add for removable porcelain strainer	1.00

Height, 18-inch urinal, 46 inches; 24-inch urinal, 48 inches. Can be set on top of, or imbedded in, floor, or can be furnished with sides ground for partitions, or glazed to set apart, at same price.

PLATE 3735-A

"Windsor" Modern Porcelain White Glazed Stall Urinal, 18 inches wide, with integral drip receptor and integral projecting side shields; automatic Douglas Vitreous China tank, glazed inside and out; nickel-plated heavy cast brass angles and top clamps; nickel-plated flush pipe; nickel-plated cast brass inlet connection and spreader; nickel-plated cast brass outlet strainer and connection.

Each urinal, list	$65.50
Battery of two with Vitreous China tank and branching flush pipes, list	130.00
Battery of three with Vitreous China tank and branching flush pipes, list	178.00
Add for each 24-inch wide urinal	7.50
Add for bottom vent on urinal, with integral hood, each urinal	3.00
Add for removable porcelain strainer, each urinal	1.00

Height, 18-inch urinal, 46 inches; 24-inch urinal, 48 inches.

Urinals are glazed over all exposed surfaces, and can be set any distance apart desired.

Can also be furnished with interlocking joint at no additional charge.

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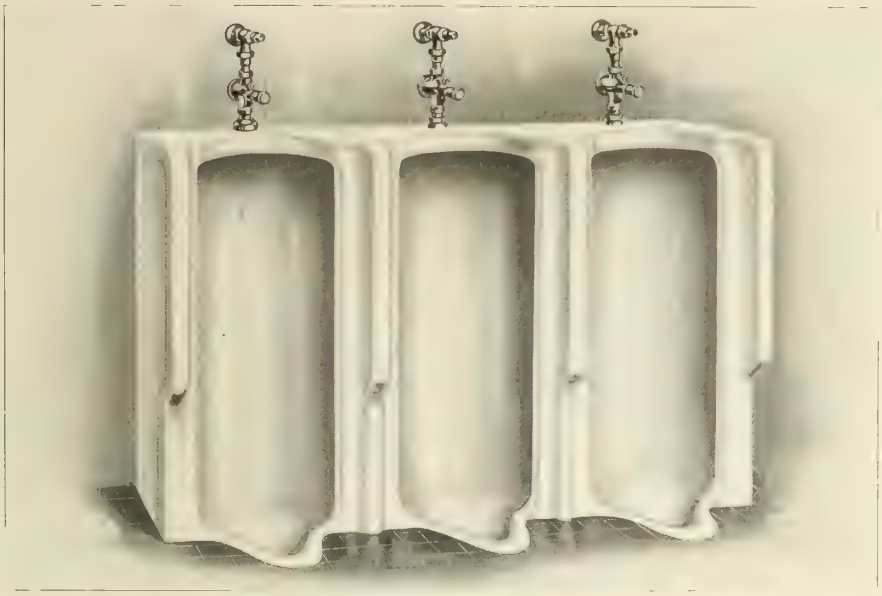

PLATE 3730-A

"Windsor" Modern Porcelain White Glazed Stall Urinal, 18 inches wide, with integral drip receptor and integral side shields; "Ætna" nickel-plated push-button self-closing flush valve, with loose-key angle stop valve and flange; nickel-plated cast brass inlet connection and spreader; nickel-plated cast brass outlet strainer and connection for lead pipe.

Each urinal, list	$52.50
Add for each 24-inch urinal	7.50

NOTE—Where urinals are set in battery they are furnished with interlocking joint, as shown, and at no additional charge.

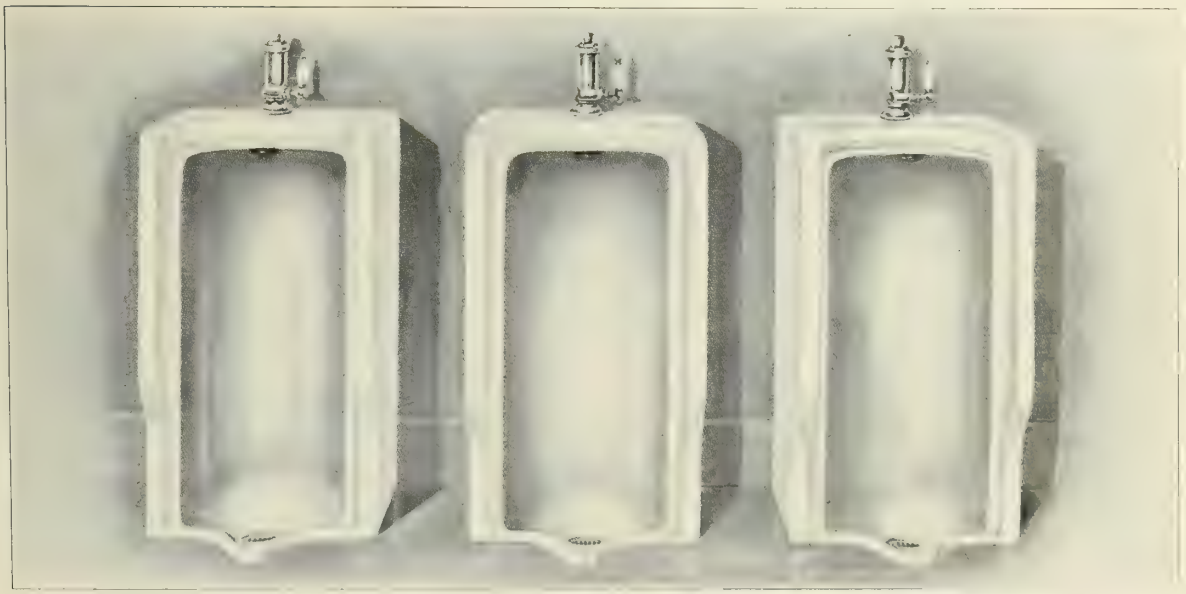

PLATE 3733-A

"Windsor" Modern Porcelain White Glazed Stall Urinal, 18 inches wide, with integral drip receptor and integral projecting side shields; nickel-plated "Niagara, Jr." flush valves, less stop valves; nickel-plated cast brass inlet connection and spreader; nickel-plated cast brass outlet strainer and connection.

Each urinal, list	$56.50
Add for each 24-inch urinal	7.50
Add for nickel-plated stop valve for flush valve	1.50
Add for bottom vent on urinal, with integral hood	3.00
Add for removable porcelain strainer	1.00

Height, 18-inch urinal, 46 inches; 24-inch urinal, 48 inches.

Urinals are glazed over all exposed surfaces, and can be set any distance apart desired, or can be furnished with interlocking joint at no additional charge.

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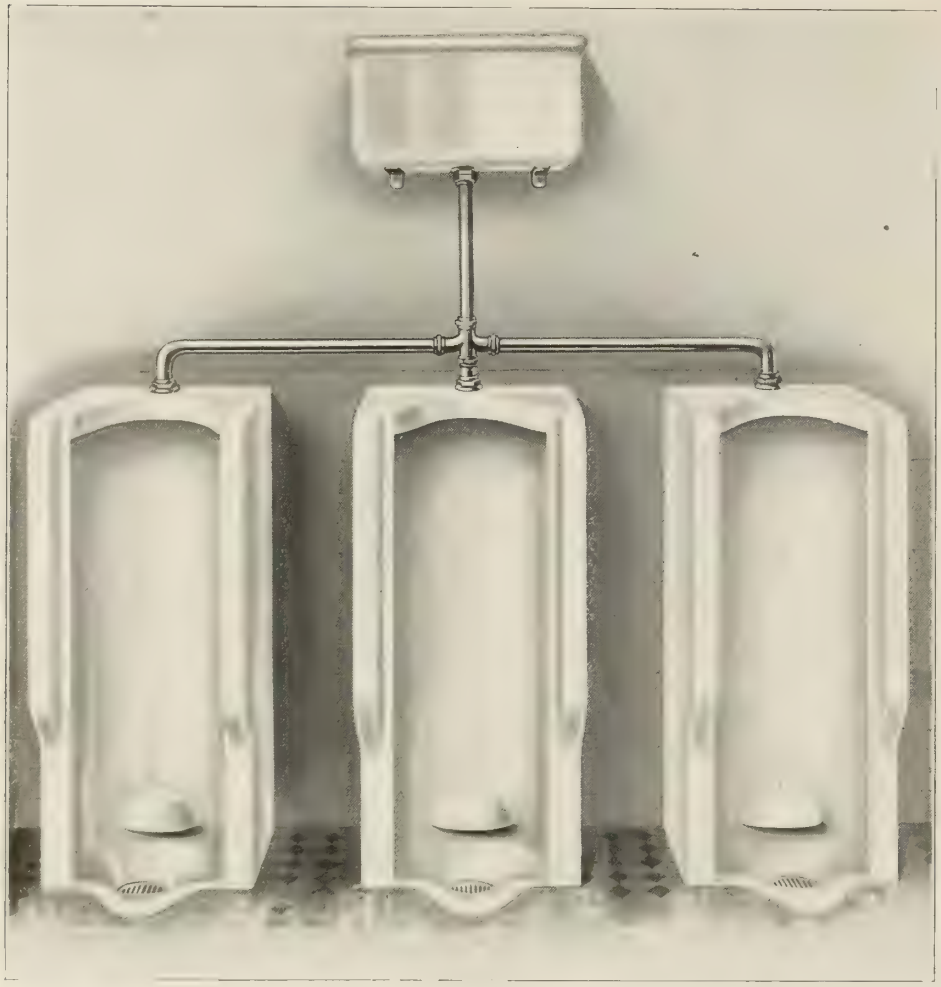

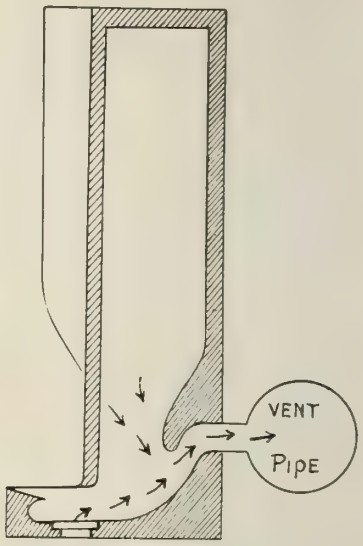

Cross-section

PLATE 3738-A

Battery of three Windsor 18-inch Modern Porcelain Stall Urinals, with integral bottom vents with hoods, integral side shields and drip receptors, glazed over all exposed parts; Douglas Vitreous China automatic urinal tank; nickel-plated three-way dividing piece, and branching flush pipes to three nickel-plated brass inlet connections and spreaders; nickel-plated cast brass strainers and outlet connections.

Battery of 3, list	$187.00
Battery of 2, with tank, list	136.00
Single urinal, with tank, list	68.50
Add for each 24-inch wide urinal	7.50
Deduct for each 18-inch urinal, no shields	4.75
Add for each 24-inch urinal, no shields	3.25

NOTE—Urinals can be furnished to set closer together with interlocking joints at same prices as listed.

PLATE 3901 A

"Star Era" Urinal Combination, with nickel-plated "Niagara, Jr." flush valve with coupling ring and flange and nickel-plated cast brass wall support, cast brass outlet connection, nickel-plated brass bolts, "Star Era" Douglas Vitreous China syphon jet urinal, with integral trap and concealed outlet.

List	$27.50
If with stop valve, add	2.00

PLATE 3913 A

"Princeton" Ventilated Urinal Combination, with nickel-plated "Niagara, Jr." flush valve with coupling ring and flange, and nickel-plated cast brass wall support; cast brass outlet connection; nickel-plated brass bolts; "Princeton" Douglas ventilated Vitreous China syphon jet urinal, with integral hood, trap and vent, and concealed outlet.

List	$30.00
If with stop valve, add	2.00

Continued on next page

PLATE 4003-A

"Victor" Douglas Vitreous China oval lavatory, 33 x 24 inches; Vitreous China fluted pedestal; nickel-plated adjustable wall supports; "Ideal" nickel-plated 1¼-inch combination compression supply and waste fitting, with china knob, china cross handles and china indices; nickel-plated 1¼-inch "Sterling" unvented P trap to wall, with tubing and flange; nickel-plated ⅜-inch iron-pipe size brass supplies to wall, with flanges and compression angle stop valves.

List.....$63.00

PLATE 4010-A

"Dominion" Douglas Vitreous China all Roll Rim Oval Lavatory; 28 x 22 inches, with 18½ x 13½ x 6½-inch bowl; vitreous china pedestal; nickel-plated adjustable wall supports; "Ideal" nickel-plated combination compression supply and waste fitting, with vitreous china cross handles and Vitreous China waste knob; 1¼-inch nickel-plated "Sterling" unvented P trap, with tubing and flange; nickel-plated ⅜-inch iron-pipe size brass supplies, with angle stop valves and wall escutcheons.

List.....$57.50

PLATE 4015-A

"Trojan" Douglas Vitreous China all roll Rim Rectangular Lavatory; size, 30 x 22; vitreous china square pedestal; nickel-plated adjustable wall supports; 1½-inch nickel-plated "Favorite" standing waste and basin connection; 1½-inch nickel-plated "Sterling" unvented P trap, with outlet threaded female for iron pipe; nickel-plated low pattern compression basin cocks, with china indices and china cross handles; nickel-plated ⅜-inch iron-pipe size brass supplies, with angle stop valves and wall flanges.

List.....$64.00

Can also be furnished 28 x 22 inches. List.....$59.50

PLATE 4020-A

"Trojan" Douglas Vitreous China all Roll Rim Rectangular Lavatory; 30 x 24 inches; vitreous china square pedestal; nickel-plated adjustable wall supports; "Premier" nickel-plated combination compression gooseneck pattern supply and waste fitting, with china knob. China cross handles and china indices; nickel-plated 1½-inch sterling unvented P trap to wall, with tube and flange; nickel-plated ⅜-inch iron-pipe size supply pipes to wall, wheel-handle compression angle stop valves and flanges.

List.....$69.00

Continued on next page

PLATE 4022-A

"Trojan" Douglas Vitreous China Rectangular Pedestal Lavatory; 24 x 20 inches; vitreous china square pedestal; nickel-plated adjustable wall supports; "Favorite" nickel-plated waste, with China index; "Sterling" 1¼-inch nickel-plated cast brass unvented P trap to wall, with tube and flange; nickel-plated China index compression basin cocks.

List.....$38.00

PLATE 4023-A

"Trojan" Douglas Vitreous China Rectangular Pedestal Lavatory; 24 x 20 inches; integral sanitary open overflow; vitreous china square pedestal; nickel-plated adjustable wall supports; nickel-plated chain stay, chain, basin connection and rubber stopper; "Sterling" 1¼-inch nickel-plated cast brass unvented P trap to wall, with tube and flange; nickel-plated China indexed compression basin cocks.

List.....$34.50

PLATE 4043-A

"Model" Douglas Vitreous China Lavatory; size, 30 x 22 inches, with integral back 10 inches high, two vitreous china legs, cast brass angle brackets, nickel-plated "Empire" waste, with china knob and chain connection, 1¼-inch nickel-plated cast brass unvented "Bag" "P" trap, with tube to wall and flange; nickel-plated cast brass Fuller basin cock with China handles marked "H" and "C."

Size of basin, 17½ x 19 inches.

List.....$65.50

PLATE 4043-A

"Bijou" Douglas Vitreous China Lavatory, with integral sanitary open overflow; size 28 x 22 inches, with integral back 8 inches high; two vitreous china legs; cast brass angle brackets; nickel-plated "Juno" pop-up waste and basin connection; 1¼ inch nickel-plated cast brass unvented "Star" P trap to wall, with tube and flange; nickel-plated cast brass compression basin cocks, with china cross handles and china name plates marked "Hot" and "Cold."

Size of basin, 13 x 17 inches.

List.....$60.00

Same as above, size 26 x 22 inches. List.....$58.20

Continued on next page

PLATE 4051-A

"Climax" Douglas Vitreous China Lavatory; size, 24 x 20 inches, with integral back 8 inches high; integral sanitary open overflow and vitreous china leg; malleable iron concealed hangers; nickel-plated "Juno" pop-up waste and basin connection; 1¼-inch nickel-plated cast brass unvented "Star" P trap to wall, with tube and flange; nickel-plated low pattern compression basin cocks, with china name plate marked "Hot" and "Cold."

Size of basin, 12 x 16 inches.

List.....$38.75

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

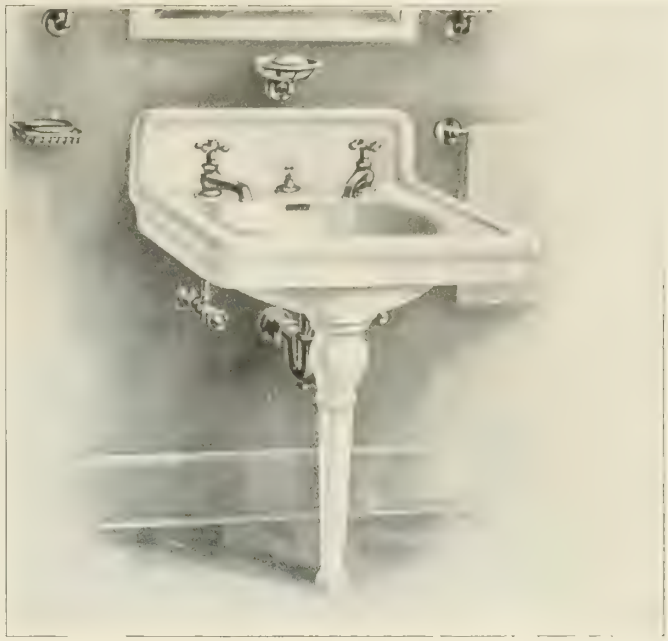

PLATE 4065-A

"Triumph" Douglas Vitreous China Lavatory; size, 20 x 18½ inches, with integral back 6 inches high; integral sanitary open overflow and vitreous china leg; malleable iron concealed hangers; nickel-plated "Juno" pop-up waste and basin connection; 1¼-inch nickel-plated cast brass unvented "Sterling" P trap to wall, with tube and flange; nickel-plated cast brass China indexed low pattern compression self-closing basin cocks; ⅜-inch iron-pipe size nickel-plated brass supplies, with wheel handle compression stop valve.

Size of basin, 11½ x 14½ inches.

List.....$28.50

Same Lavatory as above, but with standing waste. List.....$33.50

PLATE 4052-A

"Climax" Douglas Vitreous China Lavatory; size, 24 x 20 inches, with integral back 8 inches high; set upon malleable iron concealed hangers; 1¼-inch nickel-plated "Leader" waste, with china name plate; 1¼-inch nickel-plated cast brass unvented "Bag" P trap, with plate tube to wall and flange; nickel-plated low pattern compression basin cocks, with china name plate marked "Hot" and "Cold."

Size of basin, 12 x 16 inches.

List.....$38.50

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4202-A

"Champion" Douglas Vitreous China Corner Lavatory, with Vitreous China leg and concealed iron angles; nickel-plated cast brass combination removable overflow grating; chain, and rubber stopper; 1¼-inch nickel-plated cast brass unvented "Star" P trap to wall, with tube and flange; nickel-plated cast brass Fuller basin cocks, with China handles marked "H" and "C."

Length, 23 inches. Width from back to front, 26 inches. Size of basin, 13 x 17 inches. Height of integral back, 6 inches.

List.....$45.00

Same with "Favorite" waste and "Bag" trap. List..$50.00

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4066-A

"Triumph," 20 x 18 inches, Douglas Vitreous China Lavatory, with 6-inch integral back; malleable iron concealed hangers; 1¼-inch nickel-plated "Leader" waste with China name plate; 1¼-inch nickel-plated "Bag" trap; nickel-plated China indexed compression basin cocks; nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges. List.....$25.00

PLATE 4067-A

"Triumph," 20 x 18 inches, Douglas Vitreous China Lavatory, with 6-inch integral back and sanitary open overflow; malleable iron concealed hangers; nickel-plated chain and rubber stopper; 1¼-inch nickel-plated cast brass unvented "Sterling" "P" trap with tube to wall and flange; nickel-plated low pattern compression basin cocks with China name plates marked "Hot" and "Cold." List.....$16.00

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4068-A

"Triumph," 20 x 18-inch Douglas Vitreous China Lavatory, with 6-inch integral back and sanitary open overflow; malleable iron concealed hangers; "Reliance" nickel-plated pop-up waste and basin connection; 1¼-inch "Sterling" nickel-plated cast brass unvented P trap, tube to wall and flange; nickel-plated China indexed compression basin cocks; nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges.

List.....$21.10

NOTE—Special attention is desired to the three "Triumph" Vitreous China Lavatories illustrated above, because of the many installations where small fixtures are necessary and the desirability for greatest durability and sanitation in such installations.

Wonderful improvements in manufacturing "Triumph" Lavatories have made it possible for us to produce these fixtures in any quantity desired and at so extremely low a price that it is no longer necessary on account of expense to install fixtures of inferior materials.

We invite your most careful consideration of Douglas "Triumph" Vitreous China Wall Lavatories, because they are made of the most sanitary and durable material and may be installed in the many places where heretofore expense has made necessary the use of less desirable fixtures.

PLATE 4126-A

"Atlas" Douglas Vitreous China all roll Rim Lavatory, with integral sanitary open overflow; size, 24 x 20 inches; vitreous china leg; nickel-plated cast brass adjustable wall supports; nickel-plated "Juno" pop-up waste and basin connection; 1¼ inch nickel-plated cast brass unvented "Sterling" P trap, with tube to wall and flange; nickel-plated cast brass china indexed low pattern compression basin cocks.

Size of basin, 12 x 16½ inches.

List.....$27.75

Add for nickel-plated ⅜ inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

Continued on next page

PLATE 4110-A

"Herald" Douglas Vitreous China all roll Rim Lavatory, with integral sanitary open overflow; size, 28 x 22 inches; two vitreous china legs; nickel-plated cast brass adjustable wall brackets; nickel-plated "Juno" pop-up waste and basin connection; 1½-inch nickel-plated cast brass unvented "Sterling" P trap, with tube and wall flange; nickel-plated cast brass china indexed low pattern compression basin cocks, with drop-ear handles.

Size of basin, 13 x 17 inches.

List.....$41.25

Same as above, size 26 x 22 inches. List.....$40.00

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4081-A

"Crescent" Douglas Vitreous China Lavatory; 24 x 23 inches, with integral back 6 inches high; vitreous china leg and concealed angles; nickel-plated cast brass combination removable overflow grating; chain and rubber stopper; 1¼-inch nickel-plated cast brass unvented "Star" P trap, with tube to wall and flange; low pattern china indexed compression self-closing basin cocks.

Size of basin, 13½ x 16 inches.

List.....$39.00

Same with "Favorite" waste and "Bag" trap. List.....$44.00

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4101-A

"Spartan" Douglas Vitreous China all roll rim Lavatory; size, 30 x 24 inches, with two vitreous china legs and nickel-plated cast brass adjustable wall supports; nickel-plated "Crown" combination waste and cocks, with china knob and china handles; 1¼-inch nickel-plated cast brass unvented "Star" P trap, with tube to wall and flange.

Size of basin, 13½ x 19 inches.

List.....$56.00

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4151-A

"Creston" Douglas Vitreous China all roll rim Lavatory, size 24 x 23 inches, with curved front, nickel-plated cast brass adjustable wall supports; "Favorite" nickel-plated waste with China knob; 1½-inch "Sterling" nickel-plated cast brass unvented P trap, tube to wall and flange; nickel-plated Fuller basin cocks with China handles; nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and wall flanges.

List.....$39.25

Continued

PLATE 4208-A

"Acme" Douglas Vitreous China Corner Lavatory, with concealed iron angle brackets and corner support; nickel-plated "Favorite" waste, with China knob; 1¼-inch nickel-plated cast brass unvented "Bag" trap, with tube to wall and flange; low pattern China indexed compression basin cocks, with drop-ear handle.

Length on sides, 20½ inches. Width from back to front, 24½ inches. Size of basin, 12 x 15 inches. Height of integral back, 8 inches.

List.....$39.50

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4209-A

"Acme" Douglas Vitreous China Corner Lavatory, with sanitary open overflow; concealed iron angle brackets and corner support; nickel-plated chain and rubber stopper; 1¼-inch nickel-plated cast brass unvented "Sterling" P trap, with tube to wall and flange; low pattern China indexed compression basin cocks, with drop-ear handles.

Length on sides, 20½ inches. Width from back to front, 24½ inches. Size of basin, 12 x 15 inches. Height of integral back, 8 inches.

List.....$34.50

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4214-A

"Modern" Douglas Vitreous China Corner Lavatory; 6-inch integral back; concealed angle brackets and corner supports; nickel-plated "Leader" waste, with China name plate; 1¼-inch nickel-plated cast brass unvented "Bag" trap, with tube to wall and flange; nickel-plated China indexed low pattern compression basin cocks.

Length on sides, 16¾ inches. Width from back to front, 21¾ inches. Size of basin, 11 x 14 inches.

List.....$29.00

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4216-A

"Modern" Douglas Vitreous China Corner Lavatory, with [illegible] integral back and sanitary open overflow; concealed angle brackets and corner [illegible], nickel-plated chain and rubber stopper, 1¼-inch nickel-plated cast brass unvented "Sterling" P trap, with tube to wall, and flange; [illegible] China indexed low pattern compression basin cocks.

Length on sides, 16¾ inches. Width from back to front, 21¾ inches. Size of basin, 11 x 14 inches.

List [illegible]

Add for nickel-plated [illegible] inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4220-A

"Monarch" Douglas Vitreous China Corner Lavatory, with nickel-plated cast brass adjustable brackets; nickel-plated "Favorite" waste, with China knob; 1¼-inch nickel-plated cast brass unvented "Sterling" P trap, with tube to wall and flange; nickel-plated cast brass extra heavy Fuller pattern basin cocks, with union in body.

Length on sides, 20½ inches. Width from back to front, 24½ inches. Size of basin, 12 x 15 inches.

List.....$35.50

Add for nickel-plated ⅜-inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

PLATE 4221-A

"Monarch" Douglas Vitreous China Corner Lavatory, with sanitary open overflow; nickel-plated cast brass adjustable brackets; nickel-plated chain and rubber stopper; 1¼ inch nickel-plated cast brass unvented "Sterling" P trap, with tube to wall and flange; nickel-plated cast brass extra heavy Fuller pattern basin cocks with union in body.

Length on sides, 20½ inches. Width from back to front, 24½ inches. Size of basin, 12 x 15 inches.

List.....$30.50

Add for nickel-plated ⅜ inch iron-pipe size supplies, angle stop valves and flanges, $4.00 per pair.

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PLATE 4356-A

"Bethesda" Douglas Vitreous China Instrument Sink, 36 x 24-inch all roll rim, with two Vitreous China legs and wall connections; "Perfect" nickel-plated pedal pop-up waste and basin connection; 1½-inch nickel-plated "Sterling" unvented P trap, tube to wall and flange; "Perfect" nickel-plated combination pedal supply valve, with nickel-plated connection to nickel-plated gooseneck spout with removable rose spray.

List price.....$125.00

PLATE 4357-A

"Bethesda" Douglas Vitreous China Instrument Sink, 36 x 24-inch all roll rim, with two Vitreous China legs and wall connections; "Gem" nickel-plated knee action pop-up waste and basin connection, with nickel-plated "Sterling" unvented P trap, tube to wall and flange; nickel-plated "Gem" knee action supply valve, with ½-inch iron-pipe size supplies from wall with stop valves and flanges; nickel-plated connection from valve to gooseneck spout with removable rose spray.

List.....$131.50

PLATE 4358-A

"Rex" 30 x 24 x 7-inch Douglas Vitreous China all roll rim Instrument Sink, with two Vitreous China legs and wall supports; nickel-plated "Gem" knee action pop-up waste and basin connection, with nickel-plated "Sterling" unvented P trap, tube to wall and flange; nickel-plated "Gem" knee action supply valve, with ½-inch iron pipe size supplies from wall with stop valves and flanges; nickel-plated connection from valve to gooseneck spout, with removable rose spray and support.

List.....$95.00

PLATE 4363-A

"Atlas" 24 x 20-inch all roll rim Douglas Vitreous China Surgeon's Lavatory, with sanitary open overflow; heavy nickel-plated cast brass angle brackets; "Perfect" pedal pop-up waste and basin connection, with 1¼-inch nickel-plated "Sterling" unvented P trap, tube to wall and flange; "Perfect" nickel-plated combination pedal supply, with nickel-plated connection to nickel-plated low pattern spout.

List.....$66.00

PLATE 4376-A

Douglas Vitreous China Domestic Science Sink with integral back and ends, and sanitary open overflow, nickel-plated sink connection and strainer with rubber stopper.

List.....$23.00

Sink, 27 x 22 inches outside, 6 inches deep inside; 2-inch back and ends which are ground smooth to fit table top.

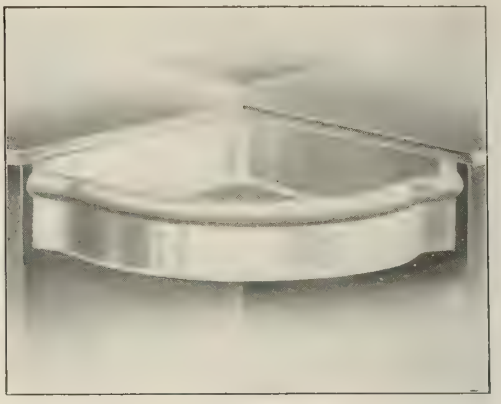

PLATE 4378-A

Douglas Vitreous China Corner Domestic Science Sink with integral back ground smooth to fit against table top.

List.....$22.50

Length on sides, 24 inches; depth inside, 6 inches; height of integral back, 2 inches.

PLATE 4385-A

Douglas Vitreous China Flat Rim Laboratory Sink, 17 x 12 inches outside; 9 inches deep inside end outlet.

List.....$16.75

PLATE 4387-A

Douglas Vitreous China Laboratory Sink with flat rim, 10½ inches outside with integral strainer; 8 inches diameter inside, 6¾ inches deep.

List.....$8.50

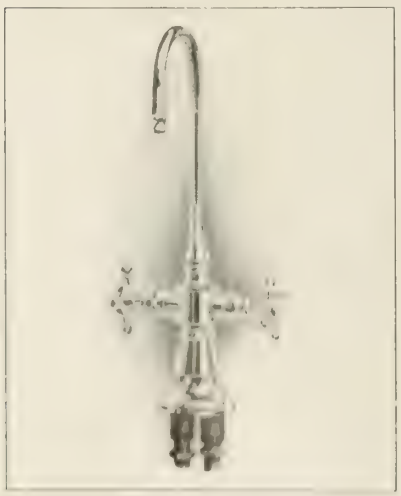

PLATE 7625-A

Douglas Nickel-plated Concentric China Indexed Connected Double Pantry Cock.

List..... $10.00

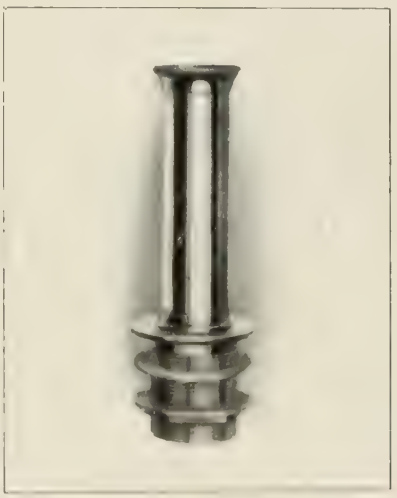

PLATE 7934-A

Nickel-plated Standing Waste and Overflow with basin connection and ground joint

For Sink, Plate 4385-A:

Height, inches	4	6	8
1¼-inch N.P. brass, each	$3.10	$3.20	$3.30

For Sinks, Plates 4376-A, 4378-A:

1¼-inch N.P. brass, each	$3.90	$4.00	$4.10

PLATE 7866-A

National 1½-inch Non-syphoning S Trap

Tube to floor and flange.

7866-A	List, 1½-inch "S"	$12.00
7867-A	List, 1½-inch "P"	12.50
7868-A	List, 2-inch "S"	16.50
7869-A	List, 2-inch "P"	17.50

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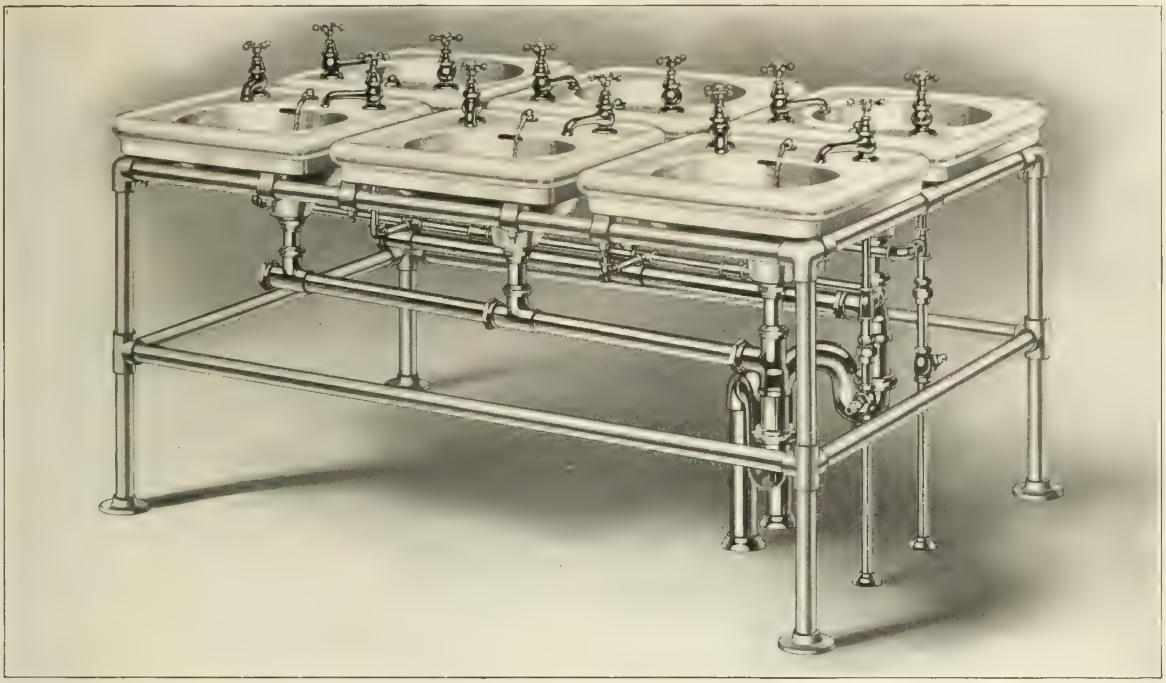

PLATE 4430-A

Battery of "Atlas" Douglas Vitreous China all roll Rim Lavatories, with sanitary open overflow; galvanized iron reinforced supporting frame, nickel-plated chain stays, chains, basin connection and rubber stoppers; nickel-plated continuous waste, with "Sterling" unvented S trap; nickel-plated China indexed compression basin cocks, with nickel-plated iron-pipe size continuous supplies, with loose-key stop valves and flanges.

	Size— 24 x 20-inch.	20 x 18-inch.
List price, battery of 4, 1 trap	$135.00	$120.00
" " " " 6, 2 traps	206.00	176.00
" " " " 8, 2 traps	260.00	225.00
" " " "10, 2 traps	315.00	275.00
" " " "12, 4 traps	382.50	337.50
" " " "14, 4 traps	440.00	387.50
" " " "16, 4 traps	500.00	440.00

If with nickel-plated China indexed compression self-closing basin cocks, add $2.00 per pair.

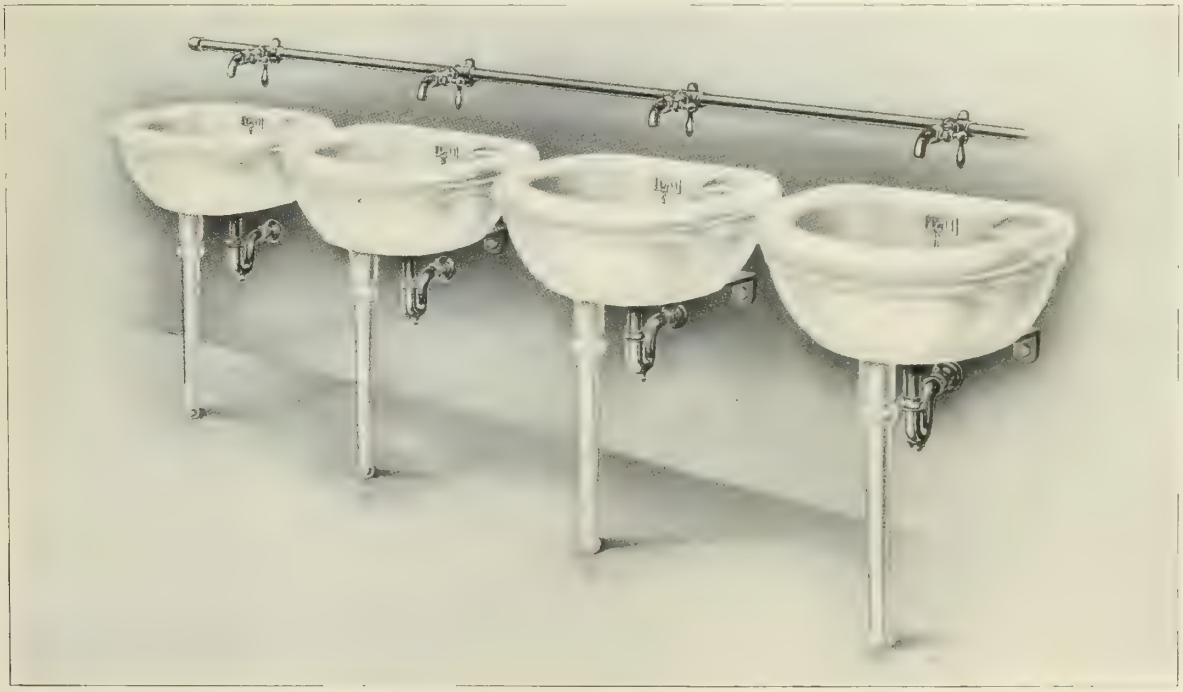

PLATE 4440-A

"Pioneer" Douglas Vitreous China all roll Rim Lavatory, with soap dish moulded in ware; galvanized iron wall support and leg; nickel-plated cast brass overflow grating, with chain and cast brass plug; 1½-inch nickel-plated cast brass "Sterling" unvented P trap with tubing to wall; one nickel-plated cast brass Fuller bibb, with one galvanized iron supply pipe fitting.

Dimensions: Length, 20⅝ inches. Width, 18½ inches. Basin, 13½ x 17 x 7 inches.

Each, list.....$28.00

Note—This price does not include supply pipe.

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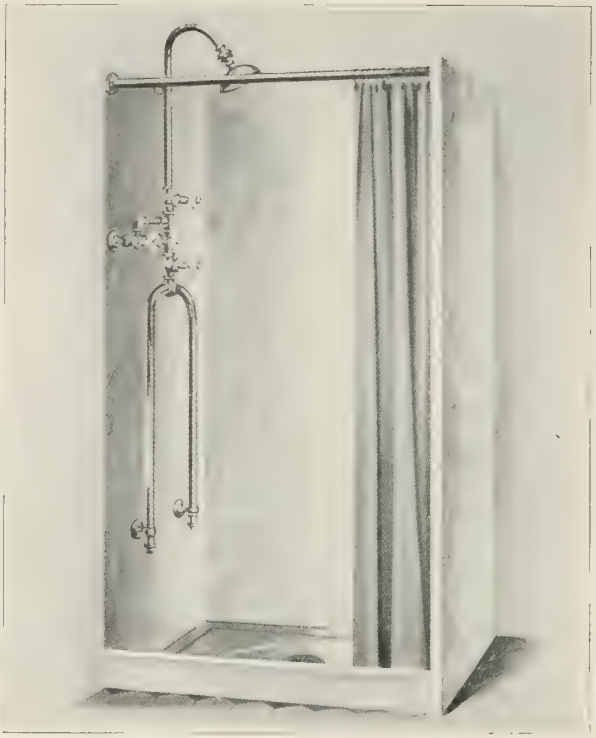

PLATE 4783-A

Douglas Nickel-plated Combination Shower and Needle Bath, with 6-inch rain shower head with removable face, air-valve, adjustable ball joint and gooseneck mixing-column with support; china-indexed cross handle control valves, with checks; supplies from wall, with flanges.

List.....$40.00

Price does not include stall nor curtain.

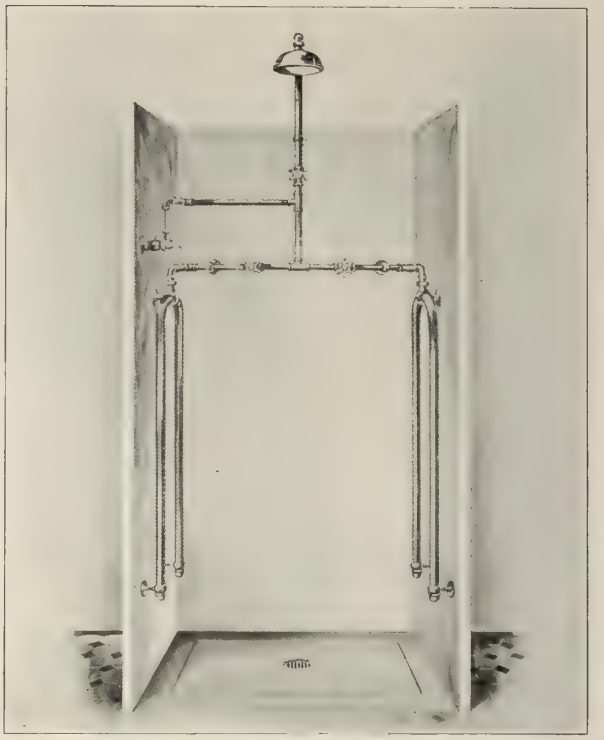

PLATE 4784-A

Douglas Nickel-plated Combination Rain Shower and Double Needle Bath, with 6-inch rain shower head with removable face, air-valve and elbow connection; double needle, with necessary connections and supports; china-indexed china cross handle control valves, with checks; supply valves placed at entrance to stall.

List.....$73.50

Price does not include stall.

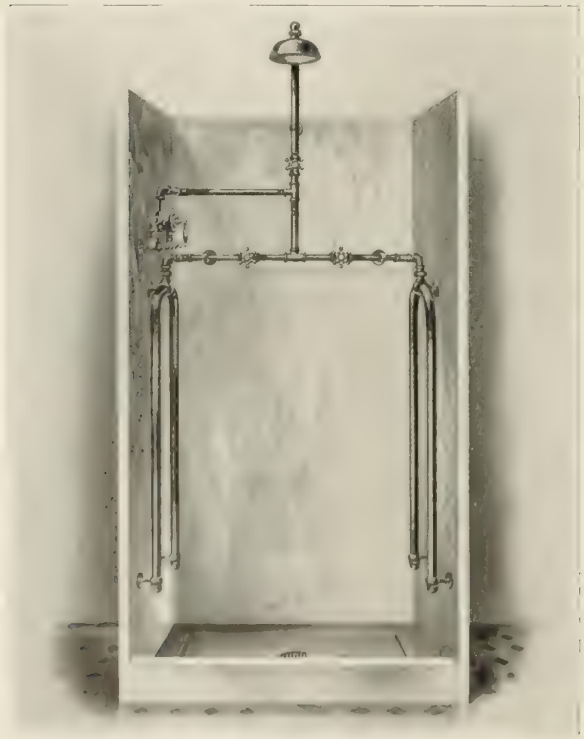

PLATE 4786-A

Douglas Nickel-plated Combination Rain Shower and Double Needle Bath, with 6-inch rain shower head with removable face, air-valve, adjustable ball joint and elbow connection to mixing-column, double needle, with necessary connections and supports, new style "Rapid" lever handle and anti-scalding mixing-valve, with concealed check valves, loose-key angle-stop valves and flanges placed near entrance to stall, connection to shower with three china-indexed control valves for each shower.

List.....$80.00

Price does not include stall.

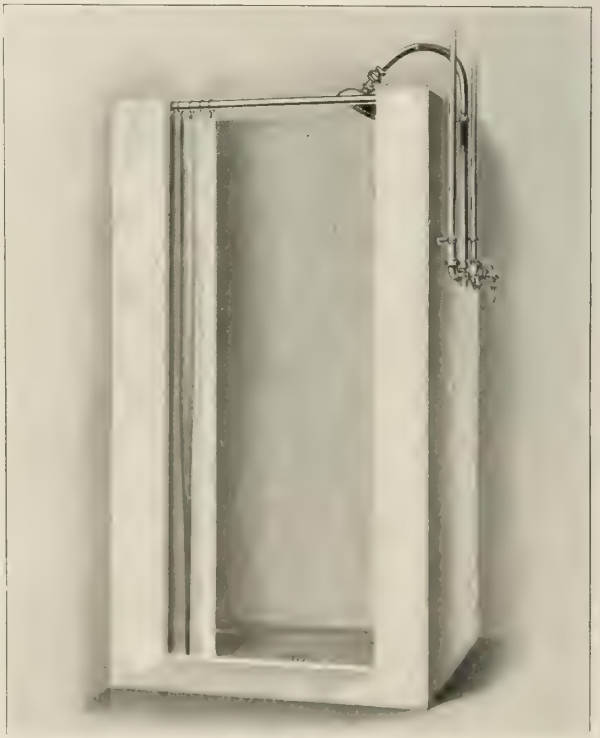

PLATE 4808-A

Douglas Nickel-plated Shower, 6-inch rain shower head, with removable face, air-valve, adjustable ball joint, and gooseneck mixing-column, with support, "Rapid" lever handle anti-scalding mixing-valve, with concealed check valves; ½-inch iron-pipe size supplies, 4 feet long toward ceiling, with support.

List.....$29.00

Price does not include stall nor curtain.

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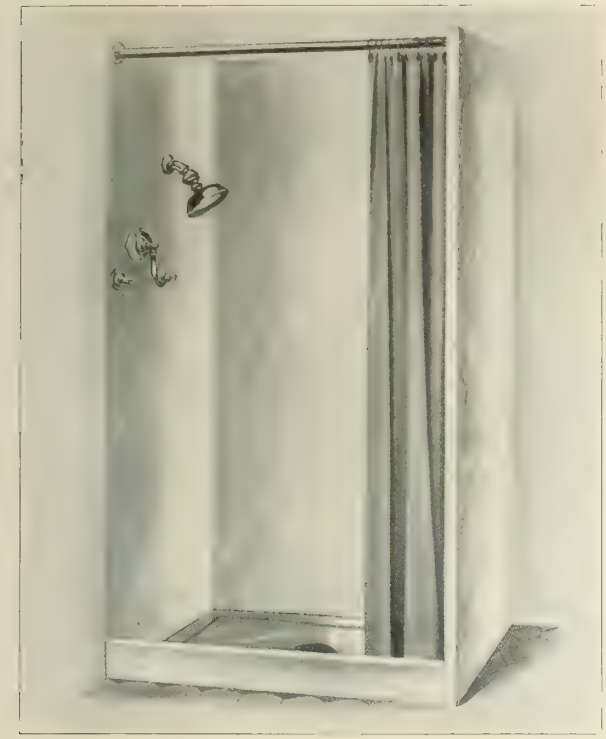

PLATE 4810-A

Douglas Nickel-plated Shower, with 6-inch rain shower head with removable face, air-valve, adjustable ball joint, and nipple to wall with flange; rough brass connection to concealed new style "Rapid" lever-handle anti-scalding valve, with checks and stop valves; nickel-plated lever and face plate.

List.....$25.00

Price does not include stall nor curtain.

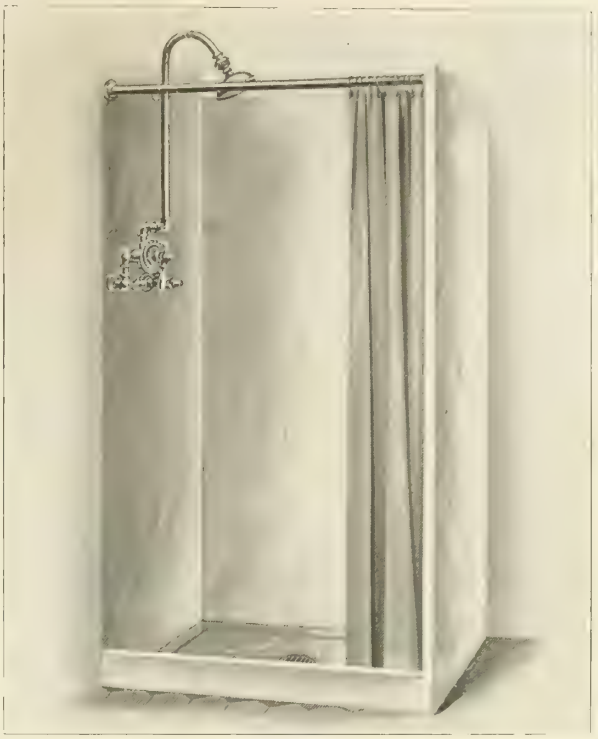

PLATE 4812-A

Douglas Nickel-plated Shower, with 5-inch rain shower head with removable face, air-valve, adjustable ball joint, and gooseneck mixing column with support, less offset; "Rapid" lever handle anti-scalding mixing valve, with concealed check valves, angle stop valves and flanges.

List.....$30.00

Price does not include stall nor curtain.

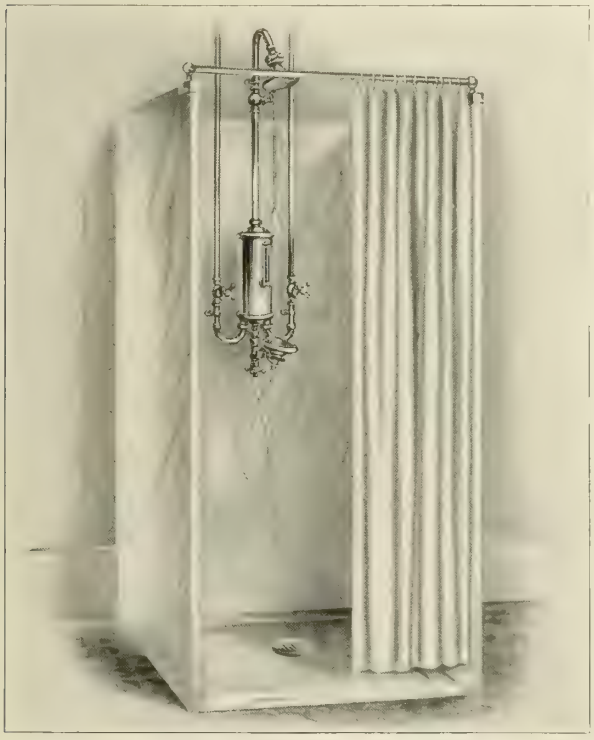

PLATE 4835-A

Douglas Nickel-plated Shower, with 4½-inch cast brass beveled split shower head, removable face, air-valve and adjustable ball joint; ¾-inch iron-pipe size brass gooseneck mixing-column, support and self-closing shower valve; chain and china pull; extra heavy 4½-inch brass mixing chamber and thermometer; rubber-bound champoo sprinkler, rubber hose, holder and stop valve with china index marked "Shampoo"; two china indexed controlling valves marked "Hot" and "Cold"; ½-inch iron-pipe size brass overhead supply piped four feet long, with supports.

Price, as described.....$43.50

Price does not include stall nor curtain.

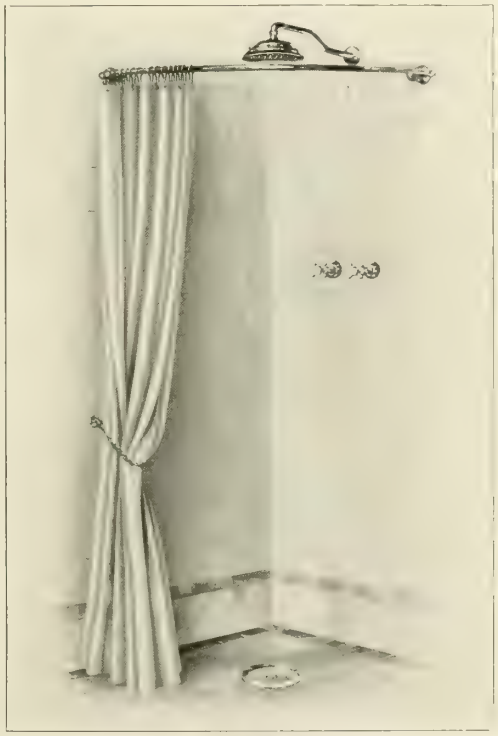

PLATE 4755-A

Douglas Nickel-plated 7½-inch Tubular Shower Head; supply from wall with flange; concealed control valves, with nickel-plated china-indexed handles on face of wall; rough brass connection to head supply, less concealed supply pipes; nickel-plated curtain rod with flanged supports, white duck curtain, hook and chain.

List.....$28.00

Continued

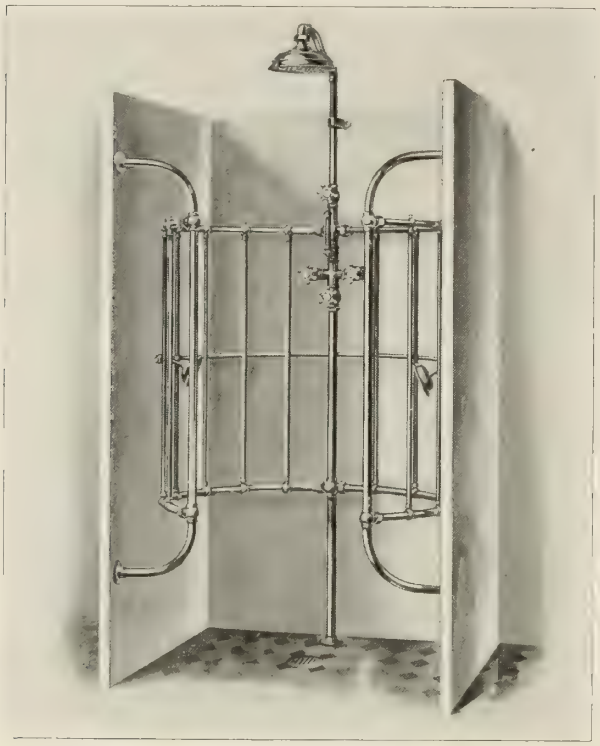

PLATE 4759-A

Douglas Heavy Nickel-plated Combined Tubular Shower; Vertical Needle and Liver Spray Bath; thermometer; China-indexed control valves.

Head, 10½ inches; diameter, 42 inches; height, 7 feet 6 inches.

List.....$275.00

For baths of this type supplies should be large enough, and pressure at least 20 pounds, to insure proper results. Price does not include stall.

PLATE 4761-A

Douglas Heavy Nickel-plated Combined Shower and Horizontal Needle Bath, with clearout caps, China cross handle control valves, and supplies to door on outside of stall.

Head, 8 inches; diameter, 30 inches; height, 7 feet 6 inches.

List.....$145.00

Price does not include stall.

For baths of this type supplies should be large enough, and pressure at least 20 pounds, to insure proper results.

PLATE 4760-A

Douglas Nickel-plated Combination Tubular Shower; Needle and Liver Sprays; white duck curtain; China-indexed control valves.

Head, 10½ inches; diameter, 36 inches; height, 7 feet 6 inches.

List.....$180.00

For baths of this type supplies should be large enough, and pressure at least 20 pounds, to insure proper results.

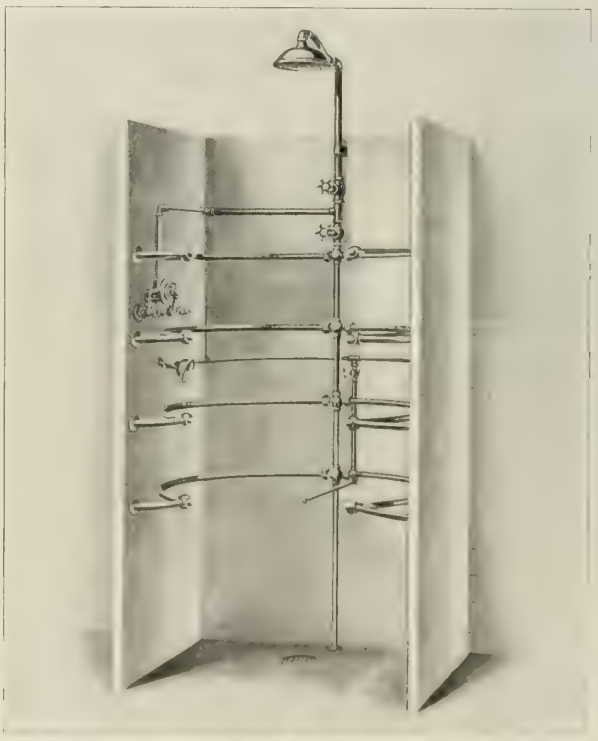

PLATE 4763-A

Douglas Heavy Nickel-plated Combined Shower; Horizontal Needle, Liver Spray, and Folding Bidet; "Rapid" lever handle, anti-scalding mixing valve, with concealed check valves, loose-key angle stop valves and flanges; china-indexed control valves.

Head, 10 inches; diameter, 36 inches, height, 7 feet 6 inches.

List.....$225.00

For baths of this type supplies should be large enough, and pressure at least 20 pounds, to insure proper results. The ends of the needles have removable caps for convenience in cleaning needle tubes. Price does not include stall.

Continued on next page

PLATE 4821-A

Douglas Nickel-plated Shower, with perforated ring shower; ½-inch iron-pipe size mixing column, with China-indexed control valve and support; "Rapid" lever handle anti-scalding mixing valve, with concealed check valves, ½-inch iron-pipe size supplies from floor, with supports and flanges; rubber-bound shampoo sprinkler; rubber hose, holder and China indexed control valve.

List.....$39.75

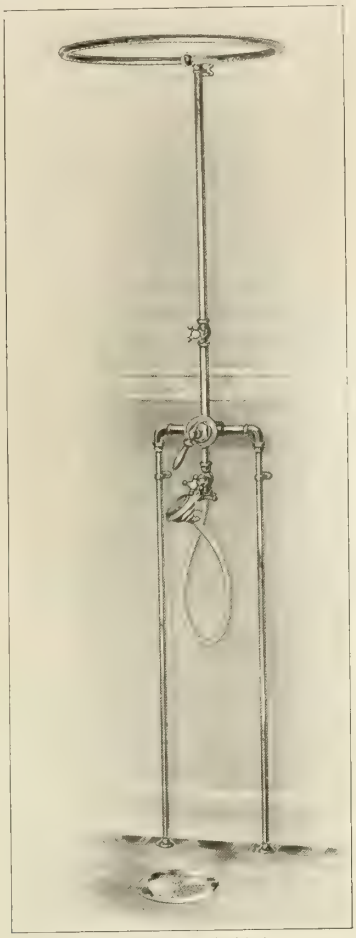

PLATE 4821-A

PLATE 4823-A

Douglas Nickel-plated Brass Shower, with perforated ring shower; ½-inch iron-pipe size mixing column, with China-indexed stop valve marked "Shower"; two China-indexed controlling valves marked "Hot" and "Cold"; ½-inch iron-pipe size supply pipes to floor, with supports and flanges; rubber-bound shampoo sprinkler, rubber hose and shampoo holder, China-indexed control valve marked "Shampoo."

List, as described.....$33.50

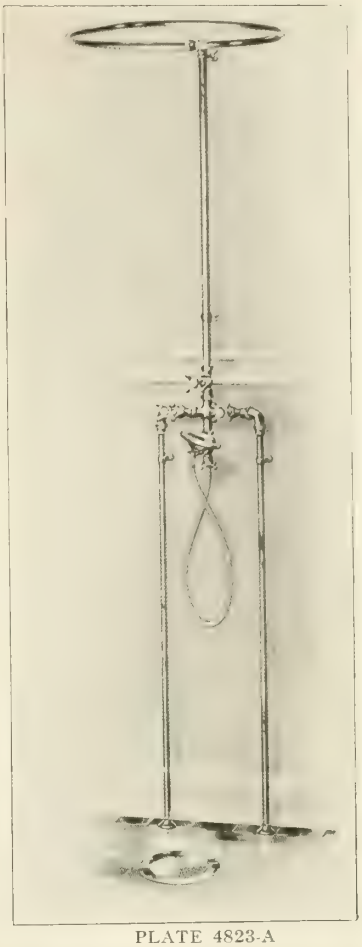

PLATE 4823-A

PLATE 4847-A

Douglas Nickel-plated Brass Shower, with 8-inch brass tubular shower head; ½-inch iron-pipe size supply pipe for cold water only, with support and flange; ½-inch iron-pipe size compression controlling valve, with China index marked "Cold."

List, as described.....$13.50

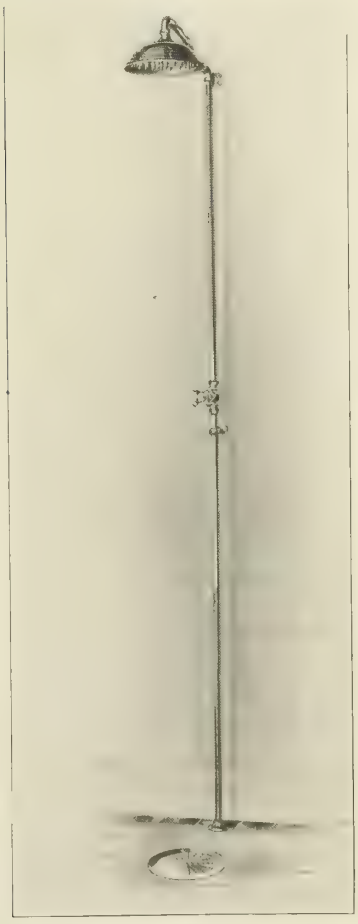

PLATE 4847-A

PLATE 4851-A

Douglas Nickel-plated Brass Shower, with cast brass 6-inch rain shower head, detachable face, air-valve, and adjustable ball joint; ½-inch iron-pipe size gooseneck mixing column and support; two China-indexed compression controlling valves marked "Hot" and "Cold"; ½-inch iron-pipe size supply pipes to floor, with supports and flanges.

List, as described.....$24.00

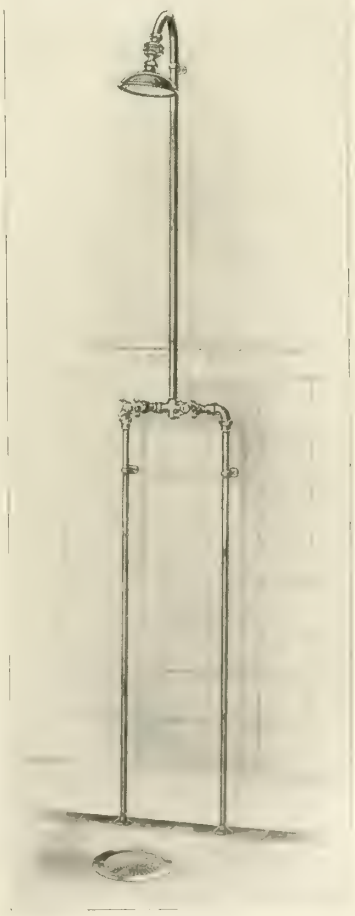

PLATE 4851-A

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PLATE 4776-A

Douglas Nickel-plated Combined Rain Shower and Spinal Bath; supplies from wall and China-indexed control valves.

List.....$75.00

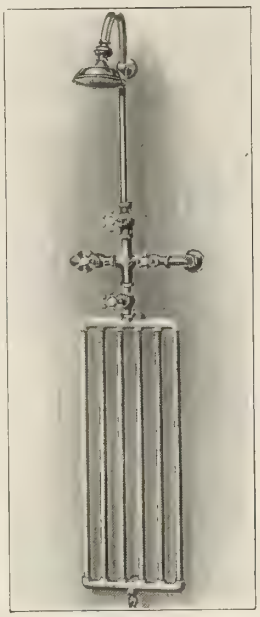

PLATE 4776-A

PLATE 4827-A

Douglas Nickel-plated Brass Shower, with 9-inch tubular shower head, ¾-inch iron-pipe size mixing column, with China-indexed control valve marked "Shower"; 4½-inch extra heavy brass mixing chamber; thermometer; rubber-bound shampoo sprinkler; rubber hose, holder and stop valve, with China index marked "Shampoo"; two China-indexed controlling valves marked "Hot" and "Cold"; check valves; ½-inch iron-pipe size brass overhead supply pipes 4 feet long, with supports.

List as described.....$47.50

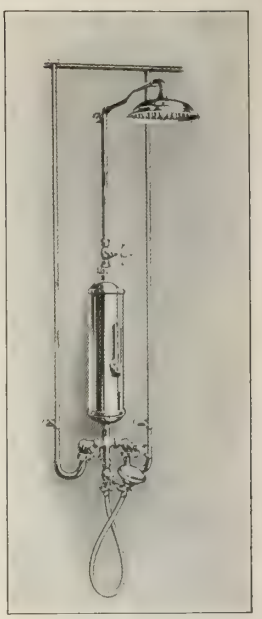

PLATE 4827-A

PLATE 4801-A

Douglas Nickel-plated Shower, with 5-inch rain shower head with removable face, air-valve, adjustable ball joint and gooseneck mixing column with support; "Rapid" lever handle anti-scalding mixing valve, with concealed check valves; ½-inch iron-pipe size supplies, 4 feet long toward ceiling or to floor, with loose-key stop valves and supports.

List.....$35.00

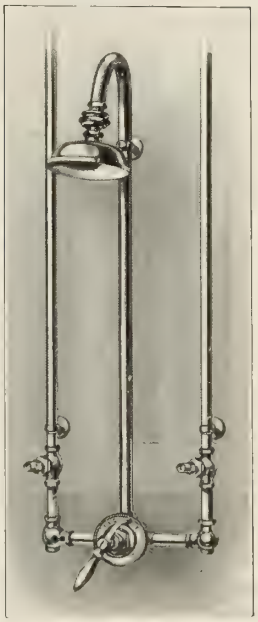

PLATE 4801-A

PLATE 4807-A

Douglas Nickel-plated Shower, with 4½-inch cast bevel split shower head with removable face, adjustable ball joint and gooseneck mixing column with support; "Rapid" lever handle anti-scalding mixing valve, with concealed check valves; ½-inch iron-pipe size supplies, 4 feet long to ceiling, with stop cocks and supports.

List.....$32.50

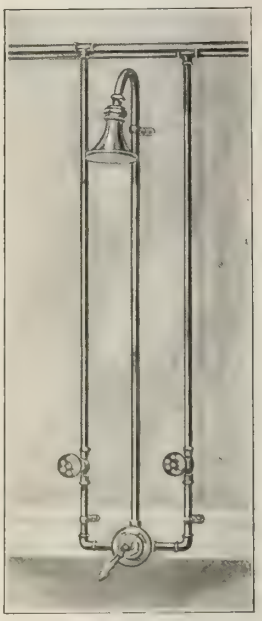

PLATE 4807-A

PLATE 4814-A

Douglas Nickel-plated Shower, with 6-inch rain shower head with removable face, air-valve, adjustable ball joint, and gooseneck mixing column with two supports; "Rapid" lever handle anti-scalding mixing valve, with concealed check valves and elbow connections to wall, with flanges.

List.....$27.50

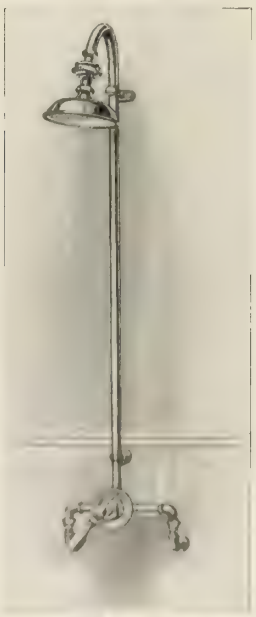

PLATE 4814-A

PLATE 4825-A

Douglas Nickel-plated Shower, with 8 x 2½-inch oblong rain shower head with removable face and adjustable ball joint and gooseneck mixing column and support; thermometer; "St. Peter" mixing valve; China-indexed control and valves; supplies from wall, and flanges.

List.....$35.00

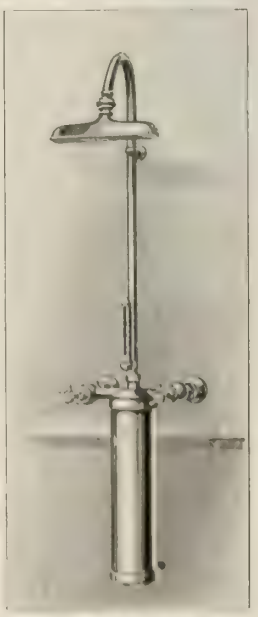

PLATE 4825-A

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PLATE 4809-A

Douglas Nickel-plated Shower, with 6-inch rain shower head with removable face, air-valve and adjustable ball joint; elbow connection to wall; concealed connection to "Rapid" lever handle anti-scalding mixing valve concealed in wall, with concealed check valves; lever handle and face plate heavily nickel-plated.

List.....$23.00

PLATE 4809-A

PLATE 4845-A

PLATE 4846-A

Douglas Nickel-plated 9-inch Tubular Shower Head; supply from wall, with self-closing chain, and ring valve and wall flange.

List...$13.50

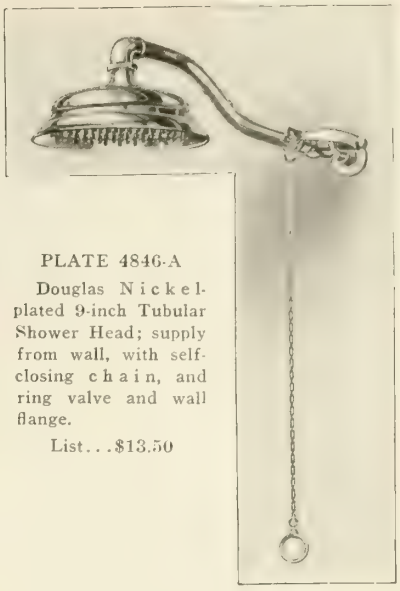

PLATE 4846-A

PLATE 4867-A

Douglas Rubber-bound Nickel-plated Brass Shampoo Sprinkler, with rubber hose; shampoo holder with stop valve; cast brass soap cup; support and two controlling valves with China name plates marked "Hot" and "Cold"; supplies to wall, with union joints and flanges.

List as described, including soap cup.....$12.50

PLATE 4867-A

PLATE 4845-A

Douglas 6-inch Nickel-plated Rain Shower Head, with removable face and air-valve; with supply from ceiling, with flange; self-closing valve, with chain and ring pull.

List.....$11.00

PLATE 4872-A

Douglas Nickel-plated Shampoo Mixer, with rubber-bound shampoo sprinkler, rubber hose, hook, China-indexed control and "Rapid" lever handle anti-scalding mixing valve; concealed check valves; supplies from wall, and flanges.

List.....$18.50

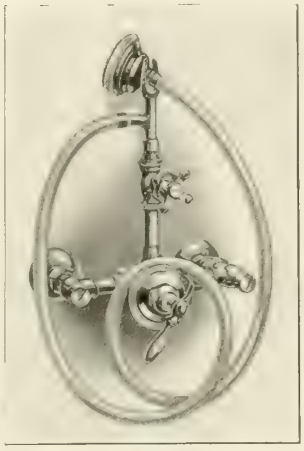

PLATE 4872-A

PLATE 4751-A

Douglas Nickel-plated Combination Corner Shower and Needle Bath, with 5-inch rain shower head, adjustable ball joint, and gooseneck mixing column with support and China-indexed control valve; "Rapid" lever handle; anti-scalding mixing valve, with concealed check valves; supplies from wall with flanges; three vertical needle showers, with China-indexed control valve, connections and supports.

List.....$52.50

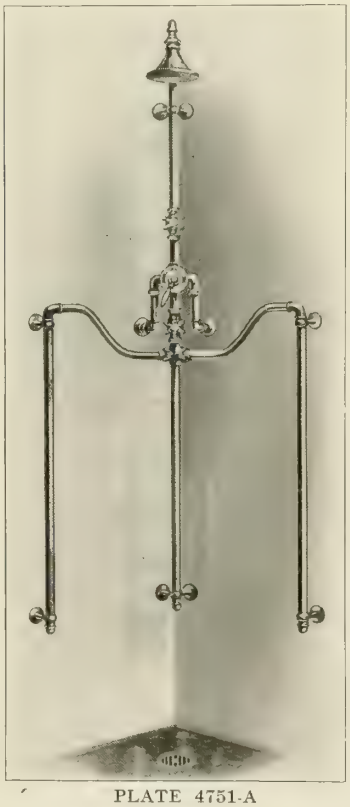

PLATE 4751-A

PLATE 4871-A

Douglas Rubber-bound Nickel-plated Brass Shampoo Sprinkler, with rubber hose; shampoo holder with stop valve; cast brass soap cup and support; two controlling valves with China name plates marked "Hot" and "Cold"; ½-inch iron-pipe size supplies to floor, with union joints, supports and flanges.

List as described, including soap cup.$19.50

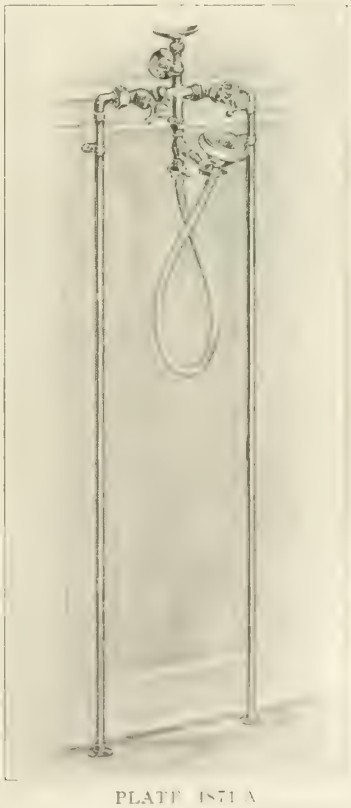

PLATE 4871-A

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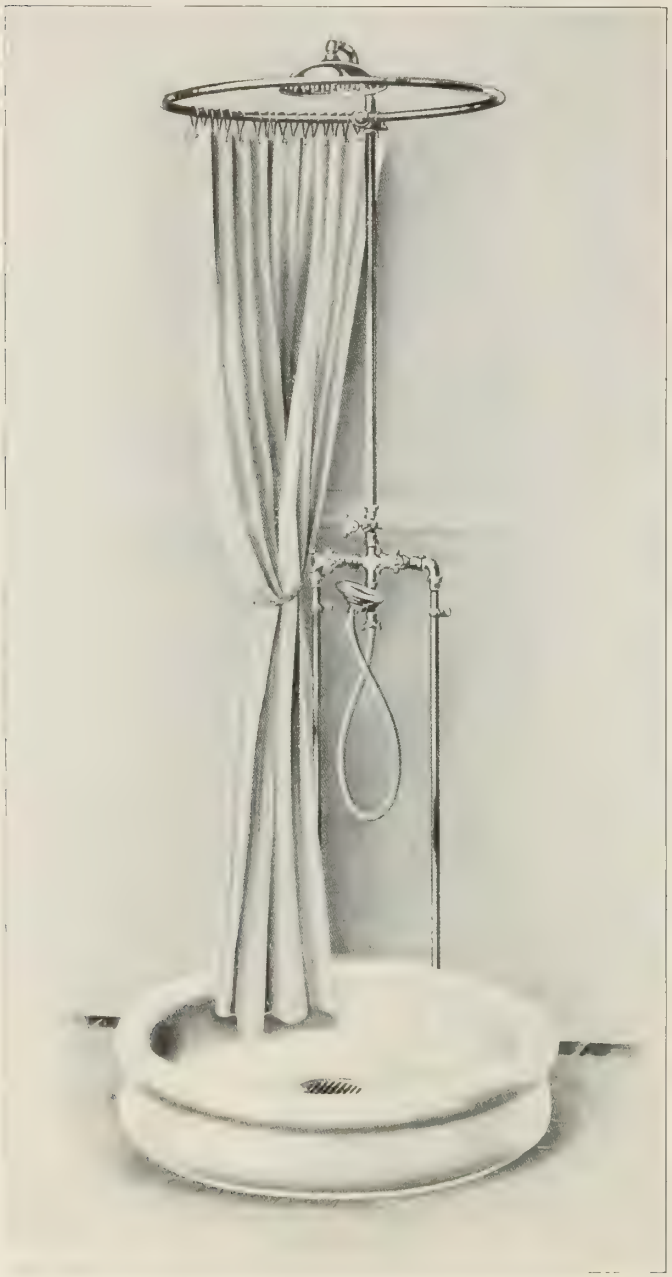

PLATE 4815-A

Douglas Nickel-plated Brass Shower, with 8-inch tubular shower head; ½-inch iron-pipe size mixing column, with china indexed control valve marked "Shower"; two china indexed controlling valves marked "Hot" and "Cold"; ½-inch iron-pipe size supply pipes to floor, with supports and flanges; curtain ring with white duck curtain, hook and chain; rubber-bound shampoo sprinkler; rubber hose and shampoo holder with china indexed control valve marked "Shampoo."

List, as described....$40.00

Price does not include receptor. Receptor prices on application.

If with ¾-inch iron-pipe size brass mixing column with stop valve, add	$1.00
Deduct, without shampoo	4.25
Add, for rubber curtain	4.50
Deduct, if without white duck curtain and nickel-plated curtain ring	$12.00
Add for cast brass floor drain	10.00
Add for floor drain, galvanized cast iron body	8.00

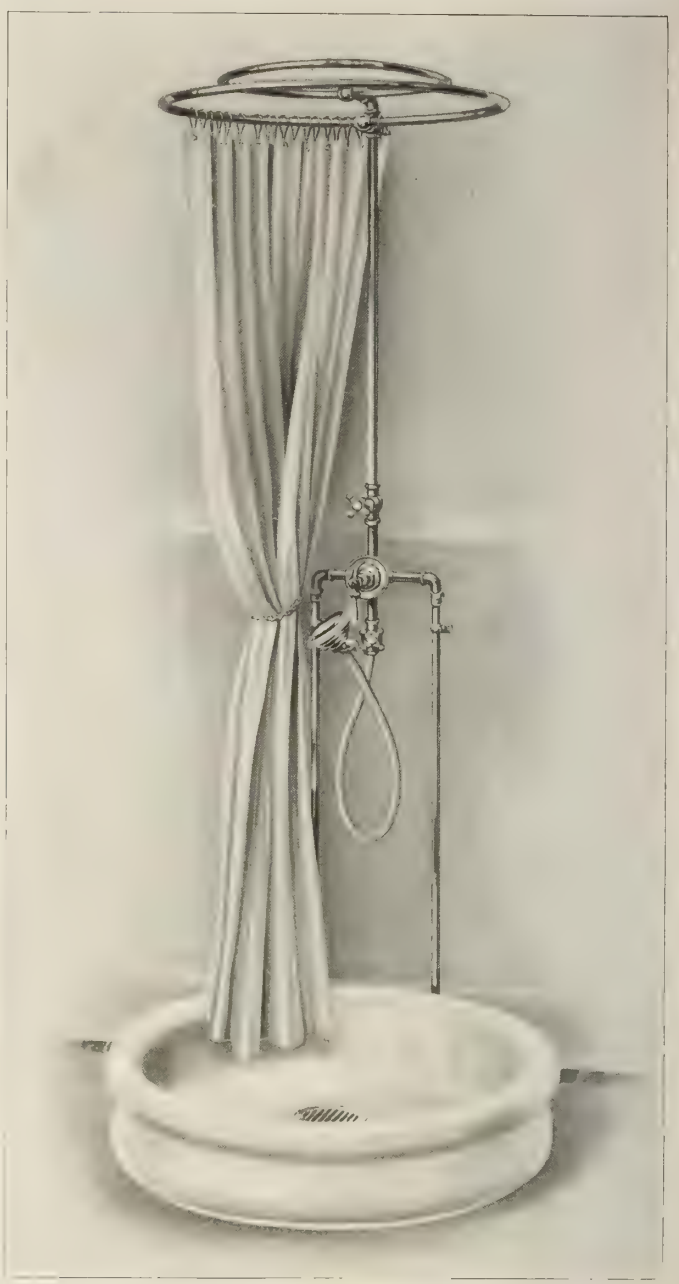

PLATE 4817-A

Douglas Nickel-plated Shower, with perforated ring shower, curtain ring with white duck curtain, chain and wall hook; rubber-bound shampoo sprinkler, with rubber hose, china indexed-control and wall hook; mixing column with support and china-indexed control valve; "Rapid" lever handle anti-scalding mixing valve, with concealed check valves and ½-inch iron-pipe supplies from floor, with supports and flanges.

List, as described....$50.00

Price does not include receptor. Receptor prices on application.

If with ¾-inch iron-pipe size brass mixing column with stop valve, add	$1.00
Deduct, without shampoo	4.25
Add, for rubber curtain	4.50
Deduct, if without white duck curtain and nickel-plated curtain ring	$12.00
Add for cast brass floor drain	10.00
Add for floor drain, galvanized cast iron body	8.00

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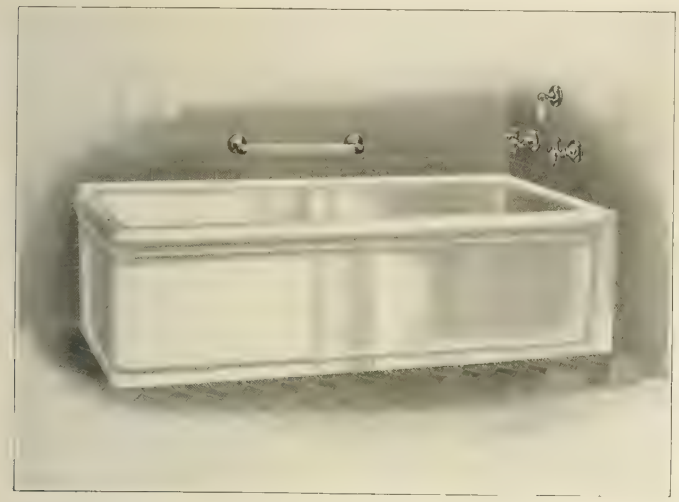

PLATE 5027-A

"Amboy" Modern Porcelain Light-Weight Corner Bath; 5 feet; for right- or left-hand corner; glazed over all exposed parts; "Victor" combination compression china-indexed concealed supply and waste fitting, less concealed supplies; exposed parts heavily nickel-plated.

List..... $90.00
Same, 5′ 6″ long, List... 97.50

PLATE 5028-A

"Amboy" Modern Porcelain Light-Weight Corner Bath; 5 feet; for right- or left-hand corner; glazed over all exposed parts; "Eclipse" nickel-plated china-indexed combination compression top nozzle supply and standing waste fitting, with ½-inch iron-pipe size supplies from floor with flanges.

List..... $92.50
Same, 5′ 6″ long, List.... 100.00

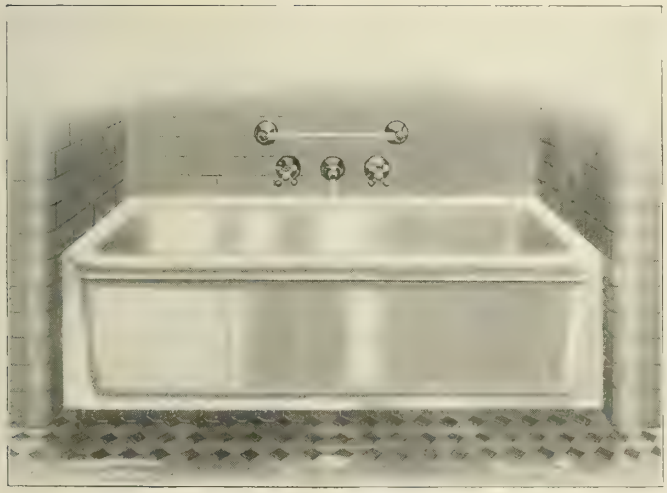

PLATE 5038-A

"Walton" 5′ 0″ Modern Porcelain Light-Weight Recessed Bath glazed over all exposed parts; Victor combination compression china indexed concealed supply and standing waste fitting, less concealed supplies; exposed parts heavily nickel-plated.

List..... $90.00
Same, 6′ 0″ long, List... 97.50

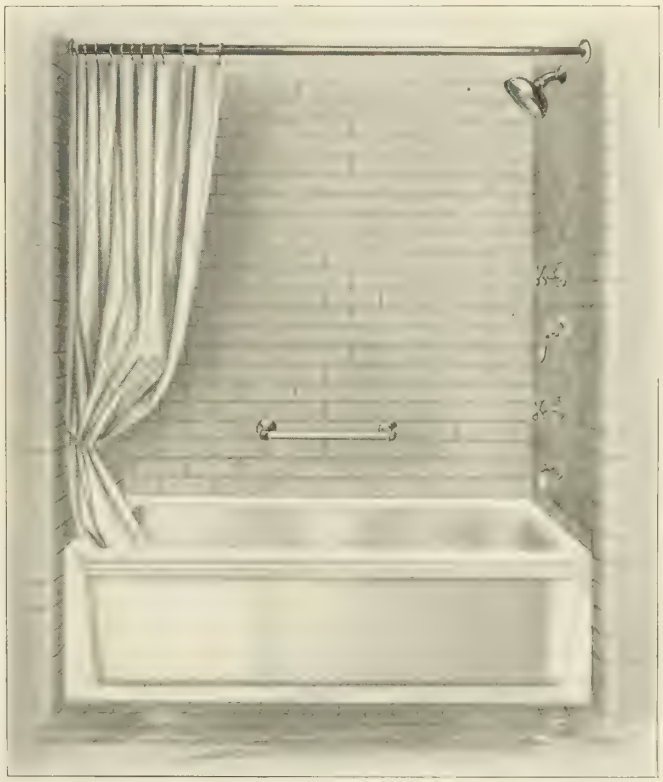

PLATE 5037-A

Walton" 5′ 0″ Modern Porcelain Light-Weight Recessed Bath glazed over all exposed parts; "Hudson" combination shower and supply fitting, concealed in wall with 6 in. rain shower head with 45° connection to wall with flange, rough brass connection with china-indexed control valve marked "Shower," to 7193-A, "Rapid" lever handle anti-scalding mixing valve with concealed check valves, less concealed supplies, but with rough brass connection, with china-indexed control marked "Bath," to gooseneck spout; concealed standing waste and overflow fitting with china handle; all exposed parts to be heavily nickel-plated.

List..... $100.00
Same, 5′ 6″ long, List.. 107.50

PLATE 5890-A

"Wyoming" Douglas Vitreous China Pedestal Drinking Fountain, with white metal bubbling spout and strainer; nickel-plated pedal self-closing valve, with loose-key stop valve; concealed brass supply and waste pipes; loose-key stop valve and rough cast brass unvented S trap to floor; nickel-plated floor bolts.

List.....$40.00

PLATE 5901-A

"Colonial" Douglas Vitreous China Pedestal Drinking Fountain; vitreous china bubbling cup with integral spout and overflow; concealed supply and waste pipes; push-button self-closing valve and loose-key stop valve through side of pedestal; rough cast brass unvented S trap; nickel-plated floor bolts.

List.....$25.50

PLATE 5902-A

"Colonial" Douglas Vitreous China Pedestal Drinking Fountain, with vitreous china bubbling cup with overflow, concealed brass supply and waste pipes, push-button self-closing valve and rough cast brass unvented S trap to floor; nickel plated floor bolts.

List.....$24.00

PLATE 5909-A

"Mackinac" Douglas Vitreous China Drinking Fountain on bronzed iron pedestal, with vitreous china bubbling cup with overflow; brass supply pipe, with nickel-plated loose-key stop valve; rough brass union for waste outlet threaded female for 1-inch iron pipe.

List.....$23.00

Continued on next page

PLATE 5915-A

"Yosemite" Douglas Vitreous China Wall Drinking Fountain, 18 x 14 inches with 10-inch integral back and integral trap, concealed outlet connection and cleanout plug; concealed wall hangers; nickel-plated cast brass "Pusho" self-closing drinking nozzle; nickel-plated iron-pipe size supply to wall, with loose-key stop valve and flange; nickel-plated heavy pattern push-button ice water flanged bibb.

List.....$42.80

PLATE 5916-A

"Yosemite" Douglas Vitreous China Wall Drinking Fountain, 18 x 14 inches with 10-inch integral back and with integral Vitreous China Trap and concealed outlet connection; concealed wall hangers; nickel-plated cast brass "Aqua Pura" self-closing drinking nozzle, with strainer; nickel-plated iron-pipe size supply pipe to wall, with loose-key stop valve and flange.

List.....$36.50

PLATE 5918-A

"Yosemite" Douglas Vitreous China Wall Drinking Fountain, 18 x 14 inches with 10-inch integral back and with integral Vitreous China trap and concealed outlet connection; concealed wall hangers; Vitreous China bubbling cup, with overflow; nickel-plated iron-pipe size supply to wall, with loose-key stop valve and flange.

List.....$32.00

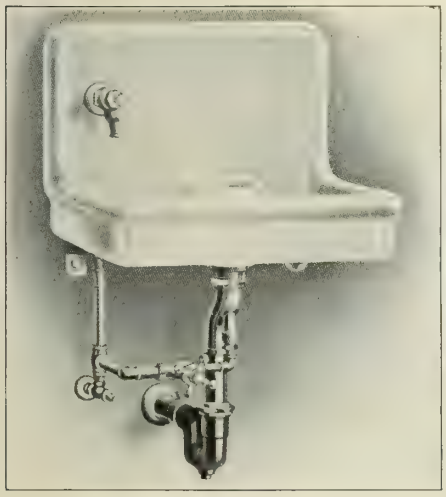

PLATE 5926-A

"Baltic" Douglas Vitreous China Wall Type Drinking Fountain; size, 18 x 14 inches, with 10-inch integral back; malleable iron concealed hanger; nickel-plated cast brass angle supports; "Pacific" Vitreous China Bubbling Cup, with integral spout and strainer; nickel-plated cast brass offset outlet connection to nickel-plated cast brass 1½-inch sterling unvented P trap to wall, with tube and flange; nickel-plated loose-key angle stop valve and wall flange, with connections to nickel-plated push-button self-closing bibb and to bubbler with self-closing valve.

List.....$38.50

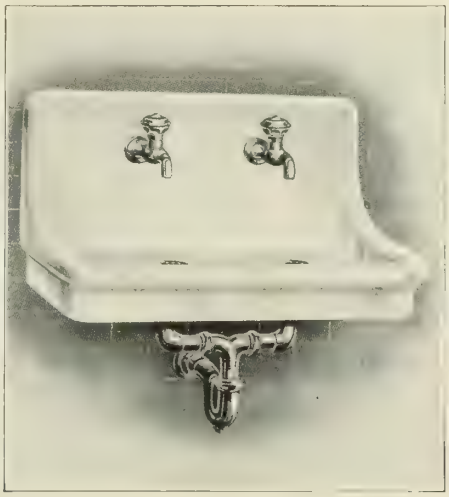

PLATE 5965-A

"Gotham" Douglas Vitreous China Double Drinking Fountain; size 30 x 12 inches, with 10-inch integral back; concealed malleable iron brackets; nickel-plated cast brass strainers; basin connections; elbows and two-way connection to 1½-inch nickel-plated cast brass unvented sterling P trap, with tube to wall and flange; two nickel-plated crown handle self-closing flanged bibbs threaded for iron pipe.

List.....$42.50

PLATE 5966-A

"Gotham" Douglas Vitreous China Drinking Fountain, 30 x 12 inches, with 10-inch integral back; concealed malleable iron brackets; nickel-plated cast brass strainers, basin connections, elbows and two-way connection to Sterling 1½-inch unvented "P" trap, with tube to wall and flange; self-closing flanged bibb and two "Arctic" self-closing bubbling bibbs, less traps, with Vitreous China Bubbling Cups with integral spouts.

List.....$55.00

Continued on next page

PLATE 5927-A

"Phoenix" Douglas Vitreous China all roll rim Wall Type Drinking Fountain, with integral trap and concealed outlet; cast brass outlet connection and bolts; nickel-plated supporting bolts and washers; nickel-plated strainer; "Simplon" nickel-plated push-button self-closing drinking bibb, with Vitreous China Bubbling Cup with integral spout.

List.....$17.25

PLATE 5928-A

"Phoenix" Douglas Vitreous China all roll rim Wall Type Drinking Fountain, with integral trap and concealed outlet; cast brass outlet connection and bolts; nickel-plated supporting bolts and washers; nickel-plated strainer; "Simplon" nickel-plated push-button self-closing drinking bibb with non-squirtable spout.

List.....$15.00

PLATE 5929-A

"Phoenix" Douglas Vitreous China all roll rim Wall Type Drinking Fountain, with integral trap and concealed outlet; cast brass outlet connection and bolts; nickel-plated supporting bolts and washers; nickel-plated strainer; "Simplon" nickel-plated push-button self-closing drinking bibb, with non-squirtable spout and nickel-plated cup.

List.....$15.75

PLATE 5934-A

"Phoenix" Douglas Vitreous China all roll rim Wall Type Drinking Fountain, with integral trap and concealed outlet; cast brass outlet connection and bolts; nickel-plated supporting bolts and washers; nickel-plated strainer; "Simplon" nickel-plated push-button self-closing drinking bibb, with Vitreous China bubbling cup with integral spout and extra push self-closing spout for individual cup.

List.....$18.75

PLATE 5935-A

"Phoenix" Douglas Vitreous China all roll rim Wall Type Drinking Fountain, with integral trap, cast brass outlet connection and bolts; nickel-plated supporting bolts and washers; Vitreous China Bubbling Cup, with overflow, nickel-plated iron-pipe size supply pipe to wall, with loose-key angle stop valve and flange.

List.....$15.50

PLATE 5937-A

"Phoenix" Douglas Vitreous China all roll rim Wall Type Drinking Fountain, with integral trap; cast brass outlet connection and bolts; nickel-plated supporting bolts and washers; nickel-plated cast brass "Aqua Pura" self-closing drinking nozzle, with strainer; nickel-plated iron-pipe size supply pipe to wall, with loose-key angle stop valve and flange.

List.....$21.50

Continued on next page

PLATE 5939-A

"Phoenix" Douglas Vitreous China all roll rim Wall Type Drinking Fountain, with integral trap and concealed outlet; cast brass outlet connection and bolts; nickel-plated supporting bolts and washers; Vitreous China Bubbling Cup, with integral spout and overflow; nickel-plated push-button self-closing angle valve, with loose-key stop valve; supply from wall and flange.

List.....$18.00

PLATE 5963-A

"Sphinx" Douglas Vitreous China Combined Flushing Rim Lavatory and Drinking Fountain, with 4-inch back and integral Vitreous China drinking spout, sanitary open overflow and integral soap dish; nickel-plated cast brass non-removable outlet connection and strainer; two cast brass push-button self-closing valves behind partition, with push extending through partition with china indices; rough iron supporting bolts to lead into back of lavatory.

List.....$29.50

PLATE 5970-A

"Anchor" Douglas Vitreous China Wall Drinking Fountain, with integral trap; nickel-plated cast brass waste strainer and cleanout plug; cast brass outlet connection with nickel-plated bolts; crown handle self-closing flanged bibb.

List.....$27.75

PLATE 5942-A

The "Simplo" Nickel-plated Cast Brass Drinking Nozzle, with push-button, self-closing valve with regulating screw; non-squirtable spout.

Can be attached to any standard ⅜- or ½-inch iron-pipe size fitting.

List.....$3.35

PLATE 5941-A

Same as above, only with Vitreous China Bubbler.

List.....$4.35

PLATE 5945-A

"Erie" Nickel-plated Cast Brass Self-Closing Drinking Water Cock; Douglas Vitreous China Bubbling Cup, with integral bubbling spout and nickel-plated loose-key stop valve.

List.....$7.50

PLATE 5948-A

"Arctic" Douglas Vitreous China Bubbling Cup, with integral bubbling spout, nickel-plated supply from wall with flange and four-arm self-closing cock; nickel-plated waste connection with 1¼-inch nickel-plated cast brass "Star" unvented trap, with tube to wall and flange.

List..... $9.50
List, less trap..... 7.00

Continued on next page

PLATE 6001-A

"Regis" Douglas Vitreous China Kitchen Sink, with integral back and two vitreous china legs; malleable iron wall supports; nickel-plated cast brass 1½-inch unvented "Star" P trap and sink connection; nickel-plated cast brass combination compression supply valves, with china name plates marked "Hot" and "Cold," and nozzle through back of sink.

Dimensions: From wall to front of sink, 24 inches. Length of sink, 36 inches. Depth of sink inside, 7 inches. Height of integral back, 10 inches.

List	$90.00
Add for 30-inch drainboard wlith nickel-plated hinges, telescope legs and catch, list	15.00
Add for 30-inch corner drainboard with nickel-plated hinges and catch, list	10.00
Add for wood mat, list	3.50

NOTE—This sink can also be furnished 30 inches long.

List	$70.00

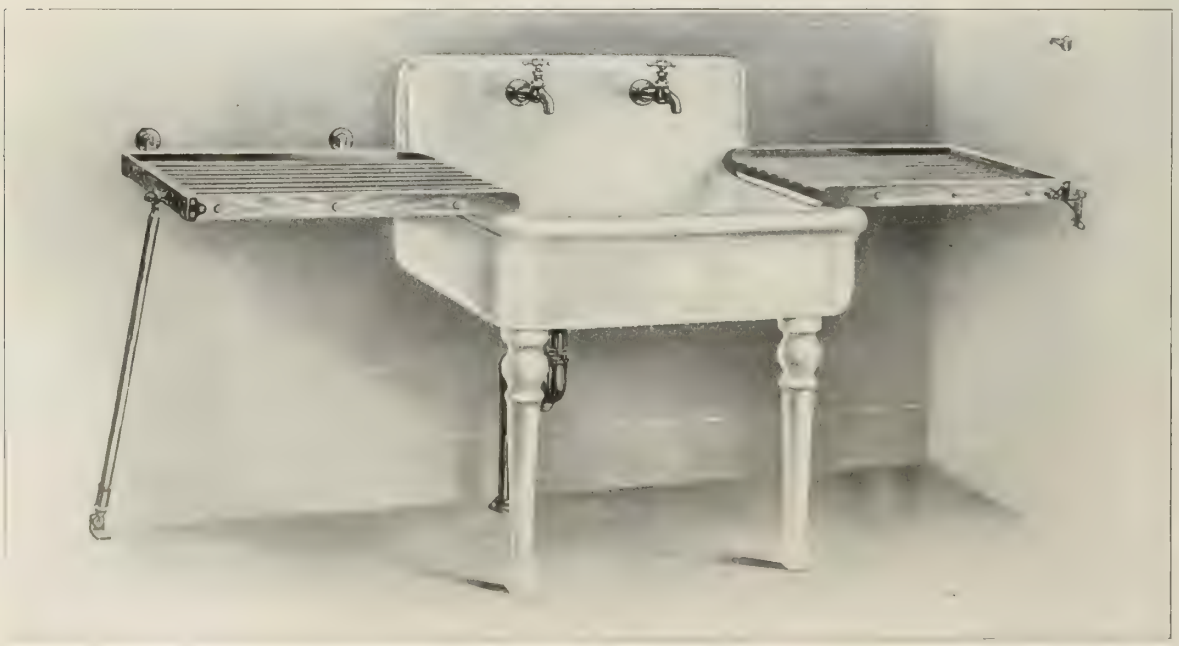

PLATE 6005-A

"Regis" Douglas Vitreous China Kitchen Sink, with integral back and vitreous china legs; malleable iron wall supports; nickel-plated cast brass 1½-inch unvented "Star" P trap and sink connection; ¾-inch nickel-plated cast brass compression bibbs, with flanges and with china name plates marked "Hot" and "Cold."

Dimensions: From wall to front of sink, 24 inches. Length of sink, 36 inches. Depth of sink inside, 7 inches. Height of integral back, 10 inches.

List, as described	$87.50
Add for 30-inch drainboard with nickel-plated hinges, telescope leg and catch, list	15.00
Add for 30-inch corner drainboard with nickel-plated hinges and catch, list	10.00
Add for wood mat, list	3.50

NOTE—This sink can also be furnished 30 inches long.

List	$67.50

Continued on next page

PLATE 6020-A

Douglas Vitreous China Workroom Sink; 18 x 14⅜ x 6 inches deep inside; 10-inch integral back—concealed wall hangers and nickel-plated cast brass angles; nickel-plated cast brass strainer and connection; "Sterling" 1¼-inch nickel-plated unvented P trap, with tube to wall, and flange; nickel-plated T handle compression flanged bibbs, threaded female for ½-inch iron pipe.

List.....$28.50

PLATE 6023-A

Douglas Vitreous China Wash Sink; 24 x 30 inches, with all roll rim; integral soap dish and sanitary open overflow; 6 inches deep on inside; supported by heavy galvanized cast-iron brackets; nickel-plated cast brass basin connection, with chain and rubber plug; "Sterling" 1½-inch nickel-plated unvented P trap tube to wall and flange; nickel-plated china indexed double compression bath cock; union connection to galvanized cast-iron flanged elbows; ½-inch galvanized supplies, with rough plated cast brass angle compression stop valves and flanges.

List.....$40.75

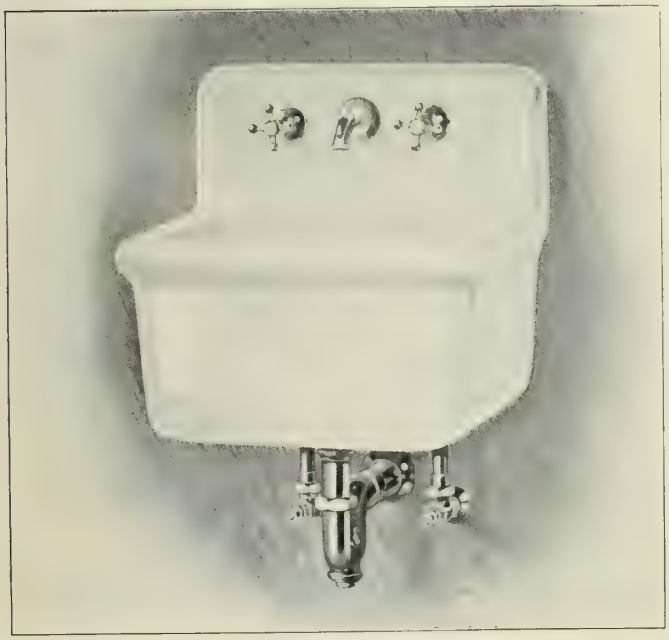

PLATE 6070-A

Douglas Vitreous China Laboratory Sink; 20 x 16 x 12 inches, 8-inch integral back, heavy malleable iron concealed brackets; concealed cast brass combination compression supply fitting, with spout and china indexed handles, heavily nickel-plated; ½-inch iron-pipe size concealed supplies, brought out directly beneath sink with flanges; elbows and union joint angle loose-key stop valves, heavily nickel-plated; nickel-plated cast brass outlet connection and removable plug; "Sterling" nickel-plated 1½-inch unvented P trap; tube to wall and flange.

List.....$39.00
List, less supplies...32.00

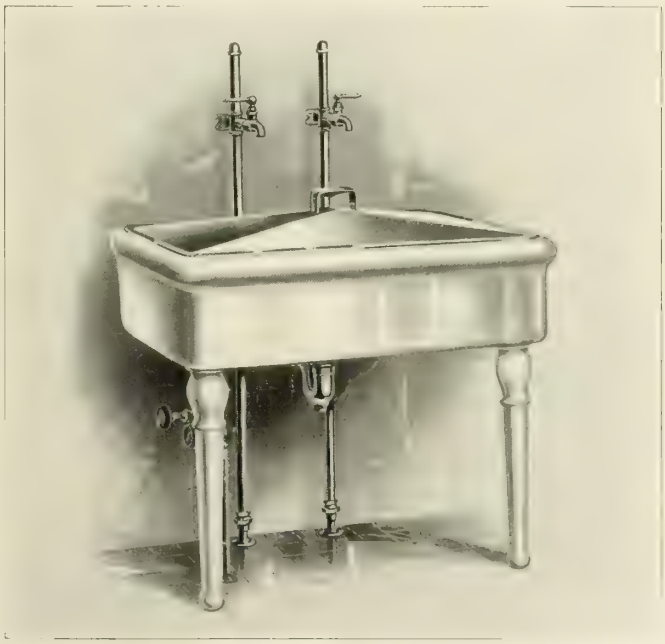

PLATE 6565-A

Modern Porcelain all roll rim Sterilizing Sink, with recess; 30 x 20 x 7 inches, nickel-plated cast brass removable standing waste overflow and sink connection; modern porcelain legs and wall connections; nickel-plated Fuller bibbs; ¾-inch iron-pipe size supplies from floor, with air-chambers, stop cocks, unions and flanges; nickel-plated steam coil with supply and return pipes to floor, with valves and flanges; tinned copper perforated tray and copper cover.

List.....$100.00
Price for other sizes on application.

Continued on next page

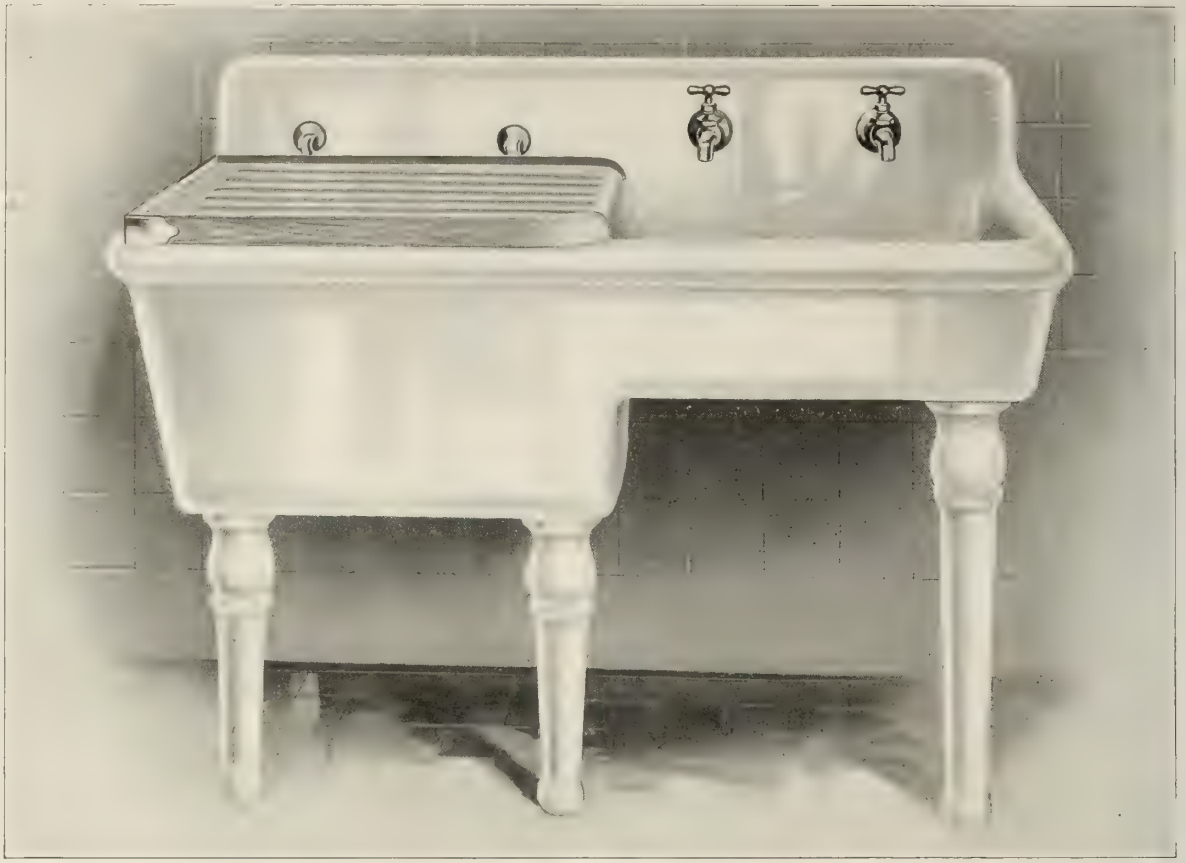

PLATE 6040-A

Modern Porcelain Combination Sink and Laundry Tray with 6-inch integral back, 48 x 24 inches outside dimensions, with three modern porcelain legs and wall supports; nickel-plated sink strainer and connection, nickel-plated tray connection with rubber plug, two nickel-plated Sterling unvented P traps with tubes to wall and flanges; nickel-plated compression bibbs for sink and tray, ash drainboard and tray cover with heavy nickel plated cast brass hinges and wall hook.

List.....$70.50

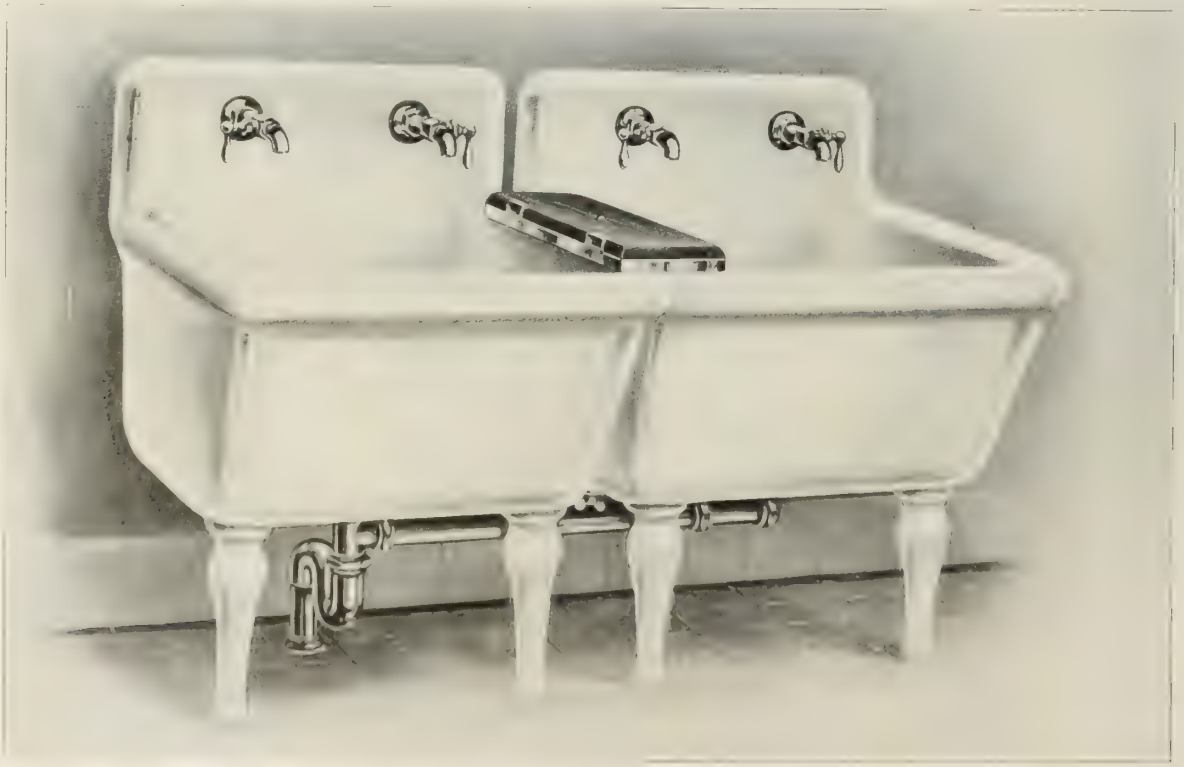

PLATE 6582 A

Type "Stellar" Double Modern Porcelain Laundry Trays, with modern porcelain legs and wall connections; nickel plated cast brass plate, combination rubber stopper, 1½-inch nickel-plated brass continuous waste, with special nickel plated 1½ inch cast brass unvented "Sterling" S trap with flanges; nickel plated ½-inch cast brass Fuller bibbs.

Dimensions: Length, 48 inches, or 6-26 inches. Width from wall to front, 24 inches. Depth, inside, 17 inches. Height of integral back, 8 inches.

Each, as described, on 24-in.	$72.50	Add for each wringer base	$4.00
Each, as described, on 27-in.	107.50	Price other sizes on application.	

Continued on next page

PLATE 6511-A

"Zenith" Douglas extra heavy Vitreous China Slop Sink, 22 x 28 inches, and 12 inches deep, with all roll rim; vitreous china 3-inch non-syphoning trap standard with cleanout plug; nickel-plated cast brass waste strainer; nickel-plated supply fixture with nickel-plated compression controlling valves, with china name plates marked "Hot" and "Cold"; nickel-plated cast brass nozzle, with pail hook and brace; nickel-plated air chambers; ¾-inch nickel-plated iron-pipe size brass supply pipes to floor, with stopcocks, unions, and cast brass flanges.

List, as described....$57.75

PLATE 6512-A

"Zenith" Douglas extra heavy Vitreous China Slop Sink, 22 x 18 inches, and 12 inches deep, with all roll rim; vitreous china 3-inch non-syphoning trap standard, with cleanout plug; nickel-plated cast brass waste strainer; ¾-inch nickel-plated cast brass compression bibbs with flanges; China name plates marked "Hot" and "Cold."

List, as described....$41.75

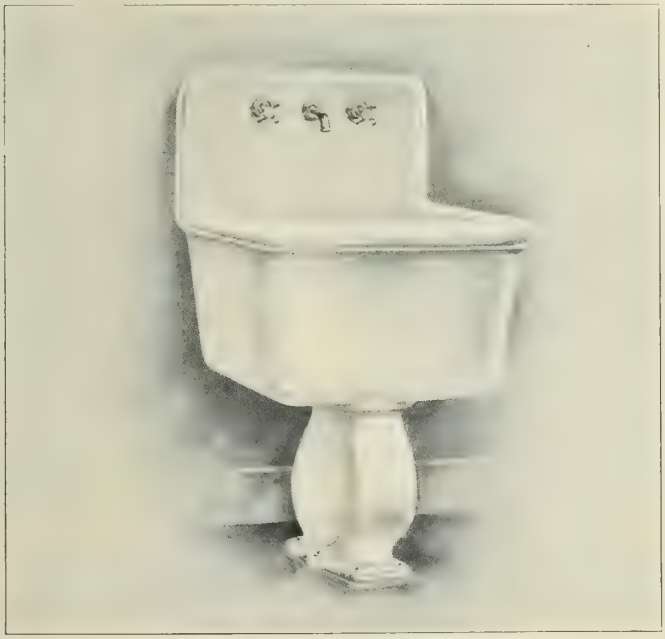

PLATE 6516-A

"Excelsior" Douglas extra heavy Vitreous China Slop Sink, 22 x 18 inches, and 12 inches deep, with roll rim and integral back 10 inches high; vitreous china 3-inch non-syphoning trap standard with cleanout plug; nickel-plated cast brass waste strainer; nickel-plated cast brass combination compression supply valves; china name plates marked "Hot" and "Cold"; nozzle through back of lavatory.

List, as described....$54.50

PLATE 6521-A

Same as above; size, 22 x 22 inches and 12 inches deep.

List..... $58.75

Same as above but with china-indexed compression bibbs. List..... 52.25

PLATE 6522-A

"Excelsior" extra heavy Douglas Vitreous China Slop Sink 22 x 22 x 12 inches, with roll rim and 10-inch integral back; Vitreous China non-syphoning trap standard, with cleanout plug; nickel-plated cast brass waste strainer and connection; combination compression supply fitting with nickel-plated spout with bucket hook and brace to back of sink and china-indexed handles; concealed ¾-inch iron-pipe size supplies brought out directly beneath sink with nickel-plated elbows, flanges and union joint loose-key angle stop valves.

List as described.....$67.50

List sink 22 x 18 inches..... 63.75

Deduct less supplies..... 7.00

Continued

PLATE 6523-A

"Norwood" Douglas Extra Heavy Vitreous China Slop Sink, with integral flushing rim and syphon jet integral trap; nickel-plated cast brass combination compression faucet, with china name plates marked "Hot" and "Cold," and with pail hook and trace on nozzle; nickel-plated cast brass wall supplies, with unions and cast brass flanges; Douglas tank, with nickel-plated cast brass angle brackets and iron top clamps, and with china pull and chain; nickel-plated 1½-inch brass flush pipe, with support. Woodwork, selected quartered oak, natural or antique finish.

Dimensions: Width, 20 inches. Length, 20 inches. Height, 20 inches. Depth inside, 10 inches.

List, as described . . $69.50

PLATE 6530-A

"Norwood" Douglas Vitreous China roll rim Slop Sink, with integral flush rim and trap with jet, complete; combination compression supply fitting, with nickel-plated spout, bucket hook and brace to wall; "Novel, Sr." push-button flush valve, with wall flange and elbow connection to spud.

List $60.00

Size 20 x 20 x 20 inches high and 10 inches deep.

PLATE 6551-A

"Highland" Douglas Vitreous China roll rim Clinic Slop Sink, mounted on vitreous china trap standard, with rubber gaskets and bolts; "Novel, Sr." "Npl." flush valve, with flange and connection to spud; combination compression supply fitting, with nickel-plated spout, bucket hook and brace to wall; china-indexed handles; combination compression control valves behind partition, with individual china-indexed control for urinal spout and bedpan spray; all parts in front of partition heavily nickel-plated.

List $80.00

Continued on next page

PLATE 6009-A

"Regent" 24 x 20-inch Douglas Vitreous China Kitchen Sink with 10-inch integral back; one Vitreous China leg, malleable iron wall supports; nickel-plated sink strainer and connection, nickel-plated cast brass "Sterling" unvented P trap, tube to wall and flange; nickel-plated china indexed ½-inch compression flanged bibbs.

List.....$49.50

Can be furnished with drain boards same as 6001-G. Standard dimension 20 x 24 inches. Can be furnished special sizes when specified.

PLATE 6545-A

Iron enameled roll rim Slop Sink with 14-inch integral back; nickel-plated strainer; iron enameled adjustable trap standard with cleanout and outlet threaded female for 2-inch iron pipe; nickel-plated china indexed compression flanged bibbs.

List Price

Size	Enameled In and Out	Inside Only
16 x 20 x 12 inches	$22.90	$18.40
18 x 22 x 12 inches	25.00	20.50
20 x 24 x 12 inches	27.50	22.50

Note—Can furnish with "S" trap standard at same price.

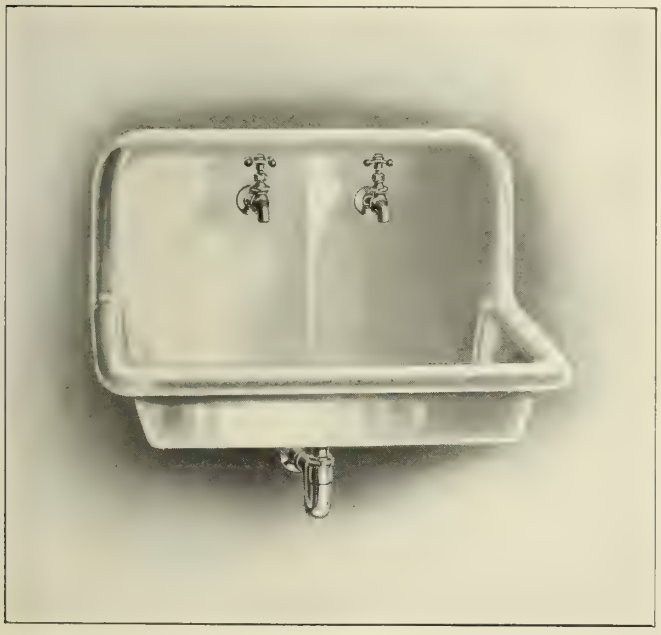

PLATE 6101-A

Enameled iron roll rim Sink with 12-inch integral back and concealed hanger; nickel-plated strainer and outlet; nickel-plated cast brass "Sterling" unvented P trap, tube to wall and flange; nickel-plated Fuller flanged bibbs.

List Size	Enameled In and Out	Inside Only
18 x 30 inches	$23.00	$17.50
20 x 24 inches	22.60	18.10
20 x 30 inches	23.80	18.25
20 x 36 inches	27.00	21.30
20 x 40 inches	31.10	24.25
22 x 30 inches	26.10	21.70
22 x 36 inches	29.00	22.60
22 x 42 inches	32.80	25.80

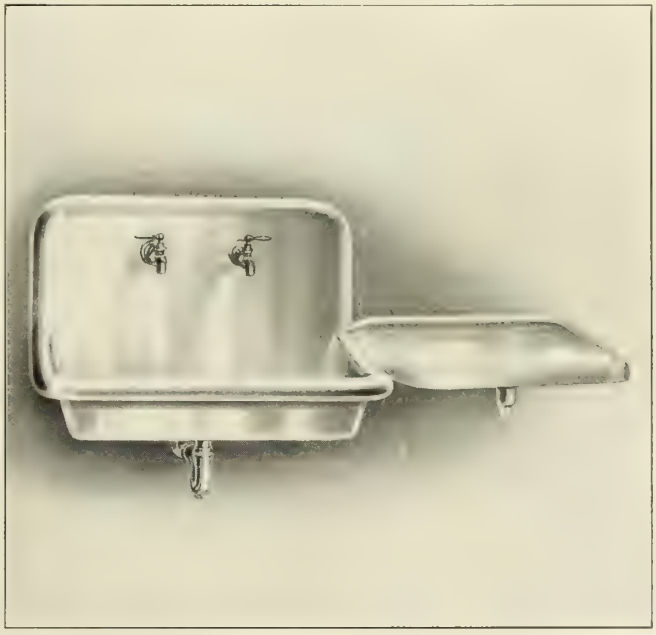

PLATE 6106-A

Enameled iron roll rim Sink with 12-inch integral back and concealed hanger, 24-inch interchangeable enameled iron drain board, with concealed iron bracket; nickel-plated strainer; nickel-plated cast brass "Sterling" unvented P trap, tube to wall and flange; nickel-plated Fuller flanged bibbs.

List Price

Size	Enameled In and Out	Inside Only
18 x 30 inches	$28.40	$23.00
20 x 24 inches	28.40	23.80
20 x 30 inches	28.80	24.00
20 x 36 inches	32.75	27.00
20 x 40 inches	36.80	30.00
22 x 30 inches	32.25	26.80
22 x 36 inches	35.00	28.70
22 x 42 inches	38.50	31.70

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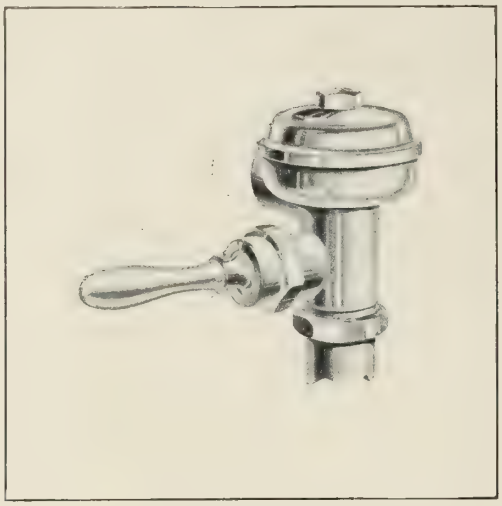

PLATE 7187-A--BUCKEYE VALVE

We recommend the use of this valve, as it is simple, durable and positive in operation. The handle can be used from any angle, as a slight movement of the handle in any direction causes the valve to flush. No rubber diaphragms to crack or wear out. Made of best red metal and workmanship.

List.....$10.75

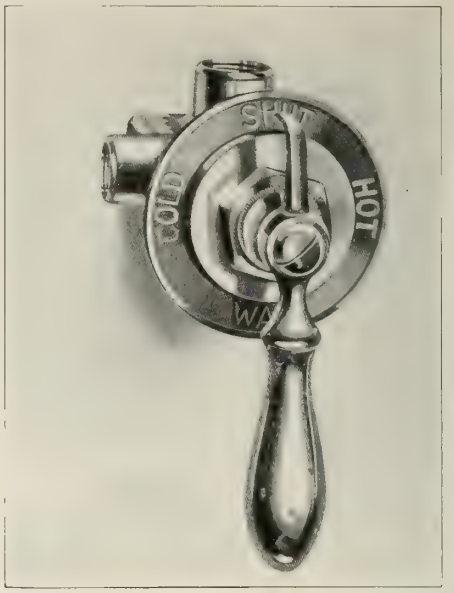

PLATE 7193-A

Rapid lever handle anti-scalding mixing valve. This valve is the simplest and best valve of this type on the market, is made of best grade of red metal and workmanship. It is free from all springs and cup leathers. Check valves are concealed type and are part of valve. There are less moving parts in this valve than any other valve on market at present time, there being nothing but plunger and stem; requires no experience to take apart and reassemble. By removing bonnet all parts can be removed as one piece from the body of valve. By this arrangement it makes the valve the best one to use as a concealed valve, as only the face plate and handle are exposed.

List.....$10.75

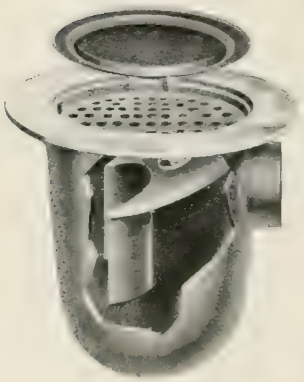

PLATE 8231-A

Combination Floor Drain and Trap with polished or nickel-plated cast brass top with hinged strainer.

Size of outlet	2 inches	3 inches
Diameter of top	9 inches	11 inches
Depth	9 inches	11 inches
List, with galvanized cast iron body	$8.00	$9.50
List, cast brass body	10.00	12.00

PLATE 8233-A

Combination Floor Drain and Trap with polished cast brass top with hinged cover and hinged strainer.

Size of outlet	2 inches	3 inches
Diameter of top	9 inches	11 inches
Depth	9 inches	11 inches
List, with galvanized cast iron body	$9.50	$14.75
List, cast brass body	11.50	18.50

PLATE [illegible]

[illegible]

List	$5.00
[illegible]	6.00

PLATE 8237-A

Nickel plated Cast Brass Floor Strainer with removable face

List, 5 inch diameter, 2 inch lead pipe outlet	$1.70
6 inch diameter, 3 inch lead pipe outlet	2.20
5 inch diameter, 2 inch iron pipe outlet	2.70
6 inch diameter, 3 inch iron pipe outlet	3.20

THOMAS MADDOCK'S SONS CO.

MANUFACTURERS OF

Vitreous China Sanitary Plumbing Fixtures

TRENTON, N. J.

Products.

A complete line of improved VITREOUS CHINA SANITARY PLUMBING FIXTURES.

(See Index, following page.)

Advantages.

"Maddock's" Vitreous China Sanitary Ware is a solid white china product, non-absorbent throughout and covered with an absolutely impervious transparent glaze, which is applied to the vitreous china ware and subjected in our kilns to so intense a heat as to chemically amalgamate all substances used, thereby assuring the most sanitary product, of the greatest consistency and durability.

Vitreous china plumbing fixtures can not become discolored through usage, and are kept clean with but ordinary attention, the glaze permanently maintaining its lustrous gloss.

Utility.

"Maddock's" White Vitreous China Sanitary Plumbing Fixtures are used in Bathrooms, Toilets, Kitchens, Pantries, Laboratories, Operating Rooms, etc. In construction they meet the requirements of all plumbing codes, and also conform in design to architectural ideas as to style and adaptability.

Official Endorsement.

"Maddock's" White Vitreous China meets the requirements of all Government, State and municipal bodies throughout the United States.

Provisions in Plans.

Complete measurements are given in connection with each illustration. Roughing-in measurements of water-closets are given on page 1012.

Distribution.

Goods are carried in stock by plumbing-supply houses in addition to those in our extensive warerooms at the pottery.

Facilities.

We have the largest Unit Sanitary Pottery Plant in the United States, with a capacity of sixteen kilns operating under a systemized management, with offices in the manufacturing plant.

The owners give personal attention to every order and shipment, no matter of what size, assuring competent service in every detail.

TRADE-MARK

All goods are carefully packed by the most experienced men, and railroad spurs extending into the yards assure quick and accurate shipments to all points.

Special Features.

All "Madrid" Lavatories can be furnished with the Integral Supply feature.

All "Madera" Closets are also made in the juvenile 13-inch height, having, however, the same roughing-in measurements as the regular "Madera" Closet.

Prices.

Plumbing contractors and plumbing-supply houses throughout the United States can immediately furnish estimates and quote prices on all fixtures illustrated in this catalogue. Plate numbers are identical with those in our trade catalogues, which are extensively distributed, thus providing immediate service when required.

Specifications.

Complete specification wording is given with every fixture illustrated herein.

Guarantee.

We have but one grade of goods. The "Anchor" Trade-Mark is stamped under the glaze on all fixtures —a guarantee of quality that we have lived up to for more than fifty years.

Consequential Damages.

Any goods proving defective in use because of manufacturing defects will be replaced, but no claim for labor or damages will be allowed.

References.

Our references are to reputable plumbing-supply houses and plumbing contractors who have purchased and installed our goods for more than fifty years.

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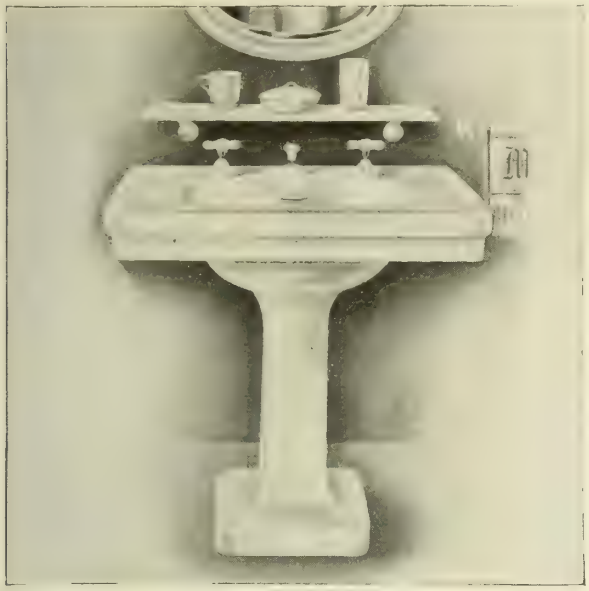

MADRID, PLATE GS-2000

How to Specify—"Maddock's" White Vitreous China Straight Front Lavatory; size (see below), with Integral Supply Nozzle; Cleansing Overflow Feature; Square Bowl; Hooded Overflow and Splash Rim; Plain Square Pedestal and Nickel-plated Brass Wall Brackets. Fitted with combination supply and pop-up waste fixture with china knob; compression supply valves with china cross-arm handles and escutcheons; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

Dimensions

Lavatory Slab	20″ x 24″	22″ x 26″	22″ x 28″	24″ x 30″
Bowl	16″ x 12″ x 6″	16″ x 12″ x 6″	18″ x 13″ x 6″	18″ x 13″ x 6″

List Prices

Complete as specified, less Trap and Supply Pipes	$62.46	$67.86	$72.72	$76.50

MADELPHI, PLATE GS-2007

How to Specify—"Maddock's" White Vitreous China Swelled Front Lavatory; size (see below), with Hooded Overflow; Anti-splash Rim; Square Fluted Pedestal and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob; compression supply valves with china cross-arm handles and escutcheons; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

Dimensions

Lavatory Slab	24″ x 30″	24″ x 33″
Bowl	18″ x 12″ x 6″	18″ x 12″ x 6″

List Prices

Complete as specified, less Trap and Supply Pipes	$66.30	$76.30
Lavatory Slab only, no fittings	29.00	39.00
Hooded Overflow	1.00	1.00
Pedestal only	11.00	11.00

MADRID, PLATE GS-2003

How to Specify—"Maddock's" White Vitreous China Straight Front Lavatory; size (see below), with Hooded Overflow; Anti-splash Rim; Plain Square Pedestal and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob; compression supply valves with china cross-arm handles and escutcheons; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

Dimensions

Lavatory Slab	20″ x 24″	22″ x 26″	22″ x 28″	24″ x 30″
Bowl	16″ x 12″ x 6″	16″ x 12″ x 6″	16″ x 12″ x 6″	18″ x 12″ x 6″

List Prices

Complete as specified, less Trap and Supply Pipes	$53.30	$58.30	$62.80	$66.30
Lavatory Slab only, no fittings	16.00	21.00	25.50	29.00
Hooded Overflow	1.00	1.00	1.00	1.00
Pedestal only	11.00	11.00	11.00	11.00

MADELPHI, PLATE GS-2013

How to Specify—"Maddock's" White Vitreous China Swelled Front Lavatory; size (see below), with Hooded Overflow; Anti-splash Rim; Plain Pedestal with Concave Base, and Nickel-plated Brass Wall Brackets. Fitted with pop-up waste fixture with china knob and escutcheon, and nickel-plated brass fuller faucets with china handles; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

Dimensions

Lavatory Slab	22″ x 26″	24″ x 30″	24″ x [illegible]
Bowl	16″ x 12″ x 6″	18″ x 12″ x 6″	18″ x 12″ [illegible]

List Prices

Complete as specified, less Trap and Supply Pipes	$47.30	$55.30	[illegible]
Lavatory Slab only, no fittings	21.00	29.00	[illegible]
Hooded Overflow	1.00	1.00	1.00
Pedestal only	11.00	11.00	11.00

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MADALADE, PLATE GS-2017

How to Specify—"Maddock's" White Vitreous China Oval Lavatory; size (see below), with Hooded Overflow; Anti-splash Rim; Round Fluted Pedestal and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob; Fuller supply valves with china handles and escutcheons; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab...	22″ x 26″	24″ x 30″	24″ x 33″
Bowl.....16″ x 12″ x 6″		18″ x 12″ x 6″	18″ x 12″ x 6″

LIST PRICES

Complete as specified, less Trap and Supply Pipes.....	$59.80	$67.80	$77.80
Lavatory Slab only, no fittings..	21.00	29.00	39.00
Hooded Overflow.....	1.00	1.00	1.00
Pedestal only.....	11.00	11.00	11.00

MADONIS, PLATE GS-2030

How to Specify—"Maddock's" White Vitreous China Barber Lavatory; size (see below), with Hooded Overflow; Plain Square Pedestal and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination shampoo fixture with mixing chamber; nickel-plated Fuller faucets with china handles, and nickel-plated brass plug, chain and chain stay; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab.....	22″ x 27″
Bowl.....16″ x 12″ x 6″	

LIST PRICES

Complete as specified, less Trap and Supply Pipes.....	$103.85
Lavatory Slab only, no fittings.....	28.05
Pedestal only.....	11.00

MADRID, PLATE GS-2100

How to Specify—"Maddock's" White Vitreous China Straight Front Lavatory; size (see below), with Hooded Overflow, Anti-splash Rim; Two Vitreous China Legs with Rods and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob; Fuller supply valves with china handles and metal escutcheons; nickel-plated brass supply pipes to floor and nickel-plated brass waste trap to floor.

DIMENSIONS

Lavatory Slab..	22″ x 28″	24″ x 30″
Bowl....	.....16″ x 12″ x 6″	18″ x 12″ x 6″

LIST PRICES

Complete as specified, less Trap and Supply Pipes.....	$64.80	$64.80
Lavatory Slab only, no fittings.....	29.00	29.00
Hooded Overflow.....	1.00	1.00
Vitreous Legs with Rods, per pair...	8.00	8.00

MADELPHI, PLATE GS-2103

How to Specify—"Maddock's" White Vitreous China Swelled Front Lavatory; size (see below), with Hooded Overflow; Anti-splash Rim; Two Vitreous China Legs with Rods and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob; Fuller supply valves with china handles and escutcheons; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab.....	24″ x 30″	24″ x 33″
Bowl.....	18″ x 12″ x 6″	18″ x 12″ x 6″

LIST PRICES

Complete as specified, less Trap and Supply Pipes.....	$64.80	$74.80
Lavatory Slab only, no fittings.....	29.00	39.00
Hooded Overflow.....	1.00	1.00
Vitreous Legs with Rods, per pair....	8.00	8.00

Continued on next page

MADASCO, PLATE GS-2107

How to Specify—" Maddock's " White Vitreous China Straight Front Surgical Lavatory; size (see below), with Instrument Receptacle on both sides of main bowl; Two Vitreous China Legs with Rods and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination raised supply nozzle with removable rose spray; supply valve and pop-up waste fixture are controlled by foot pedals; nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab	24" x 36"
Main Bowl	17" x 13" x 6"
Instrument Receptacles	14½" x 6½" x 1½"

LIST PRICES

Complete as specified, less Trap and Supply Pipes	$126.76
Lavatory Slab only, no fittings	60.48
Vitreous Legs with Rods, per pair	7.38

MADRID, PLATE GS-2200

How to Specify—" Maddock's " White Vitreous China Straight Front Lavatory; size (see below), with Hooded Overflow; Anti-splash Rim; Vitreous China Leg and Rod and Nickel-plated Brass Wall Brackets. Fitted with pop-up waste fixture with china knob and escutcheon and nickel-plated brass compression faucets with china cross-arm handles; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab	20" x 24"	22" x 26"
Bowl	16" x 12" x 6"	16" x 12" x 6"

LIST PRICES

Complete as specified, less Trap and Supply Pipes	$34.30	$39.30
Lavatory Slab only, no fittings	16.00	21.00
Hooded Overflow	1.00	1.00
Vitreous Leg with Rod	4.00	4.00

MADRID, PLATE GS-2203

How to Specify—" Maddock's " White Vitreous China Straight Front Lavatory, with 6-inch Integral Back and Concealed Hangers; size (see below), with Hooded Overflow; Anti-splash Rim and Vitreous China Leg with Rod. Fitted with pop-up waste fixture with china knob and escutcheon and nickel-plated brass Fuller faucets with china handles; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab	20" x 24"
Bowl	16" x 12" x 6"

LIST PRICES

Complete as specified, less Trap and Supply Pipes	$40.00
Lavatory Slab only, no fittings	22.00
Hooded Overflow	1.00
Vitreous Leg with Rod	4.00

MADELPHI, PLATE GS-2210

How to Specify—" Maddock's " White Vitreous China Swelled Front Lavatory; size (see below), with Hooded Overflow; Anti-splash Rim; Vitreous China Leg with Rod and Nickel-plated Brass Wall Brackets. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob; compression supply valves with china cross-arm handles and escutcheons; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab	20" x 24"	22" x 26"
Bowl	16" x 12" x 6"	16" x 12" x 6"

LIST PRICES

Complete as specified, less Trap and Supply Pipes	$46.30	$51.30
Lavatory Slab only, no fittings	16.00	21.00
Hooded Overflow	1.00	1.00
Vitreous Leg with Rod	4.00	4.00

CONTINUED

MADRID, PLATE GS-2213

How to Specify—"Maddock's" White Vitreous China Round Front Lavatory with 6-inch Integral Back with Concealed Hangers; size (see below), with Hooded Overflow; Anti-splash Rim; Vitreous China Leg with Rod. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob; compression supply valves with china cross-arm handles and escutcheons; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

Dimensions

Lavatory Slab	20″ x 24″
Bowl	16″ x 12″ x 6″

List Prices

Complete as specified, less Trap and Supply Pipes	$51.00
Lavatory Slab only, no fittings	22.00
Hooded Overflow	1.00
Vitreous Leg with Rod	4.00

MADRIATIC, PLATE GS-2224

How to Specify—"Maddock's" White Vitreous China Corner Lavatory with 6-inch Integral Back; size (see below), with Hooded Overflow; Anti-splash Rim; Vitreous China Leg and Rod, and Brass Brackets. Fitted with pop-up waste fixture with china knob and escutcheon and nickel-plated brass Fuller faucets with china handles; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

Dimensions

Lavatory Slab, along sides	20″ x 20″	24″ x 24″
Back	6″	6″
Bowl	16″ x 12″ x 6″	16″ x 12″ x 6″

List Prices

Complete as specified, less Trap and Supply Pipes	$46.00	$62.00
Lavatory Slab only, no fittings	27.00	43.00
Hooded Overflow	1.00	1.00
Vitreous Leg with Rod	4.00	4.00

MADDEN, PLATE GS-2226

How to Specify—"Maddock's" White Vitreous China Extra Heavy Lavatory [illegible] with Corner Soap Dish, size (see below), with Galvanized Iron Overhead [illegible] Fitted with galvanized iron supply pipes for hot and cold water [illegible] for lavatories, nickel-plated brass combination [illegible] and nickel-plated brass [illegible] and chain.

Dimensions

Lavatory	18″ x 20″

List Prices

Complete as specified, less Trap	$187.10
Lavatory only, no fittings	14.00
Overhead only, for 20″ Lavatories	25.50

MADDINGTON, PLATE GS-2302

How to Specify—"Maddock's" White Vitreous China Manicuring Table, size (see below); Diameter of Bowl, 6 inches, with Integral Supply, Hooded Overflow and Vitreous China Leg and Rod. Fitted with nickel-plated brass combination supply and pop-up waste fixture with china knob, compression supply valves with china cross-arm handles; 1¼ inch nickel-plated brass trap; ⅜-inch I. P. S. seamless supply pipes to wall.

Dimensions

Top of Table	18″ x 32″
Diameter of Bowl	6″

List Prices

Complete as specified	$84.90

Continued on next page

MADRID, PLATE GS-2407

How to Specify—"Maddock's" White Vitreous China Straight Front Lavatory with 6-inch Integral Back and Concealed Hangers; size (see below), with Anti-splash Rim. Fitted with pop-up waste fixture with china knob and escutcheon and nickel-plated brass compression faucets with china indexed handles; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab	18" x 20"
Bowl	14" x 10" x 6"

LIST PRICES

Complete as specified, less Trap and Supply Pipes	$23.00
Lavatory Slab only, with Anti-splash Rim and Concealed Hangers, no fittings	13.00

MADRID, PLATE GS-2414

How to Specify—"Maddock's" White Vitreous China Round Front Lavatory, with 6-inch Integral Back and Concealed Hangers; size (see below), with Anti-splash Rim. Fitted with pop-up waste fixture with china knob and escutcheon and nickel-plated brass Fuller faucets with china handles; nickel-plated brass supply pipes to wall and nickel-plated brass waste trap to wall.

DIMENSIONS

Lavatory Slab	16" x 18"	18" x 20"
Bowl	14" x 10" x 6"	14" x 10" x 6"

LIST PRICES

Complete as specified, less Trap and Supply Pipes	$24.00	$26.00
Lavatory only, with Anti-splash Rim and Concealed Hangers, no fittings.	11.00	13.00

MADCELL, PLATE GS-2419

How to Specify—"Maddock's" White Vitreous China Prison Lavatory with 6-inch Integral Back and Corner Soap Dish; size (see below), with Integral Supply Nozzle; Slow Draining Integral Outlet carried to Wall. Fitted with self-closing push-button supply valve arranged in back.

NOTE—This lavatory can be arranged for integral drinking attachment on supply nozzle whenever specified.

DIMENSIONS

Lavatory Slab	14" x 14"
Depth of Bowl	5½"

LIST PRICES

Complete as specified	$20.00

MADENTA, PLATE GS-2450

How to Specify—"Maddock's" White Vitreous China Straight Front Dental Lavatory with 5-inch Integral Back and Concealed Hangers; size (see below). Fitted with nickel-plated brass combination fixture with goose-neck nozzle and compression supply valves with china cross-arm handles; waste plug provided with loose china grid instead of stopper; nickel-plated brass supply pipes to wall and nickel-plated waste trap to wall.

DIMENSIONS

Lavatory Slab	13" x 13"
Bowl	9" x [illegible]

LIST PRICES

Complete as specified, less Trap and Supply Pipes	$26.50

MADORIAN, PLATE GS-2800

How to Specify—"Maddock's" White Vitreous China Pedestal Drinking Fountain; height (see below), with Vitreous China Bubbling Cup. Fitted with ⅜-inch supply and 1¼-inch waste fixture, inside of pedestal, with loose key stop and self-closing valve on side.

DIMENSIONS

Height	26″	30″	36″
Diameter of Base	14½″	14½″	14½″
Diameter of Top, outside	11″	11″	11″

LIST PRICES

Complete as specified	$35.50	$35.50	$40.50
Pedestal Fountain only, no fittings	18.00	18.00	22.00

MADOCO, PLATE GS-2803

How to Specify—"Maddock's" White Vitreous China Drinking Fountain on Galvanized Iron Standard; height (see below), with Vitreous China Bubbling Cup. Fitted with ¾-inch supply and 2-inch waste fixture, inside of standard, with loose key stop at floor and self-closing valve at side.

NOTE—Standard can be furnished painted either White Enamel, Bronze or Aluminum.

DIMENSIONS

Height	30″	36″
Diameter of Bowl, outside	13″	13″
Diameter of Standard at Floor	14½″	14½″

LIST PRICES

Complete as specified	$31.02	$32.52
Vitreous China Bowl only, no fittings	7.20	7.20

MADOLA, PLATE GS-2806

How to Specify—"Maddock's" White Vitreous China Wall Hanging Drinking Fountain; size, 20 inches; Diameter of Bowl, 12 inches; Projection from Wall, 14 inches; Height on Wall, 9 inches, with Integral Housing for Fittings and Vitreous China Bubbling Cup. Fitted with ⅜-inch supply and 1¼-inch waste fixture with P trap, supply controlled by loose key stop and self-closing valve, with china oscillating handle.

LIST PRICES

Complete as specified	$26.00
Fountain only, no fittings	10.00
Vitreous China Bubbling Cup only	1.50

MADANTIC, PLATE GS-2807

How to Specify—"Maddock's" White Vitreous China Swelled Front Wall Hanging Drinking Fountain; size, 24 inches; Projection from Wall, 14 inches; 14 inch Integral Back with Concealed Hangers and Two Vitreous China Bubbling Cups. Fitted with ⅜-inch nickel-plated brass supply pipes with crown handle self-closing valves and 1¼-inch nickel-plated cast brass trap.

LIST PRICES

Complete as specified	$68.34
Fountain only, no fittings	10.00
Two Vitreous Bubbling Cups (each)	2.52

Continued on next page

MADOPIAN, PLATE GS-2808

How to Specify—" Maddock's " White Vitreous China Swelled Front Wall Hanging Drinking Fountain; size 18 inches. Projection from Wall 14 inches, 9¼-inch Integral Back with Concealed Hangers and Vitreous China Bubbling Cup. Fitted with 1¼-inch white enameled iron trap and ⅜-inch nickel-plated brass supply pipe with loose key stop.

List Prices

Complete as specified	$54.52
Fountain only, no fittings	36.00
Vitreous China Bubbling Cup	2.52

MADANGLO, PLATE GS-2810

How to Specify—" Maddock's " White Vitreous China Straight Front Wall Hanging Drinking Fountain; size 20½ inches. Projection from Wall 10½ inches, with 9½-inch Integral Back and Concealed Hangers. Fitted with nickel-plated brass ½-inch self-closing rabbit ear faucets; nickel-plated brass waste strainer and coupling and 1¼-inch nickel-plated cast brass trap.

List Prices

Complete as specified	$30.20
Fountain only, no fittings	18.00

MADAWARE, PLATE GS-2812

How to Specify—" Maddock's " White Vitreous China Wall Hanging Drinking Fountain; height 20 inches, width 12 inches. Projection from Wall 8 inches, with Integral China Trap. Fitted with nickel-plated brass ½-inch crown handle self-closing ice water faucet with china index; nickel-plated brass strainer, cast brass trap connection and washer.

List Prices

Complete as specified	$21.20
Fountain only, with Integral Trap, no fittings	14.00

Note—This fountain can also be furnished without the integral trap.

MADALLION, PLATE GS-2813

How to Specify—" Maddock's " White Vitreous China Recessed Drinking Fountain; height 18 inches, width 12 inches, depth from Face to Extreme Back 5½ inches. Projection from Wall 3 inches. Fitted with nickel-plated brass ½-inch crown handle ice water faucet with china index and nickel-plated cast brass 1¼-inch outlet plug.

List Prices

Complete as specified	$24.20
Fountain only, no fittings	16.00

MADELTA, PLATE GS-2828

How to Specify—"Maddock's" White Vitreous China Flushing Rim Pedestal Bidet Pan; height 15 inches, with Fixture Shelf and Integral Supply Nozzle in Rim. Fitted with nickel-plated brass 1¼-inch pop-up waste fixture with china knob; 1¼-inch (outside dimensions) tail piece; hot and cold compression supply valves with china cross-arm handles and metal escutcheons. Less Trap and Supply Pipes.

For Roughing-in Measurements, see page 1012.

DIMENSIONS

Length over all	24″
Width	14½″
Opening of Bowl	15″

LIST PRICE

Complete as specified, less Trap and Supplies $23.30

MADET, PLATE GS-2829

How to Specify—"Maddock's" White Vitreous China Flushing Rim Pedestal Bidet Pan; height 15 inches; with Douche and Fixture Shelf. Fitted with nickel-plated brass 1¼-inch pop-up waste fixture with china knob; 1¼-inch (outside dimensions) tail piece; hot and cold compression supply valves to douche, and hot and cold compression supply valves to rim; Supply Valves fitted with china cross-arm handles and china escutcheons. Less Trap and Supply Pipes.

For Roughing-in Measurements, see page 1012.

DIMENSIONS

Length over all	25″
Width	14½″
Opening of Bowl	15½″

LIST PRICE

Complete as specified, less Trap and Supplies $39.30

ARISTON, PLATE GS-2900

[illegible] "Maddock's" White Vitreous China Non-soiling [illegible] Syphon Jet Closet, with Extended Top Inlet and Floor Outlet, Chrome Plated Brass Spud, Extended Front Lip and Cut-back Rim, flushed all the way around. Height 14½ inches, Opening of Bowl 16 inches; Water Surface 14 by 10 inches, Sanitary Rim with 1¼ inch downward Projection inside of Bowl; Water Seal 3 inches, and Trap Opening conforming with Government Specifications. White Celluloid-covered [illegible] Seat on Cover, Open Front and Back with Heavy Nickel-plated Brass Bar Hinges; White Vitreous China Flush Pipe Cover and White Vitreous China Bolt Caps; White Vitreous China Pillar Front Supply Fitting [illegible] with Concealed Lever.

For Specifications of Trap see GS-3113.

For Roughing-in Measurements, see page 1012.

LIST PRICES

Complete as specified	$62.84
Closet only	24.00
[illegible]	26.00
[illegible] Flush Pipe Cover	2.00
White Celluloid-covered seat	9.40

ARISTON, PLATE GS-2905

How to Specify—"Maddock's" White Vitreous China Silent Action Syphon Jet Closet, with 1½-inch Brass Spud, Side Inlet and Floor Outlet, Extended Front Lip and Cut-back Rim, flushed all the way around. Height 14½ inches, Opening of Bowl 16 inches; Water Surface 14 by 10 inches, Sanitary Rim with 1¼ inch downward Projection inside of Bowl; Water Seal 3 inches, and Trap Opening conforming with Government Specifications. Birch Mahogany Saddled Seat, no Cover, Open Front and Back with Heavy Nickel-plated Brass Bar Hinge; White Vitreous China Bolt Caps and Nickel-plated Brass Flushing Valve.

For Roughing-in Measurements, see page 1012.

LIST PRICES

Complete as specified	$52.84
Closet only	26.00
Seat only	6.10

Continued on next page

ARISTON, PLATE GS-2915

How to Specify—"Maddock's" White Vitreous China Silent Action Syphon Jet Closet, with Extended Top Inlet and Floor Outlet, 2-inch Brass Spud, Extended Front Lip and Cut-back Rim, flushed all the way around. Height 14½ inches; Opening of Bowl 16 inches; Water Surface 14 by 10 inches; Sanitary Rim with 1¼-inch downward Projection inside of Bowl; Water Seal 3 inches; Trap Opening conforming with Government Specifications and 3- by 5-inch Unobstructed Raised Rear Vent entirely above the top of Closet Rim; Raised Seat Attachment above Vent. White Celluloid-covered Saddled Seat and Cover, open in back with Heavy Nickel-plated Brass Bar Hinge; One-piece White Vitreous China Flush Pipe Cover, and Oval Vent Collar, and Vitreous China Bolt Caps. White Vitreous China Swelled Front Tank with Top Side Lever.

For Specification of Tank, see GS-3106.
For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as specified	$75.64
Closet only	34.00
Tank, with fittings, see GS-3106	21.00
Seat only	13.80

MADERA, PLATE GS-3003

How to Specify—"Maddock's" White Vitreous China Syphon Jet Closet with Extended Top Inlet, Floor Outlet, Extended Front Lip and 2-inch Brass Spud. Height 15 inches; Opening of Bowl 14 inches; Water Surface 12½ by 10 inches; Trap Opening 2½ inches; Water Seal 3 inches. Genuine Mahogany Saddled Seat, no Cover, open in front with Heavy Nickel-plated Brass Bar Hinge. White Vitreous China Swelled Front Low-down Tank with Double-acting Top Side Lever.

For Specification of Tank, see GS-3104.
For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as shown	$51.84
Closet only	17.00
Tank only, with fittings, see GS-3104	23.80
Seat only	7.90

MADERA, PLATE GS-3001

How to Specify—"Maddock's" White Vitreous China Syphon Jet Closet with Extended Top Inlet, Floor Outlet and 2-inch Brass Spud. Height 15 inches; Opening of Bowl 12 inches; Water Surface 12½ by 11 inches; Trap Opening 2½ inches; Water Seal 3 inches. Genuine Mahogany Saddled Seat and Cover with Heavy Nickel-plated Brass Bar Hinge; White Vitreous China Bolt Caps. White Vitreous China Swelled Front Low-down Tank with Under-pull Lever.

For Specification of Tank, see GS-3104.
For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as specified	$46.94
Closet only	17.00
Tank only, with fittings, see GS-3104	22.30
Seat only	6.50

MADISON, PLATE GS-3017

Also furnished with Lip, Plate GS-3018

How to Specify—"Maddock's" White Vitreous China Reversed Trap Syphon Action Closet with Back Inlet, Floor Outlet and 2-inch Brass Spud. Height 15 inches; Opening of Bowl 12 inches; Water Surface 10 by 8 inches; Water Seal 3 inches. Birch Mahogany Seat and Cover with Heavy Nickel-plated Brass Bar Hinge; White Vitreous China Bolt Caps. White Vitreous China Straight Front Low-down Tank with Rounding Corners with Top Side Lever.

For Specification of Tank, see GS-3110.
For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as specified	$34.14
Closet only	10.00
Tank only, with fittings, see GS-3110	19.50
Seat only	3.50
Closet only, with lip	12.00

Note—This closet can also be furnished with jet, $2.50 additional.

Continued on next page

MADORIC, PLATE GS-3020

How to Specify—"Maddock's" White Vitreous China Syphon Action Washdown Closet with Back Inlet, Floor Outlet and 2-inch Brass Spud. Height 15 inches; Opening of Bowl 12 inches; Water Surface 7 by 7 inches; Water Seal 3 inches. Birch Mahogany Seat and Cover with Heavy Nickel-plated Brass Bar Hinge; White Vitreous China Bolt Caps. White Vitreous China Straight Front Low-down Tank with Rounding Corners and Top Side Lever.

For Specification of Tank, see GS-3111 on following page.
For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as specified	$28.04
Closet only	8.50
Tank only, with fittings, see GS-3111	14.90
Seat only	3.50

MADRIS, PLATE GS-3025

How to Specify—"Maddock's" White Vitreous China Syphon Jet Juvenile Closet with Top Inlet, Floor Outlet and 2-inch Brass Spud. Height 10 inches; Opening of Bowl 8 inches; Water Surface 5½ by 4 inches; Water Seal 1½ inches. Birch Mahogany Seat and Cover with Heavy Nickel-plated Brass Bar Hinge. White Vitreous China Bolt Caps. White Vitreous China Straight Front Low-down Tank with Rounding Corners and Top Side Lever.

For Specification of Tank, see GS-3111 on following page.
For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as specified	$36.64
Closet only	17.00
Tank only, with fittings, see GS-3111	14.90
Seat only	3.60

MADOVA, PLATE GS-3027

How to Specify—"Maddock's" White Vitreous China Extra Heavy Syphon Action Private Washdown Closet with Back Flange, Back Inlet, Wall Outlet, 1½-inch Brass Spud and Integral China Seat. Height 15 inches; Opening of Bowl 11 inches; Water Surface 7½ by 5¾ inches; Weight 64 pounds. Flushing Valve, concealed behind Wall, operated with China Indexed Push-button through Wall.

For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as specified	$42.72
Closet only, as shown	20.42
Closet only, with seat attachment, including 1½-inch Brass Spud	21.42

MADAWAN, PLATE GS-3030

How to Specify—"Maddock's" White Vitreous China Extra Heavy Hopper and Trap, Back Inlet, Floor Outlet, 1½-inch Brass Spud and Integral China Seat. Height 15 inches; Opening of Bowl 10½ inches; Water Surface 5½ by 5½ inches; Water Seal 2½ inches. Weight 59 pounds. White Vitreous China 8-gallon High-up Tank with Pull Fittings and China Lever Handle.

For Specification of Tank, see GS-3115 on following page.
For Roughing-in Measurements, see page 1012.

List Prices

Combination complete as specified	$36.30
Closet only, as shown	13.70
Closet only, with seat attachment	12.00
Tank only, with fittings, see GS-3115	22.00

Continued on next page

MADOLGA, PLATE GS-3100

How to Specify—"Maddock's" White Vitreous China Straight Front Low-pattern Tank and Cover; capacity 7½ gallons. Fitted with under-pull lever with china handle, elevated high pressure compound lever ball cock, standard pattern flush valve with 1¼-inch overflow pipe, 5-inch, 12-ounce solderless copper float, ⅜-inch nickel-plated brass full iron-pipe size seamless supply pipe and nickel-plated brass flush connection.

DIMENSIONS

Tank over all.....21" x 17" x 8½"

LIST PRICES

Complete as specified.....$22.30
Tank and Cover only, no fittings..... 10.90

MADALIN, PLATE GS-3106

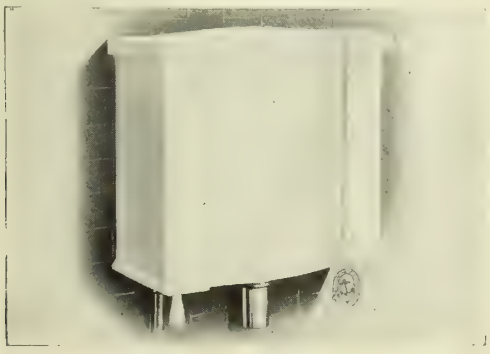
How to Specify—"Maddock's" White Vitreous China Swelled Front Low-pattern Tank and Cover; capacity 8 gallons. Fitted with double-acting top side lever and china handle, elevated high pressure compound lever ball cock, standard pattern flush valve with 1¼-inch overflow pipe, 5-inch, 12-ounce solderless copper float, ⅜-inch nickel-plated brass full iron-pipe size seamless supply pipe and nickel-plated brass flush connection.

DIMENSIONS

Tank over all.....22½" x 18¼" x 8¼"

LIST PRICES

Complete as specified.....$19.50
Tank and Cover only, no fittings..... 9.90



MADANGO, PLATE GS-3113

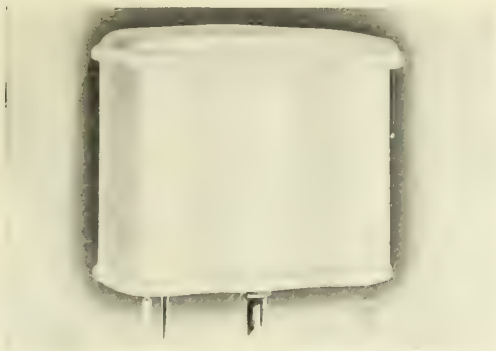
How to Specify—"Maddock's" White Vitreous China Pillar Front Low-pattern Tank and Cover; capacity 8 gallons. Fitted with under-pull lever with china handle, elevated high pressure compound lever ball cock, standard pattern flush valve with 1¼-inch overflow pipe, 5-inch, 12-ounce solderless copper float, ⅜-inch nickel-plated brass full iron-pipe size seamless supply pipe and nickel-plated brass flush connection.

DIMENSIONS

Tank over all.....20½" x 19" x 8½"

LIST PRICES

Complete as specified.....$25.40
Tank and Cover only, no fittings..... 14.00



MADALIN, PLATE GS-3104

How to Specify—"Maddock's" White Vitreous China Swelled Front Low-pattern Tank and Cover; capacity 8 gallons. Fitted with under-pull lever with china handle, elevated high pressure compound lever ball cock, standard pattern flush valve with 1¼-inch overflow pipe, 5-inch, 12-ounce solderless copper float, ⅜-inch nickel-plated brass full iron-pipe size seamless supply pipe and nickel-plated brass flush connection.

DIMENSIONS

Tank over all.....22½" x 18¼" x 8¼"

LIST PRICES

Complete as specified..... $22.30
Tank and Cover only, no fittings..... 10.90

MADORA, PLATE GS-3110

How to Specify—"Maddock's" White Vitreous China Straight Front Low-pattern Tank and Cover with Rounding Corners; capacity 7½ gallons. Fitted with double-acting top side lever with china handle, elevated high pressure compound lever ball cock, standard pattern flush valve with 1¼-inch overflow pipe, 5-inch, 12-ounce solderless copper float, ⅜-inch nickel-plated brass full iron-pipe size seamless supply pipe and nickel-plated brass flush connection.

DIMENSIONS

Tank over all.....22½" x 18" x 8½"

LIST PRICES GS-3110

Complete as specified.....$19.50
Tank and Cover only, no fittings..... 9.90

NOTE—This Tank is made in 6½-gallon capacity also, and is known as plate GS-3111.

LIST PRICES GS-3111

Complete as specified.....$14.90
Tank and Cover only, no fittings..... 8.80

MADABECK, PLATE GS-3115

How to Specify—"Maddock's" White Vitreous China Straight Front High-up Tank; Size and Capacity (see below). Fitted with Automatic Brass Flush Valve.

NOTE—This Tank is made for either top or bottom supply valve. Specify clearly which is desired.

Capacity	6-gal.	8 gal.	
Tank over all....	16"x10½"x9½"	20"x10½"x11½"	22"x[illegible]

LIST PRICES

Complete as specified.	$70.20	$25.20	$[illegible]
Tank only, no fittings.	7.00	12.00	[illegible]

Continued on next page

MADESTA, PLATE GS-3200

How to Specify—"Maddock's" White Vitreous China Flat-back Syphon Jet Urinal; size (see below), with Lip and Flushing Rim; Top Inlet and Bottom Outlet. Fitted with nickel-plated brass 1-inch inlet and 2-inch outlet spuds.

For Specification of Tank, see GS-3115.

DIMENSIONS

	No. 1	No. 2
Top of inlet Spud to Bottom of outlet Spud	23″	23″
Width over all	14¾″	13″
Wall to Front of Lip	14¼″	14″

LIST PRICES

Complete as specified	$16.36	$14.86
Urinal only	15.00	13.50

MADESTA, PLATE GS-3202

How to Specify—"Maddock's" White Vitreous China Syphon Jet Urinal; size (see below), with Lip and Flushing Rim, Back Inlet and Back Outlet. Fitted with brass 1-inch male inlet and 2-inch female outlet spuds, so arranged that urinal can be connected from front of wall.

For Specification of Tank, see GS-3115.

NOTE—This Urinal is also made top inlet, wall outlet and takes the same price as G-3202.

DIMENSIONS

	No. 1	No. 2
Height over all	26″	25″
Width over all	14¾″	13″
Wall to Front of Lip	14¼″	14″

LIST PRICES

Complete as specified	$17.50	$16.00
Urinal only	15.00	13.50

MADRAPORE, PLATE GS-3206

How to Specify—"Maddock's" White Vitreous China Flat-back Bedfordshire Urinal; size (see below), with Lip, Flushing Rim, Integral Strainer, Back Inlet and Back Outlet. Fitted with brass 1-inch male inlet spud and 2-inch female outlet spud. So arranged that urinal can be connected from front of wall.

For Specification of Tank, see GS-3115.

NOTE—This Urinal is also made top inlet and wall outlet, and takes the same price as G-3206.

DIMENSIONS

	No. 1	No. 2	No. 3
Height over all	24″	22½″	21″
Width over all	14½″	13″	11½″
Wall to Front of Lip	14½″	13″	11½″

LIST PRICES

Complete as specified	$12.50	$10.50	$9.50
Urinal only	10.00	8.00	7.00

MADISON, PLATE GS-3208 AND MADERICA, PLATE GS-3209

How to Specify—"Maddock's" White Vitreous China Flat-back Bedfordshire Urinal; size (see below), with Lip, Flushing Rim, Integral Strainer, Top Inlet and Bottom Outlet, Horn Connections.

For Specification of Tank, see GS-3115.

No. G-3209 is the same Urinal as GS-3208, except that it has 3-inch male inlet spud and 2-inch male outlet spud.

DIMENSIONS

	No. 1	No. 2	No. 3
Top of Inlet Horn to Bottom of Outlet Horn G-3208	20½″	19½″	18″
Top of Inlet Spud to Bottom of Outlet Spud G-3209	20″	19½″	17½″
Height over all	15″	13″	12″
Wall to Front of Lip	14″	13″	12″

LIST PRICES

Urinal only, G-3208	$10.00	$8.00	$7.00
Urinal only, G-3209	10.00	8.00	7.00

MADSTONE, PLATE GS-3210

How to Specify—"Maddock's" White Vitreous China Syphon Jet Pedestal Urinal with Back Inlet, Floor Outlet and 1½-inch Brass Spud, High Back, Extended Front Lip and Flushing Rim. Dimensions: Floor to top of Back 32 inches; Floor to top of Lip 24 inches, Opening of Bowl 18½ inches; Face of Spud to Front of Lip 21 inches; Water Surface 6 by 6 inches; Water Seal 3 inches; Trap Opening 2 inches. White Vitreous China Bolt Caps and White Vitreous China 6-gallon High-up Tank with Automatic Fittings.

For Specification of Tank, see GS-3115.

NOTE—The action of the "Madstone" Urinal is the same as that of the modern Syphon Jet Closet, which feature with the large trap opening easily disposes of the refuse that finds its way into the ordinary Urinal. The connection to the soil pipe is made the same as that of a regular closet. This Urinal is also made with top inlet and juvenile height.

LIST PRICES

Complete as specified	$14.10
Urinal only, including 1½-inch brass spud	27.10
Tank only, with fittings, see GS-3115	17.00

Continued on next page

MADEVIAN, PLATE GS-3302

How to Specify—"Maddock's" White Vitreous China Straight Front, Roll Rim Kitchen Sink with 10-inch Integral Back and Two Vitreous China Legs with Rods; size 22 x 30 inches; Inside Depth 8 inches. Fitted with heavy nickel-plated brass quick compression faucets with china lever handles, threaded ¾-inch iron pipe female; nickel-plated brass outlet plug with strainer top, arranged for 1½-inch brass trap.

List Prices

Complete as specified, less 1½-inch Trap	$77.80
Sink only, no fittings	60.00
Two Vitreous Legs with Rods	7.20

MADIATOR, PLATE GS-3308

How to Specify—"Maddock's" White Vitreous China Slop Sink with 13-inch Integral Back; size 18 x 22 inches; Depth of Sink 10 inches; Vitreous China Floor Outlet Trap Standard with Clean-out Plug; Nickel-plated Brass Outlet Strainer and Plug connecting Sink and Trap Standard; Nickel-plated Compression Faucets with China Indexed Handles.

List Prices

Complete as specified	$68.00
Sink only, no fittings	45.00
Vitreous Pedestal Trap only, with nickel-plated Brass Clean-out Plug	10.70

MADAGON, PLATE GS-3312

How to Specify—"Maddock's" White Vitreous China Syphon Jet Slop Sink with Flushing Rim and Integral Trap; size 18 x 18 inches. Top Inlet, Floor Outlet; Water Surface 12 by 12 inches; Water seal 3 inches. Fitted with nickel-plated brass combination supply fixture with air chambers and compression valves with china indexed handles; supply nozzle with hook to hold pail. Flushing Rim supplied by High-up Tank.

For Specification of Tank, see GS-3115.

List Prices

Complete as specified	$60.80
Slop Sink only, no fittings	36.00

MADWIN, PLATE GS-3316

How to Specify—"Maddock's" White Vitreous China All Roll Rim Slop Sink; size 18 x 22 inches; Depth of Sink 11 inches, with Vitreous China Floor Outlet Trap Standard with Clean-out Plug; Nickel-plated Brass Outlet Strainer and Plug connecting Sink and Trap Standard; Nickel-plated Brass Combination Supply Fixture with Compression Valves, with China Indexed Handles and Supply Nozzle with hook to hold pail.

List Prices

Complete as specified	$71.20
Slop Sink only, no fittings	36.90
Vitreous Pedestal Trap only, with nickel-plated Brass Clean-out Plug	10.70

Continued

Roughing-in Measurements.

Complete Roughing-in Measurements Covering "Maddock's" Vitreous China Water-Closets—These measurements will be found of great value in determining the application of fixtures; especially where sizes of wall and rooms are settled, or where alteration work is being done and it is desirable to replace old-fashioned closets with the modern, improved fixtures, as illustrated in this Catalogue. These measurements are subject to very slight changes because of variations in firing, and are guaranteed only on goods ordered during 1916.

PLATE GS-2828 PAGE 1006

Height of bidet	15"
Width of bidet	14¼"
Length over all	24"
Centre to centre of supplies	7"
Centre of supplies to back of shelf	3¼"
Centre of supplies to centre of outlet	2½"

PLATE GS-2829 PAGE 1006

Height of bidet	15"
Width of bidet	14¼"
Length over all	25"
Centre to centre of supplies	8"
Centre of supplies to back of shelf	4½"
Centre of supplies to centre of outlet	2"

PLATE GS-2900 PAGE 1006

Height of closet	14½"
Centre of inlet to centre of outlet	8"
Centre of inlet to centre of seat attachment	6"
Centre of seat attachment to front of rim	19"
Centre to centre of seat attachment	5½"
Outside width of rim	14"

PLATE GS-2905 PAGE 1006

Height of closet	14½"
Centre of side inlet to centre of outlet	2"
Centre of seat attachment to front of rim	19"
Centre to centre of seat attachment	5½"
Outside width of rim	14"

PLATE GS-2915 PAGE 1007

Height of closet	14½"
Centre of inlet to centre of outlet	8"
Centre of inlet to centre of seat attachment	5"
Centre of seat attachment to front of rim	18"
Centre of vent to floor	16½"
Centre of inlet to face of vent	4"
Outside width of rim	14"

PLATE GS-3001 PAGE 1007

Height of closet	15"
Centre of inlet to centre of outlet	6½"
Centre of inlet to centre of seat attachment	6"
Centre of seat attachment to front of rim	16½"
Centre to centre of seat attachment	5½"
Outside width of rim	13½"

PLATE GS-3003 PAGE 1007

Height of closet	15"
Centre of inlet to centre of outlet	6½"
Centre of inlet to centre of seat attachment	6"
Centre of seat attachment to front of rim	18½"
Centre to centre of seat attachment	5½"
Outside width of rim	13½"

PLATE GS-3017 PAGE 1007

Height of closet	15"
Centre of outlet to face of inlet spud	4½"
Centre of seat attachment to front of rim	16½"
Centre to centre of seat attachment	5½"
Outside width of rim	13½"

PLATE GS-3018 PAGE 1007
This is Plate GS-3017 with Lip

Height of closet	15"
Centre of outlet to face of inlet spud	4½"
Centre of seat attachment to front of lip	18"
Centre to centre of seat attachment	5½"
Outside width of rim	13½"

PLATE GS-3020 PAGE 1008

Height of closet	15"
Centre of outlet to face of inlet spud	6"
Centre of seat attachment to front of rim	16½"
Centre to centre of seat attachment	5½"
Outside width of rim	13½"

PLATE GS-3025 PAGE 1008

Height of closet	10"
Centre of inlet to centre of outlet	2"
Centre of inlet to centre of seat attachment	5"
Centre of seat attachment to front of rim	12"
Centre to centre of seat attachment	5½"
Outside width of rim	9¾"

PLATE GS-3027 PAGE 1008

Height of closet	15"
Centre of inlet to centre of outlet	5¼"
Centre of outlet to floor	7¾"
Back of closet to front of rim	22"
Outside width of rim	13¾"

PLATE GS-3030 PAGE 1008

Height of closet	16½"
Centre of outlet to face of inlet spud	10½"
Back of rim to front	16½"
Outside width of rim	15½"

BAY RIDGE SPECIALTY CO., INC.

White Vitreous China Bathroom Furnishings

5613 First Avenue
BROOKLYN, N. Y.

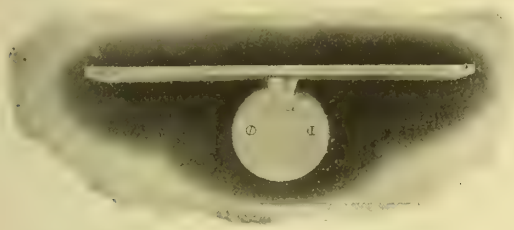
Products.

BATHROOM FURNISHINGS in WHITE VITREOUS CHINA, including HAND RAILS, TOWEL BARS, SHELVES, TUMBLER HOLDERS, TOOTH-BRUSH HOLDERS, PAPER HOLDERS, SOAP DISHES, ROBE HOOKS.

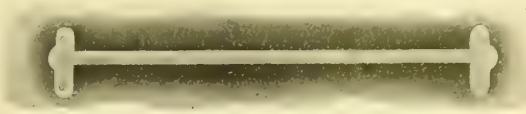
Representation.

This line is carried by all jobbing and plumbing supply houses.

Can be furnished with white covered screws.

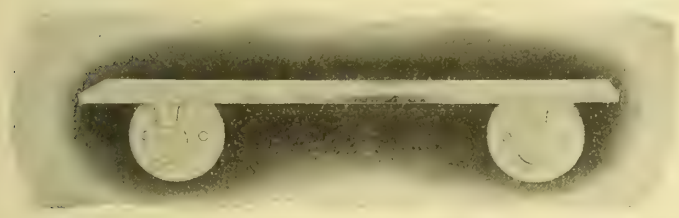


NO. 435. WHITE OPAL SHELF
6 inches wide, ¼ inch thick, 12 inches long; bracket diameter, 3½ inches; depth, 3½ inches. Price, $2.25



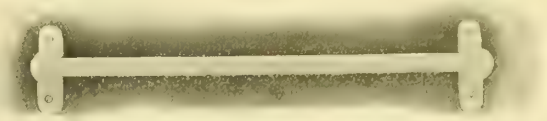
NO. 305. TOWEL BARS, 1¼-INCH OPAL BAR, OBLONG POSTS WHITE VITREOUS CHINA ENDS
Brackets, ¾ x 3 inches; depth, 2½ inches

Length, inches	18
Price, each	$.60



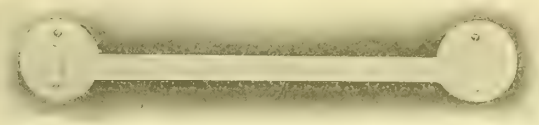
NO. 335. WHITE OPAL SHELF, 6 INCHES WIDE, ¼ INCH THICK
Bracket diameter, 3½ inches; depth, 3½ inches

Length, inches	18	24	30	36
Price, each	$4.10	5.10	5.80	6.60



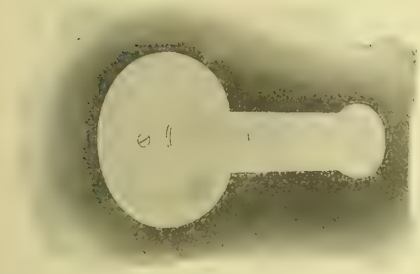
NO. 315. ¾-INCH OPAL BAR, OBLONG POSTS, WHITE VITREOUS CHINA ENDS
Brackets, 1 x 3 inches; depth, 3 inches

Length, inches	18	24	30	36
Price, each	$1.35	1.70	2.00	2.45



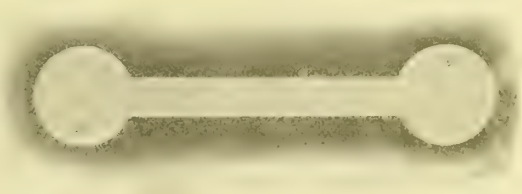
NO. 325. 1-INCH OPAL BAR, ROUND POSTS, WHITE VITREOUS CHINA ENDS
Bracket diameter on back, 3½ inches; depth, 4 inches

Length, inches	18	24	30	36
Price, each	$2.85	3.60	4.25	5.10



NO. 375. PAPER HOLDER
Bracket diameter, 3½ inches; depth, 6 inches; holds standard roll. Price, $.90

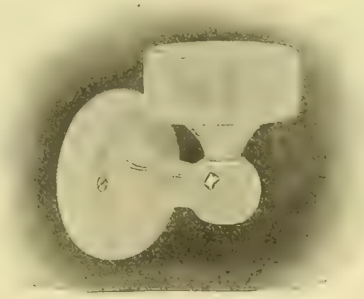
NO. 385. ROBE HOOKS
Bracket diameter, 2½ inches; depth, 3½ inches. Price, $.50



NO. 425. 1½-INCH OPAL HAND RAIL, WHITE VITREOUS CHINA ENDS
Bracket diameter, 3½ inches; depth, 4 inches

Length, inches	9	12	16
Price, each	$2.85	3.60	4.35

NO. 355. TUMBLER AND TOOTH BRUSH HOLDER
Bracket diameter, 3½ inches; depth, 4½ inches; height, 4½ inches
Price, each..... $1.50



NO. 345. TUMBLER HOLDER
Bracket diameter, 3½ inches; depth, 4½ inches; height, 4½ inches
Price, each..... $1.20

NO. 365. SOAP DISH
Bracket diameter, 3½ inches; height, 4¾ inches; cup, 5 x 3½ inches
Price, each..... $1.25

THE D. A. EBINGER SANITARY MANUFACTURING CO.

Specialists and Manufacturers of Ventilated Toilet Fixtures

Sanitary and Ventilating Engineers

COLUMBUS, OHIO

Products.

"Ebinger" Ventilated Individual and Range Closets, Ventilated Octagon and Wall Urinals; "Ebco" Ventilated Automatic Closets, Ventilated Vitro Porcelain Urinals, Vitreous Wall and Enamel Pedestal Drinking Fountains.

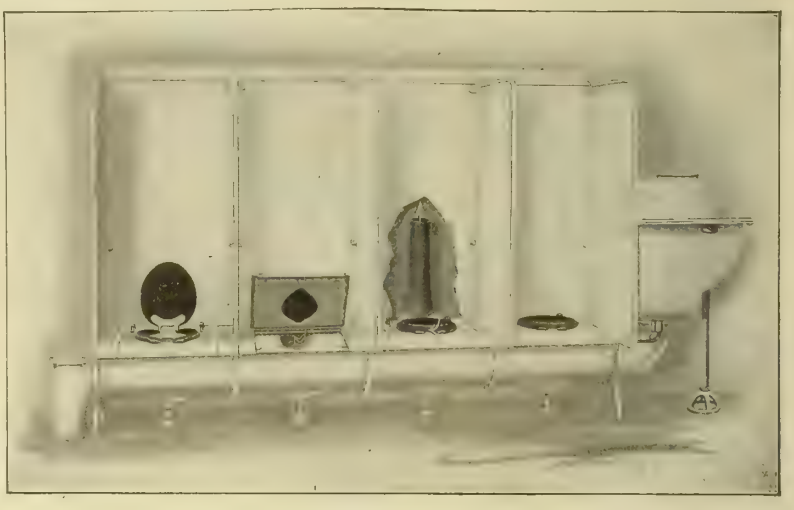


Plate B-22
"EBINGER" VENTILATED RANGE CLOSETS

Ebinger Ventilated Range Closet.

"Ebinger" Ventilated Range Closets, 24-inch or 28-inch sections, with automatic flushing tank, inlet and outlet elbows, sanitary composite seats with porcelain enameled seat plates. Partitions and backs to be of cast iron porcelain enameled. Opening in these plates extended both front and rear and provided with quartered oak seat pieces and cover. Hinges for seat covers shall have stops to prevent standing open when not occupied. Perforated brass spray pipes shall be provided at both front and rear of bowl. All bowls to have 2-inch depression under seat that will stand full of water at all times, and shall have vent openings at the rear of bowls, each having an effective vent area of 12½ square inches. Bowls, seat plates, end plates, inlet and outlet elbows shall be heavily porcelain enameled all over, whether exposed or hidden. Said closet combinations to be described as per Plate B-22.

Plate B 81
"EBINGER" VENTILATED INDIVIDUAL CLOSET

Specifications—"Ebinger" Ventilated Individual Closet, heavy vitreous china extended lip, siphon jet bowl, with large raised rear vent; positive flush valve with china oscillating handle, and [style, kind, finish] open front and rear reinforced sanitary seat. Said closet combination to be as per Plate B 81 in catalogue of The D. A. Ebinger Sanitary Manufacturing Co., Columbus, Ohio.

Plate B 61
"EBCO" VENTILATED AUTOMATIC CLOSET

Specifications—"Ebco" Ventilated Automatic Closet, heavy vitreous china bowl, extended front and rear with large raised rear vent, having large free vent area above flush rim, automatic seat operating flush valve, with concealed mechanism; heavily reinforced quartered oak, extended seat open front and rear. Said closet combination to be described as per Plate B 61 in catalogue of The D. A. Ebinger Sanitary Manufacturing Co., Columbus, Ohio.

Continued on next page

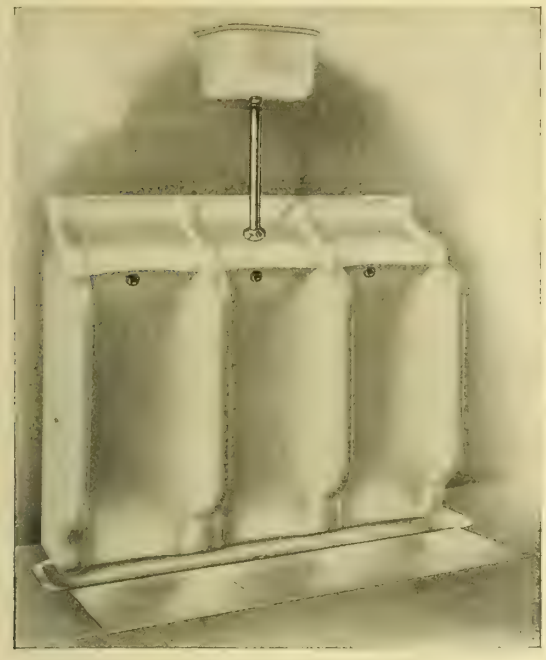


PLATE A-3
"EBINGER" VENTILATED WALL URINAL

Specifications—"Ebinger" Ventilated Wall Urinal, to have concave backs and massive partitions, to be made in one piece. Each urinal back to be flushed periodically from automatic flushing tanks. White glass floor slabs to be set so as to drain into troughs. Each urinal stall to have two points of ventilation having an effective vent area of 25 square inches, connected to ventilatng flue through vitrified tile or galvanized iron ducts of ample capacity. Said urinal combination to be as described on Plate A-3 in catalogue of THE D. A. EBINGER SANITARY MANUFACTURING CO., Columbus, Ohio

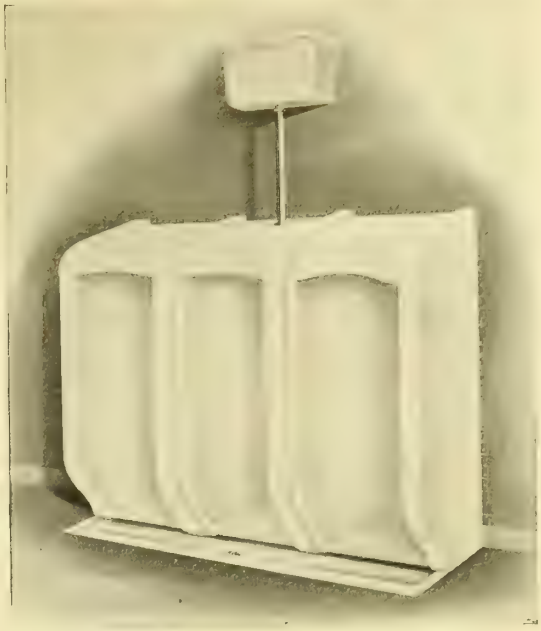


PLATE A-7
"EBCO" VENTILATED VITRO PORCELAIN URINAL

Specifications—"Ebco" Ventilated Vitro Porcelain Urinal, any number of stalls to the range, concave backs, and partitions cast integral with interlocking joints, each urinal stall to be flushed periodically from automatic flushing tank. Each urinal stall to have two points of ventilation having effective vent area of 30 square inches connected to ventilating flue. Said urinal combination to be as described on Plate A-7 in catalogue of THE D. A. EBINGER SANITARY MANUFACTURING CO., Columbus, Ohio

PLATE A-2
"EBINGER" VENTILATED OCTAGON URINAL

Specifications—"Ebinger" Ventilated Octagon Urinal, each consisting of a battery of eight stalls arranged octagonally. Each urinal back to be flushed periodically by adjustable sprays supplied from automatic urinal flushing tanks. All parts to be vitreous enameled. Each stall to have two points of ventilation, sixteen points in all, having a net vent area of 200 square inches per battery. Glass floor slabs about urinal to properly drain into trough. Said urinal combination to be as described on Plate A-2 in catalogue of THE D. A. EBINGER SANITARY MANUFACTURING CO., Columbus, Ohio

PLATE C-244
"EBINGER" WALL FOUNTAIN

Specifications—"Ebco" Vitreous Wall Fountain, fitted with vitreous china bubbler, self-closing and regulating valves, trap and supplies to wall complete as described on Plate C-244 in catalogue of THE D. A. EBINGER SANITARY MANUFACTURING CO., Columbus, Ohio. Plate C-243 same as Plate C-244 without self-closing valve

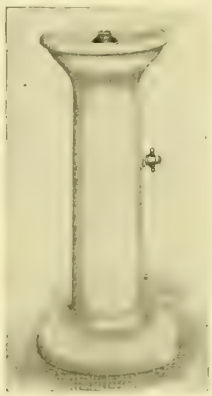


PLATE C-202
"EBINGER PEDESTAL DRINKING FOUNTAIN

Specifications — "Ebco" Vitreous Enamel Pedestal Fountain, with sanitary anti-squirting bubbler, concealed galvanized supply and waste-pipes to floor or wall; nickel-plated stop and self-closing valves. Complete as per Plate C-202 in catalogue of THE D. A. EBINGER SANITARY MANUFACTURING COMPANY, Columbus, Ohio. C-201 same as above, but without self-closing valve

Catalogue.

These descriptions are found in the catalogue of The D. A. EBINGER SANITARY MANUFACTURING CO., Columbus, Ohio.

ESTABLISHED 1873

KOHLER CO.

Manufacturers of Enameled Plumbing Ware

KOHLER, WIS.

SHIPPING POINT, SHEBOYGAN, WIS.

BRANCH OFFICES AND SALESROOMS

BOSTON, MASS., Commercial and Hanover Streets

CHICAGO, ILL, 763 McCormick Building
Telephone, Harrison 4761

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Telephone, Hiland 2678-J

NEW YORK, N. Y., 20 West 46th Street
Telephone, Bryant 3723

SAN FRANCISCO, CAL., 571 Mission Street
Telephone, Sutter 1955

LONDON, ENG., 329 High Holborn, W. C.
Telephone, Holborn 6419

BRANCH WAREHOUSES

BOSTON, MASS., Commercial and Hanover Streets
Telephone, Richmond 734

NEW YORK, N. Y., 610-612 West 39th Street
Telephone Greeley 4630

SAN FRANCISCO, CAL., 571 Mission Street
Telephone, Sutter 1955

Products.

Manufacturers of a complete line of ENAMELED IRON BATHTUBS; SITZ BATHS; FOOT BATHS; CHILD'S BATHS; SHOWER RECEPTORS; LAVATORIES, including Barber, Dental and Prison; DRINKING FOUNTAINS; KITCHEN, FACTORY and SLOP SINKS; DRAINBOARDS; SINK BACKS; LAUNDRY TRAYS; CLOSET TANKS and URINALS.

Construction.

Kohler Enameled Plumbing Ware is made in one piece, and therefore has no panels or dirt-collecting joints. All flutings and other unnecessary ornamentations have been eliminated from our patterns, thus giving them a more graceful and attractive appearance, and a more hygienic design.

Catalogue.

Our complete line is shown in Catalogues K and V. The latter is devoted exclusively to the "Viceroy" tub, the most popular one-piece, built-in bath. It has an apron from rim to floor, and is enameled on the outside as well as the inside.

The Permanent Trade-Mark.

Each piece of Kohler ware has incorporated in it the name KOHLER in faint blue letters, in the pure white enamel. This trade-mark is inconspicuous, but is easily found and is a symbol of the confidence we have in the quality of our ware.

It is your right to identify Kohler ware quickly and easily at all times. This is now possible with the imperishable trade-mark, which is a guarantee to the consumer that his enameled plumbing ware is of one quality—the highest. In addition, each piece has the name "Kohler" cast on the underside of the article in raised letters, and has pasted on it the blue and gold trade-mark label.

KOHLER
TRADE MARK

Illustration V—10—F

Illustration V—12—A

THE "VICEROY" BATHTUB

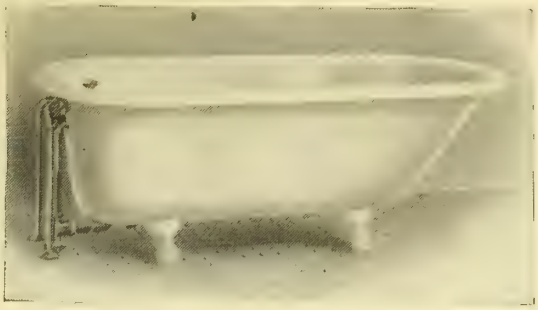
The "Viceroy" Bathtub is made in one piece, the body, rim and apron being cast integral and enameled both *in* and *outside*. Tub is made in patterns for left hand corner and recess installation, in addition to wall and right hand corner tubs as illustrated, and all are designed for sitting on a tile floor. Outlet is at right hand end on both of tubs shown, but can be furnished with outlet at left hand end and with supply and waste fixture either concealed or exposed at side, center or end of tub.

Dimensions—Sizes, 4½, 5, 5½, and 6 feet, width over rim, 30 inches; depth inside, 17 inches; width of rim, 3½ inches.

Continued on next page

V—16—L RECESS "VICEROY" BATHTUB, WITH SHOWER

Waste outlet at right-hand end. Sizes, 4½, 5, 5½ and 6 feet. For description and dimensions of bathtub see opposite page



K—64—V "COLONNA" BATHTUB

Fitted with nickel-plated brass Fuller double bath cock with nickel-plated brass handles, offset supply pipes, and connected waste and overflow.

Sizes, 4, 4½, 5, 5½ and 6 feet; width over rim, 30 inches; depth inside, 17 inches; floor to top of rim, 21½ inches; width of rim, 3 inches

K—141—D "FILMORE" LAVATORY

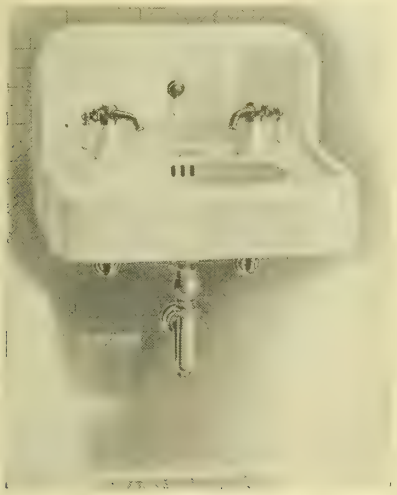
With combination supply and waste fixture

Slab, sizes	20 x 28″	24 x 34″
American basin	12 x 15″	14 x 18″
Depth of apron	4½″	4½″

K—205—E "COLUMBIA" LAVATORY

With combination supply and waste fixture

Slab, sizes	20 x 24″	22 x 27″
American basin	12 x 15″	14 x 18″
Depth of apron	5″	5″



K—332—L "EMMET" LAVATORY

With lift waste through back.

Slab, sizes	18 x 24″	20 x 24″	22 x 27″
American basin	12 x 15″	12 x 15″	14 x 18″
Height of back	10″	12″	12″
Depth of apron	5″	5″	5″

K—1005 SINK

One-piece apron sink on adjustable legs, allowing adjustment from 30 to 34 inches. Can furnish legs for sink adjustment from 32 to 36 inches

Sink, sizes	20 x 30″	22 x 30″
Height of back	12″	12″
Drainboard	24″	24″
Depth of apron	6″	6″

I X L PUMP & MFG. CO.

PATENTEES AND MAKERS OF

Simple Plumbing Specialties

957-961 North Ninth Street
958-962 North Darien Street
PHILADELPHIA, PA.

Products.

Air Chambers
Automatic Tanks, with 1¼ to 2½ inch Siphon
Ball Cocks
Basin Clamps
Battery Closets
Compound Air and Water Regulators
Factory or Mill Closets
High and Low Tank Anti-Freezing Closet Combinations
Hopper Valves (Spring and Weight)
Pitless Hopper Valves
Pipe Supports
Pull Combinations, High and Low-Down
Seat - Action Closets, High and Low-Down
Urinal Combinations
Urinal Sprays
Valve Rests
Water - Closet Seat Hinges
Also,
Air Compressors
Beer Pumps
Cellar Drainers
Expansion Bolts
I X L Sewage Ejectors
Water Lifts
Water Systems

Quality.

Our claim for superiority for I X L products lies in their simple construction, ease of installation and positive action.

No rubber balls or special washers are used. Flat washers have proved adaptable to all requirements of water-closet construction and we use them exclusively, reducing repairs to a minimum and entirely removing the inconvenience and delay, which often occur where special washers are required for repairs.

Simple Construction.

I X L Valves and Operating Mechanisms can be placed in any style tank, and used with any type of closet desired. They have no delicate or complicated parts; and because of the greater strength and corrosion-resisting qualities of red brass, we use it exclusively in their construction.

Test.

We challenge any one on the merit of I X L goods, and will gladly submit any of our products in a competitive test.

Prices.

Our prices are as low as good workmanship and first-class material will allow.

Guarantee.

All I X L goods are thoroughly guaranteed against defects of material, workmanship and operation for one year.

Catalogue.

Our catalogue fully illustrating and describing I X L Specialties will be mailed on request. We distribute our product through the plumbing trade only.

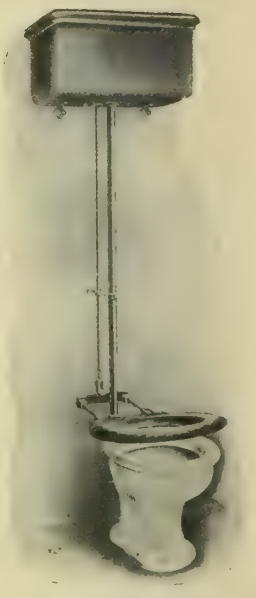
I X L "Suro" Seat-Action Closet Combination with High Tank.

The tank of this combination contains a siphon valve with flat washer on the priming tube, and the operating mechanism is of the same simple order as used in low tank "Suro" combination.

Tank can be furnished of wood, copper-lined, any finish desired, or of iron galvanized or enameled in and out, and vitreous china.

Seats can be furnished of any finish desired, either closed or open fronts, and non-raising, as shown in illustration, or full raising if desired.

Specifications for fixture as shown are as follows:



I X L "SURO" SEAT-ACTION CLOSET COMBINATION

Specification—I X L "Suro" 8-gallon oak tank, 14-oz. copper lining, golden oak finish; Plate 70, 1¼-inch "Suro" siphon valve; Plate 61, I X L high pressure ball cock; 1⅜-inch N. P. flush pipe and brackets; I X L golden oak guaranteed seat, with "Suro" non-raising N. P. brass box hinge, N. P. brass reinforcing seat strip and oblong rubber bumpers, bronzed iron operating rod; I X L vitreous china siphon jet closet; floor plate; gasket, and bolts.

I X L "Suro" Low Tank Seat-Action Combination.

In this combination the tank is fitted with a siphon valve.

The operating mechanism is of very simple construction and there are no adjustments whatever to be made inside of tank.

A flat washer is used on priming tube of siphon, obviating troublesome rubber ball so commonly used.

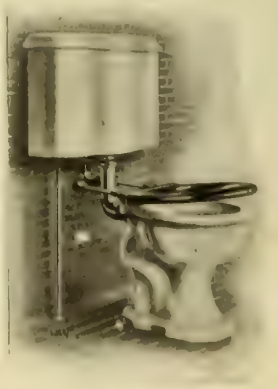
The hinge is full box, holding seat very securely.

Seats can be furnished non-raising as shown, or full raising as desired.

Tank can be furnished of vitreous china, galvanized iron, iron enameled in and out, or of any desired finish of wood, copper-lined as may be best suited to the requirements.

Any type of bowl may be used, as may be considered best for the location of the fixture.

Specifications for fixture as shown are as follows:



I X L "SURO" LOW TANK SEAT-ACTION COMBINATION

Continued on next page

Specification—I X L "Suro" low vitreous china tank and lid, fitted with 2-inch "Suro" siphon valve; I X L high pressure ball cock; 2-inch N. P. brass bend; I X L "Suro" non-raising oak seat, guaranteed; I X L "Suro" N. P. brass box hinge, with N. P. brass reinforcing seat strip, with oblong rubber bumpers; I X L vitreous china siphon jet closet; floor plate; gasket; bolts, etc.; ⅜-inch I P size, N. P. supply pipe and flange.

I X L "Factory" Closet Combination.

An ideal combination for factory use and is particularly well adapted for low pressures, such as are often found in upper floors of mills having their own tank supply.

The tank of this combination is fitted with a valve, which is a combined ball cock and supply valve.

In operation when seat is depressed, the tank fills; when seat is released, the tank flushes into closet and remains empty until seat is again depressed.

Valve contains but two small round flat washers, which give no trouble, but are readily accessible when necessary.

I X L "FACTORY" CLOSET COMBINATION

This fixture is very sturdy, has few parts and will stand most severe use without getting out of order.

The tank can be furnished of iron enameled in and out, or galvanized, and any bowl of approved type may be used.

Specifications for fixture as shown are as follows:

Specification—I X L "Factory" enameled in and out low tank and lid, fitted with "Factory" valve and "Duplex" ball cock; 2-inch N. P. bend; oak guaranteed seat with "Factory" galvanized iron seat hinge; vitreous siphon action non-overflow bowl; floor plate; bolts; gasket, etc.

No. 117. I X L Combination.

The valve of this combination is easy acting and slow closing, strongly built, and washered with flat washers, and is adaptable to any standard siphon action closet with 1¼-inch spud.

These closets are suitable for railroad depots, schools and factories, and give excellent service. The water pressure at the bowl should be at least 20 pounds.

Specifications for fixture as shown are as follows:

Specification—I X L galvanized iron pressure tank; 1¼-inch galvanized iron flush pipe; I X L N. P. pressure flushing valve, with I P coupling; I X L self-raising guaranteed oak seat, with Plate 77 "Factory" galvanized iron equalizing weight, galvanized iron reinforcing seat strip; I X L vitreous china siphon action hopper; floor plate; gasket, and bolts.

NO. 117. I X L COMBINATION

No. 107. I X L Combination.

This combination is an anti-freezing closet, and will give perfect satisfaction in any place exposed to freezing weather.

No pit is required, the valve being repaired from above floor. The valve is slow closing, eliminating all jar on supply pipes, and is washered with flat washers.

Hopper can be furnished to calk into soil pipe if desired.

Combination shown has hopper enamled inside only. Hoppers can be furnished enameled inside and out at extra cost.

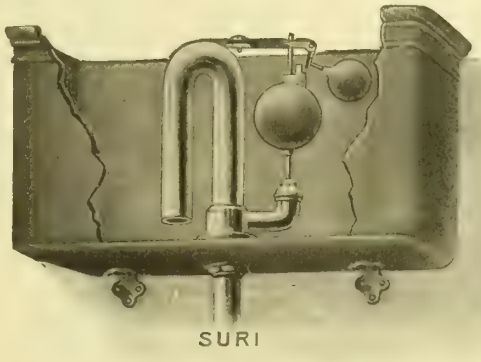
NO. 107. I X L COMBINATION

I X L "Suri" Tank.

For automatically flushing urinals, individual or range water closets. Extremely simple in construction and very positive in action. Valve is very sensitive, and will give a strong, full flush every time tank is filled, no matter how slowly tank is supplied with water.

A flat washer is used on priming tube of siphon and is readily accessible for repairs.

Siphon can be furnished with any finish of tank desired, either wood, iron or vitreous china, and any capacity from 4 gallons to 40 gallons.



SURI

I X L "SURI" TANK

I X L Urinal Spray.

Slab of urinal forms the back half of mouth of the spray, preventing corrosion.

Throws a perfect sheet of water against slab and will not splash or throw jets of water on the floor.

Sprays should be set on 24-inch centers. Furnished either back supply as shown, or top supply as desired, threaded for ½-inch I P supply pipe.

I X L URINAL SPRAY

Finished in polished brass or nickel plated.

VAN ARNAM MFG. CO.

High-Grade Closet Combinations and Samson Seats

FORT WAYNE, IND.

Products.

Manufacturers of "Samson" and "Closruf" Closet Seats, "Vanarco" Closets and Urinals, "Anti-Singing" Ball Cocks, Drain Boards, etc.

Van Arnam Quality.

All woods entering into the construction of Van Arnam seats and tanks are stored in our yards to insure perfect seasoning, this being carried to a high state of perfection in our dry kilns. This is the only method by which a raw product, measuring up to the Van Arnam standard, can be assured. Glue used is highest obtainable and is applied in a scientific manner, insuring strong adhesive qualities and preventing decomposition with age.

All brass goods manufactured from our standardized special brass composition.

The beautiful and lasting finish of Van Arnam goods is obtainable only by thorough and efficient finishing methods together with the finest stains and varnishes that money and experience can produce.

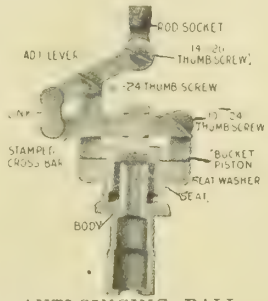
To the best of our knowledge, Van Arnam tank linings are the only ones tested under hydraulic pressure and stamped with weight of metal.

These features of Van Arnam products make their cost slightly higher than the ordinary kind, but the true value many times greater.

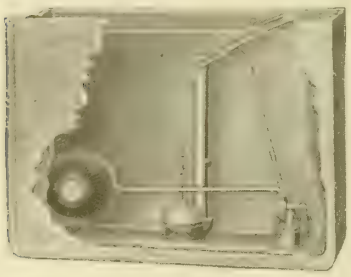
Exclusive and Special Van Arco Features.

Illustrated here are some of the features of Van Arco construction.

Anti-Singing Ball Cock—This feature alone is sufficient to give Van Arco combinations preference over all others. It will positively fill the tank without the exasperating singing noises that have driven householders and apartment dwellers to the limit of desperation.

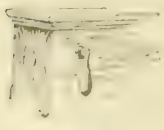


ANTI-SINGING BALL COCK
Showing details and features of construction



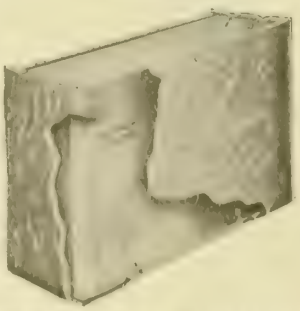
SECTIONAL VIEW OF LOW DOWN TANK
Shewing Anti-Singing Ball Cock

PUSH-BUTTON
Operates by pushing down

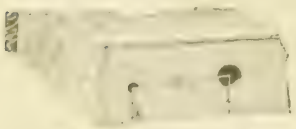


EZ-PUSH LEVER
Patented May 31, 1910
Construction

UP-OR DOWN LEVER
Patented
Operates by either pulling up or pushing down



THE VENTILATING FEATURE
The prevent sweating of tank, by circulation of air between tank and lining. Notice tongue and groove construction of tank, eliminating nails



FOR ROUGH-IN MEASUREMENTS
Showing how low tank can be set

Van Arco Closet Combination, C-5110.

This combination has the following exclusive and special Van Arco features: Anti-singing ball cock; float valve; ventilating feature; tongue and groove construction; moulding screwed on to cover to prevent warping; "catch-on" hanger; inside of tank coated with paraffin; lining tested under hydraulic pressure and stamped with weight of metal; three coats of varnish polished.

C-5110 COMBINATION

Standard Equipment

Tank—For flushing, extra heavy cast brass face plate with china index push-button. Lining, 12-ounce plain copper. Ball cock, Van Arco Anti-singing, submerged. Supply pipe, heavy, nickel-plated and annealed. Elbow nickel-plated. Wood, quarter sawed oak; color, golden. Finish, polish.

Seat—No. 550 (Samson construction). Wood, quarter sawed oak; color, golden. Finish, three coats of varnish and superb polish.

Bowl—Syphon action washdown. (Reverse Trap).

The above standard equipment will be furnished unless otherwise specified.

Plain Sawed Oak—This combination is the same as No. C-5110 quarter sawed oak described above except the wood, which is of plain sawed oak for the tank and seat.

Optional Equipment

Type—For flushing, Van Arco Up-or-down or Ezypush lever, nickel-plated or china handle. Lining, 8- to 14-ounce plain or tinned copper. Ball cock, Van Arco Anti-singing, elevated. Supply with wheel handled compression stop-cock. Offset instead of elbow, if for use with staple roll rim syphon jet bowl.

Woods and Finishes—Quarter sawed oak; color, golden or natural. Genuine or imitation light or dark mahogany. Finish, polish or flat. Other woods and finishes as specified.

Seat—No. 550 seat finished in any wood; color and finish to match tank. Or any seat illustrated on following page.

Bowl—Staple roll rim syphon jet.

Van Arco Closet Combination, C-5121.

This combination has the same features and standard equipment as the C-5110 combination, with the exception of the seat, which is our No. B-220 (Samson construction). Wood in seat and tank is plain sawed oak.

C-5121 COMBINATION

Continued on next page

If desired, optional equipment as described above may be specified.

Van Arco High Tank Closet Combination, C-6104.

In this Combination are the following special and exclusive Van Arco features: Anti-singing ball cock; tongue and groove construction; "catch-on" hanger. Tank and seat have three coats of varnish, making a handsome varnish finish.

C-6104 COMBINATION

STANDARD EQUIPMENT

Tank—For flushing, pull and nickel-plated chain. Ball cock, Van Arco Anti-singing, top supply. Flush valve, gooseneck, galvanized. Lining, 8-ounce plain copper. For hanging tank board. Wood, plain sawed oak; color, golden. Finish, varnish.

Flush Pipes—Heavy, nickel-plated and annealed. Elbow, slip-joint, nickel-plated.

Seat—No. B-22 (Samson construction). Wood, plain sawed oak; color, golden. Finish, varnish.

Bowl—Staple Roll Rim Syphon Jet.

The above equipment may be modified by the following, when specified.

OPTIONAL EQUIPMENT

Tank—For flushing, wall plate and link rod, nickel-plated. Ball cock, Van Arco Anti-singing, top supply. Flush valve, cone syphon or rubber float valve. Lining, 10- to 14-ounce plain or tinned copper. For hanging, Van Arco "catch-on" hanger.

Flush and Supply Pipes—With bottom supply ball cock, supply pipe is added.

Woods and Finishes—Plain or quarter sawed oak; color, golden or light. Finish, varnish or polish. Other woods and finishes as specified.

Seat—No. B-22 (Samson) seat in any wood, color and finish to match tank, or any seat illustrated.

Bowl—Staple roll rim. Syphon action washdown.

Van Arco High Tanks.

These tanks are equipped with the Van Arco special and exclusive features, and are regularly furnished in golden or light colored, plain, or quarter sawed oak, varnish or polish finish. Other woods and finishes as specified.

DIMENSIONS

C-102, 17 x 8 x 10 in. inside measurement, 1¼ in. Syphon
C-104, 19 x 9½ x 10 in. inside measurement, 1¼ in. Syphon
C-106, 19 x 9½ x 10 in. inside measurement, 1½ in. Syphon

"Closruf" Closet Seat.

This seat meets a long felt demand, where, on account of close roughing or for other causes, the regular hinges do not provide sufficient offset to allow seat to balance when raised.

Illustration is of our No. 260 "Closruf" closet seat, of semi-saddle shape, with heavy bar hinge.

NO. 260 "CLOSRUF" SEAT

SHOWING NO. 260 "CLOSRUF" SEAT APPLIED

"Samson" Closet Seats.

The mechanically correct construction of the "Samson" makes it the strongest seat on the market; hence the name "Samson."

There are no bolts or nuts to work loose. The mitered corners are tenoned and reinforced by strong steel clamps which hold the joints so rigidly that they cannot come apart. The clamps are specially made.

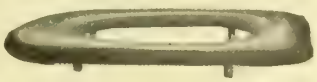
DETAIL SHOWING CONSTRUCTION OF SAMSON SEAT
Arrows show joints in seat

NO. 550 FULL SADDLE "SAMSON" SEAT, WITH HEAVY BAR HINGE AND "TURTLE-BACK" COVER

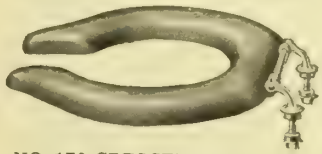
NO. 240 SEMI-SADDLE "SAMSON" SEAT WITH BAR HINGE

NO. 18 SELF-RAISING SEAT

NO. B-22 OVAL "SAMSON" SEAT WITH BAR HINGE



NO. 19 BABY SEAT



NO. 176 CRESCENT SEAT FOR RAISED LIP BOWL, TOP VIEW

NO. 178 CRESCENT SEAT FOR EXTENDED LIP BOWL, TOP VIEW

NO. 176 CRESCENT SEAT FOR RAISED LIP BOWL

NO. 178 CRESCENT SEAT FOR EXTENDED LIP BOWL

Bottom views, showing hinge and reinforcing plate

NEVER SPLIT SEAT COMPANY

Manufacturers of "Never Split" Closet Seats

1400-1408 Morgan Avenue

EVANSVILLE, IND.

Product.

"Never Split" Closet Seats.

The "NEVER SPLIT" TRADE-MARK

Specific Advantages.

Permanent steel-bolted joints are the base of the *five year guarantee* that the "Never Split" Seat will not crack, split, warp nor become loose at the joints.

"Never Split" Seats practically eliminate closet-seat repairs and replacements.

Thirteen years of service and extensive bacteriological tests have proved the durability and the sanitary perfection of these seats.

Quarter-sawed white oak is the standard material used, but the seat can be supplied in any specified wood and any specified design or finish when template is furnished.

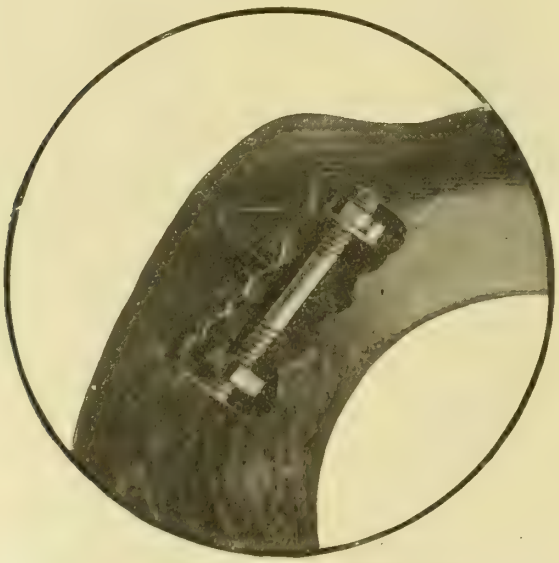


Fig. 1. DETAIL OF CONSTRUCTION

Full round or open fronts, as desired.

Construction.

The seat is assembled from four pieces of seasoned, kiln-dried wood, tongued and grooved. One of the four steel bolted joints is shown in Fig. 1. The bolts are let in at the ends of the pieces while the nuts and washers are inserted through small mortise holes at the bottom. Fig. 2 shows the underside of the seat after it has been joined and bolted together, but before it has been finished or the mortise holes filled. The nuts have been tightened until the washers are sunk into the wood, thus holding the joints together as if in a vise. When the holes have been filled and the seat finished, only a trace of them remains, and that on the underside. In a test of a stock "Never Split" seat by the Testing Laboratories of Pittsburg, Pa., the seat was alternately steamed, soaked and baked for thirty-six hours. It was then subjected to a hydraulic pull. The joints did not open, but the wood between the joints fractured at 2100 pounds.

Fig. 2. UNFINISHED SEAT

Guarantee.

All seats bearing the trade-mark of the Never Split Seat Company are guaranteed for five years from the date of purchase.

Specifications.

Architects are respectfully advised to specify: "All closet seats shall be constructed of four pieces of straight-grained wood bolted together with steel bolts, nuts and washers and shall bear the trade-mark of the Never Split Seat Company of Evansville, Ind."

Special Work.

Being in business to give the architect exactly what he requires in the way of closet seats, we are prepared to manufacture either open or closed front Never Split seats in any desired shape and size, to fit any special type of bowl, when the order is sufficiently large to warrant the additional expense incurred.

We will also match to sample any special color or finish desired.

Continued on next page

SEAT NO. 120. WHITE CELLULOID

Finished with the same special celluloid as our No. 300, shown on the right, making a handsome addition to any bathroom. Guaranteed for five years. One and one quarter-inch stock, quartered oak. Price, $7.00.

SEAT NO. 300. WHITE CELLULOID

The seat for the pure white bathroom. One and one half-inch stock, quartered oak, with special white celluloid finish, which is acid-proof and guaranteed for five years.

Absolutely sanitary, and the correct selection where elegance is considered first. Price, $10.00.

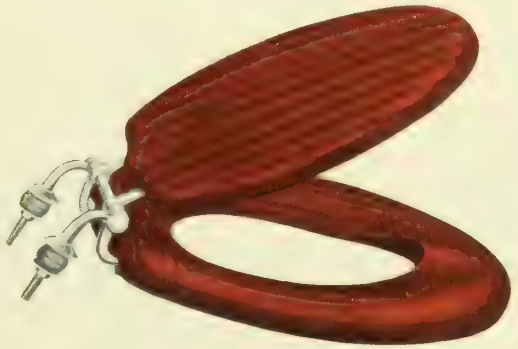
SEAT NO. 120. OPEN FRONT

One and one quarter-inch stock, cast brass, nickel-plated, offset post hinges, with bumpers attached. For low tank.

Finished in natural, antique or golden oak, varnish finish. Price, $3.25.

Finished in imitation cherry or mahogany, rub finish. Price, $3.50.

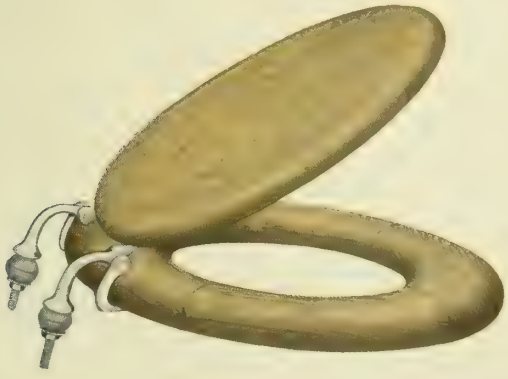
Finished in genuine mahogany, cherry, walnut or bird's-eye maple. Price, $4.25.



SEAT NO. 300

Full hand fancy saddle-shape. Fitted with heavy cast brass bar hinge. Made of one and one half-inch selected quarter-sawed white oak. Finished in natural, antique or golden oak, or in imitation cherry or mahogany, piano finish. Price, $6.25.

In genuine Mexican mahogany, cherry, walnut or bird's-eye maple. Price, $7.25.



SEAT NO. 120

One and one quarter-inch stock, cast brass, nickel-plated, offset post hinges, with bumpers attached. For low tank.

Finished in natural, antique or golden oak, varnish finish. Price, $3.25.

Finished in imitation cherry or mahogany, rub finish. Price, $3.50.

SEAT NO. 300-W

Same as No. 300, but without cover. Fitted with heavy bar hinge and stop to prevent seat from striking tank or flush valve when raised. Natural, antique or golden oak, imitation cherry or mahogany, piano polish. Price, $6.25.

In genuine Mexican mahogany, cherry, walnut or bird's-eye maple. Price, $7.25.

SEAT NO. 110-W

One and one quarter-inch stock, cast brass, nickel-plated, straight post hinges with two arms to each post, preventing seat from becoming unhinged. Bumpers attached. No cover. For high or low tank.

Finished in natural, antique or golden oak, varnish finish. Price, $2.75.

Finished in imitation cherry or mahogany, rub finish. Price, $2.90.

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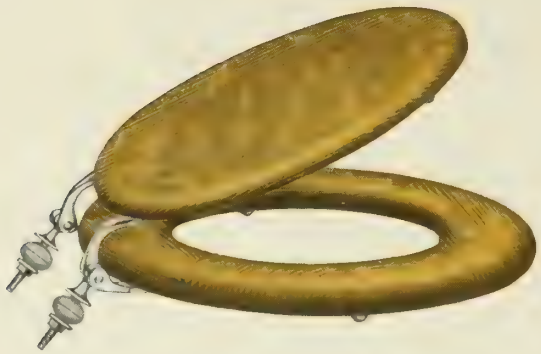
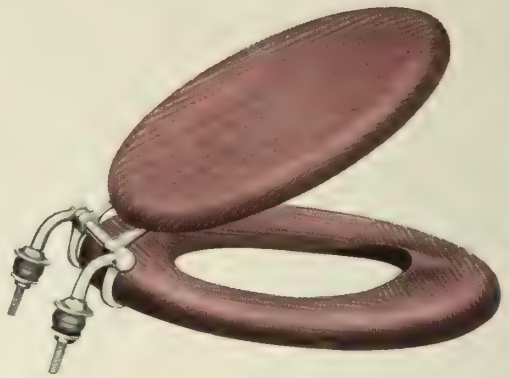


SEAT NO. 115

One and one quarter-inch stock, cast brass, nickel-plated, straight-post hinges, with bumpers attached. For high tank.

Finished in natural, antique or golden oak, varnish finish. Price, $3.00.

Finished in imitation cherry or mahogany, rub finish. Price, $3.25.



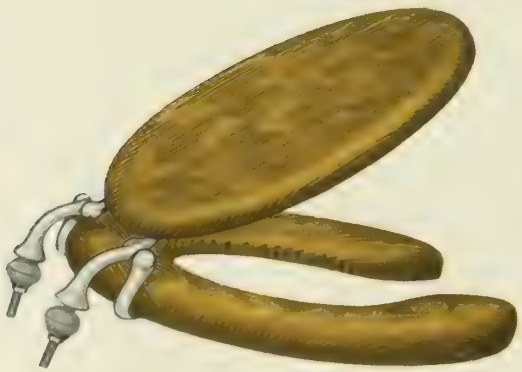
SEAT NO. 135

One and one quarter-inch stock, selected quarter-sawed white oak, hand-hollowed, saddle-shape, heavy cast brass offset bar hinges, with bumpers attached.

Finished in natural, antique or golden oak, imitation cherry or mahogany polished. Price, $4.00.

In genuine Mexican mahogany, cherry, walnut, bird's-eye maple, piano polish. Price, $5.00.

In white celluloid. Price, $8.00.



SEAT NO. 160

One and one half-inch stock, machine hollowed, heavy cast brass, nickel-plated, offset post hinges, with bumpers attached. For low tank.

Finished in natural, antique or golden oak, rub finish. Price, $4.25.

Finished in imitation cherry or mahogany, rub finish. Price, $4.50.

Also in quartered oak, genuine cherry, walnut or mahogany.

SEAT NO. 175. OPEN FRONT

One and one half-inch stock, quarter-sawed oak, without cover. Equipped with special heavy cast brass, nickel-plated, "hotel hinge," with bumpers attached. For high or low tank.

Finished in natural, antique or golden oak, rub finish. Price, $3.85.

In genuine cherry, mahogany or walnut. Price, $4.50.

White celluloid. Price, $7.00.

All open front seats can be supplied for either raised lip or extended lip bowl.

SEAT NO. 175

One and one half-inch stock, quarter-sawed oak, without cover. Equipped with special heavy cast brass, nickel-plated, "hotel hinge," bumpers attached for high or low tank.

Finished in natural, antique or golden oak, rub finish. Price, $3.85.

In genuine cherry, mahogany, walnut, bird's-eye maple, piano polish. Price, $4.50.

SEAT NO. 175

This is a view of the underside of the seat illustrated and described at the left.

It is intended to show more clearly the massive construction of our special "hotel hinge" — one of the strongest closet seat hinges ever designed, and therefore particularly suitable for installation in hotels and similar buildings where the seats are liable to receive rough usage.

THE GLAUBER BRASS MANUFACTURING COMPANY

Finest Brass Goods Made for Plumbing, Gas and Water-Works

GENERAL OFFICES AND WORKS
CLEVELAND, OHIO

BRANCHES
NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO

Products.

Glauber Concealed Valve Bath Fittings, Combination Lavatory Fittings; Faucets and Cocks for Lavatories, Tubs and Sinks; Shower Bath Fittings, Pantry Cocks, Ice Water Cocks, Sanitary Bubbler Drinking Fountains, and all other Brass Goods for plumbers and gas and water companies.

Pop Waste Lavatory Fitting.

The "Miami" pop waste combination lavatory fitting can be installed on any lavatory drilled for pop waste. It is adjustable to fit any centers. Has non-rising stem valves. Tested at the factory under 200 pounds hydraulic pressure, and *guaranteed for five years.*

GLAUBER "MIAMI"

Concealed Valve Bath Fitting.

The "Cuyahoga" concealed valve bath fitting has non-rising stem valves (¾-inch, unless ½-inch are ordered); ground seat unions for connecting the galvanized pipe; 2-inch connected waste and overflow, the fittings of which are cast; valve centers 10 inches unless otherwise ordered. Chain and plug waste. Tested at the factory under 200 pounds hydraulic pressure, and *guaranteed for five years.*

GLAUBER "CUYAHOGA"

Continued on next page

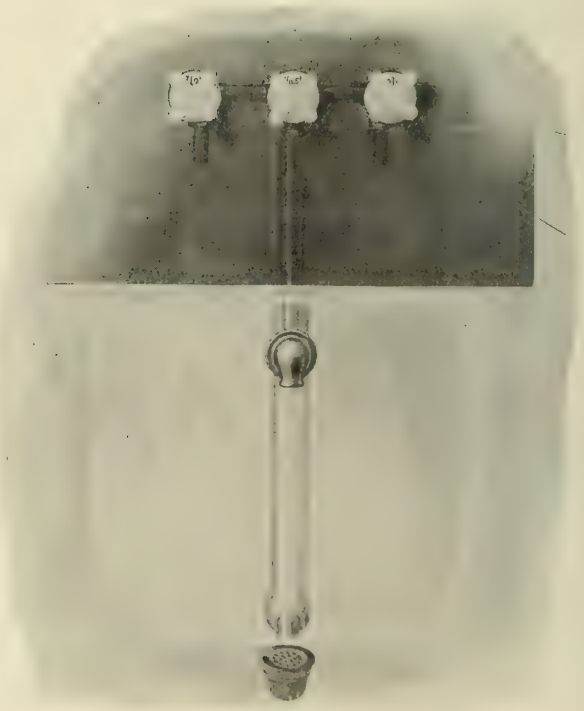
Standing Waste Combination Lavatory Fitting.

The "San Joaquin" standing waste combination lavatory fitting can be installed on any lavatory drilled for standing waste. It is adjustable to fit any centers. Has non-rising stem valves. Tested at the factory under 200 pounds hydraulic pressure, and *guaranteed for five years.*

GLAUBER "SAN JOAQUIN"

Concealed Valve Bath Fitting.

The "Sacramento" concealed valve bath fitting has non-rising stem valves (¾-inch, unless ½-inch are ordered); ground seat unions for connecting the galvanized pipe; 2-inch connected waste and overflow, the fittings of which are cast; valve centers 10 inches unless otherwise ordered. Mechanical lift waste. Tested at the factory under 200 pounds hydraulic pressure, and *guaranteed for five years.*



GLAUBER "SACRAMENTO"

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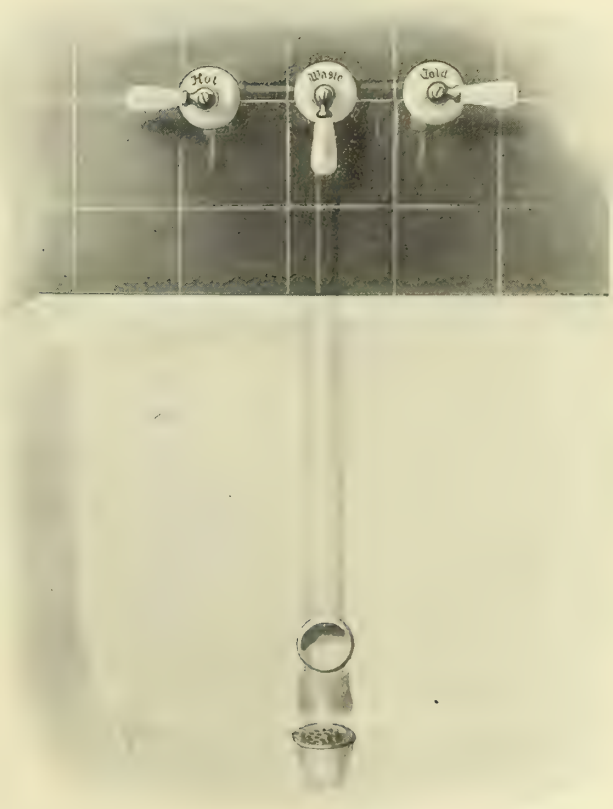
Chain and Plug Combination Lavatory Fitting.

The "Amazon" chain and plug waste combination lavatory fitting can be installed on any lavatory drilled for chain and plug waste or pop waste. It is adjustable to fit any center. Has non-rising stem valves. Tested at the factory under 200 pounds hydraulic pressure, and *guaranteed for five years.*

GLAUBER "AMAZON"

Concealed Valve Bath Fitting.

The "Arkansas" concealed valve bath fitting has non-rising stem valves (¾-inch, unless ½-inch are ordered); ground seat unions for connecting the galvanized pipe; 2-inch connected waste and overflow, the fittings of which are cast; valve centers 10 inches unless otherwise ordered. Mechanical lift waste. Tested at the factory under 200 pounds hydraulic pressure and *guaranteed for five years.*



GLAUBER "ARKANSAS"

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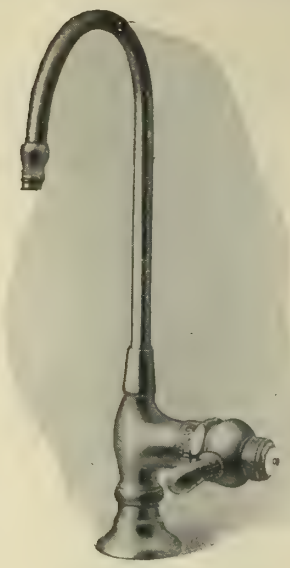
Pantry Cocks.

In addition to installation in connection with pantry sinks, our pantry cocks are especially recommended for school use. Thousands of them have been installed on laboratory tables and have been found to be superior to other makes. The "Colonel" has our "Nu-Rapid" mechanism, while the "Ensign" is self-closing. These goods captured medals of honor (highest possible prize) at the San Francisco Exposition. They are tested at the factory under 200 pounds hydraulic pressure and *guaranteed for five years.*

GLAUBER "COLONEL"



GLAUBER "ENSIGN"

Shower Bath Fittings.

The "Maryland" will serve to represent our complete line of showers with non-scalding mixing valves. Any desired type of concealed or exposed shower can be furnished.

Special Advantages—Glauber mixing valves are superior to all others in that all water is thoroughly mixed. It is a well-known fact that other mixing valves produce a shower which is either intermittently hot and cold, or one half of which is hot and the other half cold.

When so ordered, showers are fitted with Glauber combination stop-check-regulator valves, which (1) prevent the backing up of cold water into the hot supply, or vice versa, as is the case with other valves, owing to inequality of pressure resulting from water in a near-by room being suddenly turned on or off; (2) permit flow regulation so that the shower will strike the user with just the desired force—of vital importance in the case of buildings equipped with direct gravity systems, which produce excessive pressure on the lower floors; (3) serve as complete shut-offs for use in re-washering the valves.

GLAUBER "MARYLAND"

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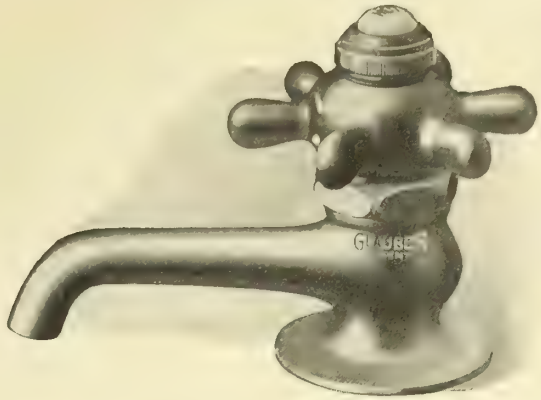
GLAUBER "WASHINGTON—F 803"



GLAUBER "ADAMS—F 803"

GLAUBER "MONROE—F 803"

GLAUBER "LINCOLN—F 803"

GLAUBER "VAN BUREN—F 803"

GLAUBER "CLEVELAND—F 803"

Patented Ball-Bearing Self-Closing Cocks.

Of the seven medals awarded to Glauber goods at the San Francisco Exposition, one was the Medal of Honor (highest possible award) covering our entire line of ball-bearing self-closing work. All the prominent manufacturers in the country competed for these honors.

The most popular members of The Glauber "family" of F 803 cocks are here shown. These are unquestionably the best self-closing cocks ever made. They have never failed to sustain this reputation when subjected to the most severe conditions, nor to outlast other makes when placed in competition, under both test and service conditions. Covered by our customary *five-year guarantee,* which goes with all Glauber goods. We warrant these cocks to be perfect, and not to open because of pressure, even though it should run up to 200 pounds, at which pressure they are tested in our factory.

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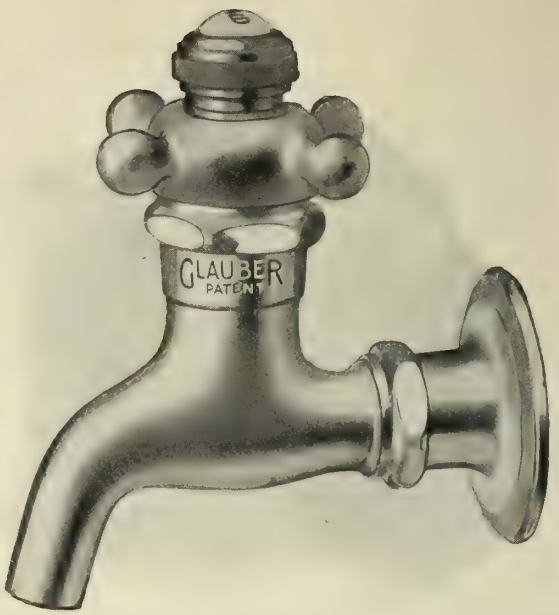
GLAUBER "NU-WON" COMPRESSION BASIN COCK



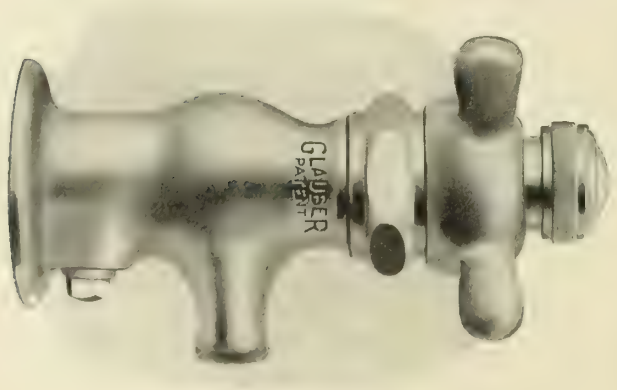
GLAUBER "HENDRIX"

Glauber "Nu-Won" Compression Cock.

Glauber "Nu-Won" is as fine a compression basin cock as can be made. Four deep, square threads, raised seat, smooth and ample, and encased seat washer, are the outstanding features. Like all Glauber faucets, it is finished as finely as a piece of jewelry, tested under 200 pounds, and *guaranteed for five years.*

Ball-Bearing Self-Closing Bibb.

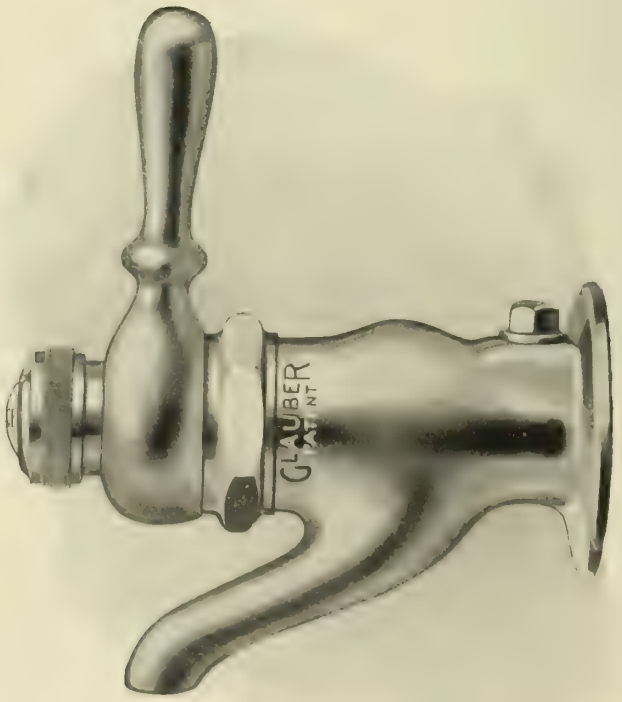
The "Hendrix" is a representative Glauber ball-bearing self-closing bibb. Furnished with nickel-plated brass lever, china sleeve lever, four-arm, six-arm or No-ti handle, when so ordered, also made for iron pipe connection, or with male or spiral flange. *Guaranteed for five years.*



GLAUBER "MORRISON"

Ball-Bearing Self-Closing Ice Water Cocks.

The "Morrison" and "Benson" are our most popular patterns of ball-bearing self-closing ice water cocks. They have regulating screws which give perfect control of the flow. Tested at the factory under 200 pounds hydraulic pressure, and *guaranteed for five years.*



GLAUBER "BENSON"

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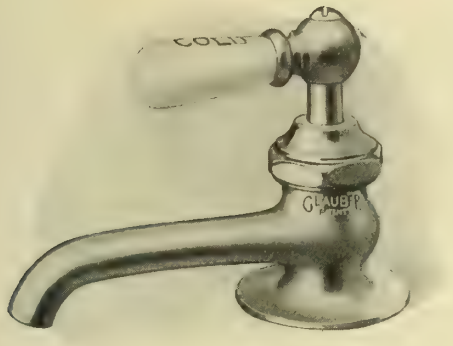
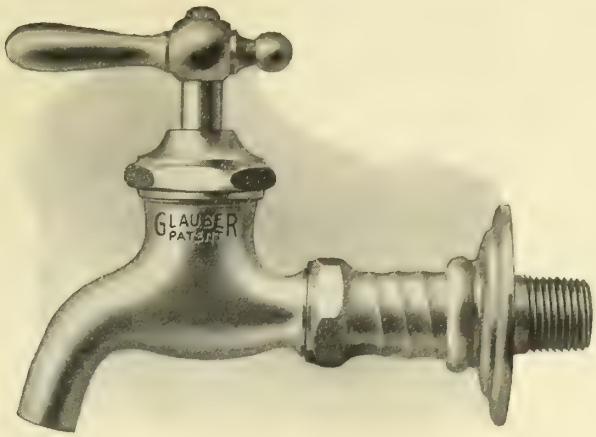
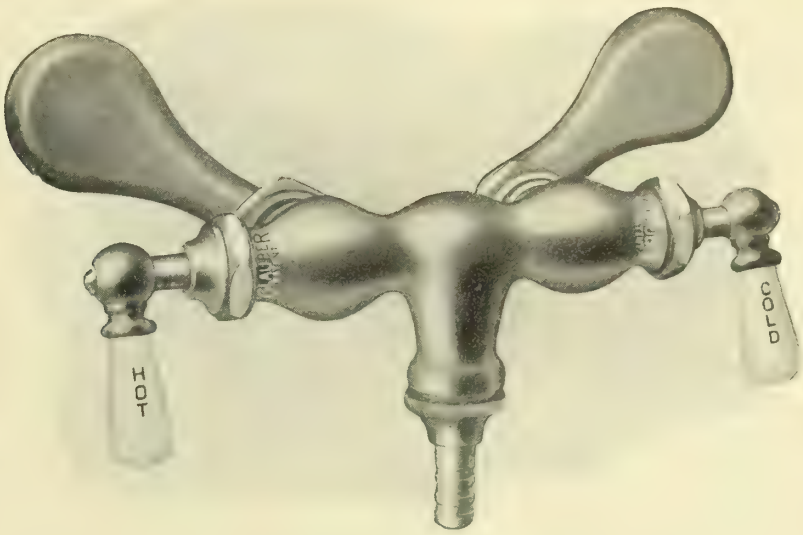


GLAUBER "JUNO" NU-RAPID BASIN COCK



"NU-RAPID" BIBB WITH SPIRAL FLANGE

GLAUBER "BAYSIDE" NU-RAPID BASIN COCK

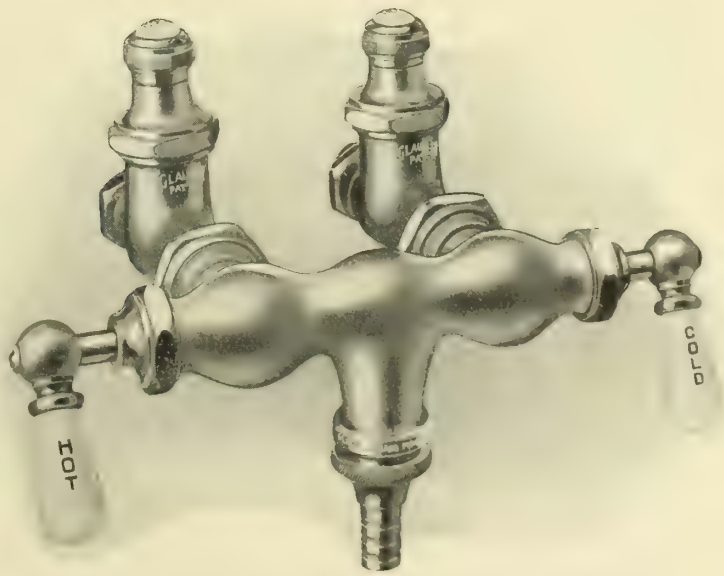


GLAUBER "LAKESIDE-ERIE" NU-RAPID BATH COCK
For recess and corner built-in tubs

Glauber "Nu-Rapid" Work.

Our "Nu-Rapid" work, examples of which are shown on this and other pages, shares with our self-closing work the distinction of being awarded the Medal of Honor at the San Francisco Exposition.

Ours are the finest quick-opening cocks that it is possible to make. They give a full flow with a quarter turn of the handle, but no city in the United States has water pressure sufficiently high to open them. Other quick-opening cocks are frequently "self-opening," because they are merely ordinary compression work with a quick thread. Our "Nu-Rapid" mechanism is patented. Each and every piece covered by our *five-year guarantee.*



GLAUBER "LAKESIDE-PACIFIC" NU-RAPID BATH COCK
For recess and corner built-in tubs

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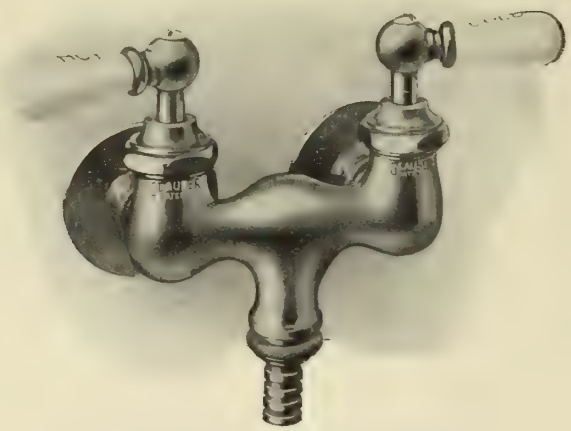
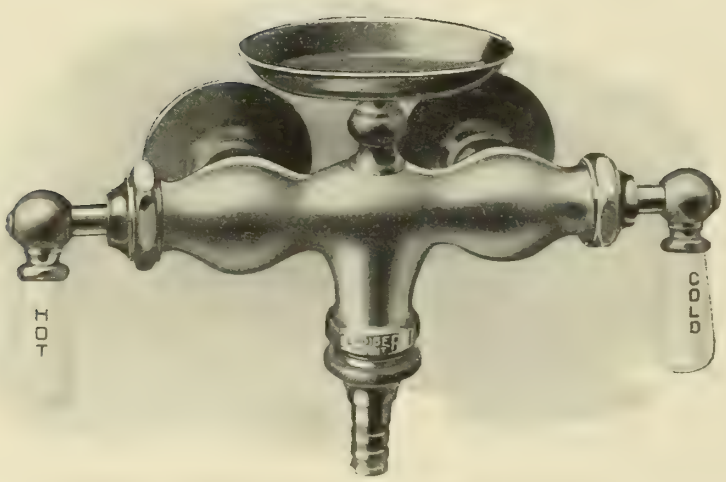
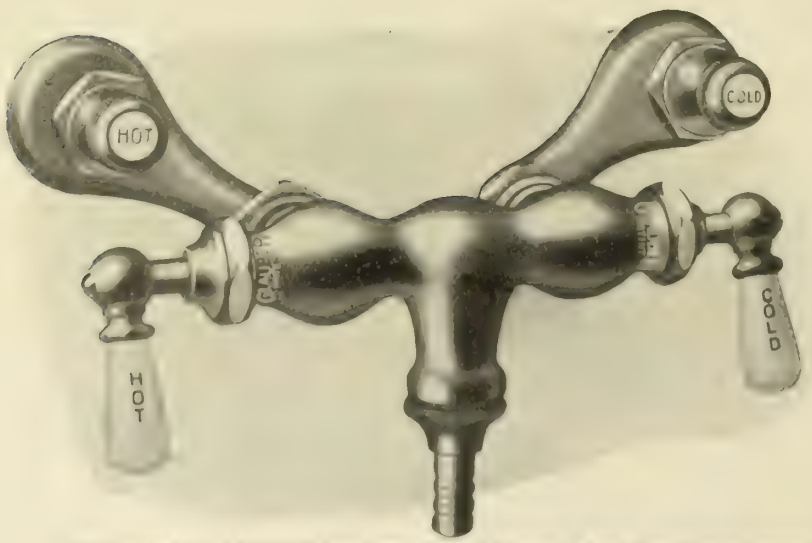


GLAUBER "CREST" NU-RAPID BATH COCK



GLAUBER "LAKESIDE NO. 5" NU-RAPID BATH COCK



GLAUBER "LAKESIDE-ATLANTIC" NU-RAPID BATH AND SINK COCK

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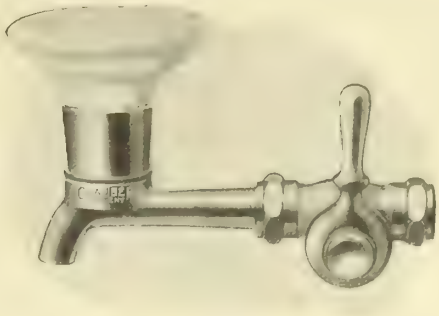
GLAUBER "CORNELL"
Self-closing

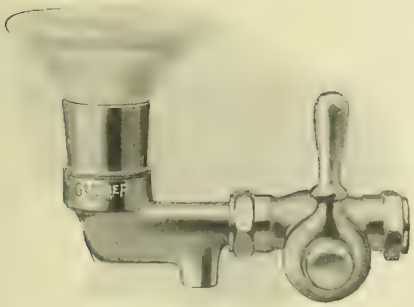
GLAUBER "HARVARD"
Self-closing or continuous flow



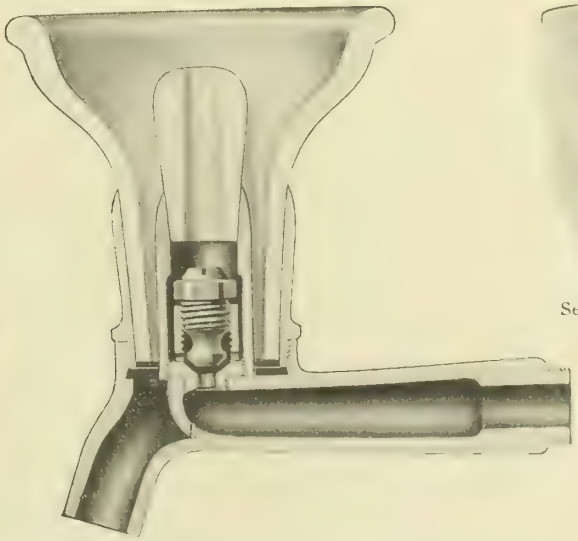
GLAUBER "GIRARD"
Self-closing

GLAUBER "PRINCETON" IN USE
Installed in this instance in connection with "Monroe" self-closing basin cock

GLAUBER BUBBLER IN USE
Shows impossibility of user touching lips to jet



GLAUBER "YALE"
Self-closing



SECTIONAL VIEW OF GLAUBER BUBBLER
Showing flow regulator

GLAUBER "PRINCETON"
Self-closing basin cock and bubbler combined

NOTE—Glauber Bubblers won the highest prize at the San Francisco Exposition

Continued on next page

Glauber Bubbler Drinking Fountains.

Because of the fact that they are so constructed that they cannot be contaminated by contact between users' lips and the jet, and because of their mechanical perfection, Glauber Bubbler Drinking Fountains were awarded the Medal of Honor at the San Francisco Exposition. We know of no other drinking fountains on the market that are both sanitary and mechanically perfect. Most of them fall short in both respects.

Glauber bubblers will be furnished with nickel-plated brass or Glauber silver metal bowls and jets when so ordered. Any Glauber self-closing bubbler may be converted into a continuous flow bubbler by turning down a regulating nut which is a part of each bubbler.

The "Dartmouth" — "Dartmouth," White Vitreous China Pedestal Drinking Fountain, fitted with "Cornell" self-closing ring bubbler.

Dimensions: Height of pedestal, 30 inches; diameter of base, 15 inches; diameter of top, 10½ inches.

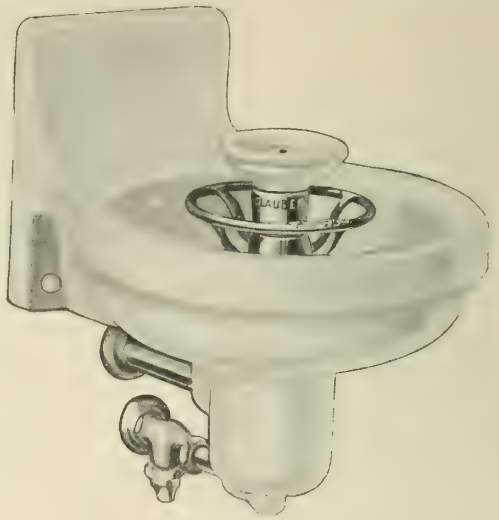
Approximate weight packed, 105 pounds.

The "Carlisle"—"Carlisle" White Vitreous China Pedestal Drinking Fountain on galvanized iron standard, fitted with "Harvard" bubbler and self-closing lever handle stop.

Dimensions: Diameter, 13½ inches; height, 30½ inches; diameter of iron base, 14 inches.

Approximate weight packed, 70 pounds.

The "Georgetown"—"Georgetown" White Vitreous China Wall Pattern Drinking Fountain with



GLAUBER "GEORGETOWN"

6-inch integral back, fitted with "Cornell" bubbler, loose key stop and nickel-plated trap.

Dimensions: Diameter of bowl, 13 inches; wall to front of bowl, 15 inches; extreme height on wall, 9½ inches.

Approximate weight packed, 60 pounds.

The "Vassar"—"Vassar" White Vitreous China Wall Pattern Drinking Fountain, fitted with "Harvard" bubbler and push-button self-closing concealed valve and brass trap.

Dimensions: Diameter of bowl, 10½ inches; wall to front of bowl, overall, 12 inches; top to bottom on wall, 10½ inches.

Approximate weight packed, 60 pounds.

GLAUBER "DARTMOUTH"

GLAUBER "VASSAR"

GLAUBER "CARLISLE"

THE GALARD COMPANY

Manufacturers of Sanitary Plumbing Specialties

327-341 Sixth Avenue

NEWARK, N. J.

Products.

MEDICINE CABINETS, WATER-CLOSET SEATS, HIGH and LOW CLOSET TANKS, MIRRORS, GLASS SHELVES, BATH STOOLS, GRAB RAILS, TOWEL BARS, TOWEL SHELVES, TOWEL BASKETS, SOAP HOLDERS, TUMBLER HOLDERS.

TRADE-MARK

Description.

Galard products are furnished in polished quadruple nickel-plate finish, or in "Omala" sanitary white finish.

"Omala" is a non-inflammable chemical preparation compounded from a secret formula. It keeps out all moisture and resists all acids. It cannot be injured by lye, potash, soap, sapolio, gases or body alkalies.

"Omala" is the white that stays white; and is guaranteed never to crack, craze, chip or blister.

"Omala" Cabinets.

These are hand-made by master wood-workers. Mirrors are of finest quality. Shelves are adjustable, and are of plate glass. Finish is hand-rubbed and polished "Omala."

"Omala" Flush Tanks.

Made of kiln-dried bent wood, they have no outside joints. Lining is of twelve-ounce cold-rolled copper, and fittings are mechanically perfect.

"Omala" Water-Closet Seats.

Made of kiln-dried, close-grained wood, and guaranteed for long service. Trade-mark and date of manufacture are indelibly stamped on every seat.

References.

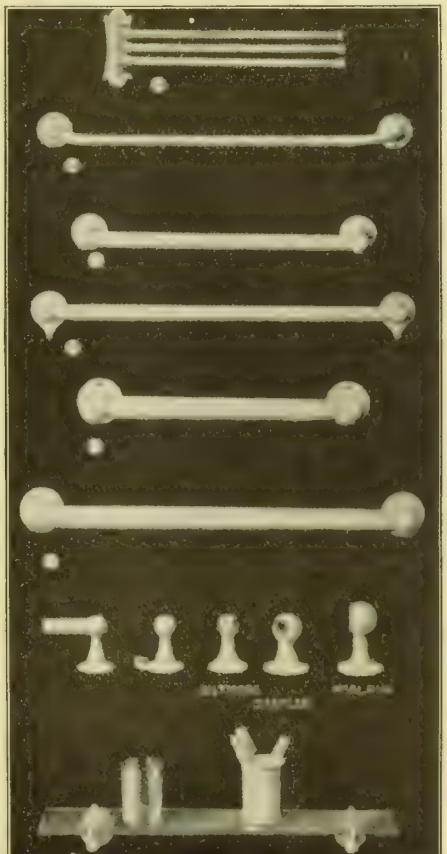
The following references speak for themselves:

BUILDINGS AND ARCHITECTS

Woolworth Building, New York, Cass Gilbert
Union Central Life Insurance Co., Cincinnati, Ohio, Cass Gilbert
Kinney Building, Newark, N. J., Cass Gilbert
Arbuckle-Havemeyer Building, Brooklyn, N. Y., Cass Gilbert
Munsey Building, Baltimore, Md., McKim, Mead & White
5th Avenue & 81st Street Apartments, New York, N. Y., McKim, Mead & White
Prudential Insurance Co., Newark, N. J., Geo. B. Post & Sons
Hotel Statler, Cleveland, Ohio, Geo. B. Post & Sons
Hotel Pontiac, Oswego, N. Y., Geo. B. Post & Sons
Stamford Hospital, Stamford, Conn., Geo. B. Post & Sons
Hotel Biltmore, New York, N. Y., Warren & Wetmore
Hotel Vanderbilt, New York, N. Y., Warren & Wetmore
Meadow Brook Hunt Club, Long Island, N. Y., Warren & Wetmore
Metropolitan Life Insurance Co. Sanatorium, Mt. McGregor, N. Y., D. Everett Waid
Englewood (N. J.) Hospital, Crow, Lewis & Wickenhoefer
Knapp Mem. Hospital, New York, N. Y., Crow, Lewis & Wickenhoefer
John Sealy Hospital, Dallas, Texas, Crow, Lewis & Wickenhoefer
Muhlenberg Hospital, Plainfield, N. J., Crow, Lewis & Wickenhoefer
Hotel McAlpin, New York, N. Y., Frank M. Andrews
Hotel Plaza, New York, N. Y., H. J. Hardenburg
Hotel Auditorium, Chicago, Ill., Marshall & Fox
Hotel Robert Treat, Newark, N. J., Guilbert & Betelle
Public Service Terminal, Newark, N. J., Guilbert & Betelle
Hotel Hermitage, Nashville, Tenn., J. E. R. Carpenter
Fullerton Weaver Apartments, New York, N. Y., J. E. R. Carpenter
Hollenden Hotel, Cleveland, Ohio, Geo. F. Hammond
San Francisco City Hospital, City Architect and Engineer

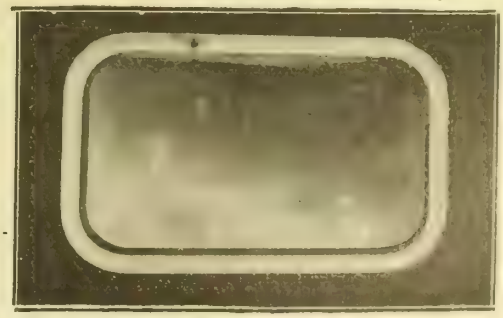
MEDICINE CABINET NO. 4

MEDICINE CABINET NO. 8



"OMALA" TOWEL BARS AND GLASS SHELF

STYLE OF MIRROR IN NOS. 9, 10, 11, 12

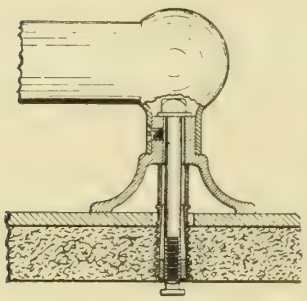


STYLE OF MIRROR IN NOS. 13, 14, 15, 16

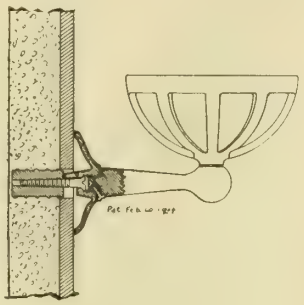
Continued on next page

Lock Type Fixtures (Patented).

These fixtures are made of heavy cast brass, and are finished in "Omala" white or in quadruple nickel-plate. The method of attaching them to the surface of a wall reduces labor expense fully seventy-five per cent as only one screw and anchor, entirely concealed in the fixture, is used, instead of the two or three screws and anchors ordinarily required. In drilling tile, marble, etc., only one hole is necessary; this allows a margin of more than one inch of wall surface between the hole and the outer edge of the fixture flange. It is, therefore, possible for the workman to drill rapidly, with less risk of blistering the exposed wall surface.



"OMALA" TOWEL BAR POST
Showing concealed fastening
When fixtures are to be locked safe, small exposed screw is replaced with a flush pin



"OMALA" SOAP HOLDER
Showing concealed fastening
When fixtures are to be locked safe, small exposed screw is replaced with a flush pin

PRICES, PATENTED LOCK TYPE ACCESSORIES AND FIXTURES

Bathroom Accessories

No.		"Omala" Finish.	N. P. Finish.
40½	Cast brass combination tumbler holder	$4.55	$3.55
41½	Cast brass combination tumbler and small soap holder	6.70	4.60
42½	Cast brass combination tumbler and large soap holder	7.05	5.00
43½	Cast brass combination tumbler and large soap holder	5.45	3.45
44½	Cast brass combination tumbler and small soap holder	4.80	3.30
45½	Cast brass soap holder (large)	3.25	2.25
18½	Cast brass soap holder (small)	2.95	1.85
2½	Cast brass tumbler holder, without tumbler	2.50	1.70
191½	Cast brass tooth-brush holder	3.05	2.00
5½	Heavy brass wire combination soap and sponge	3.62	3.07
14½	Cast brass adjustable glass shelf brackets, 5 ins., per pair	3.56	2.82
15½	Cast brass combination tumbler and tooth-brush holder (no glass)	3.43	2.28

Towel Bars, Biltmore Pattern Posts

			All "Omala" Finish.	Posts N. P.
175	18" x 1"	Cast brass two-part posts	$2.80	$2.56
176	24" x 1"	Cast brass two-part posts	3.05	2.81
177	30" x 1"	Cast brass two-part posts	3.30	3.06
178	36" x 1"	With center post	4.19	3.84
179	48" x 1"	With center post	4.74	4.39
180	60" x 1"	With center post	5.27	4.92

Towel Bars, Statler Pattern Posts

103	12" x 1½"	Cast brass posts	4.08	3.76
104	18" x 1½"	Cast brass posts	4.43	4.11
105	24" x 1½"	Cast brass posts	4.76	4.44

PRICES, REGULAR TYPE "OMALA" FIXTURES

Towel Bars, with Posts

No.	Size.	Posts.	All "Omala" Finish.	Posts N. P.
125	18" x 1"	Cast brass posts	$2.67	$2.43
126	24" x 1"	Cast brass posts	2.93	2.69
127	30" x 1"	Cast brass posts	3.15	2.91
128	36" x 1"	With center post cast brass	4.00	3.70
129	48" x 1"	With center post cast brass	4.55	4.25
130	60" x 1"	With center post cast brass	5.07	4.77
150	18" x 1½"	With razor-strop hook cast integral on each post	3.69	3.38
151	24" x 1½"	With razor-strop hook cast integral on each post	3.94	3.63

Towel Bars, One Piece 18 Gauge Bent Brass Tubing

200	¾" x 18"		1.31	.94
201	¾" x 24"		1.69	1.16
202	¾" x 30"		1.95	1.31
203	¾" x 36"		2.24	1.44

Bathroom Towel Bar Racks, Brass Castings and 18 Gauge Tubing.

125	2 bar ¾" x 18"		$2.25	$2.25
126	3 bar ¾" x 18"		4.11	3.11

Bathtub Hand Rails

100	McAlpin pattern 12" x 1½"	Cast brass posts	3.70	3.28
101	McAlpin pattern 18" x 1½"	Cast brass posts	4.05	3.43
102	McAlpin pattern 24" x 1½"	Cast brass posts	4.39	4.07

Every architect and every house-owner knows that mechanics are often careless, and that in drawing a screw tight they damage the screw-heads. With the lock type fixture no screw-heads are exposed to view. This eliminates possibilities of marring the fixture in installing and also all lodging places for the collection of dirt. Moreover, the socket is a guide for the mechanic'sscrew-driver bit.

In hotels and public or semi-public buildings, these fixtures may be locked theft-proof in position by using a flush pin in place of the little screw indicated in the details herewith, making it impossible for anybody to remove the fixture without destroying it.

"OMALA" BATHROOM ACCESSORIES

PRICES, REGULAR TYPE BATHROOM ACCESSORIES

		"Omala" Finish.	N. P. Finish.
40	Cast brass combination tumbler holder	$4.25	$3.25
41	Cast brass combination tumbler and small soap holder	6.40	4.30
42	Cast brass combination tumbler and large soap holder	6.75	4.75
43	Cast brass combination tumbler and large soap holder	5.15	3.15
44	Cast brass combination tumbler and small soap holder	4.50	3.00
45	Cast brass soap holder (large)	2.95	1.95
47	Cast brass combination soap and tumbler holder, bone china	12.80	10.00
17	Cast brass ring holder with bone china soap dish	5.65	4.65
18	Cast brass small soap dish	2.65	1.65

Note—China and glassware included in all above prices unless otherwise specified.

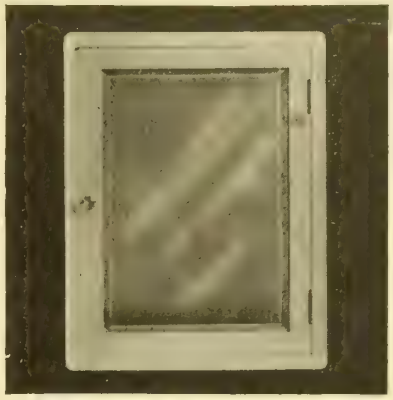
2	Cast brass tumbler holder (no glass)	2.20	1.40
6	Cast brass tumbler holder (no glass)	2.30	1.40
15	Cast brass combination tumbler and tooth-brush holder (no glass)	3.15	2.00
191	Cast brass tooth-brush holder	2.50	1.35
16	Cast brass ring tumbler holder (no glass)	2.15	1.30
7	Cast brass shell-pattern soap dish	2.40	1.50
8	Stamped brass shell-pattern soap dish	1.10	.40
30	Solid brass recess type toilet paper holder, 7" x 9" recess	13.45	11.95
31	Solid brass toilet-paper holder for sheets 5½" x 7½"	3.30	2.00
32	Solid brass toilet-paper hood for sheets 5½" x 7½"	3.30	2.00
33	Cast brass lock-type toilet-paper holder, roll type	3.30	2.50
34	Stamped brass lock-type toilet-paper holder, roll type	3.30	2.50
35	Stamped brass toilet-paper holder, roll type	2.00	1.25
46	Heavy brass wire soap holder	1.90	1.05
19	Heavy brass comb and brush holder	2.70	1.45
5	Heavy brass wire combination soap and sponge holder	3.13	2.58
9	Stamped brass soap dish with china dish	2.95	1.90
133	Solid brass wash-cloth holder, 7" bars	1.50	.75
10	Towel pin brass tubing, 7" x ¼"	.80	.45
11	Cast brass towel pin, 7½" x ⅝"	.70	.48
12	Towel pin solid brass rod, 7" x ¼"	.65	.25
14	Cast brass adjustable glass shelf brackets, 5", per pair	3.55	2.35
20	Cast brass glass shelf brackets, 5", per pair	3.05	1.75
13	Stamped brass glass shelf brackets, 5", per pair	2.95	1.70
22	Cast brass robe hook	.45	.22
23	Cast brass robe hook	.45	.22
24	Cast brass robe hook	.53	.31
25	Cast brass robe hook	.61	.38
26	Cast brass robe hook, with stamped wall flange	.70	.32
27	Cast brass robe hook, with stamped wall flange	.81	.48
28	Solid cast brass robe hook	.95	.79
29	Large robe hook, brass tubing, with stamped wall flange	1.26	.73

Continued on next page

DIMENSIONS, IN INCHES, OF "OMALA" MEDICINE CABINETS

Plate No.	Over-All Dimensions*	Inside of Cabinet	Recess in Wall	Open Recess under Cabinet	Beveled Mirror	Shelves	No. of Shelves	List Price
			SURFACE CABINETS					
4	14½x18½x6	12⅝x16¾x4½	.....	.....	10x14x ¾	12½x4x ¼	2	$12.50
5	18½x24½x6	17 x23 x4½	.....	.....	14x20x1	16½x4x ¼	3	20.00
6	22½x28¾x6	21 x27 x4½	.....	.....	18x24x1¼	20½x4x ¼	4	25.00
			FLUSH CABINETS					
8	26⅝x32½x2	21 x27 x4¼	23¼x29¼x4¼	.....	18x24x1¼	20½x4 x¼	4	27.50
9	22¾x28½x2	17 x23 x4½	19½x25¼x4	.....	14x20x1	16⅝x4 x¼	3	22.50
10	18¼x22½x2	12¾x16¾x4½	15 x19 x4	.....	10x14x ¾	12¼x4 x¼	2	16.25
11	26 x38¾x2	20⅝x26¾x4½	23¼x36 x4	20½x6 x5¾	18x24x1¼	20¼x4 x¼	4	29.50
12	22½x36 x2	17 x23 x4½	19 x32¾x4	17 x7 x5½	14x20x1	16½x4 x¼	3	23.75
13	17½x26¾x2	12⅝x16¾x4½	15 x24½x4	12⅝x4½x5½	10x14x ¾	12¼x4 x¼	2	17.50
14	15 x19⅞x1½	12⅝x16¾x4½	14½x18½x4½	.....	10x14x ¾	12½x4¼x¼	2	15.00
15	19 x25 x1½	16¾x22¾x4½	18¼x24¼x4½	.....	14x20x1	16½x4 x¼	3	18.50
16	23⅜x29⅜x1½	21 x27 x4½	22½x28½x4½	.....	18x24x1¼	20½x4 x¼	4	22.50
17	18¼x24¼x1½	16⅛x22⅛x3¼	16¼x22¼x3¼	.....	14x20	15⅝x4 x¼	3	11.75

* For Flush Types this is only for part exposed; in Nos. 8, 9 and 10, this includes loose frame (⅞" thick), adding that much to depth of cabinet.



MEDICINE CABINET NO. 17

DATA OF "OMALA" TANKS

LOW DOWN FLUSH TANKS

Plate No.	Woodwork	Lining	Capacity	Net Price	With "Omala" Finish on Metal Trimmings	With Wheel-Handle Valve on Supply Pipe
5	Bent-wood	12-ounce copper, with rolled wire top edge	8 gals.	$15.75	Add net $1.50	Add to net $1.00
6	Bent-wood	12-ounce copper, with rolled wire top edge and extra lining of corrugated fiber.....	10 gals.	17.50	Add net 1.50	Add to net 1.00

In Nos. 5 and 6 the flush valve is of the rubber ball type and of finest quality; the supply pipe is of N. P ⅜-inch brass; the flush connection is either offset or elbow as specified; and the ball cock is of the high pressure, elevated type.

In No. 5 the flushing lever is of cast brass, with a porcelain top, low down. In No. 6 the flushing lever is of cast-brass eccentric with a china handle.

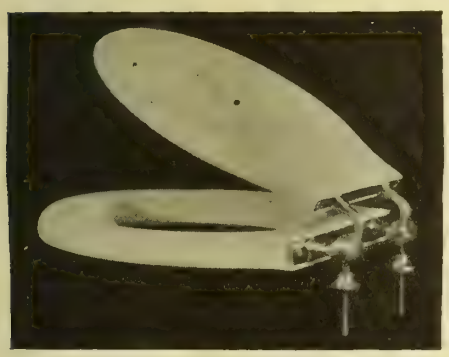
NOTE—All tanks are shippped with offset connection unless elbow connection is ordered.

ELEVATED FLUSH TANKS

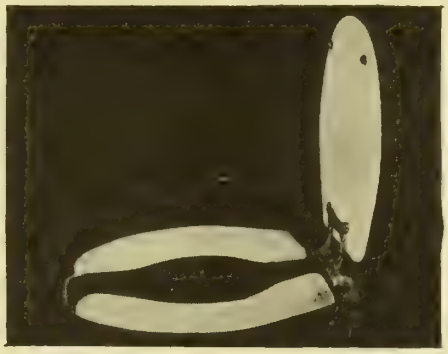
Plate No.	Woodwork	Lining	Capacity	Net Price
4	Kiln-dried wood of finest quality	12-ounce copper unless otherwise ordered	10 gallons	$15.00
4	Kiln-dried wood of finest quality	12-ounce copper unless otherwise ordered	8 gallons	13.75
4	Kiln-dried wood of finest quality	12-ounce copper unless otherwise ordered	6 gallons	12.00

Flush valve of the goose-neck siphon rubber-ball type or of the siphon cone type.
Ball cock, high pressure, for top or bottom supply.

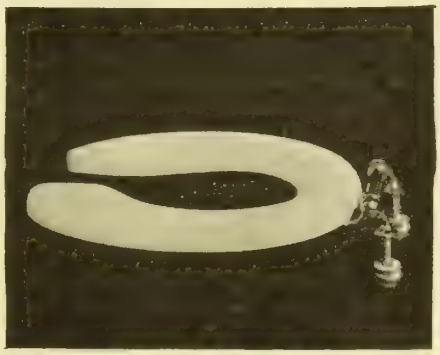
"OMALA" TANK NO. 5



WATER-CLOSET SEAT NO. 102



WATER-CLOSET SEAT NO. 52



WATER-CLOSET SEAT NO. 30

DATA OF "OMALA" WATER-CLOSET SEATS

Plate Number and Pattern		Woodwork (First quality stock)	Hinges	Bumpers	Finish	Net Price With Cover	Net Price Without Cover	With Solid Non-corrosive White Metal Hinges	With "Omala" Finished Hinges
102		Finest straight-grained kiln-dried cherry, ⅝" dowels back and front, finished 1⅜" thick.	New Galard ball type, sanitary, adjustable.	Pure rubber bar	"Omala" Premierquality	$12.50	$11.25	Add to net $1.25	
98		Same as in No. 102.	Same as No. 102	Pure rubber bar	"Omala" Premierquality	11.25	10.00	Add to net 1.25	
105		Straight-grained kiln-dried birch, finished 1⅛" full.	Same as No. 102	Pure rubber bar	"Omala" Premierquality	8.65	7.40	Add to net 1.00	
52	Divided sanitary.	Kiln-dried birch or cherry, finished 1⅜" thick.	Heavy N.P. cast brass.	Pure rubber bar	"Omala" Premierquality	14.25	13.25		Add to net $.75
48	Divided sanitary, to fit ordinary S. J. or W. D. bowl.	Kiln-dried birch or cherry, finished 1⅛" thick.	Heavy N. P. cast brass.	Pure rubber bar	"Omala" Premierquality	12.15	11.15		Add to net .75
30	Sanitary open front.	Straight-grained cherry finished full 1⅜" with hardwood ⅝" spiral-threaded dowel.	Heavy cast-brass crescent, reinforcing pattern.	Pure rubber bar	"Omala" Premier grade	9.10	7.85	With heavier cast brass hinges, add, net, .75	Add to net .50
75	Hand-shaped full saddle.	Kiln-dried cherry finished full 1⅜" with hardwood ⅝" spiral-threaded dowels back and front.	Heavy cast-brass bar.	Pure rubber bar	"Omala"	8.00	6.75		Add to net .50
60	Semi-saddle.	Kiln-dried cherry, finished full 1⅛" with hardwood ⅝" spiral-threaded dowels back and front.	Heavy cast brass.		"Omala"	7.00	5.75		Add to net .50
110	Oval	Kiln-dried birch or cherry, finished full 1⅛".	Heavy N. P. cast brass.	Rubber bar.	"Omala"	6.00	4.75		Add to net .50
2	Oval.	Kiln-dried birch or cherry, finished full 1⅜".	Heavy N. P. cast brass.	Pure rubber bar	"Omala"	6.25	5.00		Add to net .50

THE CENTRAL BRASS MANUFACTURING COMPANY

Quick-pression Faucets and Other High-Grade Brass Goods for Plumbers and Water-Works

6117-6207 Cedar Avenue, S. E.
CLEVELAND, OHIO

Products.

Ball Cocks, Basin Cocks, Bath Cocks, Bath Fixtures, Bibbs, Drinking Fountains, Lavatory Fixtures, S & W Cocks, Valves—all made in Quick-pression and Automatic Quick-pression work.

Bath Wastes and Overflows, Bath and Basin Supplies, Couplings, Ground Key and Compression Work, Lavatory Traps, Refrigerator Traps, Wash-Tray Wastes, Vent Fittings, and other Brass Specialties for plumbing purposes.

Trade-Marks.

Quick-pression. This mark is clearly stamped on all Quick-pression types. Automatic Quick-pression types are also clearly stamped. Other Central Brass products are stamped with the "Central, Cleveland" trade-mark.

QUICK-PRESSION
TRADE-MARK

Advantages of Quick-pression.

Quick-pression combines the positive seat and good wearing qualities of compression work with the quick, quarter-turn operation of Fuller work. It gives the rigidity and solidity of compression work minus the slow opening; it gives the convenience of the quick opening of Fuller work minus the hammering, the wearing down of the ball, the loosening up of parts, and the necessity of frequent repair. Quick-pression was originated, designed, patented, and is made only by The Central Brass Manufacturing Company, and should be specified by those who wish durability and thorough satisfaction in brass goods. Full information concerning Quick-pression and all other products is found in our Catalogue H.

Advantages of Automatic Quick-pression.

Automatic Quick-pression has been on the market for five years. It opens with a quarter-turn, and closes automatically. The handle turns in either direction. The action is regulated by ball-bearings, and is smooth, quick, and so easy that a child can operate it. It closes without jarring or hammering. The working-parts are few, simple, and *can all be removed in one unit without disconnecting them from one another.* The washer can thus be reached and replaced in a few seconds.

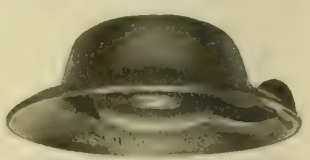
Automatic Quick-pression was originated and is made only by The Central Brass Manufacturing Company, and should be specified by those who wish the only satisfactory automatic cock. It is so far superior to any type of self-closing work that we have entirely discontinued the manufacture of the latter.

Advantages of Quick-pression Stop and Waste Valves.

Quick-pression Stop and Waste Valves possess all the advantages of Quick-pression in durability and quick, convenient action. They will not leak nor stick under any conditions, even on hot water or under ground. They are supplied with universal joints so that the waste can be turned in any direction, making the valve easy to install. They open to full flow with exactly one-quarter turn, and shut off so quickly that no overflow can occur from the pressure end. Construction is extra heavy throughout.

Sanitary Refrigerator Trap.

To install this sanitary trap, no cutting of floors, no lead pipes, pans or traps are needed. As it is always sealed, no sewer gas can escape. It can not become clogged because lifting the cap instantly removes dirt, sediment, etc. There is nothing to get out of order, and no detachable part to get lost.



SANITARY REFRIGERATOR TRAP

It is manufactured exclusively by The Central Brass Manufacturing Company, and should be specified as follows:

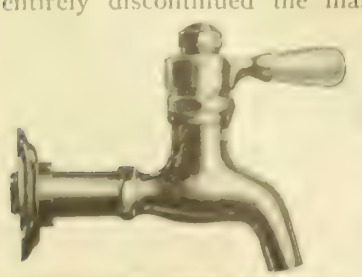
The floor opening for refrigerator connections is to be fitted with the Cleveland Deep Seal Refrigerator Trap, made by The Central Brass Manufacturing Company of Cleveland.

Guarantee.

All products of this Company are made of the best metal for the purpose for which they are intended. They have been thoroughly tested under pressure greatly in excess of any they will be subjected to in actual use, and have been carefully inspected for finish and perfection of detail. We, therefore, guarantee them to be satisfactory and absolutely free from all flaws in material, manufacture or packing. Should you find them defective in any particular, we agree to replace them or refund the money.

Catalogues.

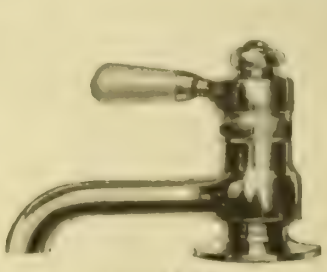
New catalogues and circulars are published frequently, and sent on request. They cover complete information concerning Quick-pression, Automatic Quick-pression, and all our other products, accessories and supplies.



AUTOMATIC QUICK-PRESSION ADJUSTABLE FLANGE PLAIN BIBB

NO. 5 QUICK-PRESSION BASIN COCK

NO. 1 QUICK-PRESSION BASIN COCK



(Lever handle)
NO. 1 AUTOMATIC QUICK-PRESSION BASIN COCK

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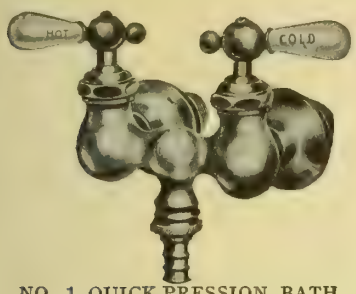
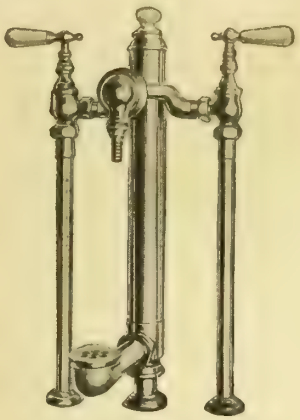
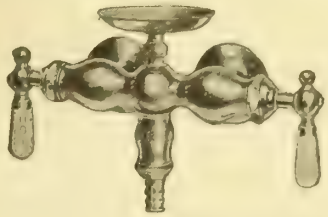


NO. 1 QUICK-PRESSION BATH COCK

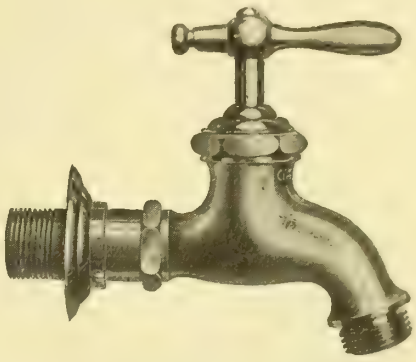


QUICK-PRESSION BATH FIXTURE

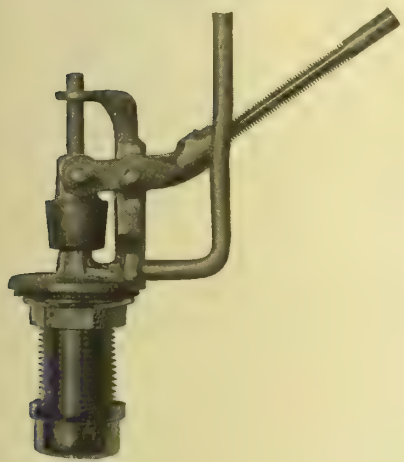


NO. 5 QUICK-PRESSION BATH COCK

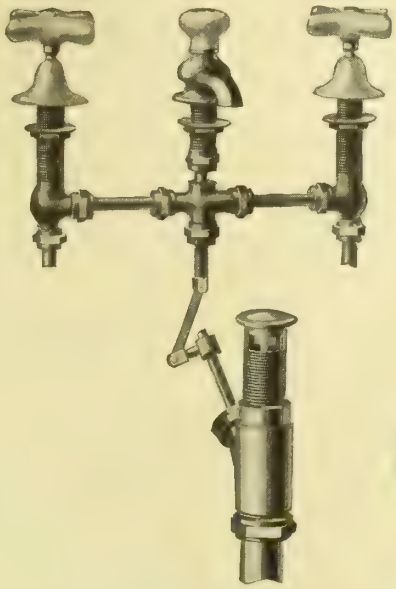
AUTOMATIC QUICK-PRESSION DRINKING FOUNTAIN



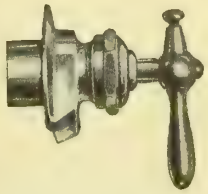
QUICK-PRESSION ADJUSTABLE FLANGE HOSE BIBB



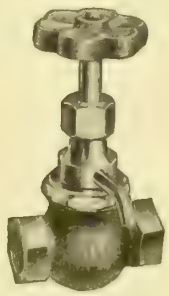
QUICK-PRESSION BALL COCK



QUICK-PRESSION LAVATORY FIXTURES



QUICK-PRESSION WASH-TRAY BIBB



QUICK-PRESSION STOP AND WASTE VALVE

SPECIFICATIONS (GENERAL)

To insure the use of highest-grade goods and most advanced construction only, specifications should be issued in the following form:

All valves, bibbs, cocks, wastes, traps, supply pipes and other brass goods required in plumbing work to be those manufactured by The Central Brass Manufacturing Company, Cleveland.

SPECIFICATIONS (Sinks)

Where non-automatic bibbs are used. — Sinks to be fitted with Quick-pression Flanged Bibbs, { Brass / Porcelain } Handle, { Nickel-Plated / Brass } Finish.

Where automatic or self-closing bibbs are used. — Sinks to be fitted with Automatic Quick-pression Flanged Bibbs, { Brass Lever / Porcelain Lever / Six Ball } Handle, { Nickel-Plated / Brass } Finish.

SPECIFICATIONS (Lavatories)

Where non-automatic cocks are used. — Lavatories to be fitted with Quick-pression Basin Cocks, { N. P. Brass / Porcelain } Handle, Nickel-Plated Finish.

Where automatic or self-closing cocks are used. — Lavatories to be fitted with Automatic Quick-pression Basin Cocks, { Porcelain Lever / N. P. Brass Lever / Six Ball } Handle, Nickel-Plated Finish.

SPECIFICATIONS (Bath-Tubs)

Bath-Tubs to be fitted with Quick-pression Bath Cocks, { Porcelain / N. P. Brass } Handle, Nickel-Plated Finish.

SPECIFICATIONS (Wash-Trays)

Wash-Trays to be fitted with Quick-pression Stub Wash-Tray Bibbs, { Porcelain / Brass } Handle, { Nickel-Plated / Brass } Finish.

SPECIFICATIONS (Stop and Waste Cocks)

All lines to be controlled by Quick-pression Stop and Waste Valves.

SPECIFICATIONS (Refrigerator Traps)

The floor opening for refrigerator connections is to be fitted with a Central Deep-Seal Refrigerator Trap.

THE IMPERIAL BRASS MANUFACTURING CO.

"Ingham" Shower Mixers, Mixing Valves, Memorial Tablets, Etc.

1211 West Harrison Street
CHICAGO, ILL.

Products.

Shower Mixers, Mixing Valves, Swimming-pool Ladders, Bronze Memorial Tablets, Mausoleum Bronzes, Brass Kick Plates, Threshold Railings, Pull and Push Bars and Plates, Marble Trimmings, Special Building Hardware.

"Ingham" Shower Mixer.

Mixes either steam or hot water with cold water for individual or multiple showers, and provides instant, absolute and constant control of water temperature. It is safe, fool-proof, economical in operation, and easy to install.

Construction and Operation.

The "Ingham" Shower Mixer consists of a cylindrical metal bell-shaped jacket, varying in height according to capacity, attached to a cast-metal base-plate, through which project two special valves connected to the cold-water and steam (or hot-water) pipes respectively. The cold water flowing through right-hand valve passes through the bent tube and dashes against center of bottom plate, whence pressure carries it to top of mixing chamber to the outlet at top, and thence to shower head.

The steam or hot water passes through the left-hand valve directly to copper coil. This coil extends almost to top of mixing chamber, terminating in a straight leg that points down through center of coil. As this leg is perforated with holes about one half inch apart, the steam or hot water, passing through the coil and down the perforated leg, spurts out in a spray directly into the cold water. The cold water arising from bottom of chamber is thus tempered by contact with the steam coil and the temperature is raised by direct action of the hot spray mixing with it.

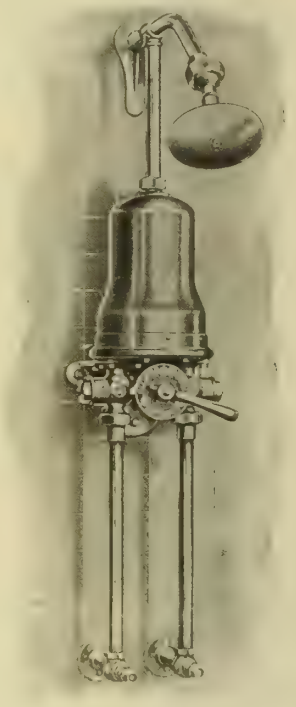
The operator has a perfect, easy control of water temperature at all times by means of an indicator handle on dial plate. The valve stems are operated by a compound cam, and the first movement of handle allows cold water to flow; turning it further opens steam valve slightly, giving a warm shower; a still further movement fully opens the steam valve, giving a shower of a higher temperature. At the end of the turn the handle meets a positive stop and any reverse movement automatically shuts off the steam, thus leaving the cold water last to be shut off and preventing live steam or scalding water from reaching the shower head or bather.

Special Advantages.

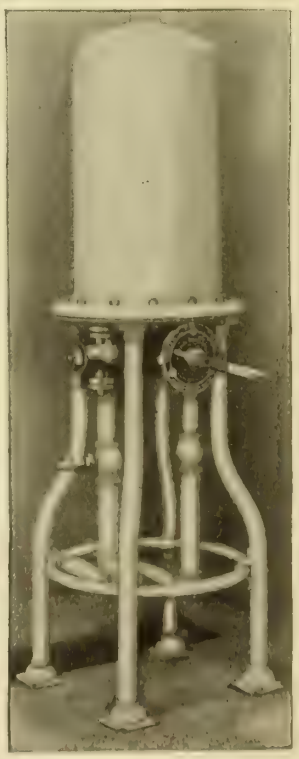
In most shower bath systems having more than one shower there is great irregularity in the water temperature. An adjustment in the water temperature of one shower may cause the water in another to suddenly change from hot to cold or from cold to hot. Severe injury often results or such changes are extremely annoying. The "Ingham" Mixer more positively prevents such changes than any other mixing device.

The "Ingham" Shower Mixer will give perfect results with steam and cold water or with hot water and cold water. Any temperature from cold to boiling can be maintained with no adjustment and always under control of the operator. There are no valves to pack, no drippings or traps requiring attention; it is self-cleaning, taking care of all sediment, dirt and gravel; and is practically noiseless. The "Ingham" may be used to control any number of shower heads with the same ease and simplicity as one.

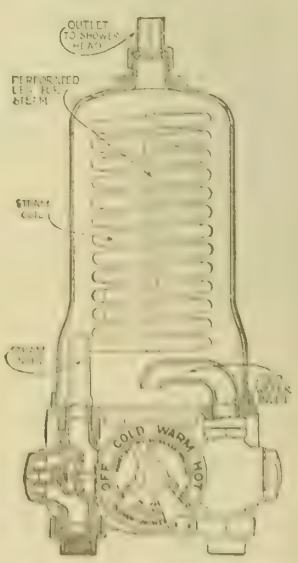
The "Ingham" Mixer produces the desired temperature of water from the very start of flow. No time is lost testing temperature of water; therefore the efficiency of shower bath is greatly increased. The "Ingham" is perfectly automatic, and saves thirty per cent of water, fifty per cent of steam and fifty per cent of time. It absolutely prevents sudden changes of temperature, whether used with a single or with multiple showers.



"INGHAM" SHOWER MIXER
Showing Individual Installation



"INGHAM" SHOWER MIXER
For Multiple Showers



"INGHAM" SHOWER MIXER
Sectional View, Showing Simple Mechanism

Continued on next page

Installation.

When the "Ingham" Mixer is installed the maximum temperature of water from shower head is determined. This is usually placed at 110 or 115 degrees. To arrange this, close the loose key valves that are placed about twelve inches below the special mixer valve on both cold and hot supplies. Open the indicator handle that operates the special mixer valves until the pointer indicates "Hot." Now open the loose key valve on the cold-water supply until the desired volume and pressure of cold water comes from the shower head. Allow the cold water to run and open the loose key valve on the steam or hot-water supply until sufficient steam or hot water is admitted to the mixing chamber (through the special mixer valve) to bring the water coming from the shower head to the predetermined temperature of 110 or 115 degrees. Removing the keys from the loose key valves permits of no variation of the amount of cold water and steam or hot water that may enter the mixing chamber, consequently the operator is bound to secure the same temperature at a given point on the indicator plate, day after day.

Sizes and Capacities.

The "Ingham" Shower Mixer is made in the following sizes:

No. 1 Mixer controls one shower head
No. 2 Mixer controls four shower heads
No. 3 Mixer controls eight shower heads
No. 4 Mixer controls twelve shower heads
No. 5 Mixer controls eighteen shower heads

Shower Heads and Accessories.

We make and furnish shower heads and rings and furnish mixers, complete with all accessories if desired.

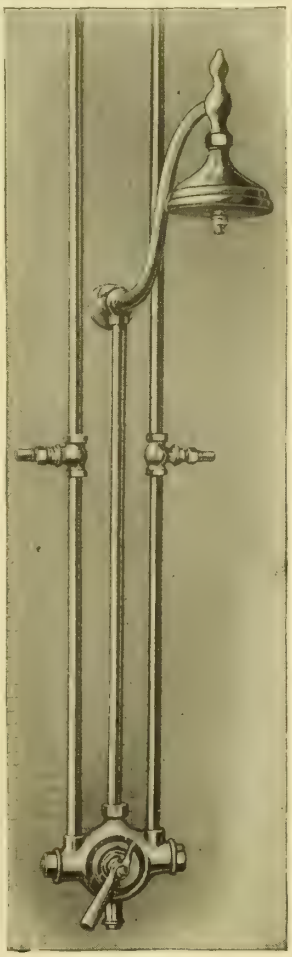
References.

The "Ingham" Mixer is in use at the University of Chicago, University of Wisconsin, Parental School of Chicago, South Park Play Grounds of Chicago, North Central High School of Spokane, Wash., Illinois Athletic Club, Chicago, and many other prominent institutions, as well as hundreds of private residences.

"Ingham" Mixing Valve.

Mixes hot and cold water for individual shower installations. Is furnished complete as shown in illustrations, every detail being high-grade in every respect.

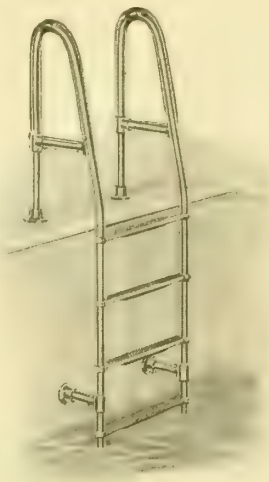
There is nothing about the "Ingham" to foul or clog up. No strainer is required. Although "foolproof," the turn of a wrench makes all working parts instantly accessible, cleanable, sanitary. The automatic drain cleans both valve and shower pipe of water, when apparatus is not in use, and is a safety signal should anything be wrong. With scalding impossible, temperature being under instantaneous control, the "Ingham" Mixing valve is ideal for hotels, gymnasiums, both private and public sanitariums, parks and residential use.



"INGHAM" MIXING VALVE
Typical Individual Installation

Imperial Swimming-Pool Ladder.

Made of big, sturdy, good looking solid brass tubing, so heavy and well-built it will stand the maximum of wear for years. Note how close to the wall it is set. This is the big safety-first feature, making it absolutely impossible for any swimmer to become caught *behind* the ladder. Steps are corrugated and heavily reinforced. Every detail has been worked out to make it the acknowledged masterpiece in swimming-pool ladders.



"IMPERIAL" BRASS SWIMMING-POOL LADDER

Specifications — Uprights usually made of 2 or 2¼ inches by No. 12- or No. 14-B & S gauge, seamless brass tubing. Cast rungs 18, 20 or 24 inches on center, of manganese bronze, accurately machined to fit uprights and securely fastened to same. Flanges to fasten ladder to wall; ends of uprights 6 inches below floor line so they can be set in cement.

Ladders made also of silver bronze.

We always ship ladders complete ready to install.

Special ladders made from architects' specifications given prompt attention.

Memorial Tablets, etc.

We are prepared to make up bronze tablets or special bronze work of any description according to architects' drawings, or will submit sketches on request.

BRONZE MEMORIAL TABLET

HOFFMANN & BILLINGS MFG. CO.

MANUFACTURERS OF

High-Grade Plumbing Fixtures

MILWAUKEE, WIS.

Products.

HIGH-GRADE PLUMBING FIXTURES: "NIEDECKEN MIXERS"; "NIEDECKEN MIXER" ANTI-SCALDING VALVES; SHOWER and NEEDLE BATHS with "NIEDECKEN MIXERS"; SHAMPOO FIXTURES; PLUMBERS' BRASS WORK; COMPRESSION WORK; FULLER WORK; SELF-CLOSING WORK; BASIN COCKS; BATH COCKS; BELL SUPPLY FIXTURES and HOSPITAL FIXTURES.

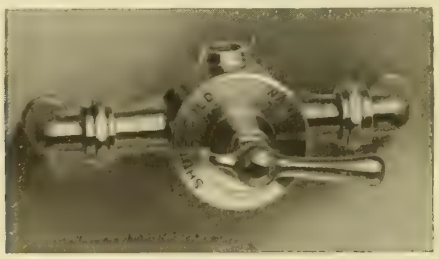
"Niedecken Mixer."

The illustration gives an idea of the general appearance of the "Niedecken Mixer."

The construction is the most substantial possible, and the principle, being compression, eliminates all cams and springs.

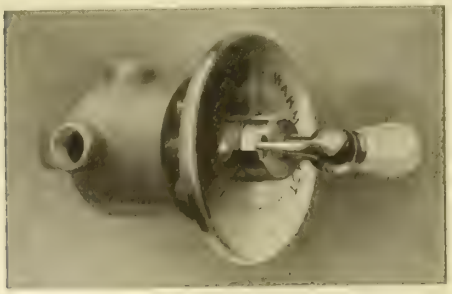
The valve seats are renewable, making it possible to keep the valve at all times in perfect condition, even after years of use.

The anti-scalding feature is especially important, and consists of a device by means of which the valve can be set to a predetermined temperature.



"NIEDECKEN MIXER" (PATENTED)

N 4000	½-inch Inlets and Discharge	$18.00
N 5002	¾-inch Inlets and Discharge	25.00
N 5005	1-inch Inlets and Discharge	35.00



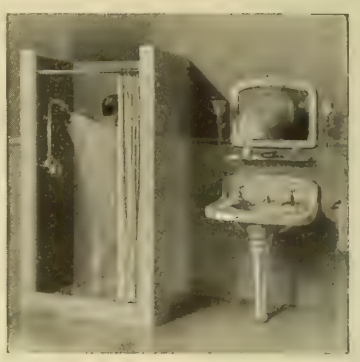
CONCEALED "NIEDECKEN MIXER" (PATENTED)

N 5015	½-inch Inlet and Discharge	$18.00
N 5017	¾-inch Inlet and Discharge	25.00
N 5020	1-inch Inlet and Discharge	35.00
Add for Cover Dial Plate		2.50

Hotel and Residence Installation.

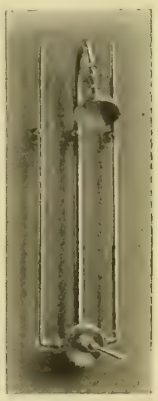
N 5070 shows the typical hotel and residence type of shower installation, namely, the fixture on the side and near the front of the shower stall. The shower head is placed five feet six inches above the floor.

That type of installation permits the bather to adjust the shower before the water strikes the body, and the location of the shower head enables the bather to take simply a body bath without wetting the head.



N 5070, HOTEL AND RESIDENCE INSTALLATION

N 4050



N 4055

N 4100

N 4050	½-inch Supplies	$25.00
N 4055	½-inch Supplies	28.00
N 4100	½-inch Supplies	25.00
Add for China Dial for N 4100		2.50

INSTALLATIONS

Hotel Statler, 1000	Cleveland, Ohio
Hotel Statler, 800	Detroit, Mich.
Hotel Astor, addition	New York, N. Y.
Hotel Pontchartrain, addition	Detroit, Mich.
Hotel Hollenden, addition	Cleveland, Ohio
Hotel Severin	Indianapolis, Ind.
Hotel Gibson	Cincinnati, Ohio
Hotel Adolphus	Dallas, Tex.
Hotel Wisconsin	Milwaukee, Wis.
Hotel Pfister	Milwaukee, Wis.
Y. M. C. A.	Detroit, Mich.
Y. M. C. A.	Boston, Mass.
Y. M. C. A.	Cleveland, Ohio
Y. M. C. A.	Richmond, Va.
Y. M. C. A.	Milwaukee, Wis.
Buckstaff Baths	Hot Springs, Ark
Imperial Baths	Hot Springs, Ark
Wm. Mayor Baths	Chicago, Ill.
Graine Stewart Baths	Chicago, Ill.
Wilder Charity Baths	St. Paul, Minn
Columbia University	New York, N. Y.
University of Michigan	Ann Arbor, Mich.
Iowa State College	Ames, Iowa
Milwaukee Hospital	Milwaukee, Wis.
Cleveland Athletic Club	Cleveland, Ohio
Exmoor Country Club	Chicago, Ill.
Denver Country Club	Denver, Colo.
Rochester Country Club	Rochester, N. Y.
Flint Vehicle Club	Flint, Mich.
Y. W. H. A	New York, N. Y.

L. E. KNOTT APPARATUS COMPANY

Manufacturers of Sanitary Drinking Fountains

TELEPHONE, CAMBRIDGE 4700

79-83 Amherst Street

CAMBRIDGE, MASS.

BRANCH OFFICE: NEW YORK, N. Y., 70 Fifth Avenue—Telephone Connection

Products.

SANITARY DRINKING FOUNTAINS, for Schools, Public Buildings, Factories, etc.; SPECIAL PLUMBING FIXTURES for Laboratory use.

For Science Laboratory Furniture, see our name in General Index.

Sanitary Drinking Fountains (Bubblers).

Designed to overcome the difficulties arising from the rapid variations in water pressure.

A uniform height of stream is maintained under wide variations of working pressure by means of a substantial, carefully fitted plunger valve (see Plate K-615), so designed that this uniform height of stream is maintained without danger of being clogged by unfiltered water. *Sanitary,* because the exterior form is such that the entire surface is washed by the flowing water. It is made *non-squirting* by means of properly located by-passes, so that in use the surrounding floor area and adjacent walls are always dry—an indispensable feature in school buildings. Adapted for use where numerous outlets are located on a single line of pipe.

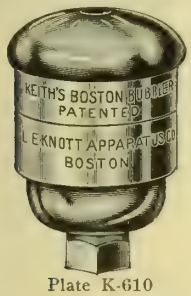


Plate K-610

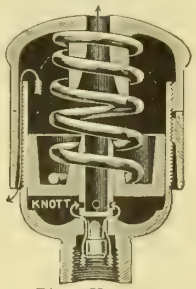


Plate K-615

Patented October 25, 1910; March 5, 1912
Other Patents Pending

Plate K-610 shows the bubbling head shaped so that entire metal surface is washed continually.

Plate K-615 is a sectional view, showing in detail all working parts.

Each bubbler is tapped ¼-inch iron pipe size female thread, and can be attached to any drinking fountain.

Type AA delivers a one quarter inch stream and is recommended when a continuous flow is required.

Type BB delivers a three eighth inch stream and is recommended when flow is controlled by a valve.

Price of Bubbler Head, with either size opening, $6.30.

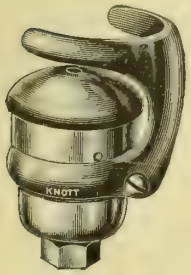


Plate K-625
With half-circle guard

Patented October 25, 1910; March 5, 1912
Other Patents Pending

Plate K-625 shows regular bubbler with U-shaped or Half-circle Guard.

Price, Guard only, $1.50.

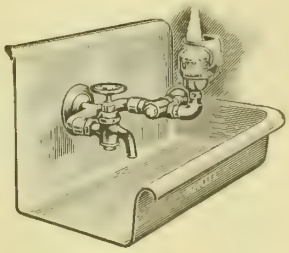


Plate K-650
Attached to double-arm outlet

Patented October 25, 1910; March 5, 1912
Other Patents Pending

Recommended for use in places where there is room for but one fixture and it is necessary to use a faucet independently of the bubbler.

Bubbler, Guard and Plumbing Fixtures complete, without Sink, $15.55.

THE KEITH BOSTON BUBBLERS

Discounts.

Discounts arranged to permit handling through usual channels.

Method of Application.

The essential part of the drinking fountain is shown in section in Plate K-615. The particular form of mounting is best determined by location and conditions of use. A few suggestions may be obtained from illustrations shown on this page. A more complete list of suggestive fittings will be found in our catalogue devoted to Sanitary Drinking Fountains.

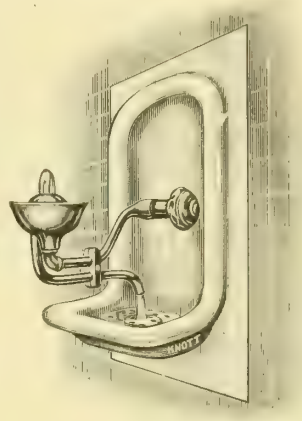


Plate K-605
WALL DRINKING FOUNTAIN
Patented October 25, 1910; March 5, 1912
Other Patents Pending

Designed for use in recessed wall receptacles.

Price complete, without Wall Receptacle, $16.05.

References.

Boards of Education in thirty-nine States.

School Systems at Cambridge, Mass., and elsewhere.

Manufacturing Plants: Goodyear Tire and Rubber Co., of Akron, Ohio, and many others.

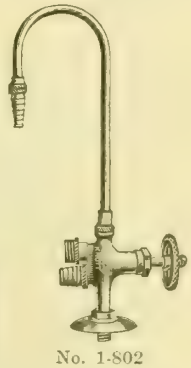
The Knott Plumbing Fixtures for Science Laboratories.

Interchangeable Triple Nozzle Water Faucets—Used throughout on our laboratory furniture. (See our name in General Index.)

Heavy brass with full nickel finish. Furnished in three styles—straight, bent, and gooseneck—each with one half inch pipe thread. Each has three attachments; two serrated for rubber tubing connections, from ¼ to ¾ inch diameter, the third being a regular threaded hose rib coupling.

No. 1-800

No. 1-801



No. 1-802

INTERCHANGEABLE TRIPLE NOZZLE WATER FAUCETS

No. 1-800 Straight Faucet.....$2.00
No. 1-801 Bent Faucet..... 2.35
No. 1-802 Gooseneck Faucet..... 2.60

Lever-Handle Serrated Nipple Gas Cocks—Lever Handle. Long serrated ends with five sharp serrations, making it easy to slip on rubber tubing, but impossible to pull it off accidentally.

No. 1894A

No. 1902

LEVER-HANDLE SERRATED NIPPLE GAS COCKS

No. 1894a ¼-inch Gas Cock.....$0.45
No. 1896 Gas Turret with one Gas Cock..... 1.30
No. 1898 Gas Turret with two Gas Cocks..... 1.70
No. 1900 Gas Turret with three Gas Cocks..... 2.10
No. 1902 Gas Turret with four Gas Cocks..... 2.50

M. H. FOUNDRY & MANUFACTURING CO.

Sanitary Bubblers and Bubble-Fonts

BELLEVILLE, ILL.

Products.

"20TH CENTURY" BUBBLERS and BUBBLE-FONTS.

Features.

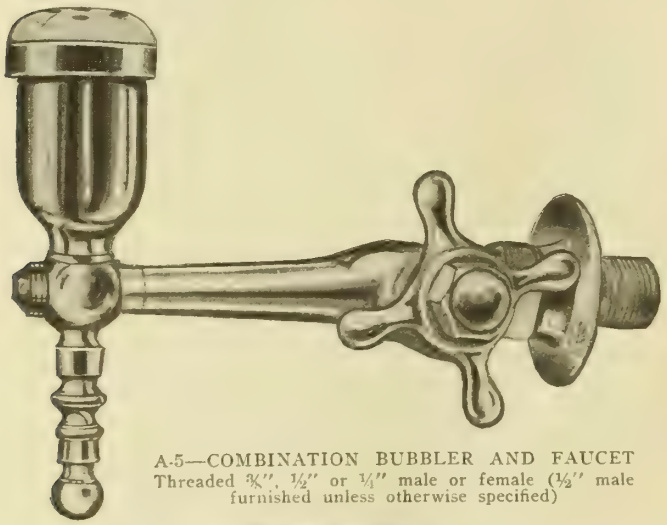
Non-corrosive, non-squirting porcelain top; attachment for regulating height of stream; self-closing stop, eliminating waste of water; reversible head; simple construction; attractive appearance without superfluous parts; easily installed; stream of uniform height and volume; fixture designed for hard usage.

These bubblers are absolutely sanitary. The stream removes instantly any germs or foreign matter that may lodge on the top. The self-covering fixture, where installed, prevents the lodgment of such injurious substances.

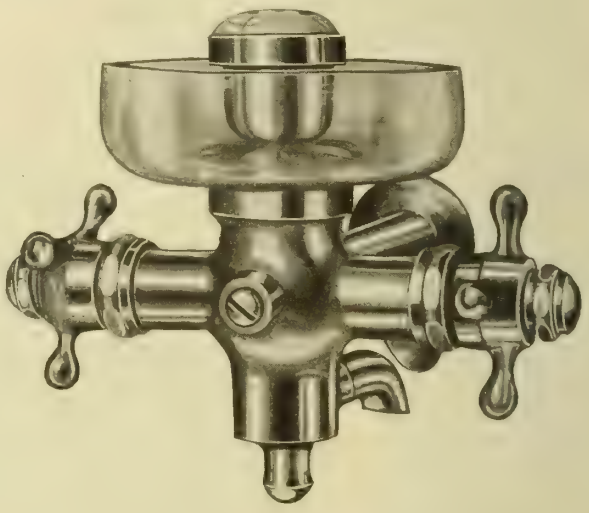
Each bubbler is thoroughly tested, before shipping, under one hundred and twenty pounds per square inch hydraulic pressure.

Catalogues.

Write for Catalogue G.

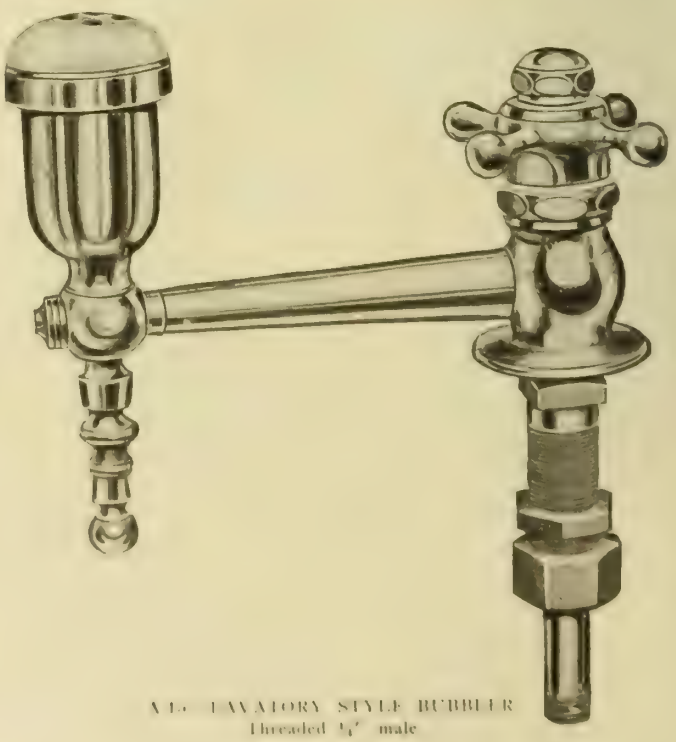


A-5—COMBINATION BUBBLER AND FAUCET
Threaded ⅜", ½" or ¼" male or female (½" male furnished unless otherwise specified)



A-12—COMBINATION BUBBLER AND DRAW COCK
Threaded ⅜", ½" or ¾" male or female (½" female furnished unless otherwise specified)

A-2—CONTINUOUS FLOW HEAD
Threaded ¼", ⅜", ½" or ¾" female (½" furnished unless otherwise specified)



A-15—LAVATORY STYLE BUBBLER
Threaded ¼" male

WOLVERINE BRASS WORKS

GRAND RAPIDS, MICH.

REPRESENTATIVES IN ALL LEADING CITIES

Products.

Exclusive Manufacturers of Peerless Self-Closing Basin Faucets and Sink Bibbs.

Advantages.

The self-closing feature of the Peerless faucets renders them especially valuable in public buildings, hotels, etc., where faucets are liable to be left open and are subjected to all kinds of abuse.

They are self-closing, but can easily be changed for hand operation.

Do not require regulation for high or low pressure, as they work the same with either, and operate easily.

Spring is concealed from the water, which keeps it from rusting and corroding, thus prolonging the life many times.

The spring is at rest when faucet is closed, and is not subjected to continuous tension as is the case with other self-closing cocks. This feature also tends to lengthen the life of the spring.

This faucet is guaranteed not to hammer under any condition. Spring is so constructed on the eccentric that it takes up all lost motion liable to occur by wear.

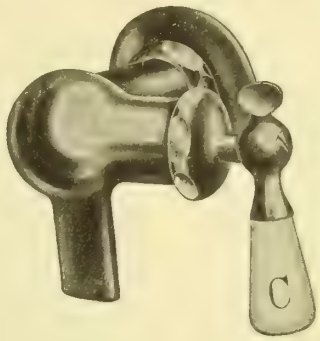
Breakage of spring does not render the faucet useless, as it can be closed and operated by hand until the spring can be replaced, preventing flooding of building and damage to property.

Materials.

Peerless self-closing work, body and union nut, made from deep red metal. All working parts made from phosphor bronze.

Finish.

Peerless faucets and bibbs are handsomely finished in polished brass and nickel plate, with china handles marked for hot and cold water, and with china base. They are graceful in design, and make an harmonious appearance when used with high class plumbing fixtures.



PEERLESS SELF-CLOSING BIBB
½-inch and ¾-inch male or female threads

Test.

Peerless faucets have been tested on a water pressure of 118 to 198 pounds for over one million complete operations, without one change of washers and with only a slight sign of wear on the bearings.

Testimonial.

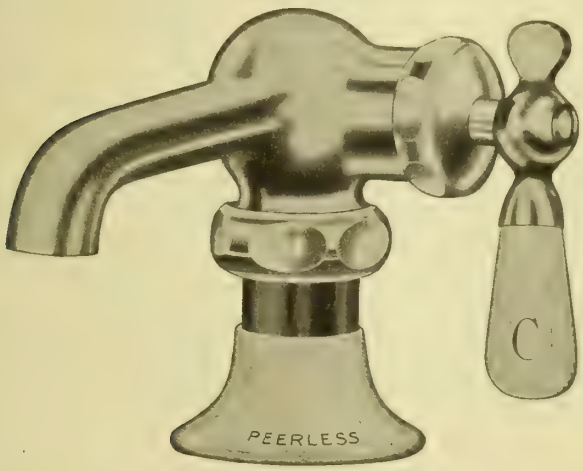
M. H. Walker Realty Company,
Walker Bank Building, Salt Lake City, Utah.

Gentlemen:

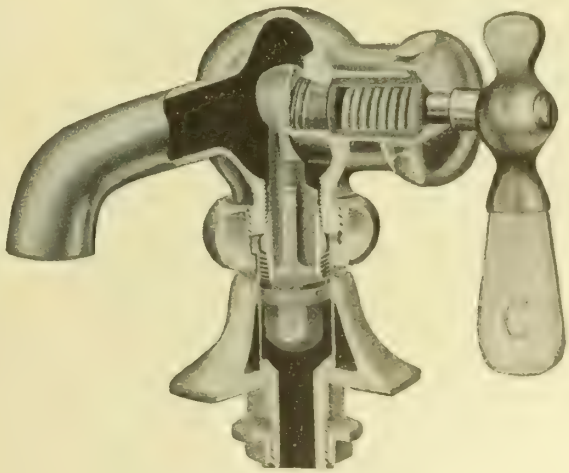
This building has installed six hundred of your faucets and we find them satisfactory in every respect. Repairs have been practically none in two and one half years.

Yours truly,

John J. Brennan,
Chief Engineer.



PEERLESS SELF-CLOSING FAUCET WITH LOOSE CHINA BASE
Also furnished with cast brass nickel base



SECTIONAL VIEW OF PEERLESS FAUCET
Also furnished with brass handles

RUNDLE-SPENCE MFG. COMPANY

Showers, Sanitary Drinking Fountains and Plumbing Supplies

63-67 Second Street

MILWAUKEE, WIS.

Products.

Manufacturers of SHOWERS and SANITARY DRINKING FOUNTAINS.

Also, PLUMBERS' and STEAMFITTERS' MATERIALS of all kinds.

Water Pressure.

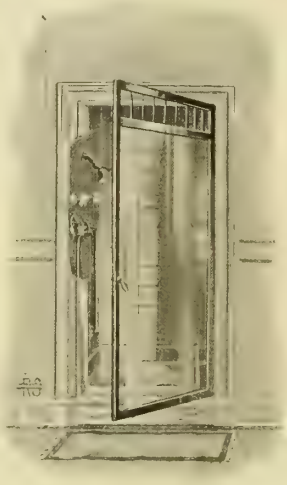
Needle showers should not be used where water pressure is less than twenty pounds, nor with small diameter supply.

G-1638

Nickel-plated brass combination needle and shower bath with mixing valve, check valves and ball-joint shower head.....$55.00

Italian marble stall as shown, size, 3 ft. 2 ins. square outside, 6 ft. 6 ins. high.....$170.00

Diameter shower, 5 ins. Height stall, 6 ft. 6 ins.

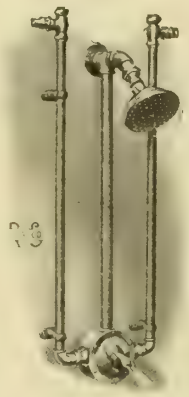


G-1643

Nickel-plated brass combination needle and shower bath with ball-joint shower head and concealed mixing and controlling valves, 42 x 42 ins. Class "A" receptor with nickel-plated brass strainer, plate glass door, etc.....$315.00

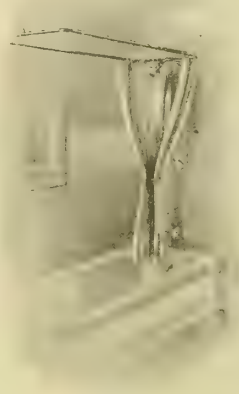
Furnished with curtain rod and white duck curtain instead of door, deduct $140.

COMBINATION NEEDLE AND SHOWER BATHS



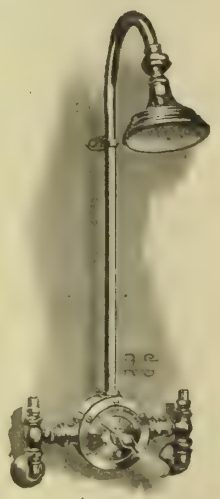
G-1698

Galvanized iron 5-in. nickel-plated brass ball-joint head and mixing valve and supply pipes, with loose key stops.....$32.00



G-1709

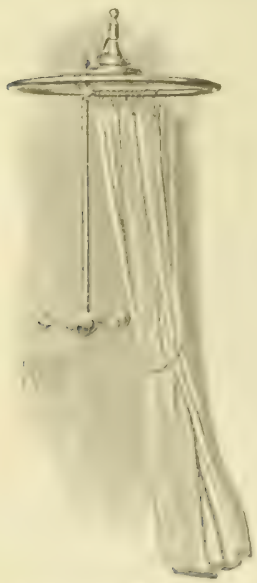
Nickel-plated brass 5-in. ball-joint shower head and concealed mixing valve, with curtain and curtain rail.....$60.00



G-1692

Nickel-plated 5-in. ball-joint head with mixing valve and loose key stops.....$32.50

SHOWER BATHS



G-1679

Nickel-plated brass shower bath with 24 in. diameter curtain ring and white duck curtain. 60 in. diameter shower head.....$27.00

G-1680

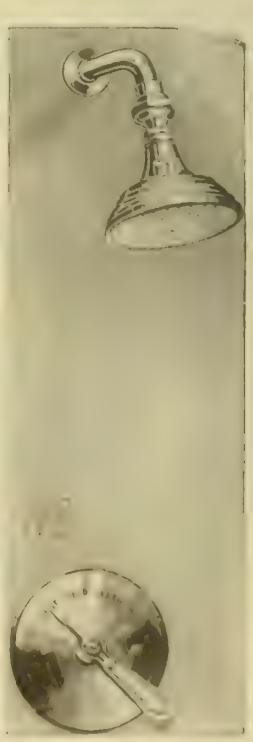
Nickel-plated shower bath with mixing valve, 24 in. diameter curtain ring and white duck curtain, 63 in. diameter shower head. Height, 7 ft. 6 ins...$42.00

Shampoo, extra.....$5.00

SHOWER BATHS

G-1672

Galvanized iron 5 in. nickel plated brass ball joint shower head.....$12.00

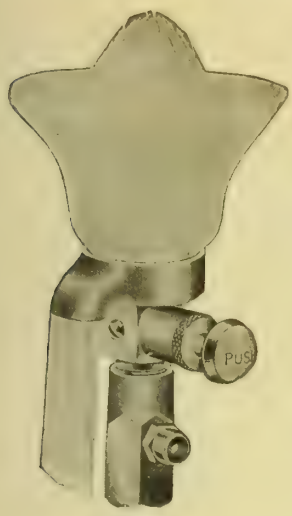


G-1712

Nickel-plated 5 in. ball joint shower head and concealed mixing valve.....$30.00

SHOWER BATHS

Continued on next page

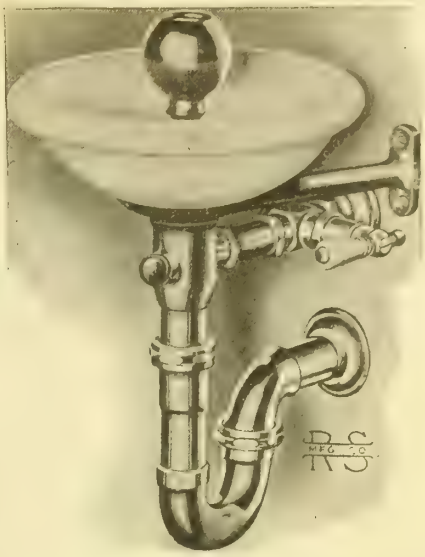


B-30

Nickel-plated brass push-button self-closing bubbling head, with spout, volume regulator and 4-in. china cup.....$5.00

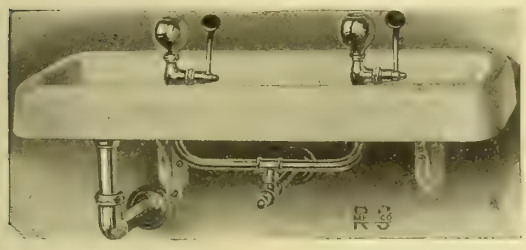
B-50

Extra heavy vitreous china bowl with nickel-plated cast brass bubbling head, self-closing stop, supply pipe with volume regulator, brass waste to wall
$11.00



B-56

Extra heavy vitreous china bowl with nickel-plated bracket, nickel-plated cast brass bubbling head, nickel-plated brass lever handle self-closing stop, nickel-plated brass supply pipe, with volume regulator, and nickel-plated brass trap to wall $10.50



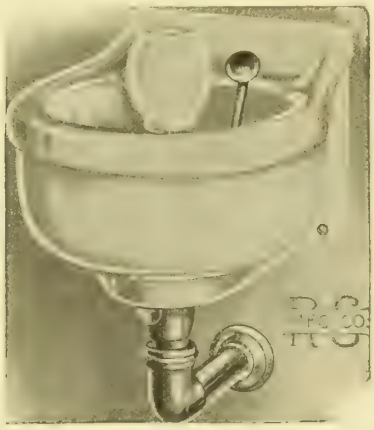
B-100

Cast-iron enameled roll-rim apron receptor, semi-concealed enameled brackets, nickel-plated self-closing bubbling heads, nickel-plated brass supply and waste pipes.

Receptor 30 ins. long, 2 heads.....$23.50
Receptor 42 ins. long, 3 heads..... 28.00
Receptor 54 ins. long, 4 heads..... 32.50

B-124
COOLER FOUNTAIN

Extra heavy vitreous china bowl, nickel-plated brass bubbling head, with lever handle self-closing stop, white oak ice barrel 25 ins. high, painted outside, with double cover.....$30.00



B-64

Vitreous china bowl on concealed wall hanger, china bubbling head with lever handle self-closing stop, nickel-plated brass supply pipe, volume regulator $20.00

B-142

Cast-iron enameled pedestal with extra heavy vitreous bowl, nickel-plated brass bubbling head, galvanized iron supply and waste pipe to floor; 30-ins. high, $18; 36-ins. $21.

Diameter of bowl, 11½ ins. Depth, 3⅝ ins. Diameter of base, 15 ins.

B-134

Vitreous china pedestal, 30 ins. high, with nickel-plated brass bubbling head with self-closing side control, volume regulator, galvanized iron waste and supply pipes to floor
$32.00

B-88

Cast-iron roll-rim enameled slab and back in one piece, china bubbling head with push-button self-closing control; nickel-plated push-button self-closing stop with spout, for use with individual drinking cup
$24.50

BUBBLING FOUNTAINS AND BUBBLING HEADS

"WHITE-STEEL" SANITARY FURNITURE CO.

FACTORY, MAIN OFFICE AND SHOWROOMS

GRAND RAPIDS, MICH.

TELEPHONE CONNECTION

BRANCHES IN ALL LARGE CITIES

Products.

"White-Steel" Enameled Steel Bathroom Fittings and Accessories, which include Medicine Cabinets with Mirror; Tumbler Holders; Soap Dishes and Holders; Towel Racks and Bars; Toilet Paper Holders; Tooth-Brush Fixtures; Hooks, for various purposes; Tub Soap Holders; Grab Rails; Electric Fixtures; Door Stops, etc.

Also, Hospital, Kitchen and Nursery "White-Steel" Enameled Steel Furniture.

WHITE STEEL

TRADE-MARK

"White-Steel" Enameled Equipment.

Sanitary designs and beautifully matched complete bathroom equipments are now factors as important to the architect as matching the building hardware or the door and window trim, etc.

"White-Steel" equipment has had much to do with the marvelous development of bathroom installations.

Hendrick's designs pioneered this development in homes and hotels, and through the entire period of advancement have led the way under the registered shop name, "White-Steel."

The bathroom fittings are supplied individually or in combination sets.

Cost.

To those who have enjoyed "White-Steel" and become familiar with it, either as an architect, owner or guest, or through other contact, it is natural the assumption should be that "White-Steel" must be expensive.

This assumption is merely the natural result of nicely matched, properly made and installed equipment, in place of random selection.

Closer familiarity with and the specification of "White-Steel" develop the fact that it is not expensive. The architect's pride in the attained results, the owner's pride in possession, and the speculative operator's need for interior character uplift, are all secured with an outlay no greater than is required for an ordinary equipment.

Co-operation With Architects.

In the ability to produce a standard at a commercially possible price, the "White-Steel" organization is very unusual. Ideals are strictly adhered to. Approval by the architect, and the desire to link our efforts with those of the architect, are in a great measure responsible for "White-Steel."

Descriptive Catalogue.

A catalogue, called "Black and White," will be sent on request. It shows many plates, all shop numbers, roughing-in tables, etc., and is of a convenient size for filing.

No need to write a letter; just write "catalogue," or "Black and White," on your business paper and mail to us.

Continued on next page

INSTALLATION OF "WHITE-STEEL" ENAMELED INSET MEDICINE CABINET AND ACCESSORIES IN BATHROOMS, HOTEL STATLER, DETROIT, MICH.

Geo. B. Post & Sons, New York, N. Y., Architects

SPEAKMAN SUPPLY AND PIPE CO.

Showers and Other Plumbing Fixtures

WILMINGTON, DEL.

NEW YORK REPRESENTATIVE
NEW YORK, Albert G. Weber, 30 East 42nd Street

PACIFIC COAST REPRESENTATIVE
SAN FRANCISCO, W. Erwin Gilchrist, Monadnock Building

Products.

Speakman Showers—Catalogue G-3.

Bath and Lavatory Fixtures—Catalogue W.

Plumbing Fixtures for Hospitals, Offices of Physicians, etc.—Catalogue S-4.

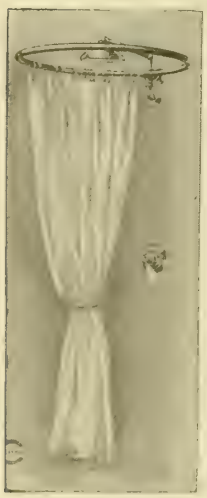
Hardware for Marble Setting—Catalogue F-2.

Installation.

When showers are set in stalls, the valve should be placed at the side rather than at the back, so that the bather can regulate the temperature of the water before entering the stall.

Water Pressure.

In order to obtain proper results with needle baths, the water pressure should be at least twenty-five pounds, and the supply pipes amply large.



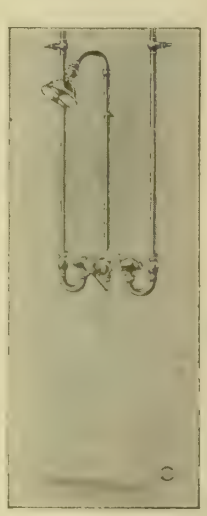
G-943. Equipped with No. 3 "Mixometer" Valve, white duck curtain and large curtain ring. Installed over any bath tub

G-952. Built-in "Mixometer" Shower Bath over built-in tub. A good type for homes, hotels and apartment houses

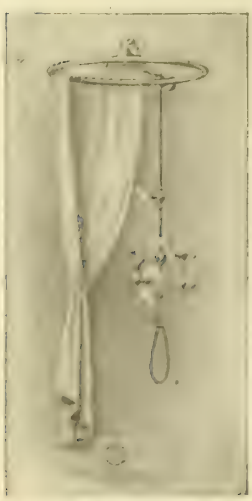
Illustration also shows built-in Speakman "Wallbrook" tub fixture, with china wall escutcheons and china handles

G-990. Speakman Institution Shower with No. 2 Mixing Valve, Strainer Unions, Cast Brass Needle Head with removable face

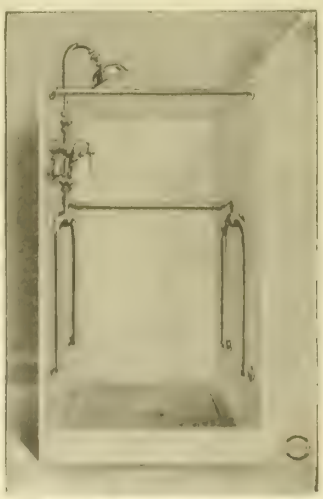
G-993. Speakman Factory Shower, with lock shield controlling valves. Recommended for factories and industrial plants



G-995. Speakman Institution Shower, with supplies to ceiling. Equipped with No. 2 Mixing Valve

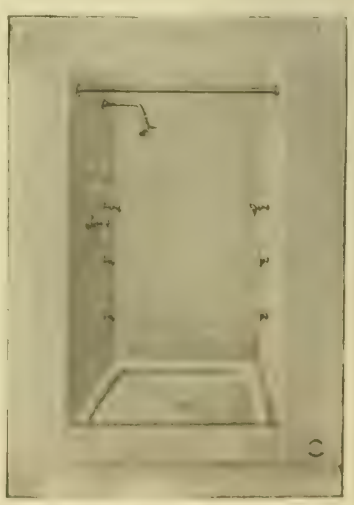


G-1009. Speakman Shower with No. 1 Mixing Valve, Strainer Unions, Shampoo, white duck curtain, and supplies to wall



G-1014. Speakman Shower and Needle Bath, equipped with No. 1 Mixing Valve set at side of stall. Recommended for clubs and private residence

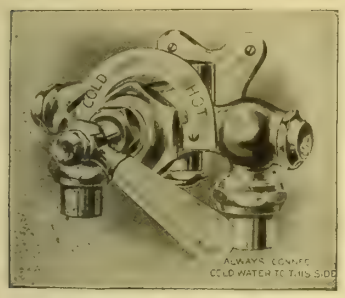
G-1016. Speakman Shower and Needle Bath with No. 1 Mixing Valve. Supplies to wall. Very desirable type for private residence



G-965. Built-in Needle Shower with No. 3 "Mixometer" Valve. Cast Brass Sprays. All piping concealed. Appropriate for high grade bathrooms

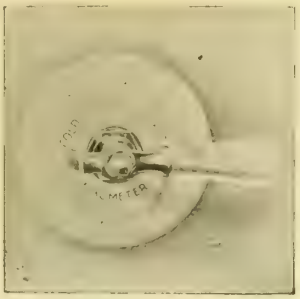
SHEET CATALOGUE

Continued on next page



NO. 1 EXPOSED TYPE VALVE

NO. 3 "MIXOMETER" CONCEALED TYPE



NO. 4 "MIXOMETER" WITH CHINA WALL PLATE

G-1318 CAST BRASS SHOWER HEAD

Speakman Mixing Valves and Cast Heads.

The Speakman mixing valve No. 1 is operated by one handle, which opens and regulates the temperature of the water. When closed, the indicator is at the extreme left, and travels to the right as the valve is opened.

Cold water is always obtained first, to prevent scalding the bather, and the temperature is increased by the travel of the handle.

The valve is very simple in construction, the cylindrical mixing chamber and the spindles being the only working parts. The spindles with washers close with the pressure, while the cylindrical chamber acts as a cam to open the disks. The exact regulation of the water is insured by the port openings in the cylinder traveling across the openings of the water supply. In opening the valve, the first movement raises the washers from their seats, and further movement by the operator mixes the water to the desired temperature.

The ports in the cylinder are so constructed that when the valve is operated, the water, both cold and hot, is measured accurately, so that the proper temperature is obtained at once, without long manipulation.

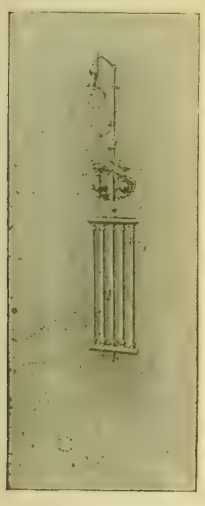
In the built-in type of Speakman mixing valves, Nos. 3 and 4, the disks or washers for both cold and hot water are raised and lowered simultaneously by turning the handle. Cold water comes first, and a continual turning of the handle adds hot water and decreases the supply of cold till the desired temperature is obtained.

No. 4 is the same as No. 3, except that it has a *china wall plate,* beautiful, and easily cleaned. This china plate can be furnished on any of our built-in mixing-valve showers.

Speakman Cast Brass Heads.

Much trouble may be caused in an improperly designed shower, by dirt stopping up the holes of the shower head. This not only spoils the effect of the shower but is apt to cause the head to "blow out," with the possibility of injury to the bather.

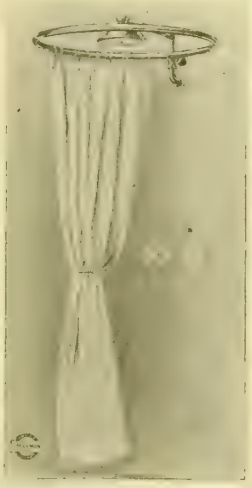
Speakman cast brass heads eliminate this trouble and danger. They have removable faces, which can be easily cleaned, and are sufficiently strong to resist even the most unusually heavy pressures.



G-1035. Speakman Rain Bath and Body Shower. Equipped with No. 1 Mixing Valve. May be used over built-in tub or in shower stall

G-1400. Speakman Built-in-the-Wall Shower, equipped with compression valves and hand shampoo

G-1402. Speakman Built-in-the-Wall Shower, similar to G-1400, but without the shampoo



G-1410. Speakman Built-in-the-Wall Shower. May be used over any bathtub

G-1512. Speakman Columbia Shower with curtain ring and duck curtain. Supplies to wall

SPEAKMAN SHOWERS

PRICE-LIST OF SPEAKMAN SHOWERS SHOWN HEREWITH

Fig. No.	G-943	G-952	G-990	G-990	G-993	G-995	G-995	G-1009	G-1009	G-1014	G-1016	G-965	G-1035	G-1035	G-1400	G-1402	G-1410	G-1512
Size of Inlet, inches	½	½	½	¾	½	½	¾	½	¾	½	¾	¾	½	¾	½	½	½	½
Price	$31.50	20.00	29.00	39.50	28.00	32.50	44.00	45.50	59.00	60.00	140.00	70.00	55.00	70.00	21.50	11.50	20.00	15.00

Only a few styles of Speakman Showers are shown on these pages. Catalogue G-3 and Supplement, showing many more styles, will be gladly furnished on request.

Continued

Speakman Hospital Plumbing Fixtures.

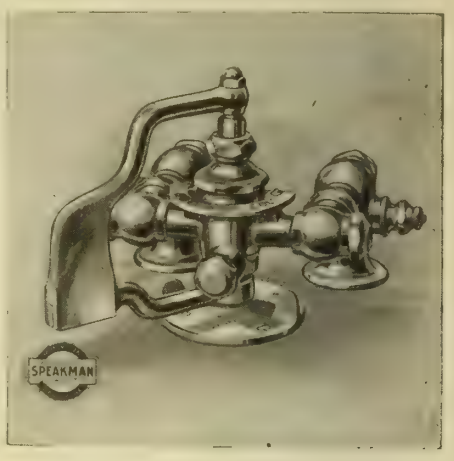
The rapid advance in medical skill, and the increased perception of the value of sterilization and sanitation in hospitals and physicians' offices, has led to the development of certain plumbing fixtures particularly adapted to meet these particular needs.

The descriptions given here include but a few of the Speakman designs. They are described fully in Catalogue S-4, which will be sent free on request.

The Speakman Hospital Mixing Valves have the same mechanical features as our No. 1 Speakman Mixing Valve.

SPEAKMAN STRATTON MIXING VALVE
Elbow Type (installed in Ford Hospital, Detroit)
Smooth lines, easily cleaned. Special strainer nozzle discharges water in compact stream, without splashing. When installing, concealed controlling stops should be provided.
List price.....$35.00

W-2554 AND W-2556. SPEAKMAN KNEE-ACTION MIXING VALVE AND WASTE
Arranged to be operated entirely by the knee. Provided with controlling valves to regulate flow of water and prevent splashing.
Operator can obtain any desired temperature of water by moving lever handle with the knee. Lever does not have to be held in position, but will stay in any position placed.
List price of Valve.....$42.50
List price of Waste..... 14.00



W-2520. KICK MIXING VALVE
Valve securely attached to floor, and desired temperature of water obtained by moving lever with the foot.
Lever stays in any position desired.
Controlling stops are provided to regulate pressure and prevent splashing.
List price..... $38.50

Speakman Bath and Lavatory Fixtures.

The modern demand for new and better plumbing has been the impetus resulting in the development of a line of Speakman bath and lavatory fixtures, which contain many new and patented advantages. The whole line, consisting of features to meet practically all requirements, is in harmony with modern ideas and the latest developments of sanitary science.

Quality—Speakman fixtures are heavily and solidly made of the finest materials, and finished to the most exacting standards of workmanship. They are made of brass, well finished and heavily nickel-plated.

All fixtures are carefully inspected and tested before leaving the factory.

Sizes—Speakman fixtures are built to conform as nearly as possible to standard designs of lavatories and baths, and to suit the regular drillings.

Speakman "Unit" and "Unit Acto" Lavatory Fixtures.

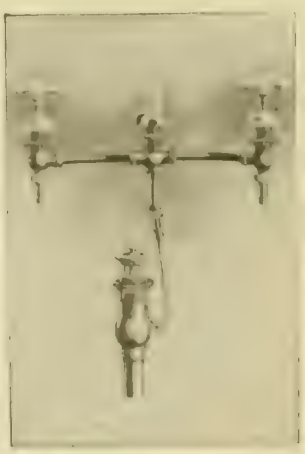
These are special designs of combination lavatory fixtures, which sell at prices that make them available for use where formerly only two separate faucets and a waste could be profitably installed.

Simplification of design and a large output has enabled us to make these lower prices, without in the least sacrificing Speakman quality.

The connecting tubes between valves and supply nozzles are of annealed metal, and can easily be bent to suit connections, thus making the fixtures adaptable to fit practically any lavatory with standard cutting of supply and waste holes.

W 2[illegible] SUPPLY AND WASTE FIXTURE
[illegible]

W 2[illegible] "UNIT ACTO" SUPPLY AND WASTE FIXTURE
[illegible]



W 2276. "UNIT ACTO" SUPPLY AND WASTE FIXTURE
Same as W 2275, except with china escutcheons

"ACTO" POP UP WASTE
Smooth action and positive operation. Outside diameter of tail piece is 1¼ inches

ESTABLISHED 1841

E. B. BADGER & SONS COMPANY

Engineering Coppersmiths and Structural Metal Workers

63-75 Pitts Street
BOSTON, MASS.

Products.

Copper, White Metal and German Silver Pantry Sinks, and Copper Wash Boilers.

Also Sheet Metal Windows.

For Copper Hot-Water Boilers, see our name in General Index.

TRADE-MARK

Badger's Pantry Sinks.

Badger's pantry sinks are made of copper, German silver and white metal. The material is heavy and of the best quality. Copper sinks are made of cold-rolled planished copper, heavily tinned on the inside, with all joints double-seamed and soldered; Badger white metal and German silver sinks are made in the same way. Large sinks with drainboards are made to order.

Metal Used.

German silver and white metal are really the same thing. Badger white metal is so called because it contains a larger percentage of nickel and has a whiter appearance. We use and recommend the Badger white metal. Either metal takes a good polish and will continue to do so until the metal is worn out. Badger pantry sinks do not chip nor crack; will not rust; the white metal does not become brassy after repeated scouring. With copper sinks it is necessary to retin them at least every two or three years, which means plumber's expense.

Utility.

Badger sinks are suitable for residences, restaurants, apartments, and hospitals. It does not matter how large the available space may be or how irregular the design, Badger's special sinks can be made to meet all requirements.

Sizes.

Square and recessed sinks are kept in stock sizes designated by table below:

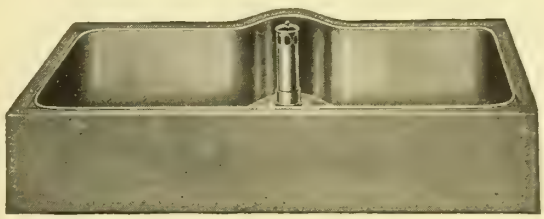
12 x 18; 12 x 20; 14 x 20; 14 x 24; 16 x 24; 16 x 30; 18 x 24; 18 x 30; 18 x 36; 20 x 36 inches.

Badger's Copper Wash Boilers.

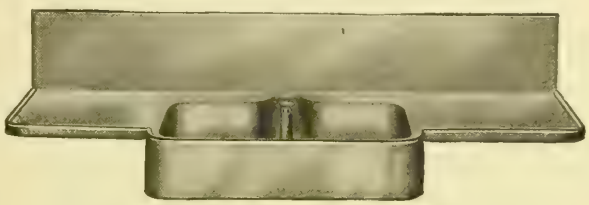
Badger's copper wash boilers are used chiefly in the laundry and are usually placed next to the wash-trays. They are made of heavy material of the best lake copper. The steam-pipe on top connects with the chimney, preventing the escape of steam into the laundry. The interior is heavily tinned.

The water supply can be connected through top of boiler and the water drawn off through the cock at bottom. The top flange of boiler rests on a soapstone coping, which makes a neat finish. Stock sizes, 10-gallon to 50-gallon capacity.

SQUARE PANTRY SINK



RECESSED PANTRY SINK



RECESSED PANTRY SINK AND DRAINBOARD

COMPARTMENT PANTRY SINK AND DRAINBOARDS

BADGER COPPER WASH BOILER

ALBERENE STONE COMPANY

QUARRIERS AND MANUFACTURERS OF

Alberene Stone Laundry Fixtures and Sanitary Work

223 East Twenty-third Street
NEW YORK, N. Y.

TELEPHONE, 5431 GRAMERCY

BRANCH OFFICES

CHICAGO, 216 North Clinton Street
Telephone, 3526 Main
PITTSBURGH, 1410 Arrott Building
Bell Telephone, 678 Court
NEWARK, N. J., 307 Prudential Building
Telephone, 6316 Market

WASHINGTON, D. C.
BOSTON, 162 Dover Street
Telephone, 5253 Oxford
PHILADELPHIA, 950 North Darien Street
Telephone, 2740 Market

Products.

ALBERENE STONE (Natural Soapstone) LAUNDRY TUBS and KITCHEN SINKS; SANITARY URINALS; TOILET and SHOWER PARTITIONS; LABORATORY TABLES, HOODS and SINKS.

Also, PHOTOGRAPHIC and ACID TANKS; HEARTH LININGS; SWITCHBOARDS and BARRIERS, and other ELECTRICAL and POWER STATION EQUIPMENT; FLOORING and STAIR TREADS.

Description.

Alberene Stone is the name applied solely to the output of the extensive quarries of this Company, and serves both to identify and to guarantee our products. Alberene Stone has come to be recognized after twenty-five years of use as a most satisfactory material for laundry and kitchen fixtures and sanitary purposes.

Alberene Stone is a natural, quarried stone, gray in color, close-grained, non-porous, and of uniform density and hardness, and, owing to its non-absorbent quality, is kept clean with the most ordinary care.

In the manufacture of Alberene Stone Laundry Tubs and Kitchen Sinks, interlocking tongued and grooved joints are employed, as illustrated in Fig. 1. The density and close grain of Alberene Stone, together with its freedom from stratification, make possible the finest milling and jointing without spawling or shaling.

The durability of Alberene Stone, together with the reasonable cost and long-continued and satisfactory service, renders it a most desirable material for laundry tubs and sinks in houses of every size and description.

FIG. 1. TONGUED AND GROOVED JOINT

Laundry Tubs.

Laundry Tubs are furnished in one, two, and three compartments (Figs. 2, 3, and 4), with or without high backs. These two- and three-part fixtures are also furnished in single compartments with abutting ends

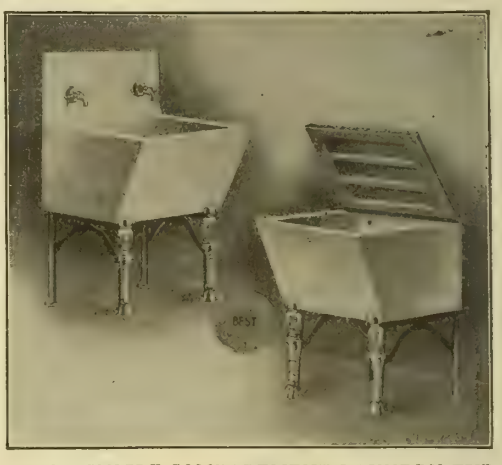


FIG. 2. SINGLE-COMPARTMENT LAUNDRY TUB

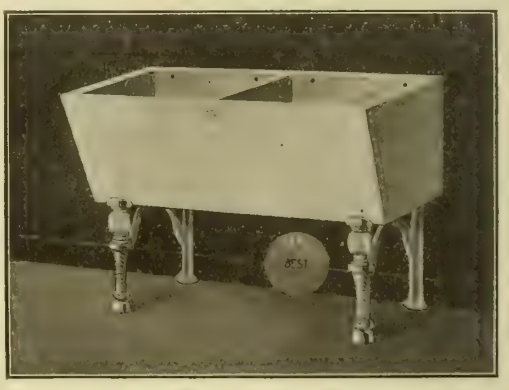


FIG. 3. TWO-COMPARTMENT LAUNDRY TUB

FIG. 4. THREE-COMPARTMENT LAUNDRY TUB

covered with brass clamps; also, in combination with sink (Fig. 5).

These fixtures may be furnished with capping and return ends, or may be otherwise modified at slight cost to suit special conditions.

Kitchen Sinks.

Alberene Stone kitchen sinks are particularly desirable, on account of the integral back and drainboards,

Continued on next page

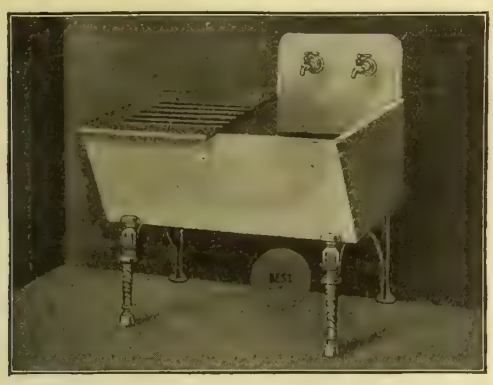


Fig. 5. COMBINATION LAUNDRY TUB AND KITCHEN SINK

which are constructed of Alberene Stone and are, therefore, both clean and sanitary (Fig. 8).

Urinals and Toilet Work.

The problem of a suitable and sanitary material for use in urinals and water-closet compartments is largely solved by the erection of Alberene Stone for these purposes, because of the non-absorbent quality of the stone and its color, and because of the water-tight joints made possible by the use of the slip-tongue (Figs. 1, 6 and 7).

Architects, Engineers, Boards of Education, and Industrial Plants use and recommend Alberene Stone for such purposes. (References will be furnished upon request.)

Fig. 6. SLIP-TONGUE JOINT

Shower Stalls.

For shower compartments and public baths Alberene Stone is giving satisfaction. The method of jointing, as shown in Figs. 1 and 6, makes the showers water-tight. A heavy countersunk floor-slab, grooved to receive partitions and backs, prevents leakage. Showers vary in height from 6 to 7 feet.

Laboratory Equipment.

For many years Alberene Stone has been used for the tops of chemical and other laboratory tables, for chemical sinks, shelving and hoods, which are constructed *entirely* of Alberene Stone (Fig. 9).

The leading chemists of the country use and recommend Alberene Stone.

Co-operation.

In preparing specifications, use the material given above. For further information, kindly write us. We will cheerfully furnish details of construction and erection and have a representative call if desired.

Name Plate and Guarantee.

The distinguishing characteristics of the products furnished and installed by the Alberene Stone Company are the Trade-Mark Plate and Guarantee.

TRADE-MARK PLATE

Fig. 7. VENTILATED URINAL

Fig. 8. KITCHEN SINK WITH HIGH BACK

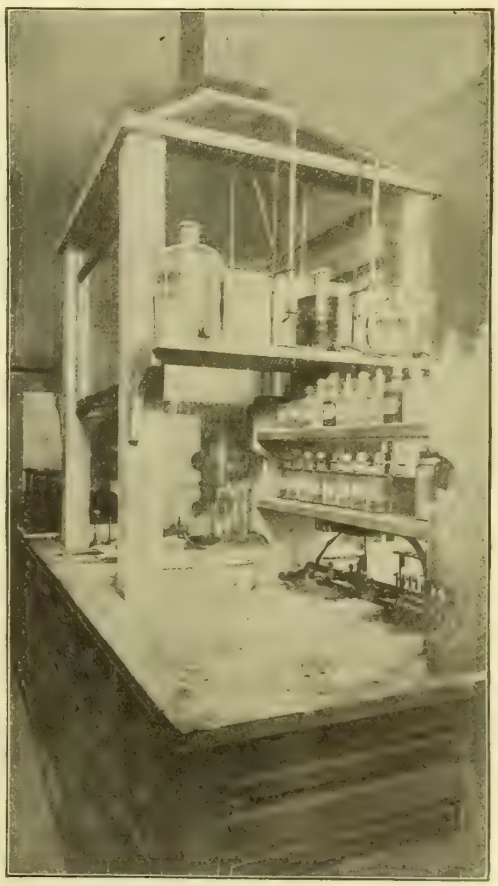


Fig. 9. ALBERENE STONE HOOD, TABLE-TOP AND SHELVING

These two features are the assurance to Architect, Owner and Contractor that the products of the quarries and mills of the Alberene Stone Company are warranted to give service and satisfaction. This Guarantee has been attested by a record of more than twenty-five years of steady growth.

LITTERER BROS. MFG. COMPANY

Pantry Sinks

154-156 Whiting Street
CHICAGO, ILL.

Products.

GERMAN SILVER and COPPER PANTRY SINKS, GERMAN SILVER and PLANISHED COPPER DRAINBOARDS.

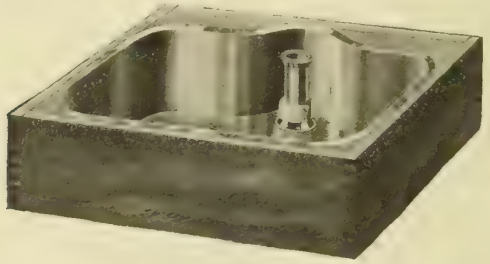
Trade-Mark.

The accompanying figure is the trade-mark which is used on all our products.

Scope of Business.

We are specialists in the manufacture of Pantry Sinks, for many years having devoted our time exclusively to the one line of manufacture. Pantry Sinks are made in four standard styles, which may be fitted to any style of fixtures.

We are also in a position to make special styles and sizes.



A-501

German Silver or Copper Pantry Sink with Recess, Nickel-Plated Standing Overflow and Waste, Coupling and Tail Piece. Inside measurements (do not include Recess):

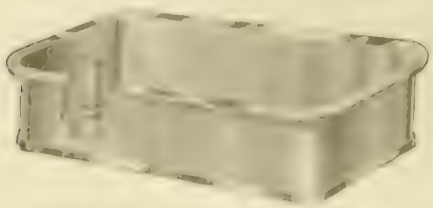
14 x 20 in.	16 x 24 in.	18 x 30 in.
14 x 24 in.	16 x 30 in.	

A-502

German Silver or Copper Pantry Sink, bottom so shaped that dishes cannot accumulate in center of sink and obstruct Waste Outlet:

12 x 18 in.	14 x 20 in.	16 x 30 in.
12 x 20 in.	14 x 24 in.	18 x 30 in.
14 x 16 in.	16 x 24 in.	

All [illegible] with Connected Side Overflow, Waste Plug, Coupling and Tail Piece



A-503

German Silver or Copper Square Pantry Sink with Round Corners, [illegible] Overflow and Waste, with Coupling and Tail Piece:

12 x 18 in.	14 x 20 in.	16 x 20 in.
12 x 20 in.	14 x 24 in.	18 x 30 in.
14 x 16 in.	16 x 24 in.	

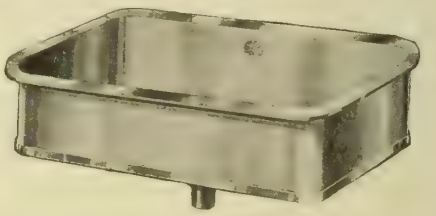
Can be furnished in either Planished or Tinned Copper

Prices and Estimates.

Prices on any style furnished on request. Also, estimates on any special equipment required will be quoted upon receipt of complete specifications.

Illustration.

The four styles, A-501, A-502, A-503 and A-504, and several styles of fixtures are illustrated.

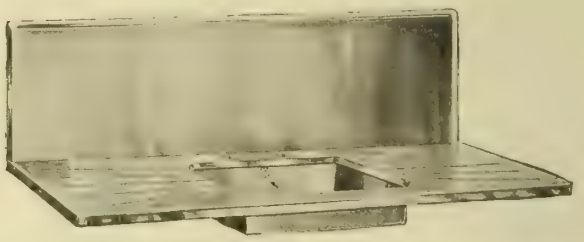


A-504

German Silver or Copper Square Pantry Sink with Round Corners, Connected Side Overflow, Waste Plug, Coupling and Tail Piece:

12 x 18 in.	14 x 20 in.	16 x 30 in.
12 x 20 in.	14 x 24 in.	18 x 30 in.
14 x 16 in.	16 x 24 in.	

Can be furnished in either Planished or Tinned Copper

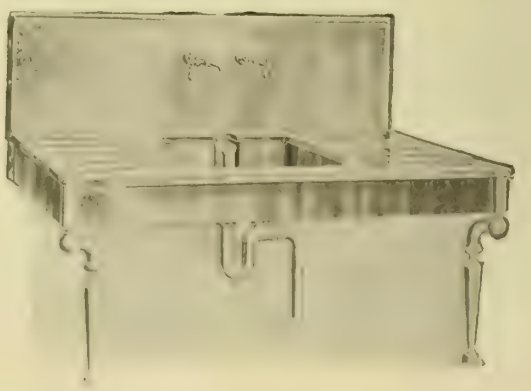


A-505

Grooved Wooden Drainboard lined with German Silver or Copper, and German Silver or Copper Pantry Sink attached to either A-502, A-503, A-504

Can be made any size, with one Drainboard, with Back and End, or for recess, and any height of back required

When ordering give outside measurements, length and width, height of back, length of drainboards, size and style of Sink



A-506

German Silver or Copper Lined Grooved Wooden Drainboard with Recess Sink (A-501), with Nickel Plated Standing Overflow

Arrangement can be changed to suit requirements. As described it has German Silver Top. Can be furnished with Heavy Planished Copper Top and Heavy Copper Sink, with Single Drainboards, or with one End or two Ends if wanted for a recess

When ordering, give correct outside measurements, length and width, height of back and length of drainboard, and size and style of Sink, and whether German Silver or Copper; or, if Marble, whether Italian or Tennessee

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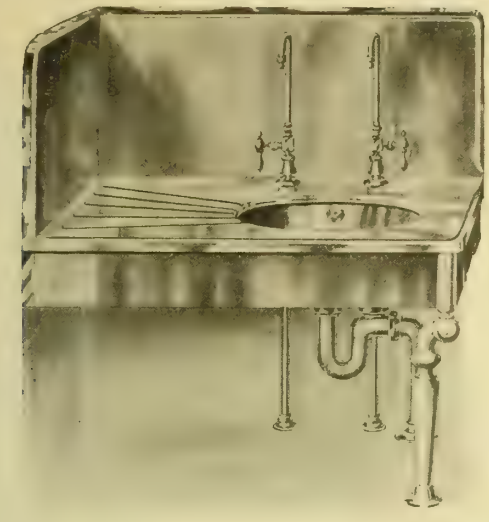
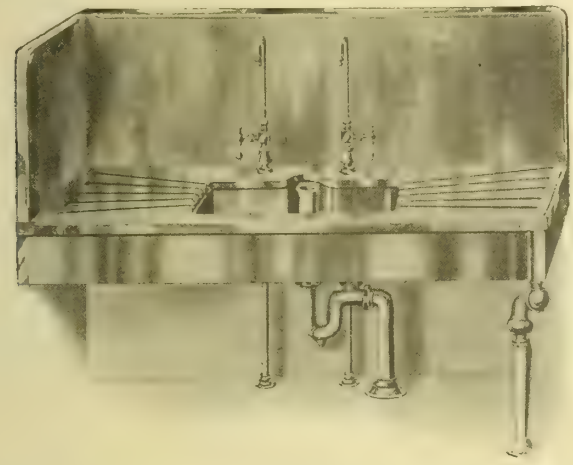


A-507

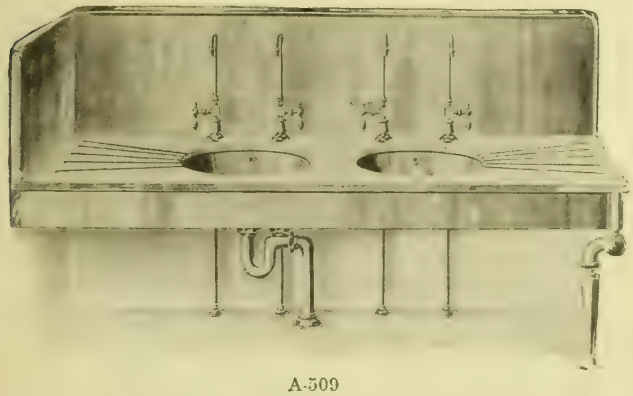
German Silver or Planished Copper Pantry Sink and Top and Grooved Drainboard with Marble Back and End, Marble Apron on Front and Right-Hand End; Oval Sink, fitted with Connected Side Overflow, Waste Plug, Coupling and Tail Piece

Can also be furnished with German Silver or Copper Back, End and Apron. For sizes of Oval Sink, see A-502



A-508

German Silver or Copper Recess Pantry Sink and Standing Overflow, with German Silver or Copper Lined Top and Grooved Drainboard; Italian Marble, German Silver or Copper Back and Left-Hand End; Apron on Front and Right-Hand End

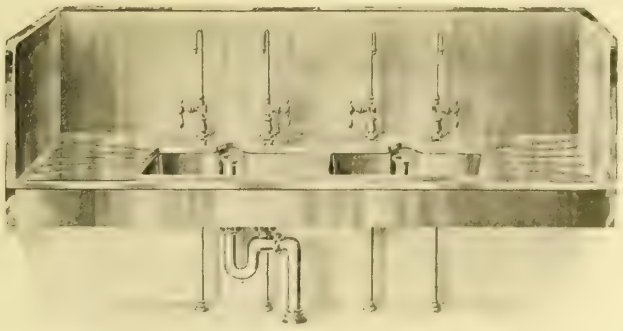


A-509

German Silver or Copper Double Oval Pantry Sinks (same style as A-502), with German Silver or Copper Lined Wood Top, grooved for Drainboards; with either German Silver or Italian Marble Back and Left-Hand End, with German Silver or Italian Marble Apron on Front and Right-Hand End

USUAL DIMENSIONS

Total Length of Sink	Width of Top	Height of Rack	Size of Each Oval Sink
7 ft.	22 in.	18 in.	14 x 20 in.
8 ft.	22 in.	18 in.	14 x 20 in.
9 ft.	24 in.	18 in.	16 x 24 in.

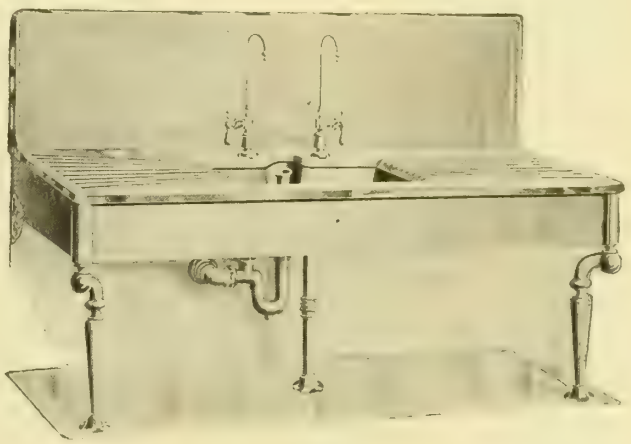


A-510

German Silver or Copper Recessed Pantry Sinks with Standing Overflows, and German Silver or Copper Top with grooved Drainboards. Made with either Italian Marble, German Silver or Copper Back Ends and Apron. Usual dimensions for a Combination Sink in this style as follows:

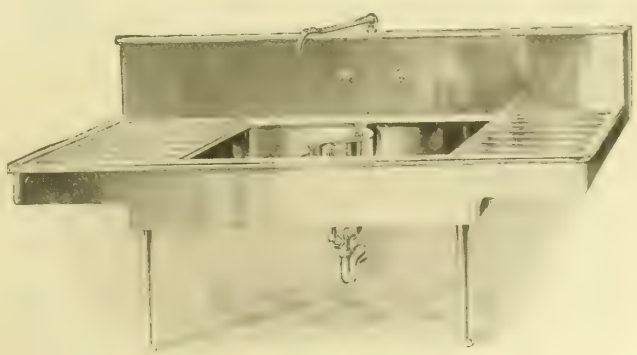
DIMENSIONS

Total Length of Sink	Width of Top	Height of Marble Backs	Size of Each Sink
7 ft.	24 in.	18 in.	14 x 20 in.
8 ft.	26 in.	18 in.	16 x 24 in.
9 ft.	26 in.	18 in.	16 x 24 in.



A-511

German Silver or Copper Recessed Pantry Sink and Standing Overflow, Countersunk Marble Top with Drainboards in one piece; Marble Back and 8-inch Aprons on Front and Ends. Can furnish this outfit complete as shown, and will be pleased to give full specifications and prices on request



A-512

German Silver or Planished Copper Double Pantry Sink with "S" Dividing Partition and Right- and Left-Hand Drainboard with Back and Apron; White Metal Combination Compression Supply Valve with Swinging Nozzle, White Metal Legs, Standing Wastes, etc.

Usual Dimensions: Length, about 6 feet 6 inches over all; width from front to back, 27 inches; height of back, 12 inches; depth inside, 7 inches; width of roll rim, 2 inches. Also furnished with Right- or Left-Hand End or both, where Sink goes in a recess

JOHN TRAGESER STEAM COPPER WORKS

Manufacturers of Range Boilers, Sinks and Drainboards

TELEPHONE, 8140 CHELSEA

447-457 West 26th Street
NEW YORK, N. Y.

Products.

COPPER and GALVANIZED RANGE BOILERS; PANTRY SINKS and DRAINBOARDS in Copper, German Silver, and White Metal.

"Graves" Range Boiler.

The "Graves" Range Boiler (Fig. 1) is hand made of heavy copper-bearing steel, galvanized inside and outside, and enameled painted outside.

Packed and boxed for shipping. Will stand 300 pounds' pressure and is warranted for six years. Every boiler bears a brass plate with this guarantee.

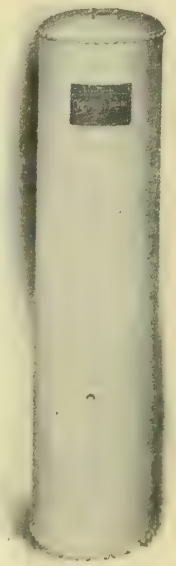


FIG. 1. "GRAVES" RANGE BOILER

CAPACITIES, DIMENSIONS AND PRICES "GRAVES" RANGE BOILER

Capacity, gallons	Size, inches	Price
30	60 x 12	$29.00
35	60 x 13	31.00
40	60 x 14	34.00
48	72 x 14	40.00
52	60 x 16	41.00
63	72 x 16	48.00
66	60 x 18	48.00
82	60 x 20	55.50
100	60 x 22	73.50

"Continental" Copper Boiler.

In the "Continental" Copper Boiler all joints are brazed and welded by new process, no rivets or solder being used in seams.

A guarantee is given with every boiler.

CAPACITIES, DIMENSIONS AND PRICES COPPER RANGE BOILERS

Capacity, gallons	Height, inches	Diam., inches	Price 200 lb. test	Price, 250 lb. test
30	60	12	$30.00	$35.00
35	60	13	35.00	40.00
40	60	14	40.00	45.00
50	60	16	50.00	60.00
60	60	18	60.00	70.00
80	60	20	80.00	90.00
100	62	22	100.00	110.00

The 250-pound test boiler is guaranteed to stand a working pressure of 150 pounds, and a test collapse

Pantry Sinks.

A White Metal Pantry Sink with drainboard (Fig. 2), and apron. Can be made in any length and to suit your requirements

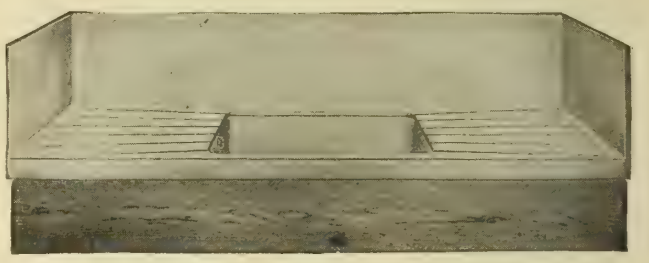


FIG. 2. "WEST END" PANTRY SINK AND DRAINBOARD

SIZES AND PRICES "WEST END" PANTRY SINK AND DRAINBOARD

Size outside, ins.	22 x 48	24 x 48	22 x 60	24 x 60	24 x 72
German Silver	$100	$105	$105	$110	$120
White Metal	130	135	135	140	150

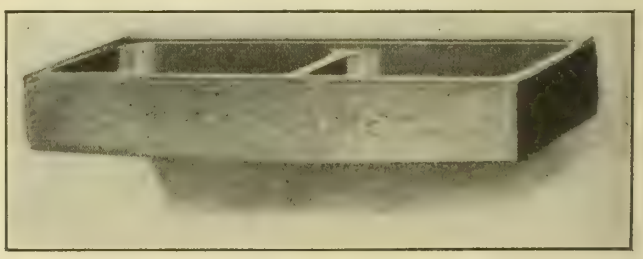


FIG. 3. DOUBLE BUTLER'S PANTRY SINK
With Partition encased in plain box

SIZES AND PRICES DOUBLE BUTLER'S PANTRY SINK

Size inside, ins.	40 x 18	44 x 22	48 x 16	48 x 24	60 x 20	60 x 24
Tinned and Planished Copper	$36	$38	$38	$40	$50	$55
German Silver	62	68	72	78	82	90
White Metal	75	80	85	95	110	120

Nickel-plated standing waste extra

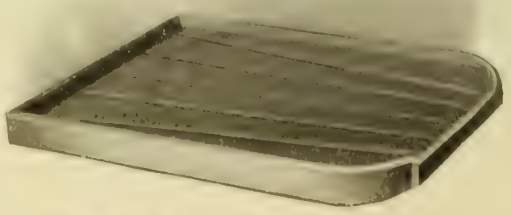


FIG. 4. "MANHATTAN" DRAINBOARD
Covered with White Metal

SIZES AND PRICES WITH BRACKETS

Size, inches	18 x 24	18 x 30	20 x 24	20 x 36	22 x 24	22 x 30
	$12 00	$12 50	$13 50	$15 50	$14 00	$15 00

Telescopic supports extra

GAYLORD SANITARY MFG. COMPANY

Water-Closets and Water-Saving Devices

OFFICE AND FACTORY
457-465 West Main Street
ROCHESTER, N. Y.

Products.

"Auto-Silent" Automatic Flushing Water-Closets; "Ideal" Bubble Drinking Fountains; "Ideal" Factory Wash Basins, for Railroads, Schools, Factories and Public Buildings; "Ideal" Carriage and Automobile Overhead Wash Founts; "Ideal" Water Saver Valves; Disappearing Hose Reels; "Always-Ready" Fire-Extinguisher Hose and Reel Outfits; "Always-Ready" Lawn Hose and Reel Outfits.

"Auto-Silent" Automatic Flushing Water-Closet.

In the "Auto-Silent" automatic water-closet a perfect valve and tank has been produced which cannot waste water nor get out of order. The flushing is seat-actuated.

Guarantee—All wearing parts are guaranteed for ten years.

Advantages—The "Auto-Silent" water-closet excels in the following features:

Simplicity; sanitation; economy of water; quality of fittings, seats, tanks and general appearance.

Tanks—Are visible or invisible, as desired. Invisible tanks fit inside any four-inch partition.

No. 204-B
Price $60.00

No. 203-B
Price $45.00

No. 500-E
Price $35.00

"IDEAL" URINAL VALVE WITH PLATFORM
Price, Iron...$10.00
Price, Brass.. 12.00

"AUTO-SILENT" AUTOMATIC WATER-CLOSETS

Individual Wash Basins.

Individual wash basins, single or in groups of six basins, with enamel top.

Price, Single Basin.$ 15.00
Price, Battery of Six, with enamel top 115.00

AUTOMATIC FACTORY WASH BASIN
Pedestal operated

"IDEAL" FOOT VALVE FOR LAVATORY

"Ideal" Bubble Drinking Fountains.

"Ideal" drinking fountains are made in two styles, china and metal bubbler.

Price, China Bubbler.....$16.00
Price, Metal Bubbler..... 20.00

DRINKING FOUNTAIN

"Ideal" Overhead Wash Fount.

Equipped with counterbalance weight and 32-candle-power electric light. Suspended on swivel joint. Ideal for garage use.

"IDEAL" OVERHEAD WASH FOUNT

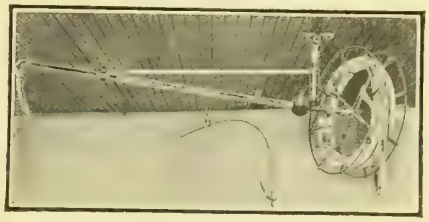
DATA "IDEAL" OVERHEAD WASH FOUNT

Complete, with electric light.....$30.00
½-inch size without electric light..... 12.00
¾-inch size without electric light..... 15.00

All standard sizes made with counterbalanced weights and Arm 4 feet 6 inches long.

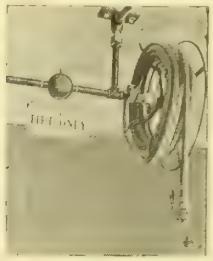
"IDEAL" OVERHEAD WASH FOUNT WITH CIRCULAR TRACK

Circular Track completely ready for installation can be furnished for any style of Overhead Wash Fount
Price, f.o.b. Rochester, track only.....$7.50



"ALWAYS-READY" OVERHEAD WASHER AND FIRE EXTINGUISHER (AUTOMATIC)

Price, with 50 feet and 10 feet each, hoses with nozzles, complete.....$35.00
Price, with 100 feet and 10 feet each, hoses with nozzles, complete..... 50.00



"ALWAYS READY" FIRE EXTINGUISHER

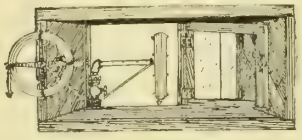
DATA "ALWAYS-READY" FIRE EXTINGUISHER (AUTOMATIC)

Price, painted vermilion red, with 50 feet of hose, complete.....$25.00
Price, painted vermilion red, with 100 feet of hose, complete.... 40.00

"IDEAL" AUTOMATIC WATER SAVER VALVE
Price $2.00

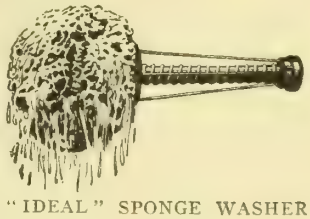
LAWN HOSE REEL

Price, with 50 ft. of hose, automatic nozzle.....$10.00
Price of Reel without hose or nozzle..... 3.00



AUTOMATIC DISAPPEARING HOSE REEL

Swings in or out of cellar window; plumbing inside of cellar; connected and ready for immediate use to reach all parts of house. Made of malleable iron and brass.
Price, 50-foot size reel with brace and couplings $5.00
Price, 100-foot size reel with brace and couplings 6.00
Roughing measurements: 50-foot size, 19-inch square sash or larger; 100-foot size, 22-inch square sash or larger. May be set with regular hanging window sash, but swings farther into cellar, to clear sash.



"IDEAL" SPONGE WASHER
Price $2.00

"IDEAL" WINDOW CLEANER

Guarantee.

Goods are guaranteed to be perfect in material, workmanship, finish and efficiency.

Catalogue.

Complete catalogue on request.

COMPOUND INJECTOR & SPECIALTY CO.

SOLE MANUFACTURERS OF

Dehn's Sanitary Plumbing Drainage Specialties

LONG DISTANCE TELEPHONES: Austin 543 and 545

419-421 North Laramie Avenue
CHICAGO, ILL.

CABLE ADDRESS, "Compound"

Products.

Dehn's Automatic Water Softening and Scale Removing Devices, "Peerless" Water Softener, "Kompost" Bricks, "Acme" Adjustable Floor Drains, with and without Automatic Back-Water Valves; "Peerless" Garage, Laundry and Stable Floor Drains; Hygienic and "Acme" Grease Traps, with and without Water Coolers.

"Acme" Closed-End Adjustable Closet Bends and Extensions; Iron Drum Traps, Clean-Out Tees, End Ferrules, Refrigerator Drains, Blow-Off, Catch and Gravel Basins, and other accessories to make a complete, perfectly sanitary Plumbing Drainage System.

Sanitary Safeguards.

Architects, Sanitary Engineers and Contractors will safeguard the health and property of their clients by specifying our Sanitary Devices. As their tradenames "Acme" and "Peerless" imply, we believe them unexcelled in design and operation. They are durable in make and in *every way reliable;* no other devices on the market may be substituted without *risk* for the "Dehn" line as being "equally as good." The essential parts of our devices are patented.

We manufacture the largest and most complete line of Sanitary Plumbing Drainage Specialties in the United States.

We will be pleased to furnish further information, together with our illustrated catalogue, upon request.

"ACME"
FLOOR DRAINS

"PEERLESS"
FLOOR DRAINS
TRADE-MARKS

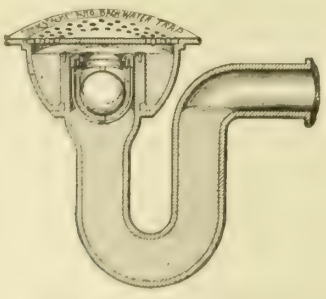


Fig. 5. DEHN'S "ACME" FLOOR DRAIN
(Patented)

With continuous pipe trap (no partitions), with the only reliable automatic back-water valve, 4" water seal in trap

Dimensions and Prices

Water Seal, inches	4	4	4
Size of Outlet, inches	2	3	4
Diameter of Top, inches	9	10	12
Depth over all, inches	11	13	15
Length over all, inches	13	14	21
Receiver above Outlet of Trap, inches	2	2	2
Approximate Weight, pounds	25	35	60
Fig. 5-A. Iron Top and Strainer, each	$ 7.00	$ 9.00	$12.00
Fig. 5-B. Finished Brass Top and Strainer, each	13.00	16.00	20.00
Fig. 5-C. N. P. Brass Top and Strainer, each	15.00	18.00	23.00

"KOMPOST" (Registered in U. S. Pat. Office) BRICKS

"PEERLESS" WATER SOFTENER

TRADE-MARKS

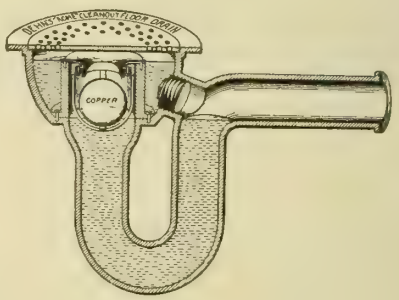


Fig. 9. DEHN'S "ACME" ONE-PIECE FLOOR DRAIN
(Patented)

With continuous pipe trap (no partitions), with large brass taper-threaded clean-out plug and the only reliable automatic back-water valve

Dimensions and Prices

Water Seal, inches	4	4	4
Size of Outlets, inches	2	3	4
Size of Brass Clean-out Plugs, inches	1½	1½	1½
Diameter of Top, inches	9	10	12
Length over all, inches	18	20	24
Receiver above Outlet, inches	2	2	2
Approximate Weight, pounds	30	40	65
Fig. 9-A. Iron Top and Strainer, each	$ 7.50	$10.00	$14.00
Fig. 9-B. Brass Finished Top and Strainer, each	13.50	17.00	22.00
Fig. 9-C. Brass N. P. Top and Strainer, each	15.50	19.00	25.00

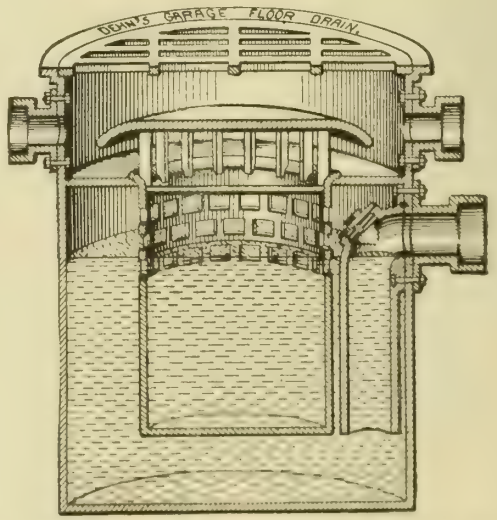


Fig. 62. DEHN'S "PEERLESS" GARAGE FLOOR DRAINS
(Patented)

Dimensions and Prices

Diameter of Top, inches	20	20	20	20
Size of Waste Outlet, inches	4	4	4	4
Depth over all, inches	30	38	46	54
Vent Hub Connections, inches	2	2	2	2
Approximate Weight, pounds	400	500	600	700
Price, Iron Top and Strainer, each	$50.00	$65.00	$80.00	$95.00

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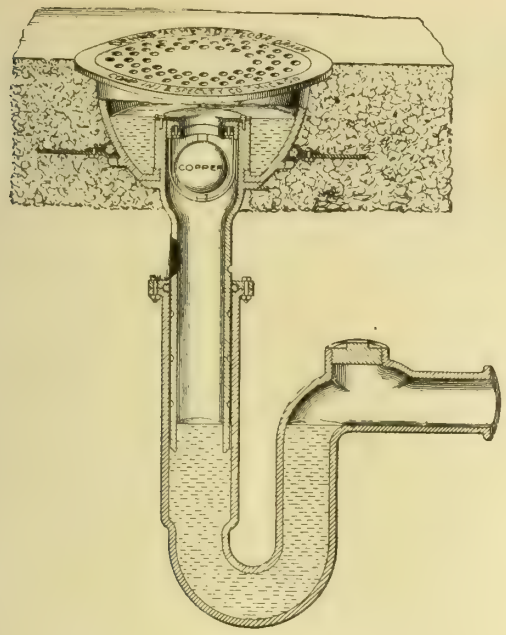


FIG. 37. DEHN'S "ACME" FLOOR DRAIN
(Patented)

With expansion joint-shelf and anchors, continuous pipe trap (adjustable), clean-out plug, etc.

DIMENSIONS AND PRICES

Water Seal, inches	4
Size of Outlets, inches	2
Receiver above Outlet of Trap, Extreme Height, inches	20
Receiver above Outlet of Trap, Lowest Depth, inches	8
Adjustment of Receiver from Lowest Depth to Extreme Height, inches	12
Depth over all, inches	28
Length over all, inches	14
Diameter of Top, inches	9
Average Weight, pounds	45
Fig. 37-A. Iron Top and Strainer, each	$16.50
Fig. 37-B. Finished Brass Top and Strainer, each	22.50
Fig. 37-C. N. P. Brass Top and Strainer, each	24.50

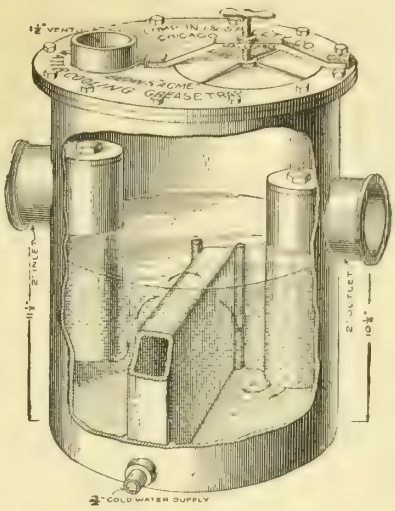


FIG. 113. DEHN'S "ACME" DOUBLE-TRAPPED WATER COOLING GREASE TRAP
(Patented)

Grease Catch Basins designed to keep water in basin at low temperature. By connecting cold water supply pipe leading to kitchen sink or other fixtures with water jacket in basin, water in basin is continually chilled to a very low temperature. As soon as greasy water enters basin, grease congeals and floats to top of water and can be easily removed. Hand-hole provided with malleable iron saddle and heavy thumb-screw

DIMENSIONS (INCHES) AND PRICES

Number	15-1	18-1	24-1	30-1	38-1	24-2	30-2	38-2
Diam. of Top	12	12	20	20	20	24	24	24
Depth over all	15	18	24	30	38	24	30	38
Size of Waste Inlet Connection	2	2	4	4	4	4	4	4
Size of Waste Outlet Connection	2	2	4	4	4	4	4	4
Size of Vent Hub Connection	1½	1½	2	2	2	4	4	4
Size of Water Supply Connection	3-4	3-4	3-4	3-4	3-4	1	1	1
Price, Painted	$28.00	$30.00	$45.00	$55.00	$70.00	$55.00	$70.00	$85.00

These Catch Basins can be furnished enameled inside, if desired. Prices quoted upon application

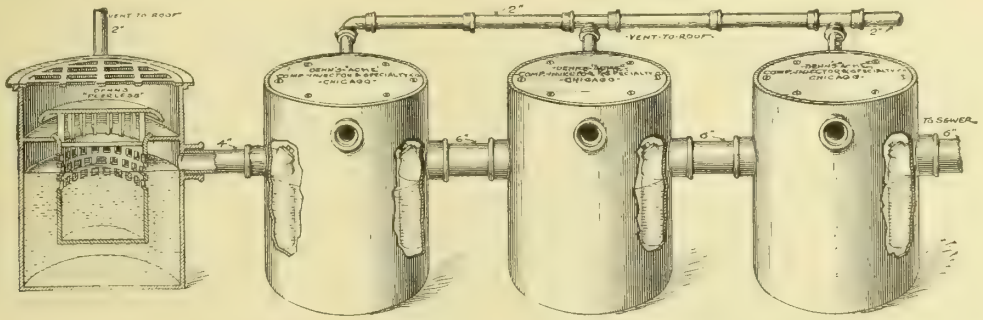


FIG. 62-C. DEHN'S "PEERLESS" GARAGE DRAINAGE SYSTEM
(Patented)

A system of Mud, Gas and Oil Garage Drainage Basins, approved and recommended by Board of Health and Fire Prevention Bureau, and installed in every public garage constructed in Chicago, Ill.

Basins furnished with flush cover, fastened in place with brass flat head machine screws, countersunk

Fig. 62-C. As illustrated, less pipes and fittings	$134.00
Fig. 62. 20" x 30" "Peerless" Garage Floor Drain only, each	50.00
Fig. 116-A. 18" x 24" "Acme" Special Gas Basin only, each	28.00
Fig. 116-B. 18" x 24" "Acme" Special Mud Basin only, each	28.00

Co-operative Service.

We are continually making improvements in our line; hence, it will be to our mutual interest for you to keep in close touch with our firm in order to keep yourself posted. We are at your service. Command us at any time.

ESTABLISHED 1886

PENBERTHY INJECTOR COMPANY

MANUFACTURERS OF

The "Penberthy" Automatic Cellar Drainer

DETROIT, MICH.

CANADIAN FACTORY: WINDSOR, ONTARIO, CAN.

BRANCHES

NEW YORK, N. Y. CALCUTTA, INDIA LONDON, ENG. HANOVER, GERMANY PARIS, FRANCE

Products.

The "Penberthy" Automatic Injector, Auto-Positive Injector, "XL-96" Ejector, "Penberthy" Regrinding Valves, Automatic Cellar Drainers, "XL-96" Swimming Pool Heater.

Also, a full line of Angle, Cross, Horizontal and Vertical Check, Swing Check and Globe Valves; Water Gauges, Water Heaters, Oil Cups, Grease Cups, etc.

"Penberthy" Automatic Cellar Drainer.

The "Penberthy" Automatic Cellar Drainer is a hydraulic ejector of high capacity with a copper float automatically operating a quick opening and closing valve C (Fig. 1); said valve being controlled by the float in its upward or downward movement on account of the rise or fall of the water in sump, as shown in Fig. 2. This valve is never partially opened—it cannot leak, and allows the ejector to give its greatest efficiency by working to full capacity.

The float arms are slotted at A, where they connect to the valve lever. This prevents the ejector from operating until the water has raised the float up to the highest point, and, as the water is ejected, they travel down the length of these slots before the weight of the float closes the valve. This allows the machine to work for longer periods and not so often, thus preventing considerable wear and the leakage and dribbling of water, as is so common in the majority of drainers.

To enable the installation of this drainer in small holes, or sumps, we have made it as compact as possible.

It takes up not over one third the space of other drainers.

The float, instead of being round, is flat on the top; it has more buoyancy and occupies less space than a round float of the same diameter. We have further economized on space by building the float around the suction pipe B. This patented feature has the added advantage of being rigid, and overcomes all the trouble of the common loose float. The balance of the drainer is built directly above the float; this not only keeps the whole machine in as small a space as possible, *but also admits of all working parts, with the exception of drainer and float, being above the water*, thus preventing corrosion, or the exterior parts becoming clogged by deposits of slime, dirt or sediment. The interior parts are prevented from coming into contact with any foreign particles by the special strainer H, which is so constructed that, instead of the water being drawn directly upward, it is taken in at the sides, allowing all

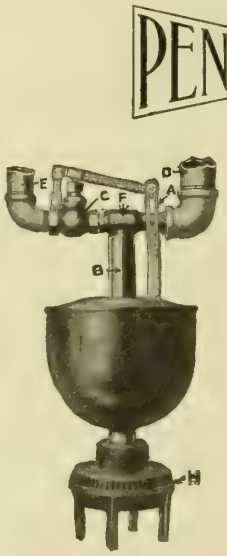


Fig. 1
"PENBERTHY" AUTOMATIC CELLAR DRAINER
E—Water Pressure Pipe
C—Water Valve
D—Discharge Pipe
F—Ejector
B—Suction Pipe

Fig. 2
"PENBERTHY" AUTOMATIC CELLAR DRAINER
Showing Installation

sediment to collect under the strainer without being disturbed by the force of the suction.

We also provide a foot valve, *inside the strainer,* which closes the instant the drainer ceases operating, holding all water in the pipes, primed for starting instantly at the next filling of the sump. This also prevents flooding by the back flow.

The "Penberthy" has no leather washers to wear and cause leaks.

The instantaneous opening and closing of the operating valves, by action of the water pressure, permits no slow leaks.

The very compact arrangement of this drainer makes it necessary to construct only a small sump, desirable because of the saving effected in both amount of space used and the cost of construction. The whole drainer is under the floor level, yet all parts are instantly accessible without disconnecting pipes or removing drainer. All working parts are conveniently located on top.

Adaptability—The "Penberthy" Automatic Cellar Drainer is particularly adapted for use in pits, sumps, cellars, tanks, settling basins, or wherever it is desired

Continued on next page

to keep water or other liquids from going above a certain level. It is more efficient, takes up less room, will last much longer, and sells at a lower price than asked for many drainers not as efficient.

Material—They are made of best bronze metal, except float, which is copper.

Estimates—We will furnish estimates for any special requirements.

Guarantee—All drainers absolutely guaranteed perfect in working and workmanship.

LIST PRICES

No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
$25.00	40.00	55.00	80.00	110.00	160.00

PRICES AND CAPACITIES AT DIFFERENT PRESSURES AND ELEVATIONS, DIMENSIONS, PIPE SIZES, WEIGHTS ETC.

Size	Working Head in Feet	Actual Capacities in Gallons of Water per Hour Taken from Sump and Not Total Amount of Discharged Water: At 25 lbs. Will Elevate	At 40 lbs. Will Elevate	At 60 lbs. Will Elevate	At 80 lbs. Will Elevate	Pipe Sizes, Inch: Supply	Discharge and Suction	Dimensions Over All in Inches: Height	Diam.	Shipping Weight Boxed, Pounds
1	3	**230**	**400**	**530**	**650**	½	1	16	10	18
	6	**200**	**350**	**480**	**580**					
	9		285	420	490					
	12			360	420					
	18			285	340					
2	3	**430**	**620**	**820**	**1050**	¾	1¼	20	12	22
	6	**320**	**480**	**700**	**840**					
	9		400	600	780					
	12			480	620					
	18			300	450					
3	3	**660**	**1100**	**1440**	**1650**	1	1½	25	15	28
	6	**520**	**860**	**1230**	**1440**					
	9		720	1050	1320					
	12			840	1040					
	18			580	760					
4	3	**960**	**1600**	**2020**	**2400**	1¼	2	28	16	32
	6	**760**	**1240**	**1880**	**1980**					
	9		1040	1600	1800					
	12			1280	1440					
	18			900	1050					
5	3	**1280**	**2100**	**2700**	**3200**	1½	2½	32	18	40
	6	**1000**	**1620**	**2300**	**2820**					
	9		1260	1960	2600					
	12			1560	2060					
	18			1080	1500					
6	3	**1680**	**2800**	**3560**	**4200**	2	3	36	20	50
	6	**1320**	**2200**	**3050**	**3700**					
	9		1840	2600	3420					
	12			2080	2700					
	18			1440	2000					

Sizes 7 and 8 made to order only. Prices subject to discount.

SPECIAL NOTICE—The above capacities are the *actual capacities of water taken from sump*, and not the combined discharge of operating and drainage water as given in most tables.

For higher elevations than shown above, special drainers can be made; also low pressure drainers for operating pressure 10 to 30 lbs.

Factories.

All articles manufactured at the Detroit factory are also manufactured in our Canadian factory.

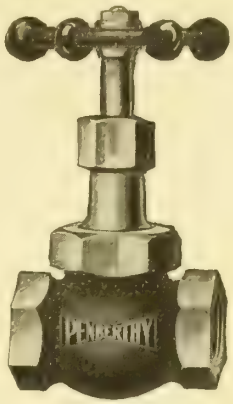
"Penberthy" Regrinding Valves.

They will add to and increase the economy, efficiency and prosperity of any power plant that installs them.

The ever increasing demand to-day by power plant owners and steam users in general is for valves that will give absolutely reliable service and dependability under high pressures and severe conditions, and that are free from unnecessary renewal of discs and repair parts. To meet this demand the "Penberthy" Regrinding Valve has been designed. It is the result of many years of practical experience in the manufacture of high-grade brass goods, and embodies the best mechanical ideas ever employed in valve construction.

The distribution of metal is such that parts subjected to the greatest strain and wear have proportionately heavier walls. For the present we illustrate only the medium pattern type, which is designed to stand a constant working pressure of 200 pounds.

A sectional view of this regrinding valve is illustrated herewith. It will give an intelligent idea of the design, construction and superior features of this high-grade valve. It will be noticed that restrictive areas are largely in excess of area of the pipe.



NO. 525-J
"PENBERTHY"
REGRINDING VALVE

"XL-96" Swimming Pool Heater.

The swimming pool of the present has called forth a development of complete systems for filtering, filling, heating, circulating, refiltering and aerating its water with regard to perfect sanitation and economy.

In this connection the PENBERTHY INJECTOR COMPANY has spent some time and no little money in obtaining the requisite data and perfecting the "XL-96" Heater to meet the requirements of noiselessly and efficiently heating these pools.

As regards time allowance for heating a pool, this depends upon the rate at which water for filling can be passed through filters; or in cases where filtering the water has been accomplished at water company's plant, upon size of filling main, the head pressure on main and capacity of boiler plant to generate the requisite number of heat units to give proper temperature increase to the water.

The "XL-96" Heater, No. 4 to No. 10, inclusive, having pipe connection 1¼ inches to 4 inches respectively, will heat pools of 15,000 to 150,000 gallons' capacity; and the following table shows the proper size to install on a basis of thirty degrees Fahr. increase of temperature, 10- or 80-pound steam pressure and a time allowance of ten hours. Two heaters to be installed on filling line and one next size smaller on recirculating line.

"XL-96" SWIMMING POOL HEATER

Steam Pressure Gauge	Capacity of Pool in Gallons: 15,000 Quan.	Size	30,000 Quan.	Size	55,000 Quan.	Size	80,000 Quan.	Size	100,000 Quan.	Size	150,000 Quan.	Size
10 lbs.	2	5	2	6	2	7	2	8	2	9	2	10
	1	4	1	5	1	6	1	7	1	8	1	9
80 lbs.	1	5	1	6	1	7	1	8	1	9	1	10
	1	4	1	5	1	6	1	7	1	8	1	9

Prices furnished on application. Write for descriptive circular.

CRAMPTON-FARLEY BRASS CO.

Manufacturers of Plumbers' Specialties

KANSAS CITY, MO.

DISTRIBUTORS

PHILADELPHIA, PA., Fleck Bros. Co.
READING, PA., Reading Foundry & Supply Co.
ST. LOUIS, MO., L. M. Rumsey Mfg. Co.
ST. LOUIS, MO., N. O. Nelson Mfg. Co.
MINNEAPOLIS, MINN., Central Supply Co.
OMAHA, NEB., United States Supply Co.
DENVER, COLO., M. J. O'Fallon Supply Co.
LITTLE ROCK, ARK., Crane Co.
ST. PAUL, MINN., Crane & Ordway Co.
KANSAS CITY, MO., All Supply Houses

Products.

Sansealo Floor Drains.

Also, Farley Self-Closing Work, Fuller Work, Compression Work, Star Hopper Valves, Solder Nipples, Vent Tees, etc.

Sansealo Floor Drains, Construction.

The outside or main part of this sanitary Floor Drain is made of one heavy piece of cast iron, on the inside of which is a flange upon which the inner trap rests. This inner trap is held in place with four brass machine screws, and a ¼-inch rubber cord forms the joint. The gate and seat on the back-water trap drain is made of bronze and carefully ground, and being submerged, works easily and surely by gravity. No joints to become loose and cause leakage.

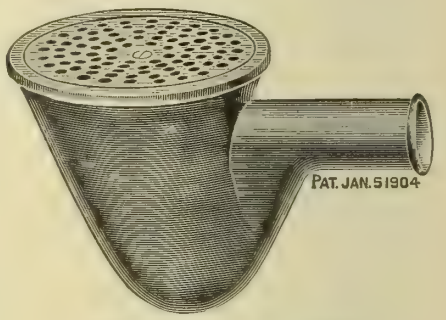
Polished Brass Tops or extra-heavy Iron Tops furnished when specified.

Advantages.

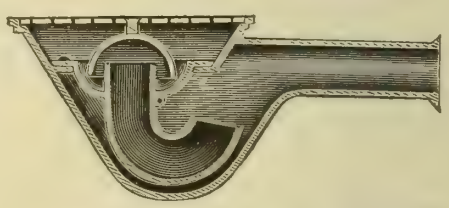
Sansealo Drains are very compact, have no outside joints to get loose and leak, the water seal is greater than in most drains and the outlet is near surface. The outlet of the inner trap being submerged, it acts as a jet and keeps the bowl filled with fresh water, allowing the grease, lint, etc., to come to surface and be carried away at next flush. This insures a clean seat and a positive seal. By removing the brass screws you can lift the inside trap out, thus giving direct access to soil pipe, which obviates the necessity of tearing up floor should soil pipe get clogged.

Specifications.

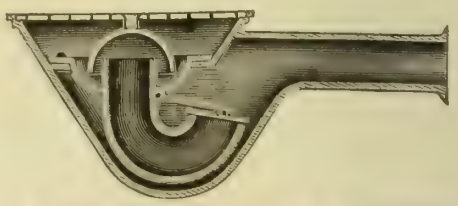
Specify by number, and state if wanted plain or with back-water trap.



SANSEALO FLOOR DRAIN
Note absence of joints



SANSEALO PLAIN DRAIN WITH OUTLET FOR SOIL PIPE
Sectional view



SANSEALO DRAIN WITH BACK-WATER TRAP
Sectional view

SIZES, STYLES AND LIST PRICES OF SANSEALO DRAINS

No.	Approximate Weight, pounds	Distance from Top Center to Outlet, inches	Style and Diameter of Top	Depth, inches	Style and Size of Outlet	Plain Drains		With Back-Water Trap	
						Iron Top	Polished Brass Top	Iron Top	Polished Brass Top
[illegible]	18	8	Round 8 in.	8	Tapped for 1½ in. Iron Pipe	$4.00	$6.25	$6.75	$8.75
8-00	[illegible]	[illegible]	Round 8 in.	8	Tapped for 2 in. Iron Pipe	4.25	6.50	7.00	9.00
[illegible]	29	[illegible]	Round 8 in.	8	For Soil Pipe 2 inch	3.75	6.00	6.50	8.50
[illegible]	33	[illegible]	Round 11 in.	[illegible]	For Soil Pipe 2 inch	5.00	10.00	8.00	13.00
[illegible]	[illegible]	[illegible]	Round [illegible] in.	12	For Soil Pipe 3 inch	9.00	18.00	13.00	19.00
[illegible]	[illegible]	[illegible]	Round [illegible] in.	[illegible]	For Soil Pipe 4 inch	13.00	21.00	18.00	28.00

For five-inch Top Extension add to List, No. 0, No. 00, or No. 1, $3.00; No. 2, $4.00; No. 3, $5.00; No. 4, $6.00.
For extra Heavy Iron Strainers add to List, No. 0, No. 00, No. 1 or No. 2, $1.50; No. 3, $2.00; No. 4, $2.50.
Discount on application.

NOS. 0 AND 00 SANSEALO DRAIN TAPPED FOR IRON PIPE OUTLET

JOSAM MANUFACTURING CO.

Manufacturers of Floor Drains

27 South Fourth Street

ST. LOUIS, MO.

ALL PLUMBING SUPPLY HOUSES IN THE UNITED STATES ARE DISTRIBUTORS OF JOSAM PRODUCTS

Products.

Josam Double Drainage Shower Urinal and Floor Drains, Combined Trap and Drains, and Rain-Water Conductor Roof Drains.

Also, Back Water Traps, Cess-Pools and Roof Flashings.

Josam Drains.

These drains, primarily for shower bath and urinal stalls and concrete roofs, are particularly important for installations where it is essential to prevent leakage to ceilings below, at points of contact between the metal drain and the composition, tile, marble, or concrete floorings, or the concrete roofs. These contacts invariably work apart (through expansion and contraction); and, with the old fashioned drains, eventual leakage is almost inevitable.

The Josam drains provide a supplementary cup (see illustrations) which is imbedded in the floor construction, and which, with its increased area (sometimes supplemented by a membranous waterproofing extending throughout the flooring and pitched toward the drain) will catch all liquid matter which may find its way down at the contact points, and also at such other points in the vicinity of the drain, which the subsurface construction may control. Through the holes at the base of the cup this drainage finds its way into the drain pipe. The corrugations in the draining cup insure a firm and enduring contact.

Materials, etc.

These drains are made in cast iron and brass, and, unless otherwise specified, have nickel-plated brass parts to the surface. All outlet connections have standard iron pipe threads which are recessed.

Can also be furnished galvanized or enameled.

Special patterns furnished on application.

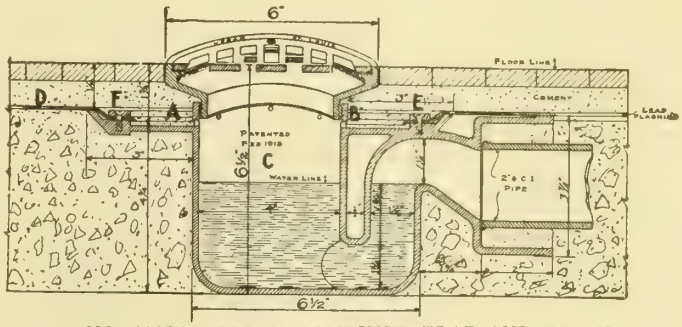
DIMENSIONS AND PRICES, JOSAM DRAINS

No.	Strainer	Outlet	Price	No.	Strainer	Outlet	Price
Shower Bath Drains				Combined Trap and Drains			
100	2 in.	2 in.	$6.50	201	4 in.	2 in.	$11.00
101	3 in.	2 in.	7.00	203	5 in.	2 in.	12.00
102	3 in.	3 in.	8.00	203A	5 in.	2 in.	12.00
103	4 in.	3 in.	9.50	Urinal Drains			
104	5 in.	4 in.	11.00	300	4 in.	2 in.	$9.00
				301	5 in.	3 in.	9.60

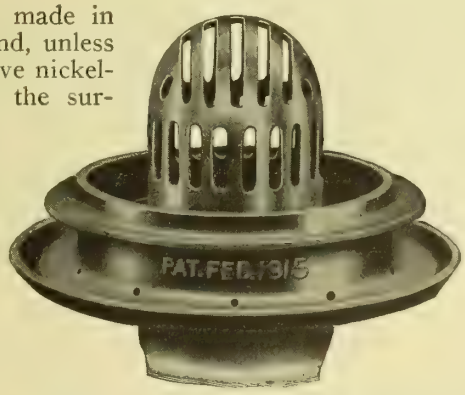
Concrete Roof Rain-Water Conductor Drain

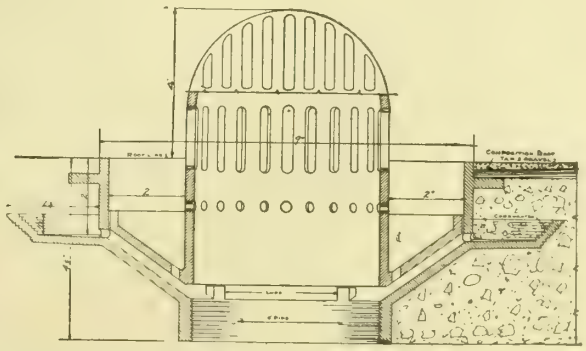
No....	400	401	402	403	404
Outlet	4 in.	5 in.	6 in.	7 in.	8 in.
Price..	$12.00	$14.00	$16.00	$18.00	$20.00

* Prices on special sizes, on application.

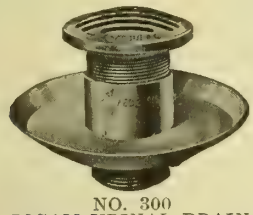


NO. 2003A. JOSAM COMBINED TRAP AND DRAIN
Section View of Special Shallow Type





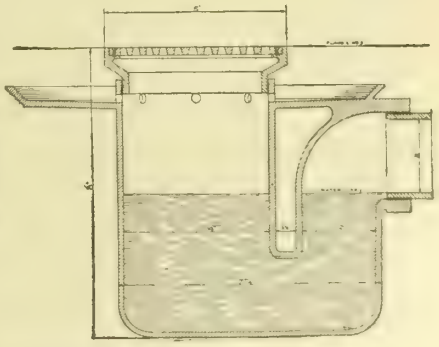
NO. 400. JOSAM ROOF DRAIN WITH SEDIMENT CUP
Showing Elevation and Section Views



NO. 300
JOSAM URINAL DRAIN

NO. 500. JOSAM CESSPOOL DRAIN

Government Type



NO. 203A. JOSAM COMBINED FLOOR DRAIN
Showing Elevation and Section Views

C. H. STEPHENSON

Manufacturer of "The Stephenson" Household Specialties

48 Furrar Street
LYNN, MASS.
TELEPHONE, 944-W

ALL GOODS SOLD DIRECT FROM FACTORY

Products.

"The Stephenson" Standard Underground Garbage Receivers, Underground Street Sweeping Receivers, Underfloor Refuse Receivers, Underground Earth Closets, Portable Earth Closets, Spiral Truss Ribbed Ash Barrels, Always-Closed Fireproof Barrels (Patented), Portable Metal Houses (for Contractors and Campers), Portable Metal Garages, Gasoline Pumps and Tanks.

Also, "The Stephenson" Nickel Heavy Cast Brass Bathroom Accessories.

THE STEPHENSON TRADE-MARK

TRADE-MARK

Trade-Mark.

Architects should note carefully our construction, and when specifying should designate all our goods by our name, as all are trade-marked "The Stephenson." Our twelve years' practical experience, with thousands of Satisfied Users, has made possible this trade-mark, which protects your client, yourself and us from substitution.

"THE STEPHENSON" STANDARD UNDERGROUND GARBAGE RECEIVER
As it appears when out of the ground
Sold direct from factory

Description.

"The Stephenson" Standard Underground Garbage Receiver sets deep in the ground, holding a heavy galvanized bucket with bail. It thus avoids the unsightly and injurious effects of wooden boxes, with their attendant annoyance of rats, cats, dogs and flies, attracted by scattered refuse. It is impossible to spill garbage between bucket and receiver, as the chute empties directly into the barrel. It is practical for all seasons; the objectionable features in the above-ground garbage bucket nuisance are eliminated.

"THE STEPHENSON" STANDARD UNDERGROUND GARBAGE RECEIVER
As it appears when in the ground. Note carefully our construction
Sold direct from factory

"THE STEPHENSON" STREET SWEEPINGS RECEIVER AT FIFTH AVENUE AND 24TH STREET, NEW YORK, N. Y.
Sold direct from factory

"THE STEPHENSON" FIREPROOF UNDERFLOOR ASH RECEIVERS
Insure a clean and sanitary cellar. *Sold direct from factory*

"THE STEPHENSON" SANITARY UNDERFLOOR ASH RECEIVERS
A space economizer. *Sold direct from factory*

Continued on next page

"The Stephenson" Underfloor Refuse Receiver.

These Refuse Receivers keep ashes out of sight under floor in front of furnace. The ashes are easily moved into them, preventing fires, saving time and space. The method of placing receiver in floor, the separate receiving chute, the cover for filling and removal cover to permit taking out inside bucket, are original with "The Stephenson" System.

"The Stephenson" Underground Earth Closet.

This device supplies a Sanitary Closet in situations where sewer connections are impossible. It is adapted for use on farms, camps, and where closets are required during construction work.

Advantages.

Each device is sanitary, portable and durable, saving time and space; hence, clean, convenient and economical.

Materials.

The best and most lasting metals are employed in all devices.

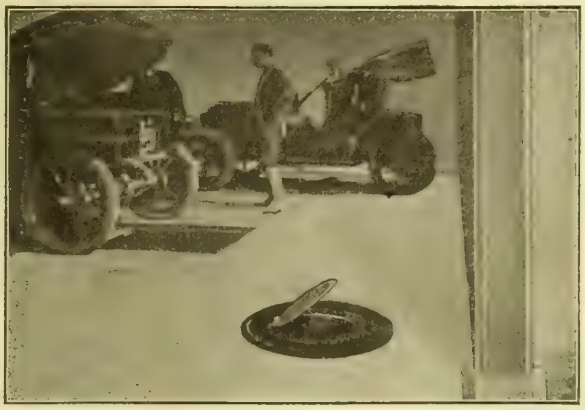
Prices.

Separate Catalogues and Price-Lists of each are promptly mailed on application.

Installation and Delivery.

The installation of all Receivers is simple. Goods are guaranteed and shipments made same day order is received. *Sold direct from factory,* Lynn, Mass.

"THE STEPHENSON" GASOLINE PUMP FOR GARAGES
Tanks also supplied
Sold direct from factory



"THE STEPHENSON" UNDERFLOOR REFUSE RECEIVER
Placed in Garages for oily waste and sweepings. Flush with floor. Easy to sweep into
Sold direct from factory

"THE STEPHENSON" ALWAYS CLOSED FIREPROOF BARREL
Showing cover held open while throwing in refuse
Sold direct from factory

"THE STEPHENSON" SPIRAL TRUSS RIBBED ASH-BARREL
Note construction and finish
Sold direct from factory

"THE STEPHENSON" UNDERGROUND EARTH CLOSET
Removing a bucket and placing another inside
Sold direct from factory

"THE STEPHENSON" UNDERGROUND EARTH CLOSET
Showing wooden seat with the cover open
Sold direct from factory

"THE STEPHENSON" PORTABLE EARTH CLOSET
Partly buried in corner of cellar of house while building is in progress
Sold direct from factory

"THE STEPHENSON" PORTABLE METAL HOUSE WITH UNDERGROUND EARTH CLOSET
For contractors, camps, bath houses and farms without sewerage
Sold direct from factory

"THE STEPHENSON" PORTABLE EARTH CLOSET
Placed on floor with an old box for a foot rest
Sold direct from factory

THE OPALITE TILE COMPANY

MANUFACTURERS OF

"Opalite," a Pure White Opaque Glass

MONACA, PA.

BRANCH OFFICE: NEW YORK, N. Y., 47 West 34th Street—Telephone, Greeley 5190

Product.

"OPALITE" (White Glass) for Wainscoting, Toilet Partitions, Wall Tiles, Floor Tiles, Refrigerator Linings, Table Tops, Pastry Boards, Counter Tops, Deal Plates, Operating-Tables, Hospital Fixtures, Sink Backs, Low-Down Tank Tops, and Shelves, Glass and Glazing Structural Glass, Interior and Exterior Refrigerator Finish and Interior Decoration.

Adaptability.

It is peculiarly adapted for use in public institutions, operating-rooms, kitchens, bathrooms, toilet-rooms, engine rooms, light-shafts, fire-engine houses, subways, mortuaries, vaults, natatoriums, breweries, etc.

Sanitation.

"Opalite," being a dense, compact material, is absolutely non-porous, consequently non-absorbent, and as it does not craze, offers no home for germs of any nature.

It is pure white and its highly polished surface reflects all the rays of the sun, which makes it a valuable agent in retarding the propagation of germ life; hence its use in penal institutions checks the spread of tuberculosis, and in hospitals, particularly those receiving patients with infectious or contagious diseases, it is almost indispensable.

Leading architects, physicians and sanitary experts endorse it unqualifiedly as the proper material for all places where sanitary conditions are necessary.

Wainscoting.

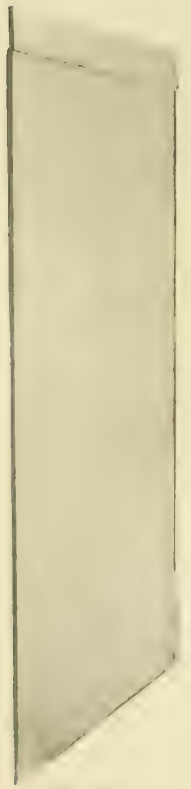
"Opalite" Wainscoting is better and costs less than marble, is not affected by climatic changes, will not discolor or deteriorate with age. Made in $\frac{1}{4}$", $\frac{5}{16}$", $\frac{3}{8}$", $\frac{7}{16}$", $\frac{1}{2}$", $\frac{9}{16}$", $\frac{5}{8}$", $\frac{3}{4}$", $\frac{7}{8}$" and 1" thicknesses, in any widths up to 60", and in any lengths up to 108". Wainscot Cap and Base to suit the above thicknesses.

Wall Tile.

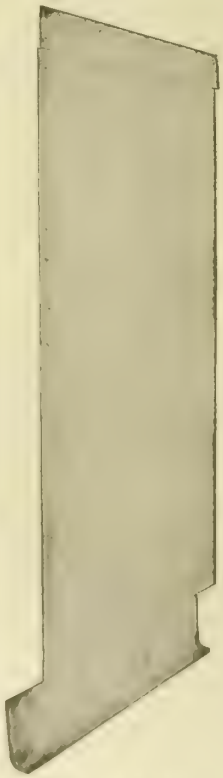
"Opalite" Wall Tile has a natural polished face surface, corrugated back surface; edges ground and slightly chamfered. Can be had in all dimensions up to 8" by 16". We have moulds for over 500 different varieties of bent shapes that are used for sanitary corners, cove base and other purposes, in connection with the tile.

Setting.

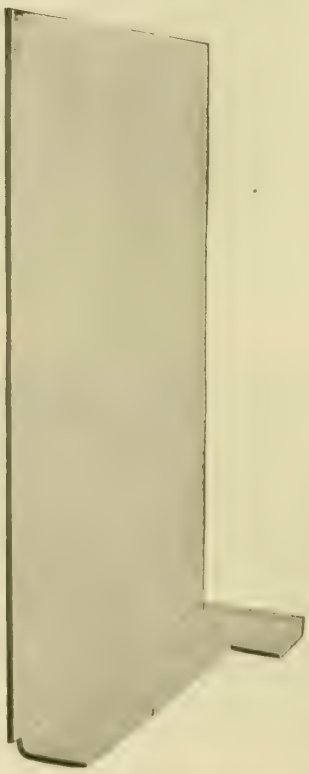
"Opalite" may be installed in various ways. When a permanent fixture, it should be set in Plastic cement, preferably ours. All construction work done under our own supervision.



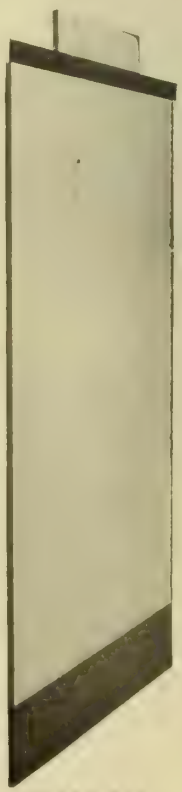
FLAP CAP AND BASE



COVE BASE



U. S. GOVERNMENT BASE



BLACK CAP AND BASE

SWEET'S CATALOGUE

Continued on next page

Testimonials.

THE ROBERT PACKER HOSPITAL,
SAYRE, PA., July 8, 1914.

OPALITE TILE CO.,
47 W. 34th St.,
New York, N. Y.

GENTLEMEN:

In reply to your letter of the 6th inst., I beg to advise that we wrote your home office some time ago that we expected to have some pictures taken of our new operating rooms, and would be glad to let them have one.

We find, however, that we will be unable to have a photographer from away come here, and we do not think that our local men can give us a job that would be satisfactory to you.

We therefore would be very glad to have you send a man here to take the pictures, and we will assist him in any way that we can.

We are proud of our operating rooms and of your work here.

Yours very truly,
H. E. BISHOP,
Superintendent.

ONE OF THE OPERATING ROOMS IN THE ROBERT PACKER HOSPITAL, SAYRE, PA.
Showing installation of Opalite Wainscoting
McCORMICK & FRENCH, Architects, Wilkes-Barre, Pa.

Fitzsimmons Building,
PITTSBURGH, PA., April 29, 1901.

WILLIAM GIBSON PRESTON, ESQ.,
Architect,
Boston, Mass.

DEAR SIR—In answer to your inquiry as to the "Opalite" Tile, I would state that I have completed the light shaft in the Fitzsimmons Buildings, which contains from 12,000 to 15,000 square feet of tile, and can say that the work gives entire satisfaction, and the lining of the light shaft with "Opalite" has produced at least 50 per cent better light than we could have gotten with the use of anything else. You not only gain the advantage of the light, but also the cleanliness of the shaft, as you fully understand the tile is non-absorbent, and that no dirt gathers to the same.

The light shaft which we have just completed is all under roof and part of it was done on old wall, which was covered with soot and some paint, and as yet we have found no loose tile in any of the work, or any tendency of the same coming loose.

I did some work two years ago on the Bakewell Law Building in our city, which is entirely outside, and I have examined the same this morning and find it in as good a condition as the day when it was placed on the building.

I can cheerfully say that you will make no mistake in the use of "Opalite" Tile in any work that you may do.

Trusting that this is giving you the desired information that you wish, I am,

Truly yours,
ELLSWORTH DEAN.

View showing "Opalite" during installation, 1901

As it appeared February 21, 1916

TWO VIEWS OF THE FITZSIMMONS BUILDING LIGHT SHAFT, PITTSBURGH, PA.
ELLSWORTH DEAN, Architect

Confirmation.

Mr. Ellsworth Dean confirmed and gave us permission to use the above on February 21, 1916.

Samples and Estimates.

Samples, estimates or fuller detailed information cheerfully given.

THE VITROLITE COMPANY

Sanitary Wainscoting, Etc.

GENERAL OFFICES

PARKERSBURG, W. VA.

BRANCH OFFICES

NEW YORK, N. Y.	PORTLAND, ORE.	CINCINNATI, OHIO	HARTFORD, CONN.
CHICAGO, ILL.	SEATTLE, WASH.	COLUMBUS, OHIO	ROANOKE, W. VA.
BOSTON, MASS.	SALT LAKE CITY, UTAH	PITTSBURGH, PA.	SPRINGFIELD, MASS.
PHILADELPHIA, PA.	SAN FRANCISCO, CAL.	HOUSTON, TEX.	MONTREAL, CAN.
CLEVELAND, OHIO	MINNEAPOLIS, MINN.	TROY, N. Y.	WINNIPEG, CAN
DETROIT, MICH.	KANSAS CITY, KAN.	ROCHESTER, N. Y.	LONDON, S. W., ENG.
BUFFALO, N. Y.	MILWAUKEE, WIS.	ATLANTA, GA.	HAVANA, CUBA
LOS ANGELES, CAL.	ST. LOUIS, MO.	LOUISVILLE, KY.	CHRISTIANIA, NORWAY

Product.

VITROLITE, an OPAQUE CERAMIC STRUCTURAL PRODUCT supplied in slabs for TOILET PARTITIONS and STALLS, WAINSCOTING, CEILINGS, and other Sanitary Purposes.

VITROLITE
"Better than Marble"
TRADE-MARK

Description.

Vitrolite is homogeneous and opaque, fused at a temperature of about 3000 degrees Fahr. The molten mass is rolled into slab form, thoroughly annealed and toughened. This process gives a brilliant, natural polished hard surface, impervious to stain or deterioration, with a tensile strength greater than glass or marble.

Color and Polish—Vitrolite is of a rich milk-white color. Exposed surface is fire-polished; on the reverse, it is in tiny corrugations or ridges.

Decorated Vitrolite—Permanent decorations, in color, for borders, panels, friezes, etc., of special design, are fired into the Vitrolite.

Catalogue in colors, showing stock designs, submitted on request.

Dimensions—The average sizes are 24 to 42 inches wide by 36 to 84 inches long. Longer dimensions, only on special order.

Thicknesses: $\frac{3}{16}$, $\frac{5}{16}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{3}{4}$ and 1 inch.

Special Features.

Absolutely sanitary. Non-absorbent. Never stains or discolors. Proof against all acids except hydrochloric. Impervious to stains, grease, dyes, etc. Will retain its beauty and strength indefinitely. Hardware hidden.

Installation.

Vitrolite is securely cemented in position, on a true surface wall as a base, by a special plastic composition, Vitro Cement.

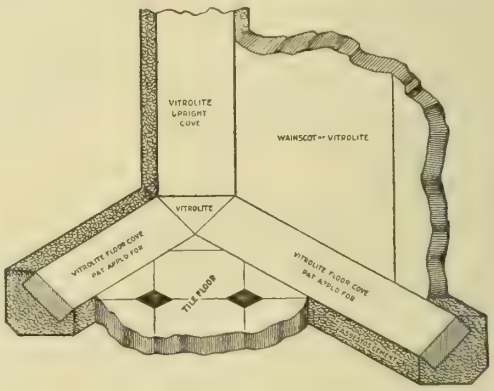
Joints are "grouted" or filled with a plastic white or black composition, which performs the double service of rendering such joints waterproof and cushioning the edges of the Vitrolite slabs.

Can be cut to any size; holes of any diameter can be drilled.

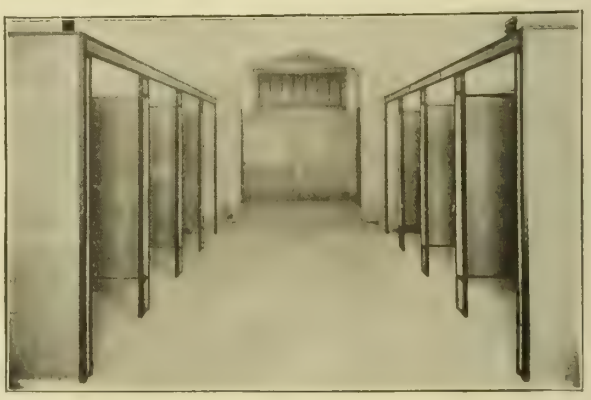
Uses.

For toilet construction Vitrolite is "better than marble." It is fool-proof, strong, durable, sanitary and attractive. All hardware is hidden (see illustrations).

Wainscoting for office buildings, apartments, etc. Lavatory linings. Hospital walls and ceilings. Bath houses. Swimming-pools. Counters, ceilings, etc., in restaurants. Light courts. Refrigerator linings, etc.



DETAIL OF SANITARY COVE OF VITROLITE



Metal Work with Plaster Board

The finished work; Vitrolite installed

VITROLITE PATENTED TOILET CONSTRUCTION

Continued on next page

Specification Notes.

Wainscoting—Panels 5/16", 7/16" or 9/16" thickness. Cap and Base 7/16", 9/16", 5/8" or 3/4" thickness; exposed edges chamfered and polished. Material secured by being laid in 3/8" bed of Vitro-Cement. All joints grouted in plastic, Vitro-Grout, well forced in and smoothly finished.

Tops—For counters, tables, desks, and furniture subjected to severe service, specify 7/16", 9/16", 5/8", 3/4" or 1" thickness, securely bedded in Vitro-Cement upon sound and true surface base.

All exposed edges polished and rounded.

Shower Baths—Wall slabs 7/16", 9/16", 5/8", 3/4" or 1" thickness.

Refrigerator Linings—5/16" or 7/16" thickness, cemented in place or held by metal flange frame.

Cabinet Linings—3/16", 5/16" or 7/16" thickness, cemented in place.

Tests.

Vitrolite vs. Marble tests conducted by Professor McCullough, Carnegie Institute, Pittsburgh, Pa.

The first series of tests were made in order to compare the strength of Vitrolite and various marbles in compression.

The compression test was performed by slowly increasing the load on the specimen until it crushed.

The results are given in detail as follows:

COMPRESSION TEST

Specimen Material	Cross-Section in Sq. Ins.	Height, Total in Ins.	Load-Unit in Lbs.	Load in Lbs. per Sq. In.
A Vitrolite	1.084x1.069	.974	30,000	25,900
B Vitrolite	1.0665x1.052	.975	38,690	34,500
D Olivo Marble	.982x.984	.951	9,540	9,880
E Olivo Marble	.876x.965	1.015	5,370	6,360
F Gray Tennessee Marble	.998x.862	1.049	14,390	16,720
G Italian English Vein Marble	1.0725x.928	1.042	14,710	14,770
H Italian English Vein Marble	1.016x1.0095	.435	11,450	11,160
I Vitrolite	1.030x1.030	.467	49,000	46,200
J Italian English Vein Marble	1.007x1.044	.456	18,260	17,350
K Meadow Tennessee Marble	.999x.977	.481	18,370	18,810

NOTE—The total load is the load registered by the machine when the specimen failed; the unit load is obtained by dividing the total load by the area of the cross-section. The results on E and H are double because of bearing surfaces

The following series of tests were made in order to compare the strength of Vitrolite and various marbles in cross-bending.

In cross-bending, the specimen was carefully placed on two supports and the load applied at the center until the specimen failed.

The results are given in detail as follows:

CROSS-BENDING TEST

Specimen Material	Width in Ins.	Depth in Ins.	Span in Ins.	Load in Lbs.	Modulus-Lbs. of Rupture per Sq. In.
A Vitrolite	3.016	1.018	8	1625	6,240
B Olivo Marble	3.067	.933	8	280	1,120
C Light Cloud Vermont Marble	3.02	.937	8	280	1,270
D English Vein Italian Marble	3.007	.901	8	435	2,140
E Gray Tennessee Marble	3.00	.866	8	350	1,870
F Vitrolite	3.03	.428	4	475	5,145
G Gray Tennessee Marble	3.04	.513	4	355	2,660
H English Vein Italian Marble	3.01	.479	4	215	1,870
I Gray Tennessee Marble	3.033	.485	4	305	2,560

Guarantee.

Vitrolite is guaranteed effective as per claims made for it, under all practical service tests.

Samples, etc.

Samples and other information will be mailed promptly on request.

References.

County Infirmary, Milwaukee, Wis.
Los Angeles County Hospital, Los Angeles, Cal.
St. John's Hospital, St. Louis, Mo.
Harper Hospital, Detroit, Mich.
Jenkins Arcade, Pittsburgh, Pa.
Hotel Taft, New Haven, Conn.
Swift & Co., East St. Louis, Ill.
Standard Oil Co., San Francisco, Cal.
Marion Apartments, Springfield, Mass.
Central Y. M. C. A., Louisville, Ky.
Sawyer Biscuit Co., Chicago, Ill.
Municipal Bathhouse, Winnipeg, Can.

VITROLITE IN SALT LAKE CITY HIGH SCHOOL

From the Architect—"When the question of wainscoting for various toilets, lavatories, etc., was taken up for the Salt Lake High School, we carefully looked into the merits of marble, tile and Vitrolite.

"After a thorough investigation the use of Vitrolite was decided upon, and it was used throughout all toilets and lavatory rooms in the building."

VITROLITE USED IN WAINSCOTING BATHROOM

VITROLITE IN HOSPITAL OPERATING ROOM

DAVIS SLATE & MANUFACTURING CO.

Slate Milling, Finishing and Contracting

618 East Fortieth Street
CHICAGO, ILL.

BANGOR, PA.

Products.

HIGH-GRADE BLACK, GREEN and PURPLE SLATE for all purposes.

SLATE PLUMBING FIXTURES

SLATE PARTITIONS and WAINSCOTING

SLATE SHELVING for REFRIGERATORS and SLAUGHTER HOUSES

SLATE TABLE TOPS

ELECTRICAL SLATE

ROOFING SLATE

SLATE BLACKBOARDS

SLATE TILE and FLOOR SLABS

SLATE BASE, COVE and BORDER

SLATE TANKS

SLATE STAIR TREADS and PLATFORMS

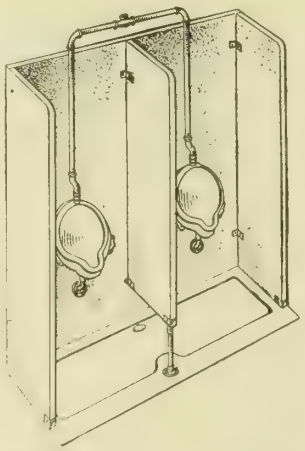
Distinctive Characteristics of Slate.

The characteristics of slate, which distinctly adapt it for the structural and sanitary uses listed above, are (1) density; (2) strength; (3) non-absorbent structure; (4) imperviousness to microbes; (5) electrical insulating quality; (6) ease of being kept clean; (7) durability, etc.

Slate Plumbing Fixtures.

The accompanying illustrations show a few of our typical styles of slate plumbing fixtures. Complete detailed information and specifications will be furnished for these or other desired styles.

For estimating purposes, on average installations of ribbon black slate, architects may figure the owner's cost for the completed installation at seventy to ninety cents per square foot of slate, depending upon size of job, freight rate, etc. For green or purple slate, add twenty cents per square foot.



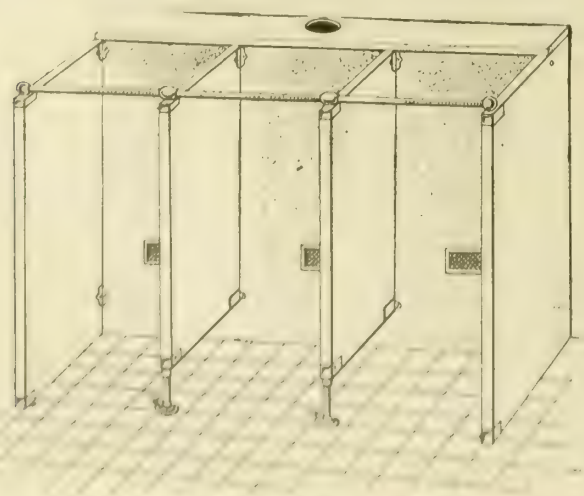
TWO-STALL SLATE URINAL

Capacity.

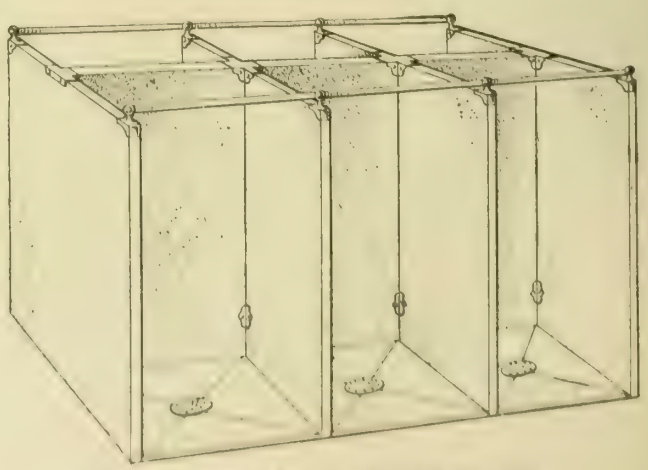
Seventy-five thousand square feet per month.

A FEW CUSTOMERS AND REFERENCES

First National Bank, Bangor, Pa.
Drexel State Bank, Chicago, Ill.
Hunt-Helm-Ferris Co., Harvard, Ill.
Illinois Steel Co., Chicago, Ill.
Packard Motor Car Co., Detroit, Mich.
University of Illinois, Chicago, Ill.
Hudson Motor Car Co., Detroit, Mich.
Ford Motor Co., Detroit, Mich.
Swift & Company, South St. Joseph, Mo.
Northwest Park District, Chicago, Ill.
Lord & Burnham Co., Chicago, Ill.
West Chicago Park Commissioners, Chicago, Ill.
Masonic Infirmary, Alma, Mich.
City Architect, Chicago, Ill.
Northwestern Marble & Tile Co., Minneapolis, Minn.
Pond & Pond, Architects, Chicago, Ill.
Armour & Company, Omaha, Neb.
Library Bureau, Chicago, Ill.
Marble & Tile Co. of Canada, Winnepeg, Can.
University of Chicago, Classics Building
The Pullman Co., Pullman, Ill.
Carnegie Steel Co., Pittsburgh, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
General Electric Co., Philadelphia, Pa.
Marshall-Wells Hardware Co., Duluth, Minn.
R. J. Love, Architect, Chicago, Ill.
Presbyterian Hospital, Chicago, Ill.
Illinois Central Railroad Co., Freeport, Ill.
J. W. Bowes, Architect, Chicago, Ill.
J. H. Anderson Granite Co., Chicago, Ill.
Hayes Monument Co., Morgan Park, Ill.
Board of Education, Chicago, Ill.
Acme Milling Co., Oklahoma City, Okla.
American Bridge Co., Chicago, Ill.
New England Westinghouse Co., Springfield, Mass.
Henry Marble Co., Chicago, Ill.



THREE-STALL CLOSET RANGE



DOUBLE THREE-STALL SHOWER RANGE

VERMONT STRUCTURAL SLATE COMPANY

FAIR HAVEN, VT.

Product.

VERMONT STRUCTURAL SLATE.

Slate as a Structural Material.

From its ready adaptation, its strength, durability and non-absorbent qualities, slate stands first and foremost among the natural stones used in architectural and engineering work. Few natural stones have so fine and firm a texture, and its transverse resistance is remarkable. No better proof of the strength and endurance of slate stone is required than the fact that slate headstones in cemeteries, which have been exposed to the rigors of our New England climate for a hundred years, are still intact and show the inscriptions clearly.

Vermont Unfading Green Slate.

Particular attention is called to the fact that, while our Vermont unfading green slate possesses all of the good qualities of other slates for structural and sanitary work, it also possesses a color and appearance distinctly its own—being light and cheerful, and not black and dismal like many grades of slate now in use. It is exceedingly strong and hard, perfectly non-absorbent, and does not chip nor spall easily as is the case with many other grades of slate.

Uses.

On account of its durability and beautiful appearance, this material can be used to advantage in hospitals, schools and other public buildings for treads, platforms, base, floors, wainscoting, sills, toilet-room work, etc., as well as for a great variety of purposes in factories, public buildings and private homes where a fireproof material is required. Many architects are specifying this material for window sills, on account of its great strength and pleasing color.

This material is especially recommended for borders, etc., in connection with terrazzo floors, both on account of its great strength and because it adds greatly to the beauty of the floor.

We are furnishing considerable quantities of floor tile in different finishes, and of several different colors of natural rock, thus producing very fine effects.

Specifications.

Slate Tile and Border—Where slate tile and border are to be laid over concrete, bring concrete slab to within 3½ inches of the finished floor line; on top of this fill in to within 1½ inches of finished floor; on this lay tile and border in rich mixture of cement mortar, all to be brought up to the floor level. Joints between slate tile and border not to exceed one sixteenth of an inch, and to be grouted after floor is laid; all to be solidly set, free from cracks, flaws and saw markings.

Slate Treads on Concrete Stairs—Where treads are 1¼ inches thick, bring concrete to within 2 inches of finished surface of treads, treads to be set in cement mortar or plaster, at the option of the architect; to have a slightly rounded nosing, and to project ¾ inch beyond the finished face of the riser; all to be drilled for two iron dowel pins, one at each end, and, when set, to incline ⅛ inch from back to front, so that water will not stand thereon; to be in perfect alignment; to be free from cracks, flaws, quarry or saw markings.

Slate Base—Slate base to be securely set against walls, with concealed brass anchors firmly imbedded in plaster of paris, or to be set with galvanized iron wire backed with cement plaster, at the option of architect; all to be smooth finish, free from flaws, to be cleaned down on completion, and to receive one coat of linseed oil applied in a uniform manner.

Toilet-Room Work—All wainscot against wall to be securely anchored with concealed brass anchors, imbedded in plaster of paris; joints to be close and true; all work standing away from the wall, and free standing, including partitions, stiles, ends, etc., to be firmly fastened together with nickel-plated angles, standards, legs, rod and wall plates, and dowels where necessary; all exposed work to be smoothly finished free from flaws and saw markings, to be cleaned down on completion, and to receive one coat of linseed oil applied in a uniform manner.

PRICES OF SLABS RUBBED ONE FACE AND EDGES

Superficial Contents in Square Feet	Thickness, Inches				
	1 or less.	1¼	1½	1¾	2
1 to 4	$.20	$.23	$.27	$.30	$.33
4 to 8	.23	.27	.30	.33	.36
8 to 12	.28	.32	.35	.38	.41
12 to 15	.33	.37	.40	.43	.46
15 to 20	.38	.42	.45	.48	.51
20 to 25	.44	.48	.50	.54	.59
25 to 30	.49	.53	.55	.59	.65
30 to 35	.55	.59	.61	.66	.72
35 to 40	.62	.66	.68	.74	.80

Complete Price-List covering all classes of work, extra labor charges, free sample, etc., sent on request.

TEST TABLES

ABRASION TEST OF VERMONT UNFADING GREEN SLATE

With best black slate, made by J. Horace Cook, Architect and Supervisor, Board of Public Education, Philadelphia, Pa.

All samples were 12 in. x 12 in. x 1 in.; were subjected to the same weight (56 lbs.), and ground under the same conditions for the same length of time (3 minutes).

Best Black wore to $\frac{13}{16}$ in. on one edge and $\frac{9}{16}$ in. on opposite edge. Vermont Unfading Green wore to ¾ in. on one edge and $\frac{11}{16}$ in. on opposite edge.

Vermont Unfading Green thus showed not only 11 per cent less, but more uniform wear.

EXTRACT FROM U. S. ARSENAL TEST OF VERMONT STRUCTURAL SLATE

Test No.	Classification	Color	Size	Ultimate Strength	
				Total, Lbs.	Per Sq. In., Lbs.
12,011-13 12,014-16	Compressive Test of Slabs } Pressure applied at ends }	Green Purple	30 in. long 12 in. wide 2 in. thick	409,000 291,800	17,035 12,166
12,020	Compressive Test of Cubes				
	On Bed	Green	4 in. each way	374,500	23,400
	On Edge	"		378,800	28,650
	On Bed	Purple		438,000	27,560
	On Edge	"		476,600	30,300

Installations.

A few of the buildings where our material has recently been installed:

BUILDING	LOCATION	ARCHITECT
High School	Hamilton, Ohio	Frank L. Packard
High School	Bellevue, Pa.	W. J. Shaw
King's Chapel	Boston, Mass.	Peabody & Stearns
Convent and Academy of Notre Dame	Boston, Mass.	Maginnis & Walsh
State Hospital	Binghamton, N. Y.	Lewis F. Pilcher
Iola Sanatorium	Rochester, N. Y.	Howard W. Cutler
High School of Commerce	Springfield, Mass.	Kirkham & Parlett
D. & H. Co. Building	Albany, N. Y.	Marcus T. Reynolds
Troop I. Armory	Buffalo, N. Y.	Lewis F. Pilcher
High School	Charleston, W. Va.	Frank L. Packard
Lafayette-Bloom School	Cincinnati, Ohio	Garber & Woodward
Calvary M. E. Church	Washington, D. C.	Murphy & Olmstead
Agricultural College	Industry, N. Y.	Lewis F. Pilcher
Military Academy	West Point, N. Y.	Cram, Goodhue & Ferguson

MANUFACTURING EQUIPMENT AND ENGINEERING CO.

Metal Sanitary Equipment

136 Federal Street
BOSTON, MASS.

Products.

INDIVIDUAL WASHBOWLS in Batteries; BUBBLING FOUNTAINS, Plain or Ice-Cooling.

Individual Washbowls in Batteries.

This apparatus consists of any number of individual bowls in a battery, with a common waste and common water supply.

Either an open or closed waste is furnished, but the open waste is deemed more sanitary.

Washbowl apparatus is equipped with plain, galvanized iron, or vitrified porcelain enameled iron bowls; single or double batteries of any number of bowls; for cold or tempered, or hot and cold water; with plain nozzle, compression or self-closing bibb.

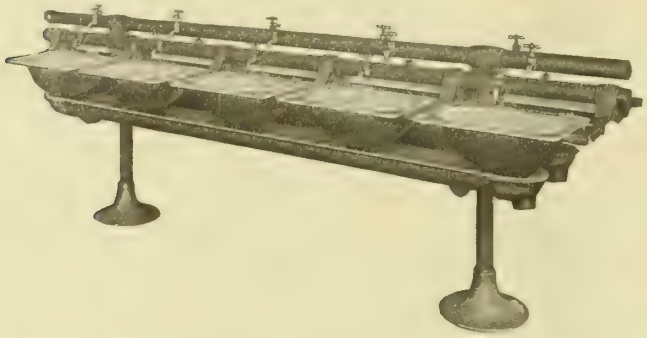


FIG. 110. DOUBLE BATTERY OF WASHBOWLS
Open-waste type, enameled bowls and connected for hot and cold water

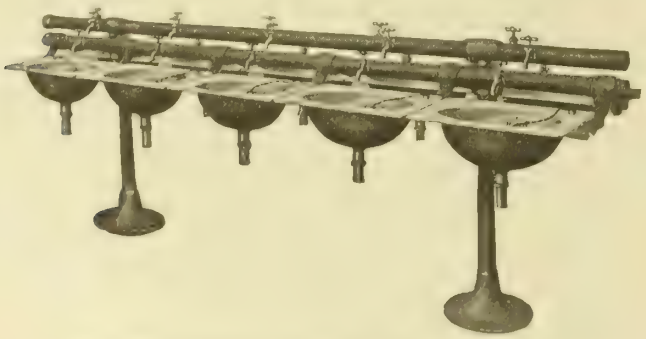


FIG. 113. SINGLE BATTERY OF WASHBOWLS
Closed waste

Specifications and Measurements.

A 2-inch steel pipe is used.

Floor space of the apparatus is as indicated in Figs. 110 and 111.

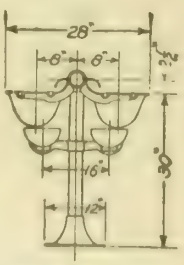


FIG. 111
DIMENSION DIAGRAM

Prices.

Prices made on each bowl as a unit, varying from $5.00 to $8.75 per bowl, according to type and equipment. Discounts upon application.

Sanitary Bubbling Drinking Fountains.

Furnished with or without ice tank. Tank holds 75 pounds of ice; is heavily cork jacketed and has 15½

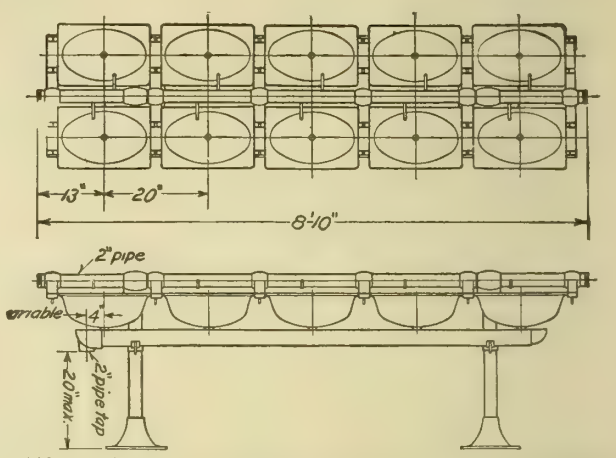


FIG. 110. PLAN AND SIDE ELEVATION, GIVING DIMENSIONS

coils of ½-inch brass pipe. Waste bowl is cast iron, enameled on inside; stops nickel-plated. A Keith Bubbler, automatically regulated, is used.

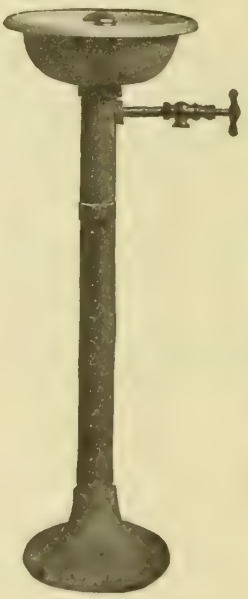


FIG. 602
BUBBLER DRINKING FOUNTAIN
List price $12.00

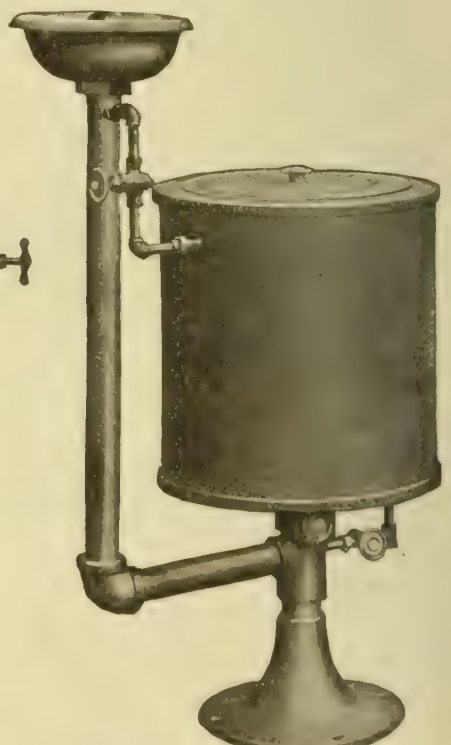


FIG. 601. BUBBLER DRINKING FOUNTAIN WITH ICE TANK
List price $50.00

REFERENCES

WASHBOWL EQUIPMENT

U. S. Steel Corporation, Pittsburgh, Pa.
Pratt & Whitney, Providence, R. I.
General Fire Extinguisher Co., Worcester, Mass.
United Shoe Machinery Co., Beverly, Mass.

SANITARY DRINKING FOUNTAINS

Pratt & Whitney, Providence, R. I.
Hendee Mfg. Co., Springfield, Mass.
Carnegie Steel Co., Pittsburgh, Pa.

C. A. DUNHAM COMPANY

MANUFACTURERS OF

Dunham Specialties for the Dunham Systems of Vacuum and Vapor Heating

MARSHALLTOWN, IOWA

CANADIAN PLANT
C. A. DUNHAM CO., LTD.
TORONTO, ONT.

BRANCH OFFICES (UNITED STATES)

CHICAGO, ILL., 1710 Fisher Building
DAVENPORT, IOWA, 303 Security Building
MINNEAPOLIS, MINN., 660 Temple Court
INDIANAPOLIS, IND., 512 Board of Trade Building
LOUISVILLE, KY., 1020 Starks Building
KANSAS CITY, MO., 208 Reliance Building
CLEVELAND, OHIO, 917 Garfield Building
BOSTON, MASS., No. 429, 201 Devonshire Street
NEW YORK, N. Y., 1 Madison Avenue
DETROIT, MICH., 618-19 Free Press Building
FORT WORTH, TEX., 301 Dan Waggoner Building
ST. LOUIS, MO., 1208 Fullerton Building
SEATTLE, WASH., 936 Henry Building
DES MOINES, IOWA, 511 Hubbell Building
PORTLAND, ME., 19 Hill Street
PORTLAND, ORE., 410 Board of Trade Building
SPOKANE, WASH., 713 Realty Building
SAN FRANCISCO, CAL., 611 Wells-Fargo Building
SALT LAKE CITY, UTAH, 211 Scott Building
ROCHESTER, N. Y., 636 Mercantile Building
MILWAUKEE, WIS., 442 East Water Street
DENVER, COLO., 414 Jacobsen Building
WASHINGTON, D. C., 638 Munsey Building
PITTSBURGH, PA., 302 Empire Building
PHILADELPHIA, PA., 1224 Stephen Girard Building
CHEYENNE, WYO., 624 Citizens National Bank
LOS ANGELES, CAL., 120 East 3d Street

BRANCH OFFICES (CANADA)

TORONTO, ONT., 701 C. P. R. Building
WINNIPEG, MAN., Tribune Building
OTTAWA, ONT., 214 Booth Building
VANCOUVER, B. C., 520 Duncan Building
MONTREAL, QUE., 11 St. Sacrament Street
HALIFAX, N. S., McCurdy Building

Products and Services.

SPECIALTIES for use in connection with the DUNHAM TWO-PIPE VACUUM SYSTEM OF HEATING, the DUNHAM AIR LINE SYSTEM OF HEATING, the DUNHAM VACUO-VAPOR SYSTEM OF HEATING and the DUNHAM VAPOR SYSTEM OF HEATING.

These SPECIALTIES are as follows: DUNHAM No. 1, No. 2 and No. 3 RADIATOR TRAPS; DUNHAM ¾-IN. and 1-IN. BLAST TRAPS; DUNHAM ½-IN., ¾-IN. and 1-IN. PACKLESS INLET VALVES; DUNHAM AIR LINE VALVE; DUNHAM line of HIGH-PRESSURE TRAPS; DUNHAM line of PRESSURE REDUCING VALVES and VACUUM PUMP GOVERNORS; DUNHAM PRESSURESTAT, THERMOSTAT, DAMPER MOTOR and AIR ELIMINATOR, for use in connection with the DUNHAM VAPOR or DUNHAM VACUO-VAPOR SYSTEMS; and the DUNHAM VACUO-VAPOR SPECIALTIES for use exclusively with the DUNHAM VACUO-VAPOR SYSTEM of HEATING.

In addition to the above SPECIALTIES, we are in position to furnish, only as an accommodation where the Architect and Heating Contractor require it, standard makes of VACUUM and BOILER FEED PUMPS, ELECTRIC MOTORS, ELECTRIC CONTROL EQUIPMENT for Pumps, GREASE and STEAM SEPARATORS, INLET RADIATOR VALVES, STEEL TANKS, GAUGES and GAUGE BOARDS, FEED-WATER HEATERS, STRAINERS, FORCE and SIGHT-FEED LUBRICATORS and CHECK VALVES.

Our Engineering and Service Department is made up of a corps of some twenty graduate engineers, whose duty it is to keep in touch with every Dunham installation and to furnish suggestions that may be helpful to the engineers who may be operating them. Special details in respect to the most approved method of installing our goods will be furnished to Architects or Engineers who may be engaged in the preparation of plans for a Dunham System, and to other interested inquirers for the same.

Scope of Use.

Each specific system of heating made or originated by the C. A. DUNHAM COMPANY will be described throughout the succeeding pages in regular order, together with the Specialties necessary for complete installation in each case.

Also, a list of the different kinds of buildings to which each system is applicable will appear in connection with the respective descriptions thereof.

Dunham Systems of Heating.

In the consideration of the Dunham Systems of Heating special attention is directed to the following important features:

First, Two-Pipe System—That all Dunham Systems of Heating, except the Dunham Air Line System, are two-pipe systems, with one pipe to carry steam to the radiator and another pipe to carry the water and air away.

Second, Dunham Radiator Trap—That all Dunham Systems of Heating, except the Dunham Air Line System, utilize the Dunham Radiator Trap, which is intercepted between each radiator and the return line (see details Nos. 1 and 2), and that *this Dunham Radiator Trap is the one which originally commercialized the hollow disc thermostatic principle. Prior to the advent on the market of the Dunham Radiator Trap, all radiator traps were of the now almost obsolete float or carbon post type. To-day the float traps and carbon post traps are seldom used, and all trap manufacturers are recommending and using the hollow disc thermostatic trap.*

Third, Important Installations—The Dunham Traps being simple, durable, and of neat construction, represent to-day the thought and ideas of a Research Department whose mission in our organization is to spend eight hours of every day in an effort to make our product better.

The results of our effort, therefore, to make the best that money can buy, is reflected through our enviable list of installations, which include some of the largest and most imposing structures on this continent.

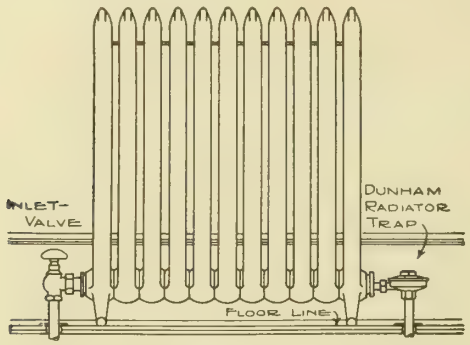
Dunham Two-Pipe Vacuum System of Heating.

Adaptability—For all larger buildings, factories, office buildings, hotels, hospitals, schools, etc.

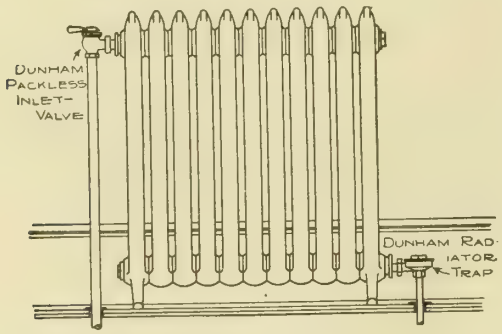
Continued on next page

Specialties—This system requires the following specialties: Dunham Radiator Traps, Dunham Pressure Reducing Valves and Vacuum Pump Governors, Dunham Inlet Valves and Dunham Air Traps.

Details Nos. 1 and 2 show connections as used in Dunham Vacuum System, Dunham Vacuo-Vapor System and Dunham Vapor System.



DETAIL NO. 1. SHOWING BOTTOM SUPPLY CONNECTION TO RADIATOR



DETAIL NO. 2. SHOWING TOP SUPPLY CONNECTION TO RADIATOR

Dunham Radiator Traps Used—Dunham Radiator Traps are used in the following sizes:

Radiators 100 square feet and under, Size No. 1
Radiators 100 to 350 square feet, Size No. 2
Radiators 350 to 450 square feet, Size No. 3
Radiators and Blast Heating Coils, 450 to 1500 square feet, ¾ in. Blast Trap
Radiators and Blast Heating Coils 1500 to 3000 square feet, 1 in. Blast Trap

The greatest care must be exercised in selecting the proper sized trap or traps for blast heating coils. The above capacity ratings for all traps are in terms of direct cast-iron radiation, at a condensation basis of one quarter pound per square foot per hour. Every unit of blast coil must be reduced to that basis before trap sizes are chosen and specified.

For Main and Riser Drips, use no smaller trap than the No. 3, and install trap as per details Nos. 3, 4 and 5 shown here. (Cuts and descriptions of Dunham Traps shown on subsequent pages.)

Supply Connections—Supply connections on this system can either be at top or bottom of radiators, as shown by Details Nos. 1 and 2 above. When top connection is used, hot-water type of cast-iron radiation is recommended. Hot-water type of radiation is to be preferred on all two pipe systems of heating. It admits of top supply connections, which are handy to reach, and our experience has taught us that steam circulation is better in this type of radiation.

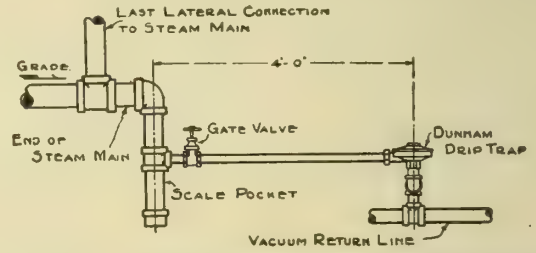
The Dunham Packless Inlet Radiator Valve (see specific description on later pages) can be used if the supply connection is at the top, but not if connection is at the bottom.

Radiator Connections—Radiator connections for this system are as follows:

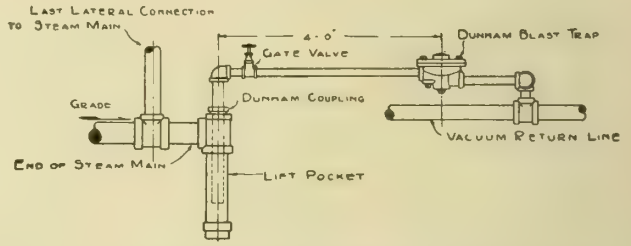
SIZES OF VALVES AND TAPPINGS FOR VACUUM SYSTEM

All dimensions in inches

When supply is at top of Radiator			When supply is at bottom of Radiator		
Sq. ft. Rad.	Inlet	Return	Sq. ft. Rad.	Inlet	Return
1 to 40	½	½	1 to 25	½	½
41 to 100	¾	½	26 to 80	¾	½
101 to 180	1	½	81 to 150	1	½
			151 to 250	1¼	½
			251 to 350	1½	½

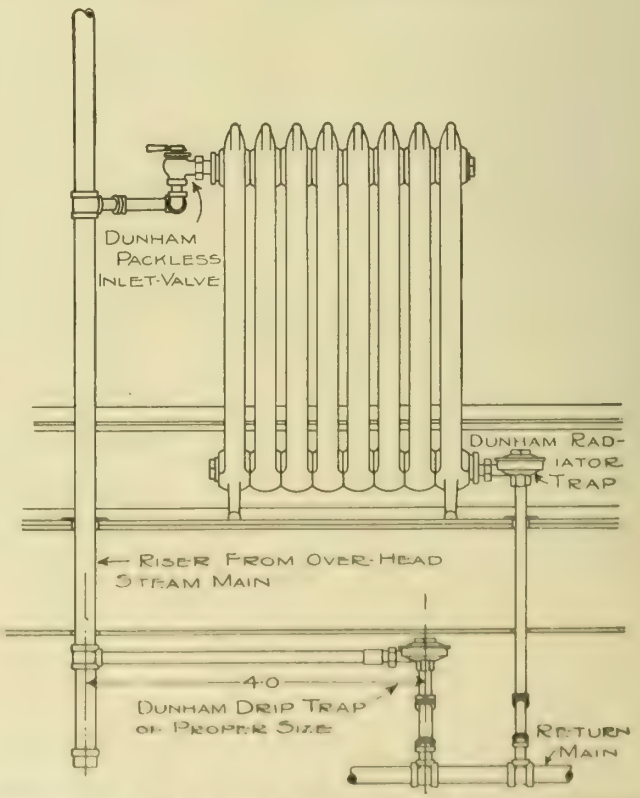


DETAIL NO. 3. SHOWING METHOD OF DRAINING END OF STEAM MAIN WHEN RETURN LINE IS BELOW STEAM MAIN



DETAIL NO. 4. SHOWING METHOD OF DRAINING END OF STEAM MAIN WHEN RETURN LINE IS ABOVE STEAM MAIN

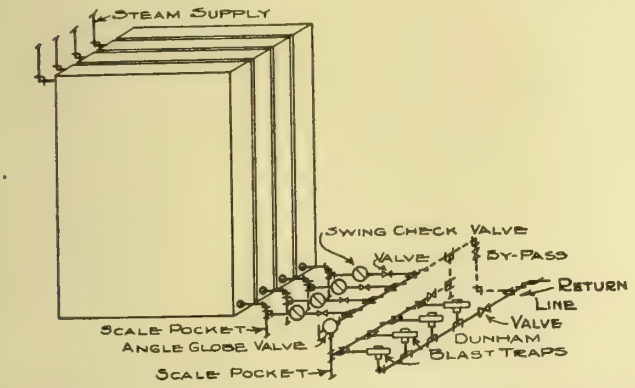
Note construction of the Lift Pocket (see Detail No. 10)



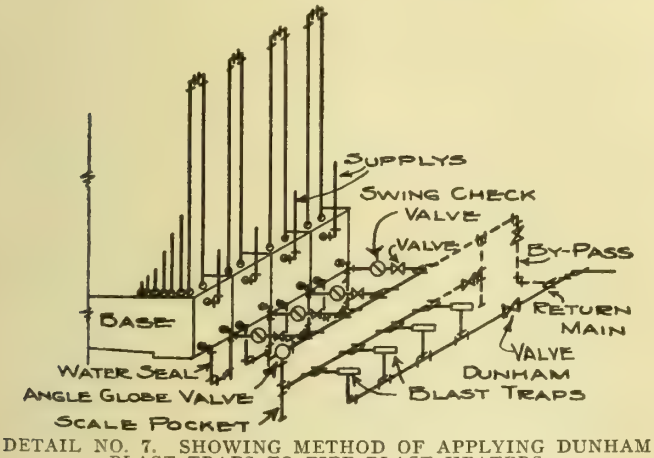
DETAIL NO. 5. SHOWING METHOD OF DRAINING BOTTOM OF STEAM RISER IN AN OVERHEAD SYSTEM

Continued on next page

Capacity of Trap Required—Care must be taken, as above cautioned, in choosing the proper size and number of traps for any direct-indirect radiator, pipe coil, vento heater, or blast coil. The rate of condensation in such type of radiation is greater than in direct cast-iron radiation, and this rate will vary with the position and service of each of the units themselves. Therefore, it is necessary to reduce the actual surface contained in any and all forms of blast radiation to equivalent direct radiation.



DETAIL NO. 6. SHOWING METHOD OF APPLYING DUNHAM BLAST TRAPS TO BLAST HEATERS



DETAIL NO. 7. SHOWING METHOD OF APPLYING DUNHAM BLAST TRAPS TO PIPE BLAST HEATERS

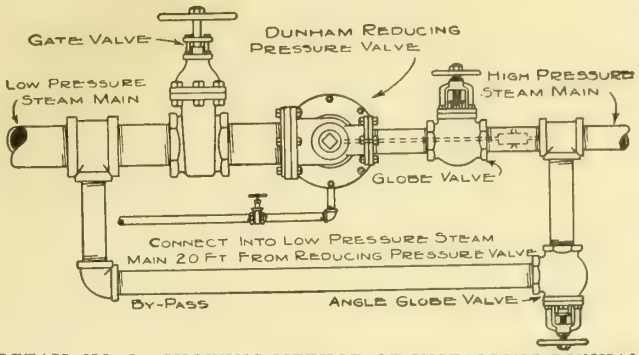
Observe details Nos. 6 and 7, which indicate the method employed by us in applying our traps to blast heating work.

Different Types of Vacuum Systems—In the Dunham Two-Pipe Vacuum System, the character of pumping equipment in boiler room is governed by types of boilers used.

We will explain various general types of boilers used:

First—High-pressure boilers which operate engines, turbines, etc. In such a case, steam used for heating comes largely from exhaust lines of engines, turbines, etc. From the fact that exhaust steam might, at times, be inadequate, or if these units do not operate at night, or are apt to be shut down during the day, steam is generally taken direct from boilers, through a Reducing Pressure Valve. (The C. A. DUNHAM COMPANY makes reducing pressure valves—see succeeding pages.)

The usual method of installing a pressure reducing valve is shown by detail No. 8 herewith. The pumps necessary for such a system are a vacuum pump, or pumps, and boiler-feed pump or pumps. The boiler-



DETAIL NO. 8. SHOWING METHOD OF INSTALLING DUNHAM REDUCING PRESSURE VALVES. PLAN VIEW

feed pump should always be equipped with an automatic receiver or water level operated pump starter.

Where high-pressure boilers are used, it is preferable to operate pumps by steam, except that, where electric current is available, electrically driven pumps are many times preferred.

Where electrically driven pumps are selected it is well to specify an automatic motor starter, which is a commercial success and which can be supplied for any current. The function of said starter is to automatically start and stop vacuum pump when vacuum in return piping reaches certain high and low limits.

The vacuum pump, or pumps, should connect directly to the end of all return lines in basement, and should discharge into a vented receiver, from which condensation is forced back to boiler, by means of boiler feed pump.

A suction strainer of accessible type should be placed on return line, just before it connects to vacuum pump.

When steam-driven vacuum pumps are selected, it is good practice to specify a Vacuum Pump Governor. (The C. A. DUNHAM COMPANY make a Vacuum Pump Governor—see succeeding pages.) Sample specifications for Dunham Devices for this type of system are indicated by paragraphs 1, 2, 3, 4, of Specifications on following page.

Second—High-pressure boilers furnishing steam only for heating purposes. In this case, pumping arrangement is identical to the preceding description. Pressure Reducing Valve is also necessary (see detail No. 8, also succeeding pages). The only difference between this type of system and the one preceding is the fact that this one has no exhaust steam to utilize. Sample specifications for Dunham Devices for this type of boiler or system are indicated by paragraphs 1, 2, 3, 4, of Specifications on following page.

Third—Low-pressure boilers with pressure reducing valve (see detail No. 8, also succeeding pages). This system is operated with from 15 to 30 pounds on boiler. Steam is furnished to heating system through reducing valve at about two pounds pressure. Pumps can either be steam or electrically operated in identically the same way as the first arrangement described above. However, if steam-driven pumps are selected, care must be exercised in proportioning steam cylinders so pumps will operate on low boiler pressure. Sample specifications for Dunham Devices for this type of system are indicated by paragraphs 1, 2, 3, 4, of Specifications on following page.

Fourth—Low-pressure boilers, supplying steam direct to radiating units. In this case the steam pressure on boiler is kept, preferably, at two pounds, al-

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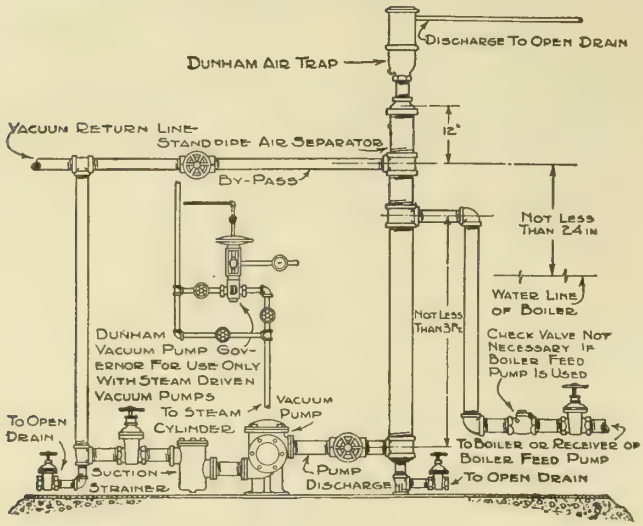
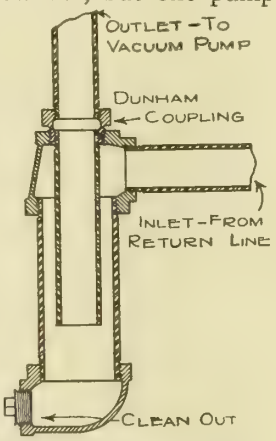


DETAIL NO. 9. SHOWING METHOD OF DISCHARGING DIRECT FROM VACUUM PUMP INTO BOILER

though it may be allowed to run up to five or six pounds. With this system, the pumping equipment must be electrically driven. However, but one pump is required, and that a vacuum pump. Vacuum pump can discharge directly back into boiler. Detail No. 9 shows how water can be gotten back to boiler without a boiler feed pump. Of course, a boiler feed pump can be used, if preferred, in which circumstance the arrangement becomes identically the same as that described by boiler system No. 1, above, except that both pumps are electrically operated.

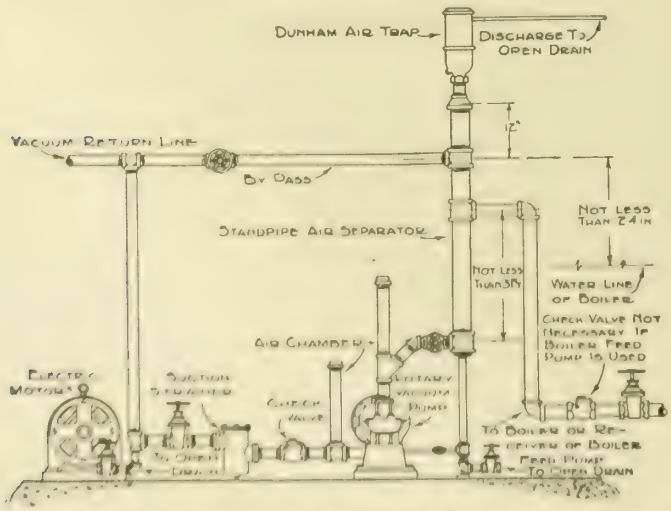


DETAIL NO. 10. SHOWING CONSTRUCTION OF LIFT IN A VACUUM RETURN LINE

Sample specifications for Dunham Devices for this type of system are indicated by paragraphs 1, 4, 5, of Specifications.

Note—Conditions will govern which of these four systems is more applicable to any particular building.

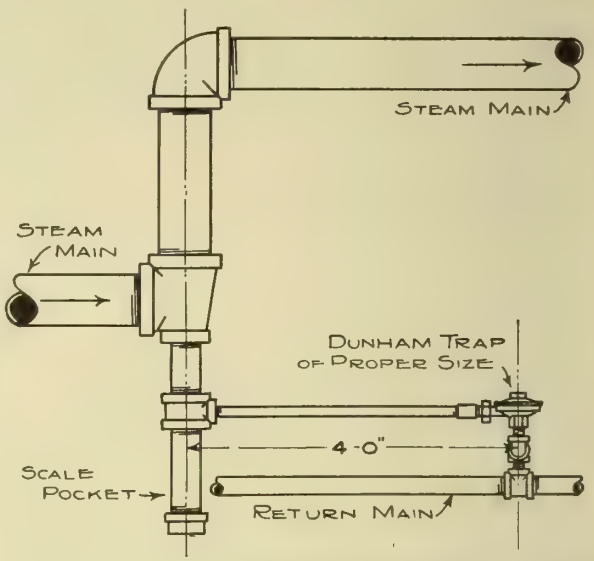
Suppose the return line terminates in the boiler room below the pump. In such a case the connection should be like detail No. 10. Note particularly the construction of the lift pocket and clean-out.



DETAIL NO. 11. SHOWING METHOD OF CONNECTING UP ROTARY VACUUM PUMP WHEN RETURN IS ABOVE PUMP

Suppose you are going to install a rotary vacuum pump, then it is imperative that you follow detail No. 11.

Detail No. 12 shows manner of dripping a rise in steam main.



DETAIL NO. 12. SHOWING METHOD OF DRIPPING RISE IN STEAM MAIN

SPECIFICATIONS

(1) *Radiator Traps*—The Heating Contractor shall furnish and install a Dunham Thermostatic Radiator Trap at the return outlet at the low point of each radiator, and always at the end opposite the inlet connection. This trap shall connect each radiator with the return pipe and shall pass, automatically, air and water of condensation and close against steam. Where the radiator traps connect to the radiator there shall be an eccentric bushing so placed that the water of condensation cannot collect and remain in the radiator.

(2) *Pressure Reducing Valve*—The Heating Contractor shall furnish and install, where indicated on plans, Dunham Pressure Reducing Valve (or valves) which will automatically reduce the steam pressure from ..... pounds on the boiler, to ..... pounds on the heating main. This valve shall be provided with Tobin bronze working parts and valve seat, and shall be installed as per detail No. 8.

(3) *Vacuum Pump Governor*—The Heating Contractor shall furnish and install in steam supply pipe to Vacuum Pump, one Dunham Vacuum Pump Governor, which shall automatically start and stop the pump in accordance with the vacuum in the return line. Governor shall be of adjustable type and capable of being set to shut down the pump at different return line pressures. Governor shall be provided with Tobin bronze working parts and valve seat, and shall be installed as per detail No. 9.

(4) *Radiator Supply Valves*—The Supply Valves to radiators shall be of the Dunham Packless type and shall be supplied and installed by the Heating Contractor. These valves shall be furnished with lever handle and shall in all cases be installed at the top of the radiator as per detail No. 2.

(5) *Air Trap*—The Heating Contractor shall furnish and install, where indicated on plans, one Dunham Air Trap which shall automatically permit the escape of air from the system, but which will close tight against water.

INSTALLATIONS AND REFERENCES

Fifty-seven-story Woolworth Building, New York
80 Maiden Lane Building, New York
Union Central Life Building, Cincinnati
Hotel Sherman, Insurance Exchange Building and Hearst Building, Chicago
Louisville Public Hospital, Louisville, Ky.
Standard Oil Building, San Francisco
High Schools in Cleveland, Ohio; Ft. Worth, Tex; Des Moines, Iowa; Spokane, Wash.
U. S. Post Offices at Washington, D. C., and Minneapolis, Minn.

And hundreds of other similar installations all over this continent, including factories, theaters and State and Government institutions.

Continued on next page

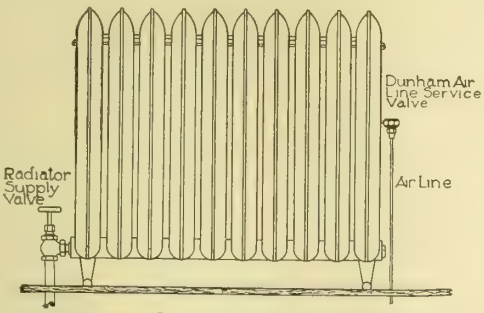
Dunham Air Line System of Heating.

Adaptability—Can be used in same types of buildings as are named under the Dunham two-pipe vacuum system.

Specialties—The Dunham specialties furnished for this system consist of the Dunham Air Line Valve, and the Dunham Pressure Reducing Valve and Vacuum Pump Governor.

Air Line Valve—The C. A. Dunham Company brought out the Dunham Air Line Valve (see succeeding pages) to revamp, mainly, old air line systems. The Air Line Valve is built upon the same principle as the Dunham Radiator Trap.

Detail No. 13 shows radiator connection of Dunham Air Line Valve. Like all air line systems, the Dunham Air Line System demands the use of a steam type radiator and a single-pipe bottom supply connection.



DETAIL NO. 13. SHOWING TYPICAL CONNECTION TO DUNHAM AIR LINE SYSTEM

The air line connecting to air line valve on each radiator terminates in boiler room and connects to a small vacuum pump, or exhauster, which produces a vacuum right up to valve itself.

Water of condensation from radiators flows back to boiler through same pipe that supplies steam to radiator.

Water of condensation discharged from air line by vacuum pump is so slight in quantity that it is wasted.

Application of System—This system can be applied to same series of boilers as were described above under the Dunham Two-Pipe Vacuum System of heating. However, in each case, provision must be made for getting water of condensation out of pipes and radiation, and putting it back in boiler. Where high-pressure boilers are used this is accomplished by dripping heel of each riser into a separate return main, which terminates into a receiving tank where all water of condensation is collected. Sometimes an overhead steam distributing system is used, in which case bottoms of all risers are connected into a special return main which leads back to a receiving tank.

It is always best, even when low-pressure boilers without pressure reducing valves are used, to collect condensation from risers and radiation in a separate return main, which leads back to boiler, direct (or to a receiving tank, from which it is pumped back into boiler).

Where installation is small, such as in a residence, and where boiler pressure is never greater than five pounds, return main can connect directly into boiler. A receiving tank, in such cases, is not necessary.

SPECIFICATIONS

The Heating Contractor shall furnish and install on each radiator one automatic Dunham Thermostatic Air Line Valve, which shall automatically permit the passage of all air from the radiator without loss of steam. The discharge opening of this valve shall be connected to a system of air line piping, including risers, connections thereto, and air line mains in basement, wholly independent of the steam piping. (For specification of Pressure Reducing Valve and Vacuum Pump Governor, see preceding page.)

Dunham Vapor System.

All specialties mentioned as being a part of this system are specifically described on later pages of this catalogue.

Adaptability—For residences, apartments, churches, schools, store buildings, small office buildings, etc.

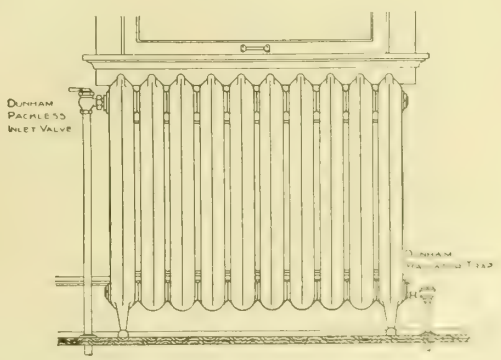
Specialties—The specialties furnished by us for the Dunham Vapor System are as follows: Dunham Radiator Traps and Dunham Inlet Valves, Dunham Air Eliminator, Thermostat, Pressurestat, Damper Motor with necessary cable, batteries, pulleys, etc., and Balanced Check Damper.

Definition of "Vapor"—The term *Vapor* as used in designating this system means steam at very low pressure.

General Description—The arrangement of the piping for a Dunham Vapor System is very simple (see detail No. 15), with one or more main steam circuits according to the design of the building. The steam mains are kept large at their ends, that is, if a main steam circuit starts 3 inches or 2½ inches it is not reduced in size, but continues full size to its extreme end; and should it start larger than 3 inches in size it may be gradually reduced down to 3 inches and then continued without further reduction to its end. The end of each steam main connects into a drip pipe or wet return which runs directly back to the boiler, and is vented through a Dunham Air Line Valve into the dry return and air piping. Thus the steam and drip piping form a complete uninterrupted circuit at boiler pressure running from and returning to the boiler. It is most important to note that the drips from two or more steam mains must not be connected together above the water line. All drips must be water-sealed before being connected together.

The return piping is likewise of simple design. The pressure within it, however, is atmospheric. The function of the return piping being to carry both the water of condensation and air, same must be kept well above the boiler water line, just as high up as possible, and must be well graded and free from water pockets; otherwise, the free air movement within same will be restricted. At its lowest point, the point of connection with the eliminator standpipe, it must not be less than 24 inches above the boiler water line, and preferably as much more as possible.

At the top of the eliminator standpipe one or more air eliminators are installed. These free the system from air and keep the return piping at atmospheric pressure, thus insuring good circulation by maintaining a positive pressure differential between the steam and return piping, a condition made possible by the use of the Dunham Radiator Trap, as hereinafter explained. At the base of the eliminator standpipe, before con-



DETAIL NO. 14. SHOWING TYPICAL CONNECTIONS FOR DUNHAM VAPOR SYSTEM

Continued

nection is made to the wet return piping or return header at boiler, an angle swing check valve is installed to prevent the water from backing out of boiler and into the return line.

The direct radiators should be of hot water type, arranged for supply connection at top with outlet at bottom of opposite end. The inlet valve is always placed at the top; and the Dunham Inlet Valve is especially constructed for this service. It is absolutely leak-proof, and packless; free from an internal spring; has lever handle, and is easily operated.

The Dunham Radiator Trap is placed always at the discharge outlet at the bottom of each radiator, at the end opposite the inlet connection. This trap automatically keeps steam and vapor within the radiator, and releases the air and water into the return piping, at the same time maintaining a differential of pressure between radiator and return piping, thus allowing the best possible circulation.

No air valves are used on the radiators; therefore, there is no opportunity for foul smelling air to escape into the room, or water to flow out and damage floor, plaster, and furnishings.

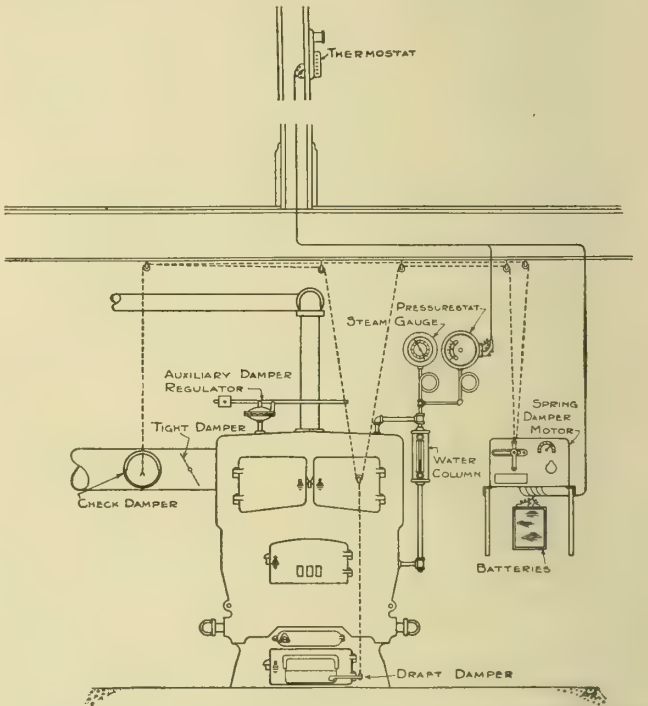
Limits of Vapor Heating—The Dunham Vapor System can be used on almost any size of building where conditions are right. We do not recommend it for very large structures, however, because the Dunham Vacuum System is more suitable. A vapor system for very large buildings, to work properly, must needs have excessively large pipes, and the extra expense so caused makes the Vacuum System preferable.

The Dunham Vapor System is for use particularly in residences, apartments, and other buildings containing from 300 to 6,000 feet of radiation, and only where low pressure heating boilers are installed.

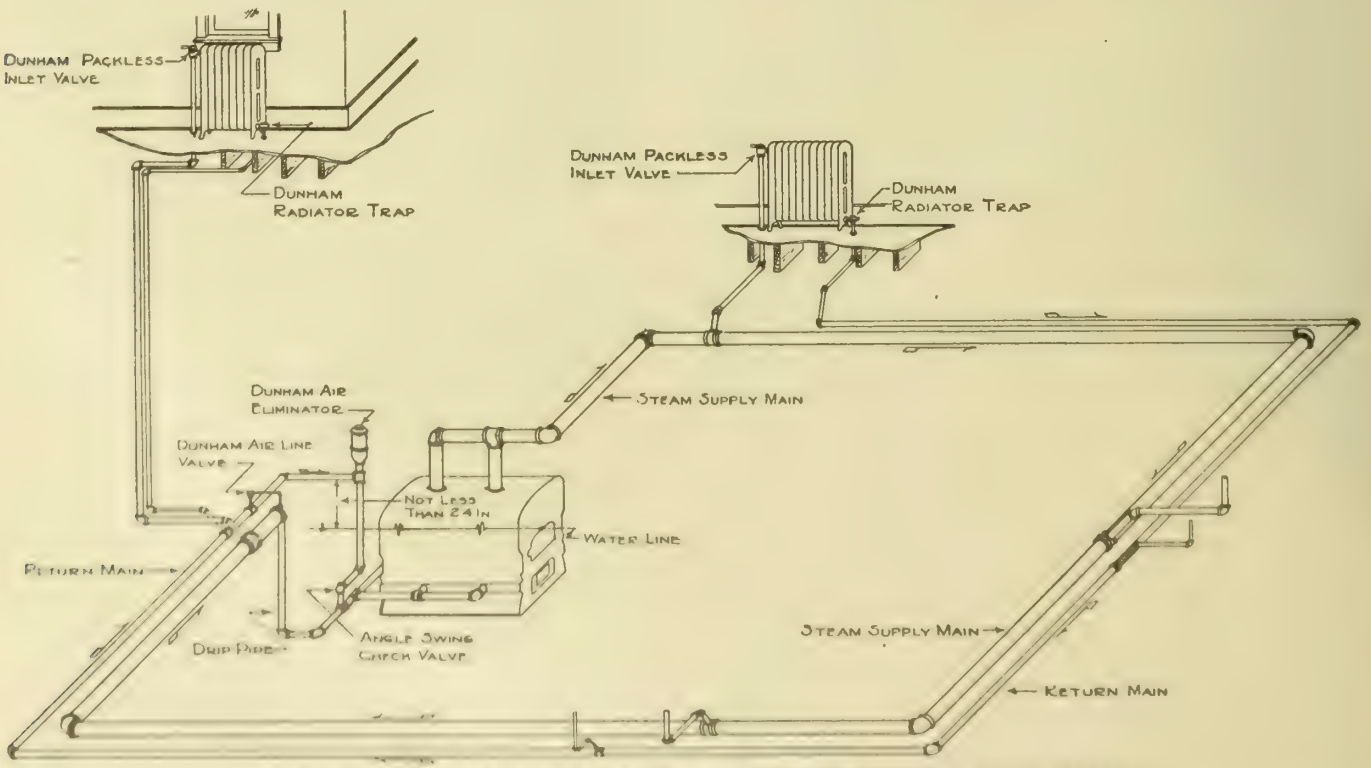
Distinguishing Features of the Dunham Vapor System—(1) The Dunham Vapor System is especially distinguished by the means employed by it to regulate the pressure on the boiler, and, at the same time, regulate the temperature in the rooms above. This is accomplished by means of the Dunham Pressurestat, Damper Motor, and Thermostat. (See Detail No. 16.)

The Damper Motor connects to the draft and check dampers of boiler, and is operated by a heavy coil spring or small electric motor.

The Pressurestat trips Damper Motor in response to boiler pressure. That is, when the pressure on the boiler drives the Pressurestat hand up against a little stop, battery circuit is closed, damper motor is tripped, and dampers close; i. e., draft damper is closed, and check damper at rear of boiler is opened.



DETAIL NO. 16. SHOWING TYPICAL MANNER OF CONNECTING PRESSURESTAT, DAMPER MOTOR AND THERMOSTAT



DETAIL NO. 17. SHOWING TYPICAL PIPING PLAN OF DUNHAM VAPOR SYSTEM

Continued on next page

When the pressure on boiler drops, and pressurestat hand falls and strikes the lower stop, damper motor is set in motion again, and dampers open.

Action of Thermostat is the same as the Pressurestat. Pressurestat controls boiler pressure; the Thermostat, the room temperature. When temperature in rooms reaches desired point, say 72 degrees, the dampers are kept closed, regardless of boiler pressure, until room temperature falls to 70 degrees; and again when Pressurestat closes the drafts, Thermostat cannot open them until pressure on boiler falls.

(2) When less heat is required, vapor pressure on boiler can be held at two or three ounces. In cold, winter weather, pressure can be increased to ten or twelve ounces. No other system ever marketed permits of such delicate, yet definite adjustment, thus effecting a big saving of fuel.

(3) Cable for use in connecting Pressurestat, Thermostat, Damper Motor and Batteries is all prepared and labeled by us, so that any one of ordinary intelligence can make the proper connection without a wiring diagram.

Chimney Sizes—Too much care can not be exercised in selecting chimney sizes and heights. Good draft is essential if a boiler is to consume coal and make steam economically. In every case a tight fitting damper should be installed in the smoke breeching shortly after it leaves the boiler.

Pipe Sizes and Radiator Connections—Below we give a schedule of pipe sizes and radiator connections for use with the Dunham Vapor System. This schedule will assist the architect in designing a Dunham Vapor System. All sizes in inches.

PIPE SIZES

Sq. ft. Rad.	Steam Main	Return Main	Steam Main Drip
Up to 400	2	1	1
700	2½	1¼	1¼
1100	3	1¼	1½
1600	3½	1½	1½
2300	4	1½	2

Run Steam Main full size its entire length, basing the size of the Main upon the Total Radiation.

RISER SIZES

	Steam		Return	
Sq. ft. Rad.	Vert. Pipe	Horiz. Pipe to Main	Vert. Pipe	Horiz. Pipe to Main
40	¾	1	¾	¾
100	1	1¼	¾	¾
180	1¼	1½	¾	¾
300	1½	2	¾	¾

RADIATOR CONNECTIONS

Sq. ft. Rad.	Inlet Valve	Vert. Supply Pipe	Horiz. Pipe to Riser	Trap	Vert. Return Pipe	Horiz. Pipe to Riser
40	½	½	¾	No. 1	½	¾
100	¾	¾	1	No. 1	½	¾
180	1	1	1¼	No. 2	½	¾

SPECIFICATIONS

Radiator Traps—The Heating Contractor shall furnish and install a Dunham No. 1 Radiator Trap at the return outlet from each radiator, said outlet to be at the low point of the radiator, and always at the end opposite the inlet connection. This trap shall connect each radiator with the return pipe, and shall pass, automatically, air and water of condensation, and close against steam. Where a radiator has more than one hundred (100) square feet of surface, the Dunham No. 2 Radiator Trap shall be used instead of the No. 1 Trap.

Dunham Vapor Attachments (to be furnished and installed by the heating contractor)—The Dunham Vapor Attachments will consist of a Dunham Pressurestat, Dunham Damper Motor, complete with Pulleys, Cable and Dry Batteries, Dunham Air Eliminator, and Dunham Check Damper; also a Dunham Packless Inlet Valve and a Dunham Thermostatic Radiator Trap for each radiator.

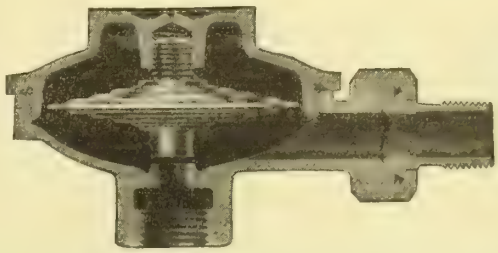
The Dunham Pressurestat shall be installed in an accessible position on the boiler water column, and shall be provided with proper syphon connection. Wiring connections to batteries and motor shall be made in accordance with instructions furnished with apparatus.

The Dunham Damper Motor shall be secured to side wall near boiler, where it will be handy for winding and in such a position that connections can be easily made to check and draft dampers of boiler. The motor shall be properly connected to the auxiliary damper regulator so that both the motor and auxiliary regulator may operate both check and draft dampers in a proper manner.

The Dunham Air Eliminator shall be installed at the top of a vertical separating pipe, and as far above the boiler waterline as possible. At the base of the air separating pipe, where it connects into the return header at boiler, an angle swing check valve is to be installed.

Dunham Radiator Trap.

Uses—The Dunham Radiator Trap is used in connection with all classes of low-pressure (below 10 pounds) steam heating work. (Refer to sectional illustration here shown.)



DUNHAM RADIATOR TRAP

Construction and Operation—The disc, or movable part of trap, is anchored rigidly to cover. It contains a combination of volatile fluids. These fluids will not corrode the metal of disc and, being hermetically sealed within disc, indefinitely retain latent powers of expanding and contracting in response to effects of temperature.

On lower portion of disc is the flat valve (use of which is one of the principal features of the Dunham Trap), which hangs over large ⅜-inch opening of trap that leads directly to return line. When installed, the chamber containing disc is connected directly to radiator; hence, same conditions that exist in radiator always exist around disc. Air or water going through radiator do not affect the disc, and pass through the ⅜-inch opening and into return line unmolested. But when steam comes, volatile liquids in disc are heated and vaporized, thereby creating a pressure within disc. This internal pressure expands disc, valve seats itself over ⅜-inch opening, and trap closes. Subsequent water and air forming in radiator naturally fall to the bottom, surround disc, condense vapor within it, disc contracts and trap opens, suction in return line sucks the water and air through trap; steam follows and surrounds disc again and trap closes.

SIZES OF DUNHAM RADIATOR TRAP

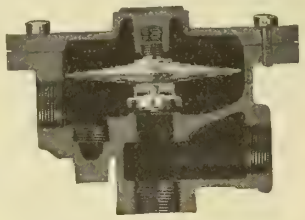
Size	Pipe Connection	Capacity in sq. ft., Direct Radiation
No. 1	½-inch	100
No. 2	½-inch	350
No. 3	¾-inch	450

The No. 1, No. 2 and No. 3 Traps, made in right-, left-hand, straightway and angle pattern. Roughing-in measurement, end of nipple to center of outlet—No. 1, 3⅛-in.; No. 2, 3¾-in.; No. 3, 3⅞-in. Made only for pressures up to 10 pounds.

Continued on next page

Dunham Blast Trap.

The Dunham Blast Trap, shown in section below, was gotten out by us for a trap of capacity large enough to drain Blast Heating Coils. Thousands of them are in use in all parts of the country. This trap operates upon precisely the same principle as the Dunham Radiator Trap. In fact it is simply a large Dunham Radiator Trap with body made of cast iron instead of bronze. The working parts are made of the same material as the working parts of the Dunham Radiator Trap.



DUNHAM BLAST TRAP

CAPACITIES OF DUNHAM BLAST TRAP

Size	Pipe Connection	Capacity in sq. ft., Direct Radiation	Weight, Pounds
¾-in.	¾-in.	1500	12½
1-in.	1-in.	3000	21

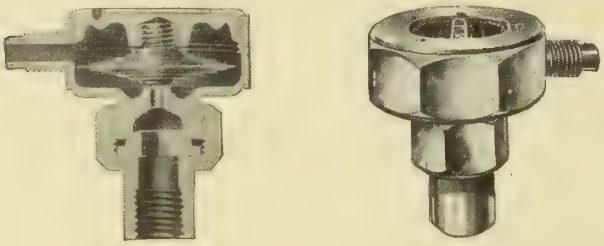
Remarks—Be sure and reduce blast service to equivalent direct radiation by multiplying actual surface of coil by a factor ranging from 3 to 9, depending upon temperature and volume of air that is blown over coils.

These traps can be installed either angle or straightway.

Roughing-in measurements, center of valve to edge of flange on cover—¾-in., 3-in.; 1-in., 3⅞-in. Made only for pressures up to 10 pounds.

Dunham Air Line Service Valve.

The principle of operation is identical to the Dunham Radiator Trap, described on preceding page. Body made of phosphor bronze.



Sectional View Exterior View

DUNHAM AIR LINE SERVICE VALVE

Made only for pressures up to 10 pounds. Can be furnished in either ⅛ in. or ¼ in. radiator connection

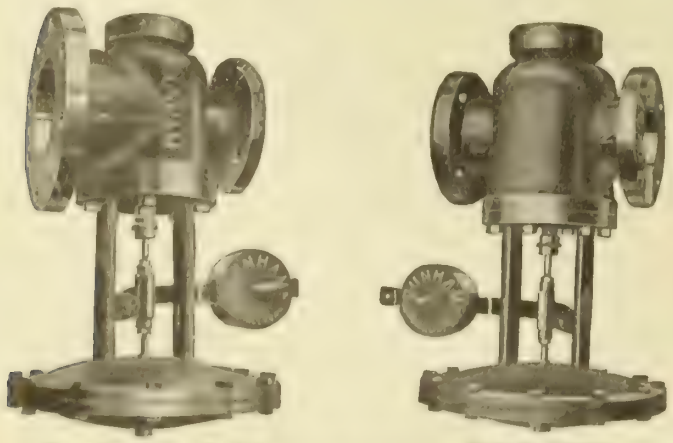
Roughing-in measurement, end of inlet to center of outlet, $1^{7}/_{16}$ in.; the same as other standard makes of air-line valves

Valve has no sliding contacts to stick or clog up, and, being made of same material as the Dunham Radiator Trap, will last just as long.

Dunham Pressure Reducing Valve.

Our line of Pressure Reducing Valves is varied in size. Straight sizes can be furnished up to ten inches, and expanded outlet sizes up to 6 by 12 inches. Larger sizes are made to order. These valves are ultra sensitive, and can be relied upon to reduce steam pressure from any initial point below 150 pounds to or near atmosphere.

We have made our line of these valves especially adapted to heating work. All Pressure Reducing Valves are of the inverted type, as shown by the illustrations.

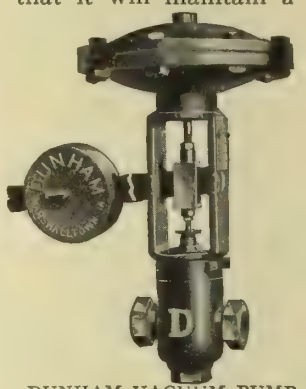


Expanded Outlet Pattern Straight Pattern

DUNHAM PRESSURE REDUCING VALVES

Dunham Vacuum Pump Governor.

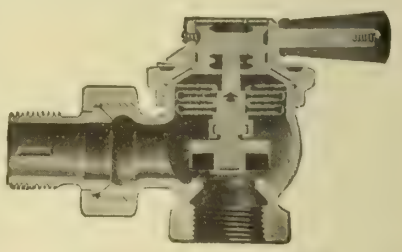
This Governor is made for use in regulating the speed of a vacuum pump, so that it will maintain a certain degree of vacuum in the suction line. Particularly is such a device needed on a vacuum pump as applied to vacuum steam heating work. In such work, a constant vacuum in the return line is often necessary to the successful circulation of steam throughout the radiation. All Vacuum Pump Governors are of the vertical type, as shown, and are made in all pipe sizes, from ½ inch to 2 inches inclusive.



DUNHAM VACUUM PUMP GOVERNOR

Dunham Inlet Valve.

The Dunham Packless Inlet Valve is for use in turning the steam on and off the radiator. Note its construction. It has no stuffing-boxes, like other valves, that are likely to leak. Raising screw is entirely out of contact with the steam, and a special hard lubricant is used in upper part of valve. It is constructed of the very best of steam metal, and comes regularly nickel-plated all over, with polished trimmings. This valve has a lever handle and is installed at top of radiator where it is convenient. It is not suited for installation at bottom of radiator. Seven eighths turn of the handle entirely opens or closes this valve. The Dunham Inlet Valve is made in the angle pattern only, ½-, ¾- and 1-inch sizes.



DUNHAM INLET VALVE

Dunham Pressurestat.

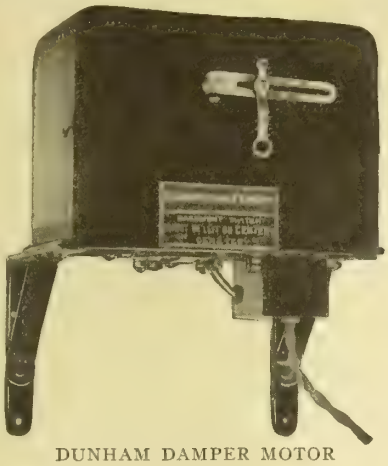
The Dunham Pressurestat is nothing more or less than a sensitive pressure gauge. It is connected directly to boiler. Two little pegs, or stops, are located in the segment traversed by the gauge hand. When gauge hand comes in contact with upper stop an electric contact is made, which, in turn, trips the Damper Motor (described on next page), and the boiler drafts are closed. Then, when pressure on boiler falls, and gauge hand touches lower stop, the Damper Motor is tripped again, and the boiler dampers are opened. The device is very durably built, and is positive in its operation. The Pressurestat does not indicate the pressure on boiler, except between the two points at which it is set.

DUNHAM PRESSURESTAT

Continued on next page

Dunham Damper Motor.

The accompanying illustration shows the front view of our Damper Motor.



DUNHAM DAMPER MOTOR

This Motor operates the boiler dampers, in response to the directions of the Thermostat (described below) and Pressurestat. It is durably built, positive in action, and silent in operation. It is operated by a heavy spring, or, if preferred, by small electric motor, at small additional cost.

Dunham Thermostat.

The Dunham Thermostat is supplied with an eight-day clock that automatically "sets back" at night and "up" in the morning. "Sets back" and "sets up" mean that at a certain time in the evening, say ten, eleven, or twelve o'clock, it closes off boiler drafts and permits the house to gradually cool down to fifty-five degrees; then in the morning at four, five, six or seven o'clock it automatically opens boiler drafts and permits the house to gradually heat up to 70 degrees. The hour of "set back" and "set up" can be varied to suit occupant of the house.

The principle of the Thermostat is this: When temperature of room rises to, say 72 degrees, expansion spring bends sufficiently to touch a little stop. This produces a closed electric circuit with the electric batteries, Damper Motor is tripped and boiler dampers close. When temperature of room falls to, say 70 degrees, expansion spring comes in contact with another stop, Damper Motor is tripped again and boiler drafts open.

The Thermostat is only nine and one fourth inches high, over all; is finished in sand blast brass and is very ornamental in appearance.

DUNHAM THERMOSTAT

Where to Place the Thermostat—The Thermostat is hardly applicable to buildings occupied by more than one tenant. This would apply to such buildings as apartments, double store buildings, or double residences. The reason for this lies in the fact that one occupant might not be satisfied with the temperature desired by another, *and two Thermostats cannot be applied to one heating system.*

In buildings occupied wholly by one tenant the Thermostat should be placed about five feet from floor, on an inside wall, and in a room (preferably a living room) having an average temperature. Care should be exercised to avoid placing it near chimneys, radiators, hot pipes (exposed or concealed), near windows, or where it will be exposed to cold drafts. Neither should it be placed where there is not a free circulation of air, as behind doors. The most convenient place is usually beside the casing of an inside door on the side where it will not be hidden when door is open.

Dunham Air Eliminator.

The Dunham Air Eliminator is used on junction of return lines in boiler room. See detail No. 15 of piping plan in boiler room. Its mission is to discharge all air from the system. It is constructed so that the presence of water around the float will close a little valve, and prohibit water from getting out on basement floor, even if water gets into it when boiler primes badly.

DUNHAM AIR ELIMINATOR

Dunham Air Trap.

The Dunham Air Trap is designed to vent air from a receptacle containing water under pressure. It is particularly adapted to heating work, where the vacuum pump is discharging water of condensation directly back to the boiler. In such service, the air which has been taken from the return lines by the pump is permitted to escape while the water is made to go back into the boiler for re-evaporation.

The device has a clean-out plug at bottom, also a vent opening at top so that air discharged can be carried into stack or out of room, if desired.

DUNHAM AIR TRAP

HUTCHISON VAPOR HEATING CORPORATION

Woodward Building
WASHINGTON, D. C.

Products and Services.

HUTCHISON SYSTEM of VAPOR HEATING, PACKLESS VAPOR VALVES, DAMPER REGULATORS, TRAP-RECEIVERS, UNION ELBOWS, SPECIAL SAFETY VALVES, SPECIAL EXTENSION STEMS.

HEATING ENGINEERS.

Hutchison System of Vapor Heating.

There are only three appliances necessary in the Hutchison System (see Figs. 3 and 4), and the only moving parts are two flexible metallic tubes, which are guaranteed to last as long as the boiler on which they are installed.

There are no air valves, return valves, exhaust valves, thermostatic valves, vacuum pumps, steam traps, motors, batteries, clockwork, mercury gauges, altitude gauges, steam gauges, thermometers, generators, circulators, or expansion tanks.

With the automatic control, there is absolutely no waste of heat and, therefore, no waste of fuel.

Hutchison Systems are installed through recognized heating contractors and steam fitters, and this organization guarantees all plants to give perfect satisfaction if installed according to plans prepared by it or approved by its engineers.

Operation.

Low pressure steam or vapor is supplied through mains and branches to the radiators through Hutchison packless vapor valves, which control the amount of vapor entering the radiators, where the vapor condenses; while the air and condensation follow the return pipes to the boiler room, the condensation entering the boiler through the Hutchison trap-receiver, and the air escaping through the vent line to the outside of the building (Figs. 1 and 3). The boiler pressure is controlled automatically by the Hutchison trap-receiver and damper regulator, which operate as follows:

As shown (Fig. 3), the trap-receiver is connected from its top with the steam space of the boiler and from its bottom with the return opening in the boiler. The center of trap-receiver is placed on level with the highest working water line, never lower; therefore the water stands in pipe "A" on level with the water in the boiler.

The condensation from the return main flows down the receiver column and into the trap-receiver, where it overflows into pipe "A," returning to the boiler. As the vapor pressure rises in the boiler, the water remains in pipe "A" on the water line with the boiler, while the water in the trap-receiver is forced around the loop and into the reservoir. The additional weight of water in the reservoir causes same to lower, closing front damper and opening check draft in smoke pipe, thereby retarding combustion.

As the pressure lowers in the boiler, the water will flow from the reservoir back through the loop and into the trap-receiver, and the reservoir, being lightened, will rise to its former position by action of counter spring. This action continues until the damper regulator automatically adjusts itself to allow only sufficient combustion to supply the demands made on the boiler.

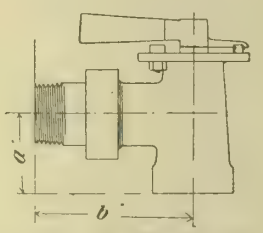


FIG. 2. DIAGRAM OF VALVE DIMENSIONS

Size, In.	a	b
½	1¼	3
¾	1½	3
1	1⅞	3¼

Should the safety valve fail to relieve the boiler of excessive pressure, then, when

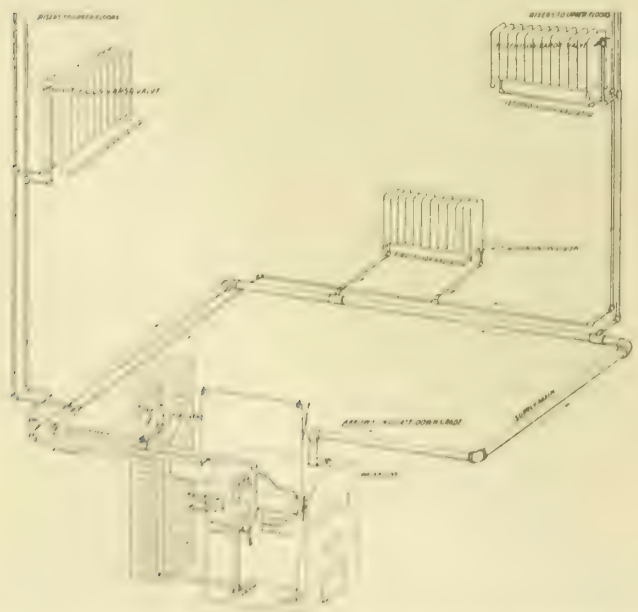


FIG. 1. TYPICAL INSTALLATION OF HUTCHISON SYSTEM OF VAPOR HEATING.

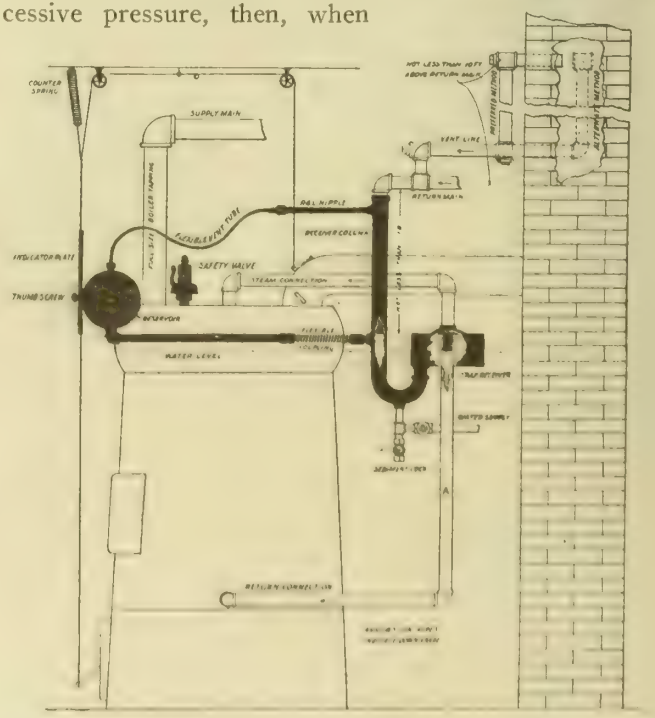


FIG. 3. DETAIL SHOWING HUTCHISON INSTALLATION ON BOILER
Bold shaded portions indicate Hutchison Appliances

Continued on next page

a predetermined pressure is reached, the water in the trap-receiver is forced out of the receiver column into the return main, and there finds an unobstructed passage for the escape of vapor through the vent line and up the flue, without backing water into the radiators or lowering the water line in the boiler. As soon as the excessive pressure is relieved, the water will flow back into the receiver column and the damper regulator will resume its normal operation.

Apparatus.

The Hutchison packless radiator valve is graduated in such a manner that it may be permanently adjusted to supply any size radiator with a pressure of two ounces in the system. It is packless, will not leak, has a self-grinding feature so that corrosion does not affect it, will not clog up the port, has only one moving part, and is thoroughly tested under 250 pounds pressure before shipment. Valve is made in three sizes: ½-inch valves for radiators of 30 square feet or less; ¾-inch valves for radiators of 31 to 90 square feet; 1-inch valves for radiators of 91 to 180 square feet.

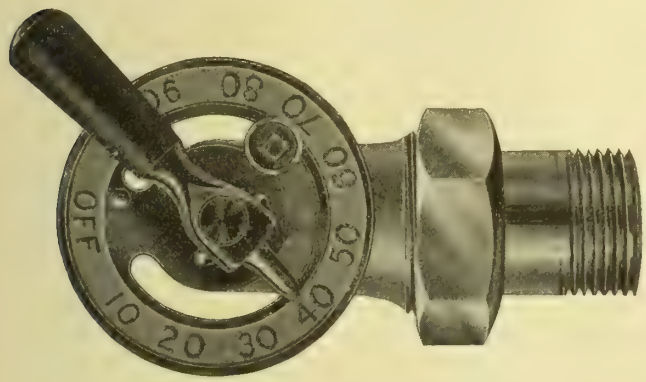


Fig. 4. TOP VIEW OF HUTCHISON MODULATING RADIATOR VALVE

Hutchison Trap-Receiver.

The Hutchison trap-receiver is an essential part of the Hutchison System. By the use of this trap-receiver, all thermostatic, float and check valves found in other vapor systems are eliminated, and there is positively not a moving part in the Hutchison System with the exception of the damper regulator. The Hutchison trap-receiver comprises a single casting, so designed that by its use an even water line is always maintained in the boiler. Even though the ash-pit door might be left wide open and the safety valve completely fail to work, yet there is absolutely no danger of an explosion in this system. No. 1¼ for boilers up to 2500 feet. No. 2 for boilers over 2500 feet.

Hutchison Damper Regulator.

The Hutchison damper regulator is simple in design and positive in action, being operated by gravity due to a flow of water from the trap-receiver into the reservoir; the action being almost instantaneous, immediately the pressure above that for which the system is previously set is generated in the boiler.

Advantages.

(1) Each radiator is heated to the amount desired, because of perfect control offered by the graduated radiator valve.

(2) Absolutely no gases or foul air can enter room from the system. Instead of a constant flow of impure air and foul gases through the air valves which are employed in many systems, in the Hutchison System the air is driven through the return pipe and discharged outside of the building, thus eliminating a disagreeable and dangerous condition.

(3) No water in radiators or pipes to freeze should furnace fire for any reason be dead.

(4) A saving of at least thirty per cent of fuel over hot water, and a comparatively greater saving over steam, through the use of the automatic damper control and rapid transmission of heat from the boiler to the radiators. When the supply of vapor to one or more of the radiators has been reduced, the fuel consumption is reduced proportionately and automatically.

(5) The entire system is positively noiseless.

(6) The system is absolutely safe and fool-proof, an explosion being impossible.

(7) The radiators are always heated in twenty-five minutes at most from the time of starting the fire. A fire banked for the night, by turning off the radiator valves, will the next morning heat up the radiators in ten minutes, by the mere turning on of the valves.

(8) The Hutchison System operates equally well with coal, wood, coke, electricity, gas or oil as a fuel.

Surface-burning, down-draft, magazine or underfeed, or any other standard type of steam boiler may be used.

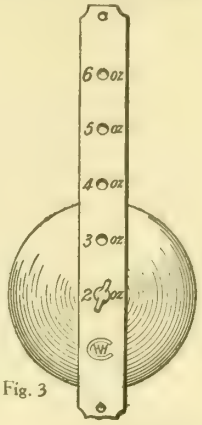


Fig. 3

Fig. 5. HUTCHISON DAMPER REGULATOR

To change the pressure, remove thumb screw from the globe and connect globe to indicator plate at hole opposite the number of ounces desired to be carried

LIST PRICES

Hutchison Packless Vapor Valves	
½-inch	$4.00
¾-inch	4.50
1-inch	6.00
Hutchison Trap-Receiver	
No. 1¼	$15.00
No. 2	36.00
Hutchison Damper Regulator	
No. 1¼	$15.00
No. 2	36.00
Hutchison Union Elbows	
One size only, ½ inch	$0.60
Hutchison Extension Stems	
In lengths up to 24 inches, for all size valves	$2.00
Special prices for longer stems	
Hutchison Special Safety Valves	
1-inch for boilers 700 ft. or less	$3.00
1¼-inch for boilers 700 to 1200 ft	3.75
1½-inch for boilers 1200 to 2000 ft	5.00
2-inch for boilers 2000 to 3500 ft	6.75
Over 3500 ft., use two valves.	
Discount to the trade	

Engineering Service.

This organization maintains an Engineering Department to assist engineers, architects, heating contractors and others in their problems. Absolutely no charge will be made for this service.

On request, a copy of the "Hutchison Fitter," containing full directions for installing the Hutchison System of Vapor Heating, will be forwarded to architects, engineers and others.

EDDY ENGINEERING CO.

Automatic Vacuum Steam Heating

ALPENA, MICH.

Product.

Eddy System Automatic Vacuum Steam Heating.

The Eddy System.

This system applies to the venting of low pressure steam heating, creating and maintaining a vacuum. It can be connected to any number of radiators, is simple to install, operate and maintain. Only ordinary care in the firing is necessary to get best results.

This system is not an untried scheme. Fourteen years of actual use has proven its efficiency, and it is now giving most satisfactory service throughout the United States and Canada, in all kinds of buildings, where low pressure steam can be used for heating.

Description.

This system is clearly shown in dark lines on accompanying drawing. It begins at the retarders which vent the several radiators, and terminates, through a system of air piping, in the boiler room. At the terminal of the main air pipe is located a combination receiver, exhausting and vacuum valve and a return water valve, as shown.

The Eddy Retarder is shown in adjoining sectional detail. The minute opening permits proper venting of the radiator, but retards the escape of steam into the air piping when the heating plant is operating under pressure.

Operation and Advantages.

The operation and advantages of this system are briefly explained by first referring to the best way of operating an ordinary low pressure steam heating plant equipped with old style compression air vents:

The Old System—Start fire in the usual manner. See that all air vents are adjusted for properly venting the radiators. When the radiators become completely filled with steam, close vents *tight*. Maintain steam pressure until temperature of building is agreeable, then adjust drafts on boiler to prevent overheating.

Closing drafts will cause steam pressure to drop, but if the heating plant throughout is practically tight, air cannot readily enter, and a vacuum follows. As air cannot readily enter and cool the radiators, and the vacuum maintains steam or vapor circulation, the temperature of the building is maintained for hours on a comparatively low fire.

The Eddy System—This system operates exactly as above, but is *automatic*. The retarders for venting the radiators are always properly adjusted, and require no closing to prevent steam escaping into the room, or air returning to the radiators when steam pressure drops.

The water of condensation from the little steam that gets into the air piping flows to the receiver, and finally through the return water valve into the boiler. All air escapes through the exhausting and vacuum valve, but no air can return through this valve.

It is not difficult to make a heating plant sufficiently tight, so the Eddy System will create a vacuum of more than twenty inches, and maintain it at a loss of less than one half inch per hour. This permits of warming the building with steam or vapor at less than 160 degrees, and makes this system ideal for early fall and late spring warming when little but quick heat is wanted. As this system does not prevent operating up to any steam pressure, it is also ideal for coldest weather, and can be operated at all times with a fuel expense just in proportion to the heat required.

The principal advantages of the Eddy System are perfect venting of the radiators, a quick heating service, simplicity of operation, minimum attention, uniform heating, and fuel economy, the fuel required being about one third less than for ordinary steam and water heating.

Cost.

The Eddy System adds but little to the cost of a steam heating plant, and the total compares favorably with the cost of an ordinary hot-water plant of equal capacity for warming.

Installation and Co-operation.

We furnish complete instructions for installing, also instructions for firing steam heating plants and operating the Eddy System, and otherwise co-operate with purchasers of this system in giving them the benefit of a long and practical experience in vacuum heating.

The engineering department will gladly co-operate with architects in preparing piping plans, etc.

Sectional View of Eddy Retarder

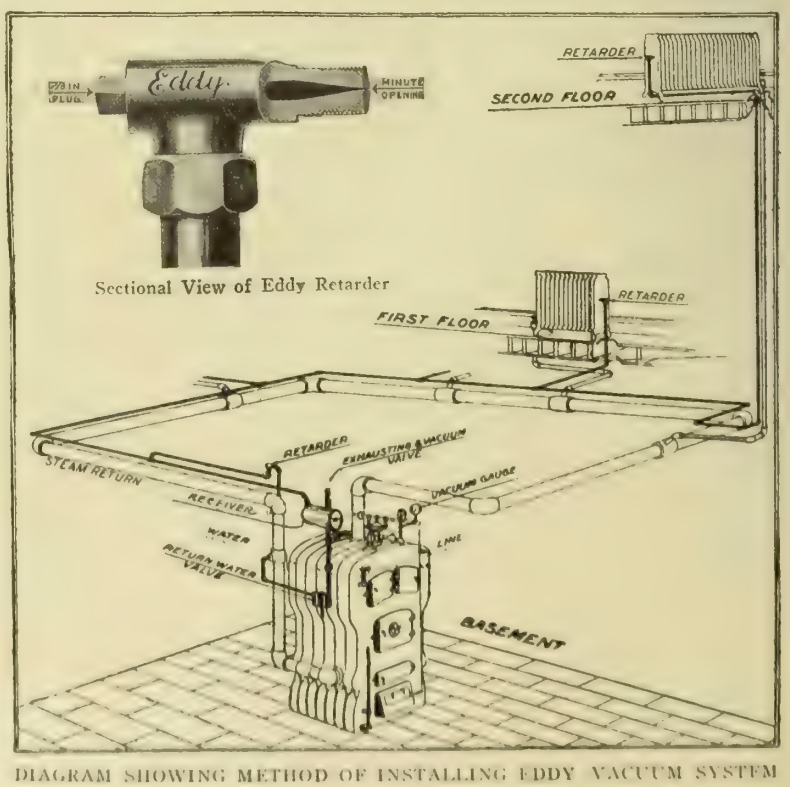


DIAGRAM SHOWING METHOD OF INSTALLING EDDY VACUUM SYSTEM

MOUAT-SQUIRES CO.

The Mouat Graduating Vapor Heating System

CLEVELAND, OHIO

Products and Services.

Manufacturers of the MOUAT GRADUATING VAPOR HEATING SYSTEM, consisting of the following exclusive devices: MOUAT AUTOMATIC VAPOR and DAMPER REGULATORS; FRACTIONAL RADIATOR VALVES; RETURN FITTINGS; PRESSURE GAUGES; SAFETY VALVES.

ENGINEERS, Vapor Heating.

The Engineering Department will, when plans of buildings are furnished, work out a complete set of heating plans, specifications, etc., for submission to any steam-fitter for quotations and estimates.

The Mouat Graduating Vapor Heating System.

A heating system (see illustrations) distinct from vacuum vapor systems, modified steam or other so-called vapor systems. Its operation depends entirely on the patented apparatus above mentioned.

Operation—Based on natural forces of *steam expansion and gravitation.* Vapor circulates naturally upward from boiler to radiators, being accelerated by a slight pressure, one half ounce or more, at boiler. Vapor in radiators heats the rooms to required temperature through manipulation of the Fractional Radiator Valve; vapor condenses and passes out through Return Fitting and return pipe to boiler, by gravity.

Vapor Regulator (constructed on principle of a hydrostatic balance, and attached to boiler) controls fire in boiler through dampers, *giving adequate vapor supply at all times.* It is set to maintain a *pressure of one or two ounces* at boiler, and operates on a variation of less than one ounce.

Air and condensation water pass down return pipe to a point near boiler, where condensation enters boiler and air escapes through a vent pipe into chimney flue.

Fuel—This system operates in conjunction with any standard heating boiler equipped for burning coal, coke or gas.

Application—Standard steam and hot-water systems may be easily changed to operate with the Mouat Graduating Vapor System.

Advantages of Mouat Vapor System.

(1) Heat is *graduated* and *regulated absolutely in each radiator in each room,* as desired. (2) System furnishes heat more *quickly* than hot water or steam. (3) Can be applied in all types of buildings using direct radiation or gravity indirect. (4) System is safe and noiseless, and operates with minimum of attention. (5) Any percentage of any radiator can be heated or entirely shut off by the Fractional Valve. (6) Boiler pressure generally does not exceed three ounces. (7) No air-valves on radiators to give off foul gases or leak. (8) No water in radiators, except condensation (always flowing back, with air, towards boiler).

Several other advantages may be mentioned.

Mouat Fractional Radiator Valves.

Each valve is adjusted, when installed, to operate harmoniously with any particular radiator on top of which it is placed; is substantially made; no loose parts; is accurately graduated to permit proper temperature.

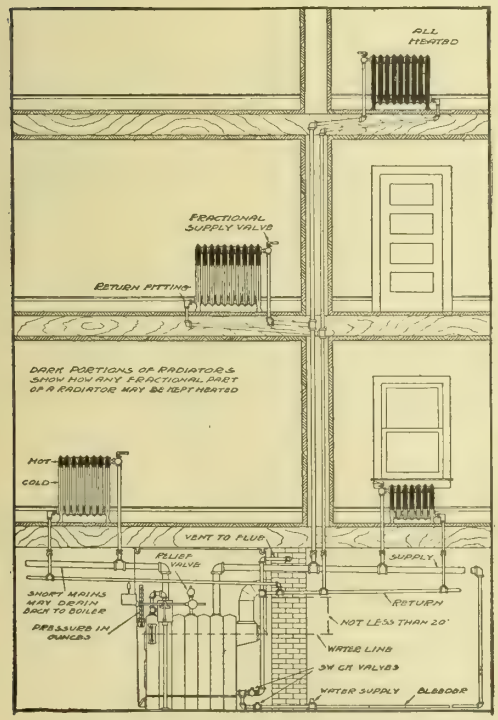
Action of valve determines the fraction of radiator (upper part) to be filled with vapor.

Cost.

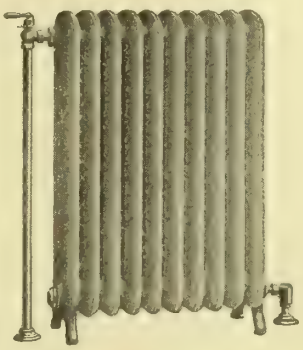
Quality and results considered, this system compares favorably in cost with steam and hot-water systems.

References and Catalogue.

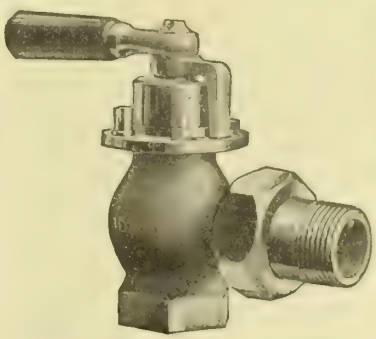
Extensive lists of installations in high-class residences, bank buildings, churches, hospitals, sanatoriums, public buildings, industrial plants, etc., will be sent on request. Also complete catalogue.



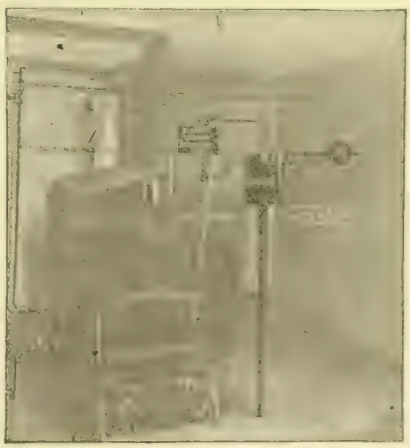
MOUAT GRADUATING VAPOR-HEATING SYSTEM AND ITS APPLICATION



TYPICAL RADIATOR CONNECTIONS
Showing Fractional Valves, etc.



IMPROVED MOUAT FRACTIONAL RADIATOR VALVE



ORDINARY BOILER
Showing damper open, check draft closed
Pressure, one ounce

WARREN WEBSTER & COMPANY

The Webster Modulation and Vacuum Systems of Steam Heating; Feed-Water Heaters; Steam and Oil Separators; Air Washers; Air Conditioning Apparatus, etc.

ESTABLISHED 1888
INCORPORATED 1895

MAIN OFFICE AND WORKS
CAMDEN, N. J.

OFFICES AND REPRESENTATIVES IN THE PRINCIPAL CITIES

Products.

We manufacture SPECIAL WEBSTER APPLIANCES for use in connection with THE WEBSTER VACUUM SYSTEM of STEAM HEATING and THE WEBSTER MODULATION SYSTEM; THE WEBSTER FEED-WATER HEATERS; WEBSTER STEAM and OIL SEPARATORS.

We also manufacture THE WEBSTER AIR WASHER, which may be arranged with THE WEBSTER METHOD OF HUMIDITY CONTROL for automatically controlling the humidity in buildings.

The Webster Modulation System.

The Webster Modulation System of Steam Heating insures the positive circulation and complete condensation of low-pressure steam in a noiseless, two-pipe system; the flexible control and close regulation of temperature; and the automatic removal of water and air. (Send for complete catalogue for more details.)

Advantages—The phlegmatic action of hot-water systems and the lack of control of ordinary steam systems, which must be either "all on" or "all off," are entirely eliminated in The Webster Modulation System. A temperature of 80 degrees need not be endured in order to avoid one of 50 degrees. Open the Modulation Valve for the amount of heat desired, and the System does the rest. There are no air-valves opening into rooms and emitting ill-smelling air, steam, or hot water; there is entire freedom from water-hammer and from air-binding.

Operation—Steam at low pressure is admitted to each radiator, the amount being controlled by a Self-Indicating Webster Modulation Valve.

By this one valve, located within easy reach at the top of each radiator (hot-water type preferred), the effective area of the heating surface can be quickly changed and the temperature of the room perfectly modulated.

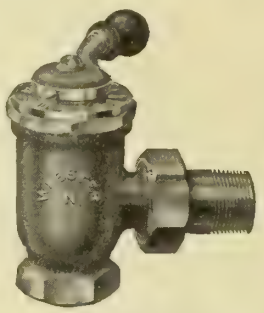
The Webster Sylphon Trap, which requires no adjustment, automatically ejects water and air from the radiator without permitting the escape of steam.

The instant steam is admitted to a radiator, the air is forced to the bottom of same and passes into the return main through a Webster Sylphon Trap, shown herewith in the No. 5 type.

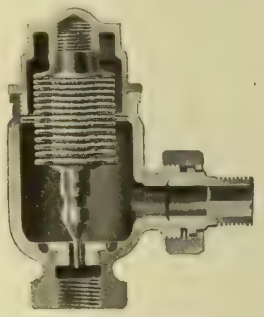
The air is finally discharged into the atmosphere, while the water of condensation is returned to the boiler by means of a Webster Modulation Vent Trap in the simpler systems, and by other methods of returning condensation to boilers in large or complex systems.

In the low-pressure gravity Modulation System a Webster Damper Regulator, especially designed for this service, closely regulates the boiler draft according to the amount of steam pressure required.

The peculiar features of this system make possible the use of smaller piping than in ordinary hot-water or steam systems. Less radiation may be used than with hot-water heating.

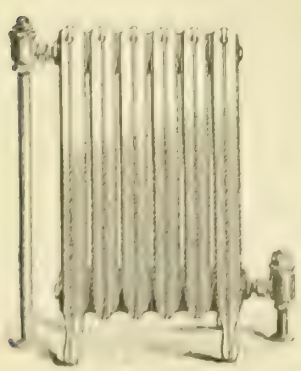


THE WEBSTER MODULATION VALVE

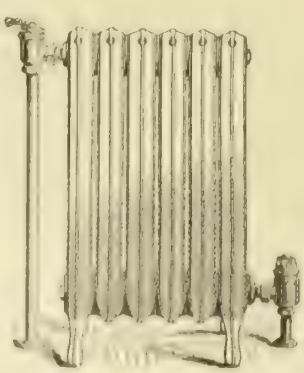


THE WEBSTER SYLPHON TRAP NO. 5
Sectional view

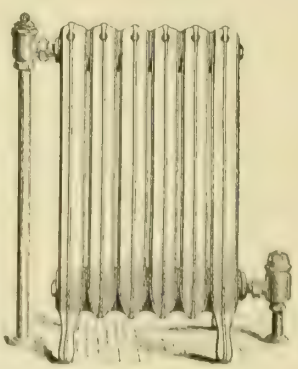
Application—The same results can be obtained in small and medium-sized buildings with The Webster Modulation System as with The Webster Vacuum System, without expensive accessories or a vacuum pump requiring relatively high steam pressure. It can be successfully installed and economically operated in any size building up to the point where the length of the runs makes it cheaper to "pull" by a vacuum pump than to "push" by increased initial pressure. When this limit is reached, The Webster Vacuum System becomes economically effective. The Webster Modulation System is so simple that it is easily understood and operated by the average janitor or householder.



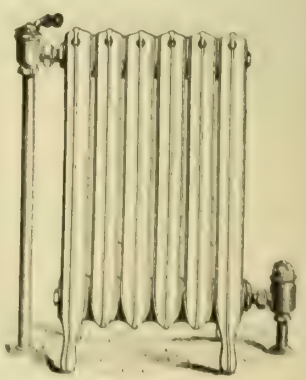
Showing steam in Radiator when Modulation Valve is about one fourth open



Showing steam in Radiator when Modulation Valve is about one half open



Showing steam in Radiator when Modulation Valve is about three fourths open



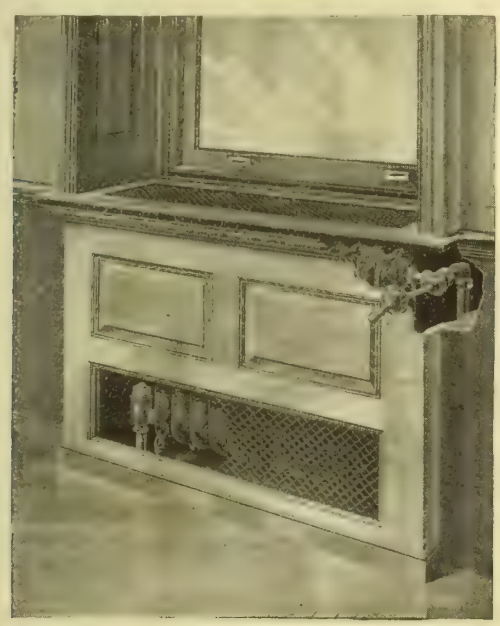
Showing steam in Radiator when Modulation Valve is full open

APPLICATION OF THE MODULATION FEATURE

Continued on next page

It should be remembered, however, that it is desirable and indeed imperative for certain large buildings or groups of buildings to use The Webster Vacuum System features in connection with The Webster Modulation System.

The Webster Modulation Features—The Webster Modulation feature is applicable to vacuum systems, to gravity "open return line" systems and to systems equipped with automatic return water apparatus; and where applied results in marked increase in economy and in comfort.



THE WEBSTER MODULATION VALVE WITH EXTENDED STEM

Showing application to radiator behind grill. The Webster Sylphon Trap on return end of radiator automatically removes air and water of condensation

The Webster Vacuum System.

The Webster Vacuum System is applicable to nearly all classes of buildings, but is particularly adapted to the large building or group of buildings. While it is used principally in connection with exhaust steam plants, it is used also on live steam installations and assures perfect steam distribution, with maximum radiator efficiency, through mains over 1,000 feet long. With this system little or no back-pressure is placed on the engines, no air-valves are required, and by means of Webster Methods and Appliances the condensation is saved, pumped, and used for boiler feed purposes.

For central plants heating scattered buildings, The Webster Vacuum System with Hy-Lo Apparatus is used. This arrangement "balances the vacuum," securing uniform distribution of steam in the several buildings. Any predetermined degree of vacuum can be maintained automatically in each building or subdivision of an extensive group.

We make several types of Water and Air Relief Traps for allowing air and water removal from radiators, coils, blast sections, etc. Experience has taught us that no one type of trap is adaptable to every condition.

When a Webster System is contracted for, we furnish such Webster Appliances as are necessary to secure the best results.

The Webster Sylphon Trap—This trap, shown on the preceding page, contains a most flexible thermostatic member of the all-metal bellows construction, and has great lift off the seat, permitting dirt that would lodge in most traps to pass through the port. Tested and adjusted at the factory, it needs no adjustment after it is installed. It is good for widely varying pressures, permitting all air and water to pass into the return, while tight against steam leakage.

The Webster Number Seven Trap—This is another of our return line traps and has a double metal diaphragm thermostatic member. While it does not contain the refinements found in the Sylphon Trap it is superior in many respects to any other trap on the market intended for the same purpose.

The Webster Water Seal Trap—This trap is of the float or differential type and has great water capacity. When properly applied and operated permits the removal of air and water from factory coils, blast sections and other heavy drainage points.

There are conditions where one of our other types of traps is preferable, however, and we prefer to have the selection of the trap to be used left to our engineers.

Engineering Service.

Our Engineering Department, with an experience of twenty-eight years in this field of engineering, is maintained for the purpose of consulting and coöperating with engineers, architects, contractors, steam fitters and owners concerning the installation and operation of Webster Systems of Steam Heating and the Webster appliances exactly suited to buildings of any size, for any use, and grouped in any number. The unsatisfactory operation of many old heating systems has been overcome by the Webster Method of securing proper circulation and flexible control. We are not contractors, but we give general supervision to every Webster Installation.

This service is a part of every Webster System contract and is available through our network of branch offices in the principal cities of the United States and Canada. We also have representatives in foreign countries.

Guarantee.

Every Webster System, when operated as we direct, is guaranteed as to proper circulation of steam and freedom from water-hammer and air-binding. All Webster Appliances are guaranteed as to workmanship and material.

The Webster Feed-Water Heaters.

For a building having its own power plant The Webster Feed-Water Heater is a coal saver. It works practically automatically, taking exhaust steam from the engine as its heating medium, bringing up to a high temperature the water to be used in the boiler.

Advantages—By utilizing the latent heat in the steam exhausted from the engine a source of heat is used which costs nothing for fuel. The operation of this heater reduces the amount of work which the boiler has to perform, and decreases fuel consumption in the same ratio (14 to 17 per cent). This reduction is the work of heating all the water passed through the system from the temperature of the main to the temperature at which the water enters the boiler.

The Webster Feed-Water Heater of the open type, as shown on following page, combines the functions of heater, oil separator and receiver for returns from the heating system. It thus makes a separate tank unnecessary. It may be so arranged as to operate automatically by means of a float, thus controlling either the discharge of hot water from the heater into the boiler, or the entry of cold water from the main into the heater.

Continued on next page

By separating oil and other impurities from the water The Webster Feed-Water Heater keeps these substances from entering the boiler, thereby keeping cleaner boiler surfaces, and preventing the formation of deposits in the boiler tubes, with resultant loss of heating efficiency. The "Vacuum" construction of this heater decreases back pressure on the engine, thus obtaining economies in steam consumption otherwise impossible in a non-condensing plant.

With cast-iron shell and copper trays, this heater has the maximum of durability. The use of copper makes its heating efficiency the very highest which can be obtained.

The Webster Feed-Water Heater is used extensively in hotels, factories and other buildings having their own power generating stations, as well as in electric light, power, railway, gas, water and other plants.

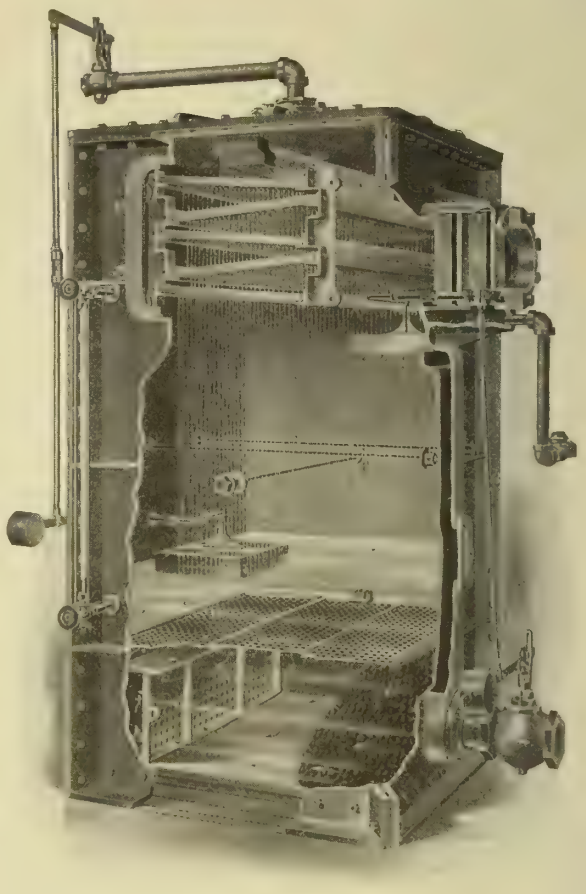
The "Preference Cut-out Type" of The Webster Feed-Water Heater is especially designed for use in connection with any kind of heating or drying system which may be operated at, above or below, atmospheric pressure.

This special type includes an extra large Oil Separator for purifying from oil all of the available exhaust steam used in the heating or drying system as well as in the heater.

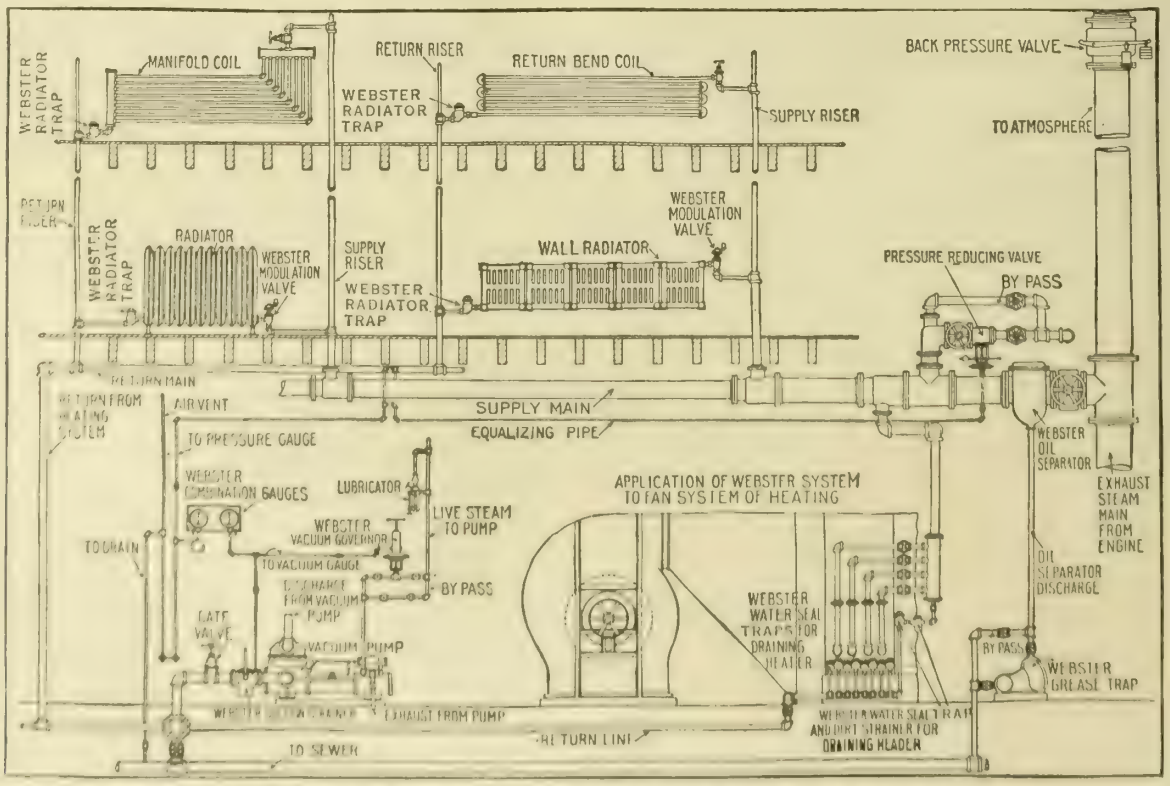
A simple cut-out valve is provided for cutting the heater "out of service" for inspection or for cleaning without affecting the flow of the exhaust to the heating system.

The Webster-Lea Heater-Meter.

The Webster-Lea Heater-Meter is a combination of the Webster Feed-Water Heater and the Lea V-Notch Recording Meter. It provides records of boiler evaporation, at the same time rendering the heating service described above. Because of its compact design less floor space is required than for independent heater and meter, while at the same time it retains all of the special operating advantages of independent apparatus.



THE WEBSTER OPEN FEED-WATER HEATER, CLASS "EB"
Interior view, showing principles of operation



GENERAL ARRANGEMENT OF THE WEBSTER VACUUM SYSTEM OF STEAM HEATING

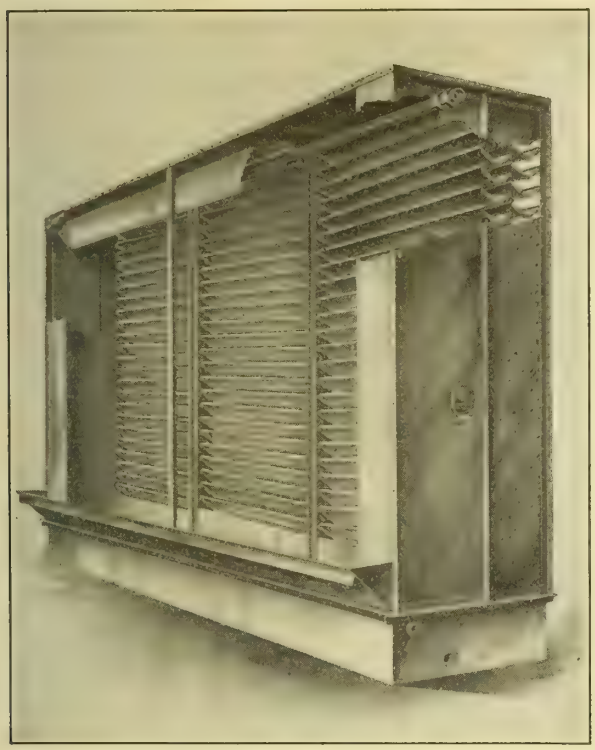
Sweet's Catalogue

Continued on next page

Webster Air Conditioning Apparatus.

The Webster Air Washers for Air Cleansing, Humidifying, Cooling, Dehumidifying and the Reclamation of Valuable Dusts or the Abatement of Dust Nuisances in connection with fan systems, represent the most advanced practice.

Specific types of The Webster Air Washers are designed and built for specific services, thus insuring the best results.

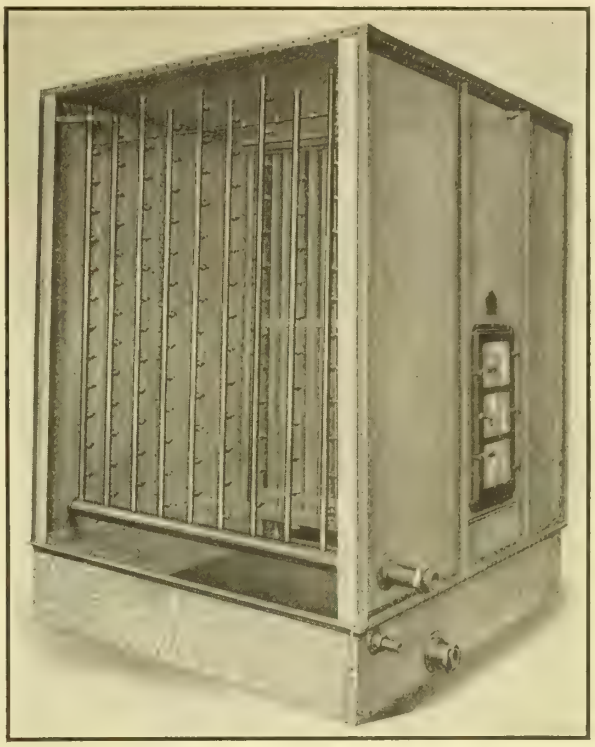


THE WEBSTER STANDARD AIR WASHER

The Webster Standard Air Washer—Is designed primarily for air cleansing; cooling of the air being relatively unimportant. This apparatus, however, will cool the air by evaporation, 60 per cent of the difference between the dry-bulb and wet-bulb temperatures of the incoming air. The unique spray device, giving a combination rain and spray effect, and the shallow depth—3′ 10″ in the direction of air flow—are characteristic features of The Webster Standard Air Washer.

For air cleansing this apparatus is unexcelled. Its simplicity of construction, ease of operation and economy of floor space are a few of its superior merits.

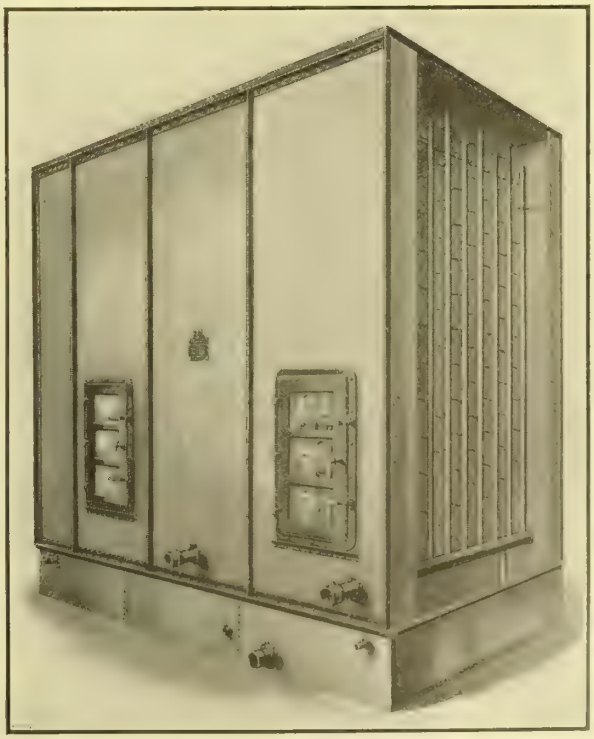
THE WEBSTER SPIRAL MIST NOZZLE
Atomizes the spray water into fine mist or fog. Water orifices $^{3}/_{16}$″ in diameter. Patented



THE WEBSTER "TYPE A" AIR WASHER

The Webster "Type A" Air Washer—Is designed primarily for cooling by evaporation; the spray water being recirculated. Where a high degree of cooling by evaporation is desired in addition to air cleansing, this apparatus is recommended. The water volume regularly used permits cooling the air 85 per cent of the difference between the dry-bulb and wet-bulb temperatures of the incoming air.

This apparatus is of the mist nozzle type, the fine atomization of spray water secured with the Webster Mist Nozzle affording an enormous area of contact between the water and air which gives best results.



THE WEBSTER "TYPE B" AIR WASHER

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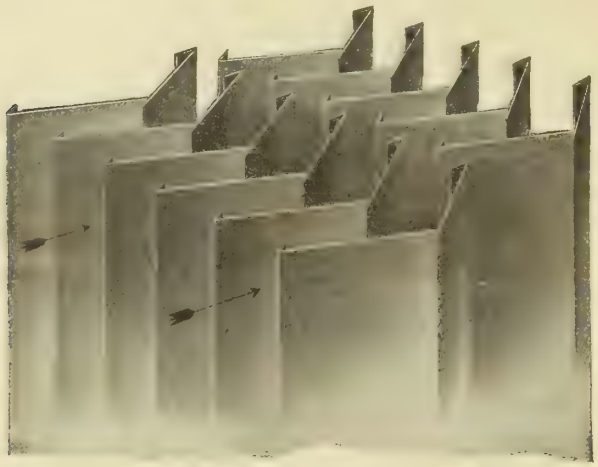
The Webster "Type B" Air Washer—Is designed primarily for cooling or dehumidifying air by the use of cold well water or water cooled with ice or mechanical refrigeration; it is designed to secure the highest refrigerating effect from the cold spray water. In addition to this it is a most efficient air purifying apparatus and will cool air, by evaporation, to the temperature of saturation.



WEBSTER ELIMINATORS
Vertical type used with The Webster Air Washers, "Type A" and "Type B"

These types of Air Washers are basic types; however, our Engineering Department will be pleased to assist architects and engineers in the specification of apparatus for special problems as are frequently presented in industrial plants; for example, the reclamation or removal of dust in connection with exhaust systems; maintenance of constant temperature or humidity, or both, at all seasons; air conditioning for low temperature drying; cooling of liquids; condensation of vapors; dry blast plants, etc.

We have the best equipped laboratory with every facility for doing experimental work in connection with special problems arising in the various fields to which Air Conditioning Apparatus is adapted.

The Webster Air Washers have the highest efficiency, and only the best design, material and workmanship enter into their construction.

Copper and Galvanized American Ingot Iron are especially recommended for Air Washer construction, as they offer greater resistance to the strong corrosive action encountered in Air Purifying work; however, galvanized steel or special metals will be furnished if desired.

The following table includes the gauges or weights and the kinds of material recommended for the various parts of an Air Washer; this is based on a wide experience, and will be found entirely satisfactory.

Air Washer	Cold-Rolled Copper	{Galvanized American Ingot Iron / Galvanized Steel}
Casing	{18 oz. up to 15000 c.f.m. / 20 oz. on larger sizes}	No. 18 U. S. S. Gauge
Eliminator	Same as above	No. 20 U. S. S. Gauge
Tank	40 oz. Copper	No. 12 U. S. S. Gauge
Angle-Braces	Copper-Plated Angle Iron	Galvanized Iron
Pipe Flanges	Brass	Galvanized Malleable Iron
All Piping	Brass	Galvanized Iron

The table of dimensions following gives necessary information for "roughing-in" purposes, but we will be pleased to furnish more complete information upon request. Reference to the illustration below of The Webster "Type A" Air Washer is to be used in conjunction with this table.

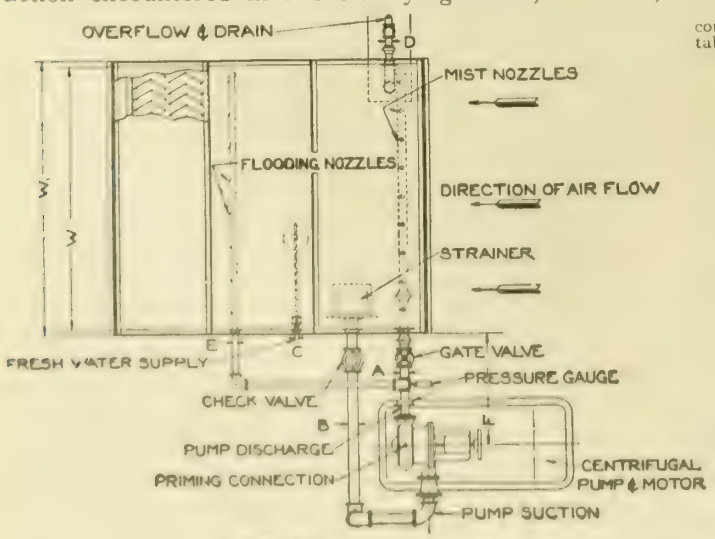
Dimensions are the same for the three types of apparatus, except the length, which is 3'-10" for the Standard Air Washer; 7'-0" for "Type A" and 9'-0" for "Type B."

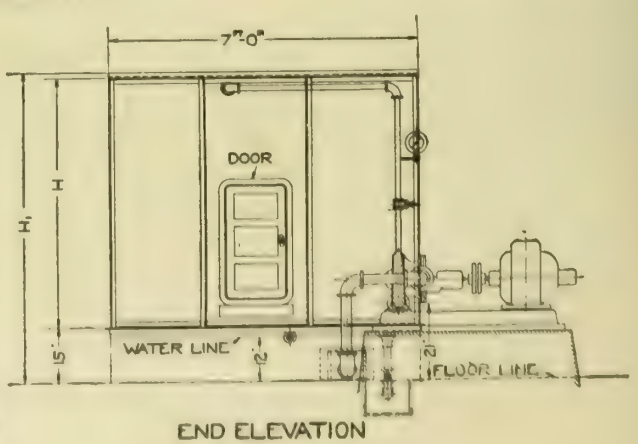
Fresh water and drain sizes are approximately the same for all.

DIMENSIONS OF WEBSTER "TYPE A" AIR WASHER

Capacity	H	W	Fresh Water	Drain	Motor Horse-Power		
					Type A	Type B	Standard
1000	2'-10½"	1'- 9"	½"	1¼"	1	1½	1
2000	4'- 1½"	1'- 9"	½"	1¼"	1½	2	1
3000	5'- 4½"	1'- 9"	½"	1¼"	1½	2	1
4000	5'- 4½"	2'- 3"	¾"	1¼"	1½	3	1½
5000	5'- 4½"	2'- 4"	¾"	1¼"	2	3	1½
7500	6'- 4½"	3'- 3"	¾"	1¼"	3	5	1½
10000	7'- 1½"	3'- 9"	¾"	1½"	3	5	2
12500	8'- 4½"	3'- 9"	¾"	1½"	5	5	3
15000	8'-10½"	4'- 3"	1"	1½"	5	7½	5
20000	9'- 4½"	5'- 3"	1"	1½"	5	7½	5
25000	10'- 4½"	5'- 9"	1"	1½"	7½	10	5
30000	11'- 0½"	6'- 6"	1"	1½"	7½	10	5
35000	11'- 0½"	7'- 6"	1¼"	1½"	7½	15	5
40000	11'- 0½"	8'- 6"	1¼"	2"	7½	15	5
45000	11'- 0½"	9'- 7"	1¼"	2"	10	15	7½
50000	11'- 1"	10'- 8"	1½"	2"	10	15	7½
55000	11'- 1"	11'- 8"	1½"	2"	10	15	7½
60000	11'- 1"	12'- 8"	1½"	2"	15	15	7½
65000	11'- 1"	13'-10"	1½"	2"	15	20	7½
70000	11'- 1"	14'-10"	1½"	2½"	15	20	7½
75000	11'- 1"	15'-10"	1½"	2½"	15	20	10
80000	11'- 1"	16'-10"	1½"	2½"	15	20	10
85000	11'- 1"	17'-10"	1½"	2½"	15	25	10
90000	11'- 1"	19'- 0"	1½"	2½"	15	25	10
95000	11'- 1"	20'- 0"	1½"	2½"	15	25	15
100000	11'- 1"	21'- 0"	1½"	2½"	15	25	15

Where headroom is limited the sheet metal tank may be omitted and a concrete tank provided for, thus decreasing the over-all height of the Air Washers tabulated by 15"





DETAILS OF THE WEBSTER "TYPE A" AIR WASHER

Continued on next page

The Webster System of Automatic Humidity Control.

The Webster System of Automatic Humidity Control, as applied to The Webster Air Washers, is the ideal method of regulating the moisture content of air. It is simple, accurate and scientifically correct in principle, being based on independent control of the dry-bulb and wet-bulb temperatures of the conditioned air, through the use of ordinary thermostats with which all operating engineers are familiar.

This method of control is the result of a discovery of this Company that, in a properly designed Air Washer used as a humidifier, the wet-bulb temperature of the air leaving the apparatus is identical with the temperature of the finely atomized spray water after contact with the air; thus, a temperature regulator subjected to such water will maintain it and the wet-bulb temperature of the air at a constant predetermined temperature by controlling steam injection to the water.

The dry-bulb temperature of the air is maintained at a constant predetermined point by means of a duct thermostat, placed in the path of the air leaving the Air Washer, controlling the steam supply to the inner sections of the tempering coil.

The Webster System of Humidity Control has many strong advantages over every other system yet devised.

(1) Ordinary thermostatic devices, with which all operating engineers are familiar, are used for control.

(2) Accuracy of control is unaffected by stratification of air currents entering or leaving the Air Washer, or by unequal spray distribution; conditions which are more or less present in every installation and which with other systems of control cause unequal humidification of the air or supersaturation, and consequent inaccurate control.

(3) The thermostatic devices are so arranged that they control the average wet-bulb and dry-bulb temperatures of the conditioned air. This is effected by conducting water from over the entire spray chamber area to the water temperature regulator, thus securing an average water temperature and consequently an average wet-bulb temperature.

The average dry-bulb temperature of the air is controlled by placing the duct thermostat in the fan discharge, when air is drawn through the Air Washer and no reheaters are interposed between it and the fan. When reheaters are interposed, air is taken from several points over the entire discharge area of the Air Washer through a sampler duct which by-passes the reheater, and in which the duct thermostat is located. It is manifest that with the methods outlined, air and water of average temperature will pass over the thermostatic devices, and that they will be unaffected by stratified air currents at the Air Washer outlet or by radiant heat from the reheater coils; this, in conjunction with the ability to maintain a slight difference between the average dry-bulb and wet-bulb temperatures, prevents supersaturation and assures perfect control.

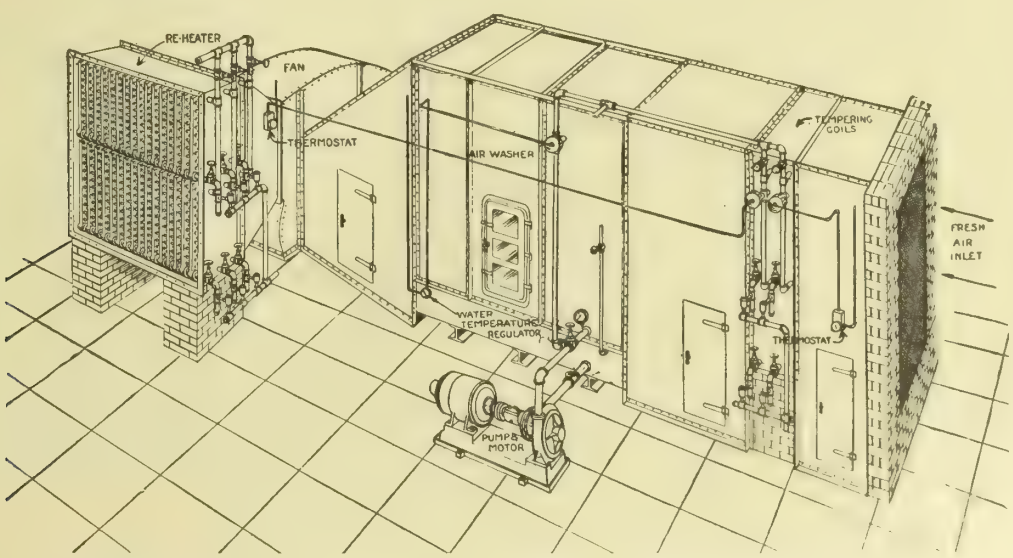
(4) The water temperature regulator is by far the more important controlling device and owing to the fact that water is a denser medium and has a higher specific heat than air, the regulator will respond more quickly to slight variations in temperature.

(5) Safety against excessive humidification, in case of accidental stopping of the pump, or the failure of air pressure on the thermostatic devices, is inherent in The Webster System as applied: no auxiliary devices are required, thus simplifying the apparatus.

Steam for warming the spray water is introduced through noiseless steam and water mixers submerged in the Air Washer tank.

It has been found and is generally conceded that tempering coils in front of the Air Washer are essential to prevent freezing of same, and that to secure true automatic humidity control, with even a fair degree of accuracy, automatic control of the steam supply to the tempering coil must be provided, because of the fact that with hand control, over-humidification is certain to result if the operating engineer fails to cut out the proper amount of heating surface in mild weather.

This Company recommends a tempering coil of the size ordinarily provided, the steam supply to the inner sections of same to be controlled by the duct thermostat, in the path of the conditioned air, in the manner previously outlined; steam to the outside section of the coil to be controlled by a cold air thermostat placed in the fresh air inlet, so as to turn on steam when the outside temperature falls below a predetermined point, thus obviating freezing of the inner sections of the coil.



PREFERRED ARRANGEMENT OF THE WEBSTER SYSTEM OF HUMIDITY CONTROL WHEN NO REHEATER IS INTERPOSED BETWEEN THE AIR WASHER AND THE FAN (PATENTED)

JOHN BRENNAN & CO.

Builders of High-Grade Steam Boilers

DETROIT, MICH.

Products.

DETROIT SMOKELESS FIREBOX BOILERS.

Also, DETROIT FIREBOX BOILERS (Straight Flue Type); DETROIT INTERNALLY FIRED WATER-TUBE BOILERS; DETROIT "OIL COUNTRY TYPE" BOILERS (Mounted and Unmounted); DETROIT INTERNALLY FIRED SCOTCH MARINE TYPE BOILERS; DETROIT WATER HEATING GARBAGE BURNERS.

John Brennan & Company

Detroit

TRADE-MARKS

Detroit Smokeless Firebox Boiler.

The Detroit Smokeless Firebox Boiler was developed to fill the growing demand for low pressure steam and water boilers of this type, for heating large residences, schools, churches, hospitals and business buildings. It is the latest achievement of sixty-six years of actual experience in the successful manufacture of Steel Boilers.

Advantages.

Detroit Smokeless Firebox Boilers will burn the cheaper grades of coal without smoke, and will pass inspection under the most rigid smoke ordinances. Gas also can be used, when desired.

Water Grates.

The water grates consist of tubes made of the best material obtainable and are practically indestructible.

The tubes are entirely independent of each other, allowing free expansion and contraction, and are thoroughly expanded at each end in exactly the same way as the fire tubes in the boiler proper.

There are no threads in the fire in these water grates, and therefore the trouble arising from threaded joints in the fire does not occur in Detroit Smokeless Firebox Boilers.

Special Features.

In case of accident to any one of the tubes forming the water grate, the tube can be readily removed and replaced without in any way interfering with the rest of the grate.

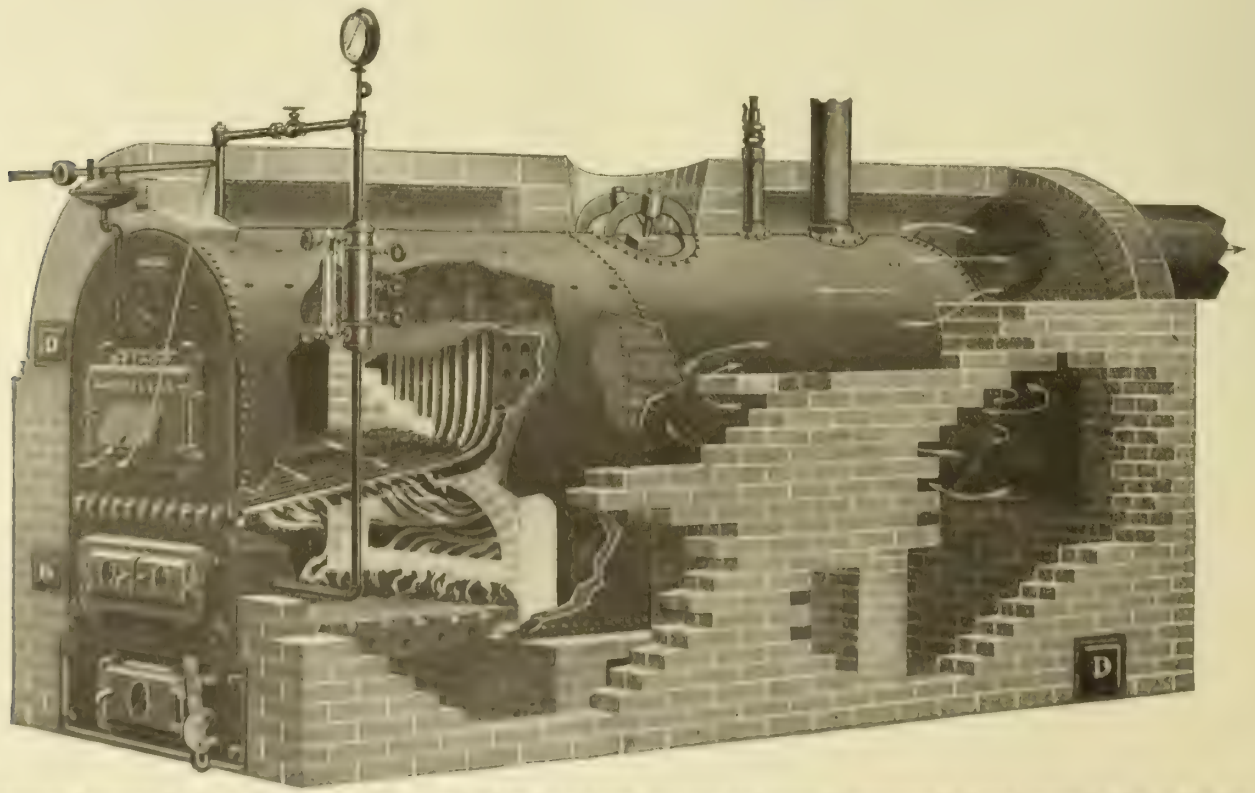
The water grates can be set and expanded at the front and through plug openings opposite every tube, and by entering the boiler at manhole the opposite end of all tubes can be set and expanded without the use of special tools.

This is the only boiler furnished with the Dutch oven setting without a three to five feet extension in front of the boiler. This feature insures the complete consumption of gases coming from the upper grates, as they are held in suspension on the lower grates until consumed by the arch setting.

Can Be Set Without Brickwork—Detroit Smokeless Firebox Boilers are used extensively in places where there is not sufficient room for a boiler requiring brick setting; and for such installations the boiler is furnished with a breeching extension at rear end, and lagged with asbestos or magnesia block covering.

Catalogue.

Our catalogue No. 121 covers both the Smokeless Type and Regular Straight Flue Type of Detroit Firebox Boilers, and will give much more detailed information in regard to both these types.



DETROIT SMOKELESS FIRE BOX BOILER WITH PART OF BRICK WORK REMOVED, SHOWING SMOKE OUTLET AT BACK END

Continued on next page

LIST PRICES AND RATINGS DETROIT SMOKELESS FIREBOX BOILERS.

Number	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Steam Boiler with Castings and Tools	$590	$620	$654	$710	$770	$840	$940	$1000	$1064	$1300	$1400	$1700	$1850	$2050	$2260	$2550	$2800
Steam Trimmings	20	20	20	24	24	24	24	24	30	30	30	40	40	40	40	44	44
Water Boiler with Castings and Tools	$605	$635	$670	$725	$785	$855	$955	$1015	$1084	$1320	$1420	$1725	$1875	$2080	$2290	$2590	$2840
Capacity, Steam.....square feet	1600	1900	2200	2500	2900	3300	3800	4400	5000	5800	7000	8200	9500	10500	12000	13000	15000
Capacity, Water.....square feet	2600	3100	3600	4100	4700	5300	6200	7200	8200	9500	11400	13400	15500	17000	19600	21000	24500
Heating Surface.....square feet	182	213	249	252	291	335	387	449	492	580	692	735	862	968	1092	1155	1310
Square feet of Steam capacity as rated for each square foot of heating surface	8.8	8.9	8.8	9.9	9.9	9.9	9.8	9.8	10,0	10.0	10.1	11.1	11.0	10.8	11.0	11.2	11.4
Weight of Boiler and Castings.....pounds	4800	5200	5700	6100	6700	7200	8400	9100	9800	12300	13600	16000	17400	19400	21000	22400	24300

Extras and Changes—Add to Above List

For longer shell, each foot or fraction of a foot	$19	$19	$19	$23	$23	$23	$32	$32	$32	$40	$40	$50	$50	$60	$60	$70	$70
Wrought iron space* rings and extra stays and braces for 100 pounds working pressure	$68	$70	$72	$78	$82	$86	$92	$96	$100	$115	$125	$90	$100	$105	$115	$125	$135

* Regular boilers larger than No. 114 made with wrought iron mud rings.
Boilers Nos. 104 to 109 have Grates in one section; Boilers Nos. 110 to 120 have Grates in two sections.
Openings in Firebox for coil, $4.00 list per Boiler.

SPECIFICATIONS OF DETROIT SMOKELESS FIREBOX BOILERS

Number	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Length Boiler Over All..feet, inches	8–7	10–2	11–7	9–10	11–4	12–11	12–4	13–10	15–4	15–10	18–4	17–10	20–4	18–4	20–4	18–4	20–4
Height from floor to top of brick work.....inches	76	76	76	82	82	82	89	89	89	95	95	107	107	113	113	119	119
Height of Water Line.....inches	59	59	59	61	61	61	65	65	65	67	67	75	75	80	80	86	86
Diameter Boiler.....inches	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	72	72
Height of Firebox.....inches	41	41	41	43	43	43	47	47	47	49	49	54	54	59	59	64	64
Width of Firebox.....inches	30	30	30	36	36	36	42	42	42	48	48	54	54	60	60	66	66
Length of Firebox.....inches	45	51	57	54	60	66	66	72	78	78	84	90	96	90	96	96	102
Depth of Water Leg.....inches	15	15	15	15	15	15	15	15	15	15	15	16	16	16	16	16	16
Size of Steam Opening.....inches	4	4	4	6	6	6	6	6	7	7	7	7	7	8	8	8	8
Size of Return.....inches	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6
Size of Safety Valve.....inches	2	2	2	2½	2½	2½	2½	2½	3	3	3	3½	3½	3½	3½	4	4
No. and size Supply and Return openings for Water....inches	2–5	2–5	2–6	2–6	2–6	2–6	2–6	2–7	2–7	2–7	2–7	2–8	2–8	2–10	2–10	2–10	2–10
Diameter of Breeching.....inches	20	20	22	22	22	24	24	27	27	30	30	34	34	36	36	38	38
Diameter of Stack.....inches	18	18	20	20	20	22	22	24	24	28	28	32	32	34	34	36	36
Minimum height of Stack.....feet	40	40	40	50	50	50	50	55	55	60	60	70	60	70	70	70	70
Diameter of Stack for two Boilers.....inches	..	..	..	26	28	30	30	32	32	34	36	38	38	40	42	44	46
Minimum height of Stack for two Boilers.....feet	..	..	..	60	60	60	60	60	60	70	70	70	75	75	80	80	80
Area of Upper Grate....square feet	5.8	7.1	8.3	8.5	10.0	11.3	11.7	13.1	14.9	17.0	19.0	21.0	23.2	23.4	25.8	28.4	31.1
Square feet of heating surface for each square foot of grate.....	31	30	30	30	29	30	33	34	34	34	36	35	37	41	42	40	42
No. of 3-inch Tubes.....	29	29	29	38	38	38	48	48	48	..	..	..	..	..	..	..	..
No. of 4-inch Tubes.....	..	..	..	..	..	..	..	..	..	42	42	48	48	64	64	82	82
Length of Tubes.....inches	55	67	79	61	73	85	79	91	103	108	132	120	144	126	144	120	138

A. D. GRANGER CO.

Oswego Internally Fired Water-Tube Boilers

92 West Street.

NEW YORK, N. Y.

Products.

The Oswego Internally Fired Water-Tube Boilers, Low Pressure for Heating Systems, and High Pressure for Power Plants.

Also, Steel Smoke-Stacks, Plate Metal Work, Breechings and Steel Tanks.

Design.

The Oswego Boiler is self-contained and internally fired, with an inner and outer shell forming a complete water jacket surrounding the fire, absorbing the radiated heat and eliminating great losses through brick-work of brick-set types. The front and back water spaces, or headers, are connected by straight inclined tubes, and the gases pass across the bank of tubes three times before passing out through the flue. The tubes can be drawn forward into the firing space when being renewed, so that no additional room at the rear of the boiler is required for this purpose as in some types of internally fired boilers.

Space Required.

The Oswego Boiler occupies the smallest space per horse-power of any boiler built. It offers the solution of power plant installation in restricted space area, as it requires but one third of the floor space of the corresponding size Horizontal Return Tubular Boiler with brick setting. The rectangular shape of the smoke connection at the back of the boiler gives an ideal construction for simple layout.

Maximum Fuel Economy.

This is evidenced in the design. The furnace is entirely surrounded by water surface and the water tubes take the direct heat from the fire as well. The gases of combustion must pass across the bank of tubes three times in their course to the chimney or flue. Being absolutely self-contained and internally fired, it is impossible to waste heat, as through a brick-set boiler, and the highest obtainable efficiency is secured in commercial practice, even with units of comparatively small size.

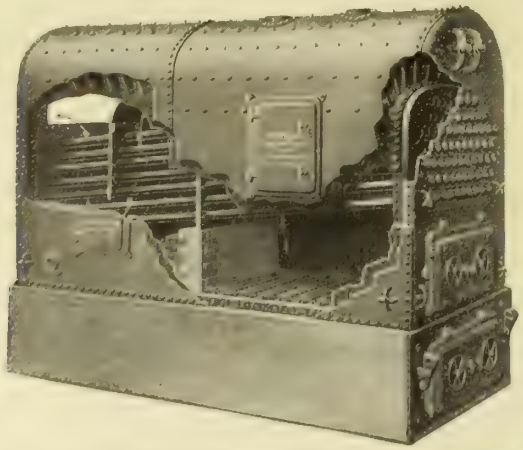
Installation.

The Oswego Boiler, as shipped, is placed in position on the base and covered with non-conducting insulation. It is very quickly and easily installed.

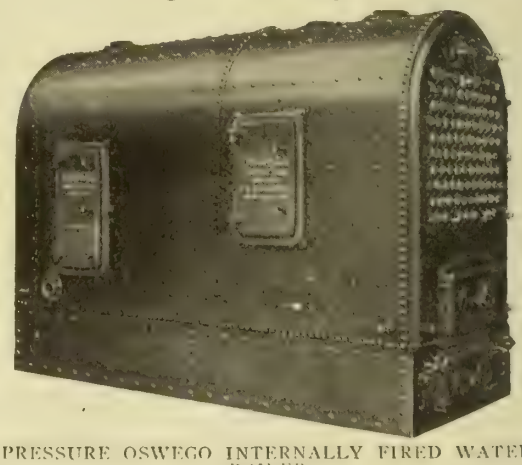
For use in public school buildings, apartment houses, office buildings, mill plants, etc., it has no superior, and has been widely indorsed by leading consulting engineers and architects.

Smokeless Furnace Boilers for Soft Coal.

The Oswego Boiler is also built with the genuine Hawley down-draft furnace system, complying with the smoke inspection ordinances of the Central States. This may be specified as the Moffat System in connection with the Oswego Boiler design.



HIGH PRESSURE OSWEGO INTERNALLY FIRED WATER-TUBE BOILER



LOW PRESSURE OSWEGO INTERNALLY FIRED WATER-TUBE BOILER

LOW PRESSURE OR STEAM-HEATING OSWEGO INTERNALLY FIRED WATER-TUBE BOILERS

Sizes up to 43 inclusive have steel bases, above 43 brick bases are used
Radiating surface subject to variation for factors of heating surface, fuel and draft

Number of Boiler	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Width	4'2"	4'2"	4'2"	4'2"	4'2"	4'2"	4'8"	4'8"	4'8"	4'8"	4'11"	4'11"	4'11"	5'9"	5'9"	6'11"	6'11"
Length	9'6"	9'10"	10'6"	11'0"	11'4"	11'4"	11'6"	11'6"	13'	13'	13'	13'	14'	14'	15'	15'	18'
Total height	6'11"	7'1"	7'2"	7'2"	7'2"	7'5"	7'8"	8'	8'	8'	8'11"	9'5"	9'5"	9'11"	10'6"	10'6"	10'6"
Height of base	1'5"	1'5"	1'6"	1'6"	1'6"	1'6"	1'8"	1'8"	1'8"	1'8"	1'8"	1'8"	1'8"	2'	2'	2'	2'
Height of water line	6'1"	6'3"	6'4"	6'4"	6'4"	6'7"	6'10"	7'1"	7'1"	7'2"	7'11"	8'3"	8'3"	8'7"	8'11"	8'11"	8'11"
Diameter of smoke flue	21"	22"	23"	23"	23"	25"	26"	28"	30"	30"	34"	34"	34"	37"	39"	40"	42"
Grate surface, square feet	16 8	17 6	18 8	19	19	20 7	25	25 5	28 5	28 5	31	31	31	37	40	48	57
Rating, square feet of heating surface	5500	6000	6500	7000	7540	8350	9000	10250	11000	12400	13500	14500	17000	20000	22500	25000	30000
Corresponding horse power	50	55	65	70	75	85	90	100	110	125	135	150	175	200	225	250	300

HIGH PRESSURE OSWEGO INTERNALLY FIRED WATER-TUBE BOILERS

Sizes up to 15 inclusive have steel bases, above 15 brick bases are used
Horse power ratings subject to variation in proportion to boiler heating surface

Catalogue Number	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Horse power	70	80	85	90	95	85	90	100	110	125	135	150	175	200	225	250	300
Width	4'2"	4'2"	4'2"	4'2"	4'2"	4'2"	4'8"	4'8"	4'8"	4'8"	4'11"	4'11"	4'11"	5'9"	5'9"	6'11"	6'11"
Length	9'6"	9'10"	10'6"	11'	11'4"	11'4"	11'6"	11'6"	13'	13'	13'	13'	14'	14'	15'	15'	18'
Total height	7'1"	7'6"	7'7"	7'7"	7'7"	7'11"	8'4"	8'7"	8'7"	8'8"	9'7"	9'11"	9'11"	10'4"	10'7"	10'9"	10'9"
Height of base	1'5"	1'5"	1'6"	1'6"	1'6"	1'6"	1'8"	1'8"	1'8"	1'8"	1'8"	1'8"	1'8"	2'	2'	2'	2'
Height of water line	6'1"	6'3"	6'4"	6'4"	6'4"	6'7"	6'10"	7'1"	7'1"	7'2"	7'11"	8'3"	8'3"	8'7"	8'11"	8'11"	8'11"
Diameter of smoke flue	21"	22"	23"	23"	23"	25"	26"	28"	30"	30"	34"	34"	34"	37"	39"	40"	42"
Grate surface, square feet	17	18	18	19	19	21	25	26	29	29	31	31	31	37	40	48	57

ABRAM COX STOVE COMPANY

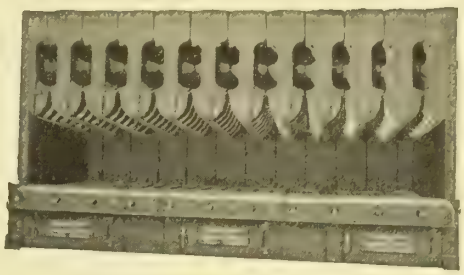
Manufacturers of Boilers, Heaters and Ranges

American and Dauphin Streets

PHILADELPHIA, PA.

Products.

"Novelty" Steam and Water Boilers, Tank Heaters, Laundry Stoves, All-Cast Warm Air Heaters, Steel Drum Warm Air Heaters, Coal Ranges, Combination Coal and Gas Ranges, Sectional Hotel Ranges, Double Oven Ranges, etc., made in a wide variety of sizes and styles, suitable for all kinds of fuel.



FLUE FRONT AND WATER-FRONT REMOVED, SHOWING DIRECT AND FLUE HEATING SURFACE OF NO. 40-12 "NOVELTY" BOILER

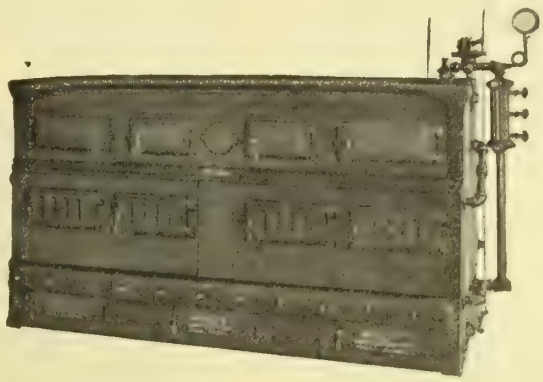
"Novelty" Steam and Water Boilers.

In the design of the "Novelty" boilers, both square and round types, the keynotes were simplicity of erection, economy of operation and durability.

In the square type the design of the sections makes practically a water-tube boiler. The free and unobstructed circulation of water reduces friction to a minimum. There are no unequal strains, and the steam boiler has a low, steady and reliable water line.

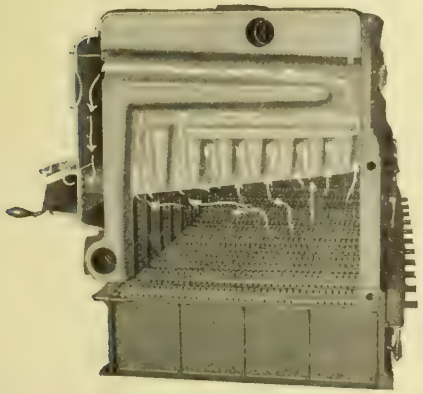
With "Novelty" arrangement of the flue surfaces, in both the round and square boilers, the combustion gases are so baffled in their course through the sections that a maximum number of heat units are extracted before they reach the smoke outlet.

The square boiler is made in four grate sizes, as to depth from front to back, and the number of sections vary from three to twelve. (See data at bottom of opposite column.)



NO. 40-12 "NOVELTY" STEAM BOILER

Guarantee—Under proper installation and management "Novelty" boilers are guaranteed to carry the ratings with which they are accredited. New castings will be furnished for any found defective in manufacture.



SIDE VIEW SHOWING INTERMEDIATE SECTION, COMBUSTION CHAMBER, ETC., OF NO. 40-12 "NOVELTY" FIRE-BOX

DATA, "NOVELTY" BOILERS WITH SQUARE FIRE-BOX

No.	Size of Grate, Ins.	Grate Area, Sq. Ft.	Base Dimensions (outside), Ins.		Boiler Dimensions (outside), Ins.		Supply Outlets, Ins.	Return Inlets, Ins.	Smoke Outlet, Ins.	Ratings, Sq. Ft.		List Price	
			Length	Width	Length	Width				Steam	Water	Steam	Water
20-3	20x 18½	2.57	34	22	47	26	1–3½	1–3½	8	550	900	$215.00	$200.00
20-4	20x 27⅝	3.83	34	32	47	36	2–3½	2–3½	10	825	1350	300.00	285.00
20-5	20x 36¾	5.11	34	42	47	46	2–3½	2–3½	12	1100	1800	385.00	370.00
20-6	20x 45⅞	6.38	34	52	47	56	3–3½	3–3½	14	1400	2300	470.00	455.00
25-3	25x 18½	3.21	39	22	52	26	1–3½	1–3½	8	700	1150	255.00	240.00
25-4	25x 27⅝	4.80	39	32	52	36	2–3½	2–3½	10	1075	1775	355.00	340.00
25-5	25x 36¾	6.38	39	42	52	46	2–3½	2–3½	12	1450	2400	455.00	440.00
25-6	25x 45⅞	7.96	39	52	52	56	3–3½	3–3½	14	1850	3100	555.00	540.00
25-7	25x 55	9.55	39	62	52	66	3–3½	3–3½	16	2250	3800	655.00	640.00
30-3	30x 18½	3.85	44	22	57	26	1–3½	1–3½	8	875	1450	320.00	300.00
30-4	30x 27⅝	5.76	44	32	57	36	2–3½	2–3½	10	1325	2200	435.00	415.00
30-5	30x 36¾	7.65	44	42	57	46	2–3½	2–3½	12	1775	3000	550.00	530.00
30-6	30x 45⅞	9.56	44	52	57	56	3–3½	3–3½	14	2250	3800	665.00	645.00
30-7	30x 55	11.45	44	62	57	66	3–3½	3–3½	16	2750	4600	780.00	760.00
30-8	30x 64⅛	13.36	44	72	57	76	4–3½	4–3½	18	3250	5400	895.00	875.00
40-3	40x 18½	5.14	49	22	62	26	1–4	1–4	8	1300	2150	410.00	390.00
40-4	40x 27⅝	7.68	49	32	62	36	2–4	2–4	10	2000	3300	580.00	560.00
40-5	40x 36¾	10.21	49	42	62	46	2–4	2–4	12	2700	4450	750.00	730.00
40-6	40x 45⅞	12.75	49	52	62	56	3–4	3–4	14	3400	5600	920.00	900.00
40-7	40x 55	15.28	49	62	62	66	3–4	3–4	16	4100	6750	1090.00	1070.00
40-8	40x 64⅛	17.81	49	72	62	76	4–4	4–4	18	5000	8200	1260.00	1240.00
40-9	40x 73¼	20.35	49	82	62	86	4–4	4–4	18	6000	9800	1430.00	1410.00
40-10	40x 82⅜	22.88	49	92	62	96	5–4	5–4	18	7000	11400	1600.00	1580.00
40-11	40x 91½	25.42	49	102	62	106	5–4	5–4	18	8000	13000	1770.00	1750.00
40-12	40x100¾	27.88	49	112	62	116	5–4	5–4	18	9000	14900	1940.00	1920.00

Height from floor to inlets, all sizes, 16 inches. Height from floor to outlets, all sizes, 59 inches
Height of water line, all sizes, 53 inches.

Continued on next page

"Novelty" Round Steam and Water Boilers.

The "Novelty" is the only *round* boiler in which the products of combustion are carried first to the back, then to the front through the right- and left-hand flues, and then back through the center flue to the smoke outlet. Thus the same fire travel is obtained as in the square boiler. All grates measure full size.

"NOVELTY" ROUND WATER BOILER

"NOVELTY" ROUND STEAM BOILER

"NOVELTY" ROUND BOILER WITH MAIN SECTION TILTED

"NOVELTY" ROUND BOILER WITH DOME SECTION TILTED

DATA, "NOVELTY" ROUND FIRE-BOX BOILERS

No.	Diam. of Grate, Ins.	Area, Sq. Ft.	Diam. of Ins.	Return Inlets, Ins.	Height from Floor to Inlet, Ins.	Height from Floor to Outlet, Ins.	Height of Water Line, Ins.	Smoke Outlet, Ins.	Ratings, Sq. Ft. Steam	Ratings, Sq. Ft. Water	List Price Steam	List Price Water
160	16	1.40	2-2	2-2	15	S-51 W-47	45	6	300	475	$125.00	$110.00
190	19	1.97	2-2½	2-2½	15	S-51 W-47	45	8	425	675	160.00	145.00
210	21	2.41	2-2½	2-2½	15	S-51 W-47	45	8	575	875	200.00	185.00
240	24	3.14	2-3	2-3	16	S-52 W-48	45	9	700	1150	260.00	245.00
270	27	3.98	2-3½	2-3½	16	S-52 W-48	45	9	1000	1400	330.00	315.00
300	30	4.91	2-4	2-4	16	S-52 W-48	45	10	1350	2000	410.00	395.00

"Novelty" Laundry Stove and Tank Heaters.

The "Novelty" line of tank heaters and laundry stoves contains more distinctive features than any similar appliances made. The fire-pots are deep, and, in the No. 10 tank heater and laundry stove, are lined with brick, thus insuring perfect combustion. This feature guarantees high efficiency with low fuel consumption. The fire travel is better and there is more heating surface. The ash-pit is extra deep and the feed-door large. The fire can be controlled perfectly by means of balanced draft and check doors.

By means of these appliances ample hot water can be had at all times at a cost of a few cents a day.

The laundry stove will also heat eight irons on the side, and has a top which will take care of a large wash boiler. Being installed in the cellar, it will not add heat to the kitchen in summer, and will keep the basement always dry.

NO. 120 "NOVELTY" LAUNDRY STOVE

NO. 12 "NOVELTY" TANK HEATER

NO. 10 "NOVELTY" TANK HEATER

DATA, "NOVELTY" LAUNDRY STOVE AND TANK HEATERS

	No. 120 Laundry Stove	No. 12 Tank Heater	No. 10 Tank Heater
Diameter fire-pot, ins	12	12	10
Diameter smoke outlet, ins.	6	6	5
Height, floor to smoke outlet, ins.	33	32	32
Tappings, ins.	1¼ x 1¼	One 2-inch Two 2-inch	1¼ x 1¼
Tank capacity, gals.	40 to 80	200	30 to 60
Square feet direct water radiation	....	250	....
Shipping weight, lbs.	225	250	200
Height, floor to flow outlet, ins.	19½	32	28
Height, floor to center of return, ins.	17½	11½	19
Deduct from height when set without legs, ins.	6	2	6
List price	$40.00	$66.00	$36.00

"Novelty" Warm Air Heaters.

The "Novelty" line of warm air heaters embraces a wide variety of styles and sizes. They are all well proportioned as to grate and heating surfaces, making them most economical in operation.

The "Novelty" all-cast, "Novelty" steel drum and "Marvel Novelty" are equipped with straight fire-pots, which materially increase their coal carrying capacity, and prevent the ashes from clinging to the sides, as they invariably do with a sloping fire-pot. They are also equipped with triplex grates, the bars of which extend clear to the edge of the fire-pot, making all parts of the grate surface movable, so that it can be readily and perfectly cleaned with the shaker, the use of a poker not being necessary as with most heaters.

These heaters have all doors carefully ground and fitted, and can be easily regulated with the check draft in the rear. They are also provided with deep cup joints throughout, making them absolutely proof against dust and gas.

The "Novelty B" all-cast, "Novelty A," "Splendid Novelty" and "City Palace" steel drum heaters complete the line, so that there is a "Novelty" suitable for every type of building.

Continued on next page

"Novelty" Formula for Measuring Building for Warm Air Heating.

Find the cubic feet of space in room by multiplying the length by the width, and then multiplying this product by the height.

To the actual cubic feet of space in room add 75 cubic feet for each square foot of exposed glass surface, and 8 cubic feet for each square foot of exposed wall surface. For either a northern or western exposure add ten per cent to glass surface and ten per cent to wall surface in making the computation. For either a southern or eastern exposure deduct ten per cent from the exposed glass surface and ten per cent from the exposed wall surface. Count outside doors the same as glass surface; but where double doors or storm doors are provided, count such doors as exposed wall surface.

Add together the figures for all the rooms to be heated, and the total will be the equivalent cubic feet of space to be provided for by the furnace. Where this total does not agree with the exact capacity rating of any size of "Novelty" furnace, select the next larger size. For example, to heat a residence having 70,000 equivalent cubic feet of space, the No. 48-26 "Novelty" furnace would be installed (capacity 80,000), and not the No. 44-25 "Novelty" (capacity 66,000).

If the hall extends to upper floors, and no register is placed above the first floor, count in all the space on upper floor as well as on first floor in computing for the hall.

The foregoing computation is based on maintaining a temperature of seventy degrees above zero in the building when the outside temperature is zero.

DATA, "NOVELTY" ALL-CAST WARM AIR HEATER

No.	Capacity in "Equivalent Cubic Feet" on basis of maintaining temperature of 70 degrees above zero in building when outside temperature is zero	Height of Heater Cased complete, Ins.	Diam. of Fire-pot at Grate, Ins.	Diam. of Casings, Ins.	Height to Top of Radiator, Ins.	Diam. of Smoke-pipe, Ins.	Size of Cold-air Duct Required, Ins.	Weight of Heater, less Casings, Lbs.
20-36	42,000	59	20	36	46	8	12x20	666
22-40	52,000	61	22	40	48	8	12x26	825
24-44	63,000	64	24	44	50½	9	12x30	956
26-48	75,000	67	26	48	52½	9	14x30	1105
30-56	106,000	72	29	56	56	9	14x38	1550

DATA, "MARVEL NOVELTY" STEEL DRUM WARM AIR HEATER

No.	Capacity in "Equivalent Cubic Feet" on basis of maintaining temperature of 70 degrees above zero in building when outside temperature is zero	Height of Heater Cased complete, Ins.	Diam. of Fire-pot at Grate, Ins.	Diam. of Casings, Ins.	Height to Top of Drums, Ins.	Diam. of Smoke-pipe, Ins.
32-18	36,000	58	18	32	45	7
36-20	42,000	59½	20	36	46½	8
40-22	49,000	61	22	40	48	8
44-24	59,000	63	24	44	49½	9
48-26	70,000	66	26	48	51½	9
56-30	95,000	68	30	56	53½	9

"Yearound Novelty" Ranges.

The "Yearound Novelty" range embodies in a most compact form all the facilities of a complete coal range for winter use, as well as a cabinet gas range and gas water heater for summer use, and the cost does not exceed that of the same articles if purchased separately.

It is made in one size only, with coal oven either to the right or left of fire-box, and has a number of exclusive features.

All gas parts of this range are standard according to the most rigid requirements of the largest gas companies. The gas water heater is the double copper coil type encased in two jackets.

The regular equipment includes gun-metal polished top, velvet black finish on the body, aluminized ovens, white enameled burner and broiler pans, porcelain gas valve handles, thermometers in both oven doors, and illuminating gas fixture. Duplex grate, spacious ash-pan, low closet with drop door. Requires no blacking.

"NOVELTY" STEEL DRUM WARM AIR HEATER

"NOVELTY" ALL-CAST WARM AIR HEATER

"MARVEL NOVELTY" STEEL DRUM WARM AIR HEATER

Note—In specifying size of the furnaces the above formula will be found to serve the useful purpose of not only providing sufficient heat for the building, but of securing estimates on a comparative and equitable basis.

DATA, NOVELTY" STEEL DRUM WARM AIR HEATER

No.	Capacity in "Equivalent Cubic Feet" on basis of maintaining temperature of 70 degrees above zero in building when outside temperature is zero	Height of Heater Cased complete, Ins.	Diam. of Fire-pot at Grate, Ins.	Diam. of Casings, Ins.	Height to Top of Drum, Ins.	Diam. of Smoke-pipe, Ins.
36-20 F	43,000	60	20	36	48	8
40-22 F	54,000	63	22	40	51	8
44-24 F	66,000	66	24	44	54	9
48-26 F	80,000	69	26	48	57	9
56-30 F	110,000	71	30	56	59	9

Without horizontal boiler but with gas water heater

Complete for coal and gas

"YEAROUND NOVELTY" RANGE

Continued on next page

DATA, "YEAROUND NOVELTY" RANGE

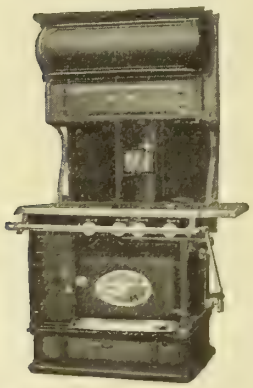
18-in. coal baking oven.
18-in. gas baking oven.
16-in. gas broiling oven.
Four 8-in. cooking holes for coal.
5-burner gas cooking top.
2-burner gas baking oven.
Pilot lighter for gas oven.
3-line burner in gas broiling oven.
Ash-chute opening, 7 ins. in diameter, with center of opening 9½ ins. from front, and 7 ins. from side.
Height of main cooking top, 31½ ins.
Height to top of gas ovens, 67½ ins.
Height over all, including boiler, 79 ins.
Capacity of horizontal boiler, 26 gals.
Coal cooking top, 25½ x 20 ins.
Gas cooking top, 25½ x 21 ins.
Length of cooking top, less gas water heater, 41 ins.
Length over all, including gas water heater, 49 ins.
Clearance between cooking top and bottom of gas ovens, 16 ins.

"Junior Yearound Novelty" Range.

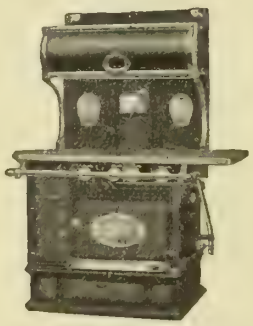
The "Junior Yearound Novelty" range is of the same general construction as the "Yearound Novelty" range, but smaller and somewhat lower in price. Can be furnished in the same forms.

"Duplex Novelty" Range.

The "Duplex Novelty" is a combination gas and coal range, equipped with only one oven which operates perfectly either with coal or gas, or both.



With boiler closet for 10-inch or 12-inch boiler



With No. 5 high closet and "Novelty" draft check

"DUPLEX NOVELTY" RANGE

DATA, "DUPLEX NOVELTY" RANGE

18-in. combination coal and gas oven.
Four 8-in. cooking holes for coal.
3-burner gas cooking top.
Height of main cooking top, 32½ ins.
Height, including high closet, 62½ ins.
Height, including boiler closet, 67 ins.
Coal cooking top, 19½ x 25 ins.
Gas cooking top, 15 x 25 ins.
Length of cooking top, less gas water heater, 34½ ins.
Length over all, including gas water heater, 42¾ ins.
Floor contact space, 18 x 30½ ins.

"Suburban Novelty" Range.

We have termed the "Suburban Novelty" the "heavy-duty range."

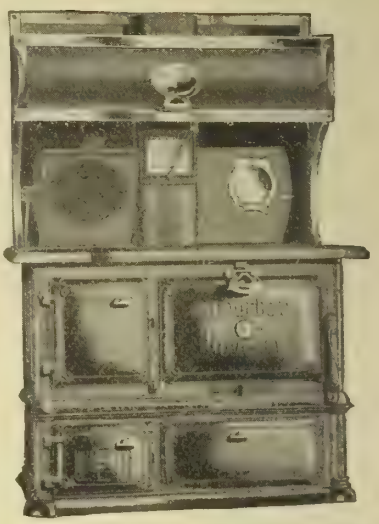
Hot water for bathing and for other domestic purposes is demanded in constantly increasing quantities in the modern household. Even the very best kitchen ranges of the ordinary types are deficient in power to meet the modern demand for hot water and for cooking and roasting at the same time.

The fire-box of the "Suburban Novelty" is more than twice as large as that of the very best kitchen ranges of the regular types. It has ample power to supply hot water for five bathrooms and to meet all cooking requirements at one and the same time.

Three types of water fronts can be furnished; and as the water heating capacity of the "Suburban Novelty" is so great, a circulating boiler of less than 60 gallons capacity should not be used even with the smallest style.

The patent lift-up ratchet slip plate on the "Suburban Novelty" is a new feature. It is easy to operate and most convenient for broiling.

The grate is the three-bar type, operated by a heavy shaker which attaches to a shank on the middle bar. Deep, spacious ash-pan furnished with every range.



"SUBURBAN NOVELTY" RANGE
With high closet

DATA, "SUBURBAN NOVELTY" RANGE

Fire-box, 14 x 12 x 8½ ins.
Oven, 20 x 20 x 12½ ins.
Gas baking oven, 18 x 17 x 10 ins.
Gas broiling oven, 18 x 12 x 10 ins.
Height of range to main top, 32 ins.
Extreme height, including high closet, 63½ ins.
Extreme height, including gas closet, 67 ins.
Extreme height, including high shelf, 54 ins.
Size of top, 45 x 27 ins.
Width of gas end shelf over all, 15 ins.
Diameter of smoke collar, 7 ins.

"Novelty Kitchener" Range.

The "Novelty Kitchener" (800 Series) is plain and dignified, yet rich and beautiful in appearance; and is the range for strength, service and endurance.

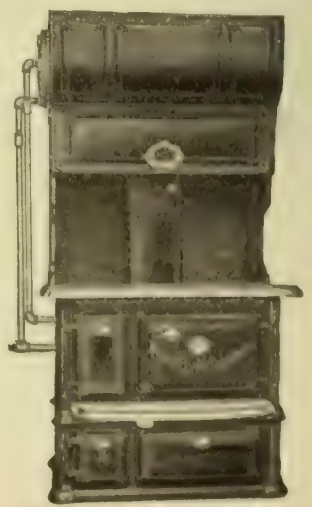
A heavy, durable construction in two parts, body and base. Has a large fire-box with improved duplex grate which, with properly constructed flues and oven, insures perfect results and economy of fuel. Made with either right- or left-hand oven.

A water-front of large capacity, constructed to supply an abundance of hot water, always furnished unless otherwise specified.

This popular line is furnished with swing oven door as well as drop oven door. The swing door type carries a nickel oven shelf that extends the full width of the range, adding greatly to its appearance.

A spacious ash-pan furnished with every range.

"NOVELTY KITCHENER" A
800 Series, with No. 5 high closet



"NOVELTY KITCHENER" D
800 Series, with boiler closet for 12- or 14-inch boiler

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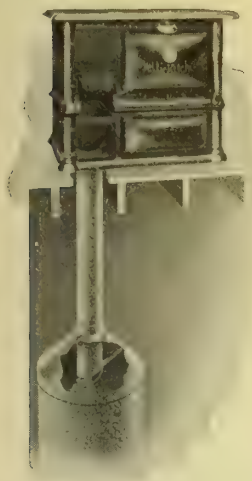
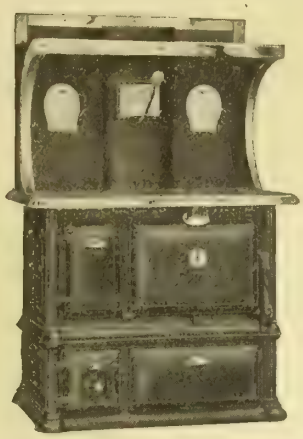


"NOVELTY KITCHENER" A, WITH ASH-CHUTE DAMPER AND ASH CAN

Entire equipment absolutely dust-proof. Ash can has sliding cover



"NOVELTY KITCHENER" A 800 Series, with No. 119 high shelf

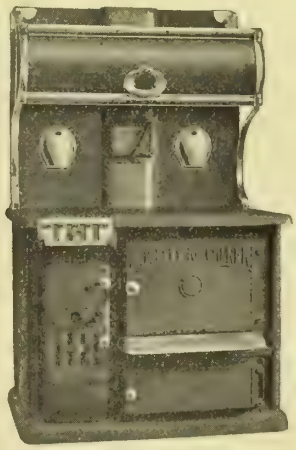
DATA, "NOVELTY KITCHENER" RANGES, 800 SERIES

	818A	820A	920A
Size of oven, ins.	18 x 18	20 x 20	20 x 20
Measurement of top, ins.	39 x 27	41½ x 28	41½ x 28
Size of smoke-pipe, ins.	7	7	7
All ranges have 6 covers. Size, ins.	8	8	9

Style	Description	Total Height, Ins.
M	Body of range only	32
N	With splash plate	38
O	With No. 119 high shelf	54
P	With No. 5 high closet	63½
Q	With boiler closet for 12- or 14-inch boiler	73½
R	With elevated gas oven	68
S	With elevated gas oven, boiler shield and 12-inch boiler	77

WITH ASH-CHUTE, DAMPER AND ASH CAN

With boiler closet for 10- and 12-inch boiler. Also made with rack for boiler



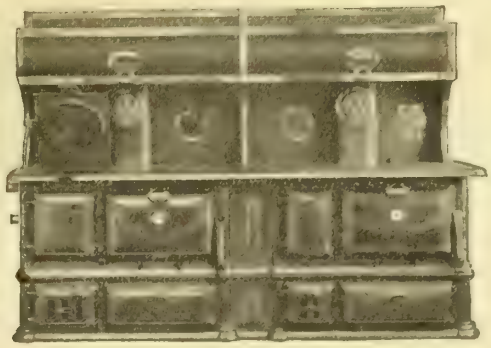
"NOVELTY KITCHENER" RANGE, 100 SERIES

With No. 5 high closet

DATA, "NOVELTY KITCHENER" RANGES, 100 SERIES

	No. 147	No. 148
Size of ovens, ins.	16 x 16	18 x 18
Measurement of top, ins.	24 x 33	26 x 36
Size of smoke-pipe, ins.	6½	6½
Size of hot air pipe, ins.	5	5
All ranges have six covers. Size, ins.	7	8

Style	Description	Height, Ins.
A	Body of range only	29
B	With splash plate	34
C	With steel high shelf	50
E	With No. 5 high closet, including smoke-pipe and check	61
G	With boiler rack for 10- or 12-inch boiler	55½
H	With boiler closet for 10- or 12-inch boiler	66
J	With elevated gas oven and gas end shelf	66
K	With elevated gas oven and gas end shelf and boiler bracket	75



"NOVELTY KITCHENER" HOTEL RANGE

An ideal kitchen appliance for hotels, large boarding houses, schools, restaurants and institutions. Furnishes hot water at all times for every kitchen use and for four or five bathrooms. Has base doors with low warming closets; can be supplied with ash-chute when specified. Three-way water-front always furnished in one section. Made with either right- or left-hand ovens, has triplex and duplex grates

Height to cooking top, 32 ins.
Height over all, 63½ ins.
Size of cooking top, as shown in illustration, 90 x 27 ins.
Two 20-in. ovens.
Six 9-in. covers.
Four 8-in. covers.
French slip plate, with quadruple reducing ring cover over fire.

Double Oven Ranges.

The "Regal Novelty" has the largest cooking top; while the "French Novelty" and "Home Novelty" are the same size, the only difference between the latter two being in the construction of the top. The "French Novelty" is equipped with a lift-up slip plate over the fire for broiling purposes, and has an opening 14 inches square, sufficiently large to carry any kind of broiling device.

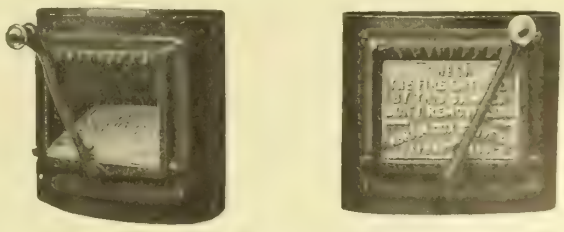
"FRENCH NOVELTY" RANGE

Double oven ranges are equipped with heavy two-bar grates and with extra efficient water-fronts.

DATA, DOUBLE OVEN RANGES

	"Regal"	"French"	"Home"
Size of ovens, ins.	18 x 20	14 x 20	14 x 20
Size of top, ins.	60 x 27½	50 x 28	50 x 28
Top Construction	Ten 8-in. covers	*Three slip plates	Eight 8-in. covers
Size of smoke-pipe, ins.	7½	6	6
Height of range and cooking top, ins.	27	32	32
Height including plate rack, ins.	49	48	48
Height including high closet, ins.		61½	61½

*Three slip plates with 8 x 12-inch reducing covers.



"NOVELTY" DRAFT CHECK

Fills the two-fold purpose of a check-draft and smoke-pipe damper. Is opened and closed by merely pushing the lever from one side to the other. Fire can be completely checked without removing lids. Furnished with all "Novelty" Ranges ordered with smoke-pipe to top of closet or shelf

FEDERAL RADIATOR COMPANY

FORMERLY THE NOVELTY IRON COMPANY, CANTON, OHIO

Steam and Hot-Water Boilers

MAIN OFFICES
NEW CASTLE, PA.

BRANCHES
BROOKLYN, N. Y. PITTSBURGH, PA. CANTON, OHIO

Products.

NICO SECTIONAL STEAM and HOT-WATER BOILERS; RIVAL and NICO ROUND STEAM and WATER BOILERS.

Also, TANK HEATERS and LAUNDRY STOVES; RADIATORS and HEATING SUPPLIES.

Nico Sectional Steam and Hot-Water Boilers.

These boilers are made in sections, in many sizes, and are adapted for either hard or soft coal. The details of design and manufacture are such as will assure efficiency in operation and economy in consumption of fuel, thus satisfying all requirements of most particular architects and engineers. See illustrations.

Radiation.

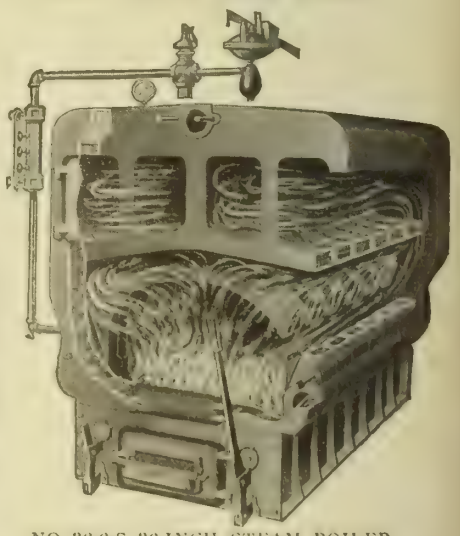
Size of boiler to be selected depends upon the full amount of direct radiation estimated for heating the building properly. All piping, mains, risers, flows and returns shall be figured as radiating surface in addition to the ordinary direct radiation to be used in each case. When indirect radiation is to be used a boiler of not less than seventy-five per cent additional capacity should be installed.

Ratings.

Ratings are based on two pounds' pressure at boiler for steam, and a temperature of 180 degrees at boiler for hot water, hard coal being used as fuel; and, for soft coal, a boiler one size larger should be selected.

Heating water for domestic purposes by pipe coil requires additional boiler capacity.

NO. 48-6-S 48-INCH STEAM BOILER



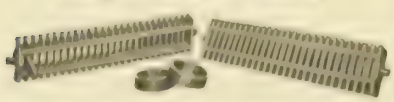
NO. 36-6-S 36-INCH STEAM BOILER

NO. 6-31-W 31-INCH WATER BOILER

DIMENSIONS, RATINGS AND PRICES STEAM AND HOT-WATER BOILERS

No. of Boiler	Number of Sections	Length of Boiler, Inches	Grate Area, Square Feet	Average Fire-pot, Square Feet	Size Foundation, Inches	No. and Size of Outlets, Ins.	Rating,	Price-List Complete
48- 6-S	6	64½	18.23	22.50	54 x 59½	2-6	5275	$1395 00
48- 7-S	7	75	21.78	26.87	54 x 70	2-6	6300	1600.00
48- 8-S	8	85½	25.33	31.25	54 x 80½	3-6	7325	1805.00
48- 9-S	9	96	28.87	35.62	54 x 91	3-6	8350	2010 00
48-10-S	10	106½	32.48	40.00	54 x101½	3-6	9375	2215 00
48 11-S	11	117	37.97	44.38	54 x112	3-6	10400	2420.00
6-48-W	6	64½	18.23	22.50	54 x 59½	2-6	8700	1375.00
7-48-W	7	75	21.78	26.87	54 x 70	2-6	10375	1580 00
8-48-W	8	85½	25 33	31.25	54 x 80½	3-6	12050	1785 00
9-48 W	9	96	28 87	35.62	54 x 91	3-6	13725	1990 00
10-48-W	10	106½	32.48	40.00	54 x101½	3-6	15400	2195 00
11-48-W	11	117	37.97	44.38	54 x112	3-6	17075	2400 00
36-5-S	5	43½	9.38	11.77	41½x 39	2-5	2125	732 00
36-6-S	6	52	11 50	14.69	41½x 47½	2 5	2675	848 00
36-7-S	7	60½	13 75	17.61	41½x 56	3-5	3225	964 00
36-8-S	8	69	16 00	20.54	41½x 64½	3-5	3750	1080 00
36-9-S	9	77½	18.25	23.46	41½x 73	4 5	4275	1196 00
5 36 W	5	43½	9.38	11.77	41½x 39	2-5	3500	712 00
6 36 W	6	52	11.50	14.69	41½x 47½	2-5	4400	828 00
7 36 W	7	60½	13 75	17.61	41½x 56	3-5	5300	944 00
8-36 W	8	69	16 00	20.54	41½x 64½	3-5	6200	1060 00
9-36-W	9	77½	18.25	23.46	41½x 73	4-5	7100	1176.00
31-6-S	6	47½	8.55	12.62	35 x 43	2-5	1975	685 00
31-7-S	7	55	10 24	15 12	35 x 50½	3-5	2325	785 00
31-8-S	8	62½	11 93	17.62	35 x 58	3-5	2675	885 00
31-9-S	9	70	13.62	20.11	35 x 65½	3 5	3025	985 00
6 31 W	6	47½	8.55	12.62	35 x 43	2-5	3250	670 00
7 31 W	7	55	10.24	15.12	35 x 50½	3 5	3825	770 00
8-31-W	8	62½	11.93	17.62	35 x 58	3-5	4400	870 00
9 31 W	9	70	13.62	20.11	35 x 65½	3-5	4975	970 00
25-5-S	5	33	4 75	6 13	28 x 33	2-4	1100	430 00
25-6-S	6	40	5 91	7 64	28 x 40	2-4	1350	505 00
25-7-S	7	47	7 08	9 15	28 x 47	3-4	1600	580 00
25-8-S	8	54	8.25	10.65	28 x 54	3-4	1850	655 00
5 25 W	5	33	4 75	6.13	28 x 33	2 4	1825	420 00
6 25 W	6	40	5 91	7 64	28 x 40	2-4	2225	495 00
7 25 W	7	47	7 08	9 15	28 x 47	3 4	2650	570 00
8 25 W	8	54	8.25	10.65	28 x 54	3-4	3050	645 00

NICO 36-INCH INTERMEDIATE SECTION, SHOWING FIRE AREA
Easily accessible for cleaning



TYPE OF GRATE BAR USED IN NICO SECTIONAL BOILERS

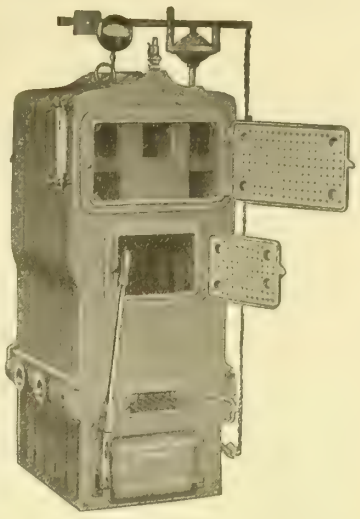
Continued on next page

NICO 20- AND 18-INCH SECTIONAL BOILERS

No. of Boiler	Grate Area, Square Feet	Size Foundation, Inches	No. of Flow and Return, Inches	Height to Top of Outlet, Inches	Smoke Pipe, Inches	Rating	List Price
STEAM SERIES							
18–4–S	1.63	20½x16¾	1–2½	57½	9	375	$195.00
18–5–S	2.14	20½x21	2–2½	57½	9	500	235.00
18–6–S	2.65	20½x25¼	2–2½	57½	9	625	275.00
18–7–S	3.16	20½x29½	3–2½	57½	9	750	315.00
20–5–S	3.24	28 x28¾	2–3	54	10	650	290.00
20–6–S	4.02	28 x34½	2–3	54	10	800	340.00
20–7–S	4.80	28 x40¼	3–3	54	10	950	390.00
WATER SERIES							
4–18–W	1.63	20½x16¾	1–2½	57½	9	625	$185.00
5–18–W	2.14	20½x21	2–2½	57½	9	825	225.00
6–18–W	2.65	20½x25¼	2–2½	57½	9	1025	265.00
7–18–W	3.16	20½x29½	3–2½	57½	9	1225	305.00
5–20–W	3.24	28 x28¾	2–3	54	10	1100	280.00
6–20–W	4.02	28 x34½	2–3	54	10	1350	330.00
7–20–W	4.80	28 x40¼	2–3	54	10	1600	380.00

The Boilers listed above are especially adapted for medium size residences. Note the deep fire-pot and large water-ways

NO. 3-22-W NICO WATER BOILER



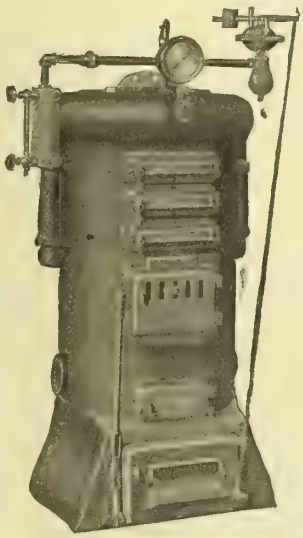
NO. 18-6-S NICO STEAM BOILER

NICO WATER BOILER SERIES

No. of Boiler	Height to Top of Outlets, Inches	Outside Diameter of Base, Inches	Nominal Diameter of Fire-pot, Inches	No. and Size of Outlets, Inches	Size of Smoke Pipe, Inches	Ratings	Price Complete
2–17–W	44⅝	24	17	2–2½	7	450	$131.50
3–17–W	49⅛	24	17	2–2½	7	500	140.50
4–17–W	53⅝	24	17	2–2½	7	550	153.50
2–19–W	45⅝	26	19	2–2½	8	575	158.00
3–19–W	50⅛	26	19	2–2½	8	650	184.50
4–19–W	54⅝	26	19	2–2½	8	725	195.00
2–22–W	46¼	29	22	2–3	9	750	197.00
3–22–W	50¾	29	22	2–3	9	875	217.50
4–22–W	55¼	29	22	2–3	9	975	235.00
2–25–W	48½	32	25	2–4	10	975	240.00
3–25–W	52¼	32	25	2–4	10	1125	275.00
4–25–W	56	32	25	2–4	10	1250	310.00

RIVAL WATER BOILER SERIES

No. of Boiler	No. of Sections	Height to Top of Outlet, Inches	Diameter of Boiler, Inches	Diameter of Grate, Inches	No. and Size of Outlets, Inches	No. and Size of Inlets, Inches	Size of Smoke Pipe, Inches	Ratings	Price Complete
192	2	46	30½	19	2–3	2–3	9	575	$158.00
193	3	51	30½	19	2–3	2–3	9	650	184.50
194	4	56	30½	19	2–3	2–3	9	725	195.00
222	2	48¼	35	22	2–3	2–3	9	750	197.00
223	3	53¼	35	22	2–3	2–3	9	875	217.50
224	4	58¼	35	22	2–3	2–3	9	975	235.00
252	2	50	38	25	2–4	2–4	10	975	240.00
253	3	55	38	25	2–4	2–4	10	1125	275.00
254	4	60	38	25	2–4	2–4	10	1250	310.00
282	2	52¾	41	28	2–5	2–5	12	1350	325.00
283	3	58	41	28	2–5	2–5	12	1500	355.00
284	4	63¼	41	28	2–5	2–5	12	1650	380.00
312	2	53¼	44	31	2–5	2–5	12	1900	425.00
313	3	58⅜	44	31	2–5	2–5	12	2100	457.50
314	4	63½	44	31	2–5	2–5	12	2325	495.00
342	2	54	48½	34	2–6	2–6	12	2400	505.00
343	3	59½	48½	34	2–6	2–6	12	2575	535.00
344	4	65	48½	34	2–6	2–6	12	2725	565.00



RIVAL STEAM BOILER

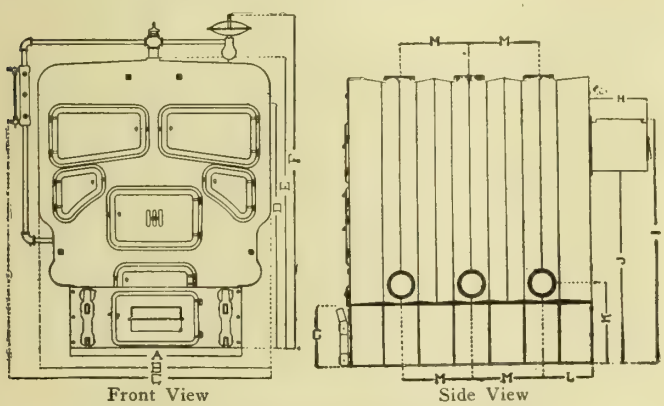
Designed for long firing periods. Fire-pot cast solid, with overhanging radial arms; corrugated inner walls

NICO STEAM BOILER SERIES

No. of Boiler	Height to Top of Outlets, Inches	Height of Water Line, Inches	Outside Diameter of Base, Inches	Nominal Diameter of Fire-pot, Inches	No. and Size of Outlets, Inches	No. and Size of Inlets, Inches	Size of Smoke Pipe, Inches	Ratings	Price Complete
2–17–S	46⅝	42⅝	24	17	1–3	2–2½	7	275	$141.50
3–17–S	51⅛	47⅛	24	17	1–3	2–2½	7	300	150.50
4–17–S	55⅝	51⅝	24	17	1–3	2–2½	7	325	163.50
2–19–S	48⅛	43⅝	26	19	1–3	2–2½	8	350	168.00
3–19–S	52⅝	48⅛	26	19	1–3	2–2½	8	400	194.50
4–19–S	57⅛	52⅝	26	19	1–3	2–2½	8	450	205.00
2–22–S	49⅝	44⅝	29	22	1–3½	2–3	9	450	207.00
3–22–S	54⅛	49⅛	29	22	1–3½	2–3	9	525	227.50
4–22–S	58⅝	53⅝	29	22	1–3½	2–3	9	575	245.00
2–25–S	51½	44⅞	32	25	1–4	2–4	10	600	252.50
3–25–S	56¼	49⅝	32	25	1–4	2–4	10	700	287.50
4–25–S	61	54⅜	32	25	1–4	2–4	10	775	322.50

RIVAL STEAM BOILER SERIES

No. of Boiler	No. of Sections	Height to Top of Outlet, Inches	Height of Water Line, Inches	Diameter of Boiler, Inches	Diameter of Grate, Inches	Two Outlets, Size, Inches	Two Inlets, Size, Inches	Size of Smoke Pipe, Inches	Ratings	Price Complete
1920	2	51½	44½	30½	19	3	3	9	350	$168.00
1930	3	56½	49½	30½	19	3	3	9	400	194.50
1940	4	61½	54½	30½	19	3	3	9	450	205.00
2220	2	55	47	35	22	3	3	9	450	207.00
2230	3	60	52	35	22	3	3	9	525	227.50
2240	4	65	57	35	22	3	3	9	575	245.00
2520	2	58	50	38	25	4	4	10	600	252.50
2530	3	63	55	38	25	4	4	10	700	287.50
2540	4	68	60	38	25	4	4	10	775	322.50
2820	2	60½	51½	41	28	4	5	12	850	340.00
2830	3	65¾	56¾	41	28	4	5	12	950	370.00
2840	4	71	62	41	28	4	5	12	1050	395.00
3120	2	61¼	53¼	44	31	4	5	12	1150	440.00
3130	3	66⅜	58⅜	44	31	4	5	12	1300	472.50
3140	4	71½	63½	44	31	4	5	12	1400	510.00
3420	2	62	54	48½	34	4	6	12	1450	520.00
3430	3	67½	59½	48½	34	4	6	12	1550	550.00
3440	4	73	65	48½	34	4	6	12	1650	580.00



NICO SECTIONAL BOILER MEASUREMENTS

DETAILS OF MEASUREMENTS APPLYING TO BOTH STEAM AND WATER BOILERS

Table of distances between points as noted upon the outline drawings of Sectional Boilers, shown opposite, appears below. These measurements are all given in inches.

	18-in. Boilers	20-in. Boilers	25-in. Boilers	31-in. Boilers	36-in. Boilers	48-in. Boilers
A	20½	22½	27¾	34	41½	54
B	23½	28	36½	50	56	67
C	29½	37½	44	58¼	65	76
D	48	47	49	52	60¾	68
E	57½	54	57¼	61	70	80
F	68	65¾	74½	76½	90½	101½
G	12	12½	12⅞	12⅞	15	15
H	8	14	14	14	14	20
I	52	48½	49¼	53	58¾	67¾
J	45½	41	36	41½	46¾	50¼
K	14⅜	14½	16⅜	17	18⅜	....
L	6¼	8	9⅜	10⅝	11½	15
M	8½	11¾	14	14¼	17	21
Size of Fire-door	8 x 11½	8½ x 13	10 x 15⅞	11 x 18	13 x 20	10½ x 17

HERBERT BOILER COMPANY

MAIN OFFICE AND FACTORY
Root and La Salle Streets
CHICAGO, ILL.

Products.

HERBERT PATENT SMOKE-CONSUMING BOILERS; HERBERT DOWNDRAFT DETACHABLE FIREBOX BOILER; HERBERT DOWNDRAFT DETACHABLE FIREBOX for Tubular Boilers; "CHICAGO" DOWNDRAFT SMOKELESS BOILER; HERBERT MAGAZINE-FEED SMOKELESS BOILER; HERBERT DETACHABLE FIREBOX BOILER; STANDARD RETURN HORIZONTAL TUBULAR BOILERS; HERBERT BASE-BURNING MAGAZINE and DROP TUBE BOILERS; HERBERT ALL-STEEL JUNIOR BOILERS.

HERBERT GARBAGE BURNING WATER HEATER, HERBERT JUNIOR MAGAZINE HEATER, HERBERT JUNIOR SOLID HEATER for Tank Heating.

Also, TANKS, STEAM COILS, etc.

Herbert Downdraft Detachable Firebox Boiler.

Principle—Air is admitted above burning fuel-bed, supported on water tubes; the natural stack draft forces it down through strata of fuel, where it mixes with the released carbons and is expelled through coking bed of coals over an incandescent fire. This lower fire, on a cast-iron shaking grate, is fed by live coals which fall through tubes of upper grate causing thorough ignition of gases. The heated gases expand in a commodious combustion chamber before entry to tubes, and highest possible energy in coal burned is obtained.

Advantages—Two thirds of outside surface of the boiler is exposed to direct action of heated gases, resulting in efficient heating surface. Return of gases through clean tubes and thorough combustion mean smallest possible percentage of soot deposited. Its perfect circulation induces quick steaming, and absence of countercurrents prevents priming. All parts easily cleaned. Flues cleaned from front. Boiler may be set in any position regardless of chimney location. Standard materials only used in construction.

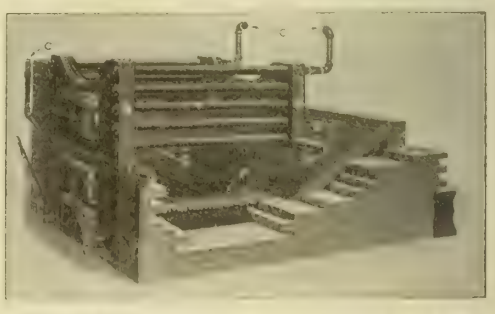
HERBERT DOWNDRAFT DETACHABLE FIREBOX BOILER

Herbert Downdraft Detachable Firebox for Tubular Boilers.

By the addition of this smoke-consuming furnace any standard horizontal tubular boiler will comply with the most rigid smoke ordinance existing; also increase its capacity fifteen to twenty-five per cent. Attachment is quickly and easily made. All necessary fittings furnished. Also built specially for all types of water tube boilers.

"Chicago" Downdraft Smokeless Boiler.

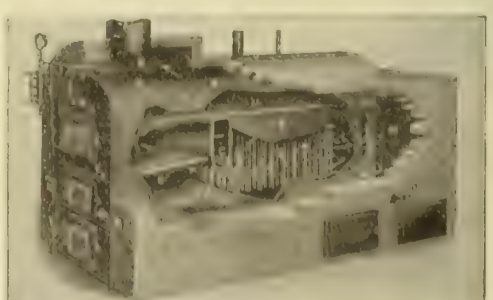
Designed for buildings with shallow basements; especially recommended for use with vapor-heating systems. It has no flues to clean; has low water line; burns 90 per cent of smoke; heating surface exposed to direct action of fire; drop tubes cause perfect circulation. Requires less space than any other boiler built. Catalogues and blue-prints sent on application.



VIEW OF DOWNDRAFT DETACHABLE FIREBOX
Showing lower cast iron front, shaking grate and bridge wall

DESCRIPTIVE PRICE-LIST, DOWNDRAFT DETACHABLE FIREBOX BOILER

Number	Diameter, Inches	Length, Feet	Height to Top of Boiler, Inches	Size of Firebox, Inches	Size of Flues, Inches	Number of Flues	Tapping	Rating, Steam, Square Feet	Rating, Water, Square Feet	Size of Smoke Pipe, Inches	Height to Water Line, Inches	Total Width of Brick Work, Ft., Ins.	Total Length of Brick Work, Ft., Ins.	Shipping Weight, Lbs.	Price, Complete
D [illegible]	[illegible]	6	72	[illegible]	[illegible]	20	4—2½	1400	2200	18	66	4-4	8-0	4000	$394 00
D 6	30	8	72	[illegible]	[illegible]	20	4—2½	1700	2700	18	66	4-4	10-0	4300	419 00
D 7	30	10	72	30x30	[illegible]	20	4—2½	2100	3400	18	66	4-4	12-0	4600	451 00
D 8	30	12	72	[illegible]	[illegible]	20	4—[illegible]	2500	4000	18	66	4-4	14-0	4900	533 00
D 9	[illegible]	10	78	[illegible]	[illegible]	26	6—3	2900	4600	20	72	5-6	12-4	5450	583 00
D10	36	12	78	[illegible]	[illegible]	32	6—3	3800	5300	20	72	5-6	14-4	5800	653 00
D11	[illegible]	14	78	[illegible]	[illegible]	22	6—4	3800	6100	20	72	5-6	16-4	6700	703 00
D12	42	12	84	[illegible]	[illegible]	30	6—4	4400	7000	22	75	6-0	14-4	7200	763 00
D13	42	14	[illegible]	[illegible]	[illegible]	30	6—4	4700	7800	22	75	6-0	16-4	7900	888 00
D14	48	12	[illegible]	[illegible]	[illegible]	38	6—4	5500	8800	22	84	6-6	15-0	8500	925 00
D15	48	14	[illegible]	[illegible]	[illegible]	38	6—4	6300	9300	22	84	6-6	17-0	9500	1025 00
D16	48	16	[illegible]	[illegible]	[illegible]	38	7—4	6900	10100	24	84	6-6	19-0	10500	1125 00
D17	[illegible]	12	90	[illegible]	[illegible]	52	7—4	6800	10000	24	89	7-8	18-4	10800	1175 00
D18	[illegible]	14	105	[illegible]	[illegible]	52	7—4	8000	12000	24	89	7-8	17-4	11800	1300 00
D19	54	16	[illegible]	[illegible]	[illegible]	42	7—4	8800	13400	24	89	7-8	19-4	12800	1400 00
D20	54	18	[illegible]	54x62	[illegible]	42	7—4	10400	16000	24	89	7-8	21-4	13800	1500 00
D21	[illegible]	14	111	60x56	[illegible]	62	7—4	10800	16000	30	93	8-2	17-4	14000	1500 00
D22	[illegible]	16	111	[illegible]	[illegible]	[illegible]	7—4	11600	17600	30	93	8-2	19-4	15000	1600 00
D23	[illegible]	18	111	[illegible]	[illegible]	[illegible]	7—4	12400	19000	30	93	8-2	21-4	16000	1700 00
D24	66	16	117	[illegible]	[illegible]	64	[illegible]	13000	20000	34	97	8-8	19-4	17000	1750 00
D25	[illegible]	18	117	66x62	[illegible]	64	[illegible]	14000	21000	34	97	[illegible]	21-4	[illegible]	1850 00
D26	72	16	123	[illegible]	[illegible]	[illegible]	[illegible]	14000	[illegible]	40	102	9-10	[illegible]	[illegible]	1900 00
D27	72	18	[illegible]	72x62	[illegible]	70	[illegible]	16000	[illegible]	40	102	9-10	21	[illegible]	2000 00



"CHICAGO" DOWNDRAFT SMOKELESS BOILER, BRICK-SET

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DESCRIPTIVE PRICE-LIST, "CHICAGO" DOWNDRAFT SMOKELESS BOILER—BRICK-SET

Number	Diameter, Inches	Length, Feet	Size Firebox Inside, Inches	Height to Top of Shell, Inches	Water Line, Inches	Diam. Smoke Pipe, Inches	Heating Surface, Sq. Ft.	Steam Rating Sq. Ft.	Water Rating Sq. Ft.	Number Red Brick*	Shipping Weight, Lbs.	List Price
F1	30	6	24x32	57	47	16	160	1600	2600	1500	2800	$600
F2	30	8	24x38	57	47	16	251	2500	4000	1700	3600	700
F3	36	8	30x38	65	51	18	305	3700	6000	2500	4600	800
F4	36	10	30x44	65	51	18	375	4400	7000	2900	5400	900
F5	42	12	36x50	70	57	20	418	5000	8400	3600	6000	1000
F6	42	14	36x56	70	57	20	518	6200	10500	4200	7400	1150
F7	48	14	42x56	73	57	24	600	7200	12000	5300	8400	1250
F8	48	16	42x62	73	57	24	748	8500	14000	5900	8900	1400
F9	54	16	48x62	77	57	24	874	10500	17500	7700	11000	1500

* Based on using 9-inch walls on sizes to 42 inches inclusive—Balanc 13-inch walls.

Herbert Magazine-Feed Smokeless Boiler.

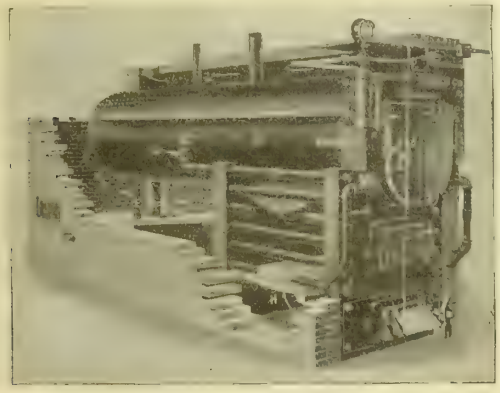
By means of a coking magazine on each side of the grate the coal is fed in at any desired rate of speed. The large capacity of the magazines enables the fireman to carry steam for an extended period without attention. Magazines should be kept filled, and green coal should never be fired through center door.

HERBERT SMOKELESS BOILER (MAGAZINE FEED)
Front View showing coking chamber

DESCRIPTIVE PRICE-LIST, MAGAZINE-FEED SMOKELESS BOILER

Number	Diameter of Boiler, Inches	Length, Feet	Size Flues, Inches	Number of Flues	Tapping for Low Pressure	Radiation Steam, Square Feet	Nominal Horse Power	Size of Smoke Pipe, Inches	Height to Top of Boiler, Inches	Water Line, Inches	Height Brick Work, Inches	Width Brick Work, Feet, Inches	Length Brick Work Feet, Inches	Approximate Shipping Weight, Pounds	Price f. o. b. Chicago
1	36	10	3	26	4—3	3000	30	20	82	74	86	7–0	13–11	6700	$700.00
2	42	12	3½	30	5—4	3500	45	22	86	75	90	7–0	16–4	7300	800.00
3	48	12	3½	38	6—4	4000	57	22	95	85	99	9–0	16–4	9000	900.00
4	48	14	3½	38	6—4	5000	60	22	95	85	99	9–0	18–4	10200	1000.00
5	54	12	4	38	7—5	6000	63	24	102	85	106	9–4	16–7	12000	1100.00
6	54	14	4	38	7—5	7000	72	24	102	85	106	9–4	18–7	13000	1200.00
7	60	14	4	46	7—5	8000	87	30	109	91	113	10–2	19–4	14000	1300.00
8	60	16	4	46	7—5	10000	95	30	109	91	113	10–2	21–4	15000	1400.00
9	60	18	4	46	7—5	11500	105	30	109	91	113	10–2	23–4	18000	1500.00
10	66	16	4	54	7—5	12000	115	34	115	91	120	10–4	21–8	18800	1650.00
11	66	18	4	54	7—5	13000	125	34	115	91	120	10–4	23–8	21000	1800.00
12	72	16	4	70	7—5	14000	135	40	124	95	129	10–6	22–2	23000	1900.00
13	72	18	4	70	7—5	16000	155	40	124	95	129	10–6	24–2	25000	2100.00

Weights are for low pressure boilers; tappings for low pressure, and it is advised that size steam and return openings be specified when ordering. Dimensions for brick setting are based on full-size walls; number of brick given on request



HERBERT DETACHABLE FIREBOX BOILER, "B" SERIES (WATER-TUBE BOX)

Herbert Detachable Firebox Boiler.

Approved by all Boiler Inspection and Insurance Companies, and built of the best material obtainable; fully guaranteed. It combines the best features of the horizontal tubular and the firebox types, and eliminates all their disadvantages. It is durable and economical; has perfect circulation, and the additional heating surface in the firebox increases its capacity at least twenty-five per cent.

DESCRIPTIVE DATA, DETACHABLE FIREBOX BOILER—"B SERIES"—LOW PRESSURE

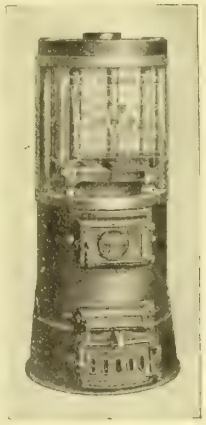
Number	Diameter, Inches	Length, Feet	Size of Firebox, Inches	Size of Flues, Inches	Number of Flues	Tapping	Rating, Steam, Square Feet	Rating, Water, Square Feet	Size of Smoke Pipe, Inches	Height to Water Line, Inches	Height of Brick Work, Inches	Width of Brick Work, Inches	Length of Brick Work, Ft., Ins.	Depth of Ashpit, Ins.	Shipping Weight, Pounds
C 1	24	4	24x26	2½	17	4—4	500	800	14	52	67	48	5–8	13	1700
C 2	24	5	24x26	2½	17	4—4	800	1200	14	52	67	48	6–8	13	1900
C 3	24	6	24x32	2½	17	4—4	1000	1600	14	52	67	48	7–8	13	2100
C 4	24	8	24x38	2½	17	4 —4	1200	1900	14	52	67	48	9–8	13	2500
B 0	30	6	30x32	3	20	4—2½	1400	2200	18	55	73	54	8–0	13	3400
B 1	30	8	30x38	3	20	4—2½	1700	2700	18	55	73	54	10–0	13	3700
B 2	30	10	30x44	3	20	4—2½	2100	3400	18	55	73	54	12–0	13	4000
B2½	30	12	30x44	3	20	4—3	2500	4000	18	55	73	54	14–0	13	4300
B 3	36	10	36x44	3	26	5—3	2900	4600	20	63	81	66	12–4	15	4650
B 4	36	12	36x44	3½	22	6—3	3300	5300	20	63	81	66	14–4	15	5000
B 5	36	14	36x50	3½	22	6—4	3800	6100	20	63	81	66	16–4	15	5900
B 6	42	12	42x44	3½	30	6—4	4400	7000	22	66	87	72	14–4	15	6500
B 7	42	14	42x50	3½	30	7—4	4900	7800	22	66	87	72	16–4	15	7300
B 8	48	12	48x50	3½	38	7—4	5200	8300	24	70	93	78	15–0	15	8000
B 9	48	14	48x56	3½	38	7—4	5800	9300	24	70	93	78	17–0	15	9300
B10	48	16	48x62	3½	38	7—4	6600	10500	24	70	93	78	19–0	15	9900
B11	54	12	54x56	3½	52	7—4	6800	10900	28	74	101	92	15 0	17	10000
B12	54	14	54x62	3½	52	7—4	8000	12800	28	74	101	92	17–0	17	10800

Special sizes not listed built to order.

Herbert Garbage Burning Water Heater.

For the sanitary disposal of garbage and rubbish accumulations of apartments, hospitals, schools, etc.

Burner consists of a lower grate of the rocking pattern for coal and an upper one, cast in two parts and hollow, for garbage. When in use this grate is filled with water. All wet substance on the upper grate dries, takes fire, and is consumed; consequently there is fire above and below water grate, which keeps the water circulating at a high speed and temperature. Unimpeded passage from lower firebox to smoke outlet, forming a perfect by-pass. Garbage chamber entirely fire surrounded. The garbage is completely consumed without smell or smoke.



GARBAGE BURNING WATER HEATER

DESCRIPTIVE PRICE-LIST, GARBAGE BURNING WATER HEATER

Number	Heating Capacity, Gallons per Hour	Number of Flats Supplied	Size Flow and Return, Inches	Outside Diameter, Inches	Diameter Coal Grate, Inches	Diameter Garbage Grate, Inches	Total Height, Inches	Diameter Smoke Outlet, Inches	Floor Space, Inches	Shipping Weight, Pounds	List Price f. o. b. Chicago
A1	150	1 to 3	1¼	17	13	14	48	6	22	525	$75
A2	250	3 to 6	1¼	20	16	17	54	6	24	625	100
A3	500	6 to 12	1½	24	20	21	54	8	30	800	150
A4	800	12 to 18	2	30	24	26	54	8	36	1250	200
A5	1200	18 to 24	3	36	30	32	60	10	42	1600	280
A6*	1600	24 to 30	3	40	36	34	60	12	46	2100	400
A7*	2000	30 to 50	3	48	44	43	60	12	54	2800	500
A8*	2500	50 to 75	3	52	48	46	60	12	58	3000	600

* Sizes Nos. A6, A7, A8 of iron plate—having same style garbage grate, base and coal grates—not regularly carried in stock. Special sizes, not listed, built on specification.

HART & CROUSE COMPANY

MANUFACTURERS OF

Hart & Crouse Smokeless Water Tube Boilers

UTICA, N. Y.

BRANCHES

NEW YORK, N. Y., Aeolian Hall
ST. LOUIS, MO., 1215 Syndicate Building
CHICAGO, ILL., Michigan Boulevard Building
WASHINGTON, D. C., 809 Vermont Avenue, N. W.

Products.

HART & CROUSE SMOKELESS WATER TUBE BOILERS, for Steam and Hot-Water Heating; HART & CROUSE HOT BLAST RADIATORS.

General Description.

A boiler of water-tube construction—two fires, instead of one. Raw fuel (soft coal) is thrown upon the upper grate through which water circulates. This fuel burns downward; hence all smoke and gases must pass through the body of the fire, becoming perfectly ignited. Perfect combustion must result. Underneath is a second and rocking grate on which all waste fuel is caught and burned upward.

Water Grate—Made of genuine, extra heavy, wrought-iron pipe connected by cast-iron headers. No boiler tubing used. Plugged openings furnished on outside to draw off dirt and sediment. Water grate is absolutely independent of the boiler and the boiler can be operated with this grate removed, if necessary. We have never furnished a replacement for a worn-out or structurally defective water grate. This grate will outwear the entire installation.

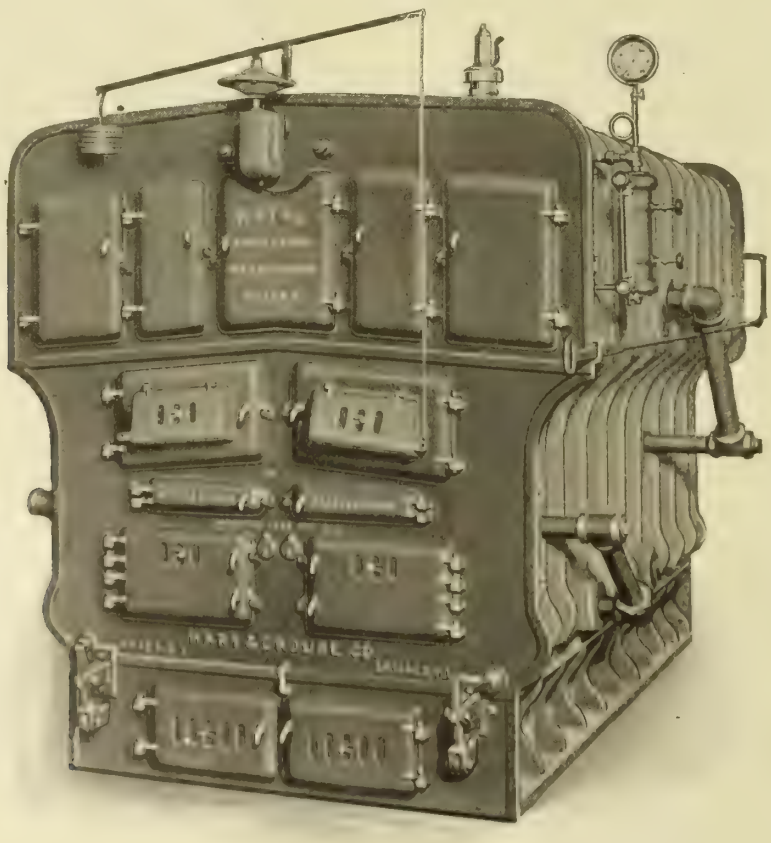
Advantages.

Fuel Saved—A large percentage of the gases in the ordinary boiler escape unconsumed up the chimney (your smoke). The double combustion of this boiler consumes the smoke with consequent increase in boiler efficiency.

The upper grates with their downdraft combustion cannot coat themselves with clinkers. When the fire is cleaned all fuel falling through is caught and consumed upon the lower grates. In the ordinary type of boiler the partially consumed coal falling through the grates is thrown away, mixed with the ashes.

There is in this boiler at least fifty per cent less ashes from a given amount of coal than from a boiler of the usual type—conclusive evidence of its economy.

Less Dirt—Because the smoke is consumed, little soot is deposited throughout the flues of the boiler.



HART & CROUSE SMOKELESS WATER TUBE BOILER
Two fires in one boiler

Continued on next page

RATINGS, PRICE-LIST, CAPACITIES AND MEASUREMENTS OF THE HART & CROUSE WATER TUBE BOILERS

PARTICULARS CHANGING WITH EACH SIZE

Boiler Number	Ratings		Grate Surface, Square Feet	Chimney Flues Recommended			List Price	
	Steam	Water		Boiler Length, Inches	Round Inches, Feet	Square Inches, Feet	Steam	Water
558	15,000	24,000	60	204	36x 80	36x100	$4,415	$4,395
557	14,500	23,200	60	194	32x100	36x 95	4,181	4,161
556	14,000	22,400	60	184	32x 90	36x 90	3,947	3,927
555	13,500	21,600	60	174	32x 80	36x 85	3,713	3,693
554	12,500	20,000	52.5	164	30x 80	36x 80	3,479	3,459
553	12,000	19,200	52.5	154	30x 75	36x 75	3,245	3,225
552	11,250	18,000	52.5	144	28x 90	32x 90	3,011	2,991
551	10,250	16,900	45	134	28x 80	32x 80	2,777	2,757
550	9,500	15,700	45	124	28x 70	32x 70	2,543	2,523
549	8,750	14,400	45	114	24x 70	28x 70	2,309	2,289
548	7,600	13,000	37.5	104	24x 70	28x 70	2,075	2,055
414	7,000	11,600	35.5	116	24x 80	24x 85	1,756	1,736
413	6,500	10,800	31.66	109	24x 75	24x 80	1,606	1,586
412	6,000	10,000	31.66	102	24x 70	24x 75	1,470	1,450
411	5,500	9,300	31.66	95	24x 65	24x 70	1,368	1,348
410	5,000	8,550	27.5	88	24x 60	24x 65	1,266	1,246
409	4,500	7,750	24	81	24x 60	24x 65	1,164	1,144
347	4,750	7,900	28	120	24x 65	24x 70	1,288	1,268
346	4,500	7,750	28	114	24x 65	24x 70	1,222	1,202
345	4,200	7,000	28	108	24x 60	24x 65	1,156	1,136
344	4,000	6,650	25.1	102	20x 60	20x 75	1,092	1,072
343	3,800	6,350	25.1	96	20x 60	20x 75	1,026	1,006
342	3,600	6,000	22.5	90	20x 60	20x 65	962	942
341	3,350	5,550	22.5	84	20x 60	20x 65	912	892
340	3,000	5,000	19.65	78	20x 60	20x 60	864	844
339	2,600	4,450	17	72	20x 50	20x 60	793	776
338	2,250	3,600	14.23	66	16x 50	16x 50	730	710
251	2,100	3,450	16.32	81	16x 60	16x 65	690	670
250	1,800	3,000	15.7	75	16x 60	16x 60	610	600
249	1,500	2,500	12.32	69	16x 60	16x 60	530	510

NOTE—The foregoing ratings provide that all piping (mains and risers, flow and return), in addition to the direct radiation to be used, shall be figured as radiating surface in estimating the size of boiler required. For indirect radiation, add 50 per cent to boiler power. Complete trimmings and firing tools furnished with boiler.

ADDITIONAL PARTICULARS CHANGING ONLY WITH THE SERIES

Series	Height of Water Line, Inches	Height of Boiler, Inches	Height to Center Smoke Collar, Inches	Width of Boiler, Inches	Size of Smoke Pipe, Inches
558–548	68	88	68	97	24
414–409	68	99	70	72	21
347–338	63	90	65	60	..
251–249	57	80	56¾	44	15

Nos. 347 to 345 have 21″ smoke-pipe: 344 to 338 have an 18″. Series 558–548 have extra heavy ground-joint push nipples.

STEAM CONNECTIONS

Numbers	Steam, Inches	Return, Inches
558–553	3–6	4–4
552–548	2–6	2–4
414–409	1–8	2–5
347–341	1–6	2–4
340–338	1–5	2–3
251–249	1–4	2–2½

WATER CONNECTIONS

Numbers	Flow, Inches	Return, Inches
558–557	5–6	8–4
556–552	4–6	6–4
551–548	3–6	6–4
414–409	2–8	4–6
347–346	2–7	4–4½
345–343	2–6	2–4½ and 2–4
342–338	1–7	4 4
251–249	3–4	3–4

Guarantee.

We offer to the purchaser the following guarantee: "A Hart & Crouse Smokeless Water Tube Boiler will successfully burn any grade of soft coal without producing any objectionable smoke and with a saving in fuel of from 25 to 33⅓ per cent over the quantity of soft coal consumed in a boiler of the ordinary type and of the same capacity. A Hart & Crouse Smokeless Water Tube Boiler will, with economy and the minimum of attention, heat an amount or equivalent of direct radiation (properly proportioned to the cubical contents) equal to capacity as rated."

References.

A few installations of the Hart & Crouse Smokeless Water Tube Boiler:

BALTIMORE, MD.

Garrett Building, South and German Streets

BROOKLYN, N. Y.

Public School No. 15
Public School No. 23

CHICAGO, ILL.

Vesta Accumulator Building, 2100 Indiana Avenue

CLEVELAND, OHIO

Rawling School
Hazeldell School
Corlett School
Murray Hill School

HIGHLAND PARK, MICH.

George W. Ferris School

ROCHESTER, N. Y.

Church of the Holy Redeemer
New York Telephone Building

NEW YORK, N. Y.

Public School No. 32
Public School No. 73
Public School No. 79

WASHINGTON, D. C.

Real Estate Trust Building, 14th and H Streets, N. W.
Wardman Courts, Clifton Street, between 13th and 14th Streets

Continued on next page

Hart & Crouse Hot Blast Radiators.

This unique and efficient type of apparatus is a sectional base radiator (Fig. 1). The cast iron base of the pipe blast coil is combined with special cast iron radiator sections (Figs. 3 and 4).

General Construction—The base has a vertical longitudinal partition, dividing it into a supply side and a return side. In old forms of pipe blast coil construction base was too long and heating surface in pipes too great for the cross-section of supply side, causing steam to back up water in front of it, and thus preventing the water from flowing back to drip pocket—resulting in many heating pipes being sealed off with water. This difficulty is now eliminated by casting a horizontal partition the width of supply side of base (near bottom), the end farthest from supply opening being cut off within 1½ inches from end of base. This space permits water to fall over into lower drip chamber, allowing it to flow to drip opening below supply connection without, therefore, coming in contact with any incoming steam.

Radiator Section—Made with vertical transverse partition (corresponding with partition in base), which ends two inches from top, thus leaving there a channel of connection between the two sides of section.

Action of Steam—Steam enters from one side of base, rises on corresponding side of section (Figs. 3 and 4), passes over top of partition and drops down on return side, thus compelling a complete circulation and perfect venting.

Connections—Sections connected to base by push nipples and tightened with bolts. Top of each section has a flat flange or platform, permitting radiator to be two or more tiers in height.

Prices—Further information, prices, etc., sent on application.

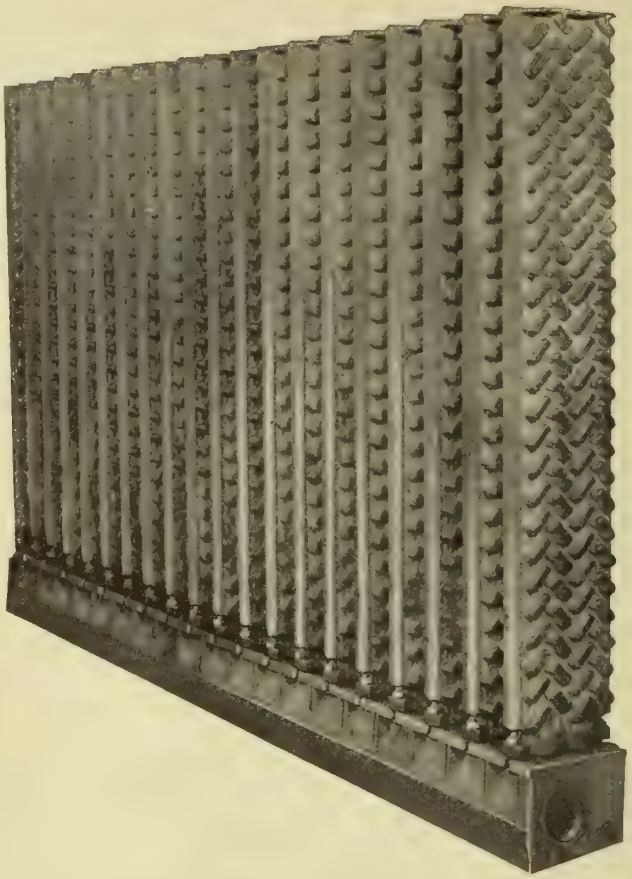


FIG. 1. HART & CROUSE SECTIONAL BASE RADIATOR

FIG. 2. CROSS-SECTION VIEW

FIG. 3. FACE OF SECTION

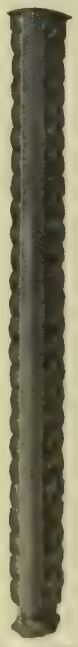


FIG. 4. EDGE OF SECTION

TABLE OF HEATING SURFACE

Section.	63-In. Sq.Ft.	53-In. Sq.Ft.	43-In. Sq.Ft.	33-In. Sq.Ft.
1.....	20	17	14	11
2.....	40	34	28	22
3.....	60	51	42	33
4.....	80	68	56	44
5.....	100	85	70	55
6.....	120	102	84	66
7.....	140	119	98	77
8.....	160	136	112	88
9.....	180	153	126	99
10.....	200	170	140	110
11.....	220	187	154	121
12.....	240	204	168	132
13.....	260	221	182	143
14.....	280	238	196	154
15.....	300	255	210	165
16.....	320	272	224	176
17.....	340	289	238	187
18.....	360	306	252	198
19.....	380	323	266	209
20.....	400	340	280	220

TABLE OF NET AIR SPACE

5 Inch Center Spacing

Section.	63-In. Sq.Ft.	53-In. Sq.Ft.	43-In. Sq.Ft.	33-In. Sq.Ft.
1.....	1.4	1.2	1.	.8
2.....	2.8	2.4	2.	1.6
3.....	4.2	3.6	3.	2.4
4.....	5.6	4.8	4.	3.2
5.....	7.	6.	5.	4.
6.....	8.4	7.2	6.	4.8
7.....	9.8	8.4	7.	5.6
8.....	11.2	9.6	8.	6.4
9.....	12.6	10.8	9.	7.2
10.....	14.	12.	10.	8.
11.....	15.4	13.2	11.	8.8
12.....	16.8	14.4	12.	9.6
13.....	18.2	15.6	13.	10.4
14.....	19.6	16.8	14.	11.2
15.....	21.	18.	15.	12.
16.....	22.4	19.2	16.	12.8
17.....	23.8	20.4	17.	13.6
18.....	25.2	21.6	18.	14.4
19.....	26.6	22.8	19.	15.2
20.....	28.	24.	20.	16.

TABLE OF LENGTHS, WIDTHS, CENTERS AND TIERING

40, 50, 60 and 70 Inches

(5 Inch Centers)

Section.	Length, Ins.	Width, Ins.	Cen. to Cen., Ins.
2.....	15	9	10
3.....	20	9	15
4.....	25	9	20
5.....	30	9	25
6.....	35	9	30
7.....	40	9	35
8.....	45	9	40
9.....	50	9	45
10.....	55	9	50
11.....	60	9	55
12.....	65	9	60
13.....	70	9	65
14.....	75	9	70
15.....	80	9	75
16.....	85	9	80
17.....	90	9	85
18.....	95	9	90
19.....	100	9	95
20.....	105	9	100

SINGLE GROUP TIERING

Base	Height.
33" and 7"	equal 40"
43" and 7"	equal 50"
53" and 7"	equal 60"
63" and 7"	equal 70"

DOUBLE GROUP TIERING

Base.	Height.
33" and 33" and 14"	equal 80"
33" and 43" and 14"	equal 90"
33" and 53" and 14"	equal 100"
33" and 63" and 14"	equal 110"
43" and 43" and 14"	equal 100"
43" and 53" and 14"	equal 110"
43" and 63" and 14"	equal 120"
53" and 53" and 14"	equal 120"
53" and 63" and 14"	equal 130"
63" and 63" and 14"	equal 140"

KANAWHA MANUFACTURING CO.

Bernhard Water-Tube Boilers

CHARLESTON, W. VA.

Products.

BERNHARD WATER-TUBE BOILERS, UP-DRAFT, DOWN-DRAFT and MAGAZINE-FEED STEAM and HOT-WATER BOILERS.

Description.

Bernhard Water-Tube Boilers are made of cast iron and built upon the unit principle, with thirty-eight hollow or cored castings. Over five hundred different sizes and styles are built, ranging from 500 to 19,500 feet steam capacity, and from 800 to 32,000 feet water capacity.

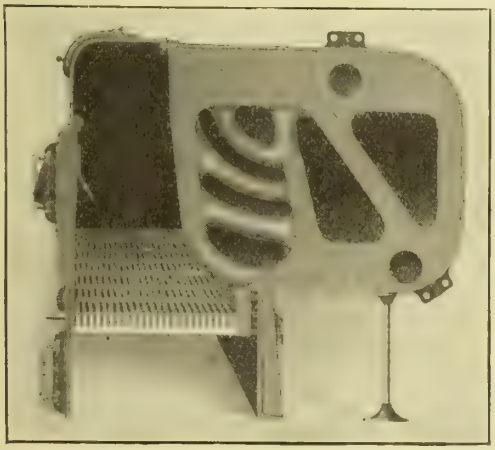
Low in Stature—The Bernhard Boilers are lowest in stature of any boiler on the market; the water line in smaller series is 38 inches, and the largest series, 47 inches. Hence, these largest boilers can be set on a level basement floor, where other boilers of same rating would require a pit 2 feet deep.

Highest in Efficiency—Because they have the greatest amount of direct fire surface; perfect circulation in each section, and the nearest perfect combustion yet obtained.

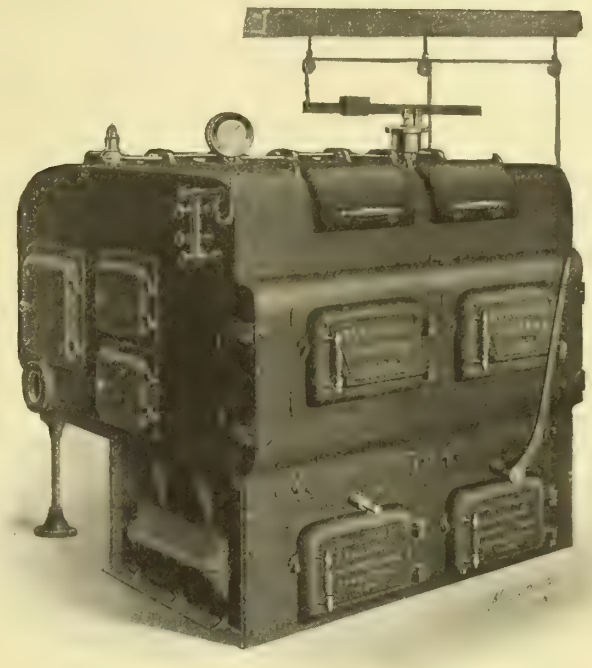
Fuel Used—There is a Bernhard Boiler designed for every kind of fuel. The very cheapest grade of soft coal can be burned, without smoke, and with the greatest economy.

Magazine Feed Boilers—Have a magazine of capacity sufficient to run the boiler with full load from twelve to eighteen hours without attention.

Principle of Burning—The burning of the coal is like the burning of gas by an inverted gas burner. The fire at the bottom heats the coal above, generating the gases; the draft inlet being above, the air and gases are drawn through the fire and burned with a high combustion, thus eliminating the smoke. As the coal feeds to the fire from the opposite side of where the combustion takes place, the fresh coal never deadens the fire, and the heat is not lost in smoke.



SECTION OF BOILER



BERNHARD MAGAZINE-FEED BOILER

System.

Bernhard Boilers are adapted to any heating system where steam or hot water can be used.

For full information regarding Bernhard Up-Draft and Down-Draft Water-Tube Boilers, see regular catalogue which will gladly be sent on request.

DATA FOR BERNHARD MAGAZINE-FEED BOILER

STEAM								WATER			
No.	Rating Sq. ft. Rad.	List Price	Code Word	B.T.U. per Hour	Water Line	Height Flow Open'g	Flow & Return 2 Each	No.	Rating Sq. ft. Rad.	List Price	Code Word
55–S	500	$275.00	Savm	125000	38″	43″	4″	55–W	800	$265.00	Wavm
56–S	700	335.00	Savim	175000	38″	43″	4″	56–W	1100	325.00	Wavim
57–S	900	395.00	Savilm	225000	38″	43″	4″	57–W	1450	385.00	Wavilm
58–S	1100	455.00	Savilem	275000	38″	43″	4″	58–W	1800	445.00	Wavilem
59–S	1300	515.00	Saixm	325000	38″	43″	4″	59–W	2100	505.00	Waixm
510–S	1500	575.00	Saxm	375000	38″	43″	4″	510–W	2500	565.00	Waxm
65–S	1200	485.00	Sevm	300000	43″	48″	4″	65–W	2000	475.00	Wevm
66–S	1600	585.00	Sevim	400000	43″	48″	4″	66–W	2650	575.00	Wevim
67–S	2000	685.00	Sevilm	500000	43″	48″	4″	67–W	3300	675.00	Wevilm
68–S	2400	785.00	Sevilem	600000	43″	48″	4″	68–W	4000	775.00	Wevilem
69–S	2800	885.00	Seixm	700000	43″	48″	4″	69–W	4650	875.00	Weixm
610–S	3200	985.00	Sexm	800000	43″	48″	4″	610–W	5300	975.00	Wexim
611–S	3600	1085.00	Sexim	900000	43″	48″	4″	611–W	6000	1075.00	Wexim
612–S	4000	1185.00	Sexilm	1000000	43″	48″	4″	612–W	6650	1175.00	Wexilm
76–S	2400	785.00	Sivim	600000	47″	54″	5″	76–W	4000	775.00	Wivim
77–S	3000	935.00	Sivilm	750000	47″	54″	5″	77–W	5000	925.00	Wivilm
78–S	3600	1085.00	Sivilem	900000	47″	54″	5″	78–W	6000	1075.00	Wivilem
79–S	4200	1235.00	Siixm	1050000	47″	54″	5″	79–W	7000	1225.00	Wiixm
710–S	4800	1385.00	Sixm	1200000	47″	54″	5″	710–W	8000	1375.00	Wixm
711–S	5400	1535.00	Sixim	1350000	47″	54″	5″	711–W	9000	1525.00	Wixim
712–S	6000	1685.00	Sixilm	1500000	47″	54″	5″	712–W	10000	1675.00	Wixilm
713–S	6600	1835.00	Sixillem	1650000	47″	54″	5″	713–W	11000	1825.00	Wixilem
714–S	7200	1985.00	Sixivm	1800000	47″	54″	5″	714–W	12000	1975.00	Wixivm
715–S	7800	2135.00	Sixvm	1950000	47″	54″	5″	715–W	13000	2125.00	Wixvm
716–S	8400	2285.00	Sixvim	2100000	47″	54″	5″	716–W	14000	2275.00	Wixvim

Series, 50″, 60″, 70″; Water Line, 38″, 43″, 47″; Height to Flow Opening, 43″, 48″, 54″.
For larger sizes, up to 17,000 feet capacity, see regular catalogue.
For other measurements, see regular catalogue.

KEWANEE BOILER COMPANY

KEWANEE, ILL.

BRANCHES

CHICAGO, Washington and Market Streets
SALT LAKE CITY, Scott Building
ST. LOUIS, Chemical Building
MINNEAPOLIS, Plymouth Building
NEW YORK, 47 West Forty-second Street
KANSAS CITY, 1420 McGee Street
LOS ANGELES, Broadway Central Building
PITTSBURGH, PA., Commonwealth Building

CANADIAN REPRESENTATIVES: The Dominion Radiator Company, Ltd.

Products.

KEWANEE

TRADE-MARK

Kewanee Firebox Boilers (Brickset), for Steam and Water Heating.

Kewanee Smokeless Firebox Boilers (Brickset), for Steam and Water Heating.

Kewanee Firebox Boilers (Portable), for Steam and Water Heating.

Kewanee Smokeless Firebox Boilers (Portable), for Steam and Water Heating.

Kewanee Radiators, Cast Iron, for Steam and Water Heating.

Kewanee Water-Heating Garbage Burners.

Tabasco Water-Heaters, Magazine Feed and Surface Burning.

Kewanee and Tabasco Water Storage and Pressure Tanks.

Haxtun Heating Boilers, for Steam and Water Heating.

Kewanee Power Boilers, Horizontal, Vertical and Portable Locomotive Types.

Kewanee Smokeless Firebox Boilers.

These boilers are built with two grates, one above the other. Fuel is fed onto the top grate, and the draft, which is downward, draws the heat-giving gases down through the fire on the upper grate, then on down and over the hot coals on the lower grate. This burns all the gases contained in the coal before they can be condensed into smoke.

These are not, however, new nor untried, but are the combination of the Down-Draft Furnace and the Kewanee Firebox Boiler. Below is a list of the principal cities in the United States which have smoke ordinances, and in which our Kewanee Smokeless Firebox Boilers have been approved, for the burning of soft coal, by the smoke inspectors.

This fact proves these boilers will burn soft coal smokelessly. Furthermore, rigid tests have shown their efficiency ranges from 73 to 81 per cent when using soft coal and fired with the help usually obtainable for low pressure heating operations.

We will gladly tell you where our boilers are installed in your own locality, so that you may inspect them personally.

Cities Having Smoke Ordinances where Kewanee Boilers Have Been Approved for the Burning of Soft Coal

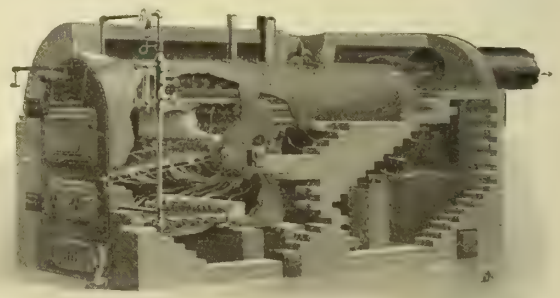
Chicago, Ill.	Baltimore, Md.
St. Louis, Mo.	Washington, D. C.
Louisville, Ky.	Knoxville, Tenn.
Salt Lake City, Utah	St. Paul, Minn.
Grand Rapids, Mich.	Memphis, Tenn.
Kansas City, Mo.	Atlanta, Ga.
Pittsburgh, Pa.	Birmingham, Ala.
Des Moines, Iowa	Nashville, Tenn.
Omaha, Neb.	New York, N. Y.
Toledo, Ohio	Philadelphia, Pa.
Minneapolis, Minn.	Milwaukee, Wis.
Indianapolis, Ind.	Toronto, Ontario

Kewanee Portable Firebox Boilers.

To meet a demand for boilers which need not be set in brickwork, we are now manufacturing a complete line of Kewanee Firebox Boilers, Portable type, regular and Smokeless types.

Ratings.

Every Kewanee Firebox Boiler will heat all of the radiation shown by its capacity. A Kewanee Firebox Boiler, rated at 1000 feet, will heat 1000 feet radiation. This is true of the larger, as well as the smaller, sizes. In choosing a Kewanee Firebox Boiler, figure the radiation needed and specify a boiler rated at that amount.



SECTIONAL VIEW OF KEWANEE SMOKELESS FIREBOX BOILER (BRICKSET TYPE)

Kewanee Power Boilers.

We do not describe, in this catalogue, nor give specifications of the Kewanee Power Boilers which include horizontal, vertical and locomotive types, as we manufacture all power boilers in accordance with the Standard Specifications used by all of the leading power boiler manufacturers. Copy of these Standard Specifications can be had, by request, of us or of any of the other power boiler manufacturers.

Kewanee Water-Heating Garbage Burners.

For any installation where there is a necessity for the incineration of garbage or rubbish, and where hot water is needed, we recommend the Kewanee Water Heating Garbage Burner. They have proved in actual installations to be not only the best method of disposing of garbage and rubbish, but the cheapest water heater on the market. They are made in three styles, suitable for the smallest apartment building, hotel, restaurant or hospital, or for the largest.

Catalogues.

For your greater convenience we have published catalogues of all of our products, giving complete descriptions, specifications, setting plans and list prices, which will be sent to you on request.

We will also send you, on request, blue-prints of any of our boilers.

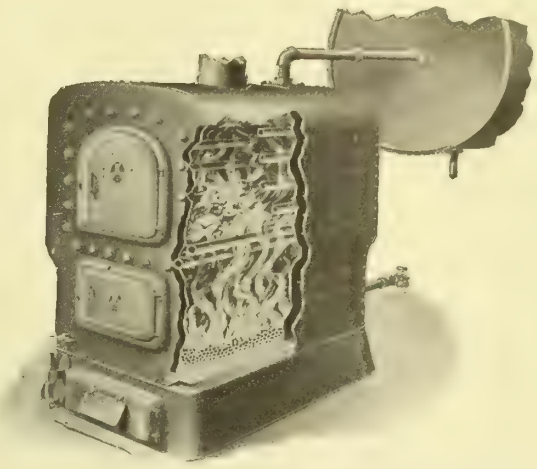
Continued on next page

SPECIFICATIONS, TYPE "A" KEWANEE WATER-HEATING GARBAGE BURNERS

Catalogue Number / Cipher		30 Gay	31 Gaze	32 Gear
Capacity, gallons per hour, 50 degree raise		200	300	400
Capacity, Garbage Chamber, one charge	Bushels	1	2	3
Height over all	Inches	58	64	64
Diameter of Floor Space required	Inches	22	25	30
Height to bottom of front Garbage Door	Inches	33	37	37
Dimensions of Garbage Door	Inches	7 x 8	7 x 8	7 x 8
Dimensions of Coal or Fire Door	Inches	7 x 8	7 x 8	7 x 8
Diameter of Coal or Lower Grates	Inches	12	16	20
Size, two each, Flow and Return Flanges	Inches	1½	2	2
Diameter of Smoke-pipe	Inches	6	8	8
Approximate Shipping Weight	Pounds	600	800	1,000

TYPE "A" KEWANEE WATER-HEATING GARBAGE BURNER

TYPE "D" KEWANEE WATER-HEATING GARBAGE BURNER



TYPE "H" KEWANEE WATER-HEATING GARBAGE BURNER

SPECIFICATIONS, TYPE "D" KEWANEE WATER-HEATING GARBAGE BURNERS

Catalogue Number / Cipher		34 Gain	35 Gale	36 Gamy	37 Gang	38 Gap	39 Garb	40 Gash
Capacity, gallons per hour, 50 degrees		500	600	800	1000	1200	1500	1800
Capacity, Garbage Chamber, one charge	Bushels	2	3	4	5	7	9	12
Height over all	Inches	56	56	56	56	56	56	56
Dimensions of Floor Space required	Inches	29 x 29	29 x 35	35 x 35	35 x 41	35 x 47	41 x 53	41 x 59
Height to bottom of Garbage Door	Inches	32	32	31	31	31	31	31
Dimensions of Garbage Door	Inches	14 x 16	14 x 16	16 x 16	16 x 16	16 x 16	16 x 16	16 x 16
Dimensions of Coal or Fire Door	Inches	14 x 10	14 x 10	16 x 10	16 x 10	16 x 10	16 x 10	16 x 10
Dimensions of Coal or Lower Grates	Inches	18 x 18	18 x 24	24 x 24	24 x 30	24 x 36	30 x 42	30 x 48
Size, one each, Flow and Return Flanges	Inches	2	2	2½	2½	2½	3	3
Diameter of Smoke-pipe	Inches	9	9	10	10	10	12	12
Approximate Shipping Weight	Pounds	1,600	1,800	2,100	2,300	2,500	3,000	3,300

SPECIFICATIONS, TYPE "H" KEWANEE WATER-HEATING GARBAGE BURNERS

Catalogue Number / Cipher		41 Gait	42 Game	43 Gasp	44 Germ	45 Gift
Capacity, gallons per hour, 50 degrees		1200	1500	1800	2200	2600
Capacity, Garbage Chamber, one charge	Bushels	6	8	9	11	12
Height over all	Inches	69	69	69	71	71
Dimensions of Floor Space required	Inches	38 x 36	38 x 42	38 x 48	38 x 54	38 x 60
Height to bottom of Garbage Door	Inches	37	37	37	37	37
Dimensions of Garbage Door	Inches	16 x 16	16 x 16	16 x 16	16 x 16	16 x 16
Dimensions of Coal or Fire Door	Inches	16 x 8	16 x 8	16 x 8	16 x 8	16 x 8
Dimensions of Coal or Lower Grates	Inches	24 x 24	24 x 30	24 x 36	24 x 42	24 x 48
Size, one each, Flow and Return Flanges	Inches	3	3	4	4	4
Diameter of Smoke-pipe	Inches	10	10	10	12	12
Approximate Shipping Weight	Pounds	2,800	3,100	3,400	3,700	4,000

One full charge of garbage can be completely destroyed, on an average, in one hour.

In large operations, we recommend that circulating mains and branches be covered.

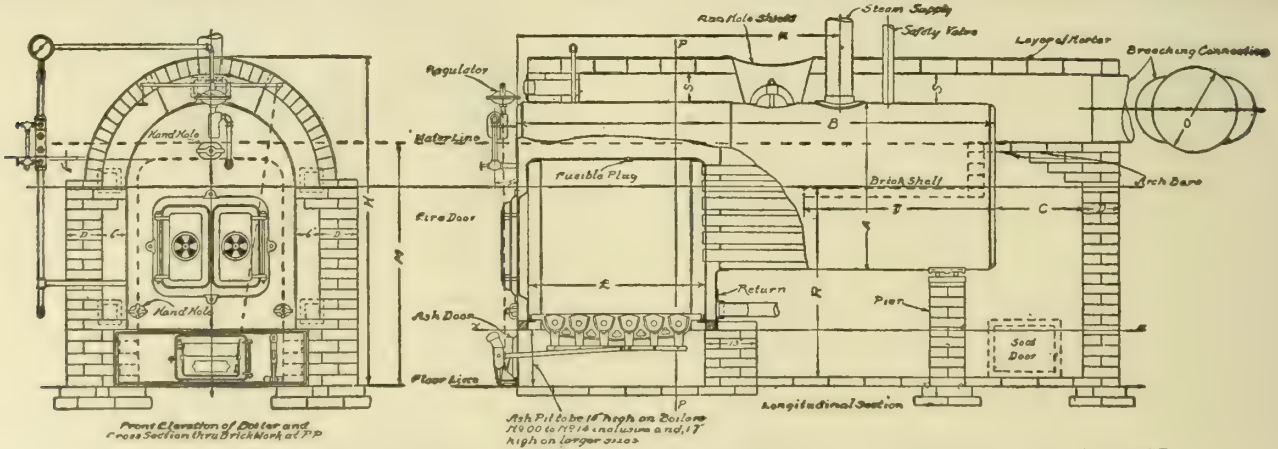
Best results are obtained when the capacity of water storage tank is 50 per cent greater than the capacity of garbage burner to which it is attached.

Continued on next page

SPECIFICATIONS KEWANEE FIREBOX BOILERS, BRICKSET TYPE

These boilers will heat all the radiation shown by their capacity

Number	00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Capacity, Steam, sq. ft.	500	700	900	1000	1200	1400	1700	2000	2200	2500	3000	3500	4000	4500	5200	6200	7000	8500	9500	10500	11500	13000
Capacity, Water, sq. ft.	800	1100	1500	1600	2000	2300	2800	3300	3600	4100	4900	5700	6500	7300	8500	10100	11400	14000	15500	17100	18700	21200
Code, Steam Boiler Complete	Dandy	Date	Dagon	Daft	Daub	Dawn	Dairy	Damp	Dark	Dash	Data	Dated	Dead	Dear	Debut	Defer	Devil	Deist	Delve	Demit	Dense	Dart
Code, Water Boiler Complete	Deal	Deny	Dirty	Deter	Dingy	Dirge	Darn	Debar	Dish	Drill	Draft	Dregs	Drink	Debit	Decay	Dusk	Decot	Decry	Deflux	Delta	Demon	Dental
Diameter Boiler, in.	24	24	30	30	30	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	72	72
Length Boiler overall, ft.	5½	7½	6½	7½	8½	7½	9	10½	8½	10	11½	10½	12	13½	14	16½	15½	18	16	18	16	18
Width of Firebox, in.	19	19	24	24	24	30	30	30	36	36	36	42	42	42	48	48	53	53	59	59	65	65
Length of Firebox, in.	20	26	26	32	38	32	38	44	38	44	50	44	50	56	56	62	62	68	62	68	68	74
Height of Firebox, in.	30	30	35	35	35	38	38	38	42	42	42	44	44	44	49	49	54	54	59	59	64	64
Heating Surface, sq. ft.	74	98	116	131	145	190	224	260	257	299	344	390	442	495	585	700	733	862	971	1097	1167	1325
Sq. ft. of Steam capacity, as rated, for each sq. foot of heating surface	6.8	7.1	7.7	7.6	8.2	7.3	7.6	7.7	8.5	8.3	8.7	8.9	9.0	9.0	8.9	8.8	9.5	9.8	9.8	9.5	9.8	9.8
Area of Grate, sq. ft.	2.6	3.4	4.3	5.3	6.3	6.7	8.0	9.2	9.5	11.0	12.5	12.8	14.6	16.3	18.7	20.6	22.8	25.0	25.4	28.0	30.7	33.4
Sq. ft. of heating surface for each sq. foot of grate	28	29	27	25	23	28	28	28	27	27	28	30	30	30	31	34	32	34	38	39	38	40
Diameter of Breeching, in.	10	10	12	14	16	16	18	18	20	20	22	22	24	24	28	28	32	32	32	32	36	36
Diameter of Stack, in.	10	10	12	12	14	14	16	16	18	18	20	20	22	22	26	26	30	30	30	30	34	34
Minimum height of Stack, ft.	40	40	40	40	40	40	40	45	45	45	45	45	50	50	50	50	55	55	60	60	60	60
Diameter of Stack for 2 Boilers, in.	.....	.....	.....	.....	.....	.....	.....	.....	24	26	28	28	30	32	34	34	36	36	36	38	40	42
Minimum height of Stack for 2 Boilers, ft.	.....	.....	.....	.....	.....	.....	.....	.....	50	50	50	50	50	50	55	60	60	70	70	70	70	70
Size of Steam opening (one), in.	3	3½	4	4	5	5	6	6	6	6	6	6	6	7	7	7	7	7	8	8	8	8
Size of Return (one), in.	2	2	2½	2½	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6
Size of Safety Valve, in.	1¼	1¼	1½	1½	2	2	2	2	2½	2½	2½	2½	2½	3	3	3	3½	3½	3½	3½	4	4
Number and size of supply and Return openings for Water, in.	1–4	1–4	1–6	1–6	1–6	1–6	1–6	1–6	2–5	2–6	2–6	2–6	2–6	2–7	2–7	2–7	2–7	2–8	2–8	2–10	2–10	2–10
Height of Water line, in.	47	47	52	52	52	55	55	55	59	59	59	61	61	61	66	66	75	75	80	80	85	85
Height from floor to top of brickwork, in.	64	64	70	70	70	77	77	77	83	83	83	90	90	90	96	96	108	108	114	114	120	120



SECTION FIREBOX BOILER (BRICKSET TYPE), SHOWING SETTING. STACK CONNECTION AT REAR

MEASUREMENTS OF SETTING KEWANEE FIREBOX BOILERS, BRICKSET TYPE

Number	00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Diameter Boiler "A," in.	24	24	30	30	30	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	72	72
Length Boiler "B," ft.	5½	7½	6½	7½	8½	7½	9	10½	8½	10	11½	10½	12	13½	14	16½	15½	18	16	18	16	18
Rear Space "C," in.	14	14	17	17	17	17	17	17	22	22	22	22	22	22	24	24	24	24	24	24	28	28
Thickness Wall "D," in.	9	9	9	9	9	9	9	9	9	9	9	9	9	9	13	13	13	13	13	13	13	13
Length Grate "E," in.	20	26	26	32	38	32	38	44	38	44	50	44	50	56	56	62	62	68	62	68	68	74
Width Ash-pit, in.	19	19	25	25	25	31	31	31	37	37	37	43	43	43	49	49	54	54	60	60	66	66
Total Height "H," in.	64	64	70	70	70	77	77	77	83	83	83	90	90	90	96	96	108	108	114	114	120	120
Location Supply "F," in.	3–1	4–2	4–0	4–8	5–6	4–11	5–11	6–11	6–2	6–8	7–2	6–8	7–10	8–6	9–2	9–8	9–6	10–8	9–8	10–8	9–9	10–9
Size Supply "F," in.	6	6	6	6	6	7	7	7	7	7	7	8	8	8	8	8	10	10	10	10	10	10
Diam. Breeching Connection "G," in.	10	10	12	14	16	16	18	18	20	20	22	22	24	24	28	28	32	32	32	32	36	36
Height Brick Shelf "R," in.	39	39	42	42	42	45	45	45	48	48	48	51	51	51	54	54	61	61	64	64	67	67
Length Brick Shelf "I," in.	25	42	30	48	44	36	42	54	36	48	60	54	66	80	84	102	90	108	90	108	84	102
Total Length Setting ft. in.	7–5	9–5	8–8	9–8	10–8	9–8	11–2	12–8	11–1	12–7	14–1	13–1	14–7	16–1	17–1	19–7	18–7	21–1	19–1	21–1	19–5	21–5
Total Width Setting ft. in.	4–6	4–6	5–0	5–0	5–0	5–6	5–6	5–6	6–0	6–0	6–0	6–6	6–6	6–6	7–8	7–8	8–2	8–2	8–8	8–8	9–2	9–2
Total Width Setting for two Boilers, ft. in.	8–3	8–3	9–3	9–3	9–3	10–3	10–3	10–3	11–3	11–3	11–3	12–3	12–3	12–3	14–3	14–3	15–3	15–3	16–3	16–3	17–3	17–3
Common Brick for one Boiler	1400	1500	1600	1700	1900	2000	2200	2400	2500	2800	3000	3200	3500	3700	4500	5700	6000	6500	6700	7100	7500	8000
Common Brick for two Boilers	2700	2900	3100	3300	3600	3900	4200	4600	4800	5400	5800	6200	6800	7200	8700	11000	10500	11300	11600	12400	13000	14000

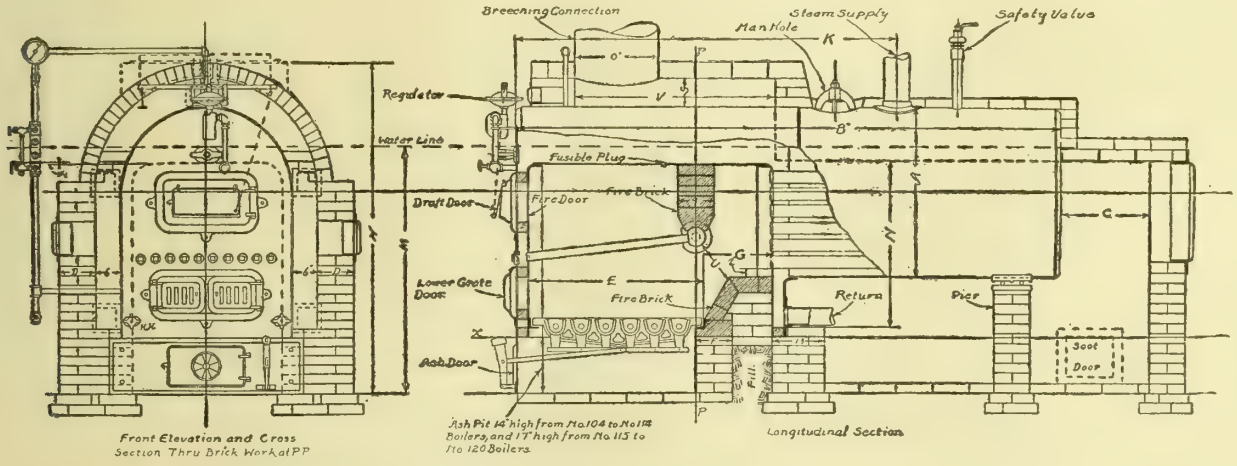
For Extended Base, add 1" [illegible] to Boilers with breeching connection at rear.

Continued on next page

SPECIFICATIONS KEWANEE SMOKELESS FIREBOX BOILERS, BRICKSET TYPE

These boilers will heat all the radiation shown by their capacity

Number	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Capacity, Steam, sq. ft.	1600	1900	2200	2500	2900	3300	3800	4400	5000	5800	7000	8200	9500	10500	12000	13000	15000
Capacity, Water, sq. ft.	2600	3100	3600	4100	4700	5300	6200	7200	8200	9500	11400	13400	15500	17000	19600	21000	24500
Code, Steam Boiler complete	Heal	Heap	Hear	Heck	Heed	Help	Hern	Hen	Henna	Herd	Herf	Herp	Herg	Hero	Herod	Heron	Hers
Code, Water Boiler complete	Hide	Hie	Hill	Hind	Hinge	Hint	Hip	Hire	Hisk	Hiss	Hit	Hitch	Hive	Hiz	Hilt	Hing	Hick
Diameter Boiler, in.	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	72	72
Length Boiler, over-all, ft., in	8–7	10–2	11–7	9–10	11–4	12–11	12–4	13–10	15–4	15–10	18–4	17–10	20–4	18–4	20–4	18–4	20–4
Width of Firebox, in.	30	30	30	36	36	36	42	42	42	48	48	53	53	59	59	65	65
Length of Firebox, in.	45	51	57	54	60	66	66	72	78	78	84	90	96	90	96	96	102
Heating Surface, sq. ft.	182	213	249	252	291	335	387	449	492	580	692	735	862	968	1092	1155	1310
Sq. ft. of Steam capacity, as rated, for each sq. ft. of heating surface	8.8	8.9	8.8	9.9	9.9	9.9	9.8	9.8	10.0	10.0	10.1	11.1	11.0	10.8	11.0	11.2	11.4
Area of Upper Grate, sq. ft.	5.8	7.1	8.3	8.5	10.0	11.3	11.7	13.1	14.9	17.0	19.0	21.0	23.2	23.4	25.8	28.4	31.1
Sq. ft. of Heating Surface for each sq. foot of grate	31	30	30	30	29	30	33	34	33	34	36	35	37	41	42	40	42
Diameter of Breeching, in.	20	20	22	22	22	24	24	27	27	30	30	34	34	36	36	38	38
Diameter of Stack, in.	18	18	20	20	20	22	22	24	24	28	28	32	32	34	34	36	36
Minimum Height of Stack, ft.	40	40	40	50	50	50	50	55	55	60	60	60	60	70	70	70	70
Diameter of Stack for two Boilers, in.	..	..	..	26	28	30	30	32	32	34	36	38	38	40	42	44	46
Minimum Height of Stack for two Boilers, ft.	..	..	..	60	60	60	60	60	60	70	70	70	75	75	80	80	80
Size of Steam opening (one), in.	4	4	4	6	6	6	6	6	7	7	7	7	7	8	8	8	8
Size of Return (one), in.	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6
Size of Safety Valve, in.	2	2	2	2½	2½	2½	2½	2½	3	3	3	3½	3½	3½	3½	4	4
Number and size of Supply and Return openings for Water, in.	2–5	2–5	2–6	2–6	2–6	2–6	2–6	2–7	2–7	2–7	2–7	2–8	2–8	2–10	2–10	2–10	2–10
Height of Water line, in.	55	55	55	58	58	58	61	61	61	66	66	75	75	80	80	85	85
Height from floor to top of brickwork, in.	76	76	76	82	82	82	89	89	89	95	95	107	107	113	113	119	119



SECTION OF SMOKELESS BOILER (BRICKSET TYPE), SHOWING SETTING. STACK CONNECTION AT FRONT

MEASUREMENTS OF SETTING KEWANEE SMOKELESS FIREBOX BOILERS, BRICKSET TYPE

Number	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Diameter Boiler "A," in.	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	72	72
Length Boiler "B," ft., in.	8–7	10–2	11–7	9–10	11–4	12–11	12–4	13–10	15–4	15–10	18–4	17–10	20–4	18–4	20–4	18–4	20–4
Rear Space "C," in.	17	17	17	22	22	22	22	22	22	24	24	24	24	24	24	28	28
Thickness Rear Wall, in.	9	9	9	9	9	9	9	9	9	13	13	13	13	13	13	13	13
Length Grate "E," in.	31	37	43	37	43	49	43	49	55	55	61	61	67	61	67	67	73
Width of Ash-pit, in.	31	31	31	37	37	37	43	43	43	49	49	54	54	60	60	66	66
Thickness Bridge Wall, in.	9	9	9	9	9	9	13	13	13	18	18	18	18	18	18	18	18
From Grates to Tube Sheet "G," in.	14	14	14	17	17	17	23	23	23	23	23	29	29	29	29	29	29
Total Height "H," in.	76	76	76	82	82	82	89	89	89	95	95	107	107	113	113	119	119
Location Supply "K," ft., in.	0–11	1–8	2–5	1–4	2–4	2–11	2–6	3–6	3–7	3–11	4–5	4–1	5–2	3–6	4–8	3–9	4–5
Top Flue Space "S," in.	7	7	7	7	7	7	8	8	8	8	8	10	10	10	10	10	10
Height Side Flue "N," ft., in.	3–6	3–0	3–0	3–3	3–3	3–3	4–1	4–1	4–1	4–6	4–6	4–10	4–10	5–2	5–2	5–6	5–6
Diameter Breeching Connection "O," in.	20	20	22	22	22	24	24	27	27	30	30	34	34	36	36	38	38
Header to Bridge Wall "U," in.	6	7	8	8	8	9	8	9	12	10	12	11	12	12	12	13	14
Length of Arch "V," ft., in.	3–5	4–5	5–5	3–7	4–1	4–7	4–7	5–1	5–9	5–4	5–10	6–4	6–10	6–4	6–10	6–11	7–5
Total Length Setting, ft., in.	10–7	12–3	13–9	12–5	13–11	15–5	14–11	16–5	17–11	18–11	21–5	20–11	23–5	21–5	23–5	21–9	23–9
Total Width Setting, ft., in.	5–6	5–6	5–6	6	6	6	6–6	6–6	6–6	7–8	7–8	8–2	8–2	8–8	8–8	9–2	9–2
Total Width Setting for two Boilers ft., in.	10–3	10–3	10–3	11–3	11–3	11–3	12–3	12–3	12–3	14–3	14–3	15–3	15–3	16–3	16–3	17–3	17–3
Common Brick for one Boiler	2500	2800	2900	3100	3400	3600	4050	4350	4550	6500	6700	7400	7900	8200	8600	9100	9600
Common Brick for two Boilers	4200	4850	4950	5400	5900	6200	7000	7500	7850	11650	11800	13150	13950	14550	15200	16200	17050
Fire Brick for one Boiler	72	72	72	90	90	90	108	108	108	150	150	190	190	230	230	300	300
Fire Brick for two Boilers	144	144	144	180	180	180	216	216	216	300	300	380	380	460	460	600	600

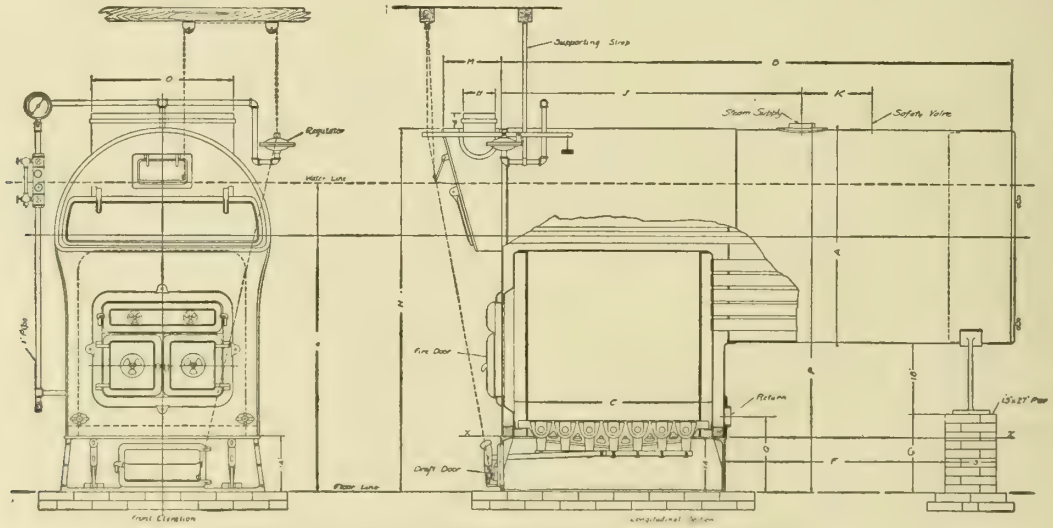
Key letters "N" and "V" apply only to boilers set with breeching connection at front.

Continued on next page

SPECIFICATIONS KEWANEE FIREBOX BOILERS, PORTABLE TYPE

These boilers will heat all the radiation shown by their capacity.

Number	0000	000	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
Capacity, Steam, sq. ft..	500	700	900	1100	1300	1500	1800	2100	2400	2800	3300	3800	4300	4800	5500	6000	7000	8000	9000	10000	12000	13000
Capacity, Water, sq. ft..	800	1100	1500	1800	2100	2500	2900	3400	4000	4600	5400	6200	7000	7800	9000	9800	11400	13000	15000	17000	20000	22000
Code, St. Boiler, complete	Pick	Pill	Pig	Pillar	Pinch	Pink	Piston	Pit	Pipe	Piaid	Plank	Plat	Plaza	Plead	Place	Plod	Plain	Plunge	Plush	Poet	Point	Polar
Code, W. Boiler, complete	Prank	Preach	Pray	Prefer	Press	Pretty	Prick	Pride	Prime	Prince	Print	Prism	Proud	Prone	Proxy	Psalm	Pulp	Punch	Pulse	Pure	Purge	Pyre
Diameter Boiler, in.	30	30	36	36	36	42	42	42	48	48	48	54	54	54	60	60	60	60	66	66	72	72
Length Boiler, ft. and in.	5–5	6–5	5–11	6–5	7–0	6–8	7–8	8–7	8–3	9–2	10–9	9–8	10–9	11–9	12–1	13–3	14–0	15–10	15–6	17–0	15–7	17–2
Width of Firebox, in.	19	19	24	24	24	30	30	30	36	36	36	42	42	42	48	48	53	53	59	59	65	65
Length of Firebox, in.	20	26	26	32	38	32	38	44	38	44	50	44	50	56	56	62	56	62	62	68	68	74
Height of Firebox, in.	30	30	35	35	35	38	38	38	41	41	41	44	44	44	49	49	49	49	52	52	54	54
Heating Surface, sq. ft.	75	89	118	128	146	187	219	248	281	320	375	422	477	528	583	642	701	804	905	1003	1202	1334
Area, Grate, sq. ft.	2.5	3.3	4.3	5.4	6.3	6.3	8	9.2	9.5	11	12.6	13	14.7	16.4	18.8	20	20.7	22	25.5	27.9	30.8	33.5
Diameter Breeching, in.	12	12	16	16	16	16	16	16	20	20	20	22	22	22	26	26	26	26	28	28	32	32
Diameter Stack, in.	12	12	14	14	14	14	14	14	18	18	18	20	20	20	24	24	24	24	26	26	30	30
Minimum Height of Stack, ft.	35	35	40	40	40	40	40	45	50	50	60	60	60	70	70	70	70	70	70	80	90	90
Diameter Breeching, two Boilers, in.	16	16	20	20	20	22	22	22	26	26	26	28	28	28	36	36	36	36	38	38	44	44
Diameter Stack, two Boilers, in.	14	14	18	18	18	20	20	20	24	24	24	26	26	26	32	32	32	32	34	34	40	40
Minimum Height Stack, two Boilers, ft.	40	40	40	40	45	45	45	45	50	60	60	60	60	70	70	70	80	80	80	90	90	90
Size of Steam Opening (one), in.	3	3½	4	5	5	5	6	6	6	6	6	6	6	6	7	7	7	7	8	8	8	8
Size of Return Opening (one), in.	2	2	2½	2½	2½	3	3	3	4	4	4	4	4	4	5	5	5	5	6	6	6	6
Size of Safety Valve Opening, in.	1¼	1¼	1½	1½	1½	2	2	2	2½	2½	2½	2½	2½	3	3	3	3½	3½	3½	3½	4	4
Number and Size of Supply and Return Openings for Water Boiler, in.	1–4	1–4	1–6	1–6	1–6	1–6	1–6	1–6	2–5	2–5	2–5	2–6	2–6	2–6	2–7	2–7	2–7	2–7	2–8	2–8	2–10	2–10
Height of Water Line, in.	55	55	60	60	60	67	67	67	71	71	71	74	74	74	83	83	86	86	90	90	96	96
Height Floor to Top of Shell, in.	61	61	69	69	69	77	77	77	83	83	83	89	89	89	98	98	101	101	107	107	113	113



SETTING PLAN OF FIREBOX BOILER, PORTABLE TYPE

MEASUREMENTS OF SETTING KEWANEE FIREBOX BOILERS, PORTABLE TYPE

Number of Boiler	0000	000	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
Diameter of Boiler, "A," in.	30	30	36	36	36	42	42	42	48	48	48	54	54	54	60	60	60	60	66	66	72	72
Length of Boiler, "B," ft., in.	5–5	6–5	5–11	6–5	7–0	6–8	7–8	8–7	8–3	9–2	10–9	9–8	10–9	11–9	12–1	13–3	14–0	15–10	15–5	17–0	15–7	17–2
Length of Firebox, "C," in.	20	26	26	32	38	32	38	44	38	44	50	44	50	56	56	62	56	62	62	68	68	74
Width of Firebox, in.	19	19	24	24	24	30	30	30	36	36	36		See	below			60	66	66	72	72	78
																	54	54	60	60	66	66
Length Ash Pit Base, in.	27	33	33	39	45	39	45	51	45	51	57		See	below			6–7	7–11	7–5	8–5	6–11	7–11
Width Ash Pit Base, in.	27	27	33	33	33	39	39	39	45	45	45		See	below			23	23	23	23	23	23
Ash-Pit Base to Pier, "F," in.	27	33	27	27	28	30	36	41	39	44	57		See	below								
Total Height, "H," in.	61	61	69	69	69	77	77	77	83	83	83	89	89	89	98	98	101	101	107	107	113	113
Height of Pier, "G," in.	12	12	14	14	14	16	16	16	17	17	17	17	17	17	20	20						
Location Steam Supply, "J," in.	2–11	3–7	3–6	4–0	4–7	4–0	4–7	5–3	4–8	5–3	6–3	5–6	6–4	7–11	8–0	8–8	21	27	26	30	24	36
Location Safety Valve, "K," in.	11	11	10	10	10	13	13	13	14	14	18	16	18	14	16	18	21	27	36	26	24	30
Height of Water Line, "L," in.	55	55	60	60	60	67	67	67	71	71	71	74	74	74	83	83	86	86	90	90	96	96
Length of Breeching, "M," in.	9	9	11	11	11	12	12	12	14	14	14	15	15	15	17	17	17	17	18	18	20	20
Width Breeching Connection, "N," in.	6	6	8	8	8	8	8	8	8	8	8	8	8	8	10	10	10	10	10	10	12	12
Length Breeching Connection, "O," in.	14	14	18	18	18	22	22	22	28	28	28	36	36	36	42	42	42	42	48	48	58	58
Height Steam Supply, "P," in.	6–2	6–2	7–0	7–0	7–0	7–8	7–8	7–8	8–4	8–4	8–4	9–0	9–0	9–0	10–0	10–0	10–3	10–3	10–9	10–9	11–5	11–5
Height Return, "Q," in.	1–8	1–8	1–8	1–8	1–8	1–9	1–9	1–9	1–9	1–9	1–9	1–9	1–9	1–9	2–0	2–0	2–3	2–3	2–3	2–3	2–3	2–3
Number of Common Brick	130	130	210	210	230	250	260	290	290	320	350	650	700	780	800	880	1100	1170	1250	1300	1380	1430
Grate Surface to be Covered, sq. in.	20	31	65	70	75	80	90	105	115	130	150	155	175	185	190	220	250	280	290	310	315	345
Length of Ash Pit, in.												47	53	59	59	65	60	66	66	72	72	78
Width of Ash Pit, in.												43	43	43	49	49	54	54	60	60	66	66
Ash-Pit, wall to pier, ft., in.												3–9	4–1	4–10	5–2	5–10	6–7	7–11	7–5	8–5	6–11	7–11

Boilers Nos. 410 and larger set on brick forms instead of cast iron ash pit.
Boilers of diameter 42 in. and larger, provided with manhole.

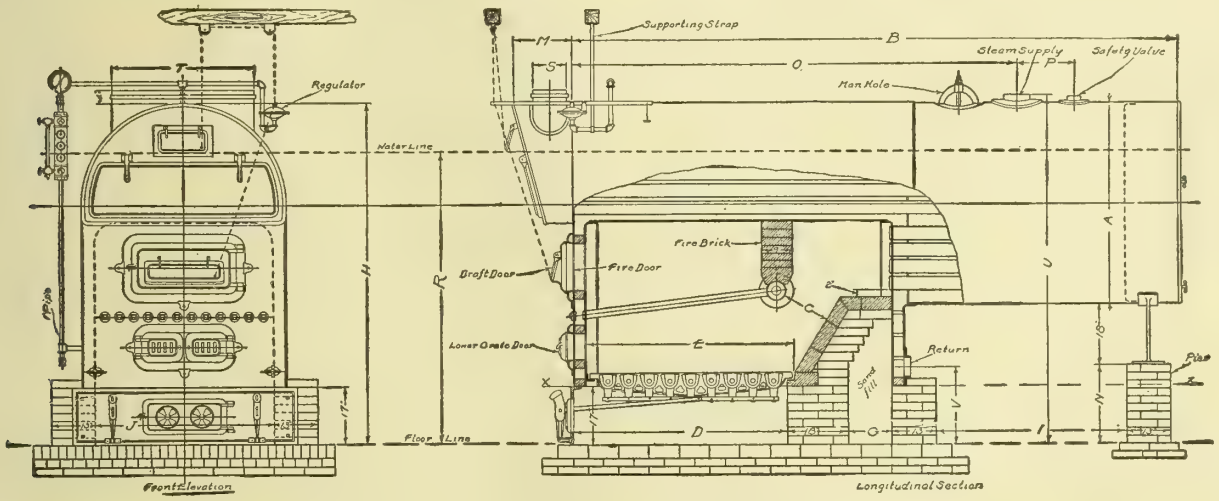
SWEET'S CATALOGUE

Continued on next page

SPECIFICATIONS KEWANEE SMOKELESS FIREBOX BOILERS, PORTABLE TYPE

These boilers will heat all the radiation shown by their capacity

Number	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322
Capacity, Steam, sq. ft.	1000	1200	1500	1900	2100	2500	3000	3500	4000	4500	5000	5500	6000	6500	7500	8500	10000	12000	14000	16000	18000	20000
Capacity, Water, sq. ft.	1600	2000	2400	3100	3400	4000	4800	5700	6500	7300	8200	9000	9800	10500	12200	13800	16300	20000	23000	26000	30000	33000
Code, Steam Boiler complete	Park	Pad	Pain	Paint	Palmy	Paltry	Panel	Panic	Pancy	Papa	Paper	Parch	Pail	Parcel	Pardon	Park	Parole	Party	Pastry	Patrol	Pawn	Pay
Code, Water Boiler complete	Peace	Pane	Pea	Pearl	Pebble	Peddle	Pelt	Penal	Pencil	Pen	Pepsin	Perch	Perfect	Peril	Period	Perish	Pemit	Persue	Person	Peruse	Petal	Pestle
Diameter, Boiler, in.	36	36	36	42	42	42	48	48	48	54	54	54	60	60	60	60	66	66	72	72	78	78
Length Boiler, ft.	7½	7¾	8½	7¾	8½	9½	8¾	10	11	10½	11½	12½	12½	13½	15	16	15½	17½	16¼	17½	17½	18½
Width of Firebox, in.	24	24	24	30	30	30	36	36	36	42	42	42	48	48	53	53	59	59	65	65	71	71
Length of Firebox, in.	44	48	51	48	51	57	54	60	66	72	78	84	78	84	90	96	90	96	96	102	102	108
Heating Surface, sq. ft.	155	161	180	211	236	261	287	341	380	425	473	528	580	630	708	760	846	981	1183	1308	1465	1563
Area Upper Grate, sq. ft.	4.4	5	5.5	6	6.7	8	8.8	10.1	11.4	12.9	14.7	16.5	17	18.5	20	21.4	23	25.5	28.1	30	32.6	34.6
Diameter Breeching, in.	14	14	16	16	16	16	20	20	20	22	22	22	26	26	26	26	28	28	32	32	36	36
Diameter Stack, in.	14	14	14	14	14	14	18	18	18	20	20	20	24	24	24	24	26	26	30	30	32	32
Minimum height Stack, ft.	40	40	45	50	50	50	60	60	70	75	75	80	80	80	80	80	80	90	90	90	100	100
Diam. Breeching two Boilers, in.	20	20	20	22	22	22	26	26	26	28	28	28	36	36	36	36	38	38	44	44	48	48
Diam. Stack two Boilers, in.	18	18	18	20	20	20	24	24	24	26	26	26	32	32	32	32	34	34	40	40	44	44
Minimum height Stack two Boilers, ft.	40	40	45	50	50	50	60	60	70	80	80	80	80	80	85	8	90	90	90	90	100	100
Size Steam Opening (one), in.	4	5	5	6	6	6	6	6	6	6	6	6	7	7		7	8	8	8	8	8	8
Size Return Opening (one), in.	2½	2½	2½	3	3	3	4	4	4	4	4	4	5	5	5	5	6	6	6	6	6	6
Size Safety Valve Opening (one), in.	1½	1½	1½	2	2	2	2½	2½	2½	2½	2½	3	3	3	3½	3½	3½	3½	4	4	4	4
Number and Size of Supply and Return Openings for Water Boiler, in.	1–6	1–6	1–6	1–6	1–6	2–6	2–6	2–6	2–6	2–6	2–7	2–7	2–7	2–7	2–7	2–8	2–8	2–10	2–10	2–10	2–10	2–10
Height of Water Line, in.	66	66	66	69	69	69	72	72	72	78	78	78	83	83	86	86	90	90	97	97	97	97
Height Floor to Top of Shell, in.	74	74	74	79	79	79	84	84	84	92	92	92	98	98	101	101	107	107	113	113	115	115



SECTION OF SMOKELESS BOILER, PORTABLE TYPE

MEASUREMENTS OF SETTING KEWANEE SMOKELESS BOILERS, PORTABLE TYPE

Number	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322
Diameter Boiler, "A," in.	36	36	36	42	42	42	48	48	48	54	54	54	60	60	60	60	66	66	72	72	78	78
Length Boiler, "B," ft.	7½	7¾	8½	7¾	8½	9⅓	8¾	10	11	10½	11½	12½	12½	13½	15	16	15½	17½	16¼	17½	17½	18½
Header to Bridge Wall, "C," in.	5½	6	6½	6	6½	8	7½	9	9½	9	10	11	10	11	12	12	13	13	14	14	15	15
Length of Ash-Pit, "D," in.	32	32	38	32	38	44	38	44	50	50	56	62	56	62	63	69	63	69	69	75	75	75
Length of Grate, "E," in.	31	31	37	31	37	43	37	43	49	49	55	61	55	61	61	67	61	67	67	73	73	73
Bridge Wall to Rear Wall, "G," in.															13	13	13	13	13	13	13	19
Height of Boiler, "H," in.	72	72	72	77	77	77	83	83	83	89	89	89	98	98	101	101	107	107	113	113	115	115
Rear Wall to Pier, "I," in.															57	63	62	80	63	74	72	79
Width of Ash-Pit, in.															53	53	59	59	65	65	71	71
Length of Base, in.	51	55	58	55	58	64	61	67	73	84	90	96	90	96	107	113	107	113	113	119	119	125
Length of Breeching, "M," in.	11	11	11	12	12	12	14	14	14	15	15	15	17	17	17	17	18	18	20	20	20	20
Height of Pier, "N," in.	17	17	17	16	16	16	17	17	17	17	17	17	20	20	23	23	23	23	23	23	19	19
Location Steam Supply, "O," ft., in	5–1	5–5	5–8	5–5	5–8	6–3	5–11	6–8	7–3	7–6	8–2	8–9	8–9	9–3	10–11	11–6	11–0	11–9	11–7	12–2	12–2	12–9
Location Safety Valve, "P," in.	10	10	12	11	12	12	12	14	14	13	13	15	15	18	16	18	17	24	17	20	20	24
Height of Water Line, "R," in.	63	63	63	67	67	67	71	71	71	74	74	74	83	83	86	86	90	90	96	96	97	97
Width Breeching Connection, "S," in.	8	8	8	8	8	8	8	8	8	8	8	8	10	10	10	10	10	10	12	12	12	12
Length Breeching Connection, "T," in.	18	18	18	22	22	22	28	28	28	36	36	36	42	42	42	42	48	48	58	58	62	62
Height of Steam Supply, "U," in.	73	73	73	78	78	78	84	84	84	90	90	90	100	100	103	103	109	109	115	115	117	117
Height of Return, "V," in.	18	18	18	19	19	19	19	19	19	19	19	19	20	20	23	23	23	23	23	23	23	23
Width of Foundation, in.	34	34	34	40	40	40	46	46	46	60	60	60	66	66	79	79	85	85	91	91	97	97
Number of Common Brick	310	325	335	400	400	425	450	460	475	875	925	975	975	1025	2100	2200	2200	2300	2450	2550	2675	2800
Number of Fire Brick	85	85	85	100	100	100	115	115	115	180	180	180	215	215	250	270	320	310	325	325	360	375
Outside Surface to be covered, sq. ft.	100	104	112	117	121	133	148	157	173	184	212	221	255	265	266	280	290	330	360	360	370	400
Thickness Bridge Wall, in.	9	9	9	9	9	9	9	9	9	13	13	13	18	18	18	18	18	18	18	18	18	18
Bridge Wall to Rear Wall, in.										12	12	12	7	7	13	13	13	13	13	13	13	1
Rear Wall to Pier, in.										27	33	39	45	51	57	63	62	80	63	74	72	7

NOTE—Boilers 301 to 310 inclusive furnished with cast-iron ash-pit as shown on previous page. Boilers 310 and larger are set on brick ash-pit as shown above

Continued on next page

Tabasco Water-Heater.

These are all steel, self-feed, and with surface burners.

SPECIFICATIONS, TABASCO WATER-HEATERS

Heater	Cipher	Heating Capacity, gallons per hour	Size of Heater, inches	Total Height, inches	Sizes, Flows and Returns, inches	Weights, pounds
17	Fabian	130	17 x 30	52	2–1¼	400
18	Fable	150	17 x 36	57	2–1½	420
21	Facade	200	21 x 30	52	2–2	520
22	Facial	250	21 x 36	59	2–2	550
25	Factor	300	25 x 36	59	2–2	780
26	Faculty	350	25 x 42	65	2–2	810
27	Facund	400	25 x 48	71	2–2	840
30	Faddle	500	30 x 42	65	2–3	1100
31	Faggot	600	30 x 48	75	2–3	1150
32	Faint	700	30 x 54	81	2–3	1240

Magazine Feed Heaters are always shipped unless Surface Burners are specified in order. Are provided with brass clean-out plugs.

On all Tabasco Heaters the heating capacity is based on raising the water in the storage tank 50° Fahr. in one hour.

TABASCO WATER-HEATER

Extra-Heavy Tabasco Heaters and Vertical Tanks.

Tested to 150 pounds for 100 pounds working pressure.

DATA, EXTRA-HEAVY TABASCO HEATERS—TYPE "R"

Number	150	200	300	400	500	700
Cipher	Goss	Gode	Gore	Goad	Golf	Gown
Capacity, gallons per hour	150	200	300	400	500	700
Total Height	5′ 3″	4′ 10″	5′ 4″	6′ 4″	5′ 10″	7′ 2″
Diameter Fire-Pot	12″	16″	20″	20″	25″	25″
Size Flow and Returns	2-1½″	2-2″	2-2″	2-2″	2-3″	2-3″
Weight, pounds	600	700	950	1130	1500	1650

DATA, EXTRA-HEAVY TABASCO TANKS AND STANDS—TYPE "S"

Size	36″x5′	42″x5′	48″x5′	54″x5′	60″x5′	60″x6′
Cipher	Gorn	Gole	Goen	Glad	Gibe	Gist
Capacity, gallons	265	360	470	590	730	875
Total Height, Tank and Stand	7′ 2″	7′ 3″	7′ 6″	7′ 5″	7′ 6″	8′ 6″
Weight Tank, pounds	900	1200	1475	1900	2300	2500
Weight, Tank, Stands	160	180	200	220	250	250

Type "R" Type "S"

EXTRA HEAVY TABASCO HEATER AND VERTICAL TANK

Good for a working pressure of 100 pounds

All Tabasco Heaters are supplied with brass clean-out plugs

Standard Tabasco Tanks.

Tested to 100 pounds hydrostatic pressure, and for use where water-working pressure does not exceed 65 pounds.

Regularly made with openings so that they may be used horizontally or vertically.

Manholes, hand-holes, and coils furnished only when specially ordered.

We recommend that tanks containing coils be made with a manhole.

SPECIFICATIONS, STANDARD TABASCO TANKS

Capacity, Gals.	Size, In.	Approx. Shipping Weight, Lbs.	Openings, In.	Size Coil, In.
66	20x 4	225	1½	4 Pipes 1
85	20x 5	260	1½	4 " 1
100	24x 4	280	1½	4 " 1¼
120	24x 5	325	1½	4 " 1¼
140	24x 6	360	1½	4 " 1¼
150	30x 4	425	2	4 " 1¼
180	30x 5	490	2	4 " 1¼
220	30x 6	555	2	4 " 1¼
250	30x 7	620	2	4 " 1¼
295	30x 8	685	2	4 " 1¼
315	36x 6	740	2	4 " 1½
365	36x 7	825	2	4 " 1½
420	36x 8	910	2	4 " 1½
525	36x10	1080	2	4 " 1½
430	42x 6	890	2	4 " 1½
500	42x 7	985	2	4 " 1½
575	42x 8	1080	2	4 " 1½
720	42x10	1270	2	4 " 1½
865	42x12	1460	2	4 " 1½
1000	42x14	1650	2	4 " 1½

Extra-Heavy Tabasco Tanks.

Tested to 150 pounds hydrostatic pressure, and for use where water-working pressure does not exceed 100 pounds; otherwise arranged the same as Standard Tanks.

For greater pressure, prices and specifications will be submitted on application.

SPECIFICATIONS, EXTRA-HEAVY TABASCO TANKS

Capacity, Gals.	Size, In.	Thickness Shell, In.	Convex Head, In.	Concave Head, In.	Approx. Shipping Weight, Lbs.	Size Openings, In.
120	24x 5	3/16	1/4	5/16	410	1½
140	24x 6	"	"	"	470	1½
180	30x 5	"	"	"	530	2
220	30x 6	"	"	"	600	2
250	30x 7	"	"	"	670	2
295	30x 8	"	"	"	750	2
315	36x 6	1/4	5/16	3/8	950	2
365	36x 7	"	"	"	1060	2
420	36x 8	"	"	"	1170	2
525	36x10	"	"	"	1390	2
430	42x 6	"	"	"	1140	2
500	42x 7	"	"	"	1270	2
575	42x 8	"	"	"	1400	2
720	42x10	"	"	"	1660	2
865	42x12	"	"	"	1940	2
1000	42x14	"	"	"	2200	2
750	48x 8	"	"	"	1600	3
940	48x10	"	"	"	1900	3
1130	48x12	"	"	"	2200	3
1300	48x14	"	"	"	2500	3
1500	48x16	"	"	"	2800	3
1700	48x18	"	"	"	3100	3

Kewanee Radiators for Steam and Hot Water.

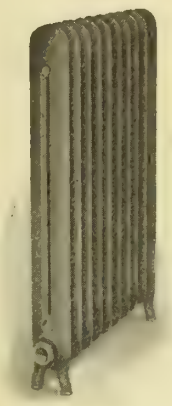
Single-Column—Regularly tapped 1½ inches right hand and bushed according to tapping list.

Continued on next page

When top tapping is required it can be furnished 1½ inches and bushed, or tapped solid any size smaller than 1½ inches.

Distance from floor to center of supply or return tapping for water is 4½ inches; steam single-pipe, drop-hub 4 inches; steam double-pipe, supply 4½ inches; return, drop-hub 4 inches. Air-vent tappings are regularly made ⅛ inch. Add ½ inch for each bushing or plug to get total length measurement of radiator.

Made plain, as illustrated; and ornamental also.



KEWANEE SINGLE COLUMN RADIATOR PLAIN

SIZES, SINGLE-COLUMN RADIATORS

Height in inches	38	32	26	23	20
Square feet per section	3	2½	2	1⅔	1½

Length—2½ inches per section. Width of section—4½ inches.

Double-Column — Regularly tapped 2 inches right hand and bushed according to tapping list.

When top tapping is required it can be furnished 1½ inches and bushed, or tapped solid any size smaller than 1½ inches.

Other measurements and dimensions same as for Single-Column.

Made ornamental, as illustrated; and plain also.

KEWANEE DOUBLE-COLUMN RADIATOR, ORNAMENTAL

SIZES, DOUBLE-COLUMN RADIATORS

Height in inches	45	38	32	26	23	20
Square feet per section	5	4	3⅓	2⅔	2⅓	2

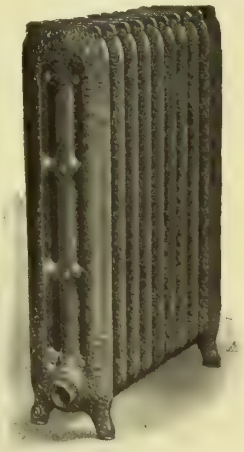
Length—2½ inches per section. Width of section—7½ inches.

Three-Column — Regularly tapped 2 inches right hand and bushed according to tapping list.

When top tapping is required it can be furnished 2 inches and bushed, or tapped solid any size smaller than 2 inches.

Other measurements and dimensions same as for Single-Column.

Made ornamental, as illustrated; and plain also.



KEWANEE THREE-COLUMN RADIATOR, ORNAMENTAL

SIZES, THREE-COLUMN RADIATORS

Height in inches	45	38	32	26	22	18
Square feet per section	6	5	4½	3¾	3	2¼

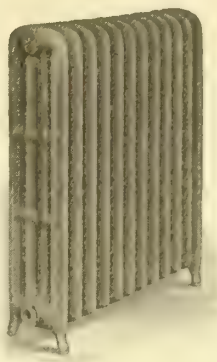
Length—2½ inches per section. Width of section—9 inches.

Four-Column—Regularly tapped 2 inches right hand and bushed according to tapping list.

When top tapping is required it can be furnished 2 inches and bushed, or tapped solid any size smaller than 2 inches.

Other measurements and dimensions same as for Single-Column.

Made plain, as illustrated; and ornamental also.



KEWANEE FOUR-COLUMN RADIATOR, PLAIN

SIZES, FOUR-COLUMN RADIATORS

Height in inches	45	38	32	26	22	18
Square feet per section	10	8	6½	5	4	3

Length—3 inches per section. Width of section—11⅛ inches.

Window—These radiators will be tapped 2 inches and bushed according to the list, unless the solid tapping is expressly ordered. When top tapping is desired it can be furnished tapped 2 inches and bushed, or tapped solid to order from factory.

KEWANEE WINDOW RADIATOR, PLAIN

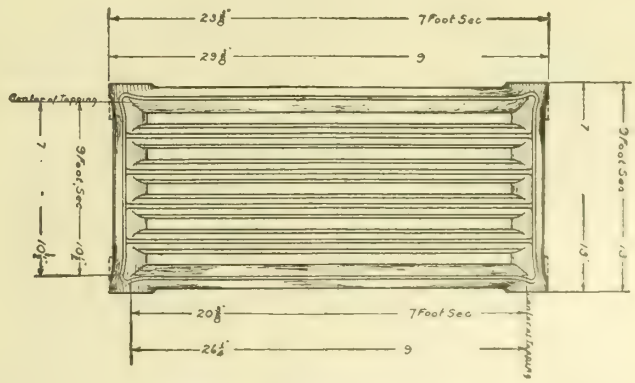
All openings will be right hand threaded, unless otherwise ordered. Air-valve tappings are regularly made ⅛ inch. Add ½ inch for each bushing to get total length measurement of radiator.

Made plain, as illustrated; and ornamental also.

SIZES, WINDOW RADIATORS

Height in inches	20	18	16	14	13
Square feet per section	5	4⅓	3¾	3	3

Length—3 inches per section. Width of section—12 inches.
Width of Legs—13 inches.



KEWANEE WALL RADIATOR

THE J. H. McLAIN COMPANY

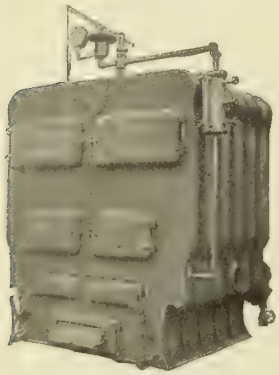
Hot-Water and Steam Boilers, Radiators and Supplies

CANTON, OHIO

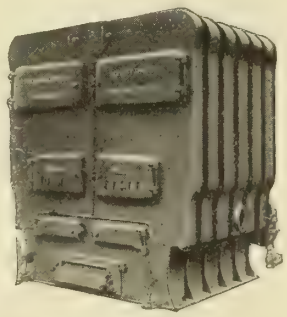
Products.

ANNAPOLIS STEAM BOILERS; WEST POINT WATER BOILERS; McLAIN GAS BOILERS—STEAM; McLAIN GAS BOILERS—WATER; YALE STEAM BOILERS; PURDUE WATER BOILERS; VASSAR WATER BOILERS; RUGBY TANK HEATERS; OHIO LAUNDRY HEATERS; McLAIN RADIATORS, one-, two-, three- and four-column, plain or ornamental, five-column, plain only; McLAIN DIRECT-INDIRECT RADIATORS.

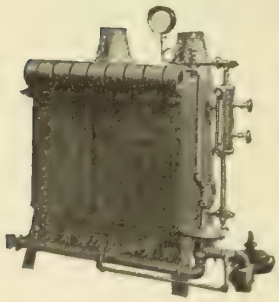
TRADE-MARK



ANNAPOLIS STEAM BOILER
48-inch series



WEST POINT WATER BOILER
48-inch series



McLAIN GAS BOILER
For steam

McLAIN GAS BOILER
For water

WEST POINT WATER BOILERS

Number of Heater	Number of Sections	Grate Area, Square Feet	Outlets, Number and Size in Inches	Length Heater, Inches	Size Ash Base, Inches	Water Rating	List Price
15- 4-W	4	2.19	2-3	19½	25x19½	650	$200.00
15- 5-W	5	2.80	2-3	24¾	25x24¾	850	235.00
15- 6-W	6	3.40	2-3	30	25x30	1050	280.00
15- 7-W	7	4.00	2-3	35¼	25x35¼	1250	325.00
18- 5-W	5	4.38	2-4	36	25½x36	1450	360.00
18- 6-W	6	5.25	2-4	43	25½x43	1750	410.00
18- 7-W	7	6.13	2-4	50	25½x50	2050	460.00
21- 5-W	5	4.82	2-4	36	28x36	1800	420.00
21- 6-W	6	5.80	2-4	43	28x43	2150	480.00
21- 7-W	7	6.79	2-4	50	28x50	2475	540.00
21- 8-W	8	7.77	2-4	57	28x57	2825	600.00
28- 5-W	5	6.73	2-4	35	36x36	2450	532.00
28- 6-W	6	8.12	2-4	42	36x43	3025	636.00
28- 7-W	7	9.50	3-4	49	36x50	3600	741.00
28- 8-W	8	10.90	3-4	56	36x57	4175	845.00
28- 9-W	9	12.27	3-4	63	36x64	4750	950.00
36- 5-W	5	9.94	2-5	42½	44x42	3800	754.00
36- 6-W	6	12.12	2-5	51	44x50¾	4675	869.00
36- 7-W	7	14.31	3-5	59½	44x59½	5550	984.00
36- 8-W	8	16.50	3-5	68	44x68¼	6400	1099.00
36- 9-W	9	18.69	4-5	76½	44x77	7275	1214.00
48- 6-W	6	16.16	2-5	52	58x51	7750	1258.75
48- 7-W	7	19.00	3-5	61	58x59¾	9125	1427.00
48- 8-W	8	22.00	3-5	70	58x68½	10500	1595.25
48- 9-W	9	24.91	4-5	79	58x77¼	11875	1763.50
48-10-W	10	27.83	4-5	88	58x86	13250	1931.75
48-11-W	11	30.83	5-5	97	58x94¾	14625	2100.00
48-12-W	12	33.66	5-5	106	58x103½	16000	2268.25

McLAIN GAS BOILERS

STEAM

Number of Heater	Height, Inches	Length, Inches	Depth, Inches	Flow and Return Tappings, No. and Size in Inches	Size Gas Feed, Inches	Number of 6-inch Flues	Steam Rating	List Price
G- 4-S	43	13⅝	29	2-3	1	1	450	$260.00
G- 5-S	43	17½	29	2-3	1	1	600	300.00
G- 6-S	43	21⅜	29	2-3	1	1	750	340.00
G- 7-S	43	25¼	29	2-3	1¼	2	900	380.00
G- 8-S	43	29⅛	29	2-3	1¼	2	1050	420.00
G- 9-S	43	33	29	2-3	1¼	2	1200	460.00
G-10-S	43	36⅞	29	2-3	1¼	2	1350	500.00
G-11-S	43	40¾	29	2-3	1¼	2	1500	540.00
G-12-S	43	44⅝	29	2-3	1¼	3	1650	580.00
G-13-S	43	48½	29	2-3	1¼	3	1800	620.00
G-14-S	43	52⅜	29	2-3	1¼	3	1950	660.00
G-15-S	43	56¼	29	2-3½	1¼	3	2100	700.00
G-16-S	43	60⅛	29	2-3½	1¼	3	2250	740.00

ANNAPOLIS STEAM BOILERS

Number of Heater	Number of Sections	Grate Area, Square Feet	Outlets, Number and Size in Inches	Length Heater, Inches	Size Ash Base, Inches	Steam Rating	List Price
15- 4-S	4	2.19	2-3	19½	25x19½	425	$210.00
15- 5-S	5	2.80	2-3	24¾	25x24¾	550	245.00
15- 6-S	6	3.40	2-3	30	25x30	675	290.00
15- 7-S	7	4.00	2-3	35¼	25x35¼	800	335.00
18- 5-S	5	4.38	2-4	36	25½x36	900	370.00
18- 6-S	6	5.25	2-4	43	25½x43	1075	420.00
18- 7-S	7	6.13	2-4	50	25½x50	1250	470.00
21- 5-S	5	4.82	2-4	36	28x36	1100	430.00
21- 6-S	6	5.80	2-4	43	28x43	1300	490.00
21- 7-S	7	6.79	2-4	50	28x50	1500	550.00
21- 8-S	8	7.77	2-4	57	28x57	1700	610.00
28- 5-S	5	6.73	2-4	35	36x36	1475	542.00
28- 6-S	6	8.12	2-4	42	36x43	1825	646.00
28- 7-S	7	9.50	3-4	49	36x50	2175	751.00
28- 8-S	8	10.90	3-4	56	36x57	2525	855.00
28- 9-S	9	12.27	3-4	63	36x64	2875	960.00
36- 5-S	5	9.94	2-5	42½	44x42	2300	774.00
36- 6-S	6	12.12	2-5	51	44x50¾	2825	889.00
36- 7-S	7	14.31	3-5	59½	44x59½	3350	1004.00
36- 8-S	8	16.50	3-5	68	44x68¼	3875	1119.00
36- 9-S	9	18.69	4-5	76½	44x77	4400	1234.00
48- 6-S	6	16.16	2-5	52	58x51	4700	1250.00
48- 7-S	7	19.00	3-5	61	58x59¾	5550	1420.00
48- 8-S	8	22.00	3-5	70	58x68½	6400	1590.00
48- 9-S	9	24.91	4-5	79	58x77¼	7250	1760.00
48-10-S	10	27.83	4-5	88	58x86	8100	1930.00
48-11-S	11	30.83	5-5	97	58x94¾	8950	2100.00
48-12-S	12	33.66	5-5	106	58x103½	9800	2270.00

McLAIN GAS BOILERS

WATER

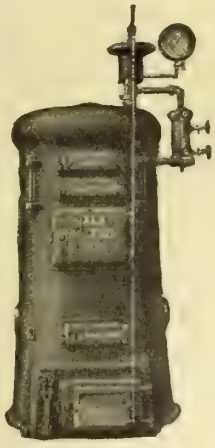
Number of Heater	Height, Inches	Length, Inches	Depth, Inches	Flow and Return Tappings, No. and Size in Inches	Size Gas Feed, Inches	Number of 6-inch Flues	Water Rating	List Price
G- 4-W	43	13⅝	29	2-3	1	1	720	$260.00
G- 5-W	43	17½	29	2-3	1	1	960	300.00
G- 6-W	43	21⅜	29	2-3	1	1	1200	340.00
G- 7-W	43	25¼	29	2-3	1¼	2	1440	380.00
G- 8-W	43	29⅛	29	2-3	1¼	2	1680	420.00
G- 9-W	43	33	29	2-3	1¼	2	1920	460.00
G-10-W	43	36⅞	29	2-3	1¼	2	2160	800.00
G-11-W	43	40¾	29	2-3	1¼	3	2400	840.00
G-12-W	43	44⅝	29	2-3	1¼	3	2640	880.00
G-13-W	43	48½	29	2-3	1¼	3	2880	620.00
G-14-W	43	52⅜	29	2-3	1¼	3	3120	660.00
G-15-W	43	56¼	29	2-3½	1¼	3	3360	700.00
G-16-W	43	60⅛	29	2-3½	1¼	3	3600	740.00

SPECIAL CATALOGUE

Continued on next page

YALE STEAM BOILERS

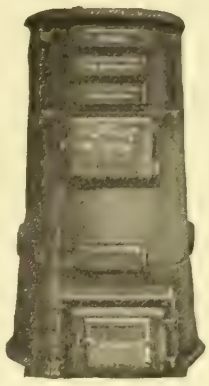
No. Heater	Grate Area, Sq. Ft.	Outlets and Inlets, No. and Size in Ins.	Height Water Line, Ins.	Size Ash Base, Ins.	Ratings	List Price
1-15-S	1.22	2–2	43	25¼	250	$132.00
1-17-S	1.40	2–2	41	25¼	275	140.50
2-17-S	1.40	2–2	45	25¼	300	149.50
3-17-S	1.40	2–2	49	25¼	325	158.00
1-19-S	1.76	2–2½	41	27¼	350	167.00
2-19-S	1.76	2–2½	45¼	27¼	400	193.00
3-19-S	1.76	2–2½	49½	27¼	450	219.00
1-22-S	2.40	2–3	41¾	30½	500	220.00
2-22-S	2.40	2–3	46¼	30½	575	240.00
3-22-S	2.40	2–3	50¾	30½	650	260.00
1-25-S	3.20	2–3½	43½	35	700	300.00
2-25-S	3.20	2–3½	48	35	775	330.00
3-25-S	3.20	2–3½	52½	35	850	360.00
1-28-S	4.12	2–4	46¼	39	900	361.00
2-28-S	4.12	2–4	51¾	39	1000	389.00
3-28-S	4.12	2–4	57¼	39	1100	417.00



YALE STEAM BOILER

PURDUE WATER BOILERS

No. Heater	Grate Area, Sq. Ft.	Outlets and Inlets, No. and Size in Ins.	Size Smoke Pipe, Ins.	Size Ash Base, Ins.	Ratings	List Price
17-2-W	1.40	2–2	7	25¼	400	$130.00
17-3-W	1.40	2–2	7	25¼	500	140 50
17-4-W	1.40	2–2	7	25¼	550	153.50
19-2-W	1.76	2–2½	7	27¼	675	187 50
19-3-W	1.76	2–2½	7	27¼	750	197.00
19-4-W	1.76	2–2½	7	27¼	825	210.50
22-2-W	2.40	2–3	9	30½	800	207.50
22-3-W	2.40	2–3	9	30½	875	217.50
22-4-W	2.40	2–3	9	30½	950	230.00
25-2-W	3.20	2–3½	9	35	1150	290 00
25-3-W	3.20	2–3½	9	35	1250	307 00
25-4-W	3.20	2–3½	9	35	1350	325.00
28-2-W	4.12	2–4	9	39	1400	336 00
28-3-W	4.12	2–4	9	39	1500	350 00
28-4-W	4.12	2–4	9	39	1600	372 50
28-5-W	4.12	2–4	9	39	1700	389.50



PURDUE WATER BOILER

VASSAR WATER BOILERS

No. Heater	Height to Top Outlet, Ins.	Size Ash Base, Ins.	Size Fire-Pot, Ins.	Grate Area, Sq. Ft.	Outlets and Inlets, No. and Size in Ins.	Size Smoke Pipe, Ins.	Ratings	List Price
2170	45	25¼	17	1.40	2–2	7	400	$130.00
3170	49	25¼	17	1.40	2–2	7	500	140.50
4170	53	25¼	17	1.40	2–2	7	550	153.50
2190	46	27¼	19	1.76	2–2½	8	675	187.50
3190	50	27¼	19	1.76	2–2½	8	750	197.00
4190	54	27¼	19	1.76	2–2½	8	825	210.50
2220	47¾	30½	22	2.40	2–3	9	800	207.50
3220	52	30½	22	2.40	2–3	9	875	217.50
4220	56¼	30½	22	2.40	2–3	9	950	230.00
2250	50	35	25	3.20	2–3	10	1150	290.00
3250	54½	35	25	3.20	2–3	10	1250	307.00
4250	59	35	25	3.20	2–3	10	1350	325.00
2280	52	39	28	4.12	2–4	12	1400	336.00
3280	57	39	28	4.12	2–4	12	1500	350.00
4280	62	39	28	4.12	2–4	12	1600	372.50
5280	67	39	28	4.12	2–4	12	1700	389.50

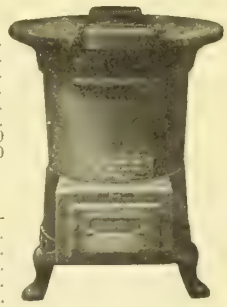
OHIO LAUNDRY HEATERS

OHIO No. 10

Diam. Grate	10 ins
Smoke Pipe	6 ins.
Diam. Top	24 ins.
Outlet	1–1¼ ins.
inlet	1–1¼ ins.
Feed Door	6 x 8 ins.
Floor to Top Smoke Outlet	29½ ins.
Gallons Hot Water per hour	60 to 140
List Price	$39.50

OHIO JUNIOR

Diam. Grate	9 ins.
Smoke Pipe	6 ins.
Diam. Top	20 x 13 ins.
Outlet	1–1 in.
Inlet	1–1 in.
Feed Door	8 x 5 ins.
Floor to Top Smoke Outlet	25 ins.
Gallons Hot Water per hour	75
List Price	$28.00



OHIO LAUNDRY HEATER

VASSAR WATER BOILER

RUGBY TANK HEATER

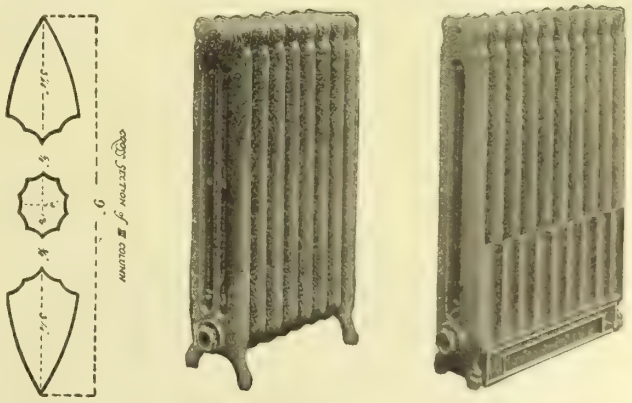
RUGBY TANK HEATERS

Number	0	10	12	16	18	20	22
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Diam. Grate	10	10	12	12	15	17	19
Size of Base	17	17	20	20	26	25¼	27¼
Diam. Fire-Pot at Bottom	14½	14½	16¼	16¼	19½	21	23
Height of Water Barrel	18	22	20	24	26	28	29
Height from Floor to Center of Upper Tapping Boss	25	29	29	33	38	41	42
Height from Floor to Center of Lower Tapping Boss	10	10	11½	11½	15½	16	16
Height from Grates to Bottom of Fire-Door	9½	14	10	13	16½	13	13½
Height Under Grate in Ash-Pit	7½	7½	8½	8½	12½	12½	12½
Height from Floor to Top of Smoke Dome	31	35	35	39	44	41	42
Fire-Door	8x6	8x6	8½x6½	8½x6½	10¼x7	12x9	12x9
Outlets	1–1½	1–1½	1–1½	1–2	2–2	2–2	2–2½
Inlets	1–1½	1–1½	1–1½	1–2	2–2	2–2	2–2½
Smoke Pipe	5	5	6	6	6	7	8
Capacity in Gallons	100	200	250	300	350	450	600
Ratings	75	150	190	200	270	350	500
List Price	$40.00	$50.00	$60.00	$70.00	$80.00	$105.00	$138.00

McLain Radiators.

McLain Radiators of three or more columns are made with the outside columns considerably larger than the inside columns, and with a larger air-space between the different columns, than in any other type of construction.

Hence, the greatest heating area is placed where there is the greatest amount of circulating air, and the generous openings between the columns afford free circulation through the radiator at all times.



Cross-Section 3-Column — 3-Column Ornamental — Direct-Indirect, Ornamental

McLAIN RADIATORS

Catalogue.

"Facts for Fitters" is a handy pocket-size catalogue of our complete product.

ESTABLISHED 1856 INCORPORATED 1877

THE WM. H. PAGE BOILER CO.

MANUFACTURERS OF

Steam and Hot Water Boilers

9-15 Murray Street
NEW YORK, N. Y.

TELEPHONE, BARCLAY 7139

FACTORIES
MEADVILLE, PA.
NORWICH, CONN.

BRANCH OFFICES AND WAREHOUSES
BOSTON CHICAGO PHILADELPHIA CLEVELAND

Products.

"VOLUNTEER" and "MONARCH" STEAM and HOT-WATER BOILERS.

"Volunteer" Boilers, Steam and Hot-Water.

"Volunteer" Boilers are made entirely of the best quality of cast iron, and are tested to 100 pounds hydrostatic pressure. The only joints or connections are formed of heavy cast iron threaded nipples, iron to iron, making a perfect and permanent joint, with no possibility of leaks and absolute freedom from all necessity of packing or bolts of any description.

The "Volunteer" Steam and Water Boilers are identical in construction, except that the top section of the water boiler is six inches lower than the dome of the steam boiler, in order to reduce the amount of water, to enable it to readily absorb the heat units and circulate freely and rapidly.

The circular ash-pit is deep and the grate is a patent triangular revolving type, the grate bars being changeable in a few moments. Fire-pots are large and deep and the inner surface is covered with small points, preventing the water from chilling the fire.

All connecting joints are made by screw nipples, insuring ease of erection, permanency and strength. "Open" and "closed" sections above fire-pot alternate, the former allowing the products of combustion to pass through the openings and the latter forcing them to pass around and over the edges. In this manner the gases are retained in the boiler until practically all the heat is absorbed by the water.

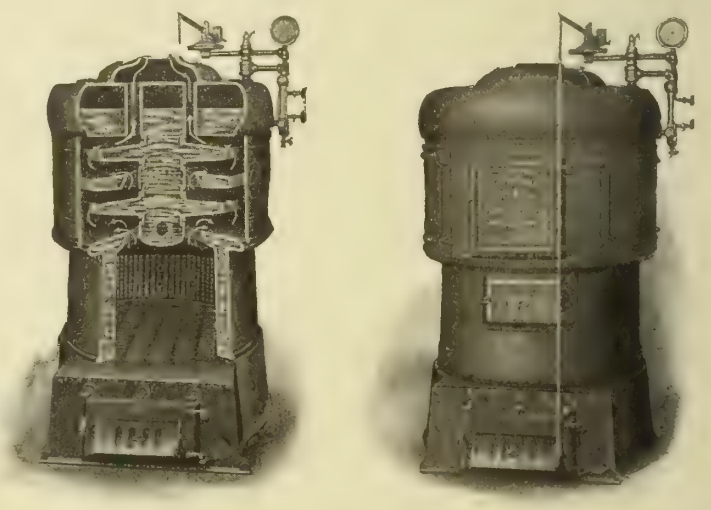
The side-outlet smoke-hood is especially adapted for low ceilings, reducing height of boiler about six inches.

"Volunteer" Steam Boilers are equipped with regulator and check drafts for controlling the drafts automatically.

"Monarch" Boilers, Steam and Hot-Water.

Monarch Sectional Steam and Hot-Water Boilers are particularly adapted for large heating work. They excel in direct-heating surface proportionate to grate surface.

Sections—All "Monarch" Steam and Water Boilers are made on the unit or sectional principle, and their capacity can be increased or diminished by adding or taking from the number of sections. Therefore, should the building be enlarged at any time after boiler is in-



Sectional View Complete View

"VOLUNTEER" STEAM BOILER

DATA OF "VOLUNTEER" STEAM AND WATER BOILERS

Number of Boiler	Rating, Steam, square feet Note *	Rating, Water, square feet Note **	Diameter of Grate and Fire-Pot, inches	Area of Grate, square feet	Number of Sections	Number and Size of Outlets, inches	Number and Size of Inlets, inches	Diameter of Smoke-Pipe
0	200	325	15	1.23	1	2–2	2–2	7
1	250	400	15	1.23	2	2–2	2–2	7
1½	275	450	15	1.23	3	2–2	2–2	7
2	300	475	15	1.23	4	2–2	2–2	7
3	350	550	18	1.76	2	2–2½	2–2½	7
3½	375	600	18	1.76	3	2–2½	2–2½	7
4	400	650	18	1.76	4	2–2½	2–2½	7
5	475	750	21	2.40	2	2–3	2–3	8
5½	525	850	21	2.40	3	2–3	2–3	8
6	575	925	21	2.40	4	2–3	2–3	8
7	675	1050	25	3.41	2	2–3	2–3	10
7½	750	1200	25	3.41	3	2–3	2–3	10
8	825	1325	25	3.41	4	2–3	2–3	10
9	1000	1600	30	4.90	2	2–3½	2–3½	10
9½	1150	1850	30	4.90	3	2–3½	2–3½	10
10	1300	2100	30	4.90	4	2–3½	2–3½	10
11½	1700	2700	36	7.07	3	2–4	2–4	12
12	2000	3200	36	7.07	4	2–4	2–4	12
13½	2800	4500	42	9.62	3	2–4	4–4	12
14	3300	5275	42	9.62	4	2–4	4–4	12
15	4000	6500	42	9.62	4	2–5	4–4	12

* A boiler one size larger is required when soft coal is to be used for fuel, than would be used for hard coal.

** See remarks in regard to *ratings* on following page.

Number of sections above listed includes dome.

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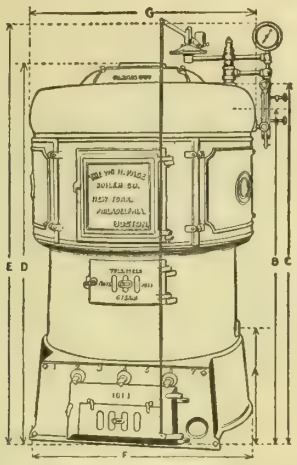


"VOLUNTEER" STEAM BOILER
Dimension Diagram

stalled, its capacity can be increased by the addition of more sections to meet the requirements.

The "Monarch" is made with two forms of connections for joining the sections: One termed "Push-nipple," consisting of heavy machine-turned smooth-tapered nipples made of cast iron, the same as the boiler, and held together by heavy tie rods; the other is known as "Header" type, the sections being connected independently to a header or manifold by means of lock-nut threaded nipples. Neither connections are in any way exposed to the action of the fire, and are unaffected by expansion or contraction, and insure absolutely tight and permanent joints.

The "push-nipple" form is lower in height, which is a particularly advantageous feature where head room is deficient, obviating the necessity in shallow cellars of digging a pit in which to set the boiler. In all other respects both constructions are identical.

Cleaning.

The large front and rear clean-out doors give free access to every part of the fire surface.

Grates.

The grate bars are divided into two sections, each operated by a separate lever, thus permitting agitation of the whole body of fire or only certain segments of it.

By removing the front panel of the ash-pit (see illustration) the entire grate frame can be withdrawn, giving free access to every part of the grate.

When adding sections to the boiler, new sections can also be added to the ash-pit, obviating the necessity of an entire new ash-pit.

Ratings.

Boiler ratings as given are conservatively made according to accepted standards and are derived from careful and exhaustive tests which proved their safety, and are based on a standard of two-pounds pressure maintained at the boiler for steam, and 180 degrees for hot water.

All piping (mains and risers, flows and returns) is to be figured as radiating surface in addition to the direct and indirect radiation attached to same.

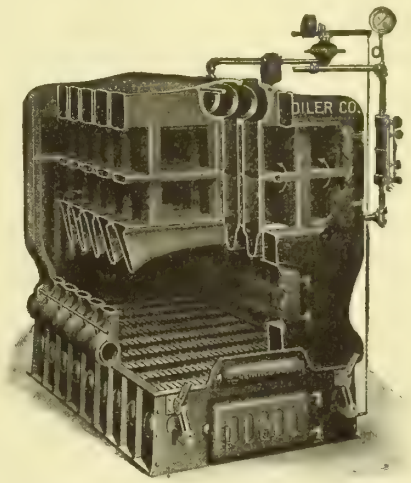
Under usual conditions an allowance for piping and factor of safety is considered equal to approximately 50 per cent of the net amount of direct radiators.

"VOLUNTEER" STEAM BOILER MEASUREMENTS

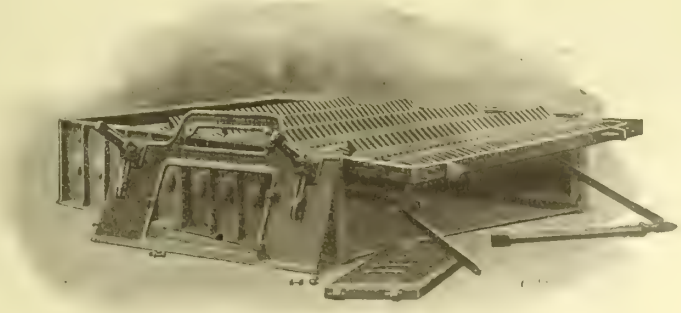
No.	A	B	C	D	E	F	G
0	16¼"	42¼"	46"	50½"	56½"	26¼"	24½"
1	16¼"	46¼"	50"	54½"	60½"	26¼"	24½"
1½	16¼"	50¼"	54"	58½"	64½"	26¼"	24½"
2	16¼"	54¼"	58"	62½"	68½"	26¼"	24½"
3	17¾"	48¾"	52¼"	56¾"	63¼"	27"	26¾"
3½	17¾"	53"	56½"	61"	67½"	27"	26¾"
4	17¾"	57¼"	60¾"	65¼"	71¾"	27"	26¾"
5	19½"	52"	56"	60"	66"	30½"	31¼"
5½	19½"	57"	61"	65"	71"	30½"	31¼"
6	19½"	62"	66"	70"	76"	30½"	31¼"
7	19½"	52¼"	56½"	61½"	67¼"	35"	35¾"
7½	19½"	57½"	61¾"	66½"	72½"	35"	35¾"
8	19½"	62¾"	67"	71½"	77¾"	35"	35¾"
9	20"	55½"	59"	64¾"	69"	42¾"	40"
9½	20"	60¾"	64¼"	70"	74¼"	42¾"	40"
10	20"	66"	69½"	75¼"	79½"	42¾"	40"
11½	19½"	60¼"	65"	70½"	75¼"	47½"	48¼"
12	19½"	65¾"	70½"	76"	80¾"	47½"	48¼"
13½	19½"	62½"	70½"	71½"	78"	54½"	55½"
14	19½"	68½"	76½"	77½"	84"	54½"	55½"
15	19½"	73½"	77½"	84"	89½"	54½"	70½"

When side-outlet smoke-hood is used, the height of boiler at top of smokepipe will be reduced about one half the diameter of smokepipe.

Water boiler measurements are the same, except that top section is six inches lower than the dome of steam boiler.



SECTIONAL VIEW "MONARCH" BOILER, PUSH-NIPPLE TYPE



"MONARCH" GRATE

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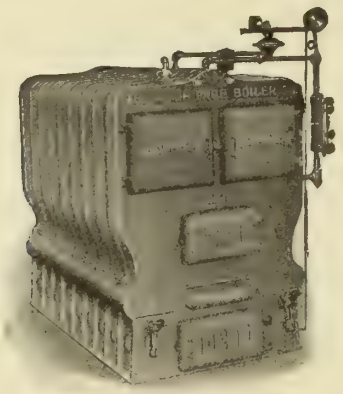

"MONARCH" STEAM BOILER, PUSH-NIPPLE TYPE

"MONARCH" STEAM BOILER, HEADER TYPE

"E" Series — "MONARCH" STEAM AND WATER BOILERS, PUSH-NIPPLE TYPE

Number of Boiler	Number of Sections	Rating, Steam, square feet Note *	Rating, Water, square feet Note*	Size of Grate, inches	Area of Grate, square feet	Height, Water Line, inches	Height to Outlet, inches	Extreme Width, inches	Extreme Length, inches	Size of Smoke Pipe, inches	Outlets and Inlets, inches
P 405	5	2400	3975	40 x 33 1/8	9.55	59	72 1/2	60	58	18	2–5
P 406	6	3000	4950	40 x 41 1/2	11.52	59	72 1/2	60	66 3/8	18	2–5
P 407	7	3600	5925	40 x 49 7/8	13.85	59	72 1/2	60	74 3/4	18	2–5
P 408	8	4200	6925	40 x 58 1/4	16.18	59	72 1/2	60	83 1/8	18	2–5
P 409	9	4800	7925	40 x 66 5/8	18.50	59	72 1/2	60	91 1/2	18	2–5
P 410	10	5400	8900	40 x 75	20.82	59	72 1/2	60	99 7/8	18	2–5
P 411	11	6000	9900	40 x 83 3/8	23.13	59	72 1/2	60	108 1/4	18	2–5
P 412	12	6600	10900	40 x 91 3/4	25.50	59	72 1/2	60	116 5/8	18	2–5
P 413	13	7200	11875	40 x 91 3/4	25.50	59	72 1/2	60	125	18	2–5
P 414	14	7800	12875	40 x 91 3/4	25.50	59	72 1/2	60	133 3/8	18	2–5
P 415	15	8400	13850	40 x 91 3/4	25.50	59	72 1/2	60	141 3/4	18	2–5
"F" Series											
P 504	4	1200	1975	28 x 24 3/4	4.82	55	64 1/2	46	49 5/8	12	2–5
P 505	5	1600	2625	28 x 33 1/8	6.45	55	64 1/2	46	58	12	2–5
P 506	6	2000	3300	28 x 41 1/2	8.07	55	64 1/2	46	66 3/8	12	2–5
P 507	7	2400	3950	28 x 49 7/8	9.70	55	64 1/2	46	74 3/4	12	2–5
P 508	8	2800	4600	28 x 58 1/4	11.32	55	64 1/2	46	83 1/8	12	2–5
P 509	9	3200	5275	28 x 66 5/8	12.96	55	64 1/2	46	91 1/2	12	2–5
"G" Series											
P 604	4	650	1075	22 x 20	3.35	44	52	38 1/2	40	10	2–3
P 605	5	850	1400	22 x 26 3/8	4.03	44	52	38 1/2	46 3/8	10	2–3
P 606	6	1050	1725	22 x 32 3/4	5.00	44	52	38 1/2	52 3/4	10	2–3
P 607	7	1250	2050	22 x 39 1/8	5.98	44	52	38 1/2	59 1/8	10	2–3

"H" Series — "MONARCH" STEAM AND WATER BOILERS, HEADER TYPE

Number of Boiler	Number of Sections	Rating, Steam, square feet Note *	Rating, Water, square feet Note*	Size of Grate, inches	Area of Grate, square feet	Height, Water Line, inches	Height to Outlet, inches	Extreme Width, inches	Extreme Length, inches	Size of Smoke Pipe, inches	Outlets and Inlets, inches
H 705	5	2400	3975	40 x 33 1/8	9.55	59	82	75	58	18	2–5
H 706	6	3000	4950	40 x 41 1/2	11.52	59	82	75	66 3/8	18	2–5
H 707	7	3600	5925	40 x 49 7/8	13.85	59	82	75	74 3/4	18	2–5
H 708	8	4200	6925	40 x 58 1/4	16.18	59	82	75	83 1/8	18	2–5
H 709	9	4800	7925	40 x 66 5/8	18.50	59	82	75	91 1/2	18	2–5
H 710	10	5400	8900	40 x 75	20.82	59	82	75	99 7/8	18	2–5
H 711	11	6000	9900	40 x 83 3/8	23.15	59	82	75	108 1/4	18	2–5
H 712	12	6600	10900	40 x 91 3/4	25.50	59	82	75	116 5/8	18	2–5
"I" Series											
H 804	4	1200	1975	28 x 24 3/4	4.82	55	76	61 3/4	49 5/8	12	2–5
H 805	5	1600	2625	28 x 33 1/8	6.45	55	76	61 3/4	58	12	2–5
H 806	6	2000	3300	28 x 41 1/2	8.07	55	76	61 3/4	66 3/8	12	2–5
H 807	7	2400	3950	28 x 49 7/8	9.70	55	76	61 3/4	74 3/4	12	2–5
H 808	8	2800	4600	28 x 58 1/4	11.32	55	76	61 3/4	83 1/8	12	2–5
H 809	9	3200	5275	28 x 66 5/8	12.96	55	76	61 3/4	91 1/2	12	2–5
"J" Series											
H 904	4	650	1075	22 x 20	3.35	44	61	44	40	10	2–3
H 905	5	850	1400	22 x 26 3/8	4.03	44	61	44	46 3/8	10	2–3
H 906	6	1050	1725	22 x 32 3/4	5.00	44	61	44	52 3/4	10	2–3
H 907	7	1250	2050	22 x 39 1/8	5.98	44	61	44	59 1/8	10	2–3

* A boiler one size larger is required when soft coal is used for fuel than would be used for hard coal. See remarks in regard to ratings on preceding page.

ESTABLISHED 1850

THATCHER FURNACE COMPANY

Manufacturers of Boilers, House Heaters and Kitchen Ranges

TELEPHONE: GREELEY 1466

131-137 West 35th Street
NEW YORK, N. Y.

PLANTS
NEWARK, N. J.
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Products.

"THATCHER" PROGRESS DOUBLE and SINGLE, "THATCHER" ROUND and "LEADER" SECTIONAL BOILERS; "THATCHER" COMBINATION COAL and GAS RANGES; "THATCHER" TUBULAR and other Types of WARM-AIR FURNACES; LAUNDRY STOVES; "GEYSER" HOT-WATER HEATERS, etc.

"Thatcher" Progress Double Boiler.

Scope of Use—Double "Progress" Boilers, with capacities up to 18,000 square feet of steam radiation, are especially adapted for use in churches, schools, libraries, hospitals, greenhouses, hotels, restaurants, public halls, apartment houses, large private dwellings, etc.

Efficient Design—The basic principle of triangular-shaped sections remains always the ruling factor, producing the lowest practical waterline on the market, perfect water circulation and triple fire travel.

Because of the several feed doors and the short depth of grate, the "Progress" is the most easily fired boiler, and every foot of grate produces maximum results.

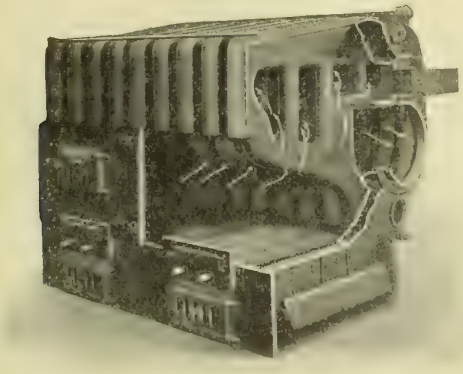
Economy—A double boiler costs much less to install than two single boilers. There is less complication in piping and valves, and less loss in radiation because only two ends of boiler are exposed instead of four; considerable economy is effected in less consumption of coal due to the "bridgewall" construction; and, further, there is the saving of floor space, which is often important.

Triangular Grates—Are furnished on 22- and 28-inch series.

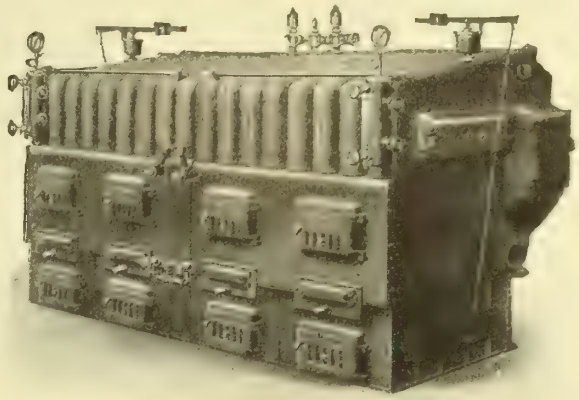
Flat Grates—Are supplied with Double Boilers and 40-inch Single Boilers. Bituminous or anthracite coal as small as pea coal may be burned on these grates.

Detailed Architects' Catalogue.

Furnished on request.



THATCHER "PROGRESS" SINGLE HOT-WATER BOILER
NO. 1040



NO. 1728 D. S. "PROGRESS" DOUBLE STEAM BOILER

"PROGRESS" DOUBLE BOILERS

STEAM										HOT WATER		
No. D-S	Rating	List Price	Length	Depth	Height	Grate Area, Sq. Ft.	Flow and Return Tap gs 2 Each, Ins.	Smoke Collar, Ins.	Feed Doors	No. D-W	Rating	List Price
1128	3,100	$1,170	101	46	55	14.02		2-12	2	1128	5,125	$1,150
1228	3,550	1,290	108	46	55	15.50	4	2-12	2	1228	5,950	1,270
1328	4,000	1,410	115	46	55	16 91		2-12	3	1328	6,700	1,390
1428	4,450	1,550	122	46	55	18.32		2-12	4	1428	7,450	1,530
1528	4,900	1,690	130	46	55	19.73		2-12	4	1528	8,200	1,670
1628	5,350	1,810	137	46	55	21 14	3	2-12	4	1628	8,950	1,790
1728	5,800	1,930	144	46	55	22 55	and	2-12	4	1728	9,700	1,910
1828	6,400	2,050	151	46	55	23 96	4	2-12	4	1828	10,700	2,030
1928	7,000	2,170	159	46	55	25 37		2-12	4	1928	11,700	2,150
1540	7,600	2,330	127	64	64	28 19		2-18	4	1540	12,650	2,290
1640	8,300	2,480	134	64	64	30 21		2-18	4	1640	13,800	2,440
1740	9,000	2,630	141	64	64	32.23		2-18	4	1740	16,175	2,590
1840	9,700	2,780	149	64	64	34.24		2-18	4	1840	17,350	2,740
1940	10,400	2,930	156	64	64	36 25		2-18	4	1940	18,525	2,890
2040	11,100	3,080	163	64	64	38 26		2-18	4	2040	19,700	3,040
2140	11,800	3,230	170	64	64	40 27	4	2-18	4	2140	21,025	3,190
2240	12,600	3,380	178	64	64	42 28	and	2-18	6	2240	22,350	3,340
2340	13,400	3,530	185	64	64	44 30	5	2-18	6	2340	23,675	3,490
2440	14,200	3,680	192	64	64	46 31		2-18	6	2440	25,000	3,640
2540	15,000	3,830	199	64	64	48.33		2-18	8	2540	26,350	3,790
2640	15,800	3,980	207	64	64	50.35		2-18	8	2640	27,700	3,940
2740	16,600	4,130	214	64	64	52.36		2-18	8	2740	29,050	4,090
2840	17,300	4,280	221	64	64	54 37		2-18	8	2840	30,400	4,240
2940	18,000	4,430	228	64	64	56 39		2-18	8	2940	31,750	4,390

Waterline: 48-inch on 28-inch grate series and 55-inch on 40-inch grate series.

"PROGRESS" SINGLE BOILERS

STEAM										HOT WATER		
No. S	Rating	List Price	Length, less Trim	Depth	Height	Grate Area, Sq. Ft.	Flow and Return 2 Each	Smoke Collar, Ins.	Feed Doors	No. W	Rating	List Price
522	800	$340	36¼	39	53	4.69	4	10	1	522	1,300	$330
622	1,100	430	43½	39	53	5.80	4	10	1	622	1,850	420
722	1,450	535	50¾	39	53	6.92	4	10	2	722	2,400	525
822	1,800	640	58	39	53	8.02	4	10	2	822	2,975	630
528	1,150	445	36¼	46	55	5.98	4	12	1	528	1,925	435
628	1,550	565	43½	46	55	7.32	4	12	1	628	2,600	555
728	2,000	685	50¾	46	55	8.80	4	12	2	728	3,350	675
828	2,450	805	58	46	55	10.22	4	12	2	828	4,100	795
928	2,900	925	65¼	46	55	11.62	4	12	2	928	4,850	915
1028	3,350	1,045	72½	46	55	13.02	4	12	2	1028	5,650	1,035
640	2,600	840	43½	64	64	10.55	5	18	1	640	4,350	830
740	3,200	990	50¾	64	64	12.57	5	18	2	740	5,275	980
840	3,800	1,140	58	64	64	14.58	5	18	2	840	6,325	1,130
940	4,500	1,290	65¼	64	64	16.53	5	18	2	940	7,500	1,280
1040	5,200	1,440	72½	64	64	18.61	5	18	2	1040	8,675	1,430
1140	5,900	1,590	79¾	64	64	20.62	5	18	2	1140	9,850	1,580
1240	6,700	1,740	87	64	64	22.63	5	18	2	1240	11,175	1,730
1340	7,500	1,890	94¼	64	64	24 05	5	18	3	1340	12,500	1,880
1440	8,300	2,040	101½	64	64	26.66	5	18	4	1440	13,850	2,030

Waterline: 48-inch in 22- and 28-inch and B series boilers; 55-inch in [illegible] series boilers.

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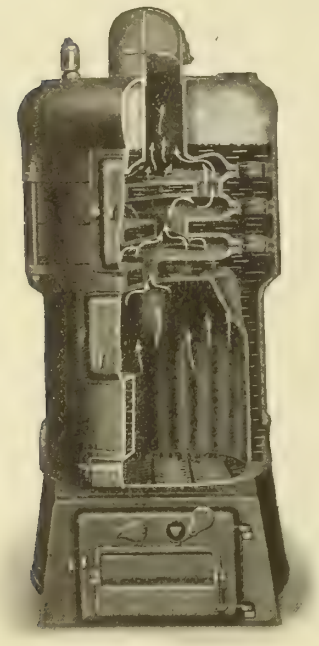
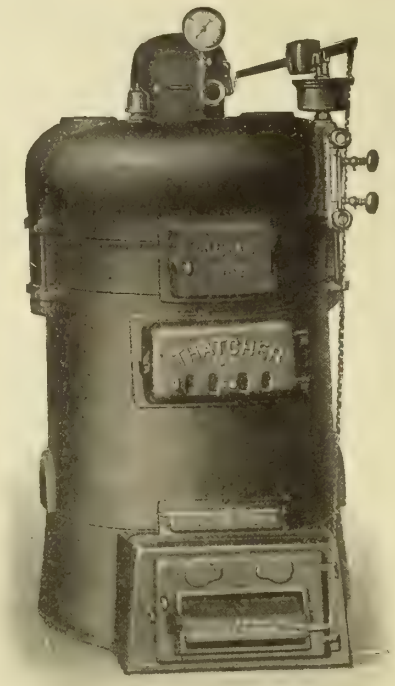


"Thatcher" No. 19-2 Steam Boiler cut open to show fire travel and water circulation



"Thatcher" No. 28-1 Steam Boiler

"Thatcher" No. 19-2 Hot-Water Boiler

"THATCHER" ROUND STEAM AND HOT-WATER BOILERS

"Thatcher" Round Boiler.

The "Thatcher" Round Boiler, in tests made under identical working conditions with other standard heaters, proved to be the most powerful house heater for rated capacity, not only in B.T.U. transmitted to the water, but in length of time between firing periods.

Fire Travel and Water Circulation—The efficient staggered fire travel between each section, from body to dome (causing flames to mushroom between sections), and the double surface formed by deep corrugations in dome section, are shown in accompanying illustration. Large and unobstructed waterways and three legs extending into fire-pot, which has straight sides, are important features.

The Grates—Of the triangular revolving type, which are the most efficient and easily operated.

The Base—High, with ample space under the grates for the convenient removal of ashes.

The Fire-Box—One and a half inches deeper than the accepted standard.

"THATCHER" STEAM BOILERS

No. of Boiler	19–0S	19–1S	19–2S	22–0S	22–1S	22–2S	25–0S	25–1S	25–2S	28–0S	28–1S	28–2S
Rating, Sq. Ft.	300	350	400	450	525	575	600	675	750	800	900	1,000
Diam. Grate, Ins.	19	19	19	22	22	22	25	25	25	28	28	28
Grate Area, Sq. Ft.	1.90	1.90	1.90	2.65	2.65	2.65	3.40	3.40	3.40	4.30	4.30	4.30
Flow and Return Openings, Ins.	2–3	2–3	2–3	2–3	2–3	2–3	2–3½	2–3½	2–3½	2–4	2–4	2–4
Diam. Smoke Pipe (Round) Ins.	7	7	7	8	8	8	9	9	9	9	9	9
List Price	$149.50	167.00	193.00	206.50	226.00	240.00	267.00	295.00	316.00	331.00	360.50	389.50

"THATCHER" HOT-WATER BOILERS

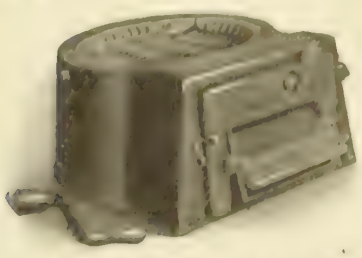
No. of Boiler	19–0W	19–1W	19–2W	22–0W	22–1W	22–2W	25–0W	25–1W	25–2W	28–0W	28–1W	28–2W
Rating, Sq. Ft.	500	575	650	750	875	950	1,000	1,150	1,225	1,325	1,500	1,650
Diam. Grate, Ins.	19	19	19	22	22	22	25	25	25	28	28	28
Grate Area, Sq. Ft.	1.90	1.90	1.90	2.65	2.65	2.65	3.40	3.40	3.40	4.30	4.30	4.30
Flow and Return Openings, Ins.	2–3	2–3	2–3	2–3	2–3	2–3	2–3½	2–3½	2–3½	2–4	2–4	2–4
Diam. Smoke Pipe (Round) Ins.	7	7	7	8	8	8	9	9	9	9	9	9
List Price	$140.50	158.00	184.50	197.00	217.50	230.00	260.00	290.00	310.00	321.50	350.50	380.00

The Automatic Damper Control—Another superior feature of the Thatcher Boiler. Delicately balanced draft damper door (in smoke hood) is connected directly with check draft damper door (in ash-pit door) by a chain through regulator. No necessity for long chain and pulley wheels usually fastened to ceiling.

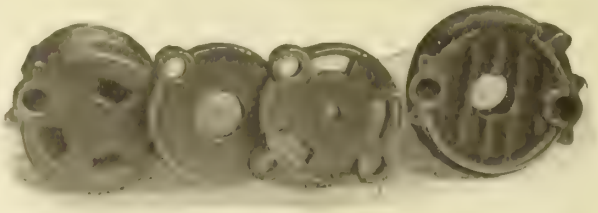
The Regulator—Of multiple-disc type, with discs of rust-proof phosphor bronze, which are extremely sensitive and cause regulator to respond to slightest pressure.

Detailed Architects' Catalogue.

Furnished on request.



"THATCHER" BOILER BASE WITH REVOLVING TRIANGULAR GRATES



"THATCHER" BOILER BODY, TWO WHITE SECTIONS AND DOME

"THATCHER" STEAM BOILER NO. 19-1 Showing automatic damper control

Continued on next page

"Thatcher" Tubular Furnace.

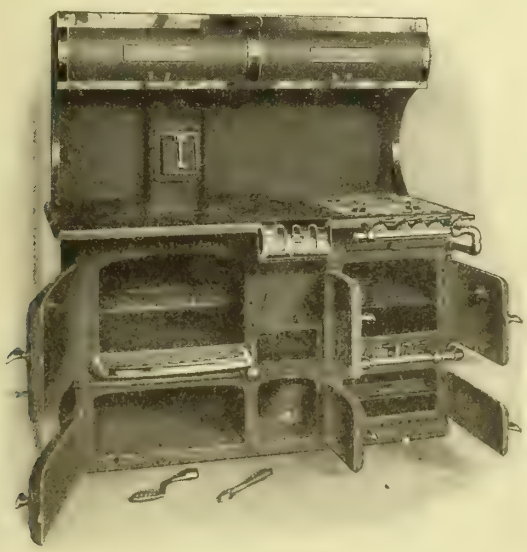
The "Tubular" is the furnace that primarily caused the success of the THATCHER FURNACE COMPANY.

For sixty-six years *it has proven itself by repeated tests the most economical and efficient warm air heater.*

The fact that it has been exclusively used by the Astor estate for over forty years is proof of its unusual service.

THE "THATCHER" TUBULAR FURNACE

No. of Furnace	Diam. Castings, Ins.	Height, Castings, Ins.	Diam. Castings, Ins.	Diam. Smoke Collar, Ins.	Heat Pipe Capacity, Sq. In.	Price, less Casing	Price, with Casing	Price, Brickset
38	38	52	32	7	403	$126.00	$147.00	$133.00
42	42	53	37	7	579	152.00	175.00	158.00
46	46	55	39	8	640	189.00	215.00	196.00
50	50	58	42	8	700	231.00	259.00	240.00
54	54	59	45	8	848	292.00	326.00	303.00
58	58	62	48	9	1030	347.00	385.00	357.00
62	62	64	53	9	1215	431.00	471.00	444.00



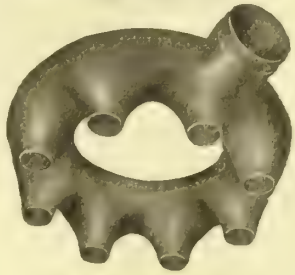
"THATCHER" COMBINATION RANGE FOR COAL AND GAS

Important Parts of "Thatcher" Tubular Furnace.

Monitor Top — Constructed to thoroughly mix rising fresh air before distribution.

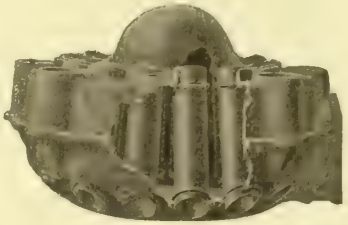
MONITOR TOP

Radiator—Smoke ring is cast in one piece, therefore, absolutely gas-tight, cup joints preventing any escape of gas from combustion chamber. Legs of radiator placed into cup joints so that smoke-pipe will lead in any direction required.



RADIATOR

"Tubular" Combustion Chamber — Constructed to allow complete combustion of hot gases. Tubes conduct the fresh air through chamber so *rapidly* that it is neither burned nor scorched.

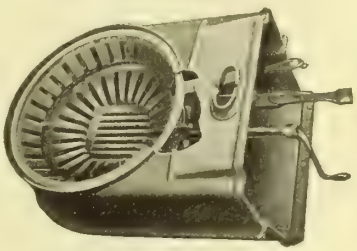


COMBUSTION CHAMBER

"Porcupine" Fire-Pot — Circular, with straight sides, insuring a live and efficient fire throughout. Projecting pins provide double radiating surface.

"PORCUPINE" FIRE-POT

Anti-Clinker Patented Grate — Ball bearing, and easily operated. Grates move in a circular manner insuring a clean fire on all sides, and quick combustion.



ANTICLINKER GRATE (PAT.)

"Thatcher" Ranges.

In addition to the Thatcher line of boilers and furnaces we have, since 1850, pioneered in the manufacture of kitchen ranges, both for coal and for coal and gas in combination. Thatcher ranges are made of finest grade of gray iron and are carefully fitted and mounted. They are absolutely gas-tight and dust-proof. Every range is thoroughly inspected and tested before leaving the foundry.

SPECIFICATIONS OF THATCHER COMBINATION RANGE

No.	Length Over All, Ins.	Depth, Ins.	Height, Ins.	Height, with Closet, Ins.	Coal Oven, Ins.	Gas Oven, Ins.	Gas Broiler, Ins.
14-D	55¼	26½	30½	60½	18½ x 17	14 x 17	14 x 17

No. 14-D Double Oven Coal and Gas Range, on Low Closet, with Waterback, Price, $92.75.

Extras: Upper Steel High Closet, $24.20. Canopy, $22.00. Couplings, $1.10. Thermometers (each), $2.10.

Detailed Archtects' Catalogue.

Furnished on request.

The "Thatcher" Exhibit Rooms.

Architects and prospective purchasers are cordially invited to use the facilities of our showrooms as frequently as they desire. Come and see us.

FRANK PROX COMPANY

Steam and Hot-Water Boilers

TERRE HAUTE, IND.

BRANCH OFFICES

INDIANAPOLIS, IND., 512 Board of Trade Building LOUISVILLE, KY., 1020 Starks Building

DES MOINES, IOWA, Hubbell Building

Products.

Manufacturers of "Smokeless Down Draft" Heavy-Duty Economic Boilers, "Smokeless Down Draft" Economic Boilers, Duplex Economic Heavy-Duty, Economic and Radium Steam and Water Boilers.

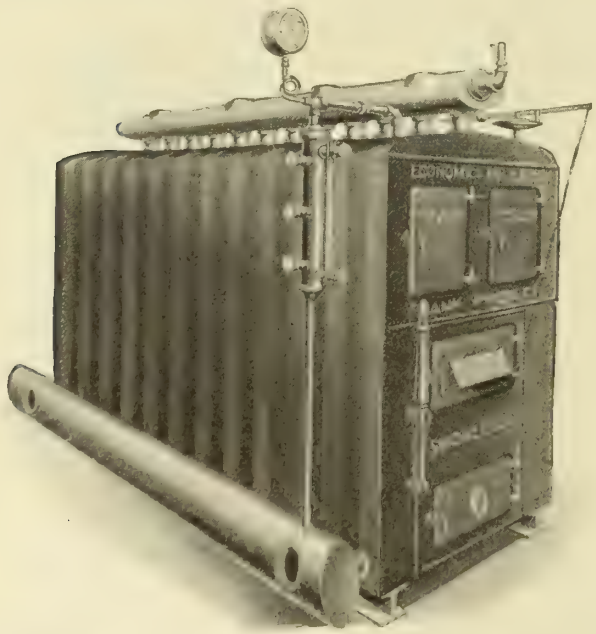
Features of Duplex Economic Heavy-Duty Boiler.

Only cast-iron sectional boiler that will handle Blast or Fan System. Only boiler made for uninterrupted service. In case of accident, plug header and continue in use.

"Down Draft" Grate is a part of the section. No outside connections to give trouble. It is always safe, easy to erect, economical in fuel, and everlasting.

Catalogue.

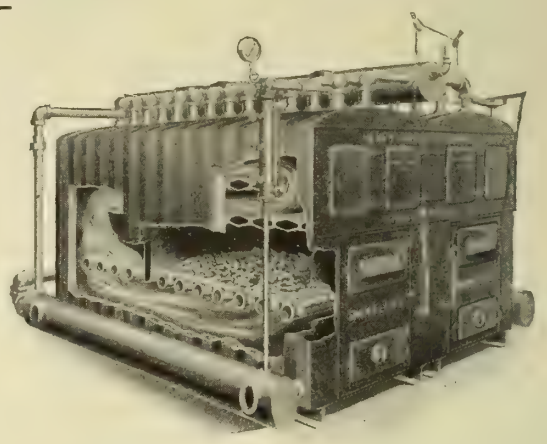
Send for catalogue.



ECONOMIC "SMOKELESS DOWN DRAFT" BOILER FOR STEAM OR WATER—100 "S" SERIES
Single water-tube shaking grate (patented)

Number	No. of Sections	Total Length, Inches	Total Width, Front to Header, Inches	Size of Flue Collar, Inches	Flows—Inches	Returns—Inches	Rating	List Price, Complete
Steam								
106-4 S	6	67	47	24 x 30	2-4	2-4	1600	$880.00
107-4 S	7	74	47	24 x 30	2-4	2-4	1850	935.00
108-5 S	8	81	47	24 x 30	3-4	3-4	2100	730.00
109-5 S	9	88	47	24 x 30	3-4	3-4	2350	795.00
110-6 S	10	95	47	42 x 30	4-4	4-4	2600	845.00
111-6 S	11	102	47	42 x 30	4-4	4-4	2850	960.00
112-7 S	12	109	47	42 x 30	4-4	4-4	3100	1045.00
Hot Water								
106-4 S	6	67	47	24 x 30	2-4	2-4	2000	$880.00
107-4 S	7	74	47	24 x 30	3-4	3-4	2310	935.00
108-5 S	8	81	47	24 x 30	3-4	3-4	2640	730.00
109-5 S	9	88	47	24 x 30	3-4	3-4	2970	770.00
110-6 S	10	95	47	42 x 30	4-4	4-4	3300	845.00
111-6 S	11	102	47	42 x 30	4-4	4-4	3630	960.00
112-7 S	12	109	47	42 x 30	4-4	4-4	3960	1055.00

Series 200 (Extra)



DUPLEX ECONOMIC HEAVY-DUTY "SMOKELESS DOWN DRAFT" BOILERS—200 SERIES
Single water-tube shaking grate (patented)

Number	Grate, Square Feet	Length, Inches	Flows—Inches	Returns—Inches	Rating	Chimney, Feet	List Price, Complete
Heavy-Duty Steam, Rear Smoke Outlet							
A-207-4S	11.4	78	2-5	4-4	4200	24 x 60	$1190.00
A-208-5S	14.4	85	2-5	4-4	4750	24 x 60	1294.00
A-209-5S	14.4	92	2-5	4-4	5250	24 x 65	1389.00
A-210-6S	17.2	99	3-5	4-4	5700	24 x 70	1484.00
A-211-6S	17.2	106	3-5	4-4	6650	24 x 75	1674.00
A-212-6S	17.2	113	3-5	4-4	7150	24 x 80	1770.00
A-213-7S	20.2	120	3-5	4-4	7600	24 x 80	1864.00

Single Grate—Height to outlet, 74½ inches; water line, 52½ inches; smoke-pipe, 18 inches; width, 93 inches.

Extra Heavy-Duty Steam, Rear Smoke Outlet							
B-210-7S	20.2	108	1-8	4-4	8000	24 x 80	$1932.00
B-211-7S	20.2	115	1-8	4-4	8800	24 x 90	2125.00
B-212-7S	20.2	122	1-8	4-4	9600	28 x 80	2320.00
B-213-7S	20.2	129	1-8	4-4	10400	28 x 80	2520.00
B-214-8S	23.0	136	2-8	4-4	11200	28 x 90	2720.00
B-215-8S	23.0	143	2-8	4-4	12000	28 x 100	2920.00
B-216-8S	23.0	150	2-8	4-4	12800	32 x 80	3120.00
B-217-9S	26.0	157	2-8	4-4	13600	32 x 90	3320.00
B-218-9S	26.0	164	2-8	4-4	14400	32 x 100	3520.00
B-219-10S	28.8	171	2-8	4-4	15200	36 x 100	3710.00
B-220-10S	28.8	178	2-8	4-4	16000	36 x 100	3900.00

Single Grate—Height to outlet, 82 inches; water line, 57 inches; smoke-pipe, 24 inches; width, 93 inches.

Heavy-Duty Hot Water, Rear Smoke Outlet							
A-407-4S	11.4	78	2-5	4-5	6925	24 x 60	$1170.00
A-408-5S	14.4	85	2-5	4-5	7825	24 x 60	1274.00
A-409-5S	14.4	92	2-5	4-5	8625	24 x 65	1370.00
A-410-6S	17.2	99	3-5	4-5	9400	24 x 70	1464.00
A-411-6S	17.2	106	3-5	4-5	10975	24 x 75	1654.00
A-412-6S	17.2	113	3-5	4-5	11810	24 x 80	1749.00
A-413-7S	20.2	120	3-5	4-5	12550	24 x 80	1844.00

Single Grate—Height to outlet, 74½ inches, width, 93 inches; smoke-pipe, 18 inches.

Extra Heavy-Duty Hot Water, Rear Smoke Outlet							
B-410-7S	20.2	108	1-8	1-8	12800	24 x 80	$1912.00
B-411-7S	20.2	115	2-8	2-8	14080	24 x 90	2105.00
B-412-7S	20.2	122	2-8	2-8	15360	28 x 80	2300.00
B-413-7S	20.2	129	2-8	2-8	16640	28 x 80	2800.00
B-414-8S	23.0	136	2-8	2-8	17920	28 x 90	2700.00
B-415-8S	23.0	143	2-8	2-8	19200	28 x 100	2900.00
B-416-8S	23.0	150	2-8	2-8	20480	32 x 80	3100.00
B-417-9S	26.0	157	2-8	2-8	21760	32 x 90	3300.00
B-418-9S	26.0	164	2-8	2-8	23040	32 x 100	3500.00
B-419-10S	28.8	171	2-8	2-8	24320	36 x 100	3690.00
B-420-10S	28.8	178	2-8	2-8	25600	36 x 100	3880.00

Single Grate—Height to outlet, 82 inches; smoke-pipe, 24 inches; width, 93 inches.

Note—Double grates can be furnished in above boilers. Write for information.

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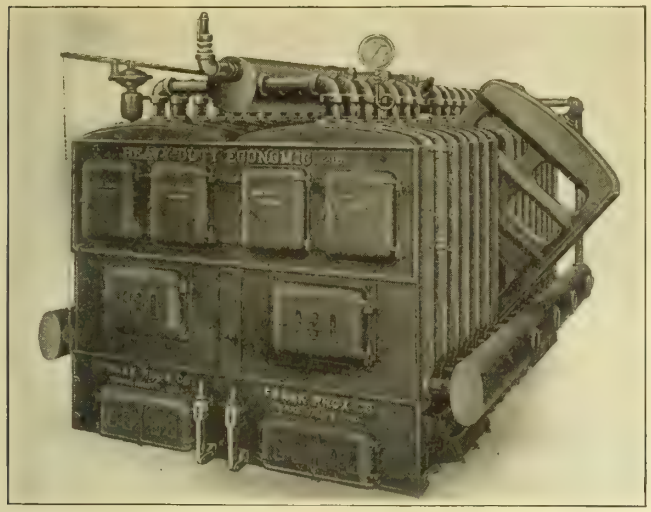
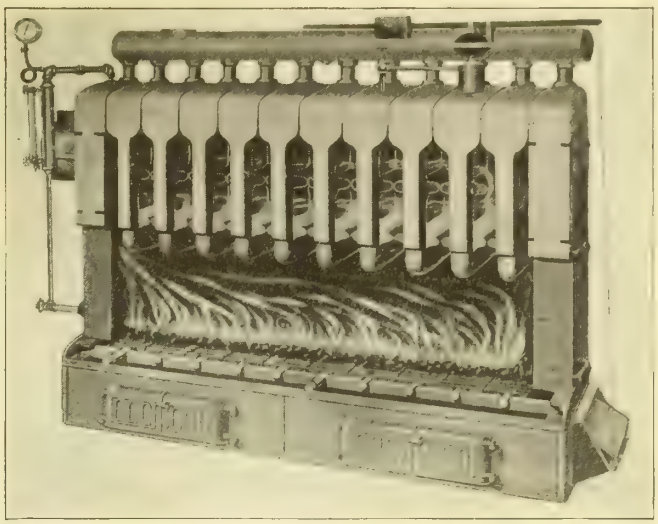


DUPLEX ECONOMIC HEAVY-DUTY BOILER—STEAM AND HOT WATER—200 SERIES



ECONOMIC SIDE-FIRED BOILER—STEAM AND HOT WATER
Sectional View, showing Fire Travel

Number	Grate, Square Feet	Length, Inches	Flows—Inches	Returns—Inches	Rating	Chimney, Feet	List Price, Complete
Heavy-Duty Steam							
Rear Smoke Outlet, A–200 Series					Front Smoke Outlet, A–700 Series		
A–206–4	12.7	71	2–5	4–4	3675	20x50	$1075.00
A–207–5	15.9	78	2–5	4–4	4200	20x60	1190.00
A–208–5	15.9	85	2–5	4–4	4750	20x60	1294.00
A–209–6	19.0	92	2–5	4–4	5275	24x60	1395.00
A–210–6	19.0	99	3–5	4–4	5700	24x65	1484.00
A–211–6	19.0	106	3–5	4–4	6650	24x70	1674.00
A–212–6	19.0	113	3–5	4–4	7325	24x70	1805.00

Height to outlet, 72 inches; water line, 50 inches; smoke-pipe, 18 inches; width, 93 inches.

Extra Heavy-Duty Steam							
Rear Smoke Outlet, B–200 Series					Front Smoke Outlet, B–700 Series		
B–210–7	22.2	108	1–8	4–4	8350	24x80	$2010.00
B–211–7	22.2	115	1–8	4–4	8800	24x80	2125.00
B–212–7	22.2	122	1–8	4–4	9600	28x70	2320.00
B–213–7	22.2	129	1–8	4–4	10400	28x70	2520.00
B–214–8	25.4	136	2–8	4–4	11200	28x80	2720.00
B–215–8	25.4	143	2–8	4–4	12000	32x70	2920.00
B–216–8	25.4	150	2–8	4–4	12800	32x70	3120.00
B–217–9	28.6	157	2–8	4–4	13600	32x80	3320.00
B–218–9	28.6	164	2–8	4–4	14400	32x80	3520.00
B–219–10	31.7	171	2–8	4–4	15200	36x80	3710.00
B–220–10	31.7	178	2–8	4–4	16000	36x80	3900.00

Height to outlet, 80 inches; water line, 56 inches; smoke-pipe, 24 inches; width, 93 inches.

Heavy-Duty Hot Water							
Rear Smoke Outlet, A–400 Series					Front Smoke Outlet, A–900 Series		
A–406–4	12.7	71	2–5	4–5	6050	20x50	$1055.00
A–407–5	15.9	78	2–5	4–5	6925	20x60	1170.00
A–408–5	15.9	85	2–5	4–5	7825	20x60	1274.00
A–409–6	19.0	92	2–5	4–5	8700	24x60	1375.00
A–410–6	19.0	99	3–5	4–5	9400	24x65	1464.00
A–411–6	19.0	106	3–5	4–5	10975	24x70	1654.00
A–412–6	19.0	113	3–5	4–5	12050	24x70	1785.00

Height to outlet, 72 inches; smoke-pipe, 18 inches; width, 93 inches.

Extra Heavy-Duty Hot Water							
Rear Smoke Outlet, B–400 Series					Front Smoke Outlet, B–900 Series		
B–410–7	22.2	108	1–8	1–8	13725	24x80	$1990.00
B–411–7	22.2	115	2–8	2–8	14080	24x80	2105.00
B–412–7	22.2	122	2–8	2–8	15360	28x80	2300.00
B–413–7	22.2	129	2–8	2–8	16640	28x80	2500.00
B–414–8	25.4	136	2–8	2–8	17920	28x80	2700.00
B–415–8	25.4	143	2–8	2–8	19200	32x80	2900.00
B–416–8	25.4	150	2–8	2–8	20480	32x80	3100.00
B–417–9	28.6	157	2–8	2–8	21760	32x80	3300.00
B–418–9	28.6	164	2–8	2–8	23040	32x80	3500.00
B–419–10	31.7	171	2–8	2–8	24320	36x80	3690.00
B–420–10	31.7	178	2–8	2–8	25600	36x80	3880.00

Height to outlet, 80 inches; smoke-pipe, 24 inches; width, 93 inches.

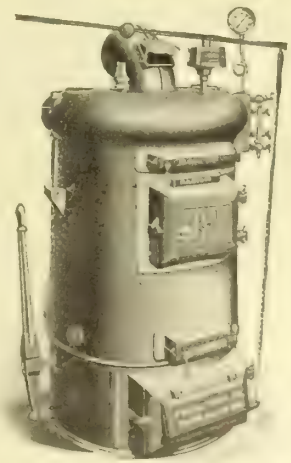
Number	Number of Sections	Total Length, End to End, Inches	Total Width Over Header, Inches	Grate Area, Square Feet	Flows—Inches	Returns—Inches	Rating	List Price, Complete
Steam								
105–3	5	60	50	6.00	2–4	2–4	1200	$460.00
106–4	6	67	50	8.19	2–4	2–4	1600	580.00
107–5	7	74	50	9.54	3–4	3–4	1850	655.00
108–6	8	81	50	10.20	3–4	3–4	2100	730.00
109–7	9	88	50	11.66	3–4	3–4	2375	795.00
110–8	10	95	50	13.12	4–4	4–4	2650	845.00
111–9	11	102	50	14.58	4–4	4–4	3150	960.00
112–10	12	109	50	16.60	4–4	4–4	3675	1075.00
Hot Water								
305–3	5	60	50	6.00	2–4	2–4	2000	$450.00
306–4	6	67	50	8.19	2–4	2–4	2650	570.00
307–5	7	74	50	9.54	3–4	3–4	3050	645.00
308–6	8	81	50	10.20	3–4	3–4	3450	710.00
309–7	9	88	50	11.66	3–4	3–4	3900	770.00
310–8	10	95	50	13.12	4–4	4–4	4325	825.00
311–9	11	102	50	14.58	4–4	4–4	5200	940.00
312–10	12	109	50	16.60	4–4	4–4	6050	1055.00

Height to top of header, 70 inches; water line, 50 inches; size smoke-pipe, 12 inches; height to center of smoke-pipe, 50 inches.

RADIUM STEAM AND HOT-WATER BOILERS

Hard and Soft Coal and Coke

Number	Height to Top of Outlet, Inches	Rating	Price, Complete
Steam			
1319	49	300	$149.50
1419	53½	400	193.00
1519	58	500	219.50
1619	62½	575	240.00
1423	53½	550	233.00
1523	58	650	287.50
1623	62½	800	331.00
1723	67	900	360.50
1426	53½	700	300.00
1526	58	850	346.00
1626	62½	1000	389.50
1726	67	1100	419.00
Hot Water			
2319	43½	500	$140.50
2419	48	650	184.00
2519	52½	825	210.50
2619	57	950	230.00
2423	48	900	224.00
2523	52½	1075	277.50
2623	57	1325	321.50
2723	61½	1500	350.50
2426	48	1150	290.00
2526	52½	1400	336.00
2626	57	1650	380.00
2726	61½	1825	409.00



RADIUM BOILER—STEAM AND HOT WATER

RICHMOND RADIATOR COMPANY

INCORPORATED

Manufacturers of "Richmond" Boilers and Radiators

1480 Broadway

NEW YORK, N. Y.

Products.

We manufacture "Richmond" and "Richmond Model" Steam and Hot-Water Heating Boilers, "Richmond" Laundry Stoves, and "Richmond," "Tuscan," and "Norman" Radiators.

For Vacuum Cleaners, see our pages in General Index.

"RICHMOND"

TRADE-MARK

"Richmond" Boilers and Radiators.

"Richmond" Boilers and Radiators are carefully rated to assure efficiency in operation and economy in consumption of fuel. Every detail of design and manufacture is so carefully looked after that "Richmond" Hot-Water and Steam Boilers and Radiators are recog nized as fulfilling all the requirements of the most particular architects and engineers.

Capacity Ratings.

Ratings are for direct radiation, and are based upon all piping (mains and risers, flows and returns) being figured as radiating surface, and in case of steam a pressure of two pounds of steam at the boiler; and, of water, a temperature of 180 degrees Fahr. in the water as it leaves the heater. Therefore, radiation to heat the building should be figured on the same basis, or due allowance made for other temperatures and pressures, as well as for loss of heat in the mains.

When soft coal is to be used for fuel, a boiler one size larger is required than would be necessary with hard coal.

When a pipe coil or cast-iron section is placed in the fire-pot of a heater, or a steam coil in a tank, for the purpose of heating water for domestic use, additional capacity must be provided in determining the size of heater required, viz., one and one quarter square feet of direct radiation for steam and two square feet for hot water for each gallon to be heated per hour.

Sufficient Radiation.

The ratings are also based on the further proviso that sufficient radiation be installed to heat the building properly; that the apparatus be properly put in; that the building be provided with a flue of sufficient capacity; and that the boiler, when installed, shall receive proper care and management.

Repairs.

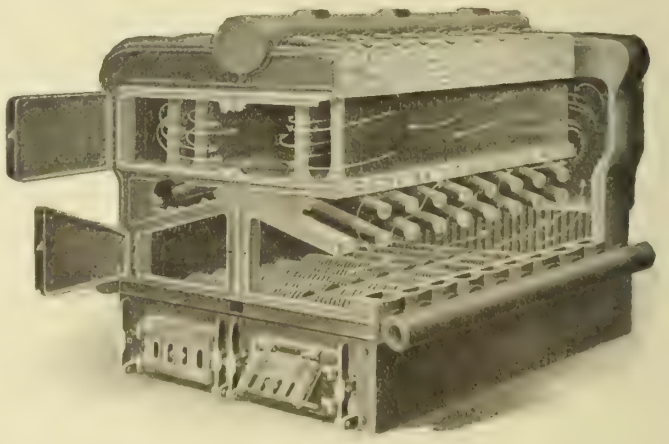
We carry a full stock at principal centers, which insures quick deliveries and prompt repairs.

Co-operation.

This firm will be pleased to cooperate with architects and others in the careful study of definite heating problems, and will furnish, promptly, all further information that may be desired, on request.

Specifications.

Always mention "Richmond" when you specify.



"RICHMOND" TWIN-SECTION BOILER, SEPARATE BASE

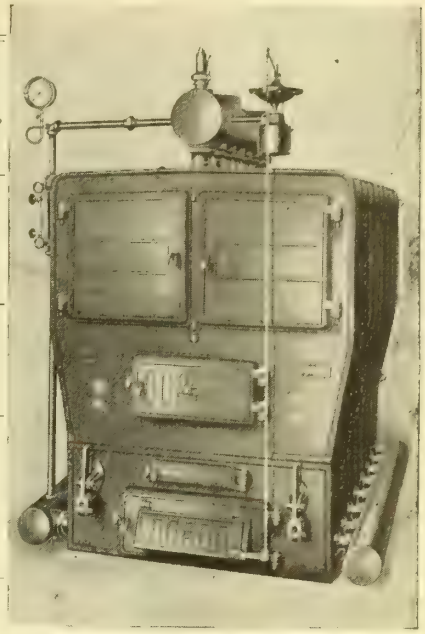
DATA "RICHMOND" TWIN-SECTION BOILERS, SEPARATE BASE

No. Boiler	Rating Square Feet, Steam	Rating Square Feet, Water	Area Fire-Pot, Inches	Smoke Collar, Inches	Number of Sections	Height of Steam Water Line, Inches	Height to Top Supply, Inches	Total Length with Smoke Box, Inches	Total Width, Inches	Steam		Water	
										Size Supply, Inches	Size Return, Inches	Size Supply, Inches	Size Return, Inches
[illegible]	4,000	[illegible]	51 x 43	15 x 26½	7	60	75	67	84	2-6	4-4	2-6	2-6
[illegible]18	4,600	7,600	51 x 50	15 x 26½	8	60	75	74	84	2-6	4-4	2-6	2-6
539	[illegible]10	[illegible]475	51 x 57	15 x 26½	9	60	75	81	84	2-6	4-4	2-6	2-6
[illegible]10	5,700	[illegible]375	51 x 64	15 x 26½	10	60	75	88	84	3-6	4-4	3-6	2-6
[illegible]11	6,400	10,575	51 x 71	15 x 26½	11	60	75	95	84	3-6	4-4	3-6	2-6
[illegible]12	7,200	[illegible]	51 x 78	15 x 26½	12	60	75	102	84	3-6	4-4	3-6	2-6
[illegible]13	[illegible]0	[illegible],100	51 x 85	15 x 26½	13	60	75	109	84	3-6	4-4	3-6	2-6
5314	8,450	[illegible],900	51 x 92	15 x 26½	14	60	75	116	84	3-6	4-4	3-6	2-6
[illegible]15	[illegible]0	[illegible],700	51 x 99	15 x 26½	15	60	75	123	84	2-8	4-6	2-8	4-6
[illegible]16	9,430	15,600	51 x 106	15 x 26½	16	60	75	130	84	2-8	4-6	2-8	4-6

Continued on next page

DATA "RICHMOND" SECTIONAL STEAM BOILERS, WATER BASE

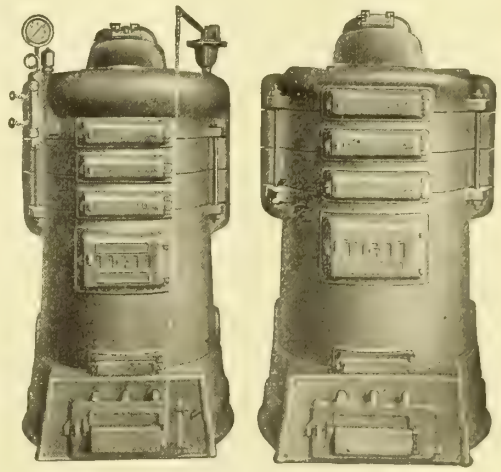
Number of Boiler	Rating, Square Feet	List Price	Fire-Pot, Inches	Smoke Collar, Inches	Number of Sections	Height of Water Line, Inches	Height to Top of Supply Outlet, Inches	Total Length with Smoke Box, Inches	Total Width, Inches	Size Supply, Inches	Size Return, Inches
204-S	525	$238.00	22x19	10	4	46	61	34	40	1-3	2-3
205-S	675	303.00	22x25	10	5	46	61	40	40	2-3	2-3
206-S	850	355.00	22x31	10	6	46	61	46	40	2-3	2-3
207-S	1,000	400.00	22x37	10	7	46	61	52	40	2-3	2-3
208-S	1,150	445.00	22x43	10	8	46	61	58	40	2-3	2-3
305-S	1,200	460.00	28x28	12	5	50	68	45	46	1-4	2-3
306-S	1,400	520.00	28x35	12	6	50	68	52	46	2-4	4-3
307-S	1,625	587.00	28x42	12	7	50	68	59	46	2-4	4-3
308-S	1,900	670.00	28x49	12	8	50	68	66	46	2-4	4-3
309-S	2,100	730.00	28x55	12	9	50	68	73	46	2-4	4-3
42-6-S	2,400	810.00	42x35	15	6	56½	78	52	64	2-5	3-4
42-7-S	2,800	904.00	42x42	15	7	56½	78	59	64	2-5	3-4
42-8-S	3,350	1,014.00	42x49	15	8	56½	78	66	64	2-6	4-4
42-9-S	3,900	1,125.00	42x55	15	9	56½	78	73	64	2-6	4-4
42-10-S	4,400	1,224.00	42x62	18	10	56½	78	80	64	2-6	4-4
42-11-S	4,900	1,324.00	42x69	18	11	56½	78	87	64	2-6	4-4
42-12-S	5,400	1,424.00	42x76	18	12	56½	78	94	64	2-6	4-4



"RICHMOND" SECTIONAL STEAM BOILER, WATER BASE

DATA "RICHMOND" SECTIONAL WATER BOILERS, WATER BASE

Number of Boiler	Rating, Square Feet	List Price	Fire-Pot, Inches	Smoke Collar, Inches	Sections	Height to Top of Supply Outlet, Inches	Total Length with Smoke Box, Inches	Total Width, Inches	Size Supply, Inches	Size Return, Inches
204-W	850	$228.00	22x19	10	4	61	34	40	1-3	2-3
205-W	1,100	293.00	22x25	10	5	61	40	40	2-3	2-3
206-W	1,400	345.00	22x31	10	6	61	46	40	2-3	2-3
207-W	1,650	390.00	22x37	10	7	61	52	40	2-3	2-3
208-W	1,900	435.00	22x43	10	8	61	58	40	2-3	2-3
305-W	2,000	450.00	28x28	12	5	68	45	46	1-4	2-3
306-W	2,350	510.00	28x35	12	6	68	52	46	2-4	4-3
307-W	2,675	577.00	28x42	12	7	68	59	46	2-4	4-3
308-W	3,150	660.00	28x49	12	8	68	66	46	2-4	4-3
309-W	3,450	720.00	28x55	12	9	68	73	46	2-4	4-3
42-6-W	3,975	790.00	42x35	15	6	78	52	64	2-5	3-4
42-7-W	4,625	884.00	42x42	15	7	78	59	64	2-5	3-4
42-8-W	5,525	994.00	42x49	15	8	78	66	64	2-6	4-4
42-9-W	6,450	1,105.00	42x55	15	9	78	73	64	2-6	4-4
42-10-W	7,250	1,204.00	42x62	18	10	78	80	64	2-6	4-4
42-11-W	8,100	1,304.00	42x69	18	11	78	87	64	2-6	4-4
42-12-W	8,900	1,404.00	42x76	18	12	78	94	64	2-6	4-4

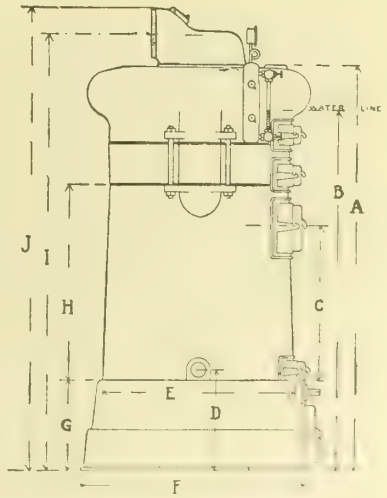


"RICHMOND" ROUND STEAM AND WATER BOILERS

DATA "RICHMOND" ROUND SECTIONAL STEAM BOILERS

Number of Boiler	Rating, Square Feet	List Price	Fire-Pot Diameter, Inches	A	B	C	D	E	F	G	H	I	J	Supply Tapping, Inches	Return Tapping, Inches	Size of Round Smoke Pipe, Ins.
1317	300	$150	17	46⅛	41	19	15	21	25¾	12½	23¾	50¾	53⅛	1-2½	2-2	7
1417	325	158	17	51⅛	46	19	15	21	25¾	12½	23¾	55¾	58⅛	1-2½	2-2	7
1517	350	167	17	56⅛	51	19	15	21	25¾	12½	23¾	60¾	63⅛	1-2½	2-2	7
1320	425	200	20	46½	41½	19⅛	16	24	29¾	13½	23¾	50¾	53½	1-2½	2-2½	8
1420	475	213	20	51½	46½	19⅛	16	24	29¾	13½	23¾	55¾	58½	1-2½	2-2½	8
1520	500	220	20	56½	51½	19⅛	16	24	29¾	13½	23¾	60¾	63½	1-2½	2-2½	8
1323	575	240	23	49¾	44¼	20½	16½	27	32¾	14	25	54 9/16	57¾	1-3	2-2½	9
1423	625	278	23	55½	50	20½	16½	27	32¾	14	25	60 5/16	63½	1-3	2-2½	9
1523	675	293	23	61¼	55¾	20½	16½	27	32¾	14	25	66 1/16	69¼	1-3	2-2½	9
1326	750	317	26	52¼	46	21½	17½	30¾	37	14¼	26¼	57½	61¼	1-3½	2-3	10
1426	825	339	26	58¾	52½	21½	17½	30¾	37	14¼	26¼	64	67¾	1-3½	2-3	10
1526	900	361	26	65¼	59	21½	17½	30¾	37	14¼	26¼	70½	74¼	1-3½	2-3	10
1329	1000	390	29	55	47½	21¾	18	33½	40	14½	27	60¼	64	1-4	2-3½	10
1429	1100	419	29	61¼	53¾	21¾	18	33½	40	14½	27	66½	70¼	1-4	2-3½	10
1529	1200	449	29	67½	60	21¾	18	33½	40	14½	27	72¾	76½	1-4	2-3½	10

See outline sketch of boiler for measurements.



OUTLINE SKETCH OF STEAM BOILER, SHOWING MEASUREMENTS

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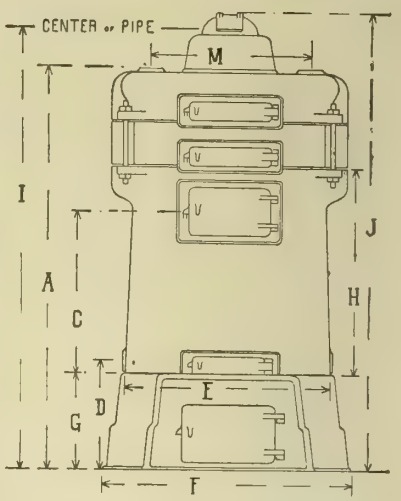
DATA "RICHMOND" ROUND SECTIONAL WATER BOILERS

Number of Boiler	Rating, Square Feet	List Price	Fire-Pot Diameter, Inches	A	B	C	D	E	F	G	H	I	J	Supply Tapping, Inches	Return Tapping, Inches	Size of Round Smoke Pipe, Ins.	M Ins.
2317	500	$141	17	42	..	19	15	21	25 3/4	12 1/2	23 3/4	46 5/8	49	2-2	2-2	7	16 3/4
2417	550	154	17	47	..	19	15	21	25 3/4	12 1/2	23 3/4	51 5/8	54	2-2	2-2	7	16 3/4
2517	575	158	17	52	..	19	15	21	25 3/4	12 1/2	23 3/4	56 5/8	59	2-2	2-2	7	16 3/4
2320	700	191	20	42 1/2	..	19 1/8	16	24	29 3/4	13 1/2	23 3/4	46 3/4	49 1/2	2-2 1/2	2-2 1/2	8	18
2420	775	204	20	47 1/2	..	19 1/8	16	24	29 3/4	13 1/2	23 3/4	51 3/4	54 1/2	2-2 1/2	2-2 1/2	8	18
2520	825	211	20	52 1/2	..	19 1/8	16	24	29 3/4	13 1/2	23 3/4	56 3/4	59 1/2	2-2 1/2	2-2 1/2	8	18
2323	950	230	23	45	..	20 1/2	16 1/2	27	32 3/4	14	25	49 13/16	53	2-2 1/2	2-2 1/2	9	20 1/4
2423	1025	270	23	50 3/4	..	20 1/2	16 1/2	27	32 3/4	14	25	55 9/16	58 3/4	2-2 1/2	2-2 1/2	9	20 1/4
2523	1100	283	23	56 1/2	..	20 1/2	16 1/2	27	32 3/4	14	25	61 5/16	64 1/2	2-2 1/2	2-2 1/2	9	20 1/4
2326	1250	307	26	47 1/4	..	21 1/2	17 1/2	30 3/4	37	14 1/4	26 1/4	52 1/2	56 1/4	2-3	2-3	10	24
2426	1375	329	26	53 3/4	..	21 1/2	17 1/2	30 3/4	37	14 1/4	26 1/4	59	62 3/4	2-3	2-3	10	24
2526	1500	351	26	60 1/4	..	21 1/2	17 1/2	30 3/4	37	14 1/4	26 1/4	65 1/2	69 1/4	2-3	2-3	10	24
2329	1650	380	29	49 1/4	..	21 3/4	18	33 1/2	40	14 1/2	27	54 1/2	58 1/4	2-3 1/2	2-3 1/2	10	24 1/4
2429	1825	409	29	55 1/2	..	21 3/4	18	33 1/2	40	14 1/2	27	60 3/4	64 1/2	2-3 1/2	2-3 1/2	10	24 1/4
2529	2000	439	29	61 3/4	..	21 3/4	18	33 1/2	40	14 1/2	27	67	70 3/4	2-3 1/2	2-3 1/2	10	24 1/4

See outline sketch of boiler for measurements.



OUTLINE SKETCH OF WATER BOILER, SHOWING MEASUREMENTS

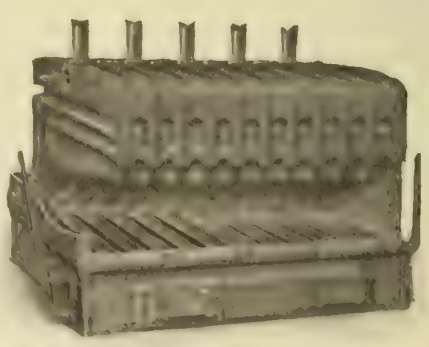
DATA "RICHMOND MODEL" STEAM BOILERS, PUSH NIPPLE TYPE

Number of Boiler	Rating, Square Feet	List Price	Grate, Inches	Smoke Collar, Inches	Number of Sections	Height of Water Line, Inches	Height to Top Supply Outlet, Inches	Total Length with Smoke Box, Inches	Total Width including W. F. Conn., Inches	Supply Tapping, Inches	Return Tapping, Inches
18-3	350	$180.00	18x14	25 3/8	3	46	51	35	22	1-2 1/2	1-2 1/2
18-4	550	245.00	18x21	28 3/8	4	46	51	35	29	2-2 1/2	2-2 1/2
18-5	725	318.00	18x28	31 1/2	5	46	51	35	36	2-2 1/2	2-2 1/2
18-6	900	370.00	18x35	31 5/8	6	46	51	35	43	2-2 1/2	2-2 1/2
22-3	450	218.00	22x14	25 3/8	3	46	51	39	22	1-3	1-3
22-4	675	303.00	22x21	28 3/8	4	46	51	39	29	1-3	1-3
22-5	875	363.00	22x28	31 1/2	5	46	51	39	36	1-3	1-3
22-6	1100	430.00	22x35	31 5/8	6	46	51	39	43	2-3	2-3
30-4	925	378.00	30x21	31 1/2	4	52	59 1/2	50	32	1-3 1/2	1-3 1/2
30-5	1200	460.00	30x28	37 1/2	5	52	59 1/2	50	39	2-3 1/2	2-3 1/2
30-6	1700	610.00	30x35	44	6	52	59 1/2	50	46	2-3 1/2	2-3 1/2
30-7	2050	716.00	30x42	47	7	52	59 1/2	50	53	2-3 1/2	2-3 1/2
40-6	2750	893.00	40x36	44	6	56	65 1/2	60	48	2-4	2-4
40-7	3200	984.00	40x42	47	7	56	65 1/2	60	55	2-4	2-4
40-8	3725	1089.00	40x49	50 1/4	8	56	65 1/2	60	62	2-4	2-4
40-9	4250	1194.00	40x56	2-37 7/8	9	56	65 1/2	60	69	2-4	2-4
40-10	4800	1304.00	40x63	2-40 7/8	10	56	65 1/2	60	76	3-4	3-4
40-11	5325	1409.00	40x70	2-44 1/4	11	56	65 1/2	60	83	3-4	3-4
40-12	5850	1514.00	40x77	2-44 1/4	12	56	65 1/2	60	90	3-4	3-4

"RICHMOND MODEL" STEAM BOILER, PUSH NIPPLE TYPE

DATA "RICHMOND MODEL" WATER BOILERS, PUSH NIPPLE TYPE.

Number of Boiler	Rating, Square Feet	List Price	Grate, Inches	Smoke Collar, Inches	Number of Sections	Height to Top Supply Outlet, Inches	Total Length with Smoke Box, Inches	Total Width including W. F. Conn., Inches	Supply Tapping, Inches	Return Tapping, Inches
18-3	575	$170.00	18x14	25 3/8	3	51	35	22	1-2 1/2	1-2 1/2
18-4	900	235.00	18x21	28 3/8	4	51	35	29	2-2 1/2	2-2 1/2
18-5	1200	308.00	18x28	31 1/2	5	51	35	36	2-2 1/2	2-2 1/2
18-6	1500	360.00	18x35	31 5/8	6	51	35	43	3-2 1/2	3-2 1/2
22-3	750	208.00	22x14	25 3/8	3	51	39	22	1-3	1-3
22-4	1125	293.00	22x21	28 3/8	4	51	39	29	2-3	2-3
22-5	1450	353.00	22x28	31 1/2	5	51	39	36	2-3	2-3
22-6	1825	420.00	22x35	31 5/8	6	51	39	43	3-3	3-3
30-4	1525	368.00	30x21	31 1/2	4	59 1/2	50	32	2-3 1/2	2-3 1/2
30-5	2000	450.00	30x28	37 1/2	5	59 1/2	50	39	2-3 1/2	2-3 1/2
30-6	2500	600.00	30x35	44	6	59 1/2	50	46	3-3 1/2	3-3 1/2
30-7	3400	700.00	30x42	47	7	59 1/2	50	53	3-3 1/2	3-3 1/2
40-6	4550	873.00	40x36	44	6	65 1/2	60	48	3-4	3-4
40-7	5300	964.00	40x42	47	7	65 1/2	60	55	3-4	3-4
40-8	6150	1069.00	40x49	50 1/4	8	65 1/2	60	62	3-4	3-4
40-9	7025	1174.00	40x56	2-37 7/8	9	65 1/2	60	69	4-4	4-4
40-10	7925	1284.00	40x63	2-40 7/8	10	65 1/2	60	76	5-4	5-4
40-11	8800	1389.00	40x70	2-44 1/4	11	65 1/2	60	83	5-4	5-4
40-12	9650	1494.00	40x77	2-44 1/4	12	65 1/2	60	90	5-4	5-4



"RICHMOND MODEL" WATER BOILER, PUSH NIPPLE TYPE

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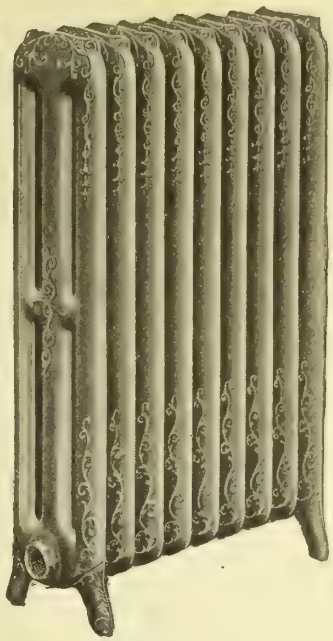
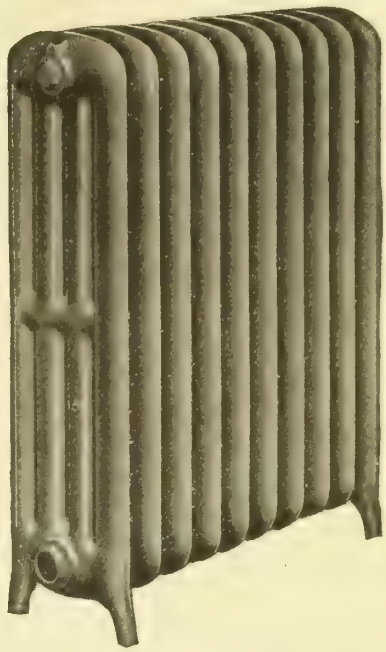
"RICHMOND" NO. 501 LAUNDRY STOVE

"TUSCAN" TWO-COLUMN RADIATOR



"NORMAN" ORNAMENTAL THREE-COLUMN RADIATOR



"TUSCAN" FOUR-COLUMN RADIATOR

DATA "RICHMOND" HOT-WATER SUPPLY BOILERS AND LAUNDRY STOVES

Number	Fire-Pot, Diameter, Inches	Height, Inches	Supply and Return Tapping, Inches	Smoke Pipe, Inches	Top, Inches	Tank, Capacity, Gallons	Price List
501	10½	28¾	1¼	7	20x27½	100	$31.00
°621	11	27	1¼	6	25x25	125	42.50
°622	13	27	1¼	6	25x28	200	53.00
HOT-WATER SUPPLY BOILERS					Rating Sq. Ft.		
631	11	27	1¼	6	75	100	38.00
632	11	34	1½	6	115	150	45.50
633	13	27	1½	6	125	200	53.00
*634	11	40	1½	6	140	225	59.00
635	13	34	1½	6	150	275	66.50
*636	13	41½	1½	6	175	300	71.50
637	15	36	2	7	200	350	81.00
*638	15	43	2	7	235	400	90.00
640	13	40	1–2	6	200	250	60.00
†641	13	40	1–2	6	225	300	70.00
642	15	43	1–2½	7	300	400	90.00
†643	15	43	1–2½	7	350	450	100.00
644	17	45	1–2½	7	400	525	110.00
†645	17	45	1–2½	7	450	600	118.00

°Have square tops.

*The capacities given above are based upon the understanding that sufficient storage tank capacity be used in connection with the boiler, and represent the estimated size of tanks which experience has shown will supply in ordinary use. For greater requirements special increased capacity should be provided.

† These boilers have drop tubes.

Oval Top Hot-Water Supply Boilers are not furnished with feet unless so ordered.

Return tapping 2–2 inches.

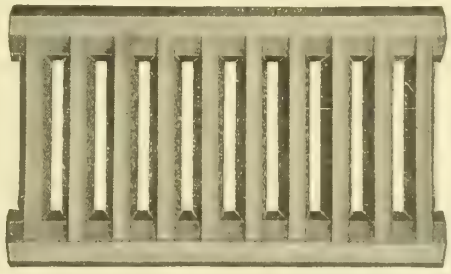
When water boilers are subjected to some unusual pressure, as is the case when tanks are connected direct to City Pumping Station, and the pressure is increased during times of conflagration or the like, it is recommended that the system be equipped with a water-pressure reducing valve and relief valve.

DATA "TUSCAN" AND "NORMAN" RADIATORS FOR STEAM OR WATER

	Height in Inches									Length in Inches	Width of Section	Width of Legs
	45	38	32	26	23	22	20	18	16	14			
One-Column— Feet per Section	..	3	2½	2	..	1⅔	1½	..	..	..	2½	4½	5½
Two-Column— Feet per Section	5	4	3⅓	2⅔	2⅓	..	2	..	..	..	2½	7⅜	8½
*Two-Column Hospital Type— Feet per Section	5	4	3⅓	2⅔	2⅓	2	..	..	..	..	..	..	..
Three-Column— Feet per Section	6	5	4½	3¾	..	3	..	2¼	..	..	2½	9	10
Four-Column— Feet per Section	10	8	6½	5	..	4	..	3	..	3	10½	11¼	
Window— Feet per Section	..	..	..	..	..	..	5	4¼	3¾	3	..	....	....

*"Tuscan" type has three-inch centers.

Add one half inch for each bushing, to get total length measurement of Radiator.



"TUSCAN" WALL PATTERN NO. 70

DATA "TUSCAN" WALL PATTERN FOR STEAM OR WATER

7-Foot Horizontal Sections, No. 70	13 5/16 x 22 3/8 x 2 7/8
7-Foot Vertical Sections, No. 71	13 5/16 x 22 7/8 x 2 7/8
9-Foot Horizontal Sections, No. 90	13 5/16 x 29 1/16 x 2 7/8
9-Foot Vertical Sections, No. 91	13 5/16 x 29 1/16 x 2 7/8

R. J. SCHWAB & SONS CO.

ESTABLISHED 1876

Manufacturers of Gilt Edge Boilers and Furnaces

OFFICE AND FACTORY
Clinton, Park and Reed Streets
MILWAUKEE, WIS.

WAREHOUSES
CAMDEN, N. J. WASHINGTON, D. C. KANSAS CITY, MO. DES MOINES, IOWA
MINNEAPOLIS, MINN. LINCOLN, NEBR. MASON CITY, IOWA

Products.

Gilt Edge Cast-Iron Sectional Boilers, Round Series and Square Series, for Steam and Hot-Water Heating; Gilt Edge Furnaces, for Warm Air and Combination Heating.

Also, Schwab Side Wall and Floor Registers, Tin and Galvanized Pipe and Fittings.

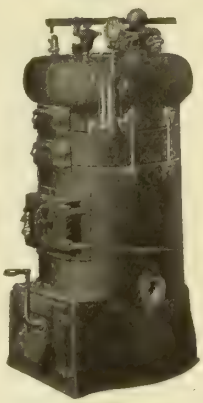
Gilt Edge Boilers, General Facts.

In all Gilt Edge Boilers the two elements of efficiency, large prime heating surface and long fire travel, are successfully combined. The waterways are narrow, the top section of the water boiler is very shallow, insuring a minimum accumulation of water in the boiler, and the steam boiler has an unusually large dry-steam chamber, adapting it well for use in connection with vapor and vacuum-heating systems.

Ease of Installation—No skill is necessary to install. Sections are simply set up with push nipple connections and tie bolts drawn up, and the work is done, excepting putting on the doors.

Push Nipples—Push nipples are of cast iron, true to one thousandth of an inch, insuring permanently tight joints.

Water



Steam

GILT EDGE BOILERS
ROUND SERIES

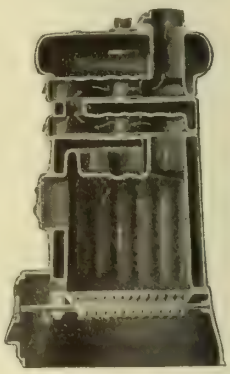
Clean-outs—Each flue has separate clean-out door, and all are located in front with nothing to obstruct them.

Large Ash-Pit Door—The only boiler having an ash-pit door opening above the top of the grates, which makes it easy to get at the grates, and also permits easy poking over grates through slicing opening, causing ashes to fall into ash-pit instead of on floor. The drop teeth in slicing opening prevent fire from running out.

Gilt Edge Boilers, Round Series.

Note the deep fire and water channels at the top of fire-pot; also corrugations which give the maximum prime surface and materially aid combustion. Notice also the absence of any lost surfaces, the products of combustion being at all times in contact with water-inclosing surfaces, until they finally reach the smoke pipe.

Fire-pot section from below

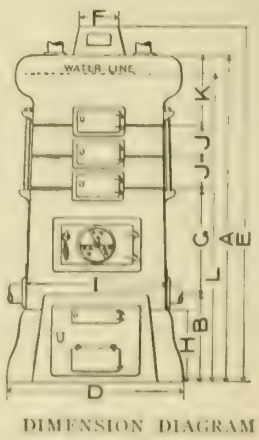


Side sectional view, showing surfaces, fire travel and absence of lost surface

SECTIONS OF GILT EDGE BOILERS, ROUND SERIES

DIMENSIONS AND RATINGS OF GILT EDGE BOILERS, ROUND SERIES

No. of Boiler	A	L	K	Sq. Ft. Direct Radiation	B	D	G	I	J	Diameter Grate, Ins.	Supply and Return, Ins.	F	No. of Boiler	A	K	Sq. Ft. Direct Radiation
	For Steam										For Hot Water					
182-S	50	44	11	325	15½	27	23½	22	6	18	2–2½	7	182-W	45	6	550
183-S	56	50	11	375	15½	27	23½	22	6	18	2–2½	7	183-W	51	6	625
184-S	62	56	11	425	15½	27	23½	22	6	18	2–2½	7	184-W	57	6	675
212-S	52½	44½	12½	450	15½	30	24½	25	6½	21	2–2½	8	212-W	46½	6½	725
213-S	59	52	12½	600	15½	30	24½	25	6½	21	2–2½	8	213-W	53	6½	825
214-S	65½	58½	12½	750	15½	30	24½	25	6½	21	2–2½	8	214-W	59½	6½	900
242-S	51	48	13	575	16½	33	25½	28	7	24	2–3	9	242-W	49	7	950
243-S	62	55	13	650	16½	33	25½	28	7	24	2–3	9	243-W	56	7	1050
244-S	69	62	13	725	16½	33	25½	28	7	24	2–3	9	244-W	63	7	1150
272-S	57	50	13	750	17½	36	26½	30	7½	27	2–3½	10	272-W	51	7	1225
273-S	64½	57½	13	850	17½	36	26½	30	7½	27	2–3½	10	273-W	58½	7	1400
274-S	72	65	13	950	17½	36	26½	30	7½	27	2–3½	10	274-W	66	7	1550
302-S	59	51½	14	1000	18	40	27	34	8	30	2–4	11	302-W	52½	7½	1650
303-S	67	59½	14	1150	18	40	27	34	8	30	2–4	11	303-W	60½	7½	1900
304-S	75	67½	14	1275	18	40	27	34	8	30	2–4	11	304-W	68½	7½	2100



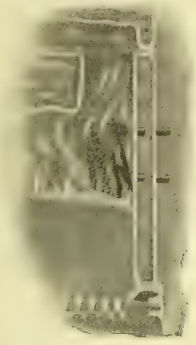
DIMENSION DIAGRAM

Sweet's Catalogue

Continued on next page

Anti-Clinker Grate—Grate bars are lever-connected and shaken from one point only (see illustrations). This construction is mechanically superior to gearing, as it requires less power and cannot bind. When shaker bar is in position, all bars are always in corresponding position. In shaking, the entire body of fuel is agitated evenly, and it is impossible to dump the fire accidentally, as, owing to the shape of the projections, space between the bars is the same in shaking as in normal position. Simply throwing shaker to the extreme left brings the shorter projections on the grates to the top, opening up ample space to allow clinkers to drop through.

Water-Back—A water-back for domestic boiler is supplied when desired. Objectionable interference with combustion and fuel-carrying capacity is overcome by placing it just above the top of the coal. It is located at the back, where it cannot interfere with firing.

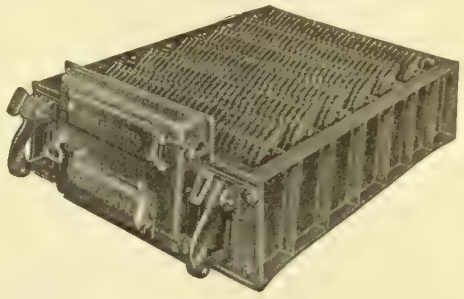


POSITION OF WATER-BACK

Normal position of bars — Fuel cannot be wasted in ordinary shaking — In dumping, the short teeth easily allow passage of material

ANTI-CLINKER GRATE BARS

Grates—Improved bar grate, lever-connected, is easiest to operate, provided with grate lock to insure proper position.



IMPROVED LEVER-CONNECTED BAR GRATES
For Gilt Edge Boilers, Square Series

Tools—With each boiler is furnished sufficient cement, a shaker, poker, scraper, and cleaning brush.

Testing.

Each section is tested under a pressure of not less than fifty pounds, and assembled boilers are re-tested.

Guarantees.

All products are guaranteed against any defects in material and manufacture.

Ratings.

The ratings given require that, in addition to direct radiation, all piping (mains and risers, flow and return) shall be figured as radiation, at temperature 70 degrees Fahr. with cast-iron radiators of standard height, boiler pressure of two pounds for steam, or temperature of 180 degrees for water. They are very conservative, and have been amply confirmed by tests and in actual operation.

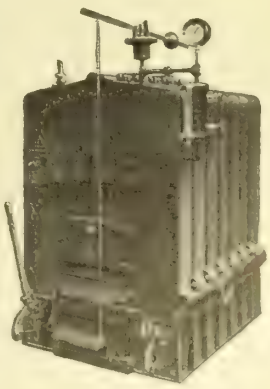
Gilt Edge Boilers, Square Series.

All dimensions are ample. The width of the sections insures a larger prime surface than in other boilers of the same rated capacity. Note illustration showing fire travel and indirect surfaces and the absence of lost surfaces. Also note the narrow waterways. These features account for the unusual efficiency of this boiler.

GILT EDGE BOILER, SQUARE SERIES
Showing long travel, large surfaces and narrow waterways

DIMENSIONS AND RATINGS OF GILT EDGE BOILERS, SQUARE SERIES

No. of Boiler	Total Height, Ins.	Height Water Line, Ins.	Size Supply, Ins.	Size Return, Ins.	Sq. Ft. Direct Radiation	Grate Area, Sq. Ft.	Total Width, Ins.	Diameter of Smoke Pipe, Ins.	No. of Boiler	Total Height, Ins.	Size Supply and Return, Ins.	Sq. Ft. Direct Radiation
	<—For Steam—>								<—For Hot Water—>			
235-S	57	47	2-3½	2-3½	800	4.10	36	9	235-W	53	2-3½	1300
236-S	57	47	2-3½	2-3½	1000	5.10	36	9	236-W	53	2-3½	1625
237-S	57	47	3-3½	2-3½	1200	6.10	36	9	237-W	53	3-3½	1950
238-S	57	47	3-3½	2-3½	1400	7.10	36	9	238-W	53	3-3½	2275
315-S	68	57	2-4	2-3½	1300	6.32	43	12	315-W	62	2-4	2100
316-S	68	57	2-4	2-3½	1625	7.84	43	12	316-W	62	2-4	2600
317-S	68	57	3-4	2-3½	1950	9.36	43	12	317-W	62	3-4	3100
318-S	68	57	3-4	2-3½	2275	10.88	43	12	318-W	62	3-4	3600
385-S	70	58	2-4½	2-4	2100	9.38	50	14	385-W	64	2-4½	3350
386-S	70	58	2-4½	2-4	2625	11.58	50	14	386-W	64	2-4½	4200
387-S	70	58	3-4½	2-4	3150	13.78	50	14	387-W	64	3-4½	5050
388-S	70	58	3-4½	2-4	3675	15.98	50	14	388-W	64	3-4½	5900
389-S	70	58	4-4½	2-4	4200	18.18	50	14	389-W	64	4-4½	6750
445-S	75	62	2-5	2-4	2500	10.22	57	16	445-W	69	2-5	4000
446-S	75	62	2-5	2-4	3125	12.82	57	16	446-W	69	2-5	5000
447-S	75	62	3-5	2-4	3750	15.42	57	16	447-W	69	3-5	6000
448-S	75	62	3-5	2-4	4375	18.02	57	16	448-W	69	3-5	7000
449-S	75	62	4-5	2-4	5000	20.62	57	16	449-W	69	4-5	8000
4410-S	75	62	4-5	2-4	5625	23.22	57	16	4410-W	69	4-5	9000



GILT EDGE BOILER, SQUARE SERIES

THE GRAFF FURNACE COMPANY

Manufacturers of Warm-Air Furnaces and Ranges

105-107 East Twenty-Ninth Street
NEW YORK, N. Y.

TELEPHONES:
MADISON SQUARE, 4383, 4384

Products.

FAULTLESS SCIENTIFIC FRESH AIR HEATER; FAULTLESS-IDEAL COMBINATION COAL and GAS RANGE.

Faultless Scientific Fresh Air Heater.

This Faultless Heater is constructed on scientific principles, and does not resemble the ordinary type of furnace. It is heavy and substantial, and is intended only for high-class work.

This system provides a large volume of pure warm air, instead of a limited supply of overheated air. The air is heated in separate currents, and can be regulated and carried to any desired part of the house.

The number of square feet of radiating surface, compared with the grate surface, is extraordinary; and for this reason results are obtained that are impossible with any ordinary type of furnace.

The fire surfaces are not as large as in ordinary furnaces, and the amount of fuel required is, therefore, much less; and better results are thus secured with greater economy and efficiency.

The distinctive feature of this Faultless Heater, and which justifies the term "scientific," is the sectional tubular radiator.

Each heater has, according to size, from nine to twelve separate air heating flues.

These flues are triangular in shape, and larger at the top than at the bottom, thus allowing for the expansion of the heated air.

Each flue is thirty inches high.

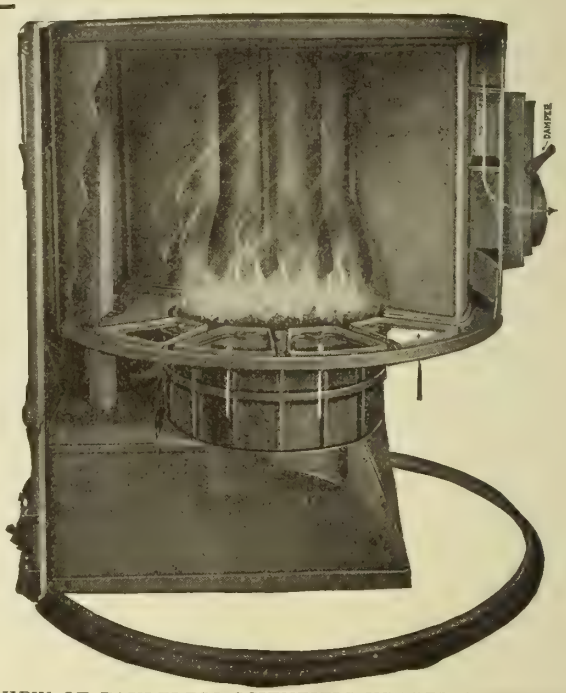
All the products of combustion pass between and around these flues, and the air supply passes into the flues at the bottom.

Each flue receives a share of the air circulation, after same has been heated by the fire-pot.

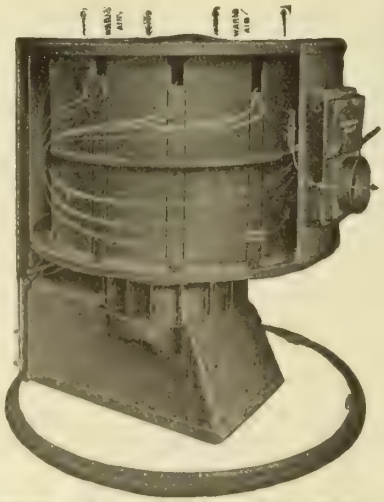
All these flues overhang the fire chamber, and the amount of radiating surface obtained by this construction is very much greater than is possible in any other type of furnace.

These air heating flues are heavy, and the constant circulation of air through them prevents their burning out.

The cold air supply strikes the fire-pot freely on all sides, and the heated air immediately passes up through the tubes, each tube conducting about the same amount of the air circulation.



VIEW OF FAULTLESS SCIENTIFIC HEATER SHOWING RADIATOR CONSTRUCTION



VIEW OF FAULTLESS SCIENTIFIC HEATER SHOWING LINE OF TRAVEL OF COMBUSTION GASES

COMPLETE VIEW OF SCIENTIFIC HEATER

DIMENSIONS AND CAPACITIES, FAULTLESS SCIENTIFIC FRESH AIR HEATER

Size	Diam. Fire Pot, Ins.	Diam. Grate, Ins.	Grate Area, Sq. Ins.	Diam. Casing, Ins.	Height of Casings, Ins.	Height with Cone Top Casing, Ins.	Usual Size Cold Air Duct, Ins.	Smoke Pipe, Ins.	Number Heating Flues	Bottom Area Each Flue, Sq. Ins.	Heating Surface, Sq. Ft.	Heating Capacity Estimated, Cu. Ft.
17-44	11	9	227	44	51	66	12 x 30	7	9	30	111	9,000 to 18,000
19-48	19	15	314	48	54	66	12 x 36	7	9	39	141	18,000 to 28,000
21-54	21	22	380	54	60	69	14 x 40	8	10	48	152	28,000 to 48,000
23-60	23	25	491	60	66	70	14 x 48	9	11	55	176	40,000 to 60,000
26-70	26	30	707	70	58	70	16 x 60	9	12	70	219	60,000 to 100,000

Continued on next page

Faultless-Ideal Combination Coal and Gas Range.

A new idea for the model kitchen.

A two-fuel range that is always ready for immediate use with either coal or gas, or with both. Each oven is entirely independent of the other.

The gas cooking burners are not in any way connected with the flue spaces necessary for the proper working of the coal oven, as in many combinations. The gas ovens are ventilated into the chimney flue.

Made both right and left hand, so as to suit the arrangement of any kitchen.

Furnished with a closed half-top over the gas burners, making two additional ordinary stove covers, and also with ash chute if so desired. The usual gas water-heater attached to range boiler for summer use is recommended in connection with this range.

Advantages.

The only complete combination coal and gas range in compact form.

Note its many advantages:

(1) It occupies no more space than an ordinary coal range or gas range.

(2) It has full capacity fire-box, with large water-back.

(3) Has large coal oven. Perfect operation guaranteed.

(4) Has large gas oven.

(5) Has extra large gas broiling oven.

(6) Has large gas cooking top, four large burners and a simmerer.

(7) Has ample cooking top over the coal fire.

(8) Either oven makes a perfect warming closet when not otherwise used.

(9) Furnishes abundance of hot water.

(10) In design and finish will constitute an ornament to any kitchen.

(11) Coal oven and gas oven are guaranteed to work perfectly.

(12) All parts of this remarkable combination are ready for use at all times, separately or collectively.

(13) In cold weather the coal fire warms the kitchen and helps warm the house, and the coal oven is always ready.

(14) On all occasions all the conveniences of a high-class gas range are available.

Dimensions.

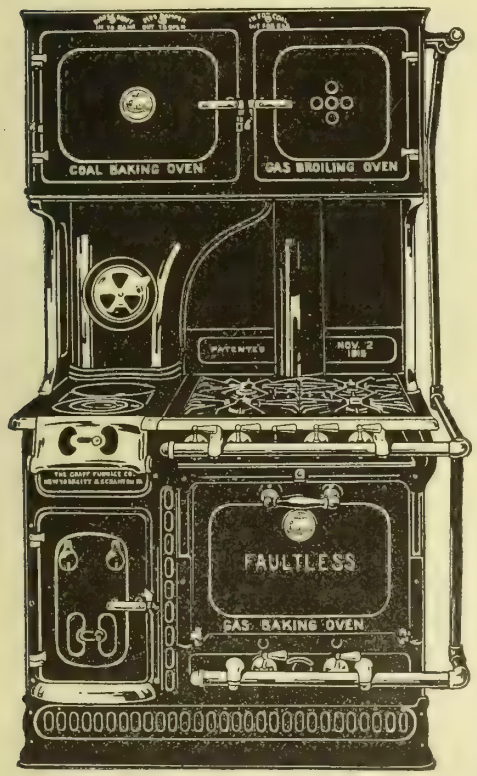
Gas Baking Oven: 18 ins. wide; 18 ins. deep; 12 ins. high.

Gas Broiling Oven: 12½ ins. wide; 16 ins. deep; 11 ins. high.

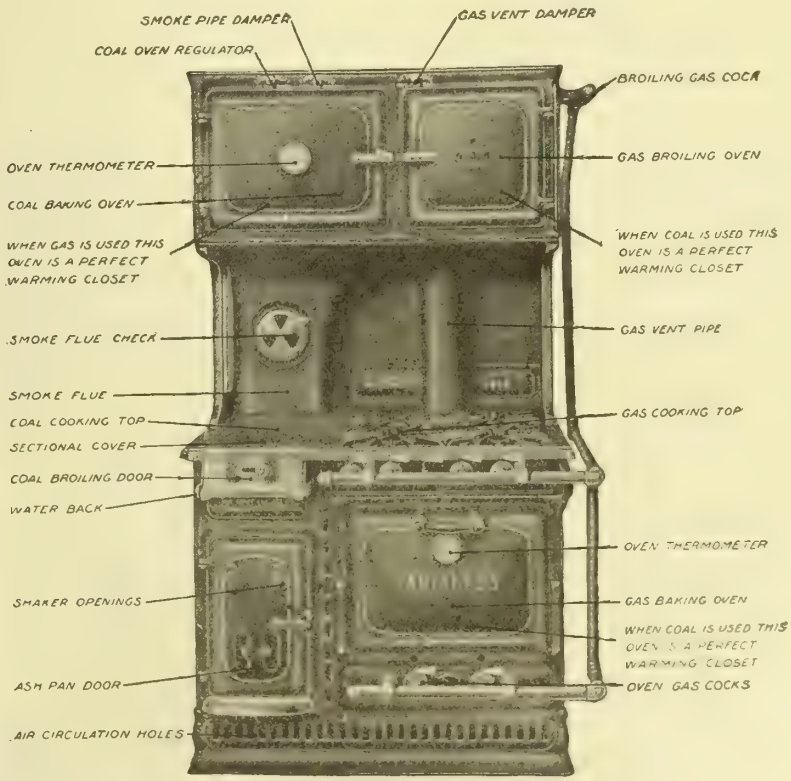
Coal Baking Oven: 16 ins. wide; 16 ins. deep; 12 ins. high.

Total height, 5 ft. 5 ins.; total width, 3 ft. 3½ ins.; total depth, 2 ft. 3 ins.

Height to cooking surface, 2 ft. 6½ ins. Smoke flue opening should be at least 5 ft. 11 ins. from floor.



FAULTLESS-IDEAL COMBINATION COAL AND GAS RANGE



VIEW OF FAULTLESS-IDEAL COMBINATION COAL AND GAS RANGE SHOWING POINTS OF MERIT

THE HOLLAND FURNACE CO.

HOLLAND, MICH.

Products.

FURNACES: HOLLAND, OTTAWA ALL-CAST, and OTTAWA; the HOLLAND WINDOW-CHUTE.

Holland Furnaces.

Advantages—The Holland Furnace will burn any and all grades of fuel, hard coal, soft coal, lignite or wood, without waste of gases, without internal explosions and without opening of joints.

It gives the maximum heat for the fuel consumed because it has the grate surface, the radiation and the most perfect and natural way of burning the fuel.

Description—The special patented features are necessary common sense improvements. The castings are heavy and well made, and the fittings are the best that can be provided.

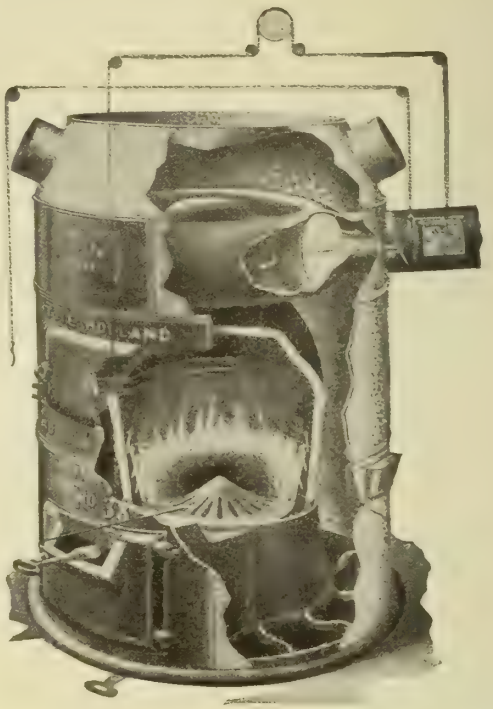
The Grate and Ash-Pit—The Holland grate, as illustrated herewith, is slightly cone-shaped, which breaks up all clinkers and makes the fuel roll towards the wall of the fire-pot, where air is mixed with the gas. This generates a much greater degree of heat than it is possible to obtain with the old duplex and flat grates, and clinkers that would form and be wasted in other furnaces are thereby consumed.

Resting on rollers, it is easily operated, and for convenience and simplicity it has no equal. Either the solid or open construction is furnished; both have the roller attachment, and either can be removed through door of ash-pit.

By lifting grate slightly and raising hooks on sides of ash-pit, the grate can be lowered, giving an opening of seven inches, and the holding bar locks back in position by simply raising grate with shaker or lifter.

The ash-pit is large and roomy on the inside, and is provided with a very large door, which makes it convenient for the removal of ashes.

Patented Fire-Pot—The Holland air-admitting fire-pot insures fuel economy, durability and cleanliness. Made in two heavy corrugated sections, with lower part provided with a large number of funnel-shaped slots, it supplies the fuel with superheated air from all sides.

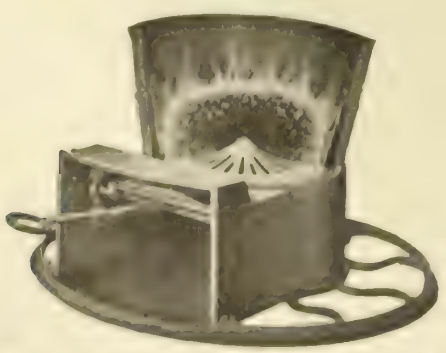


SECTIONAL VIEW OF HOLLAND FURNACE

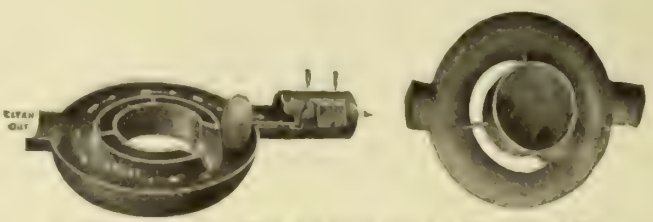
This burns the fuel from the sides and over the top. The gases and soot are consumed, which means fuel saving in place of trouble and dirt.

Patented Radiator—The Holland radiator is cast in one piece, with no joints to be cemented or bolted together. It has three heating surfaces, and longest possible smoke travel, so produces the greatest amount of radiation, all heat being utilized.

The damper, operated from the outside of casing, makes all smoke travel the full circuit, when closed; or allows a direct draft, when open. It opens and closes by lifting and lowering the weight hanging in front of furnace. With this damper arrangement the smoke has to travel twice as far in the "Holland" as it does in other furnaces similarly constructed, and the heat is equal for all warm air pipes taken off.



HOLLAND GRATE, ASH-PIT AND PATENTED FIRE-POT



PATENTED RADIATOR OF THE HOLLAND FURNACE

Combination Heating—For combination heating, cast iron water rings can be supplied to go between fire-pot and feed section. Through recess in feed section water coil can be placed for combination heat purposes, by using a radiator or two, or the coil can be used for heating bath and kitchen water.

SEE OUR CATALOGUE

Continued on next page

DATA, HOLLAND FURNACES

No.	Fire-Pot Diam., Ins.	Casing Diam., Ins.	Casting Height, Ins.	Residence Capacity, Cubic Ft.	One Room Capacity, Cubic Ft.	Weight, Lbs.	Casting, Price List	Casing, Price List
38	21	38	49	10,000	25,000	1,100	$135.00	$20.00
40	22	40	50	14,000	35,000	1,200	147.50	22.50
3-40	24	40	51	18,000	42,000	1,300	160.00	22.50
45	25	45	52	22,000	50,000	1,450	177.50	25.00
4-45	27	45	53	26,000	65,000	1,600	195.00	25.00
50	28	50	54	30,000	75,000	1,750	217.50	27.50

All-Cast Ottawa Furnace.

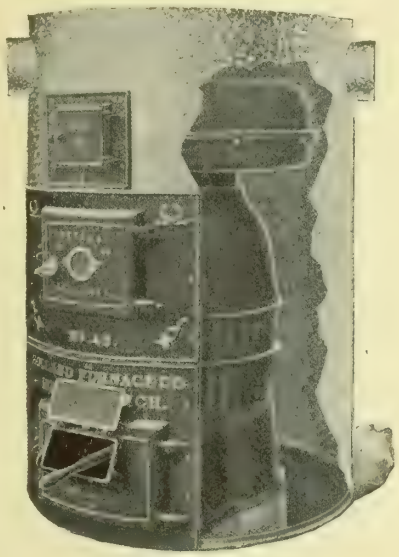
The demand by real estate dealers and builders, who build houses to sell, has made such a strong call for an ordinary all-cast furnace which can be sold at a price consideration, that we have added the All-Cast Ottawa to our line.

This furnace is heavy and well made; and while the radiator is cast in two pieces and bolted together, and the smoke travels only half as far as in the Holland, it is fully as good as other furnaces of similar construction that have not the patented "direct-indirect" damper feature of the Holland.

The fire-pot is in two plain sections, with outside surfaces corrugated. This furnace is also provided with the cone grate.

The all-cast Ottawa is an ideal heating plant for those who want an ordinary all-cast furnace, to gain a saving in first cost.

A recess is provided in the feed section for the admittance of a water coil.



ALL-CAST OTTAWA FURNACE

DATA, ALL-CAST OTTAWA FURNACES

No.	Fire-Pot Diam., Ins.	Casing Diam., Ins.	Casting Height, Ins.	Residence Capacity, Cubic Ft.	One Room Capacity, Cubic Ft.	Weight, Lbs.	Casting, Price List	Straight Casing, Price List
22-40	22	40	49	12,000	25,000	950	$110.00	$22 50
25-40	25	40	50	16,000	35,000	1,150	122.50	22.50

Holland Service.

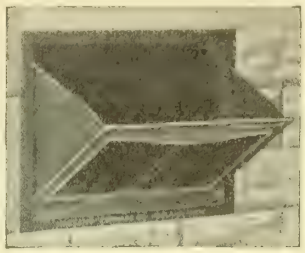
Our customers do not merely buy a furnace—a heating plant. They buy experience, the ripeness of years of dealing with heating problems and difficulties. To be sure, we sell the best furnace we can manufacture; but the matter does not end there. We make a special feature, in our service, of knowing positively that every furnace we install will give satisfaction. Write us about your heating problems.

Holland Window-Chute.

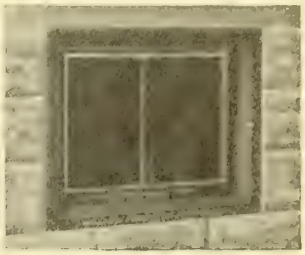
This burglar-proof coal chute is also a fine appearing glass window, and is the easiest chute on the market for the mason or carpenter to set. It will not rust out, and is strong enough to support the wall above it without buckling.

Has no hinges or bolts on the outside, and locks automatically from the outside by merely closing it.

Can be opened only from the inside, and has no bolts, hooks or clips to get out of order.



Opened as Coal Chute

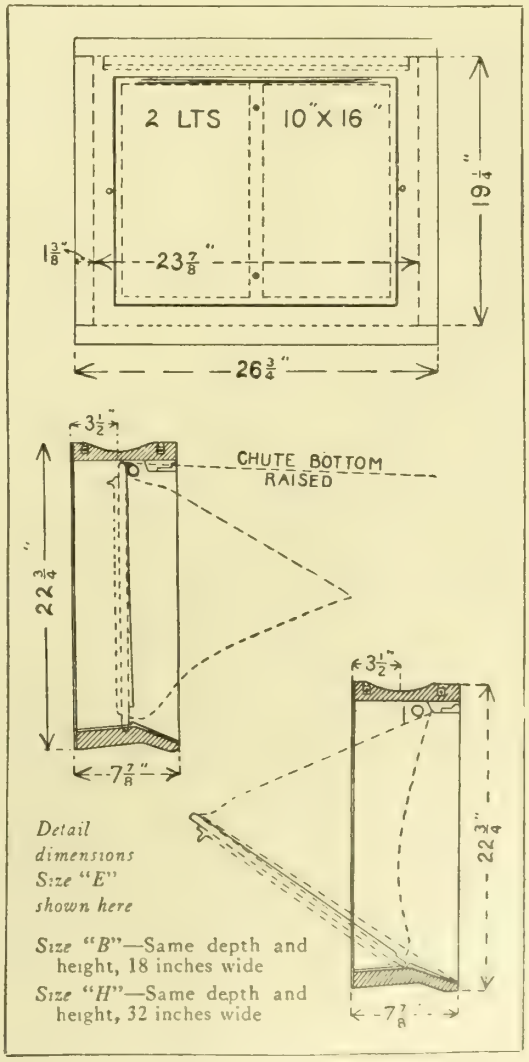


Window Closed

HOLLAND WINDOW-CHUTE

DATA, HOLLAND WINDOW-CHUTE

Size	Weight, Lbs.	Wall Width, Ins.	Opening Height, Ins.	No. of Lights	Size, Ins	Price
B	120	18	22 3/4	1	14 x 16	$10.00
E	145	24	22 3/4	2	10 x 16	12.50
H	185	32	22 3/4	2	14 x 16	15.00



DETAILS OF HOLLAND WINDOW-CHUTE

INTERNATIONAL HEATER COMPANY

Makers of Heating Apparatus

GENERAL OFFICES

UTICA, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., 601 West 27th Street

CHICAGO, ILL., 1933 Wentworth Avenue

DISTRIBUTORS

DENVER, COLO., Crosta Brothers

ST. PAUL, MINN., Farwell, Ozmun, Kirk & Co.

ST. JOSEPH, MO., Bristol Supply Co.

SALT LAKE CITY, UTAH, West Co.

Products.

International Warm-Air Furnaces, Economy Combination Heaters, International Steam and Hot-Water Boilers and Tank Heaters, Auxiliary Water Heaters, Furnace Pipe and Fittings.

TRADE-MARK

We describe only a partial list of our products in the following pages. For the full line consult our complete catalogues.

Ratings.

The ratings given for International Warm-Air Furnaces are necessarily *estimated* and *approximate* only, and are to be considered as suggestive rather than absolute. The exposed glass and wall surface, exposure and construction of the building, prevailing winds, climatic conditions, together with the location of the heater and manner of piping, are the determining factors that make each individual job a matter of judgment and experience.

A warm-air furnace that is larger than is absolutely required will give better satisfaction, last longer, and be more economical in fuel consumption than one just large enough to fulfil a guarantee; and a furnace properly set and piped will give better satisfaction than a size larger poorly installed.

The ratings on International Boilers provide for all piping (mains, risers, flows and returns) to be figured as radiating surface, in addition to the direct cast-iron radiation used.

Ratings are based on the assumption that there shall be used sufficient radiation to properly heat the building; the piping shall be of sufficient size and properly run, and the boiler connected to a flue of ample capacity, with steam at two pounds pressure as it leaves the boiler, or in case of a water boiler, with water at 180° Fahr. as it leaves the boiler.

When soft coal is used, a boiler of larger size should be used. When a pipe coil or cast-iron section is introduced into the fire-pot for heating water for domestic use, additional capacity should be figured in determining the size of boiler.

Ratings for both Warm-Air Furnaces and Steam and Hot-Water Boilers are conservatively made in accordance with accurate standards; but on account of the varying conditions surrounding installation, no guarantee is given except to the extent of furnishing new castings for any found to be defective in manufacture. We can not entertain claims for expenses.

Prices.

We sell to the trade only. Prices quoted on Furnaces and Combination Heaters are those at which any of our regular dealers, east of the Mississippi and north of the Ohio, would furnish to houseowners *at the time this catalogue was prepared, but prices will vary with the market.* These prices do not include pipes or registers or any installation work. West of the Mississippi and south of the Ohio, prices may be slightly higher on account of additional freight.

Prices quoted on boilers are *list prices,* and are subject to regular trade discounts and freight terms, which vary with the market.

Warm-Air Furnaces.

All Warm-Air Furnaces listed here, which have a 20-inch fire-pot or larger, are provided with coil openings for the insertion of a coil or cast-iron water front for heating the domestic water supply, the Heavy Duty and Wood Burner patterns being excepted.

The Warm-Air Furnace Casings made by us are double; i. e., an outer casing of galvanized iron, and an inner casing (with air space between) of black iron. Cold air necks are furnished free with all orders specifying them, but not otherwise.

International Carton Warm-Air Furnace, 1915 Pattern.

A heavy all-cast furnace, designed for the best class of high-grade heating. Made for burning either hard or soft coal. Self-cleaning radiator, cast in one piece; large air flues; straight two-piece fire-pot; herringbone triangular grate hung in drop frame.

For over half a century Carton Furnaces have maintained a high record for efficiency, durability and economy. The 1915 Pattern Carton is the latest improved design. Recommended for the best class of residence work, and for churches and stores where efficiency and durability are sought.

SIZES, CAPACITIES AND PRICES

Number Hard Coal	Number Soft Coal	Diam. Fire-Pot, Inches	Diam. Grate, Inches	Diam. Casing, Inches	Estimated Heating Capacity	Price, including Casings
40-2	40-3	20	18	40	10–14M	$76.72
44-2	44-3	22	20	44	14–17M	96.06
48-2	48-3	24	22	48	17–20M	112.38
52-2	52-3	26	24	52	20–30M	124.14
58-2	58-3	28	26	58	30–45M	166.15
160	060	33	30	60	55–80M	233.82

INTERNATIONAL CARTON FURNACE

International Heavy-Duty Warm-Air Furnace.

Designed especially for school and church heating, and can be had in either portable or brick-set form. It is constructed entirely of cast iron, and all parts are very heavy and durable. The radiator has a long gas

Series C [illegible]

Continued on next page

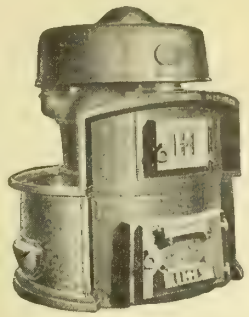
travel and plenty of free air-space to provide 30 cubic feet of fresh air per pupil, per minute, for space heated. Triangular revolving grate bars hung in a drop frame are used. For heating two fifty-pupil rooms a No. 62 Furnace is recommended.

SIZES, CAPACITIES AND PRICES

Number	Diam. Fire-pot, Inches	Diam. Casing, Inches	*Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	†Price, Including Casings
56	30	56	64	45–60 M	$187.91
62	32	62	67	60–90 M	242.89

* Furnaces cased with pitch top are approximately 12 inches higher.

† Price on Brick-Set Castings with covering bars and manhole door: No. 56, $209.67; No. 62, $266.45.



INTERNATIONAL HEAVY-DUTY FURNACE

International Queen Warm-Air Furnace.

A high-grade warm-air furnace of tubular construction. The radiator or combustion chamber consists of a series of heavy lap-welded boiler tubes, firmly imbedded in upper and lower cast-iron decks, and surrounded by a shell made of No. 12-gauge steel.

The tubes are set close together at the back and spaced wider apart at the front, so that the flames and gases pass to the front, between and around these tubes, and then back to the smoke exit, while the air passing up through them is rapidly heated. The entering air is drawn close to the fire-pot; and as it rises and expands, an extension ring increases the furnace diameter.

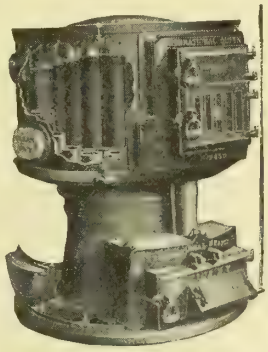
The castings are heavy and durable. Has large feed-door, coil openings and triangular grate. Can be furnished with gas ring attachment for natural gas. Recommended for high-grade work with hard coal or wood for fuel.

SIZES, CAPACITIES AND PRICES

Number	Diam. Fire-pot, Inches	Diam. Casing, Inches	Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
237 D	18	37	47	8–15 M	$62.54
241 D	21	41	50	12–20 M	83.07
245 D	24	45	51	16–28 M	101.19
249 D	26	49	51	22–38 M	125.37
259 D	29	59	54	35–60 M	175.53
*268	34	68	57	50–80 M	241.08

Double Feed Doors have 15 x 15½-inch opening.

* No. 268 is not made with double door.



INTERNATIONAL QUEEN FURNACE

International Steel Warm-Air Furnace.

"Built like a boiler." The shell which makes the ash-pit, fire-pot and combustion chamber is made of a single sheet of heavy steel plate, with a steel head or top, and all closely riveted under pneumatic pressure.

The feed-chute, which is cast in one piece and closely riveted to the combustion chamber, extends *through* the front, the feed-doors being hung on the chute on the outside.

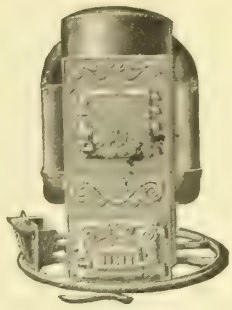
The radiator consists of three heavy steel tubes and a horseshoe-shaped cored cast base, and is connected to the combustion dome by two heavy reinforced cast elbows. The radiator is supported from the base by brackets, relieving the fire-pot and combustion dome of all strain.

Has large double feed-door, brick-lined fire-pot, hollow bar revolving grate hung in a drop frame. Guaranteed absolutely gas- and dust-tight. Especially desirable where soft coal is used for fuel.

SIZES, CAPACITIES AND PRICES

Number	Diam. Fire-pot, Inches	Diam. Casing, Inches	Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
40	18½	40	57	5–10 M	$74.33
44	21½	44	61	10–20 M	85.19
50	24½	50	65	20–30 M	102.71
56	26½	56	67	30–45 M	129.91

The feed door of No. 40 is 12 x 14 inches. All other sizes, 14 x 14 inches.



INTERNATIONAL STEEL FURNACE

International Princess Warm-Air Furnace.

Very plain and substantial. It has a large ash-pit cast in one piece and ample feed-door, with perforated lining. The two-piece fire-pot is corrugated on the outside and smooth on the inside, with no projections to which ashes can cling. The feed neck is cast solid with the combustion dome, with no joints to leak gas. Three styles of radiators are made, 12-inch and 18-inch high steel radiators for hard coal, and 12-inch high single-piece cast radiator for either hard or soft coal.

The International Princess is equipped with coil openings for inserting domestic water heater; the latest pattern herringbone triangular revolving grate hung in a drop frame, and is an aristocrat among heaters.

It is sufficiently heavy to last the user a generation. Its interior construction has been carefully worked out to secure as nearly perfect combustion as possible, and the heating surfaces have been proportioned so as to give the greatest amount of heat with the least consumption of fuel.

INTERNATIONAL PRINCESS FURNACE

SIZES, CAPACITIES AND PRICES

Number *12-inch Steel Radiator		Diam. Fire-pot, Inches	Diam. Casing, Inches	†Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
*32–0		18	32	49	8–10 M	$48.04
36–0		20	36	49	10–14 M	56.20
40–0		22	40	50	14–18 M	66.46
44–0		24	44	50	18–22 M	80.37
48–0		26	48	53	22–30 M	97.28
52–0		28	52	55	30–40 M	116.62
WITH CAST RADIATOR FOR HARD OR SOFT COAL						
‡32–2	§32–3	18	32	48	8–10 M	$52.86
36–2	36–3	20	36	48	10–14 M	61.02
40–2	40–3	22	40	48	14–18 M	71.90
44–2	44–3	24	44	49	18–22 M	86.19
48–2	48–3	26	48	50	22–30 M	105.74
52–2	52–3	28	52	51	30–40 M	126.29

* If wanted with an 18-inch Steel Radiator the numbers will read 32–1, 36–1 etc. The added cost is approximately $5.00 per size.

† Furnaces cased with pitch top are approximately 10 inches higher.

‡ For Hard Coal. §For Soft Coal.

International Baronet Furnace.

Constructed on the same general lines as the Princess. It differs in that the feed-door is double and much larger, the 32-inch, 36-inch and 40-inch having feed-doors 12 inches wide and 11 inches high. The 44-inch, 48-inch and 52-inch have feed-doors 14 inches wide and 11¾ inches high. This changes the height of the combustion dome, making the casting two or three inches higher over all and slightly increasing the cost, approximately $2.00 per size.

BARONET FURNACE FEED DOOR

Continued on next page

International Count Warm-Air Furnace.

A moderate priced, all cast furnace; low in height and built to give good service. A substantial, economical heater that we can strongly recommend to the house owner who is limited in his investment. Has herringbone triangular revolving grate, hung in drop frame, large ash-pit, corrugated sectional fire-pot and combustion dome, single-piece cored cast radiator.

Particular attention is called to the shape of this radiator, by which all the air impinging on it is held close to the surface, rapidly absorbing the heat. This furnace has an extension casing ring providing for the air expansion as it ascends. Large feed-door and three-quarter shield front.

SIZES, CAPACITIES AND PRICES

Number Hard Coal	Number Soft Coal	Diam. Fire-pot, Inches	Diam. Casing, Inches	*Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
32–2	32–3	18	32	48	8–10 M	$51.06
36–2	36–3	20	36	48	10–14 M	59.21
40–2	40–3	22	40	48	14–18 M	69.49
44–2	44–3	24	44	49	18–22 M	83.99
48–2	48–3	26	48	50	22–30 M	103.33
52–3	52–3	28	52	51	30–40 M	122.66

* Furnaces cased with pitch top are approximately 10 inches higher.
This furnace can be furnished with a steel radiator at slightly less price if desired.

INTERNATIONAL COUNT FURNACE

International Chief Warm-Air Furnace.

Has the same general construction as the four larger sizes of the International Count, except that it is built with a higher combustion dome and double feed-door, making it better adapted for use when burning lump soft coal or wood chunks. International Chief Furnaces are seven inches higher and cost an average of $5.00 each more than the corresponding sizes of International Count Furnaces.

INTERNATIONAL CHIEF FURNACE

International Duke Warm-Air Furnace.

This has a steel radiator, triangular grate, corrugated fire-pot and combustion dome; 12-inch radiator with cast top and bottom, and steel sides; large ash-pit, full shield front. A moderate priced well-built furnace that will give good satisfaction and wear well.

SIZES, CAPACITIES AND PRICES

Number	Diam. Fire-pot, Inches	Diam. Casing, Inches	*Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
[illegible]	18	28	[illegible]	6–9 M	[illegible]
[illegible]	20	32	[illegible]	[illegible]	[illegible]
[illegible]	22	36	[illegible]	10–14 M	59.83
[illegible]	24	40	50	[illegible]	[illegible]
[illegible]	[illegible]	44	[illegible]	18–22 M	[illegible]
[illegible]	28	[illegible]	[illegible]	[illegible]	[illegible]

* [illegible]

[illegible]

INTERNATIONAL DUKE FURNACE

International Earl Warm-Air Furnace.

Similar to the Duke in general construction. It has a three quarter shield front instead of a full front. The illustration shows its construction with a one-piece cast radiator. It can be furnished with a 12-inch steel radiator at an average reduction in price from those quoted in the table below of $5.00 per size.

SIZES, CAPACITIES AND PRICES

Number Hard Coal	Number Soft Coal	Diam. Fire-pot, Inches	Diam. Casing, Inches	*Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
28–2	28–3	18	28	48	7–9 M	$47.13
32–2	32–3	20	32	48	8–10 M	55.29
36–2	36–3	22	36	48	10–14 M	65.25
40–2	40–3	24	40	49	14–18 M	79.16
44–2	44–3	26	44	50	18–22 M	94.87
48–2	48–3	28	48	51	22–30 M	113.00

* Furnaces cased with pitch top are approximately 10 inches higher.
Earl Furnaces are also made with steel radiators, at slightly lower price than those quoted above.

INTERNATIONAL EARL FURNACE

International Regent Warm-Air Furnace.

A low furnace with a large steel-plate radiator. Not a high-priced heater, but designed for the house owner who seeks real and lasting service for a comparatively modest expenditure. Particularly recommended for rural residences where wood is used for fuel all or part of the time. Has large double feed-door, revolving triangular grates, sectional fire-pot, revertible flue radiator with triple heating surfaces. A wood-burning grate, to be used on top of the coal grate will be furnished without extra charge, on request.

SIZES, CAPACITIES AND PRICES

Number	Diam. Fire-pot, Inches	Diam. Casing, Inches	Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
29	16	29	45	5–10 M	$40.04
34	19	34	46	8–15 M	48.95
39	22	39	48	12–20 M	64.35
44	25	44	48	16–28 M	76.74
49	27	49	49	22–38 M	90.95

Double feed doors have 14 x 14½-inch opening.

INTERNATIONAL REGENT FURNACE

International Wood Furnace.

For burning wood only. Has long, corrugated, cast body, deep elliptical radiator with long revertible flue travel; large feed-door (14-inch by 17-inch opening); generous ash-pit and solid cast front. The two sections of the body have a covered deep cup joint, which allows for contraction and expansion without leaking smoke. This furnace is very heavy and durable, and should not be compared with the ordinary makeshift type of wood-burning heaters.

Made in two sizes, to burn either 3- or 4-foot wood.

SIZES, CAPACITIES AND PRICES

Number	Length of Wood, Feet	Height Castings, Inches	Estimated Heating Capacity, Cubic Feet	Price, Including Casings
3	3	52	25–35 M	[illegible]
4	4	55	35–50 M	120.81

Cased with pitch top the furnaces are approximately 11 inches higher.

INTERNATIONAL WOOD FURNACE

Continued on next page

International Combination Heating Systems.

With Steam and Warm Air, With Hot Water and Warm Air—Many architects appreciate the advantages of a well-planned Combination Heating System over either direct steam, direct hot-water, or a warm-air furnace alone. For those who have never specified this method, attention is called to the following facts:

In rooms that can be most easily reached by warm air pipes (and these are usually the ones most used) fewer radiators and smaller are required, and valuable wall space is saved; while distant rooms and exposed bays are easily protected with direct radiation where it would be impossible to warm them with a furnace.

In mild weather and on chilly nights and mornings of late fall and early spring, a little fire will quickly diffuse a pleasant supply of freshly warmed air through the entire building, where a steam plant would make the building intolerable and a hot-water heater would be so slow in heating up as oftentimes not to be available until the necessity was past.

In designing a Combination System, registers are placed near inside walls as close to heater as possible. Radiators are placed in exposed locations, under windows, near doors, in distant rooms, etc. It is desirable always to have one hall or large room connected both for warm air and steam or hot water to balance the combination.

Do not confuse the Economy Steam and Air, or the Economy Water and Air Combinations, with the makeshift arrangements and attachments used to convert some types of furnaces into so-called combination heaters.

Economy Combination Heating Systems are not cheaper in first cost than direct steam or hot water; the *economy* lies in the fuel saving and durability, combined with ideal ventilation in connection with the heating.

Economy Steam and Air Combination Heaters.

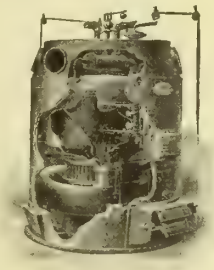
Low-Down Pattern, Portable and Brick-Set Form—The boiler is constructed of plate steel, $\frac{3}{16}$ to $\frac{1}{4}$ of an inch thick, with standard 2-inch boiler tubes, suspended directly above the fire. The combustion dome is of plate steel, No. 12-gauge sides and No. 8-gauge heads. Sectional corrugated fire-pot is of cast iron, very heavy, and with nearly straight sides. Low-hung radiator is cast in one piece, without joints.

The hot gases of combustion pass up through the boiler tubes and are deflected by the V-shaped flue strips over the outer surface and down to the radiator, around which they must pass to the smoke flue.

SIZES AND PRICES

Number	Diam. Firepot Inches	Diam. Casing Inches	Height Cased Inches	Price, Portable Cased Complete	Price, Brick-set Castings and Covering Bars
310	20	43	70	$263 52	$276 48
314	22	48	74	306 48	329 04
316	25	52	76	334 80	362 16
318	27	52	76	363 60	292 40
320	32	64	82	528 00	568 80

Brick-set price includes 16 x 28-inch man hole door which is shipped unless otherwise specified.
For data relative to capacities see table opposite.



LOW-DOWN PATTERN STEAM AND AIR COMBINATION HEATER

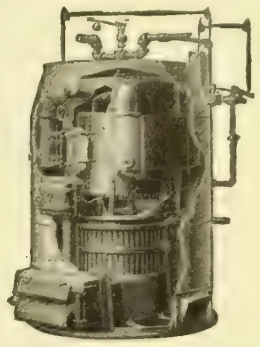
Regular Pattern, Portable and Brick-Set Form—It differs in construction from the Low-Down Pattern in the manner of attaching the warm-air radiator, which is made of steel plate. It differs also in this particular, that while a Regular Pattern Combination will heat the same *total space* as the same corresponding size in the Low-Down Pattern, more of the space is heated by warm air.

With the Low-Down Patterns over sixty per cent of the space to be heated is taken care of by radiators, and the warm air is auxiliary. With the regular pattern fifty per cent or more of the heating is done by warm air, and the steam is auxiliary. This gives a wide range of adaptation. (See table at bottom of page.)

SIZES AND PRICES

Number	Diam. Firepot Inches	Diam. Casing Inches	Height Cased Inches	Price, Portable Cased Complete	Price, Brick-set Castings and Covering Bars
310	20	43	72	$220 32	$233 28
314	22	48	79	277 68	300 24
316	25	52	82	298 80	326 16
318	27	52	82	334 80	363 60
320	32	64	90	456 00	496 80

Brick-set price includes 16 x 28-inch man hole which is shipped unless otherwise specified.
For data relative to capacities see table below.



REGULAR PATTERN STEAM AND AIR COMBINATION HEATER

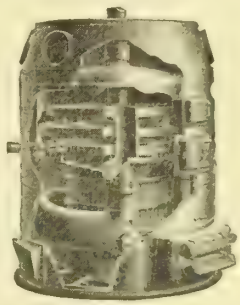
Economy Water and Air Combination Heater.

This has the same general construction as Low-Down Pattern, except that flat cast-iron hollow discs make up the water-heating surfaces. One, two, or three discs are used, depending on the amount of water radiation required. The illustration shows the Combination with three discs inserted.

SIZES AND PRICES

Number	Diam. Firepot Inches	Diam. Casing Inches	Height Cased Inches	Price, Portable Cased Complete with One Section	Price, Portable Cased Complete with Two Sections	Price, Portable Cased Complete with Three Sections
310	20	43	67	$148 32		$198 72
314	22	48	71	172 88	$212 88	227 28
316	25	52	72	205 20	248 40	270 00
318	27	52	72	219 60	262 80	298 80
320	32	64	83	326 40	398 40	456 00

Also made in Brick-set form at a little higher price per size.
For data relative to capacities see the table below.



ECONOMY WATER AND AIR COMBINATION HEATER

CAPACITIES AND ADJUSTMENT

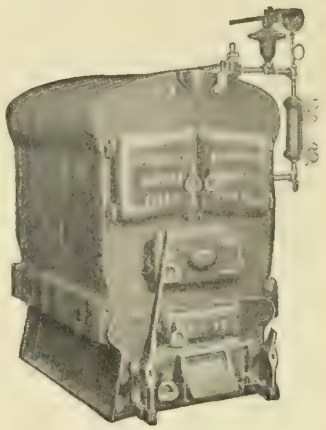
		Number	Estimated Total Radiation Including Piping	Estimated Cubic Space Heated by Radiation	Estimated Total Area Warm Air Pipes, Sq. In.	Estimated Cubic Space Heated by Warm Air	Total Estimated Heating Capacity Cu. Feet of Space	Approximate Adjustment Total Space Heated by Radiators	Approximate Adjustment Total Space Heated by Registers
STEAM AND AIR	LOW DOWN PATTERN	310	275	10000	150	4000	14000	70%	30%
		314	325	13000	200	5000	18000	70	30
		316	400	16000	300	10000	26000	60	40
		318	475	19000	350	14000	33000	60	40
		320	825	33000	450	17000	50000	65	35
	REGULAR PATTERN	310	150	6000	250	8000	14000	45%	55%
		314	225	9000	300	9000	18000	50	50
		316	275	11000	400	15000	26000	40	60
		318	325	13000	475	20000	33000	40	60
		320	500	20000	600	30000	50000	40	60
WATER AND AIR LOW DOWN PATTERN	1 Section	310	185	4500	300	9500	14000	30%	70%
		314	225	5000	350	13000	18000	30	70
		316	280	6500	450	19500	26000	25	75
		318	400	9500	525	23500	33000	30	70
		320	675	16000	720	34000	50000	30	70
	2 Section	314	375	9000	300	9000	18000	50%	50%
		316	560	13000	350	13000	26000	50	50
		318	675	16000	400	17000	33000	50	50
		320	1050	25000	550	25000	50000	50	50
	3 Section	310	440	10000	150	4000	14000	70%	30%
		314	560	13000	200	5000	18000	70	30
		316	675	16000	300	10000	26000	60	40
		318	800	19000	350	14000	33000	60	40
		320	1375	33000	450	17000	50000	65	35

Steam is based on 1 square foot of radiation heating 50 cubic feet of space.
Water is based on 1 square foot of radiation heating 30 cubic feet of space.

Continued on next page

International Steam and Hot Water Boilers.

Boilers are sold only through the trade. The prices here given are list prices, subject to the regular dealers' discounts, and change with the market. Freight rates vary to such an extent that it has not seemed to be practical to quote nets. Architects will be furnished trade discount sheets applying to their section at time of writing, on request.



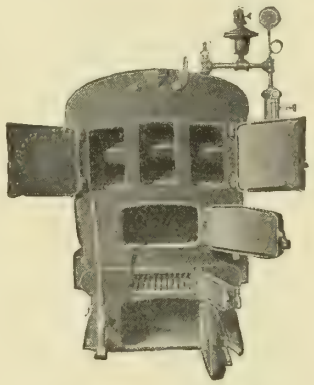
INTERNATIONAL EMPRESS STEAM BOILER

International Empress Boilers.

Are vertical sectional cast boilers of the highest type. They have large, deep combustion chambers, commodious ash-pits, balanced grates, thin waterways, and a large amount of prime heating surface.

The sections are connected with cast nipples accurately machined and drawn tight by means of heavy rods, which pass through cored openings, entirely protecting them from fire, water or steam. The openings between the sections of the lower crown sheet are of the same area as the size of the smoke-pipe required. This insures an equal vertical travel of the products of combustion, which impinge uniformly on all parts of the upper crown sheet and then pass in equal volumes through the upper set of flues. All hinges and catches are separate countersunk castings. Damper control is very accurate and sensitive.

The flues are easily cleaned through the big double doors. When burning pea coal or slack the slice bar can be inserted through the clinker door and run over the grate to break up the fire. Notice how these doors are heavily baffled.



INTERNATIONAL EMPRESS STEAM BOILER
Front View

NUMBERS, CAPACITIES AND PRICES

Size of Grate Inches	Fire Chamber Area Square Feet	*Outside Size of Base at Floor Inches	STEAM Number	STEAM Capac. Direct Radiation	STEAM Price	WATER Number	WATER Capac. Direct Radiation	WATER Price
21¼x26	4.00	29½x29	4-20	700	$310 00	20-4	1150	$300 00
21¼x30	4.66	29½x33⅜	4-20A	800	340 00	20-4A	1300	330 00
21¼x34	5.33	29½x37	5-20	900	370 00	20-5	1500	360 00
21¼x38	6.00	29½x41⅜	5-20A	1025	408 00	20-5A	1700	398 00
21¼x42	6.66	29½x45	6-20	1150	445 00	20-6	1900	435 00
21¼x46	7.33	29½x49⅜	6-20A	1250	475 00	20-6A	2050	465 00
25¾x34	6.66	34½x37	5-25	1200	$460 00	25-5	2000	$450 00
25¾x38	7.50	34½x41⅜	5-25A	1350	505 00	25-5A	2225	495 00
25¾x42	8.33	34½x45	6-25	1500	550 00	25-6	2475	540 00
25¾x46	9.16	34½x49⅜	6-25A	1650	595 00	25-6A	2725	585 00
25¾x50	10.00	34½x53	7-25	1800	640 00	25-7	2975	630 00
25¾x54	10.83	34½x57⅜	7-25A	1950	685 00	25-7A	3225	675 00
25¾x58	11.66	34½x61	8-25	2100	730 00	25-8	3450	710 00
33x34	8.40	41½x37	5-32	1600	$580 00	32-5	2650	$570 00
33x38	9.50	41½x41⅜	5-32A	1800	640 00	32-5A	2975	630 00
33x42	10.55	41½x45	6-32	2000	700 00	32-6	3300	690 00
33x46	11.61	41½x49⅜	6-32A	2200	757 00	32-6A	3625	737 00
33x50	12.66	41½x53	7-32	2400	810 00	32-7	3950	790 00
33x54	13.62	41½x57⅜	7-32A	2600	840 00	32-7A	4300	820 00
33x58	14.77	41½x61	8-32	2800	904 00	32-8	4625	884 00
33x62	15.83	41½x65⅜	8-32A	3000	944 00	32-8A	4950	924 00
33x66	16.81	41½x69	9-32	3200	984 00	32-9	5275	964 00
40x42	13.33	49½x45	6-40	3250	$994 00	40-6	5375	$974 00
40x46	14.36	49½x49⅜	6-40A	3600	1064 00	40-6A	5950	1044 00
40x50	15.56	49½x53	7-40	3900	1124 00	40-7	6450	1104 00
40x54	16.68	49½x57⅜	7-40A	4250	1194 00	40-7A	7025	1174 00
40x58	18.27	49½x61	8-40	4550	1254 00	40-8	7525	1234 00
40x62	19.58	49½x65⅜	8-40A	4900	1324 00	40-8A	8100	1304 00
40x66	20.84	49½x69	9-40	5200	1384 00	40-9	8600	1364 00
40x70	22.12	49½x73	9-40A	5550	1454 00	40-9A	9175	1434 00
40x74	23.50	49½x77	10-40	5850	1514 00	40-10	9675	1494 00
40x78	24.80	49½x81⅜	10-40A	6200	1584 00	40-10A	10250	1564 00
40x82	26.11	49½x85	11-40	6500	1644 00	40-11	10750	1624 00

	20 In.	25 In.	32 In.	40 In.
Height of Boilers—Steam	34½ in.	37½ in.	43½ in.	49½ in.
Add to height for trimmings	14 in.	14½ in.	14½ in.	16½ in.
Height of Boilers—Water	48½ in.	52 in.	58 in.	66 in.
*Add to height for smoke box	11 in.	24 in.	26 in.	30 in.
Size smoke pipe	10 in.	11 in.	13 in.	15 in.

International Prince Boilers.

Simple, durable, efficient and easily operated round boilers. They have deep ash-pits, herringbone triangular grates with drop frames, corrugated fire-pots, thin waterways, large doors and clean-outs and push-nipple connections. These boilers are very conservatively rated and are highly recommended.

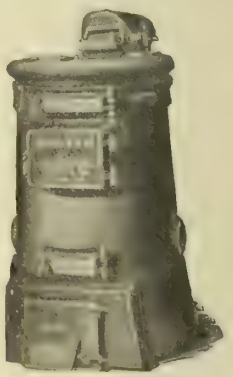
NUMBERS, CAPACITIES AND PRICES

Outside Diam. Fire-pot, Inches	Diam. Grate, Inches	Grate Area, Square Feet	STEAM Number	STEAM Capac. Direct Radiation	STEAM Price	WATER Number	WATER Capac. Direct Radiation	WATER Price
18⅛	15	1.21	1015	175	$106 00	1510	300	$ 88 00
18⅛	15	1.21	1115	200	114 00	1511	325	97 00
18⅛	15	1.21	1215	225	123 00	1512	350	101 00
21⅛	18	1.76	1018	275	$141 00	1810	450	$132 00
21⅛	18	1.76	1118	300	150 00	1811	500	140 00
21⅛	18	1.76	1218	325	158 00	1812	550	154 00
24⅛	21	2.40	1021	400	$193 00	2110	650	$184 00
24⅛	21	2.40	1121	425	200 00	2111	700	191 00
24⅛	21	2.40	1221	450	207 00	2112	750	197 00
27⅛	24	3.14	1024	500	$218 00	2410	825	$209 00
27⅛	24	3.14	1124	550	233 00	2411	900	223 00
27⅛	24	3.14	1224	600	246 00	2412	1000	236 00
30	27	3.90	1027	750	$317 00	2710	1250	$307 00
30	27	3.90	1127	800	331 00	2711	1325	321 00
30	27	3.90	1227	850	346 00	2712	1400	336 00

INTERNATIONAL PRINCE BOILER

International Sultan Steam and Hot-Water Boilers.

Well constructed cast-iron, push-nipple round boilers. They are simple, durable, and easily operated. Have herringbone grates, corrugated fire-pot, balanced draft doors, and ample clean-outs.



INTERNATIONAL SULTAN HOT-WATER HEATER

NUMBERS, CAPACITIES AND PRICES

Outside Diam. Fire-pot, Inches	Diam. Grate, Inches	Water Line Height, Inches	STEAM Number	STEAM Commercial Rating	STEAM Price	WATER Number	WATER Commercial Rating	WATER Price
18⅛	15	40½	130	225	$123 00	131	375	$113 00
18⅛	15	45	132	275	141 00	133	450	132 00
18⅛	15	49½	134	300	150 00	135	500	141 00
21⅛	18	42½	140	325	158 00	141	550	154 00
21⅛	18	47½	142	375	177 00	143	625	172 00
21⅛	18	52½	144	425	200 00	145	700	191 00
24⅛	21	44½	150	475	213 00	151	775	201 00
24⅛	21	49½	152	525	226 00	153	875	218 00
24⅛	21	54½	154	575	240 00	155	980	230 00
27⅛	24	46½	160	625	278 00	161	1025	268 00
27⅛	24	51½	162	700	300 00	163	1150	290 00
27⅛	24	56½	164	775	324 00	165	1275	314 00
30	27	48½	170	800	331 00	171	1325	321 00
30	27	53½	172	900	361 00	173	1475	351 00
30	27	58½	174	1000	390 00	175	1650	380 00

Continued on next page

International Tank Heater.

Designed to supply an abundance of hot water for domestic purposes in hotels, apartments, church baptisteries, etc. They have deep corrugated fire-pots; large ash-pits; draft and check doors equipped with ratchet attachment; clinker door at base of fire-pot.

Rated only after exacting tests, and will be found conservative.

NUMBERS, CAPACITIES AND PRICES

Number	Tank Capacity, Gallon	Price	Height from floor to top outlet, Inches	Outside Diam. Fire-pot, Inches	Diam. Grate, Inches	Size of Smoke-pipe, Inches
1	100	$27.00	32¼	12½	10	5
2	175	32.00	36	12½	10	5
3	250	50.00	31⅜	15	12½	6
4	325	64.00	34¾	15	12½	6
15	400	76.00	39⅜	16¾	15	7
16	500	90.00	43½	16¾	15	7
17	600	100.00	41	19¾	18	7
18	700	114.00	45¾	19¾	18	7

INTERNATIONAL TANK HEATER

Nos. 1 and 2 are made with ash-pit bottoms and stand on legs.
Nos. 2, 4, 16 and 18 have a water section above the fire-pot.

Ratings.—International Tank Heaters are rated on a basis of imparting 25 degrees of heat per hour to the water in the storage tank. In the ordinary use of a water heater in a residence it has been found that such a heater is sufficiently large. If a greater amount of water is required a larger heater should be selected.

When water heaters are subjected to some unusual pressure, as is the case when tanks are connected direct to city pressure, it is recommended that the system be equipped with a water pressure, reducing valve.

International Laundry Heater.

A convenient heater for supplying large quantities of hot water, providing at the same time the advantages of the house range for the heating of flatirons, wash-boilers, etc. It is made in but one size, with deep fire-pot, large ash-pit, and rocking and dumping grate.

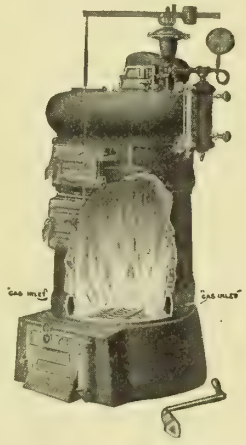
INTERNATIONAL LAUNDRY HEATER

NUMBERS, CAPACITIES AND PRICES

Number.....	0
Tank capacity	100 gals.
Size of top...	18 in. in diam.
Heats at once.	7 flatirons
Holds.....	27 lbs. coal
Grate.....	10 in. in diam.
List price....	$27.00

International Gas Rings.

The International Prince and Sultan Boilers can be equipped with Gas Rings for use in communities where natural gas is used for fuel. A boiler so equipped can be used with gas alone, coal alone, or with gas and coal combined, without any change in operation except regulating the supply of gas or adding coal.



INTERNATIONAL BOILER WITH GAS RING

A hollow cast section, having two or more gas intakes, is placed between the ash-pit and fire-pot section. The gas outlets can not become clogged when coal is used for fuel, and the grate is in no way interfered with.

The use of a Gas Ring increases the height of the boiler 3½ inches on all except the 27-inch grate, which is 5-inches higher.

The net added cost is, 15-inch size, $6.00; 18-inch size, $7.50; 21-inch size, $9.50; 24-inch size, $11.50; 27-inch size, $15.00.

Price does not include mixer, which we do not furnish.

International Auxiliary Water Heaters.

Its range of adaptation covers all needs, from heating a small radiator or kitchen boiler to supplying heat for several hot-water radiators. The shape is such that it can readily be inserted through an ordinary furnace feed-door, and the peculiar shape of the discs does not interfere with the easy firing of the furnace.

INTERNATIONAL AUXILIARY WATER HEATER
Double Auxiliary Disc

One hole drilled through back of heater and one through top of combustion chamber are all that are necessary to allow for flow and return pipes. These outlets are protected by asbestos packed collars, and held in place by set screws, effectually preventing any leakage of gas at these points.

SINGLE AUXILIARY DISC

Number, Tapped Side Inlet Top Outlet	Number, Tapped Bottom Inlet Top Outlet	*Capacity Sq. Ft. Direct Radiation	* Cap. Gals. Domestic Water Supply	
			Residence 25 degrees per hour	Apartments 40 degrees per hour
10	010	50	40	27
13	013	100	82	53
16	016	150	120	79
20	020	200	168	106

DOUBLE AUXILIARY DISC

Number	*Capacity Sq. Ft. Direct Radiation	*Cap. Gals. Domestic Water Supply	
		Residence 25 degrees per hour	Apartments 40 degrees per hour
10-010	85	66	45
13-010	135	117	65
13-013	175	147	94
16-013	225	192	120
16-016	265	221	141
20-013	275	235	147
20-016	315	260	164
20-020	350	294	188

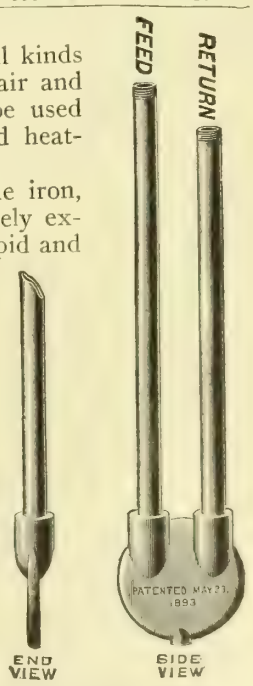
The International Howard Disc.

This heater is designed for all kinds of combination work where both air and hot water are desired, and can be used in many patterns of furnaces and heating stoves.

The disc is made of malleable iron, and, being located in the fire entirely exposed to the direct rays of heat, rapid and positive circulation is assured.

Both feed and return pipes pass out through the top of the heater. The disc is very easily adjusted, and can be raised or lowered in the heater. The feed and return pipes on all sizes are 1½ inches.

CAUTION—Do not use a disc in any fire-pot having a diameter of less than 8 to 10 inches larger than the diameter of the disc.



INTERNATIONAL HOWARD DISC

Ratings.

The ratings on this page are conservative, under proper conditions of installation, draft and firing; but since these factors are beyond our control, no guarantee is expressed or implied only to the extent of furnishing new castings for any found defective in manufacture. No claims for labor or expense incurred will be entertained.

CAPACITIES

No.	Diam. of Disc, Inches	*Sq. Ft. Direct Radiation
10	10	100
12	12	150
14	14	[illegible]
16	16	275
18	18	350
22	22	500

* Including all [illegible] figured as direct radiation in the usual way.

KELSEY HEATING COMPANY

Manufacturers of The Kelsey Warm Air Generator

CABLE ADDRESS
"KELSEYCO"

MAIN OFFICE AND FACTORY
SYRACUSE, N. Y.

WESTERN UNION
TELEGRAPHIC CODE

BRANCHES
NEW YORK OFFICE, 103 Park Avenue Building
TELEPHONE, MURRAY HILL, 6591, 6592

CHICAGO OFFICE, 2767 Lincoln Avenue
TELEPHONE, LINCOLN 11

BROCKVILLE, CAN., JAMES SMART MFG. CO.
DEALERS IN ALL PRINCIPAL CITIES

Products.

KELSEY WARM AIR GENERATORS for heating residences of any size, churches, schools and public buildings; GRAVITY and FAN-BLAST WARM AIR SYSTEMS of HEATING and VENTILATING. "CLIMAX" HOT-WATER HEATER, and KELSEY AUTOMATIC HUMIDIFIER.

THE KELSEY
WARM AIR GENERATOR
TRADE-MARK

Advantages.

The claims for the efficiency, healthfulness and economy of the Kelsey Warm Air Generator are based: (1) On its superior construction and method of warming and distributing air. (2) Its great heating surfaces and their weight. (3) The utilization of all the heat generated.

Methods of Warming Air.

The Kelsey Warm Air Generator warms fresh air by an improved method. Separate air currents pass up through the great battery of cast-iron zigzag heat tubes which surround the fire and form the fire cylinder and combustion chamber. As there are from eight to sixteen heat tubes in each Generator and as each heat tube has eight to nine square feet of heating surface, this means *great volumes of air properly, thoroughly* and *most economically warmed,* and *evenly distributed.*

Heating Surfaces and Weights.

The "Kelsey" has *two or three times* as much weight and *heating surface* as the ordinary furnace with same size grate and fuel capacity. A comparison of the weights and heating surfaces with those of furnaces will explain why the "Kelsey" is more durable, powerful and economical.

Utilization of Heat.

The heat tubes, being in direct contact with and overhanging the fire, are heated *on all four sides* by conduction, by radiation from the fire, and by the burning gases and products of combustion which pass down around their backs.

Distant and Exposed Rooms Positively Heated.

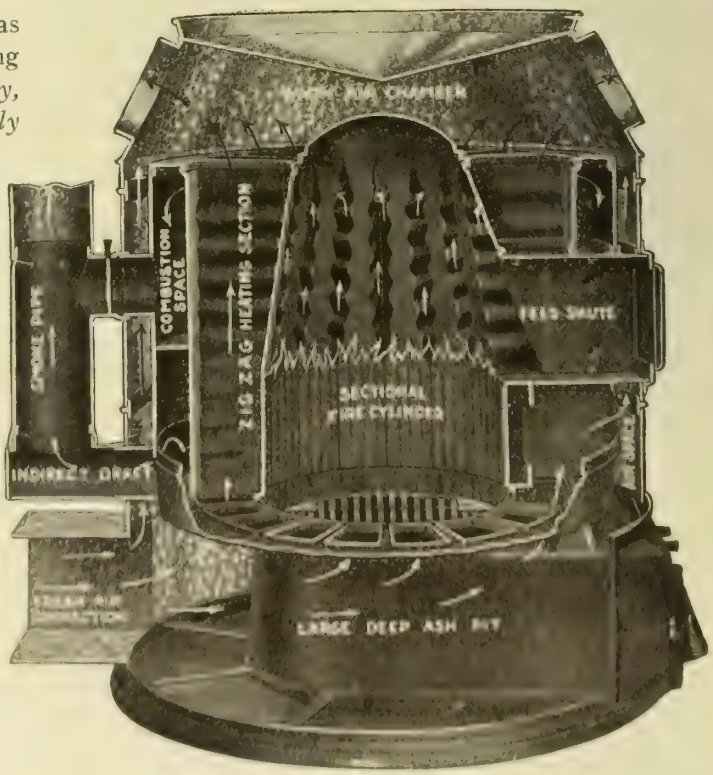
The separate currents of warm air are naturally forced out through the heat-conducting pipes and into all the rooms of houses of ordinary size.

Exposed or distantly located rooms are heated by means of the Kelsey Positive Cap Attachment.

This attachment being placed over two or more of the heat tubes forms a direct connection with the heat-conducting pipe, and the warm air which passes up through these particular heat tubes is forced through the heat pipe which may be long or "against the wind" and into the room so connected.

Durability.

The Kelsey Warm Air Generator has been in actual operation under the most severe conditions for the past twenty-three years and the letters of commendation that come to us unsolicited, as well as the heaters that have been in use for years, will convince those interested that *the sectional construction allowing for expansion and contraction at 6-inch intervals* around the circumference of the fire cylinder is the *correct principle.*



KELSEY WARM AIR GENERATOR
With the Zigzag Heat Tube Construction

Continued on next page

Combination Hot-Water Heater.

With the "Climax" Hot-Water Heater a powerful combination heating system is insured, and is especially adapted for heating conservatories and for rooms where it may be difficult to extend the warm air pipes.

Wood-Burning Construction.

Besides the regular style, with single-feed door, the "Kelsey" is made with double-feed door for admitting large chunks of wood and with cast-iron front for brick-set form.

Battery System for Large Buildings.

A battery of two or more generators under one dome-casing provides a most efficient system for heating and ventilating large residences, churches, hospitals and other large buildings. The advantages of this system are that a variable quantity of warm air is supplied as needed, without waste of fuel.

Mechanical System for Churches and Schools.

This means a forced circulation, by means of a fan or blower, of large quantities of air. The "Kelsey" is the only heater properly designed to heat air traveling at a high velocity. "Kelsey" systems are meeting all requirements of the state laws for schools. The "Kelsey" will warm 4500 cubic feet of air, traveling at a velocity of 1000 feet per minute through 130 degrees of temperature.

BATTERY OF TWO KELSEY GENERATORS UNDER ONE DOME-CASING

Water-Front.

The "Kelsey" may be provided with a water-front, under the feed-chute, at an additional cost, for the heating of water in range boilers.

Fuel.

The "Kelsey" is made for use with anthracite coal—a good grade of bituminous, such as the "Pocahontas"—natural gas and wood.

A natural gas burner that allows either gas or coal to be used without changing the grates or any part of the heater can also be furnished.

Plans and Estimates.

Heating plans and estimates will be promptly furnished for either the gravity or fan blast system, by us or by one of the nine hundred dealers selling "Kelseys," upon receipt of blue-prints of building.

Kelsey Automatic Humidifier.

KELSEY AUTOMATIC HUMIDIFIER

Showing it in Warm Air Chamber and Pipe Connection to Storage Tank
The relative humidity is increased 25 to 40 per cent by this Attachment
Made in two sizes

Humidifying apparatus is necessary with every type of heating system; and to supply this demand we have perfected an apparatus that supplies, at limited expense for installation in old or new generators, sufficient moisture to protect the furnishings of the finest home and to give the air in the rooms the humidity needed for health and comfort.

References.

The "Kelsey" booklets, explaining both the gravity and mechanical systems or any apparatus that we make, together with list of references, will be sent on request.

SIZES, WEIGHTS AND CAPACITIES, KELSEY WARM AIR GENERATORS

GRATES			HEATING SURFACES		WEIGHTS	HEIGHT	BASE	HEATING CAPACITIES		
								House Heating		Church Heating
Size or number of Generator	Diameter of Grate and Fire Cylinder, Ins.	Grate Area, Sq. Ins.	Square Feet of Heating Surfaces	Square Feet of Heating Surfaces to each square foot of Grate Surface	Weight of Generators complete, Lbs.	Height Generator, cased complete, Ins.	Diameter of Floor Space, Ins.	Number of average sized Pipes or Rooms	Total Area Heating Pipes Supplied by each Generator, Cu. Ins.	Estimated Capacity in Cubic Feet using 1-4 Pipes
14	14	154	91	85	1008	61	38	3 to 4	280 to 350	8,000
16	16	201	114	82	1168	63	42	4 to 6	350 to 420	10,000 to 14,000
18	18	254	135	78	1635	68	46	6 to 8	450 to 500	16,000 to 20,000
21	21	346	146	61	2033	69	53	9 to 11	575 to 625	25,000 to 35,000
24	24	452	161	51	2300	69	56	10 to 13	675 to 750	35,000 to 45,000
27	27	572½	176	44	2600	72	60	12 to 15	850 to 925	50,000 to 60,000
30	30	707	211	43	3124	76	64	14 to 19	975 to 1,100	70,000 to 90,000

The capacities given for house and church heating are estimated averages under varying conditions, and are based on heating to 70° Fahr., with temperature outside registering at zero.

All weights include refined sheet-iron inside casings. Series A or B. With cast inside casings add from one to three hundred pounds for each heater.

JAMES SPEAR STOVE AND HEATING COMPANY

The Spear Building, 1823 Market Street
(1014-1016 Market Street our address for 57 years)
PHILADELPHIA, PA.

Products.

We manufacture Spear's New Warm-Air Distributor, Spear's New Cooking Range, Spear's 20th Century Laundry Stove, 20th Century Water Heater and Laundry Stove Combined.

Also, Anti-Clinker Heater, Open Grates and Backs and Jambs, Fireplace Heaters, Franklin Stoves, Stoves for Stable and Garage, and for every purpose.

Spear's New Warm-Air Distributor.

The Spear System of Warm-Air Heating provides an apparatus with a heating surface two or three times greater than the ordinary heater and capable of caring for an increased quantity of cold air, which insures a summer temperature in coldest winter weather for all apartments connected to the apparatus.

If desired, the air may be filtered through a muslin frame as it passes into the air duct; and with our Improved Air Moisteners, all the air may be evenly moistened as it passes out the dome of the heater.

Construction.

Every part is made of the best iron and cast heavy so as to stand severe use.

Warm air columns form the fire cylinder and combustion chamber, and three sides of these columns overhang the fire chamber, receiving the full force of the fire and allowing no place for the accumulation of soot or dust.

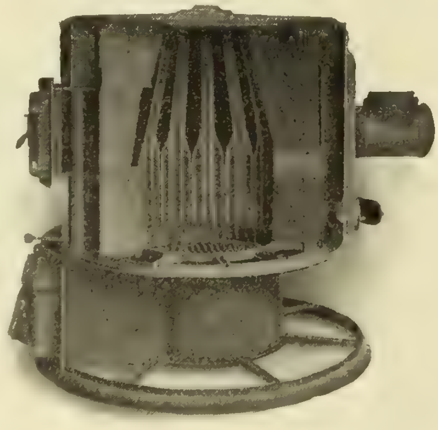
The Triangular Duplex Grate, with improved grate holder, can be removed any time without cutting or unscrewing any bolts, or disturbing the ash-pit door or any other part of the distributor. It is also fitted with Spear's Anti-Clinker Grate.

Direct and indirect drafts are combined in one by means of a special construction. The check damper, with valve opening into the smoke pipe, is fitted for use on either perpendicular or horizontal pipes and to operate with or without chain.

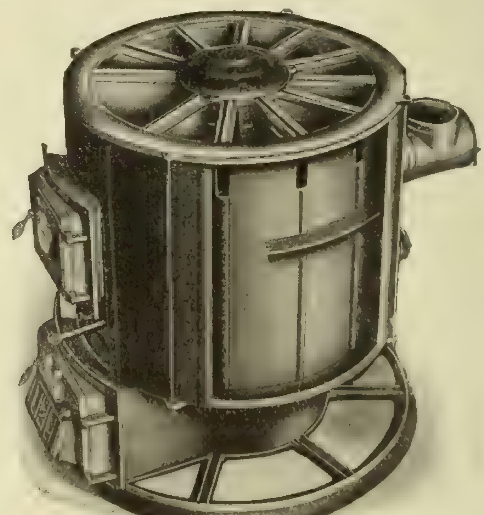
The height is considerably less than that of the ordinary heater, which allows it to be placed in the cellar without providing a pit, and gives a much better elevation to the pipes. It is provided with a direct-flue system, so that connection can be made with individual rooms which are especially difficult to heat.

Advantages.

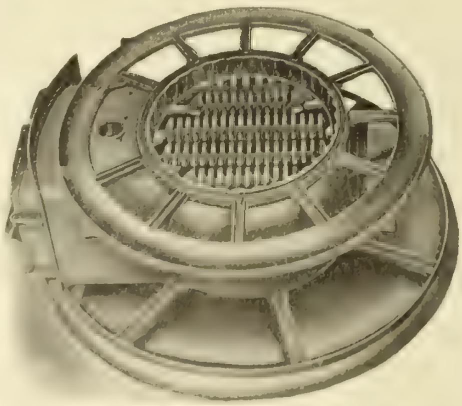
Can be fitted with a water-back to provide for domestic supply of hot water; also with combination hot-water attachment for the heating of porch, con-



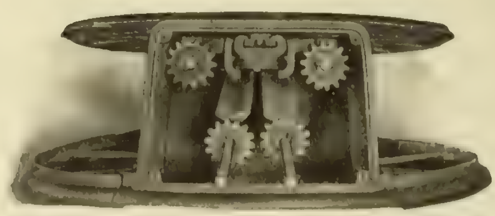
Showing Fire-Pot and Combustion Chamber



Showing Top of Heat Flues



Grates in Position and lower Deck Head



Ash-pit with Grate Hangers and Key

SECTIONS SPEAR'S NEW WARM-AIR DISTRIBUTOR

DIMENSIONS AND PRICES

Size	Capacity	Grate	Fire Pot	Cold Air Box	Height of Castings	Height of Casings	Price, Cased, Complete	Water-Back	Automatic Air Moistener
[illegible]	[illegible]	[illegible]	20 in.	12 x 36 in.	4 ft. 8 in.	5 ft. 8 in.	[illegible]	[illegible]	$20.00
No. 253	[illegible]	23 in.	24 in.	14 x 40 in.	4 ft. 10 in.	5 ft. 10 in.	175.00	8.50	[illegible]
No. 259	[illegible]	27 in.	28 in.	14 x 48 in.	5 ft. 4 in.	6 ft.	225.00	10.00	30.00
No. 265	70,000 to 100,000 cu. ft.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	300.00	12.00	[illegible]

[illegible] If larger quantity is required, or Return Circulating System used, water-backs [illegible] and capacity increased.

[illegible]

Continued on next page

servatory, servants' or other distant apartments. Capable of providing for 150 to 450 feet of radiation.

Spear's New Cooking Range.

Spear's Ranges have the following advantages: An oval fire-box, no square corners to fill with ashes; an oven that bakes evenly top and bottom; the entire top hot enough for boiling and cooking; a perfect broiling arrangement. Thermometer on the outside of the oven door. A grate which enables you to rake the fire perfectly and keep a perpetually fresh fire. Burns half the coal of an ordinary range.

Keeps fire in over night without coal gas. A dust damper and flue that enable you to rake fire without dust; a large roomy ash-pan that catches the ashes, or a damper and funnel where there is an ash-pit in the cellar.

Hot Water Supply.

A sixty-six gallon boiler with a family range will heat more rapidly than a larger one, and provides a good storage capacity. Never place a coil in the range; this and the hot water-back combined will destroy the baking and cooking qualities of the range.

Where the boiler is over forty gallons in size and there are two or more bathrooms, a range which can be fitted with a 1900 Water-Back should be selected. Have boiler as near range as possible and cover with asbestos paper.

Spear's Gas Range.

We manufacture a gas range to be used in connection with any of our family size coal ranges, except the No. 7. It adds twenty-six inches to the length of any of the coal ranges; is fitted with baking and broiling ovens, and, while being one unit, each is independent and can be used simultaneously. The additional cost to the list price of the coal range is $35.00.

Catalogues.

Send for booklets and catalogue. We make a stove for every purpose.

SPEAR'S NEW COOKING RANGE
Regular Pattern, Single Oven

No. 7 uses 6-in. pipe, other sizes 7-in. Flue not less than 8 x 8 in. inside diameter

No. 7–12	$38.00
No. 8–15	50.00
No. 8–20	55.00

1900 Water-Back, $3.50 extra, not applied to No. 7–12.

SPEAR'S NEW COOKING RANGE
Colonial Pattern, Double Oven

Pipe 8-inch. Flue 8 x 12 inch. Two sizes in ornamental design.

No. 8–13, 1900 Water-Back	$80.00
No. 8–13, "1908 Pattern"	85.00
No. 8–25, 1900 Water-Back	90.00
No. 8–25, "1908 Pattern"	95.00
Single Oven	
No. 8–15, Regular Water-Back	$53.00
No. 8–20, Regular Water-Back	58.00

1900 Water-Back, $3.50 extra

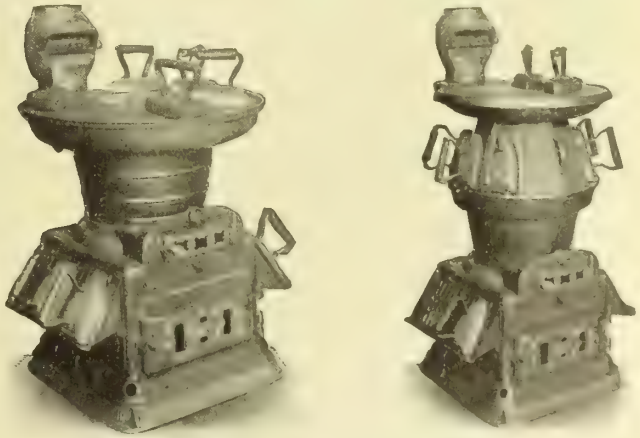
DIMENSIONS NEW COOKING RANGES

No.	Length	Depth	Entire Height	Oven Width	Oven Depth
Single Oven					
7–12	2 ft. 9 in.	23 in.	4 ft. 2½ in.	12 in.	17 in.
8–15	3 ft. 2 in.	28 in.	4 ft. 6½ in.	15 in.	20 in.
8–20	3 ft. 7 in.	28 in.	4 ft. 6½ in.	20 in.	20 in.
Double Oven					
8–13	4 ft. 4 in.	28 in.	4 ft. 6½ in.	13 in.	20 in.
8–25	4 ft. 8 in.	28 in.	4 ft. 6½ in.	15 in.	20 in.
18	5 ft. 5 in.	31 in.	4 ft. 7 in.	18 in.	22 in.

Length and width are actual space covered.

Spear's 20th Century Laundry Stoves.

Laundry stoves are arranged so as to be fitted with either a water-back or, where there is a return circulation and a number of fixtures and bathrooms, with a water jacket and connected to the kitchen boiler. They have an improved damper and collar to check the fire without cooling off the top plate of the stove.



Style "A" Style "B"

SPEAR'S 20TH CENTURY LAUNDRY STOVES

Style "A" is fitted with Water Jacket, and has capacity of eighty gallons hot water an hour

THE WILLIAMSON HEATER COMPANY

Manufacturers of Furnaces, Boilers, Etc.

GENERAL OFFICES

CINCINNATI, OHIO

BRANCH OFFICE, CHICAGO, ILL., 187 North Dearborn Street

Products.

NEW-FEED UNDERFEED WARM-AIR FURNACES and STEAM and HOT-WATER BOILERS; WILLIAMSON TOP-FEED WARM-AIR FURNACES; ROUND and SECTIONAL TOP-FEED STEAM and HOT-WATER BOILERS; WARM-AIR FURNACE PIPE and FITTINGS; METAL LAUNDRY CLOTHES DRYERS.

Williamson New-Feed Underfeed Furnace and Boiler.

The leader of the Williamson line, which comprises warm-air, steam and hot-water heating equipment suited for every requirement, is the Williamson New-Feed Underfeed furnace and boiler.

The Underfeed has been on the market during the past twelve years; in that time it has been developed from an idea into a business running into millions annually, and has enabled thousands of users to save one half to two thirds of what it would cost to operate heating equipment of the ordinary type.

The improvements represented in the New-Feed Underfeed make this apparatus more efficient, economical, and easier to operate than ever before, and they are worthy of serious consideration by every one who is interested in the subject of heating equipment.

The New-Feed is fully guaranteed to give the results we claim, when properly installed and operated, and is indorsed in the highest terms by over thirty-five thousand users in all parts of the United States and Canada.

We show illustrations of the Williamson New-Feed Underfeed warm-air furnace with casing; also of the New-Feed Underfeed boiler, as well as of the Underfeed operating mechanism, exhibiting the various stages through which the coal is fed to the fire.

The New-Feed Underfeed is of all-cast construction, and is made in the heaviest and most durable manner throughout. In the warm-air furnaces the castings, as a rule, average about twice as heavy as in ordinary furnaces of similar capacity.

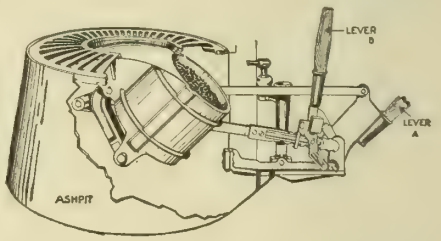


FIG. 2. FEED CYLINDER FILLED WITH COAL

Illustration shows cylinder after it has been filled with coal and is ready to be tilted up immediately beneath opening in center of grate. As cylinder is moved up, by pushing lever A back toward the furnace, apron follows it back until the cylinder is immediately beneath grate, where opening in center is entirely uncovered

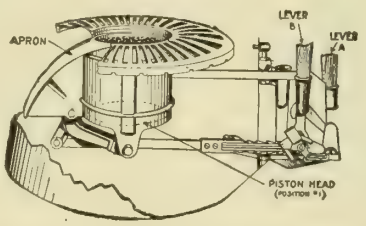


FIG. 3. FEED CYLINDER TIPPED UP BENEATH GRATE

Feed cylinder tilted to vertical position by means of lever A so that cylinder mouth coincides with feed chute opening in center of grate. Cylinder is now in position for pumping coal into fire-pot. This is accomplished by changing wood lever to left-hand socket and making three full strokes or six half strokes to and from the furnace

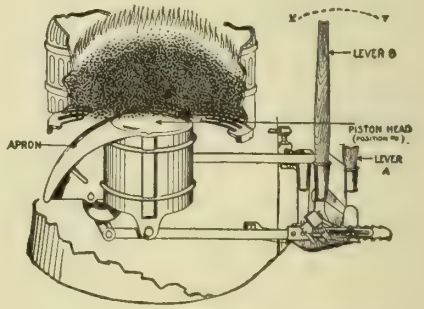


FIG. 4. COAL FED INTO FIRE-POT

By means of three strokes of lever B to and from the furnace front, from x to y, piston has been raised from position No. 1 of Fig. 3 to position No. 2 of Fig. 4, the fuel charge at the same time having been underfed into fire-pot. Note how evenly the coal is fed

FIG. 1. NEW-FEED UNDERFEED FURNACE

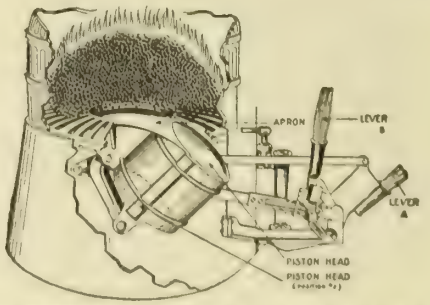
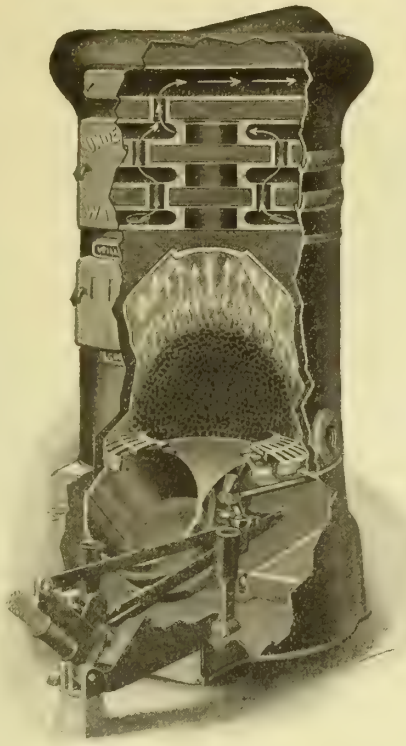


FIG. 5. FEED CYLINDER TILTED FORWARD FOR RECOALING

By lever A, cylinder is tilted to position as shown. Apron has taken position occupied by piston head, by pulling lever back away from furnace (see Fig. 4), and now hermetically seals the feed opening in center of grate. Fig. 5 shows relative position of parts between stoking periods, except that piston should be lowered to bottom of cylinder. If the stoking is to be repeated, pressure on pedal releases the pawls and lowers piston to bottom of cylinder. This brings parts back to positions as shown in Fig. 2. Two cylinders full constitute an average firing

Continued on next page

All parts are made with the utmost accuracy, and are carefully machined. The drilling is done on jigs; in fact, the New-Feed Underfeed is more than a mere furnace—it is really a machine for the scientific feeding and combustion of fuel. This furnace is also supplied with the patent cleanable cast-iron radiator, which is fully explained in the description of the 100 Series top-feed furnaces.



NEW-FEED UNDERFEED WATER BOILER

It is a well known fact among heating experts that feeding the fuel from below, with a fire on top, is the only really efficient and economical method of combustion.

We give dimensions of the various sizes of New-Feed Underfeed furnaces and boilers; also approximate net prices for the furnace or boiler only, at which this apparatus may be obtained by the consumer through the dealer, as the New-Feed Underfeed is generally sold by the heating trade throughout the country. Quotations are based on delivery f.o.b. factory, Cincinnati, without freight allowance. Prices subject to change without notice.

DIMENSIONS AND RATINGS, NEW-FEED UNDERFEED BOILERS

No.	Diam. Fire-Pot, Ins.	Height to Top Outlet, Ins.	No. and Size Outlets, Ins.	No. and Size Inlets, Ins.	Height Water Line, Ins.	Size Smoke-Pipe, Ins.	Rating, Sq. Ft.	Approx. Net Prices
Underfeed "Favorite" Steam Boilers								
220–S	22	56¾	1–3	3–3	48¾	9	450	$141.60
221–S	22	60⅞	1–3	3–3	53⅛	9	500	147.60
222–S	22	65½	1–3	3–3	57½	9	550	153.60
250–S	25	56¾	1–3	3–3	49¼	10	600	166.20
251–S	25	60⅞	1–3	3–3	53⅝	10	650	178.20
252–S	25	65½	1–3	3–3	58	10	725	190.20
280–S	28	57⅜	1–4	3–4	49½	11	775	202.80
281–S	28	62⅛	1–4	3–4	54⅛	11	850	214.80
282–S	28	66¾	1–4	3–4	58¾	11	925	226.80
310–S	31	57⅜	1–4	3–4	49½	12	1050	245.40
311–S	31	62⅛	1–4	3–4	54⅛	12	1200	263.40
312–S	31	66¾	1–4	3–4	58¾	12	1350	281.40
340–S	34	58⅛	1–5	3–5	51⅞	13	1300	276.00
341–S	34	62¾	1–5	3–5	54½	13	1500	300.00
342–S	34	67⅜	1–5	3–5	59⅛	13	1650	324.00
Underfeed "Favorite" Water Boilers								
220–W	22	53¾	3–3	3–3	....	9	750	$138.00
221–W	22	57⅝	3–3	3–3	....	9	825	144.00
222–W	22	61¾	3–3	3–3	....	9	900	150.00
250–W	25	53⅜	3–3	3–3	....	10	1000	162.00
251–W	25	57⅝	3–3	3–3	....	10	1075	174.00
252–W	25	61¾	3–3	3–3	....	10	1175	186.00
280–W	28	54¼	3–4	3–3	....	11	1275	198.00
281–W	28	58¾	3–4	3–4	....	11	1400	210.00
282–W	28	63½	3–4	3–4	....	11	1525	222.00
310–W	31	54	3–4	3–4	....	12	1725	240.00
311–W	31	58½	3–4	3–4	....	12	2000	258.00
312–W	31	63¼	3–4	3–4	....	12	2225	276.00
340–W	34	54⅝	3–5	3–5	....	13	2150	270.00
341–W	34	59¼	3–5	3–5	....	13	2475	294.00
342–W	34	63⅞	3–5	3–5	....	13	2725	318.00

DIMENSIONS AND NET PRICES, NEW-FEED UNDERFEED FURNACES

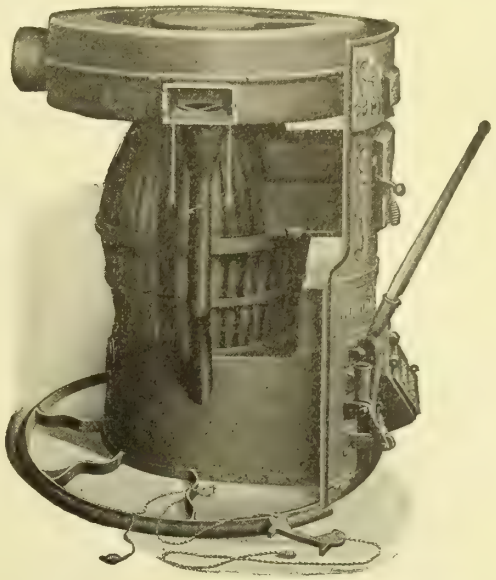
No.	Diam. Casing, Ins.	Diam. Fire-Pot, Ins.	Height of Castings, Ins.	Height of Casings, Ins.	Diam. Smoke-Pipe, Ins.	Approx. Net Price
1032	45	25	52½	65½	9	$127.00
1036	50	29	57½	70½	9	153.00
1040	56½	33	61½	74½	10	186.00

Each furnace shipped complete with double casing, cap, asbestos retort cement for packing joints, firing tools, check draft, patent friction draft regulator, chain and pulleys, vapor pan, frame and cover.

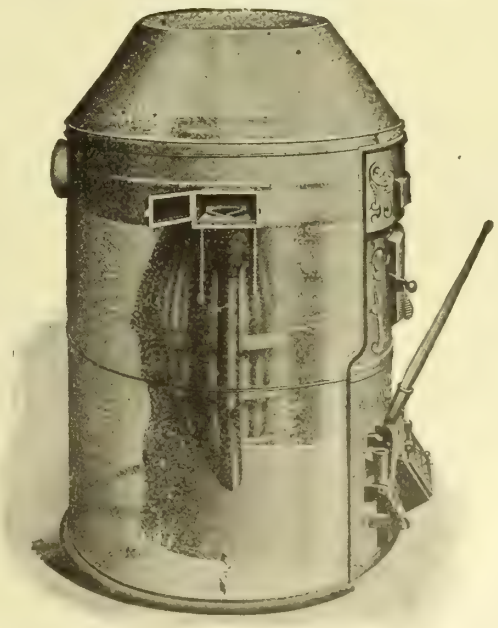
The Williamson Top-Feed Line.

In addition to the New-Feed Underfeed, we also manufacture a complete line of top-feed warm-air furnaces, steam and hot-water boilers.

The leader of the top-feed line is the 100 Series All-Cast Furnace illustrated below. This furnace is of substantial construction throughout, manufactured of the very best materials, and contains features of superiority not found in any other furnace on the market. It is supplied with either one- or two-piece fire-pot, and in several of the sizes gas rings may be supplied to take the place of upper fire-pot section, thus making a first-class gas furnace in every respect.



100 SERIES FURNACE WITHOUT CASING



100 SERIES FURNACE WITH CASING

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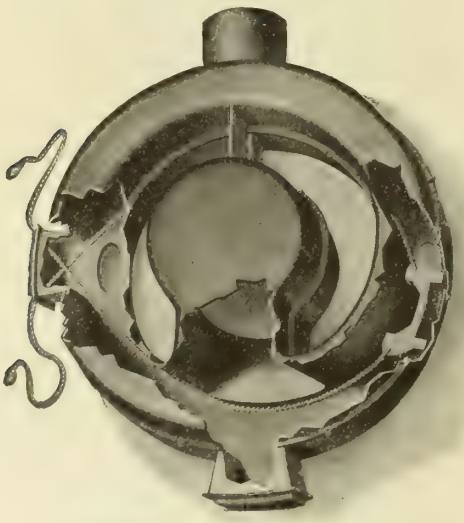
The fire-pot and dome are corrugated, increasing the radiating surface and allowing for expansion and contraction. Deep cup joints are provided between the castings allowing for a maximum of expansion and contraction, affording ample protection to the castings without the possibility of leakage of smoke, dirt and gases into the warm-air chamber. The radiator is made in two sections, with a tongue and groove joint, which insures a smoke-, gas-, and dust-tight joint at all times.

As will be noted from the illustration below, these furnaces are made with extra large radiators and casings, providing unusual heating capacity for the size of the furnace. Exhaustive tests have proved them to be the most effective furnaces of this type on the market.

A patented feature of this furnace is the cleanout for the radiator. The main drawback heretofore with this style of furnace has been the difficulty of cleaning out the radiator. This is entirely removed on the Williamson 100 Series All-Cast Furnace. What we term a cast-iron "sled" or scraper is placed inside the radiator, with chains running around the interior of the radiator and passing out through a door on the side of the furnace, where they terminate in handles, as shown in illustration. To clean the radiator it is only necessary, every two or three weeks or so, to take hold of one end of the chain and walk right away from the furnace, which will draw the sled entirely around the radiator, pushing the accumulation of soot and ash-dust before it.



RADIATOR SHOWING CLEANOUT DEVICE
(Patent Pending)

When the end of the chain is reached, the owner walks back to the furnace, grasps the other chain, and repeats the operation. Pulling on the two chains, first one and then the other, draws the sled entirely around the interior of the radiator and deposits the accumulation in the dust tube which leads from the radiator to the ash-pit. By opening the damper in the dust tube all soot and ash-dust cleaned from the interior of the radiator are dropped into the ash pit. This tube, by opening the damper, also makes the most effective dust flue it is possible to secure.

This radiator-cleaning device, which is exclusive with the Williamson furnace, enables the operator to clean the radiator easily and thoroughly, without the slightest waste of time or soiling one's clothes. In other furnaces of this type the radiator soon becomes choked up with the accumulation of soot and ash-dust, which, if cleaned out, creates an extremely dirty, difficult and disagreeable job, and, if allowed to remain, serves to reduce the draft and materially cut down the radiating surfaces of the furnace.

Note that the furnace is provided with water coil openings, has the best friction draft regulating device which is supplied with any furnace on the market, and in the flat grate type has the best grate shaking and dumping arrangement which has yet been devised.

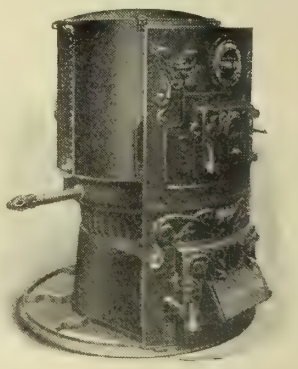
The grate is shaken or dumped by two levers operating independently, these devices being easy and positive in operation; and, together with the exclusive features described, make the 100 Series Furnace the most efficient, effective and easiest to operate of any top-feed furnace on the market.

Please note that this furnace is made with either flat or triangular grate for the use of either soft or hard coal, and is made in a wide range of sizes suitable for residences, churches, stores, and all classes of buildings.

400 Series Hard Coal and Gas Furnaces.

We also manufacture the 400 Series Furnace with steel dome and triangular grates for use with hard coal, the steel dome taking the place of the cast-iron dome and radiator.

The dome is of heavy steel plate, having cast-iron top and bottom heads, and arranged with diving flue or baffle plate in combustion chamber, in order to retard the flow of gases and heat and retain the products of combustion in the steel drum as long as possible.



400 SERIES GAS FURNACE

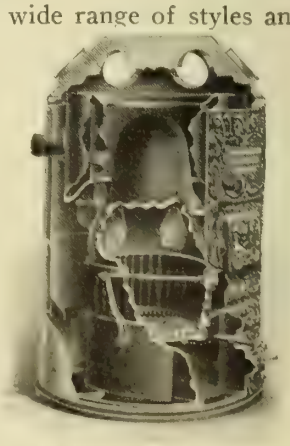
For the use of gas we supply a gas ring, illustrated herewith, which takes the place of the upper section of the fire-pot. A recess in feed pouch and openings in door frame are provided for insertion of water coil. Furnished with triangular bar grates only.

This furnace is very popular in districts where hard coal or gas is used as fuel.

43 Series Williamson Furnaces.

This series is made in a wide range of styles and sizes, and has enjoyed a large sale in every section of the country during the several years it has been on the market.

As the illustration indicates, this is a heavy and substantial furnace of the all-cast type, with the exception of the radiator, which is of heavy steel plate with cast-iron top and bottom heads.



43 SERIES FURNACE

The furnace is supplied with a corrugated fire-pot and large combustion dome, with from four to six openings from the dome into the radiator, dividing the products of combustion and increasing the heating surface.

This style of furnace is furnished with flat grate of the shaking and dumping type; the ash-pit is deep and roomy, and the furnace is well proportioned throughout, and is recommended where a heavy, substantial and economical furnace is desired.

Continued on next page

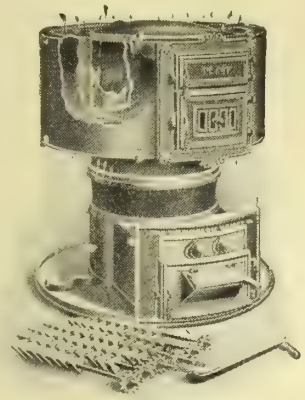
The Williamson 500 Series Furnace.

This furnace is adapted for the use of either hard coal, gas or wood. It is furnished with triangular bar grate; two-piece plain fire-pot with same diameter at top and bottom, preventing accumulation of ashes at sides of pot.

Gas ring may be substituted for lower section of fire-pot.

The furnace is built with large double doors for convenience when burning rough wood.

Radiator is of the horse-shoe type, with steel plate sides, cast-iron top and bottom heads, and large center steel dome, extending full height of furnace.



500 SERIES FURNACE

Horizontal Furnaces for Schools, Churches, etc.

In addition to the various styles of furnaces illustrated and described above, we also manufacture large horizontal furnaces, designed to be set in brick, for the heating of churches, schools, and other buildings of this character, by either gravity or mechanical methods.

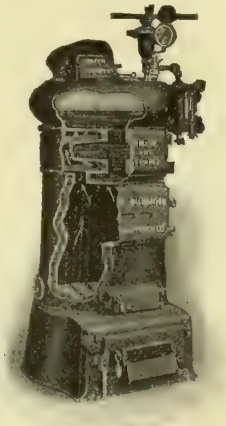
We specialize on heating and ventilating equipment for buildings of this character, and will be glad to design apparatus when this type of furnace is desired.

Williamson Steam and Water Boilers.

In addition to the New-Feed Underfeed boilers described on a preceding page, we also manufacture a complete line of top-feed boilers, both round and sectional, one style of which is illustrated herewith.

We have not the space to list the various styles and sizes, but would be glad to furnish full information and quotations on application.

Our top-feed boilers are constructed on the same high standard as our other lines of heating equipment, and are fully guaranteed in every respect. They cover a wide range of styles and sizes suitable for every possible requirement.

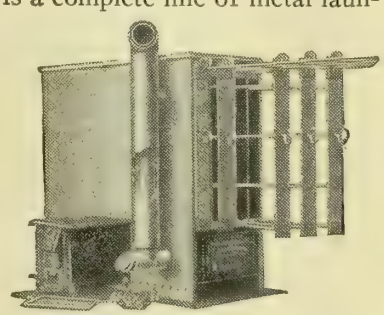


FAVORITE ROUND BOILER

Metal Laundry Clothes Dryers.

Among the numerous other products manufactured by this Company is a complete line of metal laundry dryers, one style of which is shown here.

These dryers are made in both single and double construction, of from three to fifteen racks, and may be heated with coal or gas stoves, steam or hot-water boilers—by pipe coils from a central steam or hot-water heating plant, or by gas pipe burners.



LAUNDRY DRYER WITH COAL STOVE

These dryers are largely used in apartment houses, hospitals, asylums, etc., and are rapidly coming into general use in homes of the better class. As there is a large part of the year during which it is impossible to dry clothes in the open air, it is generally recognized by the architectural profession that a laundry dryer is as much a part of the properly equipped home, or other building, as is the heating plant.

If interested, write for our complete laundry dryer catalogue, illustrating and describing the various sizes, together with quotations.

Furnace Pipe and Fittings.

One of our leading lines is the "Favorite" double and single furnace pipe and fittings, which are extremely popular in every section of the country.

The double fittings are provided with ventilating space between interior and outer walls, the current of air passing between the inside and outside pipe from the basement to the top of the register box, where it is delivered into the partition space above the registers. This eliminates danger from fire and also provides better circulation of the heated air.

Our fittings are made on scientific principles, to reduce friction to a minimum, so increasing the velocity of the heated air and insuring delivery to the registers at a higher temperature.

Special attention is called to the locking joint, which is furnished on both single and double fittings, which enables both the pipe and fittings to be locked together without the use of solder, and which provides a permanent connection that cannot be separated.

The various styles and sizes of pipe and fittings, cold-air ducts, and other warm-air heating equipment manufactured by us in tin, galvanized and black iron—also a complete line of registers and other heating supplies—are illustrated and described in our complete Fittings Catalogue, which we will be glad to mail on request.

Our fittings are manufactured to fit all standard sizes of floor, base-board and side-wall registers.

Double safety pipe is made in lengths of 96, 58, 38, 24, 18½, 12¾, 9, 6, 4 and 2 inches, and in the following dimensions, with all necessary fittings to correspond:

Double Pipe and Fittings, Outside Size.	Single Pipe and Fittings, Actual Dimensions
No. 7 —3⅝ x 10⅝ ins.	No. 106 —3 x 10 ins.
No. 7½—3 x 12⅝ ins.	No. 107 —3½ x 10 ins.
No. 8 —3⅝ x 12⅝ ins.	No. 107½—3 x 12 ins.
No. 9 —3⅝ x 13⅝ ins.	No. 108 —3½ x 12 ins.
No. 11 —4⅝ x 12⅝ ins.	No. 109 —3½ x 13 ins.
No. 13 —5⅝ x 13⅝ ins.	No. 113 —5½ x 14 ins.

Engineering Department.

For the benefit of our customers, whether architects, dealers, or consumers, we maintain a well equipped Engineering Department for the preparation of detailed heating plans and estimates from any plans or sketches sent us.

Please feel free to call on this department for any co-operation we may be able to extend in laying out heating plans; whether warm-air, steam, hot-water, vapor, vacuum, combination, or warm air gravity or mechanical systems are required.

Distribution.

Sold and installed by leading heating contractors everywhere.

RICHARDSON & BOYNTON CO.

Manufacturers of Heaters, Boilers and Ranges

31 West 31st Street 405 Boylston Street 171 East Lake Street 1342 Arch Street
NEW YORK, N. Y. BOSTON, MASS. CHICAGO, ILL. PHILADELPHIA, PA.

Products.

RICHARDSON "PERFECT" POSITIVE AIR CIRCULATING HEATERS, RICHARDSON "PERFECT" FRESH-AIR HEATERS, RICHARDSON "PERFECT" LOW-CONSTRUCTION WARM-AIR HEATERS, "RICHARDSON" STEAM and WATER BOILERS, "PERFECT" and "PROVIDENT" COOKING RANGES, HOT-WATER and LAUNDRY HEATERS. Made in many sizes and styles and for different kinds of fuel.

Our Scope.

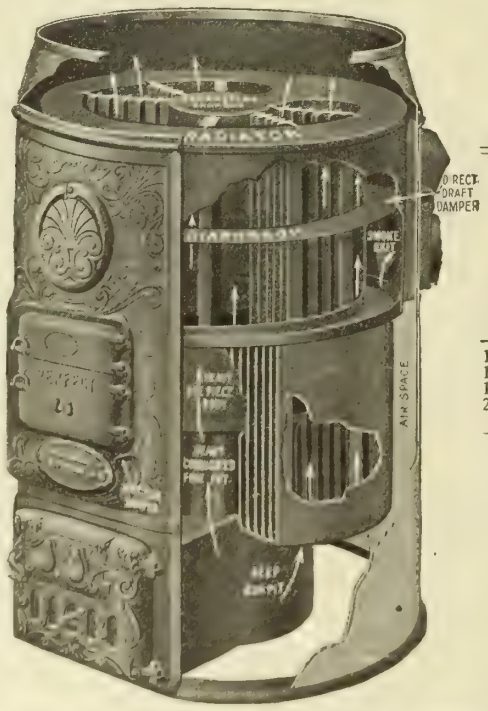
The largest and most complete line of Heating and Cooking apparatus manufactured.

Catalogues.

Complete catalogues sent promptly on request.

Efficiency in Hot-Air Heaters.

This firm has produced the highest type hot-air heaters, each one of which has been designed with special reference to quick, efficient and economical heating. Careful construction, large heating surfaces exposed directly or indirectly to the flames, and a perfect fire-grate have contributed toward making these heaters the most efficient, most economical, and most durable furnaces on the market.

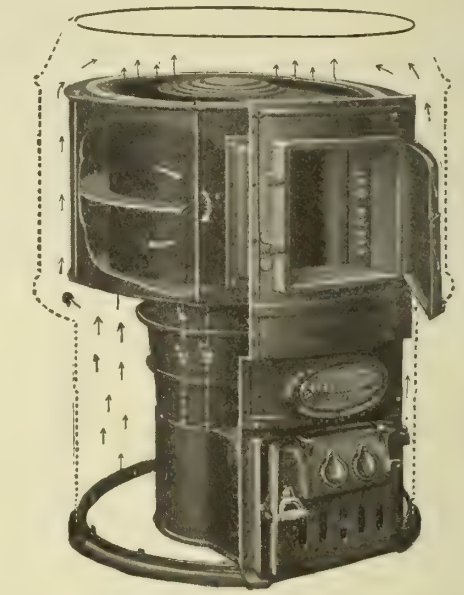


"PERFECT" POSITIVE AIR CIRCULATING HEATER
With arrangements for piping for heating water when so ordered

PRICES, SIZES AND DIMENSIONS

Size	Price, with Cases	Price, less Cases	Height of Castings, inches	Diam. Upper Cases, inches	Diam. Lower Cases, inches	Diam. Fire-pot, inches	Diam. Radiator, inches	Height Radiator, inches	Air Opening through Radiator, inches	Diam. Smoke-pipe, inches	Heat-pipe Capacity, square inches
15	$96.00	$78.00	48	41	34	19	36	20	5¼ x 20	7	246
17	132.00	110.00	49	46	39	22	41	20	5¾ x 20	8	332
19	154.00	130.00	49	51	44	25	46	20	6¼ x 20	8	416
21	190.00	165.00	51	56	49	27½	51	20	6¾ x 20	9	560

NOTE—Two-piece fire-pots, 16 inches deep. Large feed-doors, 15 by 14 inches

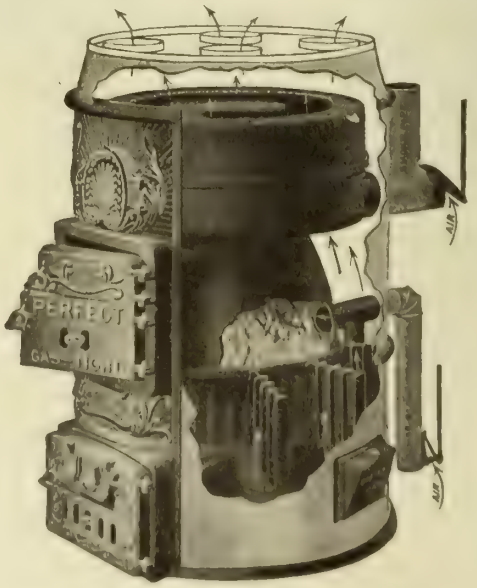


"PERFECT" LOW CONSTRUCTION WARM-AIR HEATER
For hard or soft coal or wood fuel

PRICES, SIZES AND DIMENSIONS

Size	Price, with Cases	Price, less Cases	Height of Castings, inches	Diam. Upper Cases, inches	Diam. Lower Cases, inches	Diam. Fire-pot, inches	Diam. Radiator, inches	Height Radiator, inches	Air Opening through Radiator, inches	Diam. Smoke-pipe, inches	Heat-pipe Capacity, square inches
15	$96.00	$78.00	48	41	34	19	36	20	5¼ x 20	7	246
17	132.00	110.00	49	46	39	22	41	20	5¾ x 20	8	332
19	154.00	130.00	49	51	44	25	46	20	6¼ x 20	8	416
21	190.00	165.00	51	56	49	27½	51	20	6¾ x 20	9	560

NOTE—Two-piece fire-pots, 16 inches deep. Large feed-doors, 15 by 14 inches



"PERFECT" SOFT COAL HEATER
Fitted with hot-air blast-draft which cokes the fuel and consumes the smoke and gas

Continued on next page

PRICES, SIZES AND DIMENSIONS "PERFECT" SOFT COAL HEATER

Size	Price, with Cases	Price, less Cases	Diameter Cases, inches	Diameter Fire-pot, inches	Diameter Grates, inches	Diameter Radiator, inches	Height, inches	Diameter Smoke-Pipe, inches	Heat-pipe Capacity, square inches
349	$115.50	$ 99.00	40	21	19	30	56½	8	326
353	140.00	121.00	44	24	22	34	56½	8	476
357	166.20	145.30	50	26	24	37	56½	9	560
363	210.00	184.80	55	29	27	42	57½	9	722
374	264.00	233.10	61	33	31	51	58½	10	935

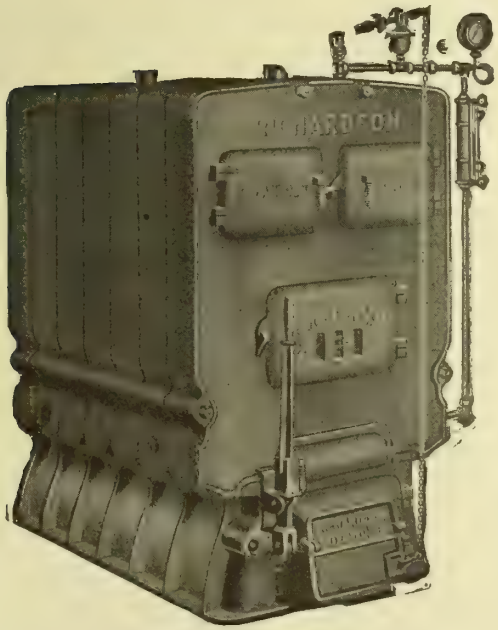
"Richardson" Boilers.

High Efficiency—The principle on which "Richardson" Boilers are constructed is the placing of a large area of heating surface in direct contact with the fire. This surface, backed by water in small quantities, heats rapidly and, consequently, circulates rapidly, thus passing a constant stream of water over the heating surfaces and absorbing the heat units as they are given off by the fire, producing a boiler of very high efficiency.

Ratings—"Richardson" Boilers are rated in accordance with results obtained after many exhaustive tests conducted at our manufacturing plant, and the thousands in actual and successful use for many years are ample demonstration of their correctness.

Our ratings provide that all piping (mains, risers and returns), in addition to the direct radiation to be used, shall be figured as radiating surface in estimating the size of boiler necessary. Also, allowance made for indirect, direct-indirect and coil radiation, and for any unusual conditions.

ROUND STEAM BOILER
Sectional view



"RICHARDSON" END-FEED BOILER

RATINGS, AND DIMENSIONS, WITH LIST PRICES OF ROUND STEAM AND WATER BOILERS

Size	Rating, Water	List price, Water	Rating, Steam	List price, Steam	Height Water Line, inches	Diam. Grate, inches	Height, Boiler, inches, Steam	Height Boiler, inches, Water	Tappings, Flow and Return, inches	Diam. Smoke-pipe, inches
161	400	$114.00	250	$124.00	45⅜	16	50	47½	2–2	7
162	425	130.00	275	140.00	49⅜	16	54	51½	2–2	7
190	500	138.00	300	148.00	42½	19	47½	45¼	2–2½	8
191	575	156.00	350	166.00	46½	19	51½	49¼	2–2½	8
192	625	175.00	375	185.00	50½	19	55½	53¼	2–2½	8
221	750	196.00	450	206.00	48¼	22	53	50½	2–2½	9
222	825	208.00	500	218.00	52¼	22	57	54½	2–2½	9
223	900	222.00	550	232.00	56¼	22	61	58½	2–2½	9
251	1025	267.00	625	277.00	49½	25	54¼	52	2–3	10
252	1100	282.00	675	292.00	53½	25	58¼	56	2–3	10
253	1200	298.00	725	308.00	57½	25	62¼	60	2–3	10
281	1350	345.00	875	355.00	51	28	55¾	53¼	2–3½	10
282	1550	362.00	950	372.00	55	28	59¾	57¼	2–3½	10
283	1675	385.00	1025	395.00	59	28	63¾	61¼	2–3½	10
Series		16		19		22	25		28	
Diameter		26½ inches		30¼ inches		33¼ inches	36 inches		40 inches	

CAPACITIES AND DIMENSIONS, WITH LIST PRICES OF END-FEED BOILERS

Size	Rating, Water	List price, Water	Rating, Steam	List price, Steam	Dimensions Fire Chamber, inches	Grate Area, square feet	Number and Size Flow Tappings Corresponding Return Tappings on each side, Steam	Number and Size Flow Tappings Corresponding Return Tappings on each side, Water	Length of Boiler over Smoke-box, inches	Diam. Smoke-pipe, inches
214	700	$200.00	425	$210.00	21x19¼	2.27	1–3	2–3	36	9
215	950	242.00	575	252.00	21x28½	3.01	1–3	2–3	42¼	9
216	1200	307.00	725	317.00	21x31¾	3.75	2–3	3–3	48½	9
217	1400	345.00	850	355.00	21x38	4.49	2–3	3–3	54¾	9
255	1525	367.00	925	377.00	29x29¾	4.57	2–3½	2–3½	47	9
256	1900	435.00	1150	445.00	29x37	5.70	2–3½	3–3½	54¼	10
257	2275	503.00	1375	513.00	29x44¼	6.83	2–3½	3–3½	61½	11
258	2650	570.00	1600	580.00	29x51½	7.97	2–3½	3–3½	68¾	11
355	2900	620.00	1800	640.00	38x33¼	7.85	2–4	3–4	47¼	14
356	3625	750.00	2250	770.00	38x41½	9.81	2–4	3–4	55½	14
357	4350	862.00	2700	882.00	38x50	11.75	3–4	4–4	64	14
358	5075	945.00	3150	965.00	38x58¼	13.70	3–4	4–4	72¼	14
359	5800	1045.00	3600	1065.00	38x66½	15.65	3–4	4–4	80½	14
427	5450	975.00	3300	995.00	44x50	13.82	2–5	3–5	64	16
428	6350	1090.00	3850	1110.00	44x58¼	16.11	2–5	3–5	72¼	16
429	7250	1205.00	4400	1225.00	44x66½	18.40	2–5	3–5	80½	16
4210	8150	1320.00	4950	1340.00	44x74¾	20.69	3–5	4–5	88¾	16
4211	9050	1435.00	5500	1455.00	44x83	22.98	3–5	4–5	97	16
536	9050	1435.00	5500	1455.00	57x54½	18.94	2–6	2–6	78¼	17
537	10825	1645.00	6575	1665.00	57x65¼	22.68	2–6	2–6	89½	17
538	12600	1855.00	7650	1875.00	57x76	26.40	3–6	3–6	101	17
539	14375	2065.00	8725	2085.00	57x86¾	30.12	3–6	3–6	113	21
5310	16150	2275.00	9800	2295.00	57x97½	33.88	3–6	3–6	124½	21

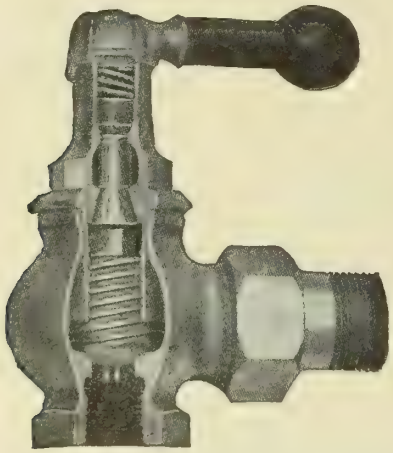
21 series—49½ inches high, 32 inches wide, 43 inches water line.
25 series—55 inches high, 39 inches wide, 48 inches water line.
35 series—63 inches high, 48 inches wide, 56 inches water line.
42 series—66 inches high, 54 inches wide, 60 inches water line.
53 series—82 inches high, 69¼ inches wide, 70½ inches water line.

Continued on next page

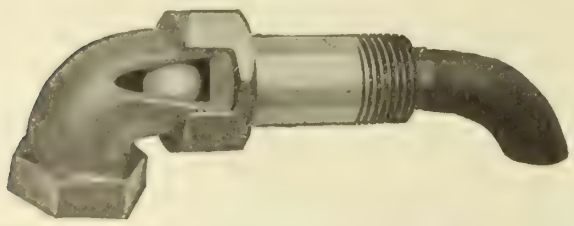
"Richardson" Vapor Vacuum Pressure System.

The "Richardson" vapor vacuum pressure system provides the means for circulating vapor or steam noiselessly and freely at all times, and with the "Richardson" packless supply valve, gives positive control over the amount of heat in each radiator, making it possible to get just as little heat as necessary in moderate weather, preventing overheating the house. It does away with the use of air valves, and requires no more radiation than would be necessary for an ordinary steam system.

The "Richardson" system is not an experiment. It has been thoroughly tried out and tested in hundreds of jobs, and is guaranteed to give absolute satisfaction. It is one of the simplest systems on the market as it requires no complicated appliances that are likely to get out of order or cause after-expense.

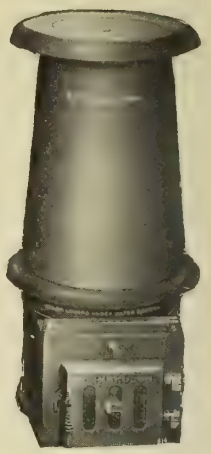


RICHARDSON PACKLESS GRADUATED SUPPLY VALVE



RICHARDSON WATER SEAL BALL CHECK UNION ELBOW

RICHARDSON WATER HEATER NOS. 110, 112, 114



NO. 125 WATER HEATER

NO. 1 UNION HEATER

NOS. 23T, 24 LAUNDRY WATER HEATER

DATA, HOT-WATER HEATERS

Size	List Price	Capacity in gallons of Water	Capacity in Square Feet of Radiation	Diameter of Grates, inches	Tappings, Flow and Return, inches	Smoke Pipe, inches	Height, inches
1	$17.00	40			1	6	24
23T	26.00	80	65	10½	1	5	23
24	30.00	100	80	10½	1	5	26
60	22.00	60	45	12	1	6	32
80	26.00	80	60	12	1	6	35
8	28.00	110	85	10½	1	6	33
10	32.00	125	100	13½	1	6	34
125	26.00	110	85	12	1	6	35
110	35.00	150	115	10	1½	6	35½
112	45.50	250	200	12	2	6	37
114	50.40	350	280	14	2½	6	38½
116	84.00	475	380	16	2½	7	44
118	105.00	600	480	18	3	8	44
120	129.50	725	580	20	3	9	45

Hot Water Circulating Systems.

Architects, generally, are specifying hot water supply systems to have return circulation providing an instant supply of hot water at each tap. The heat loss, due to the circulation of water through the building, requires additional capacity in the water back, laundry iron and tank heater. On systems of this kind, add 33⅓ per cent to the capacity of range boiler or storage tank, and figure heater capacity accordingly.

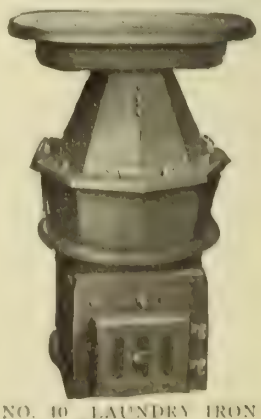
When water heaters are subject to an unusual pressure, or when the pressure is increased in the night, or during fires, it is necessary to provide the system with a water pressure reducing valve and relief valve

Laundry Iron Heater.

No. 40 is made with a brick-lined fire-pot and no water heating section, for laundry purposes only. Has space for eight irons in the cone. Made in one size only.

Fitted with high ash-pit and "Perfect" revolving grate bars.

Height, 32 inches. Top, 24 by 15 inches. Grate, 12 inches. Smoke-pipe, 6 inches. Price, $17.50.



NO. 40 LAUNDRY IRON HEATER

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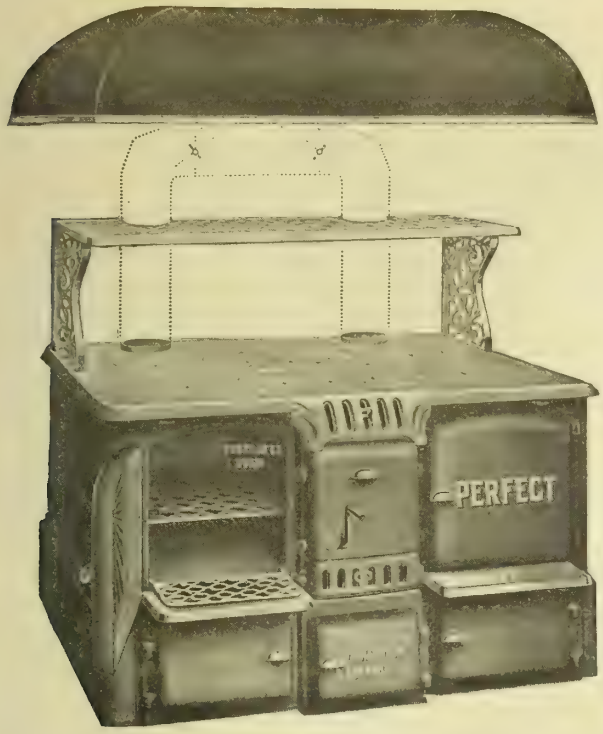


RICHARDSON "PERFECT" PORTABLE DOUBLE-OVEN RANGE

With wrought iron removable ovens. Can be fitted with ash chute
Made in portable and brick-set form

Height of range: with base, 28½ ins.; with plate shelf, 45½ ins.; with upper hot closet, 55½ ins.

DATA, "PERFECT" PORTABLE DOUBLE-OVEN RANGE

Portable Size	Prices, with Water-back	Size of Top, inches	Boiler Holes	Size of Oven, inches
111 E	$88.50	49½ x 28	8–8-inch	20 x 12 x 14
112 E	98.50	53 x 30	8–8-inch	20 x 13 x 14
113 E	107.00	53 x 30	6–9-inch, 2 8-inch	20 x 13 x 14
114 E	139.50	60 x 31	8–9-inch	20 x 16 x 14

Lower Hot Closets, extra	$8.00
Plate Racks, extra	7.50
Upper Wrought Iron Closets	24.00
Canopy, 52 inches wide	17.50
Canopy, 56 inches wide	19.50
Canopy, 66 inches wide	22.50
Gallows Pipe and Dampers	3.50

Box Water-backs will heat 50 to 60 gallon Boiler. ¾ Water-backs will heat 60 to 80 gallon Boiler.

These ratings will not apply when circulating system is used.

Richardson "Perfect" Gas and Coal Range.

The new 1915 design "Perfect" range for gas and coal. Two complete ranges in one unit.

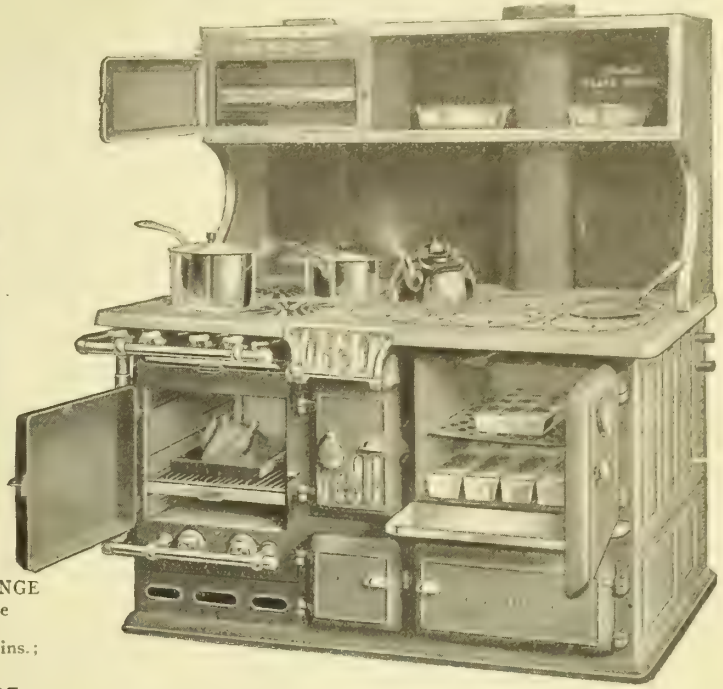
Cooking can be done either with gas or coal for fuel, or both, as desired.

This range is constructed with the end in view of giving the greatest amount of cooking surface, with economy of space in kitchen.

Heretofore, ranges of this kind had ample facilities for baking and cooking with coal; but the gas attachments were very small, with contracted ovens and small top cooking surface. In this range we have entirely done away with this objection, and the gas section of the range is as large and will do as much work as the coal section. They can be used separately, or together, as desired.

The fact is emphasized that the gas section has the largest baking and broiling ovens, and the largest top cooking surface, of any range of this type manufactured.

We have paid particular attention to the question of heating water for the kitchen boiler, and can supply water-backs that have a heating capacity of from forty to sixty gallons on a straight system. This does not apply when a circulating system is used.



RICHARDSON "PERFECT" GAS AND COAL RANGE

Height of range, 30 inches; with plate shelf, 47 inches; with upper hot closet, 57 inches; with upper gas broiler, 60 inches. Smoke-pipe at least 6 inches. Gas pipe, 1 inch. Gas broiler on left end only.

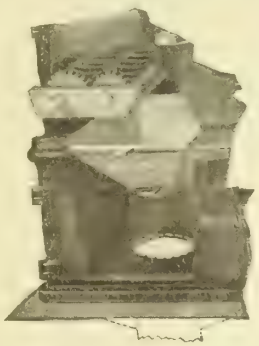
DATA, "PERFECT" GAS AND COAL RANGE

Size	Price with Water-back	Coal Oven, inches	Gas Oven, inches	Gas Broiler, inches	Width of Range, inches
528	$90.00	18 x 18 x 12	18 x 16 x 12	18 x 14 x 9	56
428	84.00	18 x 16 x 12	18 x 14 x 12	18 x 14 x 9	49½

Upper Gas Broiler with Hot Closet	$50.00
Upper Gas Broiler with Double Shelf	44.00
L Water-back to heat 50-gallon Boiler, extra	4.00
Nickel Plate Shelf	7.50
Nickel Plate Shelf with Wrought Iron Back	12.00
Upper Hot Closet	24.00
Canopy	22.50
Ash chute, with two joints of Pipe and Damper	8.00
Oven Thermometer, each	2.00
Enameled Roasting, Broiling and Drip Pans, each	2.00
Self-starting Lighters for Top Gas Burners	2.00
Solid Top Over Burners, with four Covers, extra	2.00

Ash Chute.

We can furnish an ash chute of convenient design with the "Perfect" ranges. Ashes are dropped directly into a receptacle in the cellar, avoiding dirt and dust.



ASH CHUTE FOR USE WITH "PERFECT" RANGES

Continued on next page

"Perfect" French Steel Range.

These ranges are designed especially to meet the requirements when large baking and cooking are desired, also to furnish a plentiful supply of hot water.

They are of heavy steel construction, with heavy cast-iron top cooking surface.

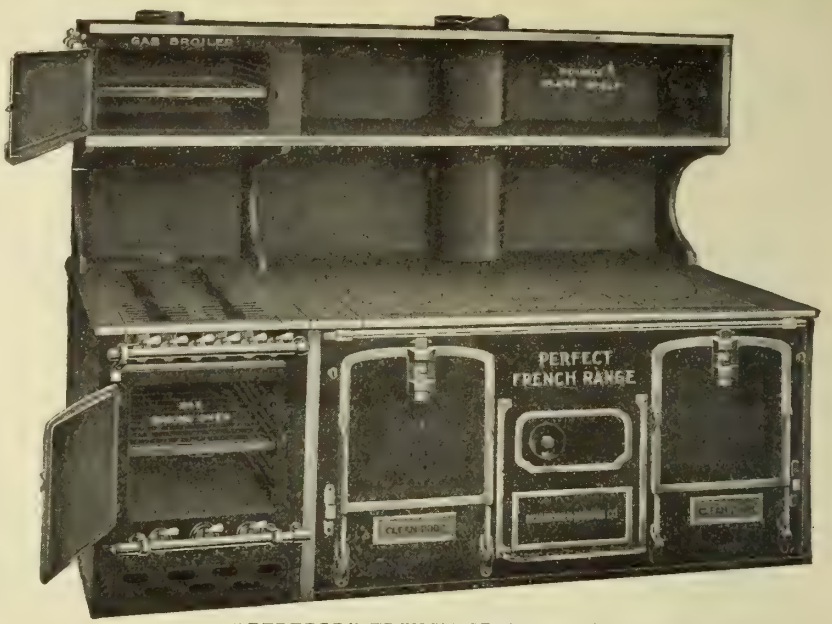
The large steel ovens are of the same type and construction as those used in all high class hotel and restaurant kitchens, and bake and roast with a delicacy and perfection that is unsurpassed.

They fulfil the most exacting requirements of the cook.

The heavy iron top plates, with squares and covers, are so formed and braced as to stand severe use.

French Top—Center square and three 9-inch holes supplied in all sizes.

American Top—Six 9-inch holes for sizes 48 and 54. Size 60 has ten 9-inch holes.



"PERFECT" FRENCH STEEL RANGE

With side gas baking oven, upper gas broiler and double plate shelf
Height of range, 30 inches; with plate shelf, 47 inches; with upper hot closet, 57 inches; with upper broiler, 66 inches. Gas broiler on left end only

DATA, "PERFECT" FRENCH STEEL RANGE

Size	Prices with Water-back	Size of Top Coal Range, inches	Coal Oven, inches	Size of Top Gas Range, inches	Gas Oven, inches
48	$130.00	48 x 33	24 x 12 x 14	24 x 33	23 x 17 x 14
54	150.00	54 x 33	24 x 14 x 14	24 x 33	23 x 17 x 14
60	170.00	60 x 33	24 x 17 x 14	24 x 33	23 x 17 x 14

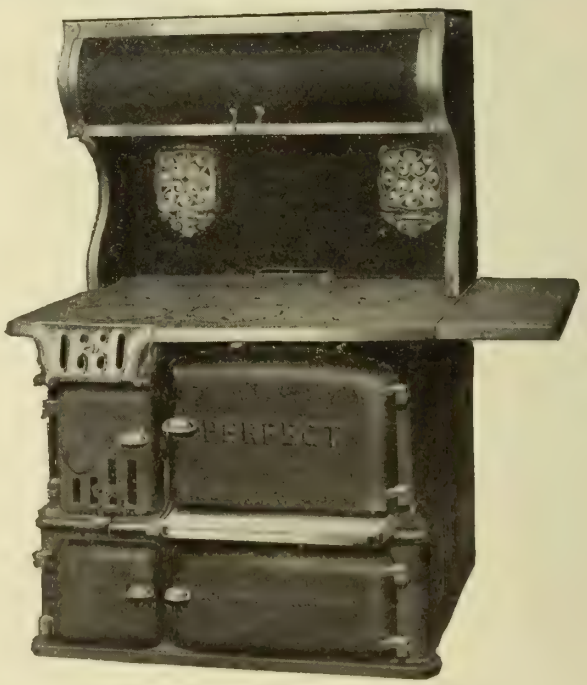
Side Gas Oven with six Top Burners	$80.00
Upper Gas Broiler with Double Plate Shelf	50.00
Single Plate Shelf	10.00
Single Plate Shelf with Back	15.00
Double Plate Shelf with Back	30.00
Canopy, 48 inches long	24.00
Canopy, 60 inches long	30.00
Canopy, 72 inches long	36.00

RICHARDSON'S PERFECT PORTABLE RANGE

With [illegible] and broiler [illegible] three gas burners and one [illegible]

Price of End Gas Oven, extra	$20.00
Upper Hot Closet	21.00
Nickel Plated Shelf	8.00

Width of gas oven attachment [illegible] inches
Size of oven [illegible] inches
Can be fitted to the No. 658 and 758 "Perfect" and 158 Perfection coal ranges only.



RICHARDSON "PERFECT" RANGE

With lower hot closet. Portable or brick-set. Can be fitted with ash chute

Furnished with right or left-hand fire-boxes. Plate shelves, 16 inches high. Upper hot closets, 27 inches high. Can be furnished with side gas ovens. Upper gas ovens, with or without drop gas shelf. Canopies should be hung 6 feet 2 inches from hearth to bottom of hood

DATA, "PERFECT" RANGE

Size	Price	Boiler Holes	Size of Top Without End Shelf, inches	Oven, inches
27S	$64.00	6 8-inch	39½ x 30	20 x 20
27	64.00	6 9-inch	39½ x 30	20 x 20
68SE	54.00	6 8-inch	39 x 27	18 x 18
44E	48.00	6 7-inch	36 x 25	16½ x 17
44SE	44.50	6 8-inch	36 x 25	16½ x 17

End Shelf adds 7 inches to length of range.

Black Iron Plate Shelf	$4.70
Nickel Plate Shelf	6.00
Upper Hot Closet	15.00
Oven Thermometer	2.00
Canopy, 48 inches long	13.00
Ash Chute, two joints of Pipe and Damper	8.00
Couplings, extra	1.00

Speed Governor

THE SPENCER HEATER COMPANY

SCRANTON, PA.

BRANCHES

NEW YORK, 101 Park Avenue, corner 40th Street
CHICAGO, Railway Exchange
PHILADELPHIA, Morris Building
BOSTON, 136 Federal Street
ST. LOUIS, Chemical Building
DETROIT, Ford Building
BUFFALO, 1377 Main Street
DENVER, 211 Sixteenth Street
MINNEAPOLIS, Plymouth Building
DES MOINES, Observatory Building

CANADIAN SALES REPRESENTATIVES

WINNIPEG, The Waldon Co., cor. Main and Portage Avenues
TORONTO, The Waldon Co., Lumsden Building

Products.

Manufacturers of the "Spencer" Magazine-Feed Tubular Steam and Vapor Heater, and the "Spencer" Magazine-Feed Sectional Hot-Water Heater.

"Spencer" Heaters.

"Spencer" Steam, Vapor and Hot-Water Heaters successfully burn the small cheap sizes of hard coal (such as pea, No. 1 buckwheat, etc), pea-coke and buckwheat-coke, or coke-screenings, as well as non-coking bituminous coals, semi-anthracite, lignites, etc. Coking coals may also be used and will give good satisfaction, but the magazine will not feed.

In comparison with other heaters burning the same classes of fuel, the "Spencer" will be found much more economical as it will require fewer tons.

When compared with heaters using the large expensive sizes of anthracite, the saving in fuel expense will be still greater, as the "Spencer" will not burn any larger tonnage of the above-mentioned fuels than the others do of the expensive sizes.

Based on the actual experiences of thousands of installations covering a period of twenty-five years, we can conservatively say that the "Spencer" averages savings on coal bills of from *one third* to *one half*.

Owing to the magazine self-feed construction, the "Spencer" requires coaling but once a day in ordinary winter weather, and never more than twice in severe weather. It maintains steady, even heat for from ten to twelve hours without attention.

Long firing periods make the "Spencer" adapted to apartment houses, greenhouses and residences.

Features of Construction.

Principles of Circulation—The "Spencer" Steam or Vapor Heater is of tubular construction, while the Hot-Water is of the sectional type, two entirely distinct methods of construction. (See Figs. 1 and 2.) This difference in construction provides fully for the different circulation requirements of steam and hot-water heaters. The combination water-tube and return-tubular construction of the "Spencer" Steam or Vapor Heater is recognized by engineers as the most efficient steam generating device; the "Spencer" Sectional Hot-Water Heater, with its scientific provision for combustion travel and thin waterways, is the best type for a hot-water system.

Water-jacketed Magazine—Figs. 1 and 2 show the "Spencer" Magazine Feed as applied to the various types of "Spencer" Boilers. It differs from all other magazines in that it is water-jacketed. This water-jacket keeps the coal held in reserve *entirely out of contact with heated surfaces and gases.*

This feature means decidedly higher efficiency of boiler service, aside from the economies mentioned above. Need for comparatively frequent replenishing of fuel supply, as is the case with ordinary surface-feed boilers, means free access of cold air to the fire-box and flues when fire-doors are opened, reduction of steam or hot-water supply the moment a new supply of coal is added, and the accompanying irregularity of the supply of fuel as the depth of the bed of coal in the heater varies. In the case of automatic regulators, it should be noted, too, that these can be of use only so long as there is a sufficient supply of coal in the heater.

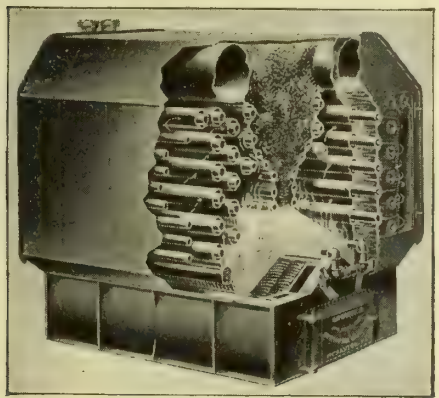


Fig. 1. "SPENCER" TUBULAR STEAM HEATER

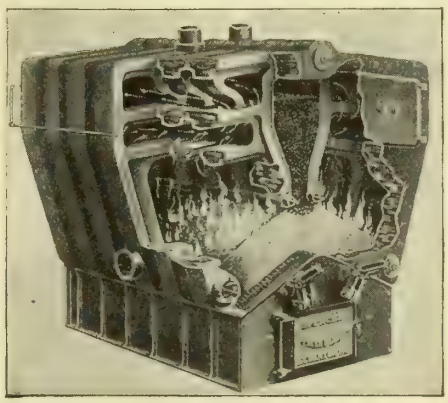


Fig. 2. "SPENCER" SECTIONAL HOT-WATER HEATER

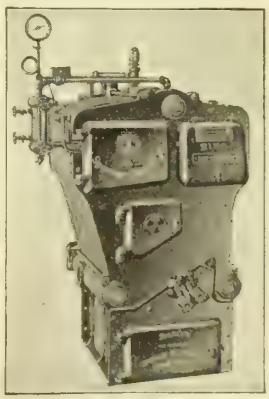


Fig. 3. "SPENCER" 15-INCH SECTIONAL STEAM HEATER

Showing water-jackeeted magazine and sloping grates; also arrangement of flues and waterways to secure perfect circulation and absorption of greatest possible amount of heat

RATINGS, ETC., "SPENCER" 15-INCH SECTIONAL STEAM HEATER

No. of Heater	154-S	155-S	156-S	157-S	158-S
Rating	375	505	630	760	900
Length of base, ins.	25 3/8	32 1/2	39 5/8	46 3/4	53 7/8
Total Length, ins.	32 5/8	39 1/4	46 3/8	54	61 1/8
No. and Size Outlet	1-4"	1-4"	1-4"	2-4"	2-4"
No. and Size Return	2-3"	2-3"	2-3"	4-3"	4-3"
Grate Size, ins.	15x22	15x29	15x36 1/4	15x43 1/2	15x51
Grate Area, sq. ft.	2.26	3.02	3.78	4.54	5.30
Water Line, height	49 1/2	49 1/2	49 1/2	49 1/2	49 1/2

Continued on next page

"Spencer" Water-jacketed Magazine Feed holds in reserve a supply of coal sufficient to last from twelve to twenty-four hours.

The magazine of the ordinary self-feed boiler will "burn out" in a few years. The magazine of the "Spencer," on the contrary, is practically indestructible, owing to its protective water-jacket.

Sloping Grates—The grates of the "Spencer" are inclined at an angle of about forty-five degrees. As the coal feeds down from the magazine it is *evenly distributed* over the whole grate surface, by gravity.

On all of our larger-sized boilers, by shaking one half of the grate and allowing the other side to fill up with ashes, one can utilize but half the capacity of the boiler, which will answer all requirements during moderate weather.

Economy of Heat Units—A reference to Figs. 1 and 2 will show that while the direct-heating surfaces are very large, the heated gases must pass to the front and then to the back of the boiler before reaching the chimney.

Thermometer tests show the gases in the smoke-stack of the "Spencer" Steam Heater average from 100 to 200 degrees lower than the gases in the smoke-stack of ordinary heaters.

Fig. 6. "SPENCER" 30-INCH SECTIONAL HOT-WATER HEATER

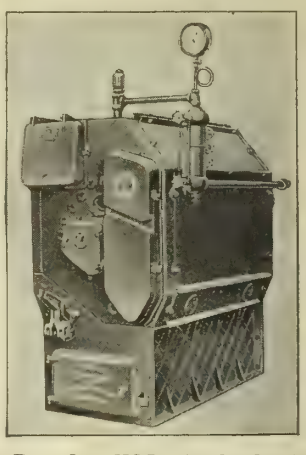


Fig. 8. NOS. 1, 2, 3, 4 "SPENCER" TUBULAR STEAM HEATER

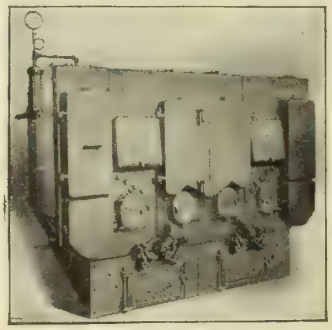


Fig. 7. NOS. 22 TO 27 "SPENCER" HORIZONTAL STEAM HEATER

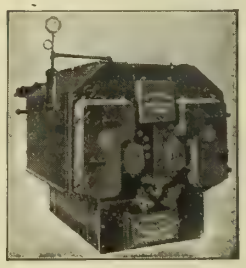


Fig. 9. NOS. 15 TO 21 "SPENCER" TUBULAR STEAM HEATER

RATINGS, ETC., "SPENCER" TUBULAR STEAM HEATER

(For Complete Dimensions, see Following Page)

No.	Rating	Grate		No. and Size	
		Size, ins.	Area, sq. ft.	Outlet	Return
1	250	15x20	2.08	1–3″	1–2″
2	350	15x26	2.71	1–3″	1–2″
3	500	15x30	3.12	2–3″	2–2″
4	600	15x35	3.65	2–3″	2–2″
5	700	26x26	.....	2–4″	2–2″
6	800	26x30	.....	2–4″	2–2″
7	900	26x35	.....	2–4″	2–2″
8	1000	30x33	.....	2–4″	2–4″
9	1100	30x36	.....	2–4″	2–4″
10	1275	30x39	.....	2–4″	2–4″
11	1425	30x42	.....	2–4″	2–4″
12	1600	30x45	.....	2–4″	2–4″
13	1725	30x48	.....	2–4″	2–4″
14	1850	30x51	.....	2–4″	2–4″
15	2000	36x48	.....	2–5″ or 1–6″	2–5″ or 1–6″
16	2250	36x51	.....	2–5″ or 1–6″	2–5″ or 1–6″
17	2500	36x54	.....	2–5″ or 1–6″	2–5″ or 1–6″
18	2750	36x57	.....	2–5″ or 1–6″	2–5″ or 1–6″
19	3000	36x60	.....	2–5″ or 1–6″	2–5″ or 1–6″
20	3500	36x66	.....	2–5″ or 1–6″	2–5″ or 1–6″
21	4000	36x72	.....	2–5″ or 1–6″	2–5″ or 1–6″
22	4500	72x51	25.50	3–5″	1–5″
23	5000	72x54	27.00	3–5″	1–5″
24	5500	72x57	28.50	3–5″	1–5″
25	6000	72x60	30.00	3–5″	1–5″
26	7000	72x66	33.00	3–5″	1–5″
27	8000	72x72	36.00	3–5″	1–5″

RATINGS, ETC., "SPENCER" SECTIONAL HOT-WATER HEATER

(For Complete Dimensions, see Following Page)

No.	Rating	Grate		No. and Size		Length of Base	Total Length
		Size, ins.	Area, sq. ft.	Outlet	Return		
154-W	600	15x22	2.29	1–4″	2–3″	25 3/8″	32 5/8″
155-W	800	15x29	3.02	1–4″	2–3″	32 1/2″	39 1/4″
156-W	1000	15x36 1/4	3.78	1–4″	2–3″	39 5/8″	46 5/8″
157-W	1200	15x43 1/2	4.54	2–4″	4–3″	46 3/4″	54″
158-W	1400	15x51	5.30	2–4″	4–3″	53 7/8″	61 5/8″
274-W	1600	26x24 1/4	4.38	2–4″	2–4″	29 1/2″	41 1/2″
275-W	2100	32 3/8x26	5.84	2–4″	2–4″	37 5/8″	49 5/8″
276-W	2600	40 1/2x26	7.31	2–4″	2–4″	45 7/8″	57 7/8″
277-W	3100	48 5/8x26	8.78	2–4″	2–4″	54 1/8″	65 7/8″
278-W	3600	56 3/4x26	10.29	2–4″	2–4″	62 1/2″	74 1/2″
306-W	2750	30x41 1/8	8.6	2–5″	2–5″	45 7/8″	56″
307-W	3300	30x49 7/8	10.32	2–5″	2–5″	54 1/8″	64 1/4″
308-W	3850	30x58 3/8	12.04	2–5″	2–5″	62 1/2″	72 1/2″
309-W	4400	30x66 1/2	13.76	2–5″	2–5″	70 3/4″	80 3/4″

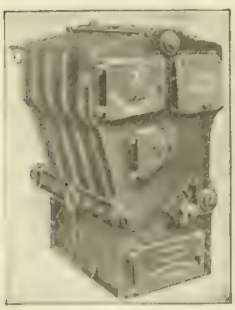
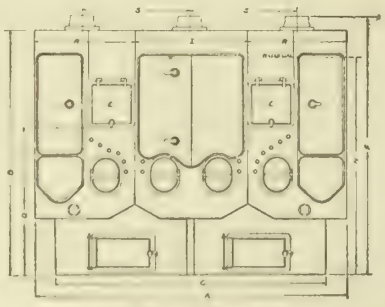


Fig. 4. FRONT VIEW OF "SPENCER" 15-INCH SECTIONAL HOT-WATER HEATER



Front View

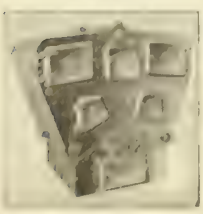
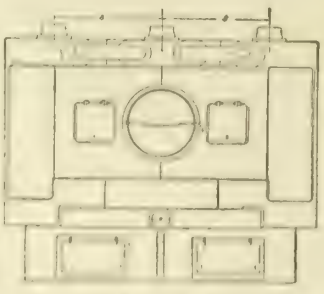
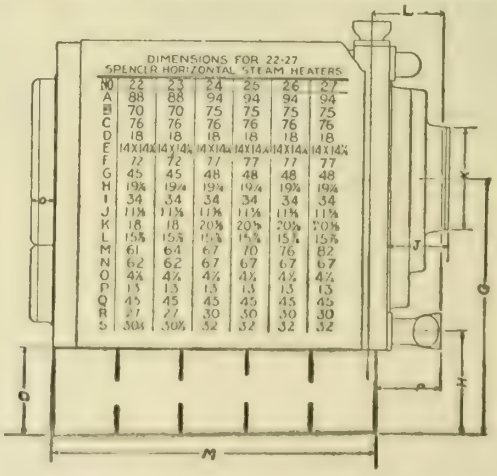


Fig. 5. "SPENCER" 25-INCH SECTIONAL HOT-WATER HEATER



Rear View



DIMENSION DIAGRAMS "SPENCER" NOS. 22 TO 27 HORIZONTAL STEAM HEATERS

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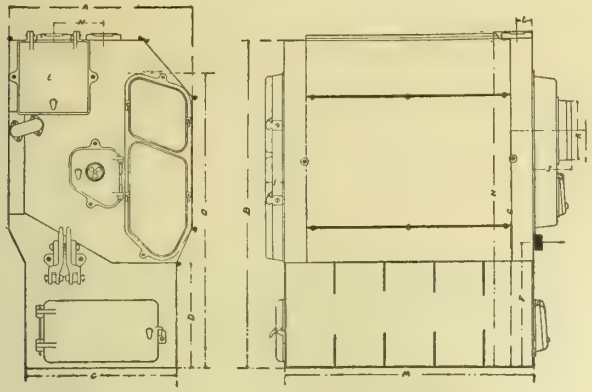
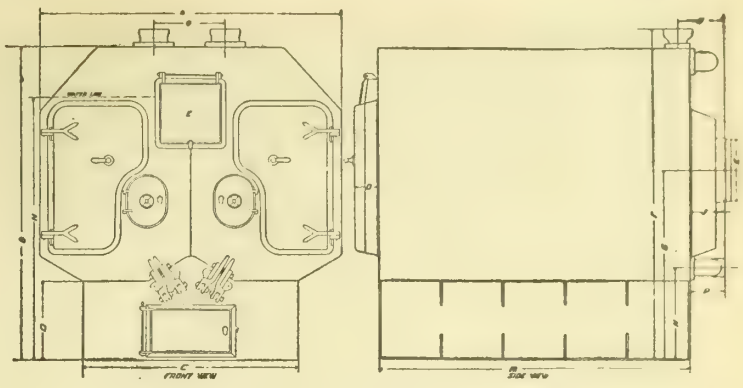


"SPENCER" TUBULAR STEAM HEATER, NOS. 1 TO 4

DIMENSIONS (IN INCHES)

Nos.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1 and 2	27¼	53⅝	24¼	18	11x12	19	37	52⅝	3	6⅛	9¾	2½	*	0	45⅝
3 and 4	29¼	54 5/16	24¼	18	11x12	19	37⅝	53 5/16	3	6⅛	9¾	2½		8	46 5/16

*M equals: for 1, 30″; 2, 36″; 3, 40″; 4, 45″.

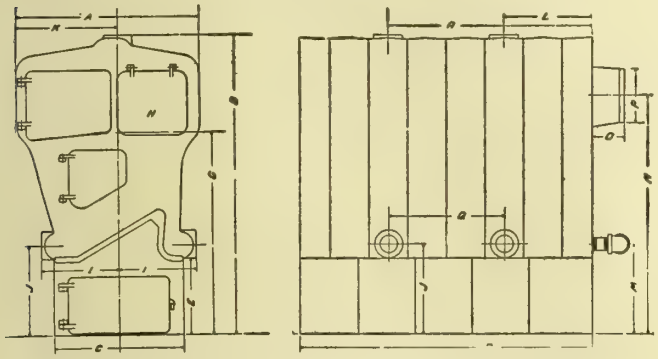


"SPENCER" TUBULAR STEAM HEATER, NOS. 5 TO 21

DIMENSIONS (IN INCHES)

Nos.	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
5 – 7	44¾	59⅜	30¼	19	11x12	58⅜	40½	19½	6⅜	9¾	11 1/16		51⅜	3	9½	24 3/16
8 –11	50½	59¼	38	18	11x12	61¼	43¾	19	7½	11¾	15⅛	*	51¼	3	13⅛	24 5/16
12–14	50½	61¾	38	18	14x14¼	63¾	43¾	19	7½	11¾	15⅛		53¾	4	13⅛	24 3/16
15–21	60	65¼	41¾	18	14x14¼	67¼	39½	19¾	8	16¼	15 7/16		56¼	5	13½	24 3/16

*M equals: for 5, 36″; 6, 40″; 7, 45″; 8, 43″; 9, 46″; 10, 49″; 11, 52″; 12, 55″ 13, 58″; 14, 61″; 15, 58″; 16, 61″; 17, 64″; 18, 67″; 19, 70″; 20, 76″; 21, 82″.



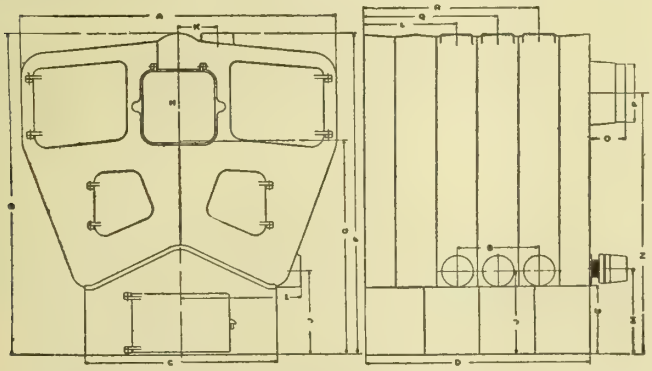
"SPENCER" 15-INCH SECTIONAL HOT-WATER HEATER
(Sizes 154-W, 155-W, 156-W, 157-W and 158-W)

DIMENSIONS, 154-W TO 158-W (IN INCHES)

A	B	C	D	E	G	H	I	J	K	L	M	N	O	P	Q	R
33½	55½	24	*	14	37½	10⅝x 11⅝	14⅜	16⅝	17¼	16¼	16½	44¼	6	10	‡	†

* D equals: for 154-W, 25⅜″; 155-W, 32½″; 156-W, 39⅝″; 157-W, 46¾″; 158-W, 53⅞″. ‡ Q equals: for 157-W, 14¾″; 158-W, 22⅛″. † R equals: for 157-W, 31″; 158-W, 38⅜″.

15-inch Sectional Steam Boiler—All dimensions same as water boiler, except total height is increased (4) inches. On boilers 155-S and 157-S, the outlet and supply are on the center section; and on all others, they are on the first section back of center.

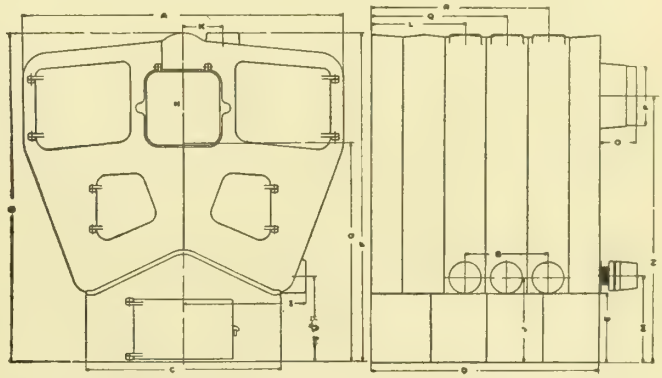


"SPENCER" 30-INCH SECTIONAL HOT-WATER HEATER
(Sizes 306-W, 307-W, 308-W and 309-W)

DIMENSIONS, 306-W TO 309-W (IN INCHES)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
63⅞	66 1/16	39	*	14	62½	44⅛	14x14	26	20½	8½	18¾	17⅝	49	8	12	†	‡	¶

* D equals: for 306-W, 45⅞″; 307-W, 54⅛″; 308-W, 62½″; 309-W, 70¾″. † Q equals: for 306-W and 307-W, 27⅛″; 308-W and 309-W, 35½″. ‡ R equals: for 306-W, 35½″; 307-W, 43⅞″; 308-W and 309-W, 52¼″. ¶ S equals: for 306-W, 16¾″; 307-W, 308-W and 309-W, 33½″.



"SPENCER" 27-INCH SECTIONAL HOT-WATER BOILER

DIMENSIONS, 274-W, 275-W, 276-W, 277-W AND 278-W (IN INCHES)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	S
55½	63 1/16	33¾	*	14	63 1/16	40⅝	14x14	40¼	17 5/16	9	§	17 5/16	53 1/16	8½	12	34¾	8 5/16

*D equals: for 274-W, 29½″; 275-W, 37⅝″; 276-W, 45⅞″; 277-W, 54⅛″; 278-W, 62½″; § L equals: for 274-W and 275-W, 14⅜″; 276-, 277- and 278-W, 22 1/16″.

Good Draft Essential.

Too much stress cannot be laid on the importance of good flue draft, especially when small-sized coal, which lies closely together, is to be used.

A table of proven reliability, by R. C. Carpenter, for sizes of chimney flues is given below.

SIZES OF CHIMNEY FLUE REQUIRED FOR VARYING AMOUNTS OF DIRECT RADIATION

Direct Radiation		Height of Chimney Flue, feet					
Steam in Square Feet	Water in Square Feet	20	30	40	50	60	80
250	375	7.4	7.	6.7	6.4	6.2	6.
500	750	9.6	9.2	8.8	8.2	8.	6.6
750	1,150	11.3	10.8	10.2	9.6	9.3	8.8
1,000	1,500	12.8	12.	11.4	10.8	10.5	10.
1,500	2,250	15.2	14.4	13.4	12.8	12.4	11.5
2,000	3,000	17.2	16.3	15.2	14.5	14.	13.2
3,000	4,500	20.6	18.5	18.2	17.2	16.6	15.8
4,000	6,000	23.6	22.2	20.8	19.6	19.	17.8
5,000	7,500	26.	24.6	23.	21.6	21.	19.4
6,000	9,000	28.4	26.8	25.	23.4	22.8	21.2
7,000	10,500	30.4	28.8	27.	25.5	24.4	23.
8,000	12,000	32.4	30.6	28.6	26.8	26.	24.2
9,000	13,500	34.	32.4	30.4	28.4	27.4	25.6
10,000	15,000	37.	34.	32.	30.	28.6	27.

Diameter of Chimney in Inches
(Side of Square, in cases of Square Flues)

THE SHARP ROTARY ASH RECEIVER CO., INC.

Manufacturers of Sharp Rotary Underground Ash and Garbage Receivers

BINGHAMTON, N. Y.

NEW YORK OFFICE, 30 East 42d Street, J. Randolph Smith, Vice President and Manager of Agencies

Product.

The Sharp Rotary Ash and Garbage Receiving System, the modern method of ash disposal.

Sharp Rotary Underground Ash and Garbage Receiver.

A most modern and sanitary way of caring for ashes, garbage and refuse. Has the hearty endorsement of Architects, Builders, Health and Fire Commissioners and hundreds of satisfied users. It has become an economical necessity in the modern home, store, office and public building. Saves space in the basement. Insures pure, dustless air. Eliminates all danger of fire from hot ashes. Can be installed under any type of heater, at any time, in new or old buildings.

Description.

It consists of a circular pit excavated in the cellar bottom and extending under the front of the heater about twelve inches. In this pit is assembled the complete Equipment, as shown in Figs. 3 and 4, which consists of a metal form containing a series of specially constructed, closely nested, galvanized iron cans that revolve on a central perpendicular shaft, by means of a lever, bringing one numbered can at a time directly beneath the ash-pit of the furnace. (Fig. 2.)

As each can is filled, the device is turned until the next number is opposite the arrow, when an empty can takes its place, and so on until all cans are filled.

The whole device is covered by stationary top plates level with the basement floor, provision being made to receive the ashes through an opening in the floor of the heater ash-pit. One plate being removable permits the filled cans to be lifted out by block and tackle, furnished by the Company, and fastened to the ceiling.

The only movable part of the system is the internal mechanism. The cover plates, being stationary, restore and preserve the continuity of the cellar bottom.

There are two styles made: the iron top and the cement top finish. The cement top finish permits of 2, 4 or 6 inches of concrete on the surface (Fig. 5), extension plates being provided for any one of these thicknesses. This style is regularly furnished for two inches of concrete, unless otherwise specified.

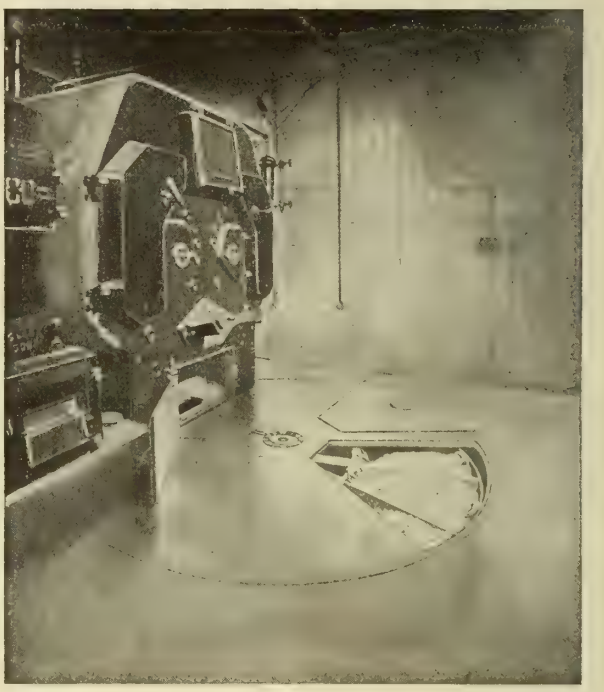


Fig. 1. IRON TOP FINISH, SHOWING REMOVABLE PLATE LIFTED OFF

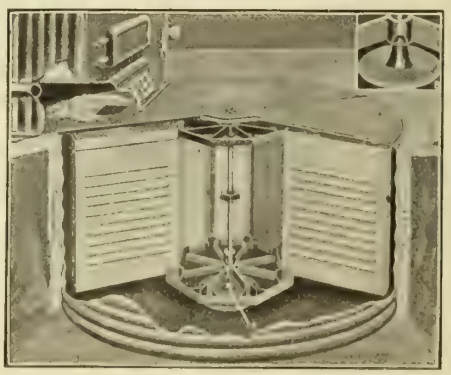


Fig. 2. SHOWING OPERATION

Advantages.

The system increases efficiency of basement space by eliminating all ash-cans and boxes. Sweepings from basement floor and waste material not easily burned may be allowed to drop into the cans, by removing a plate that covers a small hand-hole in one of the top plates.

Part of the ashes falling directly into a can, during the process of shaking the furnace, prevents the accumulation of hot ashes and saves the grates.

Waste from the kitchen may also be deposited in the cans through the open space in the floor of the ash pit, all odors being drawn up through the

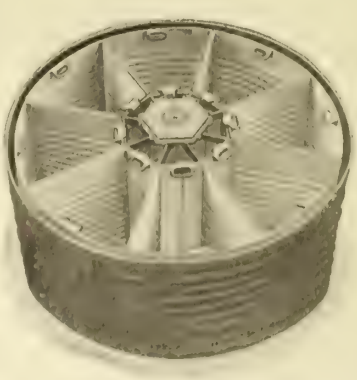


Fig. 3. Inside View

Fig. 4. Outside View

COMPLETE EQUIPMENT BEFORE INSTALLING

Continued on next page

fire-box of the heater, and passing out through chimney.

In many cases this would save the owner the expense of an incinerator. Another advantage is that by its use all waste matter may be separated, as is required in some municipalities.

The cover plates, when assembled, are air-tight, preventing any possibility of drafts to the furnace or escape of dust. Fireproof itself, it also prevents the possibility of fires.

There is a saving of at least ninety per cent of the labor connected with ash handling and disposal.

An ash chute from kitchen range can also be attached, if range is conveniently located.

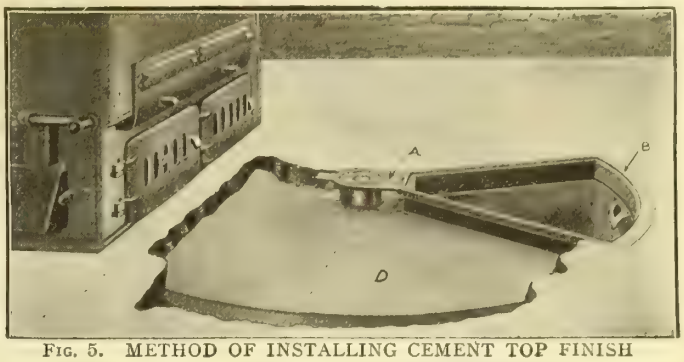


FIG. 5. METHOD OF INSTALLING CEMENT TOP FINISH

SIZES AND PRICES

Receiver No.	Corrugated Steel Cans	Cast Iron Cover Plates	Capacity, Bushels	Diameter, Inches	Height, Inches	Height of Can, Inches	Shipping Weight	Price	Where Used
1	8	6	24	60	30	25	600	$75	Residences
1A	8	6	24	60	30	25	600	85	Residences
2	12	6	33	72	30	25	800	95	Apartments
2A	12	6	33	72	30	25	800	110	Schools
5	5	1	6	44	20	16	360	35	Hotels
15	8	6	14	60	19	15	500	65	Small Residences
15A	8	6	14	60	19	15	500	75	Bungalows

Nos. 1A and 2A are made with extension castings for cement top.
No. 15A is used where obstructions in soil require shallow receiver.
No. 1 is also made with steel tight water tank at $100.00; with casting for cement, $110.00.
All prices include freight prepaid east of Mississippi River.

Installation.

The installation is simple; and a common laborer who understands mixing cement can easily follow directions sent for the installation.

Brief Specification Form.

Furnish and install, in suitable sized pit in cellar of building, a Sharp Rotary Ash Receiver (made by THE SHARP ROTARY ASH RECEIVER CO., INC., Binghamton, N. Y.), in accordance with detailed directions furnished by manufacturer, this outfit to extend twelve inches underneath ash-pit of furnace (boiler) and to conform to following specifications:

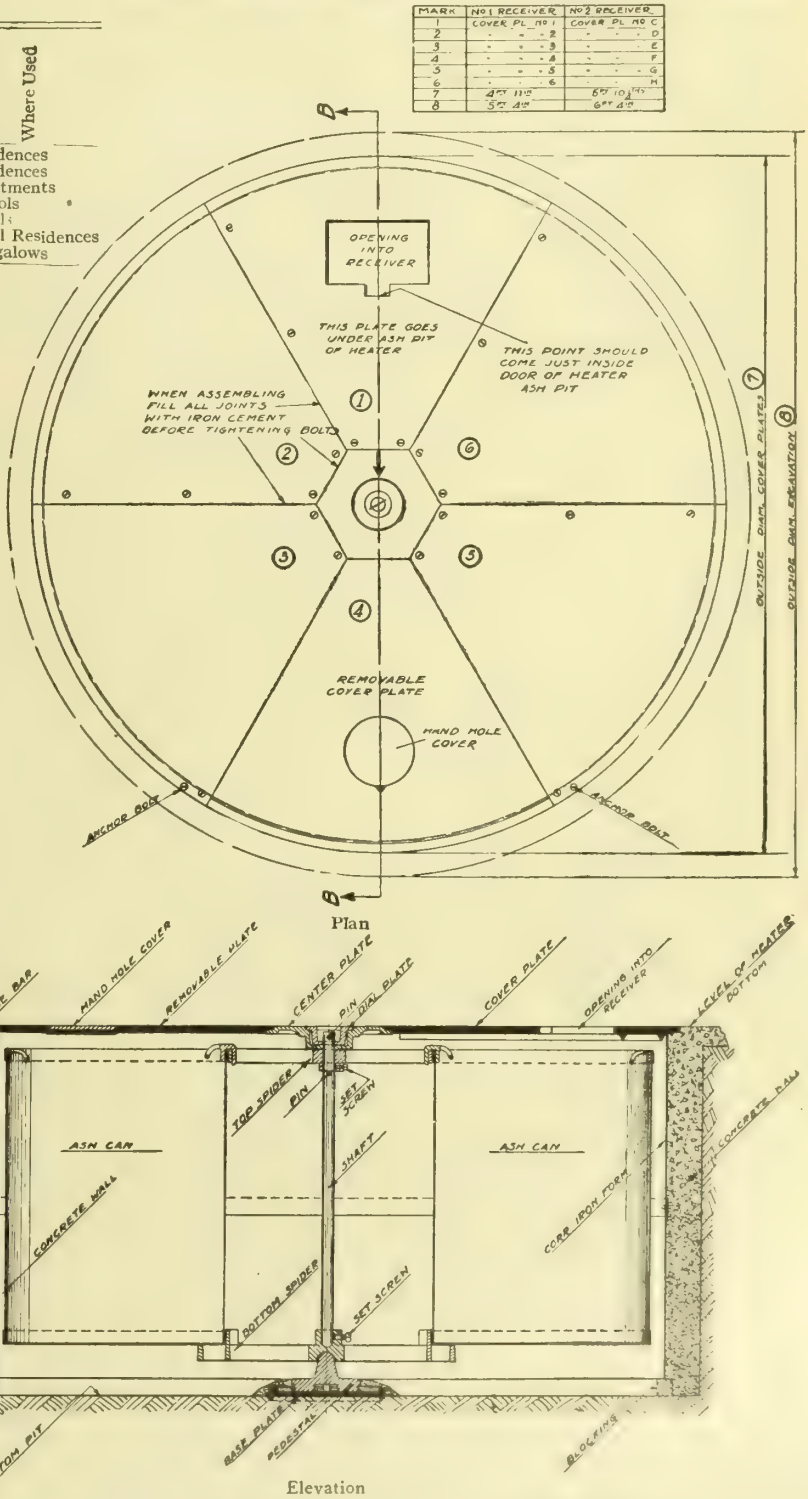
Receiver No.	Capacity Corrugated Steel Cans	Capacity Bushels	Height of Receiver, Inches

References.

Hundreds of Private Homes, Churches, Schools, Stores, etc., and well-known Companies and Municipalities are using these Ash Receivers. For lack of space we name only a few:

Lackawanna Railroad Co.
H. F. McCormick, Lake Forest, Ill.
Harry Johnson, Lestershire, N. Y.
Thos. B. Crary, Binghamton, N. Y.
Geo. Huntington, Ann Arbor, Mich.
R. C. James, Ardmore, Pa.
H. A. Bernhardt, Buffalo, N. Y.
J. A. Bollinger, Cedar Rapids, Iowa
F. A. Reynolds & Son, Chatham, N. J.
G. A. Erskine, Detroit, Mich.
Knee Heating Co., Grand Rapids, Mich
M. G. Bulkeley, Jr., Hartford, Conn.
Wm. N. Parks, Lincoln, Neb.
Geo. W. Babcock, Louisville, Ky.
Dr. W. E. Bliss, Meriden, Conn.
R. M. Cox, Middletown, N. Y.
Public Library, Minneapolis, Minn.
Allison P. Clark, Montclair, N. J.
C. C. Barlow, New Haven, Conn.
John M. Coggeshall, North Scituate, R.
Owen C. Becker, Oneonta, N. Y.
L. W. Butterfield, Orange, N. J.

One of these Ash Receivers may be seen on the Exhibit Floor of the Craftsman Building, 6 East 39th Street, New York, N. Y.



PLAN AND ELEVATION OF NOS. 1 AND 2 ASH RECEIVERS

ESTABLISHED 1841

E. B. BADGER & SONS COMPANY

Engineering Coppersmiths and Structural Metal Workers

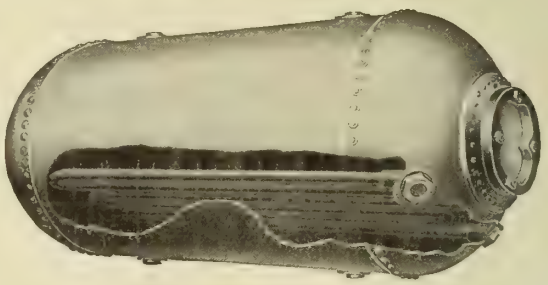
63-75 Pitts Street
BOSTON, MASS.

Products.

Copper Hot-Water Boilers.

For Copper and White Metal or German Silver Pantry Sinks and Wash Boilers, see our name in General Index.

TRADE-MARK



SPECIAL COPPER HOT-WATER BOILER, WITH OR WITHOUT STEAM COIL FOR HIGH PRESSURE

Description.

Badger's copper hot-water boilers are made for tank and direct pressure. The material used is the best lake copper. The heads are riveted. The interior is heavily tinned to insure perfectly clear water, and the smaller sizes are reinforced with heavy brass rings to prevent collapsing. No iron is used in the construction. They are finished in beautiful brown, which will not tarnish, or in polished copper.

Advantages.

Range boilers are usually connected to water-back or coil in range, or to an independent heater. The large boilers can be heated by an independent heater or by steam-coils, or by both. A Badger hot-water boiler containing nothing corrosive insures perfectly clear water, which is impossible by the use of an iron boiler. Badger copper boilers will last an indefinite number of years. Their neatness of appearance, quality, strength and evidence of mechanical skill are strong features.

Utility.

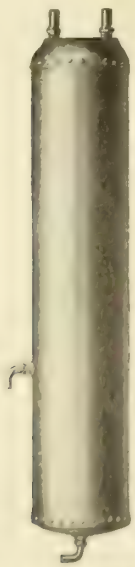
Badger's hot-water boilers are suitable for residences, apartments, office buildings, hospitals, and factories.

Sizes, etc.

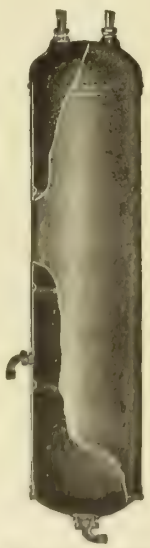
Badger's copper boilers are made in stock sizes from 30 to 100 gallons, and as large as 1,500 gallons capacity. They can be made to dimensions to meet requirements. Badger's standard pressure boilers are tested to 200 pounds cold water pressure. Heavier pressure boilers are made to stand working pressure up to 150 pounds.

Co-operative Service.

If you will write us the necessary details we will gladly send illustrative Catalogue, with exact quotations and any other information desired.

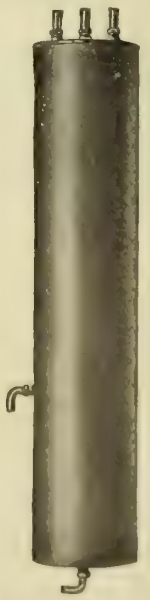


REGULAR PRESSURE BOILER 200 POUNDS TEST, SUPPLIED DIRECT FROM WATER MAIN
Made to set upright or horizontal



KEEPKLEENE BOILER
With special patented combination hand hole in bottom
Only sanitary boiler made. It can be cleaned without taking down

UPRIGHT PRESSURE BOILER WITH STEAM COIL
Can be made to hang horizontally



REGULAR TANK PRESSURE BOILER SUPPLIED FROM TANK PLACED ABOVE BOILER
Made to set upright or horizontal

ESTABLISHED 1872

I. B. DAVIS & SON

Feed-Water Heaters, Hot-Water Service Heaters, Duplex and Triplex Power Pumps

40 Cushman Street
HARTFORD, CONN.

AGENTS

NEW YORK, A. A. Cardwell, 405 Lexington Avenue
PHILADELPHIA, Thomas McAdoo, 375 Bourse Building
BOSTON, I. B. Davis & Son, 7 Pearl Street
CHICAGO, Robert M. Miller, 417 Manhattan Building

Products.

Manufacturers of Hot-Water Service Heaters; Feed-Water Heaters; Duplex and Triplex Power Pumps.

Experience and Co-operative Service.

This concern has been continually engaged in the manufacture of Feed-Water Heaters, in Hartford, Conn., since 1872 up to the present time.

Modern improvements, the result of long experience, should be a sufficient guarantee of our reliable and co-operative service. Interested persons are cordially invited to submit their intricate water heating problems for prompt consideration by our engineering department.

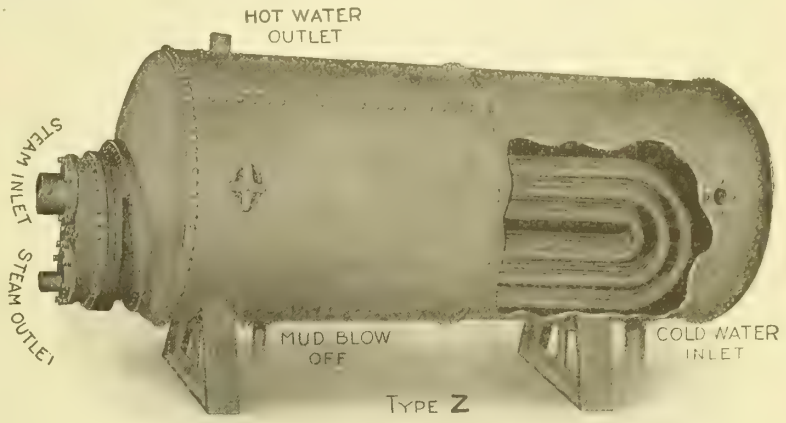


Fig. 1. DAVIS HOT-WATER SERVICE HEATER, TYPE Z

Davis Hot-Water Service Heater, Type Z.

The Davis Hot-Water Service Heater, Type Z, is a perfect device for heating water for Bakeries, Bleacheries, Breweries, Colleges, Hospitals, Hotels, Laundries, Print and Dye Works and all places where hot water is required in quantities at a desired temperature. In this respect its large water capacity makes it invaluable, for it presents a reservoir of hot water which can be drawn on either constantly or at a moment's notice. The body of the shell and heads are of steel and the tubes are of seamless drawn brass (Fig. 1).

Dimension in Inches Over-All on Cradles 6 Inches High

Cipher	Length	Width	Height on Cradles 6" High	Storage In U. S. Gallons	Gallons Heated per Hour from 50° F. to 180° F. Using Steam at Atmosphere
Zaffer	102	36	42	400	500
Zeal	126	36	42	500	600
Zebra	150	36	42	600	750
Zero	126	42	48	700	1000
Zest	142	42	48	800	1250
Zeta	157	42	48	900	1500
Zinc	175	42	48	1000	2000
Zizel	152	48	54	1100	2500
Zocco	164	48	54	1200	3000
Zone	176	48	54	1300	4000
Zoonic	135	60	66	1500	5000
Zoo	153	60	66	1750	6000
Zephyr	177	60	66	2000	7000
Zuna	225	60	66	2500	8000

Note—The above list shows only a few of the many combinations that we can furnish in both larger and smaller sizes.

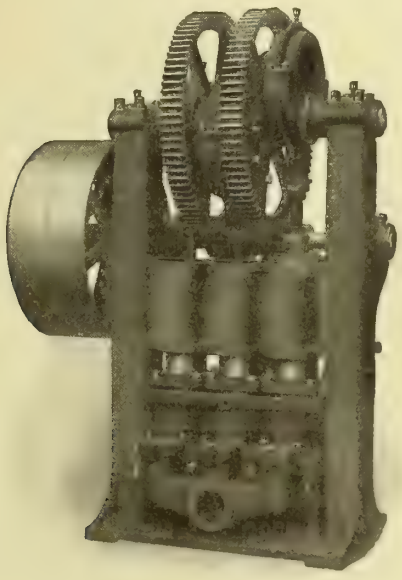


Fig. 2. THE DAVIS TRIPLEX POWER PUMP, TYPE G
Front View

Davis Triplex Power Pump, Type G.

This illustration (Fig. 2) represents a perfect type of the Upper Guided Vertical Triplex Belt-Driven Power Pump. Uprights, of strong box pattern, with no ribs on outside, can be readily cleaned. Gearing, very powerful, takes strain near center of load. Teeth (machine cut) render pump practically noiseless in operation. Bearings, large and of ample strength for severe service. All boxes are babbitted and adjustable. Cast-iron cylinders, glands and plungers. Composition valves.

Valve Chambers—Both suction and discharge are separate, securely bolted to base of pump, and can be renewed.

Special Construction—Bronze-lined base and glands, bronze plungers, rawhide pinions, etc., to order, at extra price.

Capacities and sizes—Send for catalogues containing full information.

THE NATIONAL PIPE BENDING CO.

Manufacturers of Power-Plant Equipment

156 to 168 River Street
81 to 131 Lloyd Street
NEW HAVEN, CONN.

BRANCH OFFICES AND AGENCIES

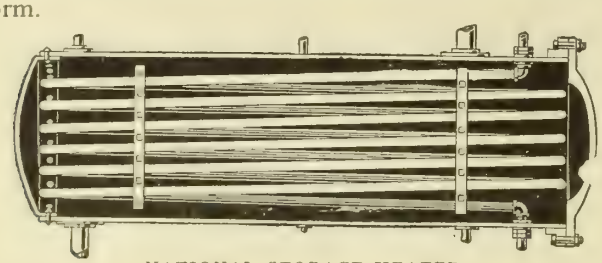
BOSTON, MASS., W. G. Ruggles Company, Agents, 54 High Street NEW YORK, Stevens Bros., Agents, 149 Broadway

Products.

Feed-Water Heaters (Closed and Open); Storage Heaters; Service Heaters; Storage Tanks; Direct-Contact Heaters; Oil Separators; Coils and Bends of Iron, Brass and Copper.

Co-operative Service.

We offer architects the results obtained from our years of experience building and designing Water Heaters, Storage Heaters, and Tanks. Our book, showing a large number of combinations and arrangements, should be in the hands of every architect. It's in blue-print form.



NATIONAL STORAGE HEATER

National Storage Heater.

For supplying a large quantity of hot water for washing in mills and factories, hospitals and hotels, the National storage heater can always be depended upon. It uses exhaust steam, thereby saving coal, or live steam if there is not enough exhaust.

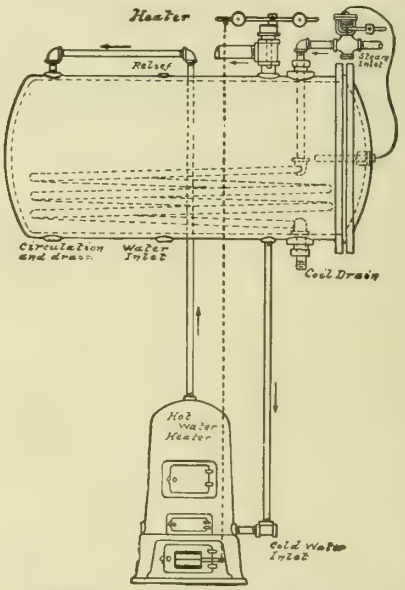
The coil is of seamless brass or copper tubing in a horizontal cast- or wrought-iron shell, which may be hung from the ceiling or carried on cradles.

Sizes—Standard sizes are of 100, 200, 300, 500 and 1000 gallon capacities.

NATIONAL FEED WATER HEATER

National Feed-Water Heater.

Consists of many coils of seamless brass or copper through which the water passes. The exhaust steam surrounds the coils. Brass and copper have no effect on the water, which is pure and clean and free from rust.



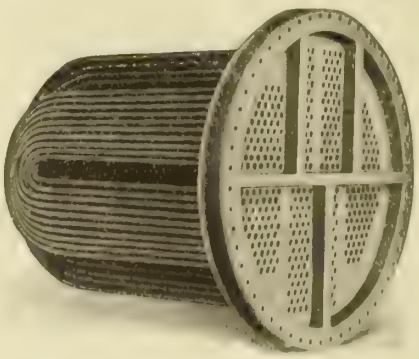
PLAN NO. 6. NATIONAL STORAGE HEATER AND AUXILIARY FUEL BURNING HEATER

National Storage Heater and Auxiliary Fuel Burning Heater.

For Public Buildings, Office Buildings, Dormitories, etc.

Coils for live steam for winter service; fuel burning heater for summer when heating or power boiler is shut down.

Regulator for live steam and damper control for stove.



NATIONAL U BEND HEATER COILS

National U-Bend Heater.

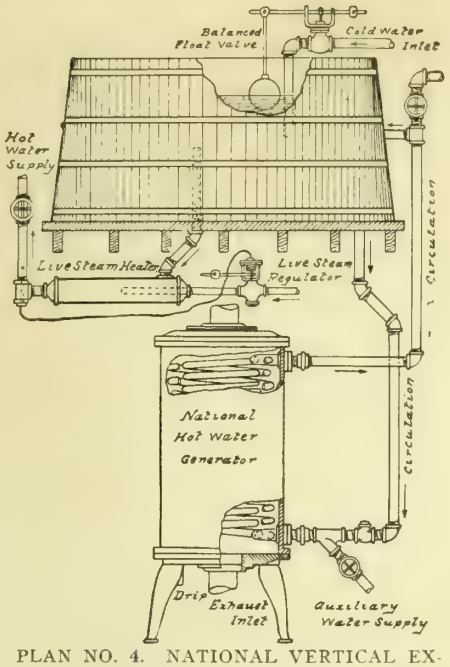
For great capacity in small space. The U Bend form of tubes gives enormous surface; and the baffles on the header compel the water to make several passes, raising the temperature to that of the exhaust steam surrounding the tubes.

Continued on next page

National Vertical Exhaust Steam Heater and Live Steam Booster.

For use with large wooden storage tank already installed in such industries as laundries, bleacheries and dye-houses.

Live steam admitted automatically to heater, as required; but no steam is wasted, for none is used unless temperature falls.

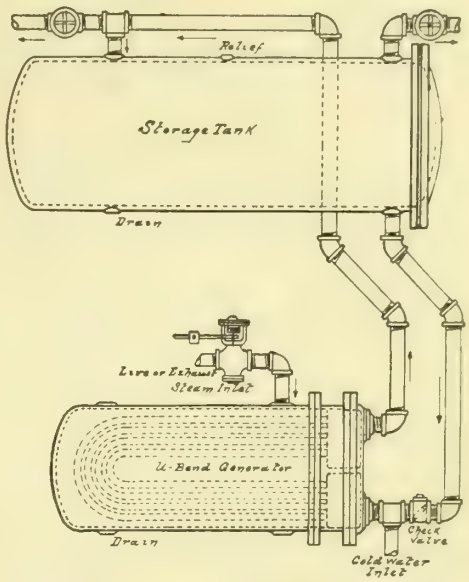


PLAN NO. 4. NATIONAL VERTICAL EXHAUST STEAM HEATER AND LIVE STEAM BOOSTER

Combination National U-Bend Heater and Cast-Iron Storage Tank.

In units for any heating and storage requirements, and for use with live or exhaust steam. Piping can be arranged to cut out storage tank and water delivered direct from heater.

Arrangement shows horizontal heater for use when head-room will not permit vertical heater. With sufficient head-room vertical heater may be substituted for horizontal.

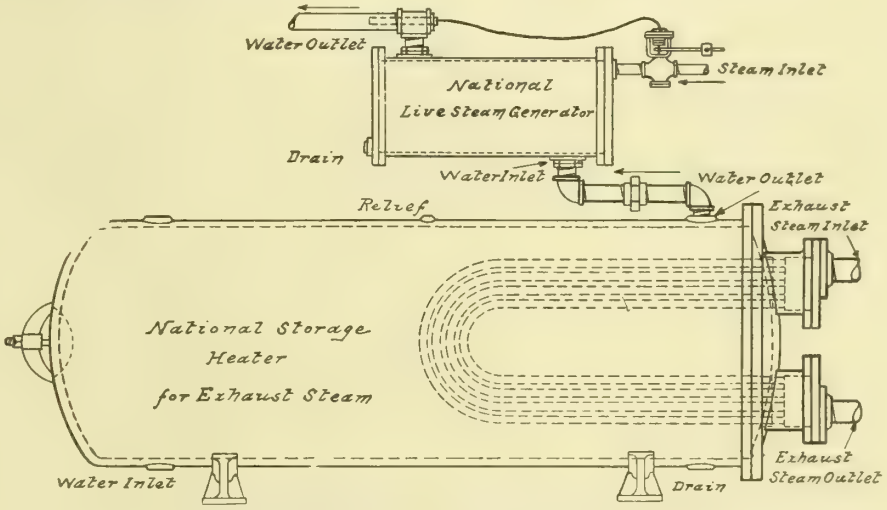


PLAN NO. 3. COMBINATION NATIONAL U-BEND HEATER AND CAST-IRON STORAGE TANK

Combination National Storage Heater for Exhaust Steam and Live Steam Booster.

For laundries, bleacheries, dye-houses, and other industries requiring large volumes of hot water. This arrangement gives a dependable supply, for when there is not enough exhaust steam, live steam can be used to raise temperature of water.

Thermostat automatically regulates use of live steam.

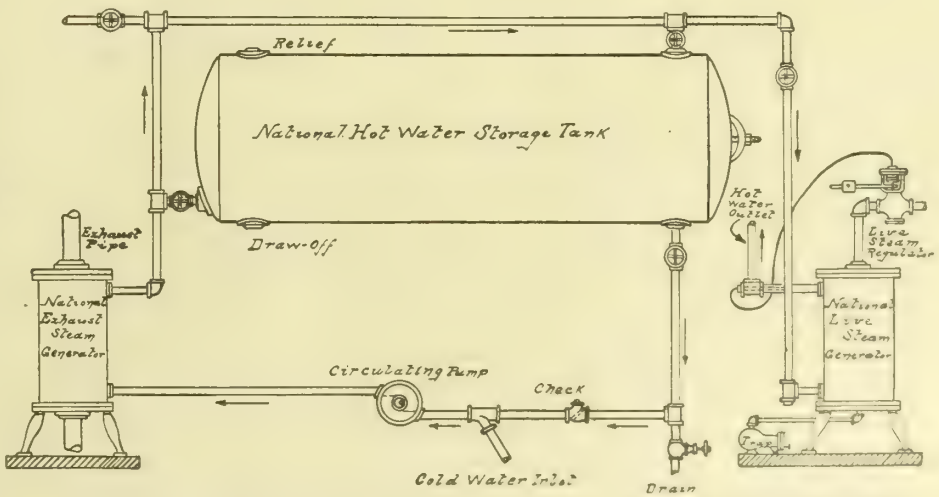


PLAN NO. 5. COMBINATION NATIONAL STORAGE HEATER FOR EXHAUST STEAM AND LIVE STEAM BOOSTER

National Combination Exhaust and Live Steam Heaters and Storage Tank.

Piping so arranged that either heater, or both, can be used with storage tank, or a heater used without the tank.

Particularly well adapted when a large volume of water is wanted intermittently, or when part of the exhaust steam is used for other purposes.



PLAN NO. 1. NATIONAL COMBINATION EXHAUST AND LIVE STEAM HEATERS AND STORAGE TANK

FRANK L. PATTERSON & CO.

Manufacturers of Hot Water Heaters and Generators

26 Cortlandt Street

NEW YORK, N. Y.

Products.

PATTERSON HOT WATER SERVICE HEATERS, GENERATORS, CONVERTORS, CHANGERS, and BERRYMAN FEED WATER HEATERS.

Co-operative Engineering Service.

Architects place themselves under no obligation by permitting the Patterson Company's engineers to submit suggestions covering heaters required for specified purposes. The individual needs of each installation are considered in the light of twenty years of engineering and manufacturing experience before any recommendations are made as to type or capacity to be used. This analysis determines whether storage capacity is desirable and, if so, its proper proportion to the heating capacity. It is positively guaranteed that any installation so recommended will satisfactorily furnish all the hot water required.

General Construction.

The tubes used in Patterson Heaters are seamless drawn brass tested to a hydrostatic pressure of 1000 pounds per square inch. Their U shape is perfect protection against leaks due to expansion and contraction strains, as each individual tube is free to move independently of all the others.

The shells of storage type heaters are made of heavy boiler plate in accordance with the best heavy pressure boiler making practice.

The heavy forged steel tube-heads into which both ends of each tube are expanded are practically unbreakable.

Guarantee.

The workmanship and material of every Patterson product is guaranteed to be first class in all respects. Any part proving defective within a year from shipment will be replaced without charge.

Each heater is also guaranteed to heat its rated capacity of water.

Convertors.

Patterson Convertors are similar in construction to Type D Instantaneous Heaters.

When requesting specifications of Convertors, state whether the radiation is direct or indirect, square feet of same, whether forced or gravity circulation, size of circulating mains, and pressure of steam used as the heating medium.

Catalogue.

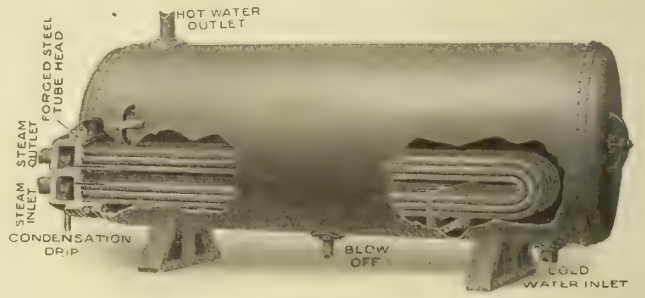
"*Data Book for Architects' and Engineers' Use*" —Send for this. It contains accurate capacity tables of the herein described and other types of Patterson Service Heaters and Generators.

Gallons of water per hour are given for each size, at various final temperatures, using steam at different pressures. Detailed dimensions are shown of all sizes; also capacities of Patterson Convertors in square feet of radiation, etc.

Patterson Combined Hot Water Heater and Service Tank, Type B.

This Type provides any required combination of heating and storage capacities. It is recommended for Dye Houses, Institutions, Association Buildings where hot water is used for shower baths, or wherever there are sudden demands for large quantities of hot water.

Only a small continuous steam supply is required, as the stored water absorbs the heat while held in reserve for the short periods of maximum duty.



PATTERSON COMBINED HOT WATER SERVICE HEATER AND STORAGE TANK, TYPE B

DATA, TYPE B

Storage Section					Heating Section			
No.	Dimensions, Inches	Storage Capacity, Gallons	Weight, Pounds	Price	No.	Hourly Heating Capacity, 50° to 180° F., Using Steam at Atmosphere, Gallons	Weight, Pounds	Price
4 B	36x 96	425	1,550	$225.00	4 B	500	350	$200 00
5 B	36x120	530	1,850	255.00	5 B	600	370	215.00
6 B	36x144	640	2,100	280.00	6 B	750	400	225.00
7 B	42x120	720	2,200	305.00	7 B	1,000	450	260 00
8 B	42x144	860	2,450	335.00	8 B	1,250	500	310.00
9 B	42x168	1000	2,800	370.00	9 B	1,500	550	345.00
10 B	48x120	940	2,925	400 00	10 B	1,750	600	380.00
11 B	48x144	1125	3,350	435.00	11 B	2,000	700	425.00
12 B	48x168	1300	3,840	480 00	12 B	2,500	800	470 00
13 B	48x192	1500	4,200	525.00	13 B	3,000	900	535.00
14 B	60x120	1460	4,300	525.00	14 B	4,000	1200	695.00
15 B	60x144	1700	4,950	590.00	15 B	5,000	1500	790 00
16 B	60x168	2000	5,600	650 00	16 B	7,500	2000	1250 00
17 B	72x174	3000	7,000	780 00	17 B	10,000	3200	1510 00
18 B	84x168	4000	8,700	940.00	18 B	12,500	3800	1850 00
19 B	96x168	5200	10,000	1150 00	19 B	15,000	4800	2150 00
20 B	96x192	6000	11,000	1270 00	20 B	20,000	5100	2875 00

NOTE—In specifying Type B Heaters, the numbers of required storage and heating sections should be combined. For illustration, "One Patterson Type B Heater with No. 9 Storage and No. 13 Heating Sections" has 1000 gallons storage with 3000 gallons heating capacity.

To determine list price of any combination of storage and heating capacities, add their respective prices.

Suggested Specifications for Type B.

Furnish and install, where shown on plans, one Type B Patterson or equally approved Combined Hot Water Heater and Storage Tank, with No. .... B storage section and No. .... B heating section.

The heating surface to consist of U shaped seamless brass tubes, 1¼ inches in diameter, both ends of each tube to be expanded in a forged steel tube-head, and to be of sufficient capacity to heat not less than .... gallons of water per hour from an initial temperature of .... degrees to a final temperature of .... degrees when supplied with steam at .... pounds pressure.

The heater to be furnished with manhole, all necessary openings, tappings, and saddles for its support.

The water space to be tested for a working pressure of .... pounds per square inch and the steam space for a working pressure of .... pounds per square inch.

Sheet Copper

Continued on next page

Patterson Hot Water Tank, Type C.

This heater, in which the heating surface consists of short parallel tubes, is a practical improvement upon the old-style tank with a coil or return bend, and is recommended for Apartment Houses, Hotels, Office Buildings, or wherever low pressure boilers are used for heating.

Expansion and Condensation Chambers.

When steam enters the expansion chamber it expands and uniformly fills the short tubes. As rapidly as it condenses in these it is discharged into the condensation chamber, instead of being carried along while rapidly cooling, as in a coil. There is thus no idle heating surface in the Patterson Tank.

The condensation chamber has sufficient area to provide for any sudden flood of condensation, without permitting it to back into the tubes to destroy their efficiency and create hammering. This is important during the periods of heaviest duty, when the thermostat is wide open and condensation rapidly formed.

PATTERSON HOT WATER TANK, TYPE C

DATA, TYPE C

No.	Dimensions, Inches	Storage Capacity, Gallons	Hourly Heating Capacity in Gallons from 50° to 180° F.	Weight, Pounds	Price
1 C	24x 72	150	225	1025	$195.00
2 C	24x 96	190	285	1175	220.00
3 C	30x 72	210	315	1250	240.00
4 C	30x 96	300	400	1425	270.00
5 C	30x120	375	560	1650	315.00
6 C	36x 96	425	640	1750	350.00
7 C	36x120	530	800	1975	390.00
8 C	36x144	640	960	2200	470.00
9 C	42x120	720	1080	2350	500.00
10 C	42x144	860	1300	2600	570.00
11 C	48x144	1125	1690	3500	650.00
12 C	48x168	1300	1950	3900	730.00
13 C	48x192	1500	2250	4300	810.00

Suggested Specifications for Type C.

Furnish and install, where shown on plans, one No. .... Type C Patterson or equally approved Hot Water Tank, ... inches in diameter and .... inches long, inside shell dimensions, having a storage capacity of .... gallons.

The heating surface to consist of U shaped seamless brass tubes 1¼ inches in diameter, the ends of each tube to be expanded in separate cast-iron headers riveted to the shell, and to be of sufficient capacity to heat not less than .... gallons of water per hour from an initial temperature of .... degrees to a final temperature of .... degrees when supplied with steam at .... pounds' pressure.

Tank to be furnished with all necessary openings and tappings, manhole, and saddles for its support.

The water space to be tested for a working pressure of .... pounds per square inch and the steam space for a working pressure of .... pounds per square inch.

Patterson Instantaneous Hot Water Service Heater, Type D.

This is a water tube heater, with only nominal storage capacity. It is recommended for use where the hot water demand is practically continuous or as a hot water generator for circulating systems.

Construction.

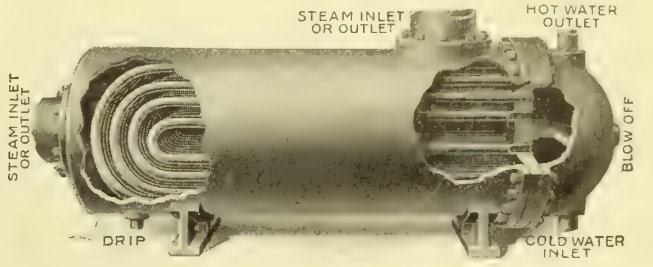
It is very compact. The heavy forged steel tube-heads permit close arrangement of the tubes, so a large amount of heating surface is contained in small space.

The area of the water passages is much greater than that of the water inlet and outlet pipes.

It is very strongly built, and as there can be no trouble due to contraction and expansion strains, this heater can be safely specified for use with high-pressure steam and any water pressure.

Changers.

Type D Heaters are suitable for use as changers, in which capacity they utilize the condensation from heating systems to heat water for domestic use. Besides the economy effected where steam is purchased from central stations, ordinances prohibiting the discharge of hot drips into sewers are complied with.



PATTERSON INSTANTANEOUS HOT WATER SERVICE HEATER, TYPE D

DATA, TYPE D

No.	Dimensions, Inches	Hourly Heating Capacity 50° to 180° F., Using Steam at Atmosphere, Gallons	Weight, Pounds	Price
1 D	14 x 25	200	285	$90.00
2 D	14 x 32	300	310	100.00
3 D	14 x 39	400	360	112.00
4 D	14 x 46	500	400	125.00
5 D	16 x 40	600	450	145.00
6 D	16 x 48	750	520	165.00
7 D	18 x 52	1,000	700	220.00
8 D	18 x 61	1,250	785	260.00
9 D	20 x 62	1,500	950	310.00
10 D	20 x 71	1,750	1050	335.00
11 D	20 x 80	2,000	1175	390.00
12 D	24 x 67	2,500	1450	465.00
13 D	24 x 76	3,000	1600	520.00
14 D	24 x 94	4,000	1800	630.00
15 D	24 x 116	5,000	1925	720.00
16 D	30 x 111	7,500	2700	1090.00
17 D	30 x 123	10,000	3150	1340.00
18 D	36 x 144	12,500	4400	1730.00
19 D	36 x 168	15,000	5000	2110.00
20 D	42 x 168	20,000	6800	2710.00

Suggested Specifications for Type D.

Furnish and install, where shown on plans, one No. .... Type D Patterson or equally approved Instantaneous Hot Water Service Heater .... inches in diameter and .... inches long.

The heating surface to consist of U shaped seamless brass tubes 1¼ inches in diameter, both ends of each tube to be expanded in a forged steel tube-head, and to be of sufficient capacity to heat not less than .... gallons of water per hour from an initial temperature of .... degrees to a final temperature of .... degrees when supplied with steam at .... pounds' pressure. Heater to be furnished with all necessary tappings, openings, and saddles for its support.

The water space to be tested for a working pressure of .... pounds per square inch and the steam space for a working pressure of .... pounds per square inch.

E. W. SEDGWICK, President H. M. SEDGWICK, Secretary-Treasurer

S. WILKS MANUFACTURING CO.

ESTABLISHED 1857

Wilks Water Heaters and Garbage Burners

3517-3539 Shields Avenue

TELEPHONE, Yards 866

CHICAGO, ILL.

Products.

WILKS TRADE-MARK

Wilks Water Heaters; Garbage Burners; Combination Water Heater and Garbage Burner; Steam Generators and Steel Storage Tanks for all purposes; Pneumatic Pressure Tanks; Vertical and Horizontal Air Receivers; Steel Gravel Basins and Blow-off Receivers.

Scope of Use.

Wilks Water Heaters—Adapted to furnish hot water for residences, apartments, hotels, laundries, bath-houses, barber shops, etc.

Wilks Hot-Water Boilers—For heating residences, greenhouses, brooder houses, garages, and other small buildings.

Wilks Combination Water Heater and Garbage Burner—Especially designed for heating water and burning garbage in residences, apartments, hotels, restaurants, hospitals, etc.

Wilks Water Heaters.

In constant use since 1869, they have demonstrated a safe, simple and economical means for providing hot water.

Construction—Being made of *steel,* heaters are strong and durable, with uniform thickness of metal—less thickness than is necessary for cast iron—thereby requiring less fire and coal consumption. Inner sheet, of conical shape, exposes entire surface to direct action of fire; fire is *entirely surrounded by water;* motion (circulation) of hot water is vertical, while cooler water descends in vertical lines; water in horizontal spaces does not usually move far from the fire; and thus the greatest possible heating surface and capacity are obtained (Fig. 1).

Coal Magazine—Self-feeding. A great *labor and fuel saver.* It has openings all around the top, giving equal combustion and equal heating capacity in front and on all sides, causing all gases to be consumed, and securing an equal distribution of heat around the interior of heater. An even and continuous fire, for from ten to twelve hours, without any attention, is the result of the Wilks construction.

Fuel—Hard or soft coal.

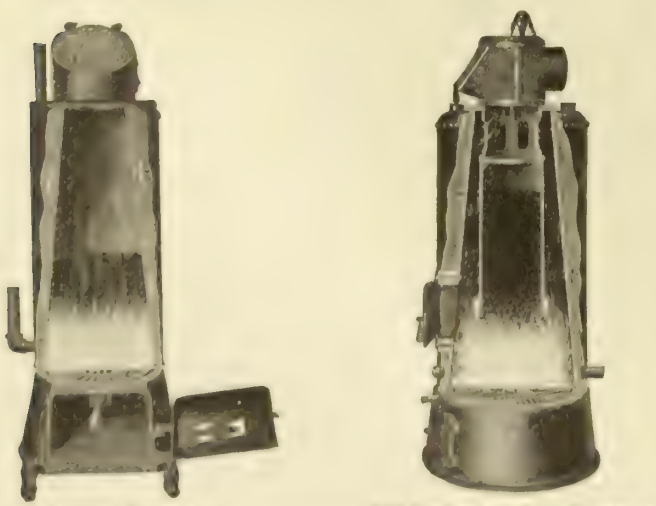
Grates—Sectional shaking and dumping grates, removable without disconnecting heater.

Piping—Hot water is conveyed by pipes, to any part of the building, where required.

Standard Steel Storage Tanks—For ordinary water storage purposes, not to exceed sixty-five pounds working pressure.

All tanks tested to one hundred pounds hydrostatic pressure; tapped to be used in horizontal or vertical position; made with coils, manholes, special tappings, etc., if specially ordered; brass and copper coils quoted on application (Fig. 2). Extra heavy storage tanks for greater pressure quoted on application and on receipt of specifications.

Fig. 2. VIEW SHOWING STANDARD STORAGE TANK
Tank can be installed horizontal or vertical



Surface Burner Self Feeder with Coal Magazine

Fig. 1. WILKS WATER HEATER

WILKS WATER HEATERS—SIZES, CAPACITY AND PRICES

Size of Boiler, Ins.	Capacity, Gals. per Hour	Price		Size of Openings, Ins.	Total Height, Ins.	Size of Smoke Pipe, Ins.	Approximate Weight, Lbs.
		Without Fire-door	With Fire-door				
10 x 18	40	$30 00		1	32	4	100
12 x 24	65	36 00	$46 00	1	43	5	160
12 x 30	80	38 00	48 00	1	49	5	170
14 x 30	100	44 00	54 00	1¼	49	5	200
14 x 36	120	48 00	58 00	1¼	55	5	235
16 x 30	130		72 00	1½	52	5	400
16 x 36	150		76 00	1½	58	5	420
20 x 30	200		90 00	2	54	7	520
20 x 36	250		96 00	2	60	7	550
20 x 42	275		110 00	2	66	7	580
24 x 36	300		126 00	2	60	8	780
24 x 42	350		132 00	2	66	8	810
24 x 48	400		142 00	2	72	8	840
30 x 42	500		160 00	3	67	8	1100
30 x 48	600		168 00	3	73	8	1150
30 x 54	700		176 00	3	79	8	1240
36 x 42	900		234 00	3	68	9	1900
36 x 48	1000		236 00	3	74	9	2000
42 x 42	1200		260 00	3	69	9	2400
42 x 48	1400		270 00	3	75	9	2800

Small sizes are not self feeders, but are furnished with shaking and dumping grates, and can be used with either hard or soft coal.

Sheet-Copper Tank

Continued on next page

Wilks Hot-Water Boilers.

Construction is similar to that of the Wilks Water Heaters. Temperature of the water is always regulated, is uniform and healthful; while the atmosphere is free from dust, smoke and gas.

Installation—It is advisable that a competent contractor should install the heating plant. He will consider the climate, construction of building, exposure on sides of building, number of windows and doors, etc., with a view towards giving each room a sufficient amount of hot-water radiation.

In large residences and greenhouses, two medium-size boilers are often used, yoked together—one only being utilized in moderate weather—with fire in both during extremely low outside temperatures.

Piping leads to any selected part of the building, and heat is controlled in any room by opening and closing valves.

Capacity—The figures given below are based on actual results from Wilks boilers installed at the present time.

	Space Heated	Radiation
16x30 Wilks Boiler will heat	5,000 cubic feet	200 square feet
16x36 " " " "	6,000 " "	250 " "
20x30 " " " "	8,000 " "	300 " "
20x36 " " " "	9,000 " "	350 " "
20x42 " " " "	10,000 " "	400 " "
24x36 " " " "	12,000 " "	450 " "
24x42 " " " "	13,000 " "	500 " "
24x48 " " " "	14,000 " "	550 " "
30x42 " " " "	16,000 " "	600 " "
30x48 " " " "	17,000 " "	650 " "
30x54 " " " "	18,000 " "	700 " "
36x42 " " " "	20,000 " "	800 " "
36x48 " " " "	22,000 " "	900 " "
42x42 " " " "	26,000 " "	1,000 " "
42x48 " " " "	28,000 " "	1,200 " "

Wilks Combination Water Heater and Garbage Burner.

See Scope of Use. The staggered arrangement of water tubes (Fig. 3) and double row of same provide *additional heating surface* and expose to the fire a *greater horizontal surface of garbage.* Note the water jacket entirely surrounding the fire.

Construction—These garbage burners are made of heavy steel boiler plate carefully riveted and braced, and tested to one hundred pounds hydrostatic pressure. In outer shell, opposite ends of tubes, are clean-out plugs (removable) for cleaning tubes at intervals. Clean-outs are also provided at each corner for removing any sediment in the water jacket.

Boiler Grates—Base of burner is furnished with sectional, rocking boiler grates which readily break up clinkers, permitting soft coal to be used successfully.

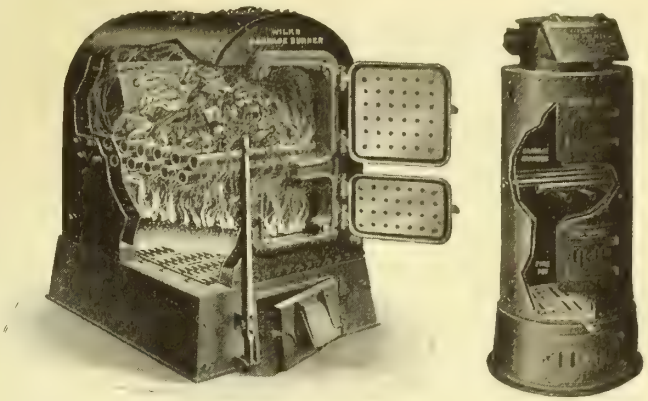
Garbage Grates—Made of best boiler tubing, securely fastened by being expanded into openings in inner shell. Garbage grates (tubes filled with water) thus form *part of heating surface.* Water, circulating through tubes, prevents injury to tubes by the heat and increases efficiency of heater.

Garbage Chamber and Fire-pot—Garbage is thrown into chamber built wide and deep, with large and convenient doors.

Fire-Box—Of large size, so that sufficient fuel can be put in at one time to keep an even and continuous fire during eight to ten hours, without attention.

Installation—Garbage burner should be placed as near chimney flue as possible; should have an independent smoke opening in chimney or a separate chimney; and smoke-pipe should be of same size as the opening furnished on garbage burner.

Pipe connections between garbage burner and water storage tank, both flow and return, should be of same size as the openings furnished in the garbage burner.



Large Type Small Type

Fig. 3. WILKS WATER HEATER AND GARBAGE BURNER

Sizes, Capacity and Prices, Large Type

No.	23	24	5	6	7	8	9	10
Heating Capacity, Gals. per hour	500	600	800	1000	1200	1300	1400	1500
Capacity Garbage Chamber, Bushels	2	3	4	5	7	8	9	10
Height Over-all, Ins	56	56	56	56	56	56	56	56
Width of Heater, Ins	24	24	30	30	30	36	36	36
Length of Heater, Ins	24	30	30	36	42	36	42	48
Dimens'ns of Floor Space, Ins	30x30	30x36	36x36	36x42	36x48	42x42	42x48	42x54
Dimens'ns of Coal Grates, Ins	18x18	18x24	24x24	24x30	24x36	30x30	30x36	30x42
Size of Garbage door, Ins.	15x16	15x16	15x16	15x16	15x16	15x16	15x16	15x16
Size of Fire-door, Ins.	10x16	10x16	10x16	10x16	10x16	10x16	10x16	10x16
Size of Openings, Flow and Return, Ins	2	2	3	3	3	3	3	3
Size of Smoke-Pipe, Ins.	8	8	9	9	10	10	10	12
Approx. Shipping Weight, Lbs.	1500	1600	1800	2000	2200	2300	2500	2700
List Price	$215.00	$240.00	$260.00	$290.00	$320.00	$350.00	$400.00	$440.00

Sizes, Capacity and Prices, Small Type

No.	Size of Boiler Diam. Ins.	Size of Boiler Hgt. Ins.	Heating Capacity, Gals. per hour	Total Height, Ins.	Diam. of Grates, Ins.	Size of Opening, Ins.	Size of Smoke-Pipe, Ins.	Weight, Lbs.	List Price
1	16	36	200	56	12	1½	7	550	$96.00
2	20	42	300	64	15	2	8	825	126.00
3	24	42	400	66	19	2	8	950	160.00
4	30	48	500	72	24	3	8	1,300	210.00

Note—The heating capacity as given above, for both types, is based on raising the temperature of the water in the storage tank 50 degrees Fahr. in one hour.

Co-operative Service.

Upon receipt of a sketch showing size of building, construction thereof (whether frame or brick), exposure, etc., from architects and other interested persons desiring information as to heating residences, greenhouses, garages, etc., this Company will gladly advise them, free of charge, concerning proper size of Wilks boilers to use; also, the best manner of connecting and operating same.

References.

Extensive lists of satisfied users of Wilks Water Heaters, Hot-Water Boilers, and Garbage Burners, during many years, will, on request of architects, contractors or owners, be forwarded without delay.

THE WHITLOCK COIL PIPE COMPANY

Feed-Water, and Hot-Water Service Heaters

HARTFORD, CONN.

Products.

Engineers, and Manufacturers of Feed-Water Heaters; Hot-Water Service Heaters; Pipe Bends; Flanged Piping; Coils and Bends of Iron; Steel, Copper and Brass Pipe and Tubing, etc.

TRADE-MARK

American Standard Feed-Water Heater.

The American Standard feed-water heater has achieved a wide reputation. For thirty years it has been the "Standard" by which all other closed feed-water heaters have been judged. Heating surface consists of coils of seamless copper tubing.

Type "A" American Standard feed-water heater is shown in Fig. 1.

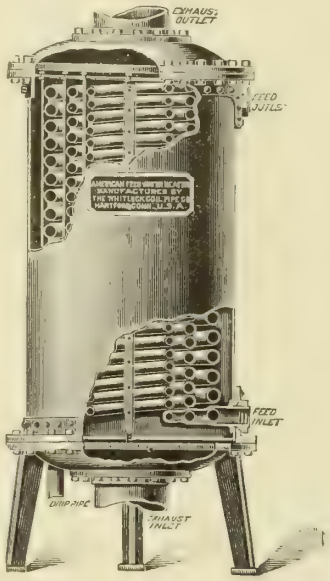


Fig. 1. AMERICAN STANDARD FEED-WATER HEATER

Whitlock-American Hot-Water Service Heaters.

Steam-actuated service heaters may be divided into two classes: storage and instantaneous. In each of these classes we offer several different types, adapted to different requirements.

Storage Heaters.

Type "J" storage heater is of the Berryman or "U-bend" construction, having a large cross-section area through tubes. Especially suitable for use with exhaust or low pressure steam (Fig. 4).

Type "K" storage heater is similar in construction, but has a greater range of storage capacity, and is especially suited to violently fluctuating service with heavy peak loads, particularly where steam supply is limited (Figs. 5 and 7).

Where supply of exhaust or low pressure steam is not sufficient to heat required amount of water, a combination heater, provided with an auxiliary high pressure heating section, is furnished. Fig. 7 shows the Combination Type "K" heater.

Live steam pattern or Type "G" storage heaters contain a continuous coil of seamless copper tubing. They are suitable for use with steam pressures of ten pounds and upward, but not for exhaust steam.

All Whitlock-American storage heaters are built with heating surface of seamless copper tubing—a better conductor of heat than brass, and more reliable mechanically, not being subject to "season cracks" sometimes developing in brass tubing.

Shells ordinarily made extra heavy and of the best grade of boiler steel. Shells of cast iron, or shells coated inside with rust-proof white enamel, can be furnished, when so ordered.

All castings are extra heavy and of the best grade of gray iron.

Tests—All heaters are tested under hydrostatic pressure before leaving our shop and made absolutely tight.

Instantaneous Heaters.

The copper-coil type is similar in construction to our Type "A" feed-water heaters.

The water in these heaters comes into contact with nothing but copper and bronze, so that there is no chance for corrosion; and they are specially suited for heating salt water or any other liquid which would corrode iron or steel (Fig. 6). Dimensions of standard sizes are given in table on succeeding page.

In the Berryman or "U-bend" Type the heating surface consists of a number of "U-bends" of seamless copper tubing mounted in parallel (the ends of the bends being expanded into a heavy tube sheet), and communicating with a cast-iron head containing the inlet and outlet water connections (Fig. 2).

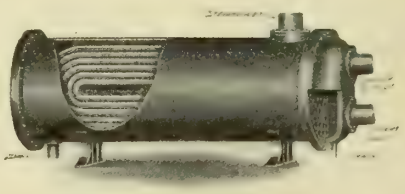


Fig. 2. WHITLOCK-AMERICAN BERRYMAN TYPE INSTANTANEOUS HEATER

The Whitlock straight tube instantaneous heaters are of the floating head type (Fig. 3). They are used wherever the water contains such quantities of mud or scale-forming materials as to necessitate the occasional cleaning of the tubes. Cleaning may be easily accomplished in this type of heater, by removing the front and rear heads and running a tube cleaner or brush through the tubes. This can be done without breaking any pipe connections.

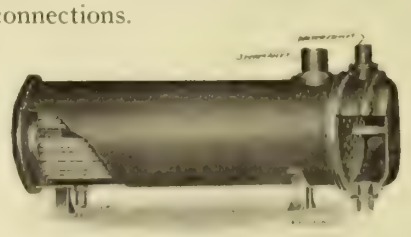


Fig. 3. WHITLOCK-AMERICAN STRAIGHT TUBE FLOATING HEAD TYPE INSTANTANEOUS HEATER

Catalogues and Bulletins.

We issue descriptive bulletins giving complete data with regard to the types of heaters mentioned above, including tables of dimensions, diagrams of typical installations, price-lists, etc. We will be glad to mail a set of these bulletins to any architect or engineer on request.

Sweet's Catalogue

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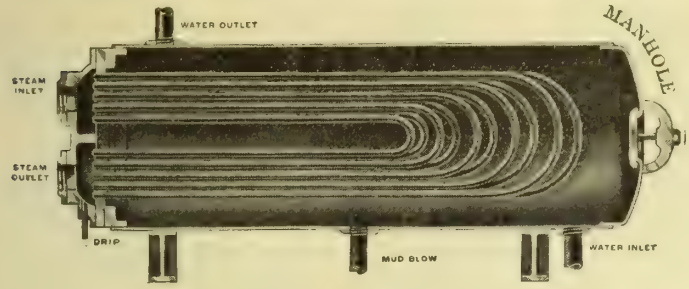

FIG. 4. TYPE "J" STORAGE HEATER

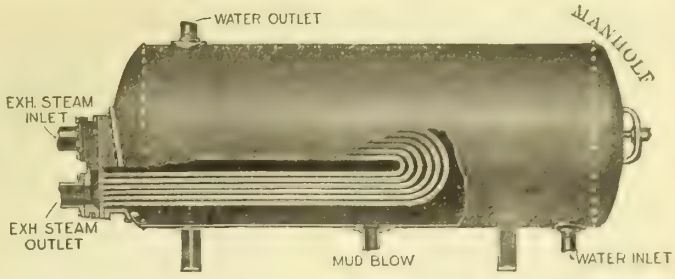

FIG. 5. TYPE "K" STORAGE HEATER

TABLE OF DIMENSIONS

Type	Shell: Diameter	Shell: Length	Shell: Thickness	Head Thickness	Size of Connections: Water	Size of Connections: Steam	Gallons: 1 Filling	Gallons: Per Hour	Weight, Pounds	Steam Connections: Center to Center	Steam Connections: Floor to lower Center	Cradles: Length	Cradles: Width
No. 1—Type "K" Storage Heaters													
J	18	60	1/4	3/8	2	2	65	150	900	9	13 1/2	20 1/2	4
J	18	72	1/4	3/8	2	2	80	200	970	9	13 1/2	20 1/2	4
K	24	60	1/4	3/8	2	2	118	250	930	6 1/2	10 3/4	21	3
K	24	72	1/4	3/8	2	2	141	300	1010	6 1/2	10 3/4	21	3
K	24	84	1/4	3/8	2	2	164	350	1090	6 1/2	10 3/4	21	3
K	30	60	1/4	3/8	3	2	185	400	1115	6 1/2	11 3/4	24 1/2	3 1/2
K	30	72	1/4	3/8	3	3	220	500	1310	8	12 1/2	24 1/2	3 1/2
K	30	84	1/4	3/8	3	3	255	550	1420	8	12 1/2	24 1/2	3 1/2
K	30	96	1/4	3/8	3	3	290	600	1530	8	12 1/2	24 1/2	3 1/2
K	36	84	5/16	1/2	3	4	365	750	2130	10	16 1/4	20	4
K	36	96	5/16	1/2	3	4	395	800	2270	10	16 1/4	20	4
K	36	108	5/16	1/2	3	4	475	900	2440	10	16 1/4	20	4
K	36	120	5/16	1/2	3	4	525	1000	2735	10	17 3/4	20	4
K	42	96	5/16	1/2	4	4	575	1250	2800	10	17 1/2	26	4
K	42	120	5/16	1/2	4	5	720	1500	3315	12	18	26	4
K	42	144	5/16	1/2	4	5	860	1750	3680	12	18	26	4
K	42	168	5/16	1/2	4	6	1000	2000	4080	12	18	26	4
No. 2—Type "J" Storage Heaters													
J	18	60	1/4	3/8	2	2	65	300	930	9	13 1/2	20 1/2	4
J	18	72	1/4	3/8	2	2	80	400	1010	9	13 1/2	20 1/2	4
J	24	60	1/4	3/8	2	2	118	500	1050	12	12	21	3
J	24	72	1/4	3/8	2	3	141	600	1120	12	12	21	3
J	24	84	1/4	3/8	2	3	164	700	1180	12	12	21	3
J	30	60	1/4	3/8	3	4	185	800	1890	15	14 1/2	24 1/2	3 1/2
J	30	72	1/4	3/8	3	4	220	1000	2000	15	14 1/2	24 1/2	3 1/2
J	30	84	1/4	3/8	3	4	255	1100	2110	15	14 1/2	24 1/2	3 1/2
J	30	96	1/4	3/8	3	4	290	1200	2220	15	14 1/2	24 1/2	3 1/2
J	36	84	1/4	1/2	3	5	365	1500	2850	18	19 1/4	20	4
J	36	96	5/16	1/2	3	5	395	1700	2970	18	19 1/4	20	4
J	36	108	5/16	1/2	3	5	475	1800	3100	18	19 1/4	20	4
J	36	120	5/16	1/2	3	6	525	2000	3220	18	19 1/4	20	4
J	42	96	5/16	1/2	4	6	575	2500	4030	21	20 1/2	26	4
J	42	120	5/16	1/2	4	6	720	3000	4800	21	20 1/2	26	4
J	42	144	5/16	1/2	4	8	860	4000	5750	21	20 1/2	26	4
J	42	168	5/16	1/2	4	8	1000	5000	6700	21	20 1/2	26	4

NOTE—All dimensions are in inches. Manhole 11" x 15". Cradles furnished free, when required. Companion flanges furnished for steam connections when connections are for 3" pipe or larger. Capacities based on heating water from 40° to 180° F., using steam at atmospheric pressure.

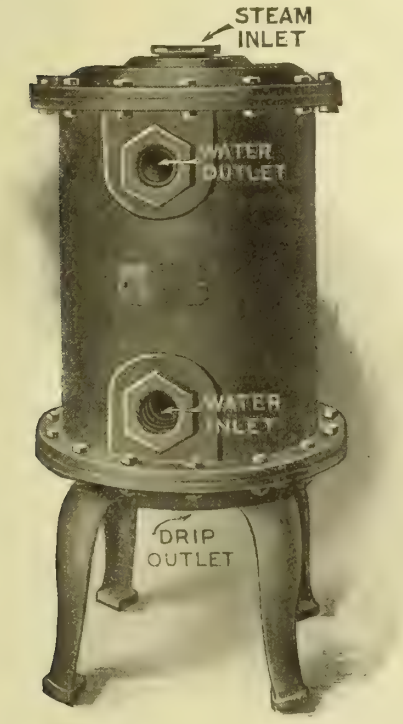

FIG. 6. INSTANTANEOUS HEATER

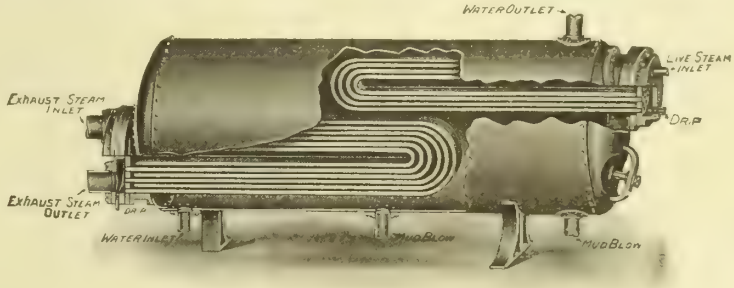

FIG. 7. TYPE "K" STORAGE HEATER
Combination live and exhaust steam pattern

DIMENSIONS AND WEIGHTS OF INSTANTANEOUS COPPER COIL HEATERS

Generator	Gals. per Hour	W'ght, Lbs.	Total L'gth A	L'gth Shell B	Dia of Flange C	Dia of Body D	C. to C. of Water Connection E	L'gth Legs F	Steam Inlet G	Water Connection H	Size of Drip for Condensation I
0	50	41	15	13	9	7	8		1	1	1/2
1	100	50	19	17	9	7	12		1	1	1/2
2	150	85	17	15	12	9 1/2	9		1	1	1/2
3	200	94	21	18	12	9 1/2	12		1	1	3/4
4	250	234	23	19	18	15	13	12	1	1	3/4
5	300	270	25	21	18	15	15	12	1	1	3/4
6	400	390	30	26	18	15	20	12	1	1	3/4
7	500	450	36	32	18	15	26	12	1	1	1
8	600	500	28	23	20	17	19	12	1	1	1
9	800	540	33	28	20	17	21	12	1	1	1
10	1000	630	38	33	20	17	26	12	1	1	1
11	1250	810	38 1/2	33 1/2	24	20	26	12	1	1	1 1/4
12	1500	890	44 1/2	39 1/2	24	20	32	12	1	1	1 1/4
13	2000	1250	54 1/2	49 1/2	24	20	42	12	1	1	1 1/4
14	2500	1450	56	50	27	24	42	12	1	1	1 1/4
15	3000	1600	69	63	27	24	55	12	1	1	1 1/4
16	4000	1750	63	57	27	24	47	12	1	1	1 1/4
17	5000	1900	76	70	27	24	60	12	1	1	1 1/4

NOTE—All dimensions are in inches. Heating capacity based on heating water from 40° to 180° F., using steam at atmospheric pressure. Conversion tables sent on request.

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Patented July 14, 1908; August 9, 1910. The faces are made of cast iron; the boxes, valves, operator, etc., of sheet steel. Each register is coated with heavy rust-proof metal coating, and carefully inspected. Manufactured regularly in two designs.

Special Designs.

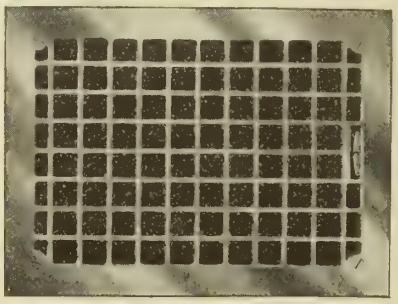
Special design goods are made to order only. In all cases, pattern work is necessary to produce. Any designs can be produced from architect's drawings or sketches, and can be made to conform to any conditions and be supplied in any finish.

References.

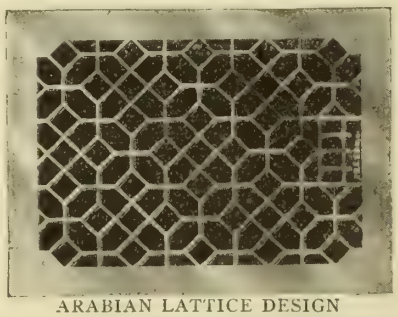
Goods are not sold on their antiquity, but solely on merit. Used and accepted by leading architects and engineers, and installed in many hotels, hospitals, post offices, and other public buildings.

Catalogues and Prices.

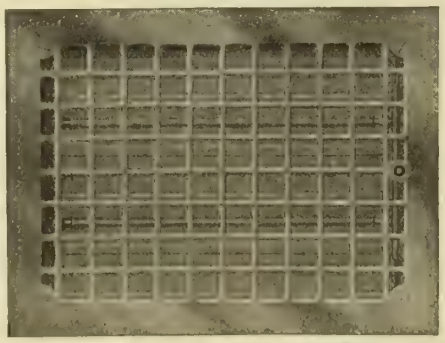
Illustrated catalogues, showing a large variety of register designs and prices, sizes and finishes, as well as further information concerning "Best" Deflecting Wall and Baseboard Registers and other products, will be sent upon application.



PLAIN LATTICE DESIGN
Made in any style

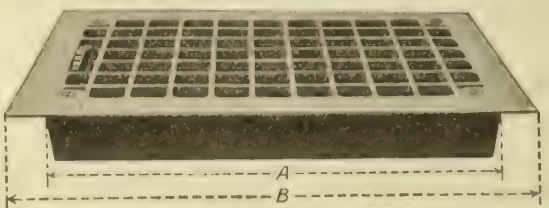


ARABIAN LATTICE DESIGN
Made in many stock sizes

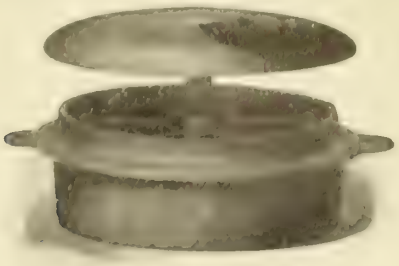


KEY-OPERATED REGISTER
Phosphor-bronze operator parts. Can not wear or rust out

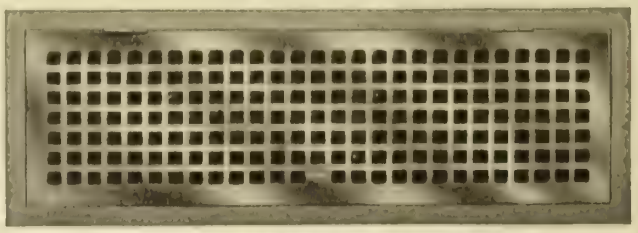
PLAIN LATTICE VENTILATING FACE
Made to order only. This design made in any length and width desired



METHOD OF MEASURING REGISTERS
A—Flue or opening size
B—Extreme measurement



MUSHROOM VENTILATOR
Fully described in Ventilator Section



GRILLE HINGED IN ANGLE IRON FRAME

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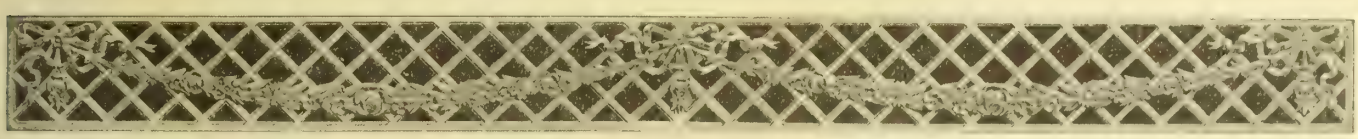

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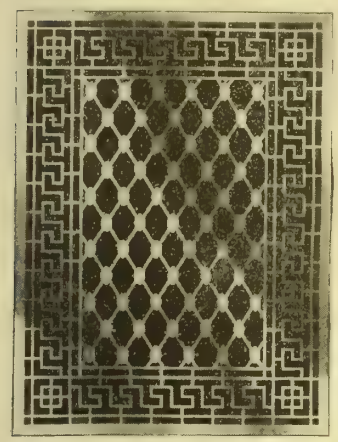

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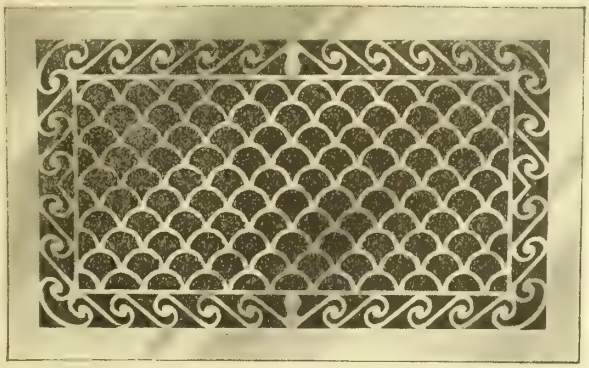

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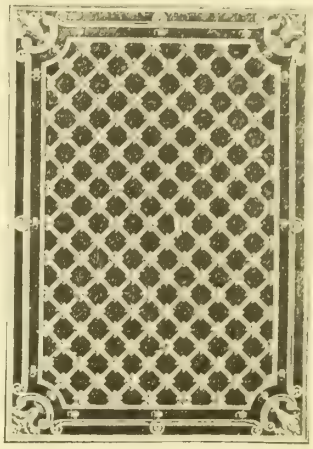

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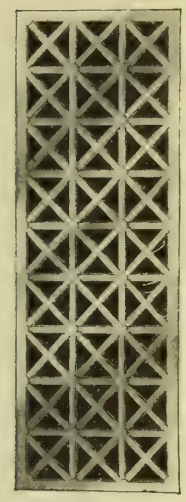

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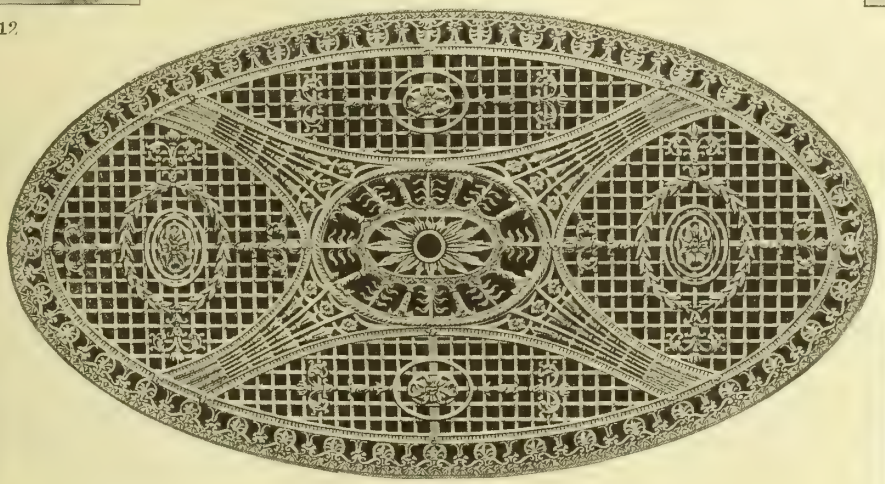

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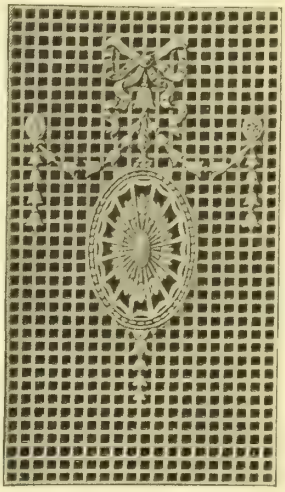

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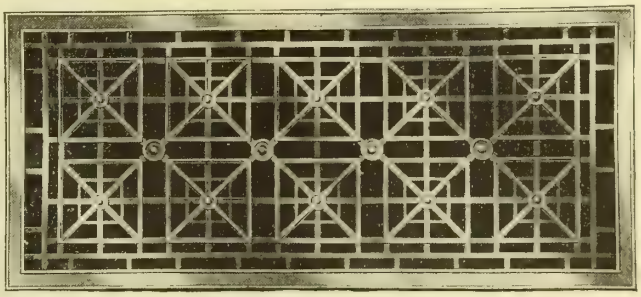

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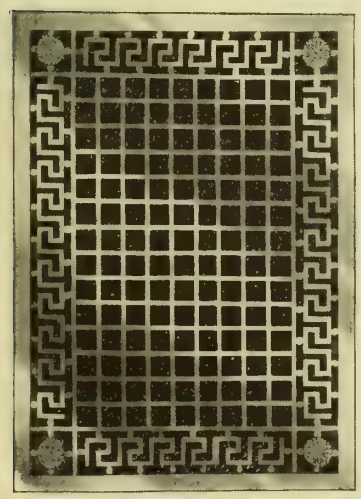

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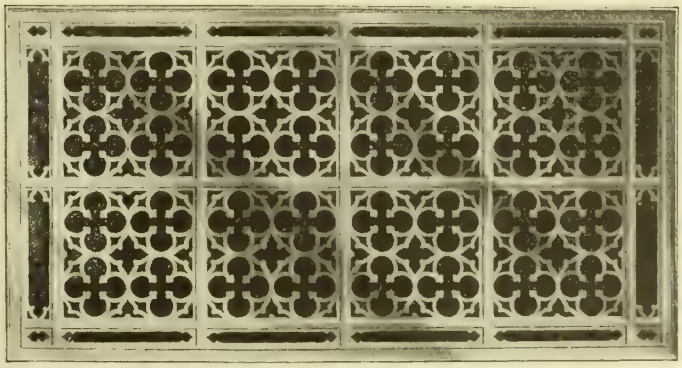

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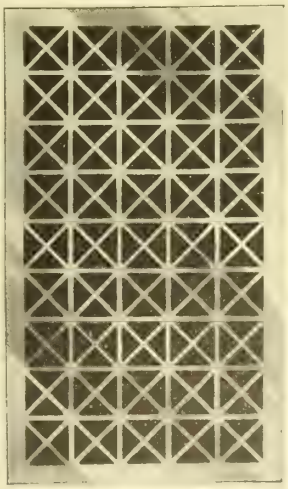

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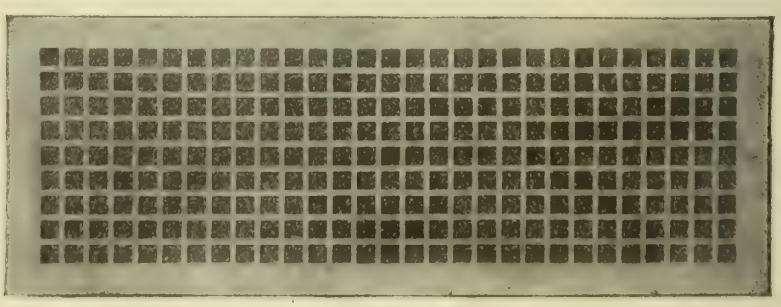
The Clinton Wire Cloth Company, manufacturers of all kinds of perforated metal products, is equipped with an elaborate assortment of dies and automatic machines especially adapted for the making of perforated metal grilles for ventilator and register faces, cupboard doors and other purposes. While certain floral and other designs cannot be produced with automatic punching machines, still our equipment is such as to enable us to offer a great variety of combinations in perforated patterns, giving an almost unlimited assortment of designs.

Advantages—Perforated metal grilles are artistic, strong and durable. They have no points of weakness like cast grilles, which are brittle and very easily broken between openings. The perforated grille is light and economical, as it may be made from metal of any thickness, thereby eliminating the excess weight which must necessarily be used in making a satisfactory casting. Being made from rolled sheets of steel, brass or bronze, the perforated grille can be given a finishing plate, which cannot be obtained on castings. Either in large or small lots, the perforated grille may be accurately, cheaply and quickly made, and often actually delivered in less time than would be consumed in preparing the pattern for cast ing.

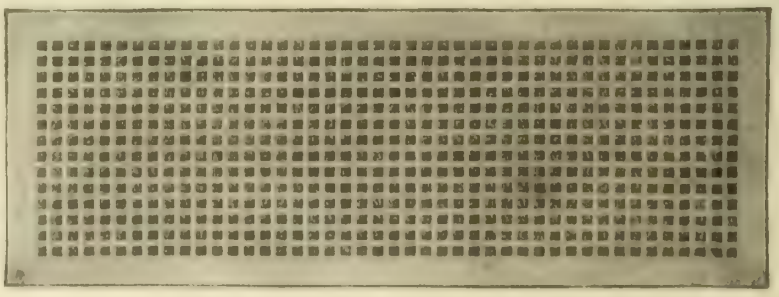
Designs and Sizes—Our perforated grilles are not carried in stock, but are made to order only. They can be made in steel, brass, copper and statuary bronze, and any size can be made in one piece up to 58 by 156 inches. While we do not ship enameled or painted grilles, still any grille made of steel can be plated in various electro-plate finishes, rendering it possible to match door plates and other hardware when a sample is sent us. Screw holes will be set in margins, without charge, when order shows exact location of same.

Information—A special grille catalogue, showing a large variety of designs, may be obtained on request.

Prices quoted only on inquiries giving outside dimensions, sizes and quantity desired.



¾-inch mesh, 73 per cent openings



PLAIN LATTICE DESIGN, CLINTON WIRE CLOTH COMPANY GRILLES
Punched in perforations of ½, ¾, ⅞ and 1⅜ inches

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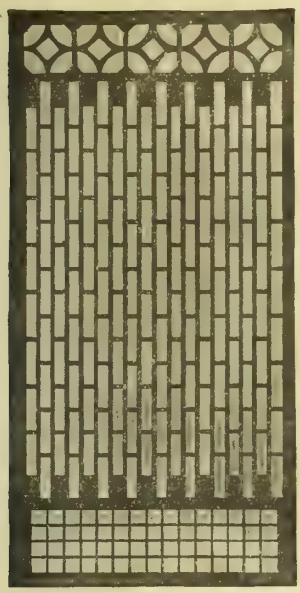
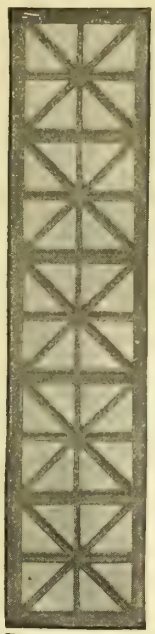


Design No. 119
47.2 per cent openings



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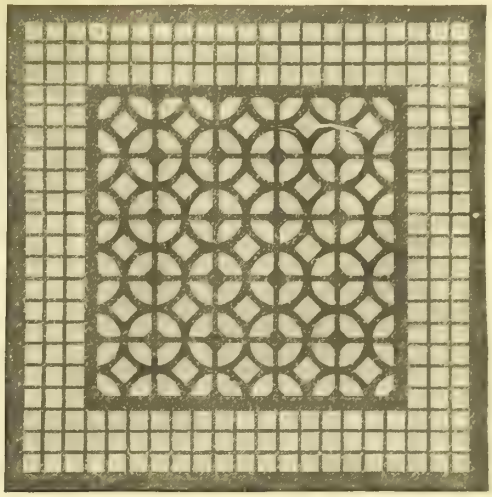
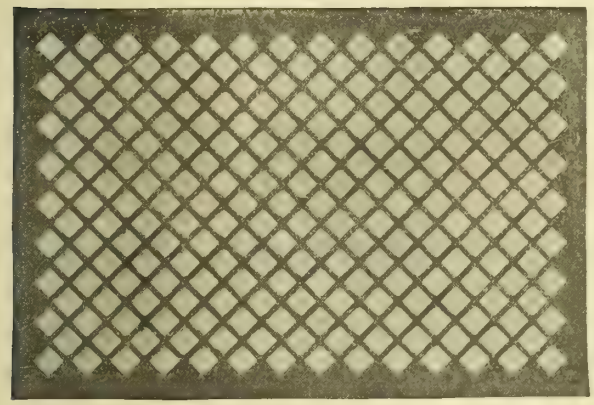
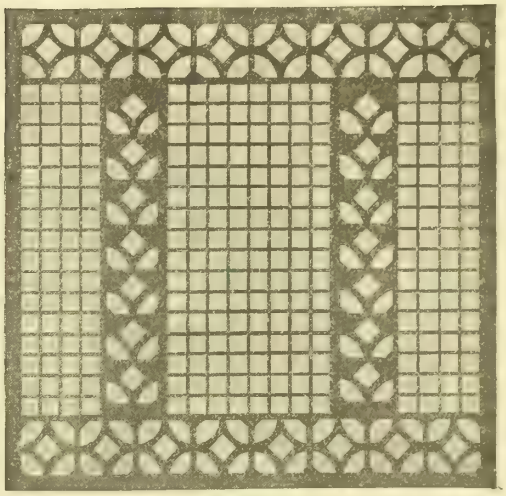
49.4 per cent openings



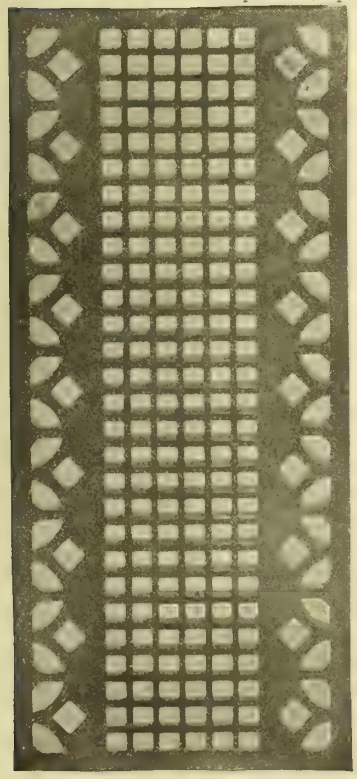
Design No. 131
49.4 per cent openings



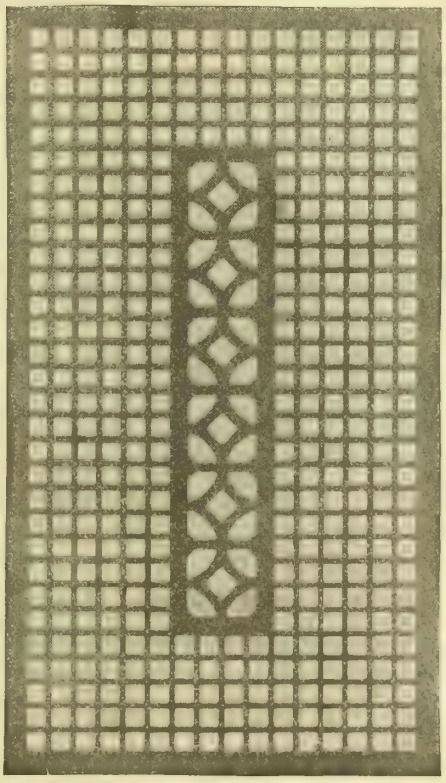
Design No. 123
60.9 per cent openings



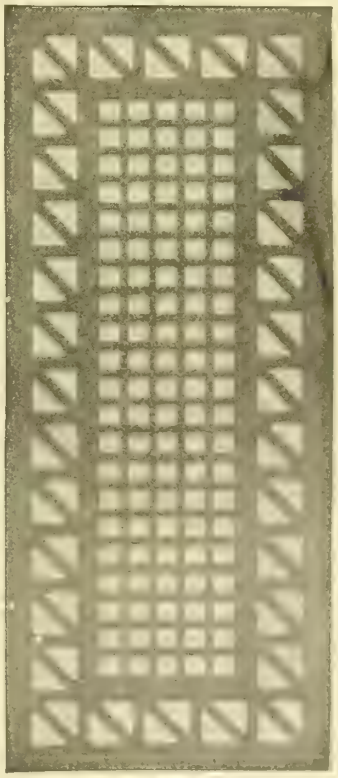
Design No. 130
59.7 per cent openings



Design No. 124
46.1 per cent openings



Design No. 118
57 per cent openings



Design No. 116
55.2 per cent openings

SPECIAL DESIGNS CLINTON WIRE CLOTH COMPANY'S GRILLES

WM. HIGHTON & SONS COMPANY

Registers, Ventilators, Grilles and Screens

HOME OFFICE AND WORKS

NASHUA, N. H.

BOSTON, MASS., 6 Portland Street

PHILADELPHIA, PA., 144 North 2nd Street

Products.

Manufacturers of a complete line of REGULAR and LOCK-CONTROLLED REGISTERS, VENTILATORS, GRILLES, SCREENS and REGISTER BORDERS, in Brass, Bronze, Cast Iron, Steel and Wire.

Also, ORNAMENTAL BRASS, BRONZE, IRON and ALUMINUM WORK, including MEMORIAL TABLETS, SIGNS, FINE NAME PLATES, etc.

"Highton" Quality.

The "Highton" make of registers has stood the test of fifty-six years. In design, workmanship and materials, they represent a high standard of quality, every phase of their production being carefully supervised by trained men.

Designs and Finishes.

"Highton" stock registers, grilles, screens, etc., are made in a large variety of designs and sizes which will regularly meet the requirements of various styles of decoration. When specially desired, however, exclusive designs can be produced from architects' or this Company's special drawings.

Standard finishes are Black Japanned or Priming Coat, White Japanned, Gold Bronzed, White Porcelain Enamel and Electro-plated. Electro-plated finish and solid bronze or brass can be furnished to match hardware if desired.

Registers.

Cast—The cast register admits of a large variety of designs, is the most durable register made, and presents a more substantial appearance than any other type.

Semisteel—Large air capacity, light weight, and strength are secured in this type of register. The face is cast iron; all other parts are of wrought steel.

Grilles and Screens.

Cast brass, cast bronze and cast iron are recommended as the most suitable materials for finely finished grilles to cover steam coils and inclosed radiators, or for ventilation. These are made also in perforated steel and woven wire. All finishes.

Deliveries.

This organization takes pride in its splendid record for delivering first-class goods promptly on schedule time. All orders, large and small, receive the prompt and careful attention of a trained and experienced force.

References.

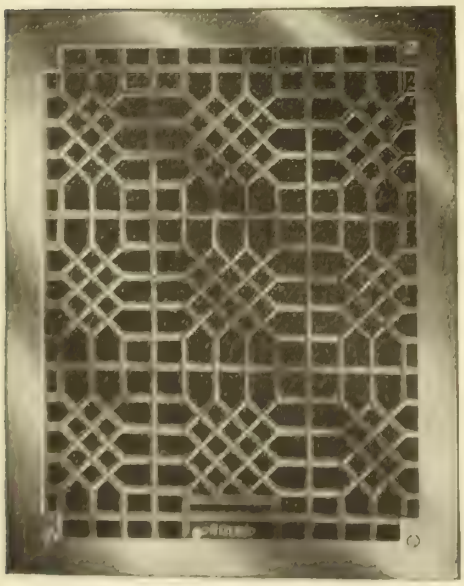
"Highton" products have been installed in many of the principal buildings throughout this country and Europe.

The following are a few instances:

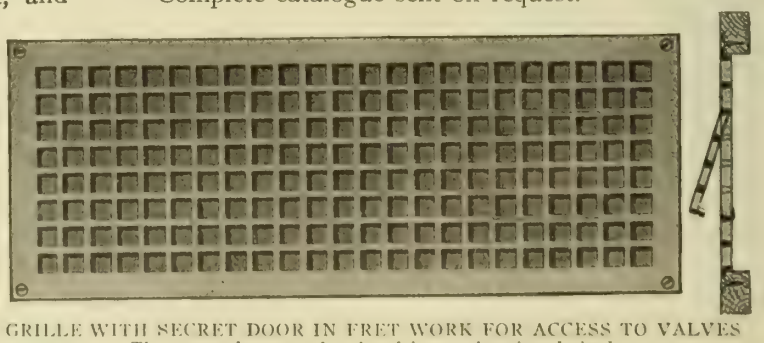
New Bureau of Engraving and Printing, Washington, D. C.
The Woolworth Building, New York, N. Y.
Bellevue Hospital, New York, N. Y.
Leader-News Building, Cleveland, Ohio
Royal Hospital, Glasgow, Scotland
Harvard Club, Boston, Mass.
Brooklyn Trust Co., Brooklyn, N. Y.
Knickerbocker Club, New York, N. Y.
Young Men's Christian Association, Rochester, N. Y.
South Side High School, Buffalo, N. Y.
Young Men's Christian Association, Bronx Branch, New York, N. Y.
Martha Cook Dormitory, Ann Arbor, Mich.

Catalogue.

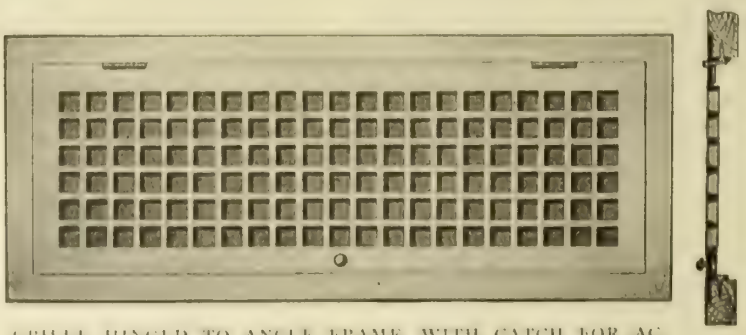
Complete catalogue sent on request.



PILGRIM, INDIAN LATTICE DESIGN



GRILLE WITH SECRET DOOR IN FRET WORK FOR ACCESS TO VALVES
The secret door may be placed in any location desired



GRILLE HINGED TO ANGLE FRAME, WITH CATCH FOR ACCESS TO VALVES AND FOR CLEANING PURPOSES

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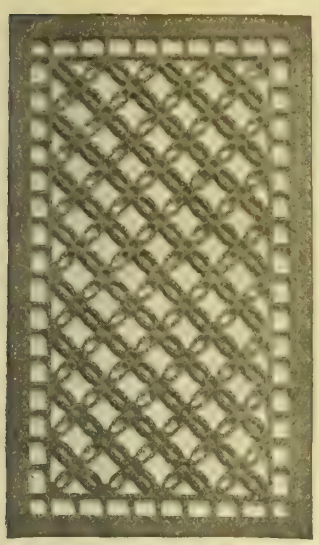

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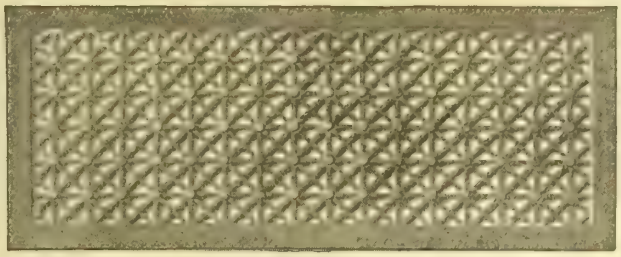

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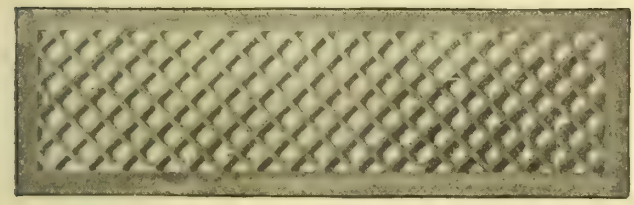

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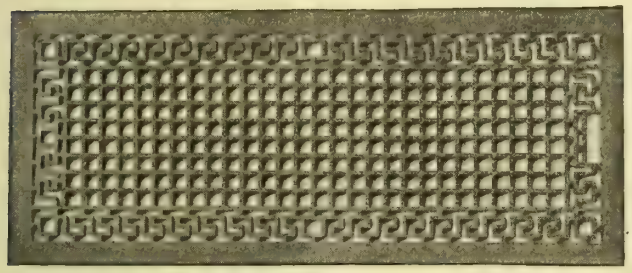

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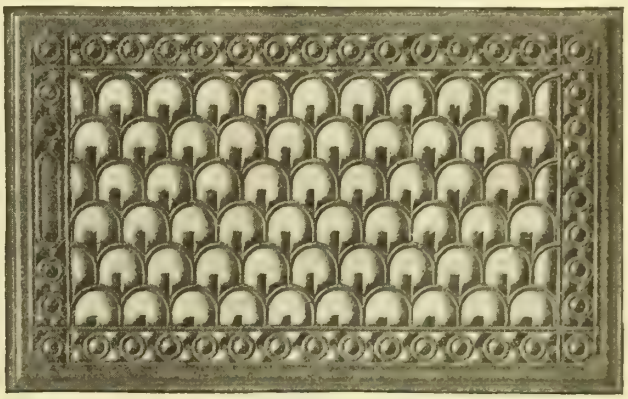

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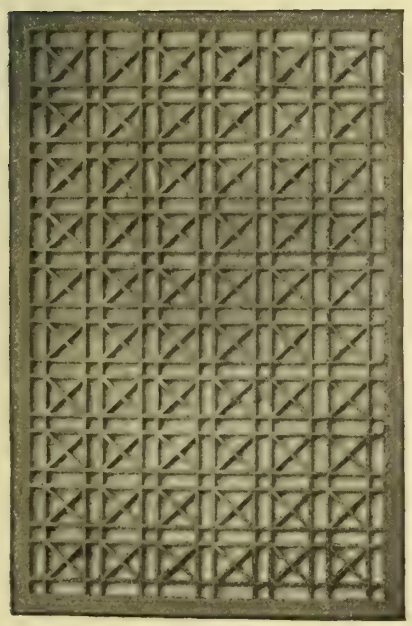

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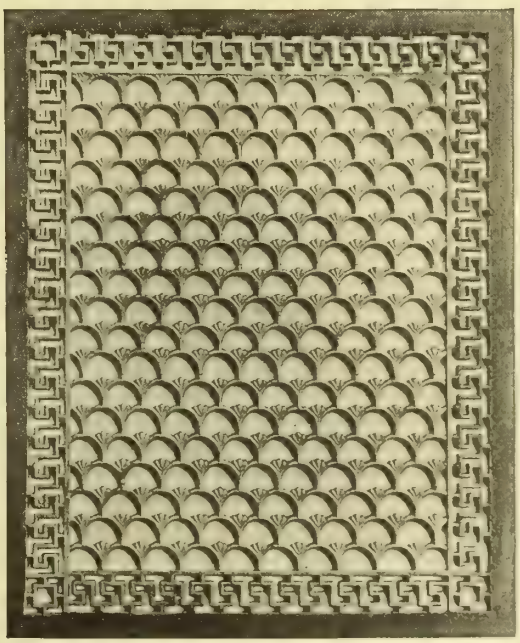

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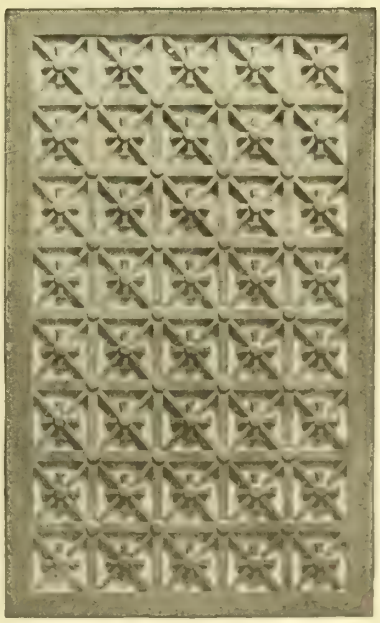


No. 110

A FEW SPECIAL "HIGHTON" DESIGNS. MADE TO ORDER ONLY

Special Designs can be made in almost any size, can be Curved, Concave or Convex, and shaped to fit Paneling or other Special Shapes

ESTABLISHED 1852 INCORPORATED 1883

THE PHILADELPHIA HARDWARE & MALLEABLE IRON WORKS

Hot-Air Registers, Ventilators, Radiators, etc.

Ninth and Jefferson Streets
PHILADELPHIA, PA.

Products.

HOT-AIR REGISTERS, VENTILATORS and GRILLES in Bronze, Brass, Cast-Iron and Pressed Steel; COLD-AIR INLETS, FLUE and PIPE DAMPERS; BRICK WALL VENTILATORS.

STEAM and HOT-WATER CAST-IRON RADIATORS and RADIATOR SCREENS. MALLEABLE, GRAY IRON, ALUMINUM, BRONZE, BRASS and STEEL CASTINGS to order.

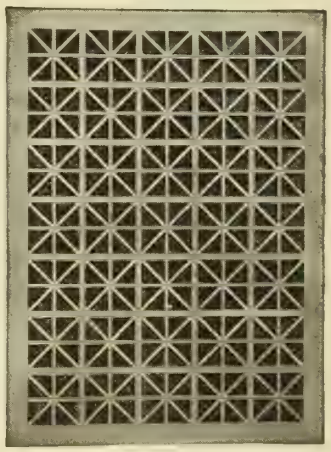
Stock Designs.

Catalogue showing complete stock designs, with sizes, prices, etc., sent on request.

Special Designs, Estimates.

Special designs and estimates on designs sent us by architects and engineers gladly furnished.

Colonial



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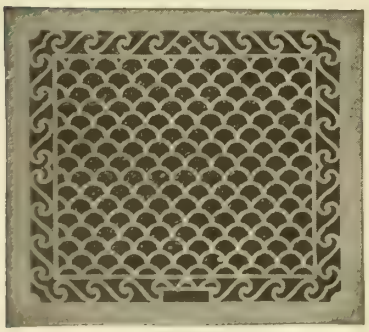
Self-indicating Ventilator. Round Standard



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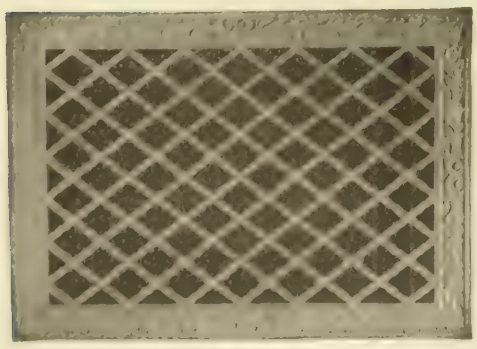

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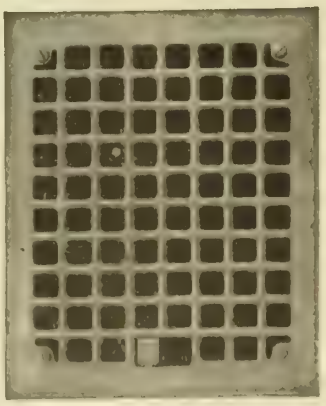
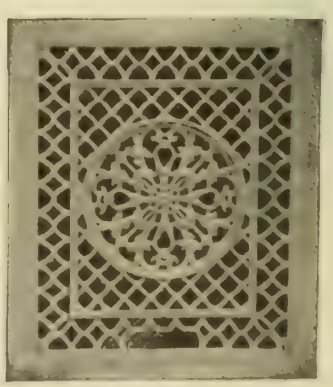


All Wrought Steel Plain Lattice Design

Lighter weight than cast registers. Wall or ceiling ventilating attachment allowed (as in cast registers) to operate by cord or chain



Renaissance

A FEW EXAMPLES OF OUR STOCK AND SPECIAL DESIGNS

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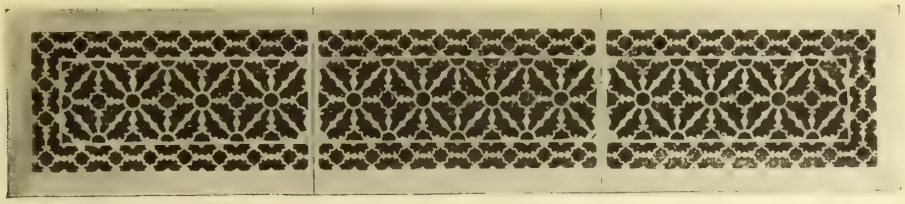
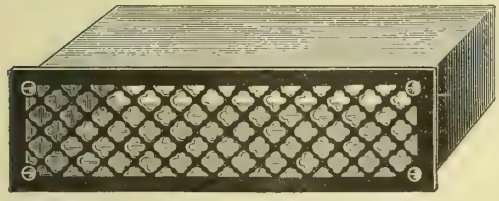


SCREEN FACES, ORIENTAL DESIGN, IN SECTIONS OF ANY LENGTH REQUIRED

SIZES AND PRICES OF SCREEN FACES, ORIENTAL DESIGN

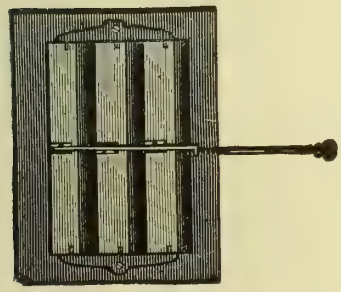
Width of Opening	Extreme Outside Measurement	Japanned Black, per Foot	Japanned White, per Foot	Gold, Copper or Bronze Finish, per Foot	Electro-Plated, Nickel, Brass, Bronze or Copper, per Foot
4¾	6	$1.40	$1.54	$1.70	$2.40
5¾	7	1.50	1.65	1.80	2.50
6¼	8	1.60	1.75	1.90	2.60
7	9	1.70	1.90	2.10	2.80
8	10	1.80	2.00	2.25	3.00
9	11	1.90	2.10	2.50	3.25
10	12	2.00	2.20	2.75	3.50
11	13	2.25	2.50	3.25	4.00
12	14	2.50	3.00	3.50	4.50



COLD-AIR INLET
4 inches deep

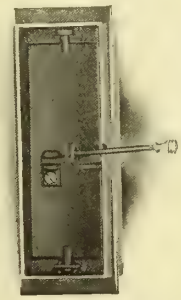
SIZES AND PRICES OF COLD-AIR INLETS

Size of Opening	Black Japanned, Each	White Japanned, Each	Size of Opening	Black Japanned, Each	White Japanned, Each
2 x 6	$1.25	$1.35	3 x 18	$4.05	$4.25
2 x 9	2.00	2.10	3 x 20	4.45	4.65
2 x 12	2.60	2.80	3 x 24	5.40	5.60
2 x 15	3.15	3.30	3 x 36	8.00	8.35
2 x 18	3.75	3.95	4 x 6	1.60	1.70
2 x 22	4.55	4.75	4 x 9	2.20	2.40
2 x 24	5.00	5.20	4 x 12	3.05	3.25
2 x 30	6.20	6.40	4 x 15	3.75	3.95
3 x 9	2.10	2.30	4 x 18	4.45	4.65
3 x 12	2.75	2.95	4 x 24	5.80	6.00



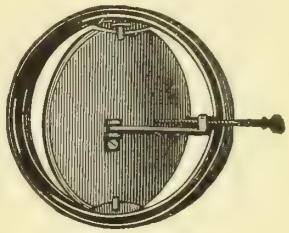
FLUE DAMPER
Square, for Brick Flues, 2 and 3 slats
Finished for Rod

4 x 6	inches,	2	slats;	each,	17	cents
4 x 9	"	2	"	"	19	"
4 x 12	"	2	"	"	21	"
5 x 5	"	2	"	"	17	"
6 x 6	"	3	"	"	18	"
6 x 9	"	3	"	"	22	"
6 x 12	"	3	"	"	26	"
8 x 8	"	3	"	"	24	"
9 x 9	"	3	"	"	28	"



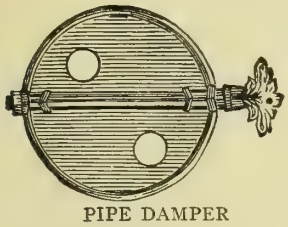
FLUE DAMPER
Square, for Tin Flues
Finished for Rod

2¾ x 6	inches;			each,	11	cents
2¾ x 8	"			"	13	"
2¾ x 9	"			"	14	"
3 x 8	"			"	14	"
3½ x 8	"			"	15	"
3½ x 9	"			"	16	"
3½ x 10	"			"	17	"
4 x 8	"			"	17	"
4 x 9	"			"	18	"
4 x 10	"			"	19	"
4 x 12	"			"	20	"
4 x 14	"			"	30	"
4 x 17	"			"	45	"



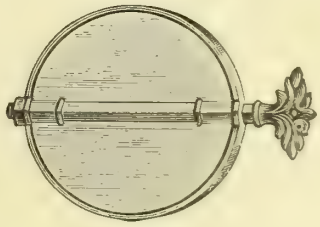
FLUE DAMPER
Round, for Tin Flues
Finished for Rod

6	inches;			each,	24	cents
7	"			"	26	"
8	"			"	28	"
8⅝	"			"	30	"
9	"			"	32	"



PIPE DAMPER
For Stove Pipes
Malleable Iron Rods and Nuts

		Per doz.	Approx. Weight per doz.
4	inches,	33 cents,	5¼ lbs.
4½	"	42 "	6⅜ "
5	"	50 "	7⅞ "
5½	"	60 "	10⅝ "
6	"	70 "	12 "
6½	"	80 "	14 "



PIPE DAMPER
For Hot-Air Pipes
Malleable Iron Rods and Nuts

		Per doz.	Approx. Weight per doz.
7	inches,	$1.10	15¾ lbs.
8	"	1.50	24¼ "
8½	"	1.65	30 "
9	"	1.80	34 "
10	"	2.50	40½ "
12	"	3.25	54½ "
14	"	5.00	76½ "

BRICK WALL VENTILATOR
Brick Size, 2¼ x 8

Plain Iron.....each, 15 cents
Japanned or Red....each, 20 cents

TUTTLE & BAILEY MANUFACTURING COMPANY

Registers, Ventilators, Grilles and Screens

225 West Lake Street
CHICAGO, ILL.

52 Vanderbilt Avenue
NEW YORK, N. Y.

83 North Tenth Street
BROOKLYN, N. Y.

17 Doane Street
BOSTON, MASS.

425 Prospect Avenue, W.
CLEVELAND, OHIO

BRIDGEBURG, ONT.

Products.

We manufacture REGISTERS, VENTILATORS, GRILLES and SCREENS of Stock or Special Design, in Bronze, Brass, Cast-Iron, Steel, or Wire.

Also, SPECIAL DESIGN TABLETS, ARCHITECTURAL BRONZE and ORNAMENTAL IRON WORK of every Description.

Cast Registers.

We strongly recommend Cast-Iron or Cast-Bronze Registers as by far the best, especially for durability. Many Cast Registers made by us sixty years ago are still in use. We offer a complete line of designs, sizes and finishes.

Semi-Steel Registers.

To secure the advantages of the Cast-Iron Face, i. e., ornamental design, large air capacity, strength and durability, with the light weight of the steel bottom, the Semi-Steel Register has been designed. All parts except the face are of wrought steel.

The patent roller movement, similar in principle to the ball bearing, is new. The valves open and close smoothly without any catch or hitch, and when fully closed lock automatically. This self-locking feature is extremely important, especially when the register is used with a blower system, as it is impossible for the draught to open the valves.

All Wrought-Steel Registers.

The All Wrought-Steel Register is lighter in weight than either the Cast or the Semi-Steel, and there is a consequent saving in freight. It is made throughout of wrought steel, which prevents breakage, and the face is rigidly braced with transverse bars. The bottom and valves are the same as on the Semi-Steel Register as described above. It operates with a roller movement, is self-locking and shallow.

Special Designs.

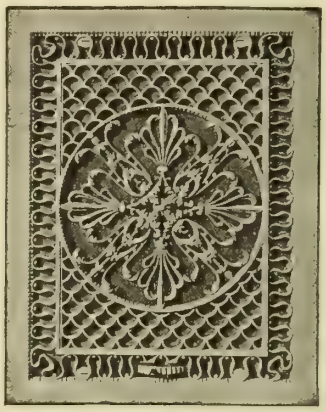
We make a specialty of designs suited to all orders of decoration, including Louis XIV., Louis XV., Colonial, Gothic, Moorish, Old English, Elizabethan, etc. A few of these, suitable for registers or grilles, are shown. We have over four hundred designs, covering all styles from the severely simple Plain Lattice to the most ornate Renaissance.

Grilles and Screens.

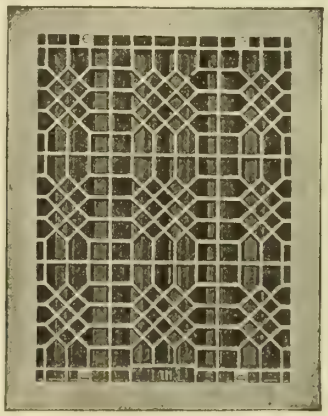
Grilles and Screens of all sizes, to cover steam coils or for ventilation, are made in any finish, of cast-iron, bronze, or brass metal, stamped steel, stamped brass, or woven wire.

Samples.

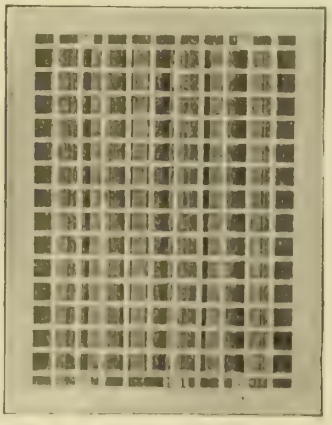
Samples filed with Architects' Samples Co., 101 Park Avenue, New York, N. Y.



CAST REGISTER, EMPIRE



SEMI-STEEL REGISTER, INDIAN LATTICE



ALL WROUGHT-STEEL REGISTER, PLAIN LATTICE

References.

For the last sixty years our goods have been specified by all leading architects and engineers throughout the world, and our Wrought Steel Register is the one now used by the United States Government.

Continued on next page

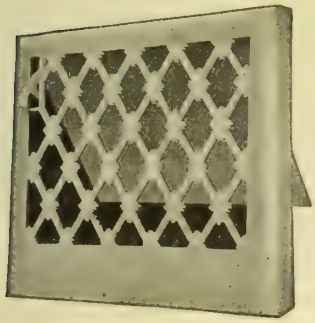
The New T. & B. Baseboard Registers.

Style 22 is a one-piece cast-iron register, the same as the Imperial, except that the body sizes have been made standard to fit stackheads. It is provided with an iron frame which fits into the stackhead and to which the register is attached with one screw. Prices include the frame.

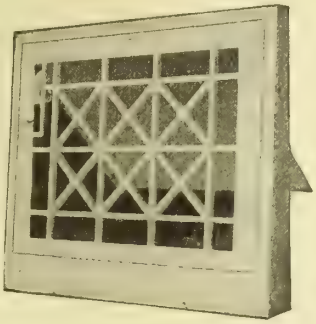
Style 44 is a two-piece cast-iron register, the same as the Quick-Set, except that the body sizes and the height from finished floor line to opening in face have been changed so that they are now standard.

Style 99 is a one-piece wrought-steel register, with patent air-tight fastener, for quick installation, to hold the register in place and to prevent the wall from being discolored by the heat.

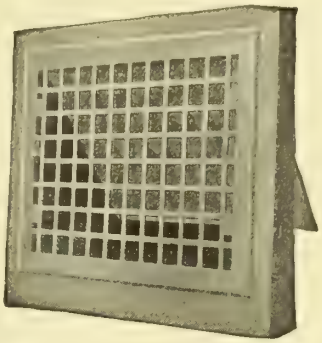
Style 100 is made by combining Wafer Register No. 10 with any depth of flange. It has the largest air capacity of any register made, is of handsome design and is equipped with our new slide movement. All parts except the face are of wrought steel.



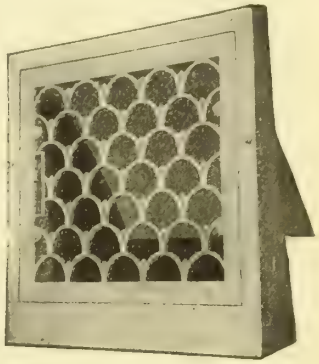
Style 22, Cast Iron



Style 44, Cast Iron

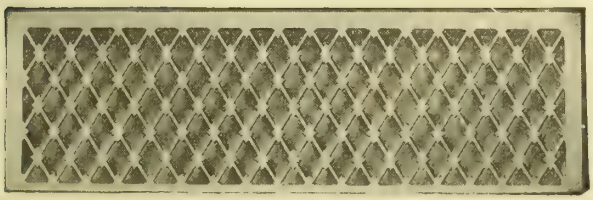


Style 99, Steel

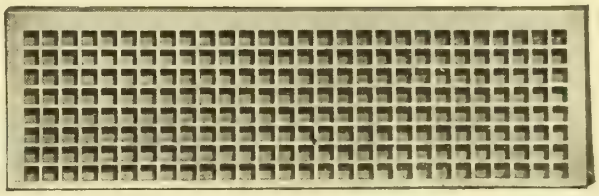


Style 100, Semi-Steel

THE NEW T. & B. BASEBOARD REGISTERS
All styles of Baseboard Registers fit the same stackheads



Style N22, Cast-Iron Intake



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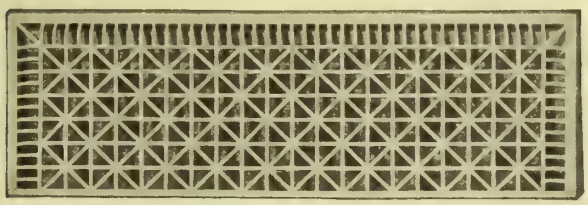
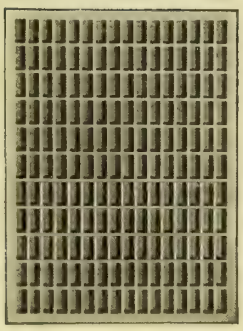


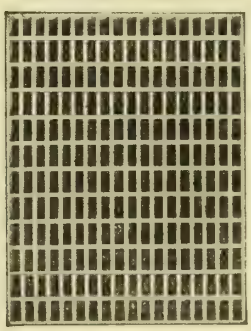
Style N44, Cast-Iron Intake

Style N100, Cast-Iron Intake

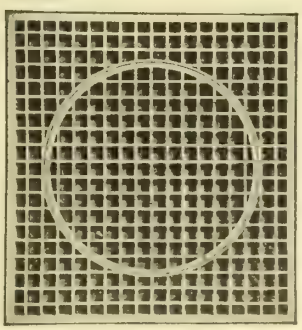
T. & B. BASEBOARD INTAKES



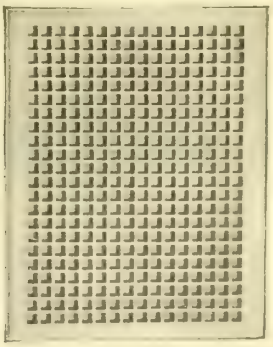
Style C, Cast Iron



Style W, Wood



Style D, Duplex



Style L, Steel

GRATINGS

Continued on next page

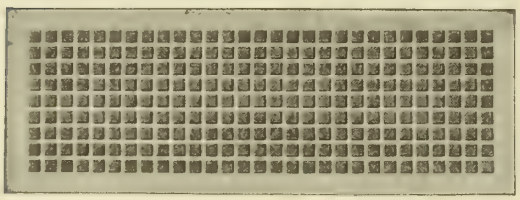
Cast Grilles.

Bronze or Cast-Iron Grilles have rims which vary in width according to size, the thickness of the rim being less than that of the fretwork. In the section shown below, A is the body size or size of opening to be covered; B is the extreme outside measure and C the daylight opening. Unless otherwise stated we assume that sizes given on orders are body sizes "A." Plain Lattice cast Grilles are made in almost all sizes (body sizes) of even inches. The mesh is 7/8 of an inch square and the bars approximately 1/4 of an inch. Various methods of fastening these grilles and providing means of access to steam valves or for cleaning purposes are shown. Any of the special design grilles can be similarly arranged. Estimates for providing hinges and catches or the special frames shown will be sent on application.

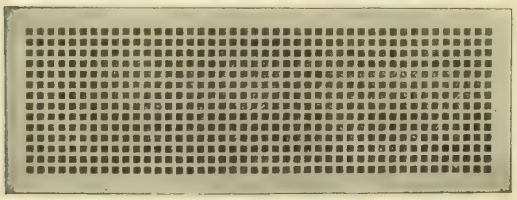
Steel Grilles.

While not as substantial in appearance or as lasting as cast-iron, Steel Grilles are cheaper and have their uses under certain conditions. They are made of sheet steel perforated in 7/8" or 1/2" mesh. The 7/8" mesh is standard and is always supplied unless otherwise specified, but we also make 1/2" mesh in both square and diagonal lattice.

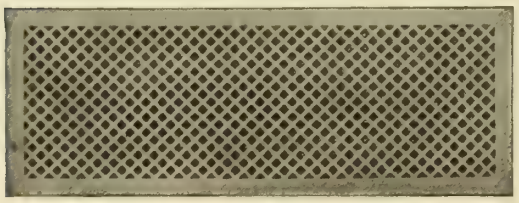
STEEL GRILLES



STANDARD 7/8 IN. SQUARE MESH



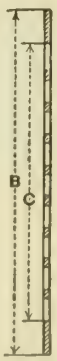
1/2 IN. SQUARE MESH



1/2 IN. DIAGONAL MESH

WIDTH IN DAYLIGHT OPENING "C"

7/8-inch Square Mesh	Number of Squares	1/2-inch Square Mesh	Number of Squares	1/2-inch Diagonal Mesh	Number of Squares
1 13/16"	2	1 7/8"	3	2"	2
3"	3	2 9/16"	4	2 1/2"	2 1/2
4"	4	3 5/16"	6	3 15/16"	4
5 1/8"	5	5 5/16"	8	5 3/8"	5 1/2
6 1/8"	6	6"	9	5 7/8"	6
7 3/16"	7	7 3/8"	11	7 5/16"	7 1/2
8 1/4"	8	8"	12	8 1/16"	8 1/2
9 5/16"	9	8 3/4"	13	9 1/16"	9 1/2
10 3/8"	10	10 1/8"	15	10 3/16"	10 1/2
11 3/8"	11	11 3/16"	17	11 3/16"	11 1/2
12 5/8"	12			12 1/8"	12 1/2

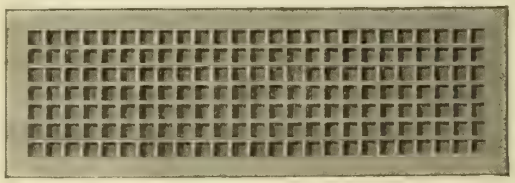


Extreme size "B" as desired. Unless otherwise ordered, rims will vary from 5/8 inch to 1 inch, all around, according to size of grille. Estimates for heavier gauge or wider sizes furnished on application.

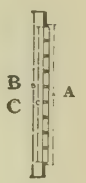
GAUGES

Having ordered ... gauge of sheet steel U. S. ... [illegible]

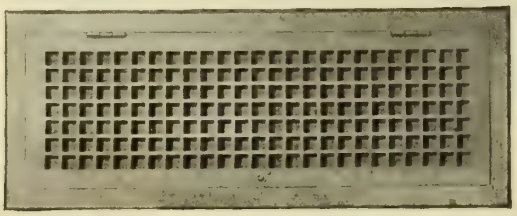
CAST GRILLES



STANDARD 7/8 IN. MESH GRILLE



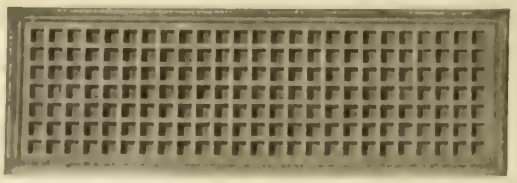
GRILLE HINGED TO WOODWORK



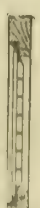
GRILLE HINGED TO ANGLE FRAME

GRILLE WITH DOOR IN FRETWORK

GRILLE ATTACHED TO IRON WALL FRAME



GRILLE HELD IN PLACE BY WOOD MOLDING



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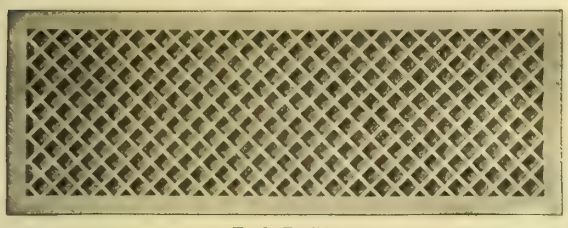
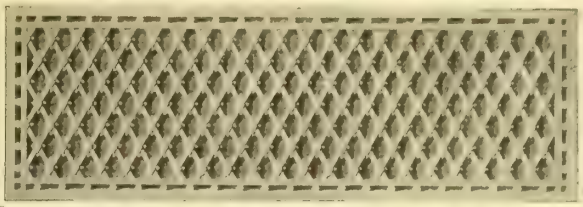


T. & B. 56



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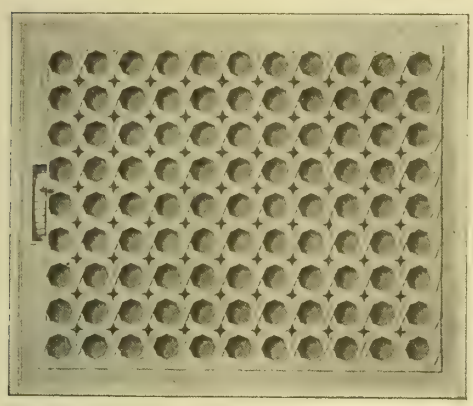

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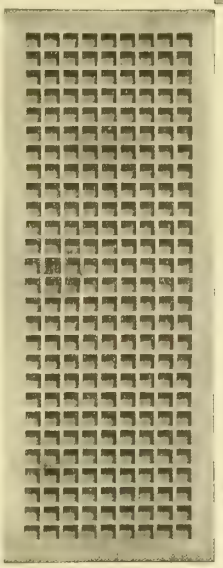

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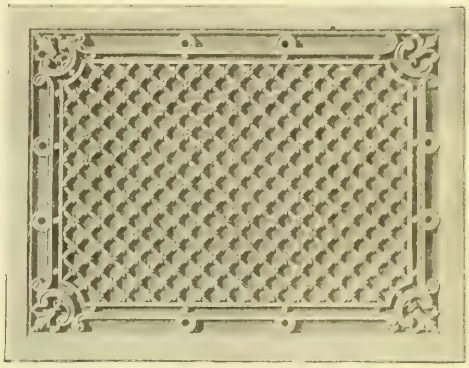

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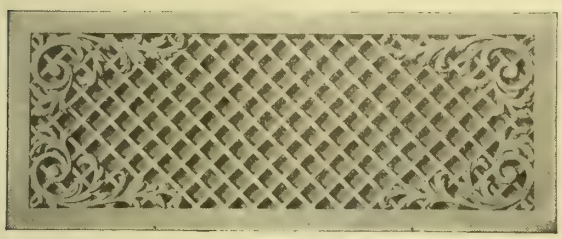

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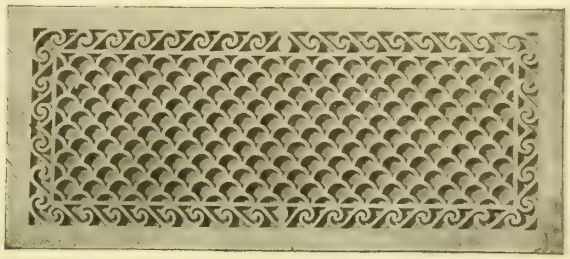

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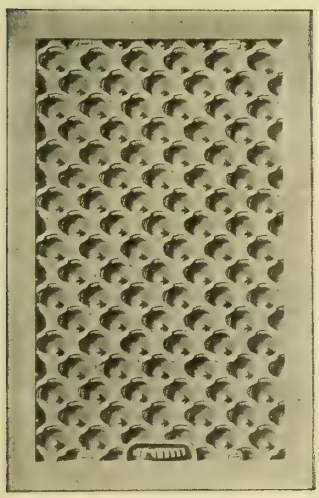

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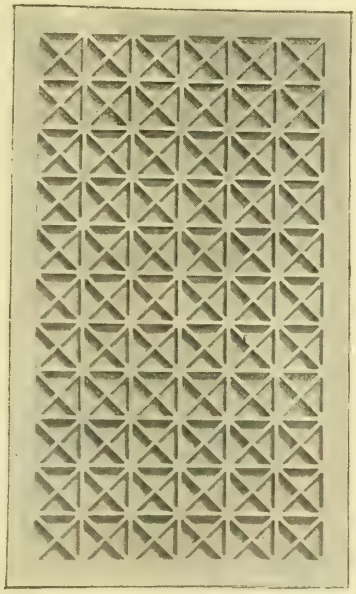

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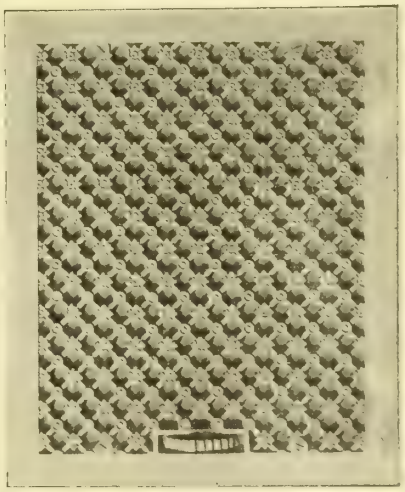

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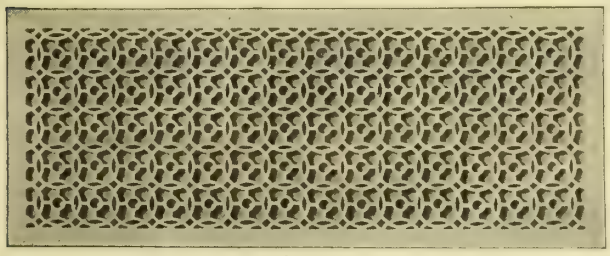

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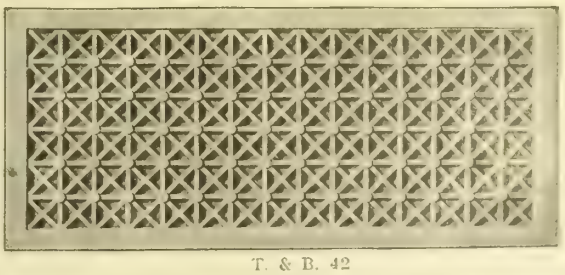

T. & B. 42

A FEW EXAMPLES OF REGISTERS, GRILLES AND SCREENS SELECTED FROM OVER 400 SPECIAL DESIGNS

Made to order only, with an additional charge over the cost of stock goods. Write for Catalogue 66A referring to above goods

AMERICAN DISTRICT STEAM COMPANY

MANUFACTURERS OF

"Adsco" Specialties for the "Atmospheric System" of Steam Heating

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Products.

"Adsco" Specialties and Materials for use with the "Atmospheric System" of Steam Heating in connection with central station distribution or individual boiler supply: Graduated Radiator Valves; Union Elbows; "Perfection" Reducing Valves; Receivers; Water and Mercury Gauges; Damper Regulators; Relief Valves.

The "Atmospheric System."

This method of heating by steam is primarily a two-pipe gravity system, with an operating pressure but a few ounces above atmosphere. The source of steam supply may be from either a central station or an independent boiler.

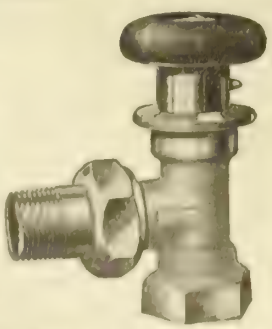
The area of the supply pipes is made liberal, because what is dispensed with in pressure must be compensated for in volume. In like manner, the return pipes are of sufficient size to accommodate easily the discharge of air and condensation from the radiators. The former finds a vent to the atmosphere through an open pipe connection leading from return piping at the boiler to the outside of the building; while the latter is returned to the boiler by gravity.

With a positive and efficient means of controlling the steam pressure in the supply mains, and with an accurately calibrated fractional supply valve on each radiator, having a steam flow capacity corresponding to the condensing power of that particular radiator, a heating equipment is provided that is so elastic in operation as to accommodate any weather condition. This naturally makes for the greatest economy, by the elimination of waste or overheating.

Advantages—The simple and easy manner of controlling heat in each radiator is most desirable. Valve, being placed at top of radiator, is in a very convenient position for operator to handle. Air vents on radiators are entirely unnecessary, thus doing away with a most objectionable feature. Steam circulates throughout the system quickly and without noise.

"Adsco" Graduated Radiator Valves.

A valve of this type makes possible the absolute control by operator of volume of steam admitted to each radiator. Every "Adsco" valve is accurately calibrated at the factory, to supply a definite amount of direct radiation with a pressure of five ounces. This amount is plainly stamped on each valve, which must be connected to a radiator having a corresponding number of square feet of heating surface. Made in three types—hand wheel, lever handle and lock shield.

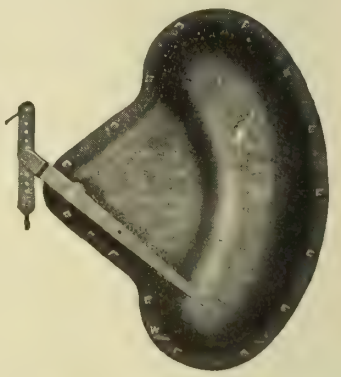


"ADSCO" GRADUATED RADIATOR VALVE

"Adsco" Damper Regulator.

This device provides a thoroughly reliable means of control for the individual heating boiler. The motive power of the regulator is furnished by the rise and fall of a weighted float, riding on a water line that fluctuates with the variation of the boiler pressure, which is indicated in ounces by the pointer on the outside of the case. Positive action is combined with sensitive control.

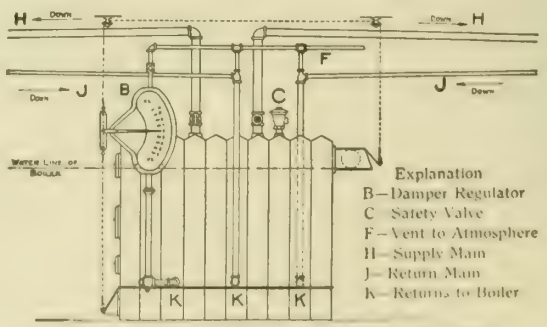
In conjunction with the "Adsco" damper regulator, an "Adsco" relief valve is installed, that is regularly set to release at approximately fifteen ounces boiler pressure, although adjustment can easily be made to carry any lower pressure desired.



"ADSCO" DAMPER REGULATOR

Simplicity.

The "Atmospheric System" constitutes the most simple method of piping, of the supply and return variety, for the distribution of steam throughout a building for heating purposes. It is free from complications of every description, and its distinguishing feature is the small number of special devices required. The fewer of these used, the less become the opportunities for trouble. It is this simplicity which has gained the popular favor enjoyed, and to it is due the wonderful success that has been experienced.



Note—Use one or more connections to boiler as required

PIPING AT BOILER, "ATMOSPHERIC SYSTEM"

Equipment.

"Adsco" specialties have been designed especially for the "Atmospheric System," and are necessary for complete equipment and satisfactory operation. We do not contract to install heating systems of this kind, but under our patents the various "Adsco" specialties are manufactured and sold by us without royalty or license charges.

THE BEATON & CADWELL MFG. CO.

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Patent Improved Adjustable Floor and Ceiling Plates, for Steam and other Piping; Adjustable Floor Sleeves, Automatic Air Valves, Patent Adjustable Wrought Steel Pipe Hangers, and Steel Pipe Hanger Rolls.

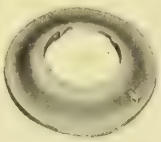
Also, Wood Wheel Radiator Air Valves, Key Radiator Air Valves, Water-Gauges, Strap and Other Kinds of Pipe Hangers, Radiator Foot Rails, etc.

Floor and Ceiling Plates (Trade Name "Perfection").

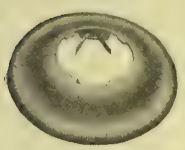
Beaton plates are made of cast iron or brass, sheet steel or brass (according to design) and plain or nickel-plated, as desired. They are furnished in a variety of types and sizes designed to meet every possible requirement. The ribs inside serve the double purpose of providing an air space between plate and pipe to prevent transmission of heat, and of aiding in centering the plate when in position on pipe.

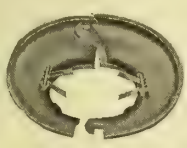
NO. 1. PATENT IMPROVED ADJUSTABLE FLOOR AND CEILING PLATE

NO. 2. CAST-IRON SET SCREW PLATE

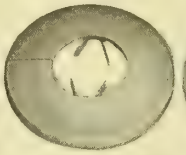


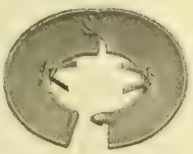
NO. 3. LATEST IMPROVED HINGED CAST PLATE





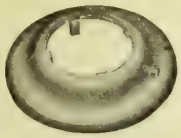
NO. 4. PATENT IMPROVED ADJUSTABLE CAST-IRON HINGED FLOOR AND CEILING PLATE



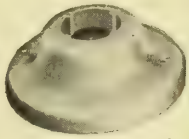


NO. 5. NEW SOIL PIPE PLATE

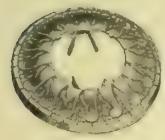
NO. 3A. HINGED CEILING PLATE WITH SET SCREW



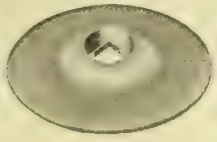
NO. 6. CEILING PLATE



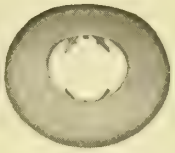
NO. 7. PATENT ADJUSTABLE WIDE FLANGED FLOOR AND CEILING PLATE 1½-inch Flange



NO. 8. HINGED ARTISTIC PLATE



NO. 9. 2-INCH FLANGE TWO-PART CAST PLATE



NO. 10. ROLLED STEEL, HINGED REINFORCED FLOOR AND CEILING PLATE

Gem No. 4

Special

Wellby No. 5

Special Lock Shield

AUTOMATIC AIR VALVES

Made of best brass, having pressed shells and special bases. List prices, 60c.; with lock shield 80c. Special No. 5 has longer shell and float than the Gem. Adjusting column is of high grade carbon reinforced with copper ferrules at top and bottom. For 10 to 15 lbs. steam pressure. List prices, "Special" 70c.; "Wellby Special" 90c.; "Special" with lock shield 90c. Special valves made with extra heavy carbon post or with drain tubes.

LIST PRICES OF STANDARD SIZES OF FLOOR AND CEILING PLATES*

Cast Metal

Sizes, Inches		⅛	¼	⅜	½	¾	1	1¼	1½	2	2½
No. 1	Black.	$ .14	.14	.15	.16	.17	.20	.22	.25	.30	.50
	N. P.	.25	.25	.26	.27	.28	.32	.35	.38	.45	.65
	C. B.	1.00	1.00	1.00	1.00	1.20	1.30	1.60	1.80	2.00	2.50

Size, Ins.		3	3½	4	4½	5	6	7	8	10
No. 1.	Black.	$ .65	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.75
	N. P.	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.00
	C. P.	3.00	4.00	5.00	6.00	7.00	9.00	10.00	12.00	16.00

No. 2—In same finishes and sizes as No. 1; same list
No. 3—In same finishes and sizes from ⅜ to 4″ as No. 1; same list
No. 4—In same finishes and sizes from ½ to 3″ as No. 1; same list
No. 5—In same finishes and sizes, 2, 3, 4 and 5″ only; as No. 1
No. 3A—In same finishes and sizes from ¼ to 4″ as No. 1; same list
No. 6—In same finishes and sizes from ½ to 2″ as No. 1; same list
No. 7—In same finishes and sizes from ¼ to 4″ as No. 1; same list
No. 8—In same finishes and sizes from ½ to 4″ as No. 1; same list
No. 9—In same finishes and sizes from ½ to 4″ as No. 1; same list

Sheet Metal

Size, Ins.		¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
No. 10	Black.	$ .15	.16	.17	.20	.22	.25	.30	.50	.65	.80	1.00	
	N. P.	.26	.27	.28	.32	.35	.38	.45	.65	.80	1.00	1.25	
	S. B.	.60	.62	.65	.72	.80	.85	1.00	1.50	1.80	2.25	2.75	

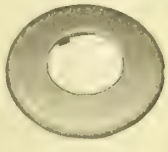
No. 10A—In same finishes and sizes from ½ to 2″ as No. 10; same list
No. 11 —In same finishes and sizes from ⅜ to 4″ as No. 10; same list

No. 12	Black.	$ .07	.07	.08	.09	.10	.11	.12	.13	.20	.25	.30	.40
	Nickel or N.P. or Pol.	.11	.11	.12	.13	.14	.15	.16	.17	.30	.35	.42	.50
	Brass	.16	.16	.17	.18	.20	.23	.25	.30	.37	.45	.55	.65

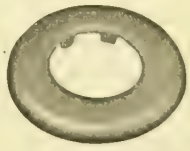
No. 13—In same finishes and sizes as No. 12; same list
No. 14—In same finishes and sizes as No. 10; same list
No. 15—In same finishes and sizes, ½ to 2″ as No. 12; same list

No. 16—S.B. only		$ .62	.65	.72	.80	.85	1.00	1.50	1.80	2.25	2.75		
No. 17§	Black	.32	.34	.40	.44								
	Nickel	.54	.56	.64	.70								
	Brass	1.24	1.30	1.44	1.60								

* Discounts on application. § No. 17 is similar in design to No. 10, only it has two openings, for twin pipe connections. N. P.—Nickel-plated; C. B.—Cast Brass; S. B.—Sheet Brass.



NO. 12. COLD-ROLLED STEEL SOLID FLOOR PLATE



NO. 15. NARROW FLANGED SOLID STEEL PLATE

Flange, ¾ in.

NO. 16. CEILING PLATE FOR ANGLE OR CIRCLE COVE

Is adjustable, fits closely to pipe on any angle from 30 to 60 degrees

ADJUSTABLE FLOOR SLEEVE

No. 1 is adjustable from 10 to 16 ins. No. 2 from 14 to 24 ins. Made in six different styles.

COLD-ROLLED STEEL HANGER ROLLS

As used with No. 5 Hanger

PATENT IMPROVED ADJUSTABLE WROUGHT STEEL PIPE HANGERS

WILLIAM S. HAINES & CO.

Manufacturers of Steam Heating Specialties

Twelfth and Buttonwood Streets

PHILADELPHIA, PA.

Products.

HAINES VACUUM HEATING SYSTEMS and AUTOMATIC VAPOR SYSTEMS, consisting of HAINES AUTOMATIC VALVES and TRAPS, AUTOMATIC AIR TRAP, GRADUATED SUPPLY VALVES, SUCTION STRAINERS, SAFETY VALVES, VACUUM PUMP GOVERNORS, DAMPER REGULATORS, LOW PRESSURE GAUGES, and all SPECIALTIES used in the Systems.

Vacuum Systems of Steam Heating.

We believe that the architect and engineer are sufficiently familiar with the principle, operation and general piping arrangement of this system to make it unnecessary for us to detail them here. It is generally conceded that a vacuum system of steam heating, properly installed and equipped, is the most efficient and economical heating system that can be used in connection with large buildings of any description. Vacuum systems of heating, however, have not always proved successful, due not to any fault in the principle of the system, but almost entirely to poorly constructed automatic valves; in fact, the automatic valve is so important a feature that, regardless of all other perfections, any system of vacuum heating would be a failure without an equipment of positive and reliable automatic valves.

Haines Automatic Valves and Traps.

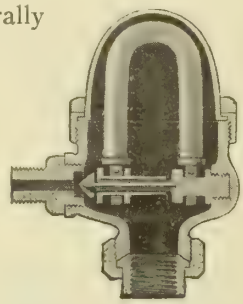
We are the sole manufacturers of the Haines Automatic Valves and Traps (four illustrated herewith), in all of which the operating power consists of our specially designed thermostatic tube. This member is not new or untried, as we have been using it in connection with our automatic valves and traps for eighteen years, and during this entire period the principle of our thermostatic tube has not been changed a particle.

Construction.

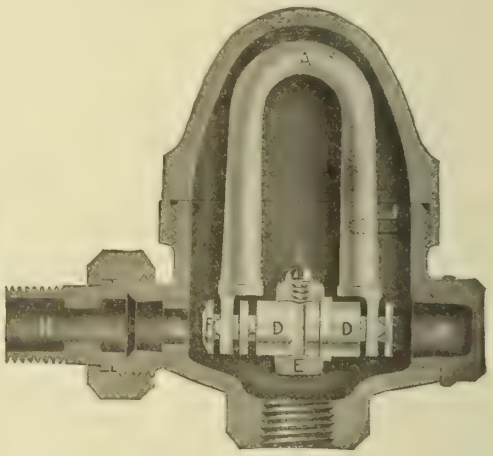
The Haines automatic valves and traps are all constructed on one principle, with some slight difference in design to meet different conditions. In all cases the operating power consists of a specially designed Haines thermostatic tube mounted vertically on a horizontal valve motion. The thermostatic tube has forked or bifurcated ends made to fit a groove in the valve-head at one end and a groove in the guide stem at the opposite end. The guide stem is set permanent, so that the movement or travel of the tube is confined to the opposite end in such a way as to automatically open and close the valve. To eliminate friction and remove any possible chance of the valve sticking, the hole in the valve stem is round, whereas the end of the guide stem on which it is mounted is square, which assures a free and perfect movement. The valve mechanism in all the Haines automatic valves and traps is mounted horizontally. This permits scale and foreign matter to drop clear of the valve and seat at each operation; and as the construction of the thermostatic tube is such as permits a long range of movement, the chances of the valve fouling with scale or foreign matter is reduced to a minimum.

Guarantee.

The Haines automatic valves, when used in connection with vacuum or vapor heating systems, are guaranteed absolutely for a period of five (5) years;

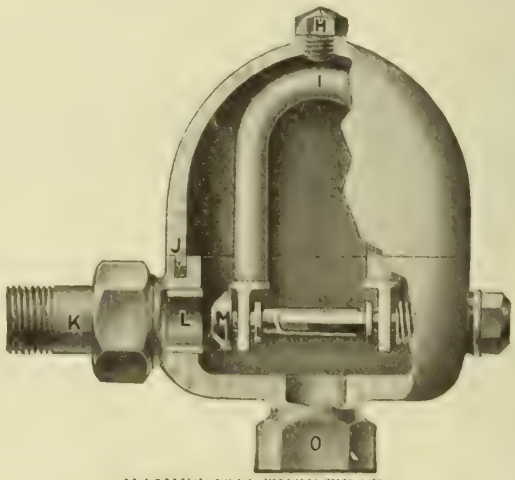


HAINES AUTOMATIC AIR LINE VALVE



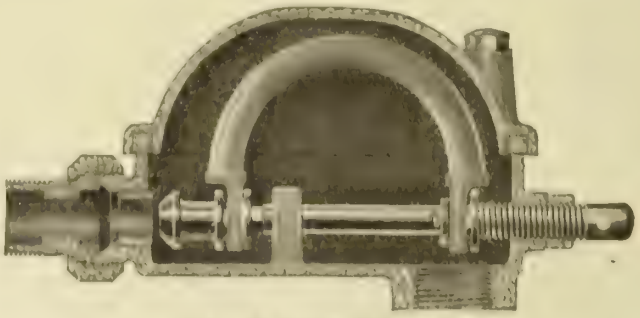
HAINES VENTO TRAP

Recommended for use with cast-iron radiation with low pressure steam. Not exceeding 10 lbs.



HAINES 1911 TYPE TRAP

Recommended for coil work and drip points with low pressure heating. Controls very large valve area



HAINES BLAST COIL TRAP

In addition to all classes of blast coil work, it can be used with any class of work employing from 1 to 100 lbs. pressure

Continued on next page

that is, should any of the valves become defective through usage during said period, we will replace all such with new ones free of cost.

Haines Vapor Vacuum Heating System.

This system as a whole is absolutely automatic, noiseless, effective and economical. On the detailed diagram herewith the installation and operation of this system is clearly shown.

Piping Arrangement.

The steam supply main is started at the highest possible point from the boiler, and should be run throughout the building in the most direct course, grading down from the boiler to the drip points. All drip points in the main supply line are connected to a common wet return line, which is carried back and connected to the boiler below the water line. The dry return pipe which carries condensation and air from the radiators is started from the highest point at the extreme end of runs, graded back to the boiler, then dropped and connected to the boiler below the water line. No air valves are used on the radiators, as the air from all radiators is discharged into the dry return line and eliminated through the automatic air trap.

Automatic Air Trap.

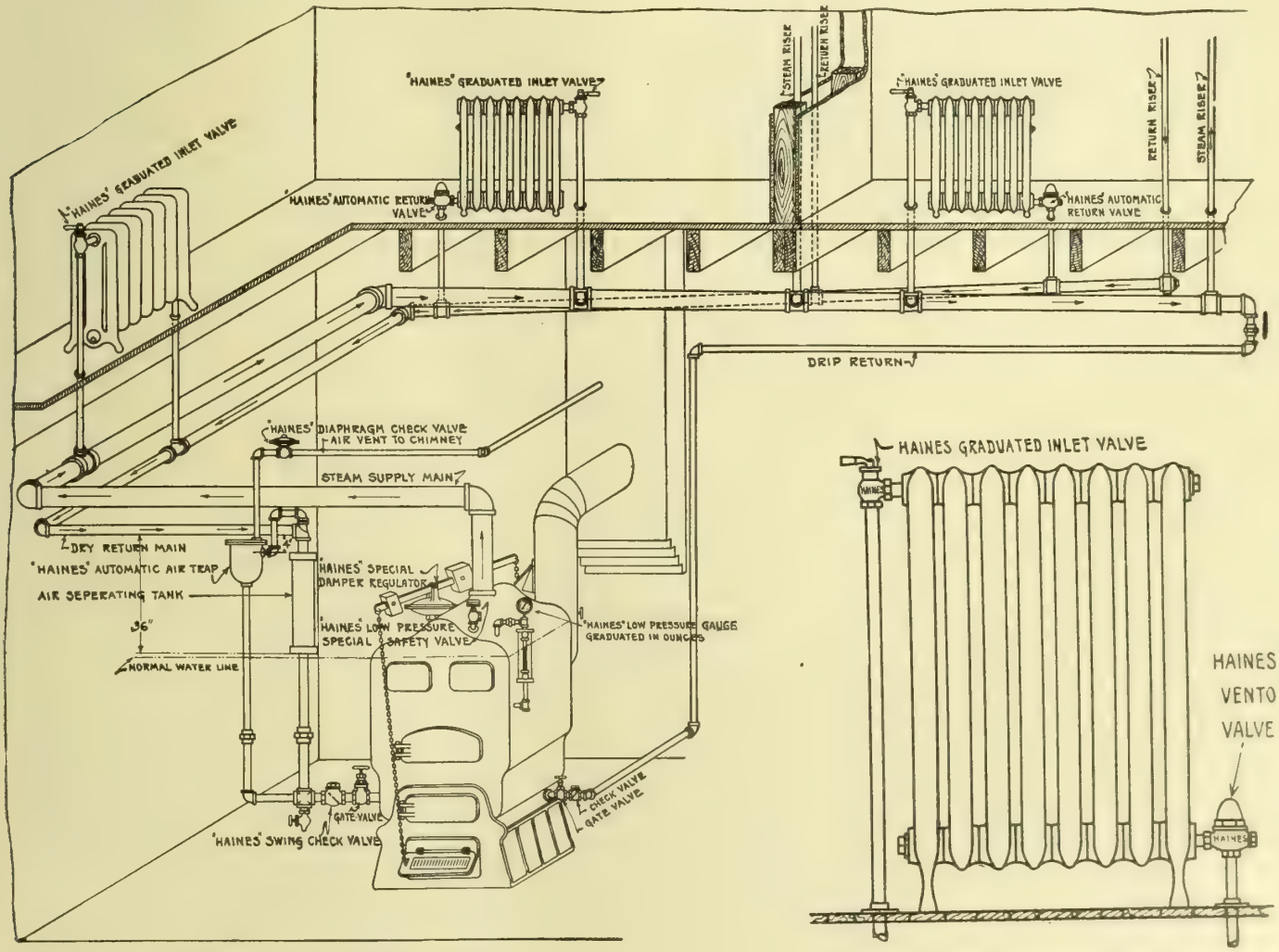
To eliminate air from the system an outlet is provided at the high point of the dry return line at the boiler and connected to the Haines automatic air trap, said air trap being provided with a vent to the atmosphere. Under normal working conditions the air trap performs no functions in connection with the operation of the system; it is simply an emergency break, or a safeguard to balance the system in the event of excessive pressures being created in the boiler.

Vento Automatic Valve.

The return end of each radiator is controlled by a Haines vento valve which automatically discharges the water of condensation and air from the radiator without permitting a particle of steam to escape to the return line.

Graduated Supply Valve.

The amount of steam or vapor admitted to all radiators is controlled by the Haines graduated supply valves. These valves, for the sake of accessibility and to permit easy regulation of the amount of heat desired, should preferably be connected at the top of each radiator.



HAINES VACUUM HEATING SYSTEM

HAINES VALVES INSTALLED ON RADIATOR

THE HONEYWELL HEATING SPECIALTIES CO.

Special Equipment for Hot-Water Heating Plants

FACTORY AND GENERAL OFFICE
WABASH, IND.

CHICAGO OFFICE
215 West Illinois Street

CANADIAN MANUFACTURERS, MONTREAL
The Robert Mitchell Co., Ltd.

FOREIGN MANUFACTURERS AND DISTRIBUTORS
Charles Winn & Co., Saint Thomas Works, Birmingham, England

Products.

The Honeywell Heat Generator.

The Honeywell Unique Hot-Water Radiator Valve.

The Honeywell Temperature and Water Regulators.

Honeywell System of Hot-Water Heating.

The Honeywell System of Hot-Water Heating is a method of installation which, by the use of the equipment mentioned above, insures a positive and uniform circulation throughout the entire piping system and radiation, with a wide range in water temperatures.

This system gives all the advantages of vacuum or steam heating without sacrificing the valuable features of ordinary hot-water work.

Pipe and valve sizes are intelligently proportioned to reduce as low as possible the volume of water, and connections from mains to branches so designed as to give a perfectly balanced circulation.

Room and water temperatures are always under perfect and automatic control.

Co-operative Service.

If the architect will send us the plans of the building in which he wishes to install the Honeywell System, showing the boiler and radiators located, and their capacities marked as he has been accustomed to figuring, we will prepare complete guaranteed piping plans for our system without charge.

On request, we will be pleased to forward to any architect's address a copy of our complete instruction book, giving detailed information in regard to the proper designing and installation of the Honeywell System.

Honeywell Air-Seal Generator.

The Honeywell Air-Seal Generator consists of two simple cast-iron partitioned chambers, called air separators. One is designed to be placed on the first or second floor and the other in the basement. One opening in the upper separator connects with the circulating system, while from the other opening in the upper separator a pipe is dropped to an opening in the lower separator. Passing upward from the lower separator is a pipe extending to the expansion tank.

The Honeywell Air-Seal Generator is a wonderfully simple, positive operating, and trouble-proof device for generating and maintaining a safe predetermined pressure on hot-water heating systems. Its simplicity and the extremely easy manner of connecting is clearly shown in the accompanying illustration (Fig. 1).

The upper separator is placed at some convenient point, usually on the second floor, against an inside wall, behind a door or in a closet. The lower separator is located in the basement, near the basement floor.

A positive interior circulation is had in the generator, making it possible to produce and maintain a predetermined pressure and permitting all water of expansion, in excess of that pressure, to pass readily and freely to the expansion tank.

The Honeywell Air-Seal Generator contains no concealed valves or mechanical parts of any kind. The pressure is created by the difference in weight between a column of air and a column of water. Both elements are always present in every hot-water heating system, and are free for the harnessing, which is simply, successfully and cheaply done in The Honeywell Air-Seal Generator.

It is impossible to dislodge or blow the air out of the generator under one hundred pounds water pressure when filling the system. Neither is it possible for air to be drawn from the generator into the system, when the water cools and contracts.

A predetermined pressure, ranging from 7 to 14 pounds, can be easily obtained in the average building. For every foot of height between the separators approximately one half pound pressure is generated, regardless of the number of floors in the building or the height of the expansion tank.

From the above it may be easily determined just how much pressure a certain location of the separators will produce. We do not advise over ten pounds pressure for any building, regardless of size or height, as this amount is perfectly safe and is ample to give most satisfactory results.

There are numerous ways to install the Honeywell Air-Seal Generator. All this, and more, is clearly explained in our complete catalogue. It is not necessary that the vertical pipes be carried parallel, or even near each other. The pipe joining the circulating system to the upper separator can be brought from any location.

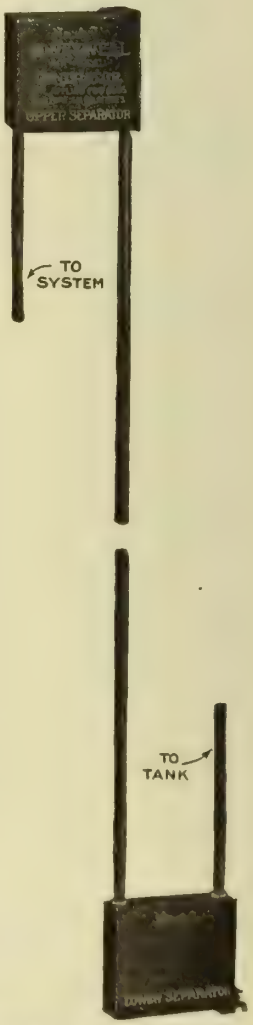


Fig. 1. HONEYWELL AIR-SEAL GENERATOR
For plants containing 1500 Sq. Ft. or less radiation:
No. A-1—For one and two stories
No. A-2—For three and four stories
For plants containing 1500 Sq. Ft. or more radiation
No. A-3—For one or two stories
No. A-4—For three and four stories

Continued on next page

The pipe joining the two separators, known as the air pipe, should run as direct as possible, but may be offset any reasonable distance. From the lower separator to the expansion tank, the pipe can be run in any manner desired. Horizontal pipes must not be trapped, and should have a good fall so that they will drain easily.

In a one-story building, the upper separator may be located at some convenient place on an inside wall near the ceiling, but below the tank. This will give sufficient height in the average one-story building to produce seven pounds, or more, pressure.

In a two-story building, the upper separator may be placed in any convenient location near the floor in a closet, behind a door or in the open.

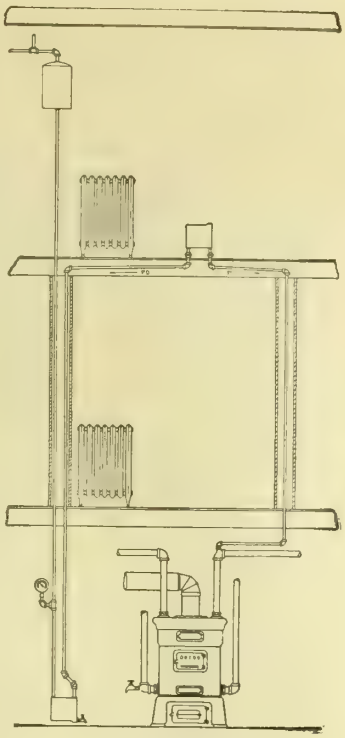


FIG. 2. INSTALLATION DIAGRAM HONEYWELL AIR-SEAL GENERATOR

The same good success can be had by placing the generator on either new or old work. It requires no special tools to install, and instructions for connecting are plainly cast on the separators. There is absolutely nothing about the generator to wear out, stick or corrode. It consists simply of two ordinary small castings, chemically treated to prevent air leaks, and will last indefinitely without any attention on the part of the fitter.

The two separators, a few feet of small pipe, and an hour's time to screw the parts together, and you have the simplest, safest, cheapest and most dependable pressure creating device for hot water heating plants possible to devise.

Honeywell Unique Hot-Water Radiator Valve.

The Unique Valve is designed to be connected to only one end of a radiator. By its use it is only necessary to extend the risers through the floors to the valve elbows. This avoids taking up flooring and cutting joists in order to extend return pipes to the other end of the radiator. The Unique Valve thus saves pipe, saves labor, and saves weakening floor supports.

The valve, as will be noticed, has an adjustable elbow on each side, permitting connection to pipe from any direction. When attached to radiator, a thin piece of metal extends through the first radiator section. This diaphragm causes the water entering through one side to rise in the first section, circulate across the top, down through the other sections and out on other side of valve. It also insures most rapid circulation, as there are no conflicting currents of water in radiator.

The unique valve is adapted to any style of piping. There is absolutely no danger of pipes freezing, even where risers are concealed in outside walls. Should it ever become desirable to increase or decrease the size of a radiator, when the unique valve is used, the extra sections can be added or taken off easily, there being no return elbow and pipe to contend with, no holes to make through the floor, or return pipes to extend.

Circulation of the water is perfect regardless of length of radiator.

These valves have been on the market for nine years and more than 275,000 of them are in use.

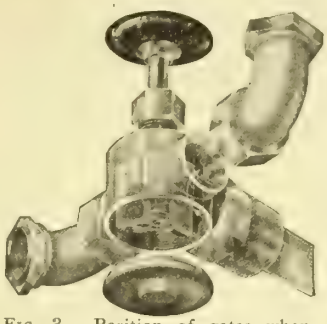


FIG. 3. Position of gates when turned on

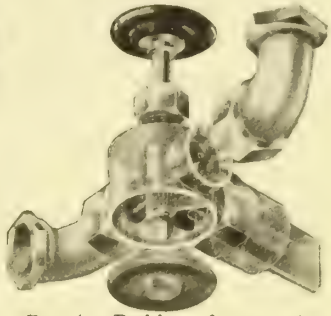


FIG. 4. Position of gates when turned off

HONEYWELL UNIQUE HOT-WATER RADIATOR VALVE

Arrows show direction of water flow for both positions of valve. Gate resembles partly opened hinge, diverts flow into radiator on one side of diaphragm, and allows return on other side. One-sixth turn of handle closes openings to radiator and by-pass of full pipe area is formed in valve, flow then being through valve body and piping. Small openings in gates allow sufficient flow of water to prevent freezing of radiator when turned off. Compact and symmetrical design. Made of best steam metal

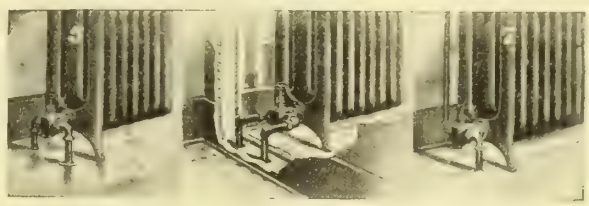


FIG. 5. SEVERAL WAYS OF CONNECTING UNIQUE VALVES

ROUGHING-IN MEASUREMENTS

Center to Center of Ells			
½″	¾″	1″	1¼″
5½″	5¾″	7″	7½″

Center of Spud to Bottom of Ells			
½″	¾″	1″	1¼″
1⅞″	1⅞″	2″	2⅝″

End of Spud to Center of Body			
½″	¾″	1″	1¼″
2⅞″	2⅞″	3″	3¼″

Radiators Should be Tapped
1¼″ for ½″ valve
1¼″ for ¾″ valve
1½″ for 1″ valve
2″ for 1¼″ valve

Honeywell Temperature Regulators.

Honeywell Temperature Regulators are made in several models to suit every condition where automatic regulation of the temperature of rooms, buildings, dry-kilns, etc., is desired. They are designed to operate dampers of hot-water and steam boilers, hot-air furnaces, as well as gas and steam valves.

These regulators are of the very highest possible grade of construction, and with each instrument is furnished a twenty-year guarantee bond.

Models—Honeywell .Temperature Regulators are made in three distinct patterns; namely, Gravity, Spring and Non-Wind Electric.

GRAVITY MOTOR REGULATORS
Model G-4 Plain Thermostat and Gravity Motor.
Model G-6 One-day Clock Thermostat and Gravity Motor.
Model G-8 Eight-day Clock Automatic Thermostat and Gravity Motor.

SPRING MOTOR REGULATORS
Model 4 Plain Thermostat and Spring Motor.
Model 6 One-day Clock Thermostat and Spring Motor.
Model 8 Eight-day Clock Automatic Thermostat and Spring Motor.

NON-WIND ELECTRIC MOTOR REGULATORS—A.C. AND D.C.
Model 14 Plain Thermostat and Electric Motor.
Model 16 One-day Clock Thermostat and Electric Motor.
Model 18 Eight-day Clock Automatic Thermostat and Electric Motor.

Specifications—Specify by model numbers; if electric, state whether A. C. or D. C. motors are desired.

Motors—All Honeywell Motors, like Honeywell thermostats, are built by skilled workmen from the best materials obtainable. Power for the gravity motor is supplied by a ten-pound weight and will give from

Continued on next page

twenty to twenty-five operations on one winding. The spring of the spring motor is large and powerful enough to control the average heater from one to two weeks, yet is so geared that it winds easily. An automatic cut-out switch prevents the motors from running down and leaving the draft or valve open. Our non-wind A.C. and D.C. motors are entirely automatic, requiring no attention whatever except to oil.

The non-wind electric motor operates on A.C. lighting current reduced to 10 volts, which reduction is made through a transformer built in the motor; or on 6 volt D.C. battery current furnished by four ordinary dry cells. Wherever A.C. current is available this is recommended; however, the 6 volt D.C. motor will operate from 4,000 to 6,000 times on one set of dry batteries and will lift a 40-pound damper several inches, in from 12 to 15 seconds.

Both the A.C. and the D.C. electric motors are of the highest grade. They are not of the permanent-field type, as in toy motors, but have electro fields and are built with heavy bronze bearings fitted with automatic oilers and with low resistance carbon brushes, which insures their running for years without attention other than oiling every two or three seasons.

Fig. 6. HONEYWELL SPRING MOTOR
Showing exterior view of motor

Honeywell motors are of highest grade construction and finish. In operation are practically noiseless, an advantage which will be appreciated. Each motor provided with a basement switch by means of which position of the drafts may be changed when coaling heater.

Model 8 Eight-Day Automatic Thermostat.

Model 8 Eight-day Automatic Thermostat is small, symmetrical and extremely neat in appearance (Fig. 7). Its principles (covered by patents, with patents pending) are entirely original with us.

Model 8 is fitted with an attractive and dependable high-grade eight-day clock, which is wound from the front without detaching it from the thermostat. Dial is 2½ inches in diameter and is of white porcelain. It is easily read from a distance, and can serve as an excellent timepiece, suitable for any room. A slight movement upward and to the left will quickly detach the clock from the thermostat base, and as simple a movement will easily attach it.

The clock movement is completely housed in a dust-proof case. A shaft only projects from the case at the rear, on which are fastened, by means of a compression thumb nut, a set of cams and an indicator Q, Fig. 8. The shaft on which these cams are fastened is so geared that it makes one revolution in twenty-four hours, and travels in a fixed relation with the hour hand.

Fig. 8 shows the back view of the thermostat with the wall plate removed, but with the clock and cams in position.

As the cams revolve, the lever A is caused to move first one way and then the other as the roller follows the contour of the cams. Through the pin C this movement is communicated to the lever D, which in turn shifts the thermostatic blade F (to the right, warmer; to the left, cooler).

Therefore it will be seen that when the roller at the top of the lever A is in contact with the high sides of the cams Q, the position of the lever will be farthest from the cam center, which throws the thermostatic

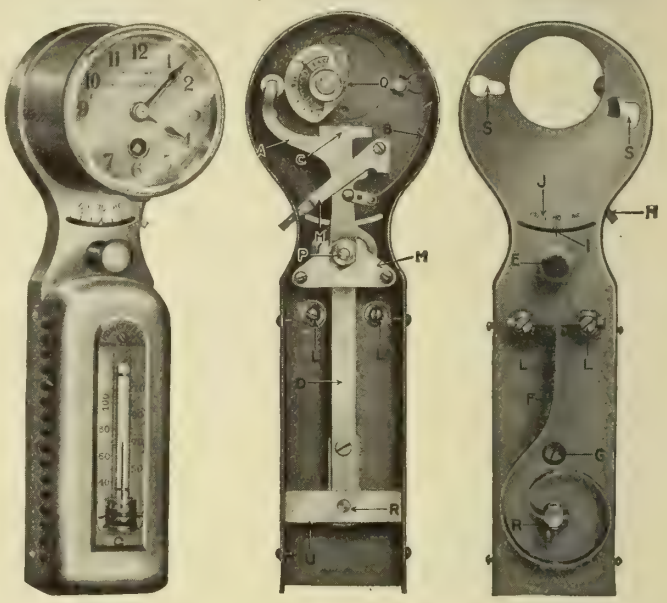


Fig. 7 Fig. 8 Fig. 9
THERMOSTAT MODEL 8 TEMPERATURE REGULATOR

A, Fig. 10, a lever pinioned at P and having a roller fitted to upper end, held firmly against the cams Q, on the clock shaft, by means of spring B. At C, in lever A, is a pin that engages in a slot in upper end of lever D. This lever extends to bottom of thermostat, dividing around pin P and keyed to shaft R, that passes through thermostat base to front, and supports thermostatic element F, Fig. 11

blade F to the right, or warmer side, which is for the day temperature. Also that when the cams revolve so that the roller makes contact with their low sides, the position of the lever A is nearest the cam center, which causes the thermostat blade to pass to the left, or cooler side, which is for the night temperature.

These cams may be so set on the shaft that at any time between noon and midnight thermostat will noiselessly set back to any desired lower temperature, and at any time during the twelve hours of the following morning will quietly set up again to seventy degrees or normal.

The closing cam is so shaped that, when set for closing, the drafts cannot open after the closing hour until the temperature of the room or building in which the thermostat is located falls to the predetermined low temperature (it may be as much as fifteen degrees below normal), after which, and during the low temperature period, the thermostat will keep the room or building at the said predetermined low temperature until an hour or two before the full opening or arising hour.

The slowly revolving A.M. cam of the Honeywell Model 8 Eight-day Automatic Thermostat opens the drafts an hour or two before the time set for arising, and if the room temperature reaches a point higher than the position of the cam would indicate, before the arising period, the thermostat will close the drafts for a short time, or until the cam revolves to a higher temperature position, when the thermostat will open again and thus perfectly control the rising temperature, so that at about the rising time the fire will be under complete control and the temperature of the house normal.

With all other time regulating instruments, the thermostat is set up by an alarm movement, which, when it releases, opens the drafts, and the thermostat then keeps them open until the room or building reaches

Continued on next page

seventy degrees or normal, and by that time (if there is enough fuel in the heater) the fire will have gained sufficient headway to cause the temperature to rise several degrees above seventy after the thermostat has closed the drafts, which is objectionable.

If at any time it is desired to change the opening or closing hours of the thermostat, it is a very simple matter to detach the clock from the base and change the setting of the cams, for it is to be remembered that, by simply loosening the thumb nut, the cams can be quickly set, so that the thermostat will close at any hour between noon and midnight, and open at any hour or fraction thereof, of the twelve hours following.

By means of the stop H, Figs. 8 and 9, the range or throw of the lever A can be controlled so that any night temperature may be maintained. By moving the stop H up or down, the range or movement of the lever A will be shortened or lengthened, thus regulating the night temperature to any degree desired between seventy and fifty-five degrees; or, by moving the stop H up, the lever A can be held off the cams entirely, thereby causing the thermostat to operate independently of the clock.

If at any time it may be desired to operate the thermostat as a plain pattern, or altogether independently of the clock, so that it can be set by hand to any temperature between fifty-five and eighty-five degrees and remain where set, it is only necessary to pull out the shifting sleeve E, Fig. 9, a fraction of an inch. This movement of the shifting sleeve disengages the lever D from the actuating lever A, the lever D being drawn back off the pin C, by a clutch at P, and thereby disconnecting the thermostat from the clock mechanism.

By now turning the knurled button on the shifting sleeve E to the right or left, the thermostat may be set to operate at any temperature within its range, which will be recorded by the indicator I on the scale J. This feature is provided, not only that the thermostat may be made to operate either as a clock or plain pattern, but for the purpose of keeping the temperature up at times when the owner may desire to maintain a normal temperature at night after the usual retiring hour, or later than the time the P.M. cam is set for closing.

Easy to Adjust—If for any reason the thermostat should get out of adjustment, all there is to do to readjust it is to see that the room in which the instrument is located is kept to a temperature of seventy degrees for an hour or two, and by means of a small screw-driver turn the adjusting screw G, Fig. 9, to the right or left slowly until the point of the thermostatic blade assumes a neutral position between the contact screw points supported by LL.

The points of the contact screws supported by posts LL, Fig. 9, are so spaced that a change of 1½ degrees will cause the thermostat to operate the motor.

Fig. 10. FRONT VIEW OF MODEL 6 ONE-DAY THERMOSTAT

Model 6 One-Day Thermostat.

Fig. 10 shows front view of Model 6 one-day clock thermostat. The operation of this type of thermostat is so well-known that we need only show the structural features of this Model 6, plainly brought out in Fig. 11, which shows the front view with the clock swung back for winding and setting, with the cover and wall plate removed. The clock can be lifted instantly from its hinges, yet holds in place when swung back. This thermostat has a range from 55 to 85 degrees, and will be found to be accurate at all temperatures.

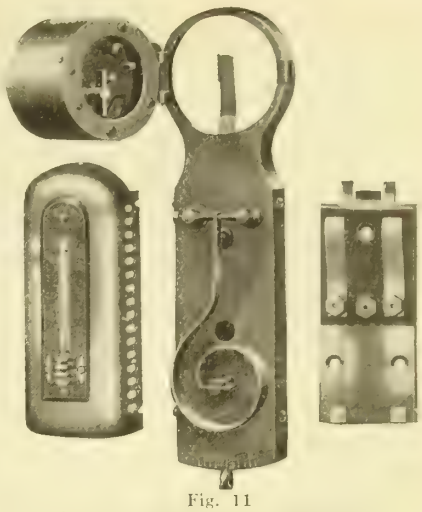


Fig. 11
MODEL 6 ONE-DAY THERMOSTAT

Model 4 Plain Thermostat.

This pattern thermostat is used for various purposes when clock controlled instruments are unnecessary; its construction is identical with that of the Model 6 except that it has no clock and the base is made correspondingly shorter.

Thermostat Construction—All of our thermostats are fitted with thermostatic blades made of special extra heavy laminated metal, which are very sensitive to the slightest change in temperature, one degree only perceptibly changing the position of the blade, therefore making delicate adjustments unnecessary. These blades are guaranteed to keep their shape under all weather conditions.

Thermostats are regularly finished in brushed brass, but any finish can be had on special order.

Wall Plate—The method of attaching all Honeywell thermostats to the wall is by means of an insulated wall plate. Wiring connections are made to back of wall plate, after which plate is screwed to wall. To attach thermostat it is only necessary to place it over wall plate and press down. When thermostat is in place the plate is entirely hidden from view. Thermostat may be removed at any time by simply lifting it from the wall plate, which is shown (Fig. 11).

Honeywell No. 3 Water Regulator.

This compact little regulator, incorporating the well-known Sylphon bellows manufactured by the Fulton Company, Knoxville, Tenn., will open and close the dampers of any heating boiler within a temperature change of from one to three degrees and has an operative range of from 120 to 240 degrees.

Fig. 12
NO. 3 WATER REGULATOR

This regulator is also largely used for controlling steam valves, as well as dampers of tank heaters where a uniform water temperature in the storage tank is desired. The regulator lever is four feet long, and it can be moved in or out to any position on the regulator. Dampers or valves are connected by means of a cable to outer end of lever.

By placing two iron weights, furnished with the regulator, in different positions on the lever any desired temperature of the water may be maintained.

The regulator is very easy to install, and when once connected needs no further attention. The regulator is only 10 inches in height over all and is threaded for 1½-inch pipe opening.

E. F. HOUGHTON & COMPANY

Manufacturers of Steam Specialties

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ST. LOUIS, MO., Southern Railway Supply & Equipment Co., 113 North Second Street
ALBANY, N. Y., F. L. McKnight, Y. M. C. A. Building

Products.

Houghton Therm System of Steam Circulation, for the automatic control of steam heating and drying systems; Houghton Modulation System of Steam Heating; American System of Heat Control; Houghton Steam Specialties, comprising the Houghton Therm Valve, Marck Therm Steam Trap, Houghton Float Trap, Houghton Pump Controlling Valve, Houghton Pressure Reducing Valve and Houghton Balanced Float Valve.

Houghton Therm System of Steam Circulation.

There are two methods of disposing of air and water condensation: one, by gravity; the other, by vacuum.

The gravity method is not so economical nor so efficient as the vacuum method, as larger size piping is necessary, and a back pressure must be carried on engines and pumps.

With the vacuum method all of these objectionable features are eliminated and the removal of air and water condensation is brought under absolute control.

The Houghton Therm System of Steam Circulation can be successfully operated on either system.

Houghton Vacuum System of Steam Heating.

This system fulfills all the requirements of an effective Vacuum System of heating and drying.

Method of Installation.

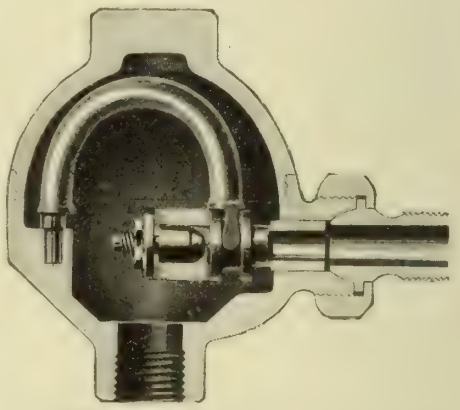
Branches are carried from the exhaust-pipes from engines and pumps to the feed-water heater and to the heating system, any surplus steam escaping to the exhaust head through a back-pressure valve.

The exhaust steam intended for the heating system is first purified by passing through an oil separator, the separator draining into a Houghton Combined Float and Grease Trap, which discharges into the sewer. The purified steam is then carried to the heating units through a system of distributing mains or risers, which may be either up feed or down feed.

At the return end of each heating unit and at the drip points of supply mains and risers, a Houghton Therm Valve is placed to automatically permit the passage of air and water of condensation and to prevent the escape of steam.

Continued on next page

The Houghton Therm Valve is constructed on the thermostatic principle. Its actuating mechanism is the well-known Marck tube, of which there are more in use than all other thermostatic devices combined.



SECTION THROUGH HOUGHTON THERM VALVE

The Houghton Therm Valve has the unique feature of a ball seating valve and is so designed as to insure perfect seating of the valve and thereby to prevent the escape of steam from the heating unit, while the extra large valve opening insures the passage of air and water of condensation with the minimum of liability to clogging.

The Houghton Therm Valve is made in four sizes and capacities as follows:

½-inch pipe connection to drain a maximum of 125 square feet of heating surface.
½-inch pipe connection to drain a maximum of 400 square feet of heating surface.
¾-inch pipe connection to drain a maximum of 750 square feet of heating surface.
1-inch pipe connection to drain a maximum of 1,000 square feet of heating surface.

The ½-inch pipe sizes are made in angle, straightway, right-hand corner and left-hand corner patterns. The ¾-inch and 1-inch pipe sizes are made in angle and straightway patterns only.

At times there may not be sufficient exhaust steam from the engines and pumps to meet the requirements of the heating system, or it may be that it is advisable or necessary to keep steam on the heating units when the engines and pumps are not running. To meet either of these conditions live steam direct from the boiler must be introduced into the heating system. This live steam has a much higher pressure than the exhaust steam, and should it be admitted at boiler pressure to the heating system it would create a back-pressure in

the exhaust line. The live steam is, therefore, passed through a Houghton Steam Pressure Reducing Valve before being admitted to the heating system. By means of this valve the heating units can always be supplied with steam at a uniform pressure, whether either high-pressure steam or exhaust is admitted.

The return mains lead to a vacuum pump, a suction strainer or dirt catcher being introduced into the line to prevent scale or dirt from being carried into the pump.

It is advisable to automatically control the vacuum created by the vacuum pump attached to the main return line in order to keep the vacuum at the predetermined point. For this purpose a Houghton Vacuum Pump Controlling Valve is attached to the pump. This apparatus insures the maintenance of a constant predetermined vacuum on the heating system with a minimum amount of steam on the pump.

Each system is provided with a set of combination vacuum and pressure gauges which indicate the amount of vacuum and the steam pressure carried on the system at all times.

Houghton Therm System Applied as a Gravity System.

The Houghton Therm System of Steam Circulation can be applied as a gravity system. As the conditions of installation vary so greatly, our engineers will consult with architects and others interested as to the best method of securing desired results.

Houghton Modulation System of Steam Heating.

Adapted not only for the larger installations, but for smaller hotels, apartment houses and dwelling house work. The application of the system to this purpose is fully treated in our Bulletin B, a copy of which will be sent on request.

Houghton Therm System and Change Overs.

It has been found that in substituting exhaust steam for live steam and installing the Houghton appliances, no increase in piping and radiating surface is necessary. Usually only slight changes are necessary in power-house piping to change over from live steam supply to exhaust steam supply.

The economies in operation effected by use of this system will often pay for the cost of installation within a comparatively short time.

The Houghton System of Low-Pressure Live Steam Heating.

Very large savings in the original cost of installation and in subsequent maintenance charges can also be effected by the use of the Houghton Therm System of Steam Circulation for low-pressure live steam heating.

Our Heating and Engineering Department will consult with architects or others interested with a view to designing layouts of heating and drying systems that will give the maximum of efficiency with the greatest saving in first cost.

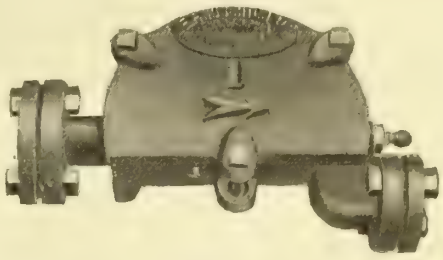
Certainty of Operation.

The various devices comprising the Houghton Therm System of Steam Circulation have been so designed as to reduce to a minimum any uncertainty as to their operation, and the system as a whole is as nearly automatic as it is possible to make it.

Marck Therm Steam Trap.

Operating on the thermostatic principle. This trap is designed for pressure up to 40 pounds, and is of larger capacity than the Houghton Therm Valve.

The Marck Therm Steam Trap has but one movable part; it is devoid of floats, levers, balance weights, air valves, pet cocks, etc.



MARCK THERM STEAM TRAP

The only function it performs is to automatically open the valve, allowing all water to drain, and to close it as soon as steam attempts to pass.

Where the pressure required is over 40 pounds, the Houghton Float Trap is usually specified instead.

Houghton Float Trap.

Designed for use on the discharge end of either high- or low-pressure steam apparatus of any kind, to automatically permit the passage of air or water of condensation and to prevent the passage of steam. It will operate at pressures up to 160 pounds per square inch.

It operates on the intermittent principle, in which the valve is either tightly closed or wide open. Wire drawing on the valve and seat is, therefore, eliminated, prolonging the life of the valve and reducing the danger of leakage through the valve to a minimum.

American System of Heat Control.

The American System of Heat Control is designed for automatically controlling every kind of heating system. It is operated by compressed air, generated by an electric, steam or hydraulic air compressor, usually located in the basement or engine room. The compressed air line is piped throughout the building. An American Thermostat is installed in each room or heating chamber in which temperature regulation is desired, operating the respective automatic valves or dampers attached to the heat sources.

American Thermostat.

The American Thermostat will operate a valve or damper from a wide open to a tightly closed position, on temperature changes of 1½ degrees, and under all barometric conditions.

Simplicity—The American Thermostat has fewer working parts than any other. When properly installed it will remain in constant and efficient operation for years, with absolutely no repair charges.

AMERICAN THERMOSTAT

Rubber Element Most Reliable—The American Thermostat maintains its properties of expansion and contraction under actual working temperatures ranging from 30° to 100° Fahr.

The thermostatic element is a hard rubber tube. Hard rubber has the highest co-efficient of expansion per degree Fahrenheit of any material suited to this purpose. A hollow tube of hard rubber always keeps its shape.

Attention is called to the absence of soft rubber diaphragms, which quickly vulcanize and crack open,

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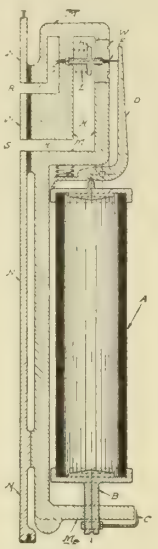
and are liable to blow out by any pressure over fifteen pounds, causing absolute breakdown of the thermostat and consequent expensive repair bills.



AMERICAN THERMOSTAT
Sectional View

Double Area Exposed — In the American Thermostat the caps on the top and bottom of the rubber tube are perforated and permit the circulation of the room air within the tube, and through it, as well as contact on the outer surface. This not only gives a perfect response to temperature changes, but it prevents any liability to warping.

Two Types—We make two types of thermostats for room temperatures, namely, graduated type and positive type. The graduated type is designed to control the hot air damper, in relation with the cold or tempered air damper, in order that the proper proportions of hot and cold air will be mixed, to maintain the desired temperature. With this type of thermostat the dampers are never open wide or closed tight, except on extreme temperature changes. The graduated thermostat is also used in vacuum or hot water systems to operate the diaphragm radiator valves.

The positive thermostat is designed for operating diaphragm control valves on either direct or indirect radiation, where the system is one- or two-pipe steam.

Easy Adjustment—In both the graduated and positive types, when the adjustment is set at 70 degrees, any temperature between the limits of 60 and 80 degrees can be obtained by moving the indicator hand to either the warm or cool side, according to the scale.

Wide Range of Adjustment—An exclusive advantage of the American Thermostat is that the instrument can be used for any range of temperature between 20 and 120 degrees Fahr.

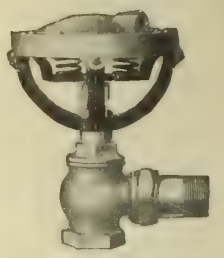
Finish—Special covers and finishes are furnished to match various styles of hardware and wall decorations, and to harmonize with any conceivable condition.

Every American Thermostat is carefully adjusted and tested under actual working conditions in our factory before shipment, and when installed it is necessary only to bring the adjustment to the desired temperature, which can be done by any one at all familiar with it. The instruments are guaranteed against original defects, and, when given proper care, to remain in constant and satisfactory operation.

American Thermostat Applied to Direct Radiation.

For the control of direct radiation, the movement of the valve admitting steam to the radiators will depend upon the heating system used. If steam, as pressure, is used in a one-pipe system, the valve must be either wide open or closed tight. If the valve remains for any length of time in an intermediate position, the passage of steam through the valve will prevent the return of the water condensation from the radiator, resulting in the annoying " water hammer " when the valve opens. With this system of heating, we use the American positive type thermostat. If a vacuum system of heating is used, in which condensation in the radiator is withdrawn through a separate pipe, it is not only advantageous, but economical to use a graduated thermostat. By use of the graduated instrument a closer regulation can be had, and for this same reason it is desirable to use the graduated thermostat in connection with a hot water heating system.

American Diaphragm Radiator Valve.



DIAPHRAGM VALVE

The American Diaphragm Radiator Valve is made in all patterns and sizes from ½ inch to 2 inches, finished in nickel or rough brass, as desired. All American Diaphragms are made of the best rubber stock obtainable and of a weight that insures long life.

American Thermostat Applied to Steam Fan Heating System.

For a fan heating system, the graduated type of thermostat is used.

The thermostat controls a diaphragm motor connected with the mixing dampers, holding them in such a position as will properly mix the hot and tempered air as it leaves the plenum chamber.

In this plan the cold air from outdoors is first drawn through tempering coils and by them warmed to the required temperature; the thermostat in the tempered air chamber operating by-pass dampers beneath the tempering coil, so as to prevent overheating of this air. Very frequently an arrangement is used which dispenses with this tempering coil, dampers being placed in the platform between hot air and tempered air chambers and thermostatically operated to direct a proportion of the heated air through the platform into the tempered air chamber, where the required temperature is maintained. The arrangement of the thermostat, diaphragm and mixing dampers is repeated for as many rooms as there are under control, each room having its own thermostat, mixing dampers and heating duct, the compressed air from the reservoir being supplied to all thermostats through a suitable arrangement of galvanized iron piping. Heating systems differ very much in their construction. The heating surface may be divided and heating coils located at the base of each flue. The automatic regulation may be applied to any of the various heating systems in use, the only requirement being an arrangement that will permit the placing of dampers or valves so that they will control, individually, the heat supply to each apartment in which the thermostat is located.

Guarantee.

The Houghton Therm System of Steam Circulation, the American System of Heat Control and the Houghton Steam Specialties are fully covered by the Houghton Guarantee as to quality of material, construction and workmanship, and, when properly installed, are guaranteed to satisfactorily perform the service for which we recommend them.

Co-operative Service.

The men at the head of our Heating and Engineering Department are thoroughly trained and competent.

This department will gladly co-operate with architects and consulting engineers in the preparation of plans and specifications, either for entirely new installations or for the adaptation of systems already installed to meet the requirements of our system.

Literature.

Descriptive bulletins of the Houghton Therm System of Steam Circulation, the American System of Heat Control and the Houghton Steam Specialties will be sent on application.

ESTABLISHED 1885

JOHNSON SERVICE COMPANY

Manufacturers of Heat Regulating Apparatus

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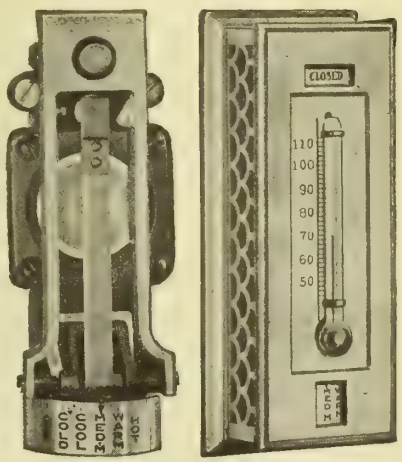
Products.

HEAT REGULATION SYSTEMS.
THERMOSTATS.
HUMIDOSTATS.

Johnson Model Positive Thermostat.

This thermostat should be specified for controlling temperatures of rooms in residences, office buildings, schools, hospitals, factories and all places heated by direct radiation, by controlling diaphragm valves on radiators or coils. It is known as a Room Thermostat.



Instrument Cover
JOHNSON MODEL POSITIVE THERMOSTAT

It is the latest development and most efficient pneumatic thermostat, embodying the following important features:

Positive Action—It is the only thermostat on the market with a positive snap-action, closing and opening the radiator valve quickly, positively and fully, which is necessary for the proper operation of steam radiator valves.

"Open" and "Closed" Indicator—To show whether radiator valve is open or closed. It is a matter of frequent interest to the occupant of a room to know whether heat is on or off.

Positive Cut-Off—With which the heat is absolutely shut off and the thermostat cut out of operation until again put in commission by the occupant of the room. This is especially advantageous for thermostats located in bedrooms, where it is desired to cut the heat off for the night, as many people keep their bedroom windows wide open and the rooms get very cold. This device prevents the thermostat from acting under these conditions and turning the heat on. It is also especially advantageous as a hotel and an office thermostat, where it is always desirable to be able to shut off rooms which are not being occupied. This means a considerable saving in fuel consumption. Besides the many other advantages, the Johnson Thermostat is the only one on the market with a positive cut-out.

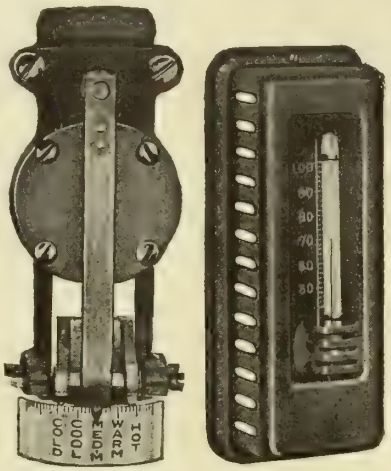
Adjusting Dial—For setting thermostat to operate at any desired temperature. No other adjustment is so accurate and simple, no dial so inconspicuous and yet so easy to read, as that on the new thermostat. The dial reads plainly in words, instead of graduations, so that anyone can set the thermostat at just the temperature desired. The dial reads as follows: "Off," "Cold," "Cool," "Medium," "Warm" and "Hot," which wording is more intelligible to the average person than a graduated dial with a pointer.

Accessibility of Parts—While repairs on this thermostat are seldom necessary, every part is readily accessible, and any part can be easily replaced in a few moments' time. All air passages are straight; there are no concealed mechanisms. The thermostat does not sacrifice any of the underlying principles which have made our thermostats the standard for over thirty years. Although it has been reduced to less than one half the size of any other thermostat, it has a total of but four working parts, and these parts are larger than before. The thermostatic element, which is the heart of any thermostat, is longer and more sensitive, producing even closer temperature control. No other thermostat has these improvements and qualities.

Continued on next page

Johnson Model Intermediate Thermostat.

This thermostat should be specified for controlling temperatures of rooms in schools and other buildings heated by the plenum or hot-blast system, by operating double mixing dampers with a graduated or intermediate motion, so as to mix hot and tempered air in the proper proportion to maintain a desired temperature in the room. It may be specified, when it is desired, to operate hot-water radiator valves, or radiator valves on a two-pipe direct-steam system, either vacuum or gravity. It is the same size as the positive thermostat, and embodies all the features of that instrument except the indicator and positive shut-off. The intermediate motion of the dampers is produced by the reducing-valve principle of the thermostat, and it is the only principle on which proper operation of mixing dampers can be produced.



Intermediate Type Instrument — Office and School Type Cover

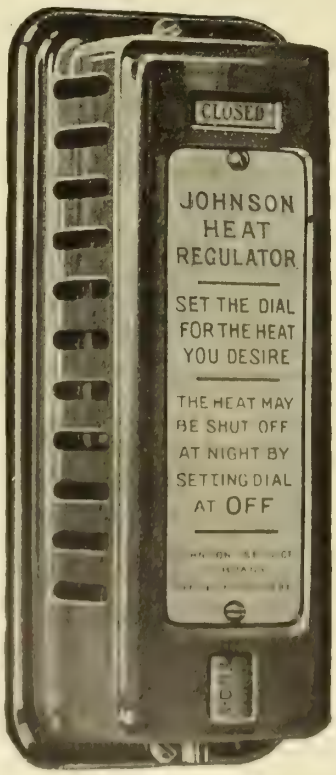
JOHNSON MODEL INTERMEDIATE THERMOSTAT

Covers for Room Thermostats.

The covers for room thermostats are interchangeable, and both of the illustrated styles can be used with either thermostat. All covers can be provided with a patent lock-shield screw, making it impossible for unauthorized persons to remove them. They are finished in any electro-plate desired, or enameled to match any tapestry or woodwork.

Small Size—Only four and three-quarter inches long, two inches wide, one inch deep.

Design—Beautiful simplicity, which, in connection with extremely small size, wins the approval of the most artistic architects. Inconspicuous on any wall and among any surroundings.



HOTEL TYPE COVER
Showing exact size of all covers

Room Temperature Control.

There are three general classes of automatic temperature control for rooms in buildings that require three distinct types of thermostats to accomplish the best results. These classes are determined by the three typical modern systems for heating buildings:

(1) Direct-steam or hot-water radiation for heating.

(2) Plenum hot-blast steam and furnace system of heating.

(3) Combination system of plenum hot-blast and direct-steam radiation.

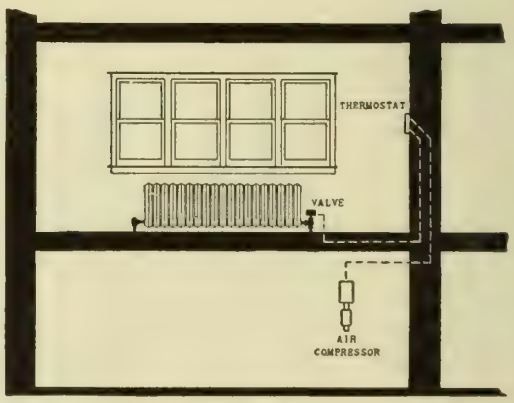
The corresponding types of thermostats required are as follows:

(1) Positive quick-acting thermostat.

(2) Intermediate graduated-acting thermostat.

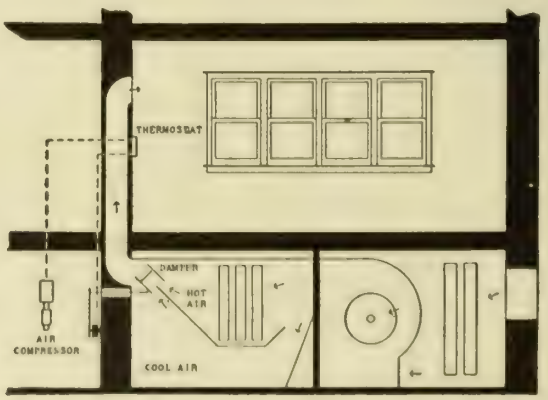
(3) Compound thermostat.

Illustrated herewith are typical applications of these thermostats to the corresponding systems of heating. These diagrams should make clear the application of thermostats in relation to the various systems of heating. By proper application of Johnson thermostats, radiator valves and dampers, any type heating system for any building can be controlled. For instance, if a



UNIT OF DIRECT RADIATION CONTROLLED BY A JOHNSON POSITIVE, QUICK-ACTING THERMOSTAT ON WALL

One air compressor will supply any number of thermostats, according to the size of the building

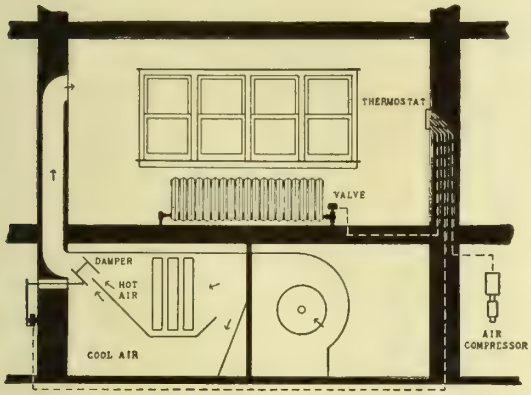


UNIT OF CONTROL FOR PLENUM HOT-BLAST SYSTEM OF HEATING

A Johnson Intermediate, Graduated acting Thermostat on the wall controls a damper which mixes hot and cool air passing to the room

Continued on next page

residence room were heated by direct radiation, with radiators behind grilles, the room thermostat would be connected to diaphragm valves on the radiators. If the room were heated by indirect radiation the same thermostat would be connected to a single damper admitting hot air through the register face. The drafts on hot-water boilers are controlled by hot-water thermostats.

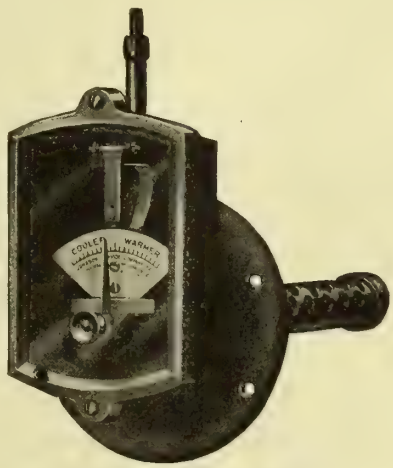


UNIT CONTROL OF DIRECT RADIATION AND HOT-BLAST SYSTEMS

A typical unit control of both the direct radiation and the hot-blast systems. Johnson Compound Thermostat operates the radiator valve quickly, and the mixing damper with graduated action

Extension Tube Thermostat.

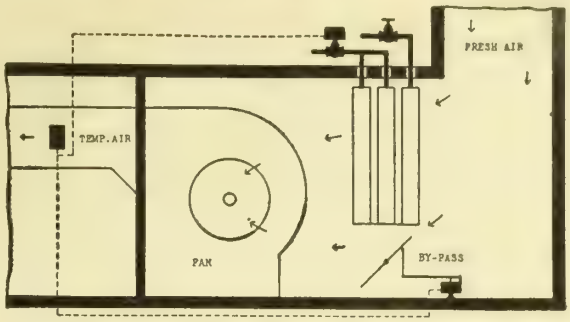
This thermostat is especially designed for the control of air and other heating mediums, where the thermostatic element must be located either at a point difficult of access, or where a standard instrument could not be expected to operate satisfactorily. For control of enameling ovens, dry-kilns, etc., the thermostatic element, or perforated tube, is inserted through the wall into the oven or kiln, leaving the working parts of the instrument outside at a convenient point. It is also designed for use in controlling heating coils according to the outside temperature, the perforated tube extending outdoors. The tube may also be inserted into galvanized iron ducts to control the temperature of the air in the duct.



EXTENSION TUBE THERMOSTAT

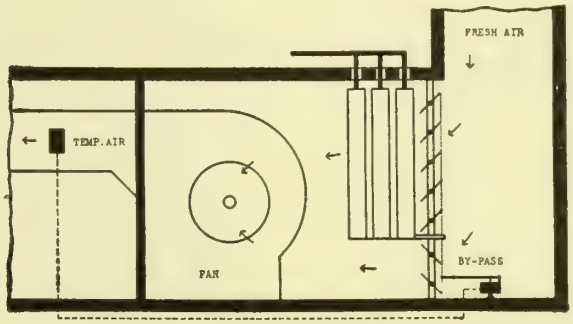
These thermostats are made entirely of cast metal, substantial and durable, with exposed surfaces highly finished, conforming to the finest engine room equipment.

Applications of extension tube thermostat are illustrated in the following diagrams.



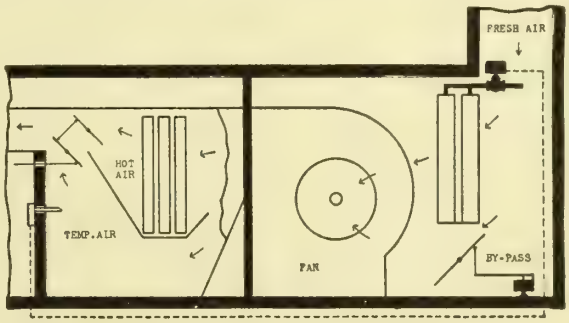
TEMPERED FAN VENTILATION NO. 1

The thermostat, located in the duct from the fan, controls the by-pass damper under the tempering coils, or the coils themselves, when there is no by-pass provided. Some engineers prefer to control both by thermostat. (See also following pages on multiple insertion thermostats)



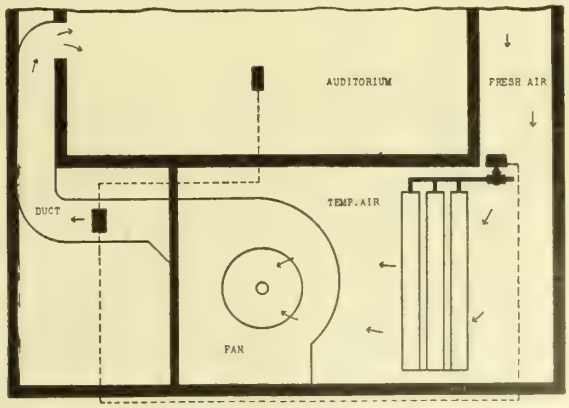
TEMPERED FAN VENTILATION NO. 2

The Insertion Thermostat here controls louver mixing dampers placed before the tempering coils. The thermostat operates the dampers so the proper proportion of air will pass through the tempering coils and by-pass, to produce a temperature of 65 to 68 degrees Fahr. of the ventilating air. Tempering coils not controlled. The Graduated-acting Type Thermostat is preferable for this purpose



HOT-BLAST HEATING SYSTEM

The thermostat located in the tempered air plenum chamber controls the by-pass damper, or the valves on the steam coils, as the case may be. Sometimes both are controlled. The thermostat is usually set for 68 degrees Fahr. When the temperature falls, the coil valves are opened and damper closed; and when temperature reaches 68 degrees Fahr., the coils are closed and by-pass damper opened



COMBINATION SYSTEM

For single room heating, such as auditoriums, etc., where a single set of steam coils is used for heating and tempering. The room thermostat controls the duct thermostat, cutting it out when more heat is required in room and keeping coils wide open. When room temperature is right, the room thermostat cuts in the duct thermostat, which then controls coil, maintaining a duct temperature of about 68 degrees Fahr. for ventilation purposes

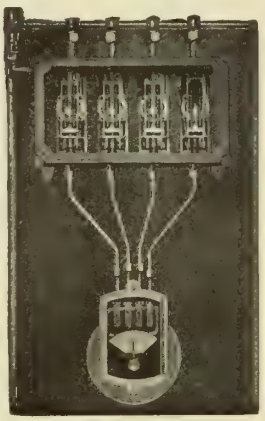
Continued on next page

Multiple Insertion Thermostat.

This type of thermostat, like the insertion thermostat previously described, is designed for insertion through the walls of hot-, tempered-, or cold-air chambers.

Our four-point multiple thermostat is illustrated here.

The principle on which this thermostat works is the same as that of the single-insertion type, except that it is provided with a number of operative points adjustable for different temperatures, all of these points being operated by one perforated thermostatic tube. By this means we are able to control a number of sections of the tempering coils at different temperatures by the one thermostat.



FOUR-POINT MULTIPLE EXTENSION TUBE THERMOSTAT
With 4 Positive Relays

As all operative points are actuated by one thermostatic tube, there will always be a constant relation between these adjustments. It would be much more difficult to maintain this constant relation of adjustments where a number of thermostats are used instead of the multiple insertion thermostat.

These thermostats are made in two-, three- and four-point multiple, which is equivalent to two, three, and four individual insertion thermostats having different adjustments. However, the installation of the multiple thermostat is much more simple than that for the corresponding number of individual thermostats. It requires much less piping, does the work more uniformly, and is more easily adjusted.

All working parts are contained in dustproof cases, and are readily accessible for observation or adjustment.

Multiple thermostats are made in three classes, as follows:

Positive-Acting Multiple Insertion Thermostat having all points positive-acting, for valve control—2-point, 3-point, 4-point.

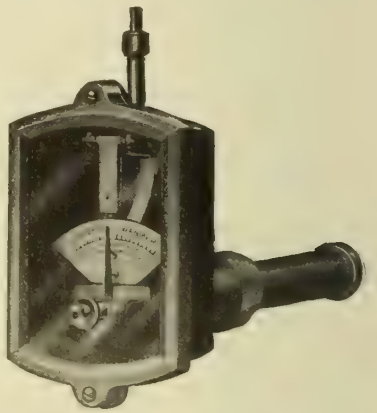
Graduated-Acting Multiple Insertion Thermostat, having all points graduated-acting, for damper control—2-point, 3-point, 4-point.

Compound-Acting Multiple Insertion Thermostat, having one point graduated-acting for control of by-pass dampers, and balance positive-acting for control of coil valves—2-point, 3-point, 4-point.

Hot Water Thermostat.

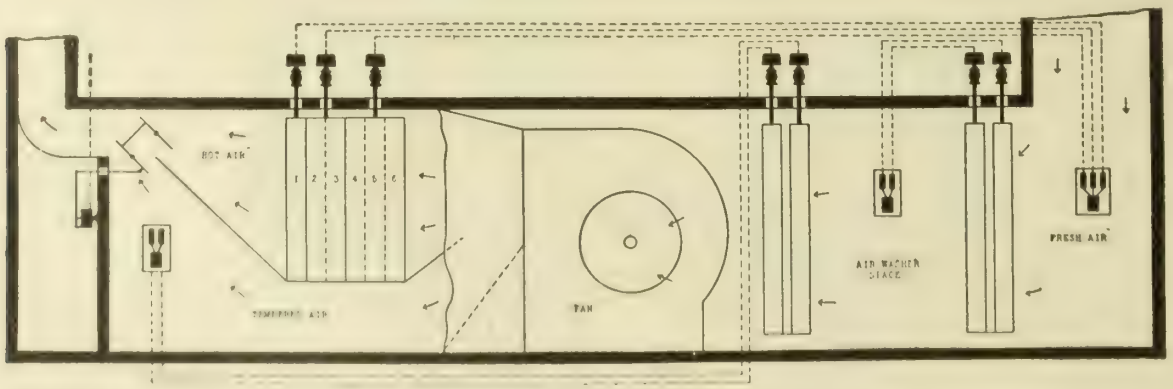
This thermostat is somewhat similar in design to the extension tube thermostat, and is made to be inserted into the hot-water tank or main. The temperature affecting the thermostat causes it to operate in the same manner as the extension tube thermostats.

If the hot-water tank is heated by means of a steam coil, as soon as the temperature reaches the desired point the thermostat will operate to close a diaphragm valve on the steam main, thus shutting off the supply of heat to the tank. Compressed air is used to close the valves, and we have operated very successfully valves up to 14 inches in diameter and weighing over 1,000 pounds.



HOT-WATER THERMOSTAT

Where the water is heated by a coal burning heater, either for household purposes or in hot-water heating systems in residences, this thermostat operates the drafts on the heater through a diaphragm motor. As a safety and economical device, it is indispensable.



APPLICATION OF MULTIPLE THERMOSTAT TO COIL CONTROL FOR HOT-BLAST SYSTEMS

A most practical and interesting application of multiple thermostats to coil control for hot-blast systems. This system is used in La Salle Hotel, Chicago, with excellent results. The 4-point graduating insertion thermostat in fresh air stack controls the reheater coils, the 2-point multiple thermostat in tempered air chamber controls the tempering coils, one point being set at 66 and the other at 68 degrees Fahr. A 2-point multiple thermostat located in air washer chamber controls two sections of coil to prevent the washer freezing, the extra point being a safeguard. As the temperature outside falls, more radiation is added for the purpose of heating the building. Room thermostats control the mixing dampers shown in plenum chamber.

Continued on next page

Hydraulic Thermostat.

Where compressed air is not available we use a thermostat of the design shown in the illustration.

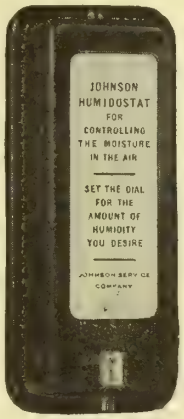
With this thermostat, the diaphragm valve on the steam supply to the hot-water tank is operated by water instead of air. These thermostats are quite sensitive, and will operate very large valves against high steam pressures.

Diaphragm motors are operated in the same manner, if an auxiliary heater is used instead of steam.

HYDRAULIC THERMOSTAT

Humidostat.

The word "humidostat" was coined by the inventor, Prof. Warren S. Johnson; and copyrights in the United States and Canada are owned by this Company. The name has been incorporated in recent editions of Webster's Dictionary, and is defined as an instrument for regulating the percentage of humidity in the air of buildings. This refers to the Johnson humidostat, as previous to this invention no such instrument was known.



ROOM HUMIDOSTAT (PATENTED)

4⅜ inches high, 2 inches wide and 1 inch deep

Operation of Humidostat—The operation of the humidostat is practically the same as for our pneumatic thermostats. It operates a diaphragm steam valve on the feed pipe to a steam humidifier, or in the case of humidifiers having mist nozzles supplied from city water, it controls a diaphragm valve on the water feed pipe.

The humidifiers are located in the main air duct, feeding air to the building. When more moisture is needed, the room humidostat opens the diaphragm valve and steam or water mist is supplied to the air. When the air has received enough moisture, the room humidostat closes the valve and cuts off the supply of moisture.

In the case of an electrically heated humidifier, the humidostat operates an electric switch, and on gas-heated humidifiers, a gas valve on the feed pipe.

All humidostats are so constructed that the humidifier will be shut off should the compressed air supply be cut off for any reason.

Owing to the different systems for heating buildings, and the corresponding difference in humidifiers required, we make two types of humidostats, the graduated-acting and the quick-acting.

Pneumatic Push-Buttons and Switchboards.

Compressed air in a building furnishes at once a very convenient and economical source of power. This fact has been recognized quite largely by heating engineers, and with fan blast systems of heating particularly its application has been very largely developed. Large dampers in the attic are opened or closed from the engine room by simply turning a switch; it is all that is necessary to open and close attic vent dampers, fresh air dampers, heating by-passes and return air dampers. Valves on the heating and tempering coils may be opened or closed, and in fact the engineer can operate his entire plant quickly and readily by means of this system, without leaving the engine room.

STANDARD SWITCH

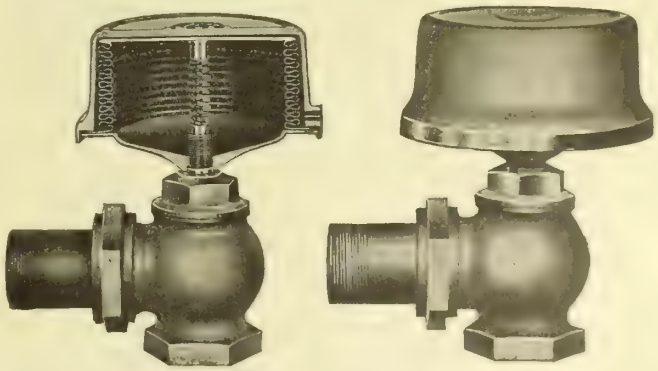
We can furnish a push-button arrangement for pneumatic control, so that when the button is pushed, a damper will be opened or closed. This switch is quite similar to an electric push-button, compressed air being used to do the work required.

If it is desired to hold dampers in partially opened or closed positions, we furnish indicating devices which show in just what position the damper is held. In modern office buildings, compressed air is used by physicians, surgeons and dentists. When temperature control is being installed, the additional compressed air system can be furnished at very small cost.

PUSH-BUTTON

Johnson Sylphon Metal Diaphragm Valve.

In this construction, the indestructible seamless brass sylphon bellows replaces the rubber diaphragm heretofore used in all diaphragm valves. It is the greatest improvement toward ideal perfect working temperature regulation ever devised.



JOHNSON SYLPHON METAL DIAPHRAGM VALVE

There is a growing practice on the part of archi-

Continued on next page

tects and heating engineers to conceal heating apparatus by placing steam pipes in wall shafts, and radiators in window boxes and behind ornamental screens. This advance in heating methods places the rubber diaphragm valve in an untenable position. The valves must necessarily be placed in inaccessible, hot places, with the radiators or heating stacks, which results in the vulcanizing of the rubber diaphragms in a comparatively short space of time. Aside from the necessity and expense of removing diaphragms frequently, the system of temperature regulation, otherwise perfectly operative, will be rendered ineffective. A careless engineer, failing to appreciate the limitations of rubber in hot places and to keep the diaphragm valves in working order, can make a failure of the finest installation.

Johnson Rubber Diaphragm Valve.

As the sylphon metal diaphragm valve will necessarily cost a trifle more than the old style rubber diaphragm valve, we shall continue their manufacture and provide them whenever specified, and guarantee them for five years unless located in excessively hot or enclosed places. The diaphragms are three-ply rubber and protected with felt. All our diaphragm valves—sylphon metal or rubber diaphragms—are made of the best metal cast in our own foundry, and are built especially heavy to prevent their being twisted out of line by a careless steamfitter.

The discs are especially made for us by the Jenkins Valve Company, and constitute the best disc obtainable.

All our valves are made in any of the commercial styles, shapes and finishes. No change in steam-piping plans is necessary because of the use of valves operated by thermostats.

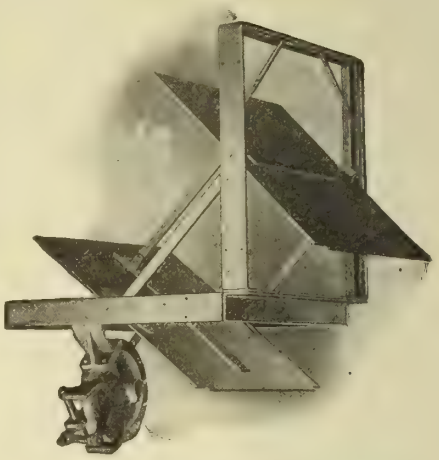
LARGE FLANGED GLOBE VALVE

Heat Regulation Dampers.

Dampers in connection with temperature regulating systems should always be furnished by the heat regulating contractor, to insure proper construction for operation by thermostats, durability and efficiency.

The Johnson dampers are made with particularly heavy frames to withstand sagging of the ducts. The blades are made of heavy sheet steel, and the entire damper is treated with two coats of japan enamel which insures ample protection against rust. Brass trunnions are ordinarily used; but on the larger dampers roller bearings are provided, insuring ease of operation.

All forms of dampers are made for use in various kinds and shapes of ducts, and in connection with various systems of indirect heating. The principal kinds are single square, single round, double right angle, double end-to-end, and louver.



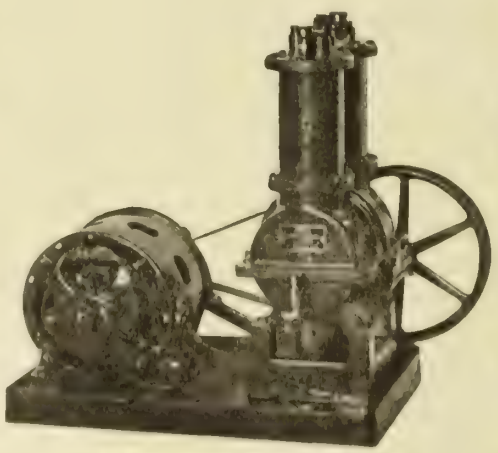
DOUBLE-MIXING DAMPER WITH DIAPHRAGM MOTOR

Air Compressors.

Air compressors are hydraulic, electric, steam or power driven. They are of fundamental importance in the operation of a successful regulating system, and must be of abundant capacity under all conditions. They should be very economical in operation and require practically no attention, and should furthermore be designed so that a uniform pressure of air will be carried on the system at all times. Johnson compressors are all equipped with automatic controlling devices to regulate the pressure and economize on power.

For small plants, hydraulic or electric are most suitable; for large plants, steam air compressors are preferable. In mechanically heated schoolhouses, a power-driven pump is most suitable and economical.

NOTE—Compressed-air supply of system can be further utilized for opening and closing fresh air and foul air dampers from a central and convenient point, cleaning of dynamos, operating pneumatic power tools, etc.



ELECTRIC AIR COMPRESSOR

HYDRAULIC AIR COMPRESSOR

Continued on next page

How to Specify.

Furnish and install a complete system of Automatic Temperature Regulation and Humidity Control, furnishing all necessary thermostats, valves, dampers, humidifiers, special devices, air compressors, piping and fittings, and the labor of installing the system, except setting the valves and dampers in position—all in accordance with the following schedule and detailed specification:

Schedule—Here state the rooms to be controlled and number of thermostats in each; the manner in which the tempered air, if there is any, is to be controlled; the manner in which the drafts of the boiler are to be controlled; and specify the manner of the control of any fresh air, vent or return air dampers, stating the location and number of switches.

Thermostats—Here specify the Johnson Model Thermostat, size, 4½ by 2 by 1; and state whether it is to have residence or school cover, indicating device, positive shut off, and whether it is to be positive or intermediate motion. Specify the number and kind of inserted thermostats.

Valves—Specify the Johnson Metal Diaphragm Sylphon Valve, and state whether to be plain or nickel-plated, with or without unions, adding that these valves will be placed in position by the heating contractor.

Dampers—Specify that the dampers shall be made by the heat regulating contractor, but installed by the galvanized iron contractor, and that the dampers shall consist of wrought iron frames, sheet steel blades, strongly cleated, with brass bearings.

Air Compressors—Specify kind of air compressor, steam, hydraulic, electric or power driven, requiring that the air compressor shall be of sufficient size to operate the system, with a factor of safety not less than three, and requiring that it be provided with all necessary governing devices, fittings, gauge, etc.

Humidostats—Specify the Johnson Humidostat and Humidifier, stating the kind of humidifier, whether perforated steam or copper evaporating pan.

Guarantee—Require that the system be complete in every respect, and that all necessary material and special fittings shall be furnished whether specifically mentioned or not. Require that the entire system be guaranteed free from all original defects in material and workmanship, and that any parts proving defective or wearing out within two years from date of completion shall be replaced free of charge. Require that the thermostats shall operate the valves or dampers to which they are attached, at a variation of not to exceed one degree above or below any given point.

References.

The best recommendations that can possibly be offered for the Johnson System, aside from the fact of the rapid growth of the business, are the repeat orders constantly received from individuals and institutions who have used the system for years.

Over fifteen years ago, this firm equipped the Santa Fé Hospital at Topeka, Kansas, with a complete system of temperature control; two years ago, it installed another system in their ten-story office building, in the same city, and recently their Union Depot at Wichita was also equipped.

For the Pennsylvania Railroad, the Terminal Stations at Washington, D. C., and Pittsburgh, Pa., were equipped.

The Chicago & Northwestern Railway contracted for their large office building in Chicago, and the magnificent Terminal Station in the same city.

Many of the buildings of the National Biscuit Company and the Bell Telephone Company, in many cities throughout the United States, have been provided with the Johnson System.

Numerous installations for temperature control in Christian Science Churches throughout the United States.

Installations.

An incomplete list of installations follows on this and succeeding pages. Representative buildings of various classes have been selected for the convenience of architects in widely separated localities to enable them to consult owners in regard to the reliability of Johnson Service.

National and State Capitols

In addition to the United States Capitol, Washington, D. C., the Capitol Buildings of the following states are equipped with the Johnson System of Temperature Regulation:

Illinois	New Jersey	North Carolina
Iowa	Pennsylvania	Maryland
Ohio	Mississippi	Wisconsin
Kentucky	Washington	California

Office Buildings

Singer Building	New York, N. Y.
United States Express Building	New York, N. Y.
Consolidated Gas Co.'s Building	New York, N. Y.
Western Union Building	New York, N. Y.
New York Telephone Building	Buffalo, N. Y.
Foster & Milburn Building	Buffalo, N. Y.
Pennsylvania Mutual Life Insurance	Philadelphia, Pa.
LaFayette Building	Philadelphia, Pa.
Oliver Building	Pittsburgh, Pa.
Frick Building	Pittsburgh, Pa.
Peerless Motor Car Co. Offices	Cleveland, Ohio
Brotherhood of Locomotive Engineers	Cleveland, Ohio
Reibold Building	Dayton, Ohio
Ford Administration Building	Highland Park, Mich.
Studebaker Buildings	South Bend, Ind.
McCormick Building	Chicago, Ill.
Conway Building	Chicago, Ill
Borland Building	Chicago, Ill.
Bell Telephone Building	Chicago. Ill.
Northwestern Mutual Life Insurance Co.	Milwaukee, Wis.
Providence Building	Duluth, Minn.
Hurt Building	Atlanta, Ga.
Long Building	Kansas City, Mo.

Union Pacific Building	Omaha, Neb.
Southern Pacific Building	Houston, Tex.
Santa Fe Office Building	Topeka, Kans.
Overland Building	Boise, Idaho
Sun Life Building	Montreal, Can.
Winnipeg Electric Railway Chambers	Winnipeg, Can.
Union Trust	South Bend, Ind.
Security Mutual Building	Lincoln, Neb.
Victor Talking Machine	Camden, N. J.
East Ohio Gas Co.	Cleveland, Ohio

Banks

Seligman Bank Building	New York, N. Y.
Day and Night Bank Building	New York, N. Y.
Queens Company Trust Co. Building	Jamaica, L. I.
Union Trust Co. Building	Jersey City, N. J.
First National Bank Building	San Jose, Cal.
Central Bank & Trust Co. Building	Memphis, Tenn.
National City Bank	New York, N. Y.
J. P. Morgan & Co. Banking House	New York, N. Y.
Girard Trust Co.	Philadelphia, Pa.
First National Bank	Philadelphia, Pa.
American Security & Trust Co.	Washington, D. C.
Central Trust Co.	Cleveland, Ohio
Second National Bank	Cincinnati, Ohio
Dime Savings Bank	Detroit, Mich.
Continental & Commercial National Bank	Chicago, Ill.
First National Bank	Chicago, Ill.
First National Bank	Milwaukee, Wis.
German Bank	Louisville, Ky.
Des Moines National Bank	Des Moines, Iowa
Merchants, Citizens, and First National	Los Angeles, Cal.
Crocker Bank	San Francisco, Cal.
U. S. National Bank	Portland, Ore.
Boise City National Bank	Boise, Idaho
Colorado National Bank	Denver, Colo.
Citizens National Bank	Hot Springs, Ark.
Fidelity Trust Co.	Buffalo, N. Y.
Security National	Sioux City, Iowa
Franklin National	Philadelphia, Pa.
Federal Reserve	Dallas, Tex.
First National	Ottumwa, Iowa

Theaters

Among the many leading theaters equipped by this company the following are mentioned:

Garden Pier Theater	Atlantic City, N. J.
Hippodrome Theater	Baltimore, Md.
Academy of Music	Philadelphia, Pa.
Riggs Theater	Washington, D. C.
Star Theater	Richmond, Va.
Powers Theater	Chicago, Ill.
Princess Theater	Chicago, Ill.
Garden Theater	Kansas City, Mo.
Orpheum Theater	Kansas City, Mo.
Empress Theater	Sioux City, Iowa
Brandeis Theater	Omaha, Neb.
Colonial Theater	Covington, Ky.
Colonial Theater	St. Joseph, Mo.
Hurt Theater	Atlanta, Ga.
Heilig Theater	Portland, Ore.
Metropolitan Theater	Seattle, Wash.
Orpheum Theater	Seattle, Wash.
Clemmar Theater	Seattle, Wash.
Lyric Theater	Indianapolis, Ind.
Orpheum	Kansas City, Mo.
Merrill	Milwaukee, Wis.

Hotels

Hotel Selkirk	Winnipeg, Can.
Hotel Knickerbocker	New York, N. Y.
Ritz & Carlton Hotel Buildings	New York, N., Y., and Montreal, Can.
Hotel Bossert	Brooklyn, N. Y.
New Hoffman House	New York, N. Y.
Rector's Hotel	New York, N. Y.
Hotel Martinique	New York, N. Y.
Hotel McAlpin	New York, N. Y
Belnord Apartment; largest in the world	
Chateau Laurier	Ottawa, Can.
Hotel Manhattan	New York, N. Y.
Hotel Plaza	New York, N. Y.
Hotel Astor	New York, N. Y.
Hotel Belmont	New York, N. Y.
Ritz-Carlton Hotel	Philadelphia, Pa.
Raleigh Hotel	Washington, D. C.
Statler Hotel	Buffalo, N. Y.
LaFayette Hotel	Buffalo, N. Y.
Greenbrier Hotel	White Sulphur Springs, Va.
Battle House	Mobile, Ala.
Hotel Sherman	Chicago, Ill.
LaSalle Hotel	Chicago, Ill.
Radisson Hotel	Minneapolis, Minn.
Baltimore Hotel	Kansas City, Mo.
Adolphus Hotel	Dallas, Tex.
St. Francis Hotel	San Francisco, Cal.
Palace Hotel	San Francisco, Cal.
C. P. R. Hotel	Calgary, Can.

Public Buildings

Municipal Building	New York, N. Y.
New York Public Library	New York, N. Y.
Metropolitan Museum of Art	New York, N. Y.
Municipal Building	Newark, N. J.
Municipal Building	Hartford, Conn.
State Educational Building	Albany, N. Y.
City Hall	Philadelphia, Pa.
United States Post Office	Washington, D. C.
Camden County Court House	Camden, N. J.
Memorial to Women of the Civil War	Washington, D. C.
Smithsonian Institute	Washington, D. C.
U. S. Court House and Customs House	Baltimore, Md.
Soldiers' Memorial	Pittsburgh, Pa.
Soldiers' and Sailors' Memorial	Cincinnati, Ohio
Cuyahoga County Court House	Cleveland, Ohio
U. S. Post Office	Columbus, Ohio
U. S. Court House and Post Office	Detroit, Mich.
Wayne County Building	Detroit, Mich.
U. S. Post Office	Indianapolis, Ind
City Hall	Chicago, Ill.
U. S. Custom House and Post Office	Chicago, Ill.
Colorado State Museum	Denver, Col.
U. S. Post Office	Denver, Col.
City Hall	Des Moines, Iowa
U. S. Post Office	Atlanta, Ga.
U. S. Post Office	New Orleans, La.
U. S. Penitentiary	Leavenworth, Kan.
City Hall	Dallas, Tex.
Criminal Court Building	Dallas, Tex.
City Hall	Oakland, Cal.
Sacramento County Court House	Sacramento, Cal.
City Hall	San Francisco, Cal.
U. S. Post Office	San Francisco, Cal.
State Supreme Court and Library	Salem, Ore.
Federal Building	Tacoma, Wash.
Federal Building	Bellingham, Wash.
Government House	Toronto, Can.
Law Courts	Winnipeg, Can.
Court House	Cincinnati, Ohio
Chamber of Commerce	Rochester, N. Y.
Court House	El Paso, Tex.
Bureau of Standards	Washington, D. C.

Continued on next page

Schools

Approximately *ten thousand* Grammar and High schools throughout the country are equipped with the Johnson System of Temperature Regulation, as well as many of the leading Colleges and Universities.

Colleges and Universities

University of Chicago	Chicago, Ill.
Northwestern University	Evanston, Ill.
University of Cincinnati	Cincinnati, Ohio
Ohio State University	Columbus, Ohio.
Ohio University	Athens, Ohio
University of Michigan	Ann Arbor, Mich.
University of Illinois	Urbana, Ill.
Michigan Agricultural College	Lansing, Mich.
Purdue University	LaFayette, Ind.
Williams Jewell College	Liberty, Mo.
University of Kansas	Lawrence, Kan.
Agricultural and Mechanical College	College Station, Tex.
University of Arizona	Tucson, Ariz.
University of California	Oakland, Cal.
University of Minnesota	Minneapolis, Minn.
University of Wisconsin	Madison, Mis.
University of Pennsylvania	Philadelphia, Pa.
Bryn Mawr College	Bryn Mawr, Pa.
Princeton University	Princeton, N. J.
Johns Hopkins University	Baltimore, Md.
University of Washington	Seattle, Wash.
University of Oregon	Eugene, Ore.
Iowa State College	Ames, Iowa
Iowa State University	Iowa City, Iowa
Cornell University	Ithaca, N. Y.
University of Nebraska	Lincoln, Neb.
Marshall College	Huntington, W. Va.

Residences

C. K. G. Billings	New York, N. Y.
Geo. J. Gould	New York, N. Y.
John D. Rockefeller	Pocantico Hills, N. Y.
E. H. Gary	New York, N. Y.
James Speyer	New York, N. Y.
Sydney Hutchison	Philadelphia, Pa.
Samuel Rea	Bryn Mawr, Pa.
Franklin McVeagh	Washington, D. C.
H. M. Hanna	Cleveland, Ohio
W. T. Morgan	Alliance, Ohio
F. A. Sieberling	Akron, Ohio
C. F. Kettering	Dayton, Ohio
J. O. Armour	Chicago, Ill.
Harold F. McCormick	Chicago, Ill.
J. N. Allison	Indianapolis, Ind.
F. H. Wheeler	Indianapolis, Ind.
W. S. Dickey	Kansas City, Mo.
R. A. Long	Kansas City, Mo.
W. N. Frew	Pittsburgh, Pa.
A. R. Peacock	Pittsburgh, Pa.
Thomas Rodd	Pittsburgh, Pa.
H. M. Thompson	Milwaukee, Wis.
Mrs. E. Uhlein	Milwaukee, Wis.
S. H. Knox	Buffalo, N. Y.
Geo. Eastman	Rochester, N. Y.
C. C. Slaughter	Pueblo, Colo.
D. J. Hennessy	Butte, Mont.
H. B. DeLong	Spokane, Wash.
Judge Burke	Seattle, Wash.
Mrs. Maud Lee Flood	San Francisco, Cal.
Lee A. Phillips	Los Angeles, Cal.
J. M. Danziger	Beverly Hills, Cal.
Cornelius Vanderbilt	New York, N. Y.
S. A. Fletcher	Indianapolis, Ind.
R. J. Reynolds	Winston-Salem, N. C.
E. A. Deeds	Dayton, Ohio
Adolph Lewisohn	New York, N. Y.

Hospitals

St. Luke's Hospital	New York, N. Y.
Post Graduate Hospital	New York, N. Y.
Bellevue Hospital	New York, N. Y.
General Hospital	Waterbury, Conn.
U. S. Naval Hospital	Philadelphia, Pa.
Homeopathic Hospital	Pittsburgh, Pa.
Mercy Hospital	Pittsburgh, Pa.
State Homeopathic Hospital	Allentown, Pa.
St. Luke's Hospital	Chicago, Ill.
Durand Hospital	Chicago, Ill.
Cincinnati General Hospital	Cincinnati, Ohio
Bethesda Hospital	Cincinnati, Ohio
City Hospital	Cleveland, Ohio
Keifer Hospital	Detroit, Mich.
Sacred Heart Sanitarium	Milwaukee, Wis.
Louisville Public Hospital	Louisville, Ky.
Hotel Dieu	New Orleans, La.
National Jewish Hospital	Denver, Colo.
Methodist Hospital	Omaha, Neb.
Providence Hospital	Seattle, Wash.
St. Vincent's Hospital	Portland, Ore.
County Hospital	Los Angeles, Cal.
Southern Pacific Hospital	San Francisco, Cal.
Orange County Hospital	Santa Ana, Cal.
Texas Baptist Memorial Sanitarium	Dallas, Tex.
New Haven Hospital	West Haven, Conn.
Criminal Insane Hospital	Fairview, Pa.
Long Island Hospital	Boston, Mass.
Orthopaedic Hospital	New York, N. Y.

Railroad Stations

Union Station	Baltimore, Md.
Broad Street Station	Philadelphia, Pa.
Michigan Central Terminal	Detroit, Mich.
Chicago & Northwestern Terminal	Chicago, Ill.
Chicago, Rock Island & Pacific and Lake Shore & Michigan Southern Terminal	Chicago, Ill.
Great Northern Station	Minneapolis, Minn.
Union Station	Pittsburgh, Pa.
Union Station	Wichita, Kan.
Union Station	Washington, D. C.
Delaware, Lackawanna and Western Terminal	Buffalo, N. Y.

Foreign Buildings

Gymnase	Mariendorf
Royal Library	Berlin
Wlassack & Hadwiger Office	Vienna
Krupp Office	Essen
Academy	Hamburg
Hotel Meurice	Paris
Residence König	Petrograd
Municipal Office	Leipzig
Admiral-Palace Building	Berlin
Restauration Pschorr	Berlin
School	Essen
Railway Station	Namur, Belge
University	Peking, China
City Hall	Kiel
Hospital	Lubeck
Diamant Exchanche Building	Antwerpen
Theater	Stuttgart

F. D. KEES MFG. CO.

Automatic Heat Regulators for Warm Air Furnaces

BEATRICE, NEB.

Product.

"Kees" Automatic Temperature Regulator, for Warm Air Furnaces only.

TRADE-MARK

"Kees" Automatic Temperature Regulator.

The "Kees" Temperature Regulator automatically opens and closes the furnace draft and damper, keeping the temperature even at any degree desired.

It consists of a rod which extends through the jacket, resting firmly on the dome, a series of levers connected to the rod, and chains running from the levers to the draft and check damper.

As the heat in the combustion chamber increases or decreases, the entire furnace body expands and contracts. This moves the rod up or down as the case may be. This movement is very slight, but the levers increase it so that it is sufficient to operate the damper and draft.

By adjusting the length of the chains, any temperature desired may be secured.

Chains run to a hand controller on the first floor make it possible to have a lower temperature at night.

Advantages—The uniform temperature increases the comfort and healthfulness of the home.

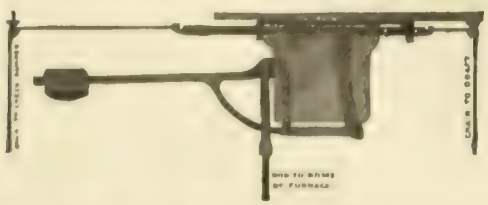
It prevents the usual waste of fuel due to overheating; no more is burned than is actually needed. Some users save as much as 25 per cent. By preventing overheating and sudden changes, it lessens the expense of repairs, and lengthens the life of the heater.

Installation—It can be used on any cast-iron or steel furnace. Following the directions we furnish, any one handy with tools can install it.

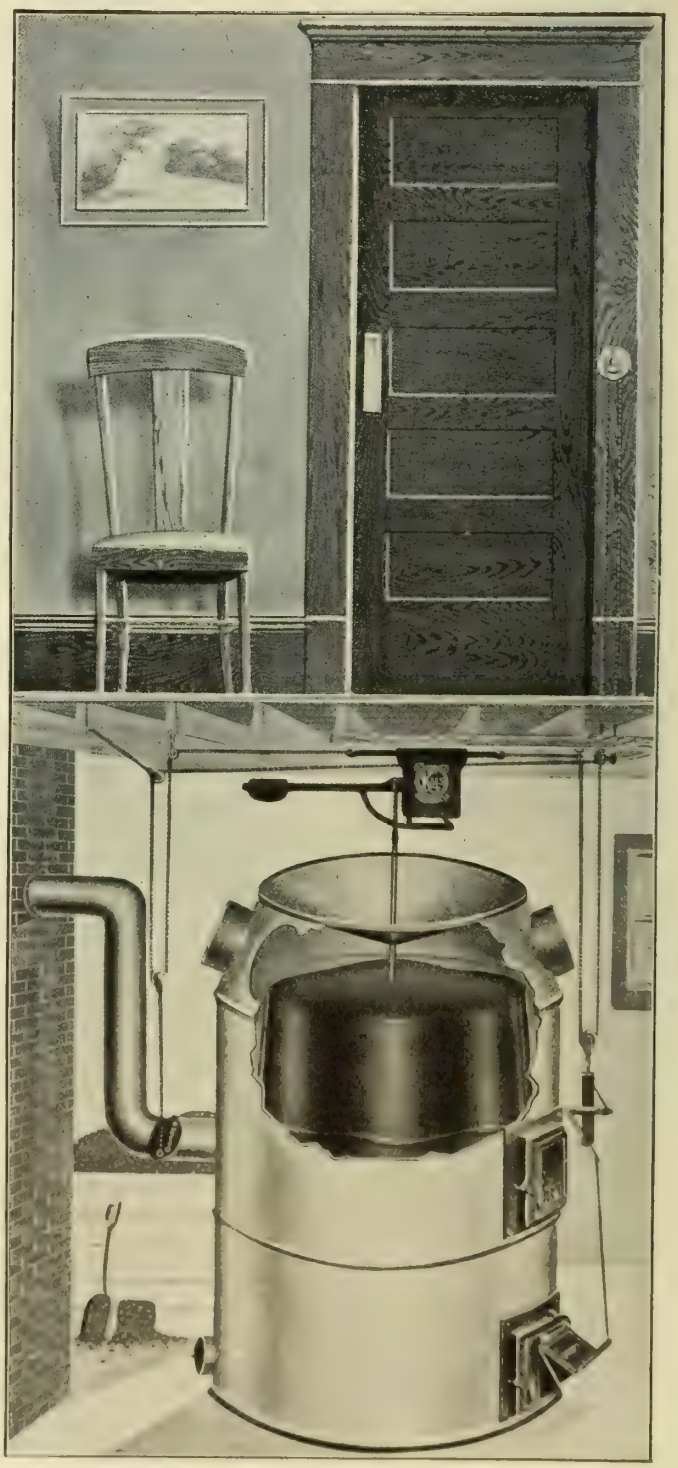
Cost—The cost installed will not exceed $15. This is about one half the price of other regulating devices which are more complicated, but no more effective, and less reliable.

Distribution—Sold and installed by furnace dealers, or may be ordered direct, on sixty days' free trial.

References—F. O. Moore & Sons, Bellefontaine, Ohio; N. Roberts, Secretary Nebraska Retail Hardware Dealers Association, Lincoln, Nebr.; Hon. W. L. Stark, Aurora, Nebr.; Charles Neidhart, Dr. B. L. Spellman, Beatrice, Nebr.; Herbert Brothers, Cherry Valley, N. Y.; F. A. Shelley, Newfane, N. Y. Write for descriptive booklet and names of other satisfied users.



X RAY VIEW OF "KEES" FURNACE REGULATOR



"KEES" REGULATOR INSTALLED

Space above Furnace may be as little as 10 in. If smoke pipe is not directly back of feed door, extra pulleys are used to run chain to check damper

THE WM. O. LEE CO.

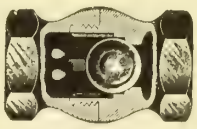
Manufacturers of Water and Oil Injectors

PORT HURON, MICH.

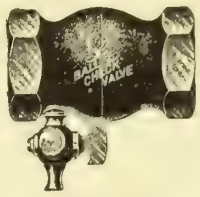
Products.

WATER and OIL INJECTORS, EJECTORS, and CHECK VALVES, CIRCULATING PUMPS. Also, CRANK PIN OILERS, HOSE and STEAM PIPE STRAINERS, NOISELESS HOT-WATER NOZZLES, MECHANICAL LUBRICATORS, and BULL'S-EYE DASH SIGHT FEED.

TRADE-MARK



Sectional View



Valve with Drip Cock

LEE CHECK VALVES

PRICES, STRAIGHT-WAY CHECK VALVES

Size, Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2
Each	$1.10	$1.10	$1.20	$1.30	$1.90	$2.60	$3.60	$5.00	$7.50
Each, with Drip Cock	1.60	1.60	1.60	1.70	2.30	3.00	4.00	5.40	7.90

Lee Water and Oil Injector.

This injector will force boiler purger or kerosene oil to the boiler at the same time it is forcing water, from two separate receptacles, the fluid and the water mingling as they enter the boiler.

Tests—Before leaving factory each injector is submittted to the following rigid test:

Start low, 16 to 18 lbs. steam pressure on a 4-ft. lift.

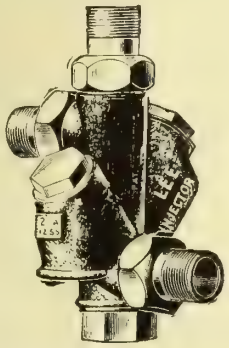
Work high, 150 to 160 lbs. steam pressure or over on a 4-ft. lift.

Lift water 20 ft. on 60 to 100 lbs. steam pressure.

Handle hot water, 120° to 130° at 65 to 80 lbs. steam pressure.

Handle hot water, 110° to 118° at 100 lbs. steam pressure.

Handle hot water, 95° to 100° at 125 lbs. steam pressure.



LEE INJECTOR

LEE EJECTOR OR JET PUMP

Lifts 20 to 25 feet. Elevates 50 to 75 feet

Sectional View

Valve with Drip Cock

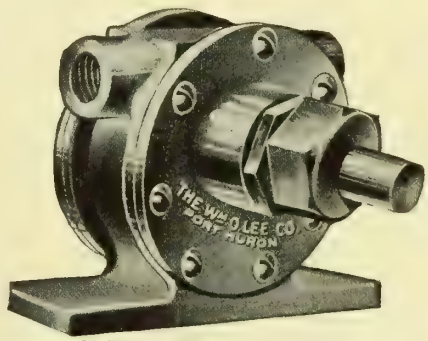
LEE HORIZONTAL BALL CHECK VALVES

PRICES, HORIZONTAL BALL CHECK VALVES

Size, Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2
Each	$1.10	$1.10	$1.20	$1.60	$2.30	$3.10	$4.00	$6.20	$9.40
Each, with Drip Cock	1.50	1.50	1.70	2.00	2.70	3.50	4.40	6.60	9.80

PRICE-LIST LEE INJECTORS

Horse-Power	Pipe Connections, Inches	Price	Size	Gallon Capacity per Hour, 2- to 4-Ft. Lift: Maximum 65 Lbs. Steam	Maximum 80 Lbs. Steam	Maximum 100 Lbs. Steam	Minimum 80 Lbs. Steam
1 to 3	¼	$15.00	O	50	55	50	25
3 to 5	⅜	15.00	1-O	65	70	60	35
4 to 8	⅜	16.00	2-O	90	100	90	50
8 to 10	½	18.00	1-A	140	150	140	75
10 to 15	½	20.00	2-A	180	190	175	95
15 to 25	¾	25.00	1-B	240	250	240	125
25 to 35	¾	30.00	2-B	350	360	340	180
35 to 50	1	40.00	1-C	475	485	460	245
50 to 60	1	45.00	2-C	600	630	580	315
60 to 95	1¼	55.00	1-D	780	830	780	415
95 to 120	1¼	60.00	2-D	950	990	900	500
120 to 165	1½	75.00	1-E	1440	1500	1375	700
165 to 230	1½	90.00	2-E	1800	1830	1750	920
230 to 290	2	110.00	1-F	2275	2300	2270	1150
290 to 365	2	125.00	2-F	2900	3000	2900	1500
365 to 500	2½	175.00	1-G	3500	3650	3500	1825
500 to 650	2½	200.00	2-G	4150	4250	4100	2100
650 to 1000	3	350.00	2-H	6000	6250	6000	4000



LEE CIRCULATING PUMP

A positive pressure rotary pump for handling liquids or air

PRICE-LIST AND DIMENSIONS LEE CIRCULATING PUMPS

Pipe Connections, Inches	Dimensions: Size Shaft, Inches	Width across Connections, Inches	Height, Inches	Foot Dimensions	Center Connection to Base, Inches	Center Shaft to Base, Inches
¼	⅜	2¾	2¾	⅞ x 3½	2	1¾
⅜	½	3	3	⅞ x 3¾	2¼	1⅞
⅜	½	3	3	1¼ x 3¾	2¼	1⅞
½	⅝	3¾	3½	1¼ x 4¼	2½	2⅛
¾	½	4½	4¼	1½ x 5	3	2½
1						

Weight	Capacity Revolutions: 200	400	600	Lift Revolutions: 200	400	600	List Price
	Gallons per Minute			in Feet			
2½	1 to 1½	1½ to 3	2 to 4	10	15	20	$6.00
2¾	1½ to 2	3 to 4	4 to 6	10	15	20	7.50
3	2 to 3	4 to 6	6 to 8	10	15	20	9.00
4	3 to 4	5 to 7	8 to 12	10	15	20	11.50
5¾	4 to 6	6 to 10	10 to 14	10	15	20	14.00

PRICE-LIST LEE EJECTORS

Size by Numbers		1	2	3	4	5	6	7	8	9
Pipe Connection, inches	Steam	⅜	½	¾	1	1	1¼	1½	2	2
	Suction	½	¾	1	1¼	1½	2	2½	3	3½
	Delivery	¾	1	1¼	1½	2	2½	3	3½	4
Gallon Capacity per Hour	45 to 65 lbs. steam, 3-ft. lift	255	485	950	1620	2275	3500	5700	9500	13600
	25 to 45 lbs. and 65 to 100 lbs.	240	435	840	1450	2075	3000	4350	8160	12400
	50 ft. elevation 40 to 65 lbs. 3-ft. lift.	120	250	420	650	975	1750	2500	4750	6800
	25 ft. elevation 40 to 65 lbs. 3-ft. lift.	180	375	625	950	1450	2600	3750	7200	10200
Vertical lift in feet	25 to 40 lbs. and 75 to 100 lbs.	20	21	22	22½	21½	21½	22	20	24
	40 to 75 lbs.	23	25	25	24	26	26	26	24	21
Each		$8.00	10.00	15.00	20.00	25.00	35.00	40.00	50.00	75.00

Nos. 6, 7, 8, 9 have Iron Bodies, balance Brass. These sizes made in all brass to order; prices on application.

Where an Ejector is used with a lift of 10 feet or over, a foot valve should be placed on the lower end of pipe.

Discounts.

Trade Discounts will be supplied on application.

ESTABLISHED 1885

MINNEAPOLIS HEAT REGULATOR CO.

MINNEAPOLIS, MINN.

FACTORY BRANCHES

SYRACUSE, N. Y., 218 East Washington Street
BOSTON, MASS., 77 Summer Street
KANSAS CITY, MO., 114 West 3rd Street
ST. LOUIS, MO., 1215 Syndicate Trust Building
CLEVELAND, OHIO, 1335 East 105th Street

ALL JOBBERS AND DEALERS IN HEATING GOODS IN THE UNITED STATES AND CANADA

Products.

MINNEAPOLIS HEAT REGULATORS, THERMOSTATS, MOTORS.

We manufacture exclusively AUTOMATIC HEAT REGULATORS for Warm-Air Furnaces, Steam, Vacuum, Vapor and Hot-Water Boilers, Hot-Water Tanks and Heaters, Gas and Street Steam Service.

Minneapolis Heat Regulator.

The Minneapolis heat regulator is made in various models as to style of both thermostats and motors. The application is simple. The thermostat (mechanical thermometer) is placed at an average temperature point in the living room, connected by a concealed three-wire cable through two ordinary dry cells to the motor, which is located in the basement. The thermostat is adjustable on a one degree or more temperature range, which operates the motor and causes it to open and close the dampers of the heater on a temperature change of one degree as registered in the living room.

What It Will Do.

It will keep the house at an even temperature, save coal, prevent destruction of property by fire, and prolong the life of a heater by always closing the draft before the fire gains too much headway. It will relieve the mind entirely of the care of the draft dampers, and the fear that at night, or during your absence for a few hours, there is danger to life or property through neglect of the heater. The regulator will demonstrate that no heating plant can be efficient or complete without it. It is especially adapted for residences.

Advantages.

The Minneapolis regulator has been on the market for thirty years, and is more widely used than any device of it character. Nothing to wear out. Many of them sold twenty-five and more years ago are still in use. No special dampers are required. The device is practically noiseless in its operation.

Thermostat.

The Model No. 47, shown in Fig. 1, is equipped with a one-day time attachment. This part of the device, located in the living room, registers the temperature the same as a thermometer. The pointer is set at a point on the scale corresponding with the temperature desired, which can be changed at will.

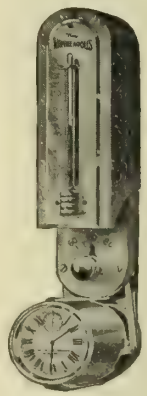


FIG. 1. MODEL NO. 47 THERMOSTAT, WITH TIME ATTACHMENT

Spring Motor.

The Motor, as shown in Fig. 2, is encased in a solid, pressed-steel cover, No. 22-gauge, finished in black enamel (baked).

Winding Index—There is an index finger with scale "A," which travels as the motor is wound and unwound, a glance at the motor showing at all times the condition in reference to winding.

Dust- and Moisture-Proof—The cover is dust- and moisture-proof, cotton sleeving being used at the shaft "B."

Basement Switch—The motor is also provided with basement switch "C," by means of which the motor can be operated in the basement, at will.

Easily wound by means of crank key.

All of our motors, when run down, *leave the drafts closed.*

FIG. 2. MOTOR ENCASED IN STEEL COVER

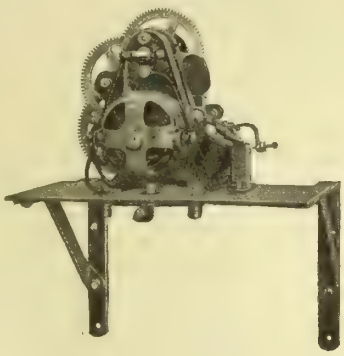
The parts of the motor are of pressed steel and brass (no cast iron); the bearings are lathe-turned, running in brass bushings, as finely adjusted and fitted as the very best clock made.

All parts of our motors are made in our own factories, including the cutting of all gears, manufacturing of our own magnets, etc. Motor lasts a lifetime. Requires winding about every week or ten days in the coldest weather.

(Continued on next page

Direct-Current Motor.

The illustration shows how compactly and neatly the Minneapolis direct-current motor is designed. The Minneapolis direct-current motor has ample power and is capable of handling the heaviest work that a heat regulator can be put to. Power is furnished by four dry cells, which have full capacity to operate the device for an entire heating season, and will generally last over into the next. We recommend, however, a new set of dry cells each fall. Aside from replenishing the batteries and oiling the machine once a year, it requires absolutely no attention.



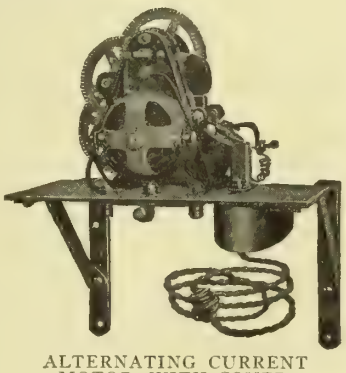
DIRECT-CURRENT MOTOR, WITH COVER REMOVED

This motor is particularly recommended for installations where alternating current is not available. Where this may be obtained, we recommend the Minneapolis alternating current type of motor, which, though slightly higher in first cost, is much cheaper in the long run, as there is no battery renewal.

Alternating Current Motor.

The Minneapolis alternating current motor is designed to operate directly from the house lighting circuit. It operates with 110-volt 60-cycle alternating current; but a small transformer is mounted on the bottom of the case, and this cuts down the voltage of the current which operates the thermostat and magnet coils. This makes for a very positive operation, and is much more satisfactory than the customary method of operating the motor itself through the low voltage current furnished by a transformer.

Our method is far superior, as the best results are obtained from a motor operating on 110 volts, and the low voltage used by the thermostat is much easier on the platinum contact points of the thermostat than the higher voltage, which it is necessary to use when the complete device is operated by the current furnished by transformer.



ALTERNATING CURRENT MOTOR, WITH COVER REMOVED

Note that this motor is furnished complete, with transformer, in one unit. This makes the installation very simple, as it is necessary only to connect the thermostat wires to the motor and then wire to your lighting circuit. There are no confusing connections to a transformer; these are all made for you in the Minneapolis factory.

Model 55.

This model is equipped with a reliable eight-day clock. The thermostat mechanism is so arranged that at night, automatically, the thermostat pointer is moved back to the night temperature, and again in the morning, at the predetermined hour, is moved forward to the day temperature.

Attached to the main shaft of the eight-day clock is a dial making a complete revolution every twenty-four hours. This dial is stamped with suitable time graduations. An adjustable double hand is used in connection with the dial for the "setting" adjustment. To "set" the device for use is extremely simple and can be accomplished by a child in five seconds. In fact, it is as simple as setting an alarm clock.

MODEL NO. 55 THERMOSTAT, 8-DAY AUTOMATIC TIME ADJUSTMENT
Two actions each twenty-four hours

Thermostat, Model No. 60.

The Model No. 60 Thermostat (Fig. 3) is equipped with a high-grade timepiece, both clock and alarm running eight days with one winding. The clock has a solid brass case, repeater alarm, jeweled balance, porcelain dial and bevel glass front.

The clock swings in a complete circle and does not have to be removed for winding.

When ready to retire, turn back pointer, press button and go to bed relieved of all anxiety about the heating plant.

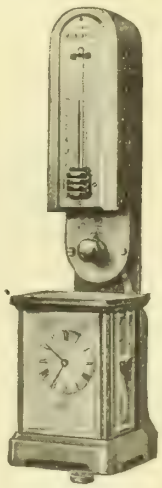


FIG. 3. MODEL NO. 60 THERMOSTAT, WITH 8-DAY CLOCK

Specifications.

For hot-air furnaces, hot-water, vapor, vacuum, or steam boilers, specify as follows:

Contractors shall furnish and properly connect to the heating plant, a Minneapolis Heat Regulator, Model No. ...., complete.

THE POWERS REGULATOR CO.

Manufacturers of Temperature Controlling Specialties

5 South Wabash Avenue
CHICAGO, ILL.

101 Park Avenue
NEW YORK, N. Y.

Products.

TEMPERATURE CONTROLLING SPECIALTIES and AUTOMATIC APPLIANCES for the proper Regulation of Heating and Cooling Mediums: POWERS HOT-WATER TANK REGULATORS; SHOWER BATH and HOT-WATER LINE CONTROLLERS; PRESSURE REDUCING VALVES; GAS VALVES; STERILIZER CONTROL VALVES, etc.

Also, Thermostats; Diaphragm Valves and Motors; Mixing Dampers, and Air Compressors, for which see our name in General Index.

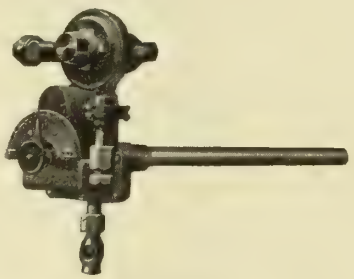
Quality and Guarantee.

The devices shown herein are the result of years of research and practice, and possess the well-known "Powers" quality. They are covered by the Powers guaranty, which is practically unlimited.

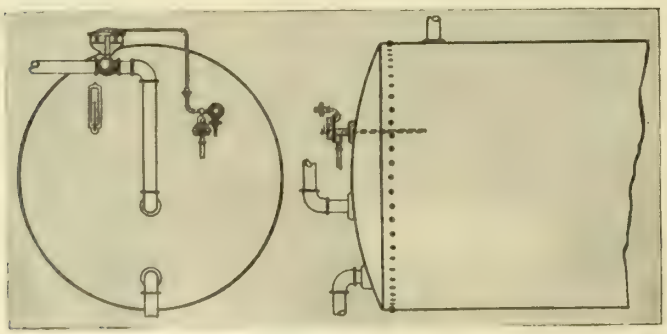
Hot-Water Tank Regulation.

For the control of steam-heated hot-water service tanks we offer:

No. 10 Powers Tank Regulator—This regulator uses power from the convenient cold-water supply for its operation, and is an extremely accurate and reliable regulator. We have had it on the market for fifteen years, and the constantly increasing sales attest its popularity.



REGULATOR



NO. 10 REGULATOR INSTALLATION

PRICE-LIST

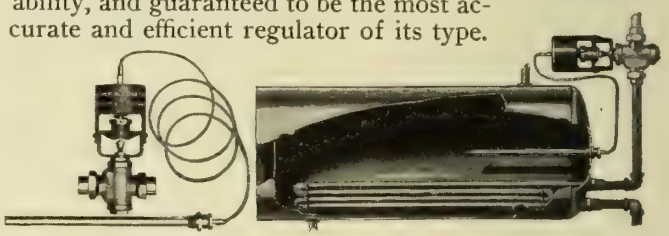
No. 10 Regulator with	1"	valve.	$70.00
No. 10 Regulator with	1¼"	valve.	75.00
No. 10 Regulator with	1½"	valve.	80.00
No. 10 Regulator with	2"	valve.	90.00
No. 10 Regulator with	2½"	valve.	95.00
No. 10 Regulator with	3"	valve.	100.00
No. 10 Regulator with	4"	valve.	120.00
No. 10 Regulator with	5"	valve.	150.00
No. 10 Regulator with	6"	valve.	175.00
No. 10 Regulator with	7"	valve.	200.00
No. 10 Regulator with	8"	valve.	225.00
No. 10 Regulator with	9"	valve.	250.00
No. 10 Regulator with	10"	valve.	275.00

DIAPHRAGM VALVE

Add for independent coal-burning heater controller, $2.00.

Liberal discount to the trade. Send for Bulletin 116, more completely descriptive.

No. 11 Powers Tank Regulator—We offer this regulator to those who want a self-contained device requiring no water or other auxiliary power for its operation. It has the advantage of requiring the minimum expense of installation. It is all metal, of great durability, and guaranteed to be the most accurate and efficient regulator of its type.



NO. 11 REGULATOR INSTALLATION

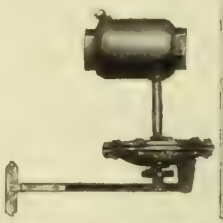
PRICE-LIST

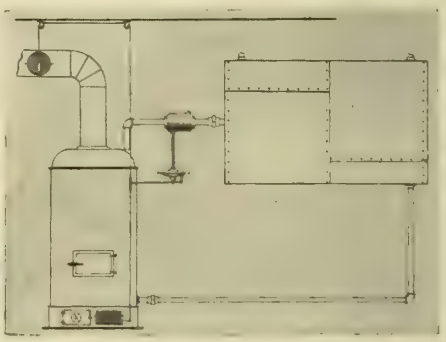
½ inch	$65.00	1¼ inch	$75.00
¾ inch	68.00	1½ inch	80.00
1 inch	70.00	2 inch	90.00

Made in all sizes up to 8-inch inclusive.

Liberal discount to the trade. Send for Bulletin 129, more completely descriptive.

No. 1 Powers Tank Regulator (for Coal-Burning Heaters)—An excellent regulator for this domestic service. Installed as shown, it is entirely automatic and will operate for years, giving good regulation of the hot-water supply.





NO. 1 REGULATOR INSTALLATION

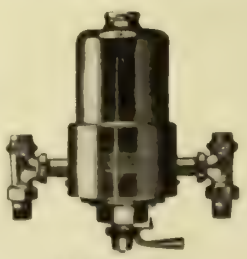
PRICE-LIST

No. 1 Regulator	$25.00
Check Damper for Smoke-pipe	1.25

Liberal discount to the trade. Send for Bulletin 120, more completely descriptive.

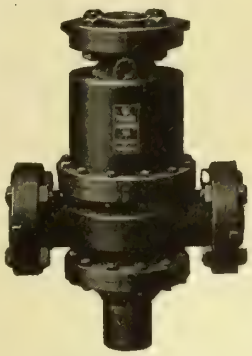
Powers Shower Bath and Hot-Water Line Controllers.

Thermostatic—This regulator furnishes an absolute thermostatic control of the water supply to shower baths, either singly or in gangs. It gives absolute protection against scalding, and makes the shower the "perfect bath." It is very simple in construction, being entirely without complicated parts, and will operate for years without attention or repairs.



TYPE A, NO. 1 CONTROLLER

Hot-Water Line Control—Kitchen, laundry, etc., put up a continual cry for *hot water*—the hotter the better—and the hot-water service tanks are usually adjusted to deliver water at 180 degrees and even hotter to satisfy that demand. This is ***too hot*** for plumbing fixtures, as the continual burning out of washers and packings testifies, and it is dangerously hot for bathing purposes.



TYPE D. NO. 8 CONTROLLER

Every hospital or institution for the care of the helpless has had its horrible experience of a scalded patient, and the only positive safeguard is a reliable device that will absolutely prevent excessively hot water from reaching the bathing department.

The Powers Hot-Water Line Controller, installed in the service line to bath department, makes scalding impossible—it will close the line entirely before it will pass water hotter than its adjusted temperature.

It is a Powers Specialty of Powers Quality, and sold with the Powers Guaranty.

PRICE-LIST POWERS THERMOSTATIC SHOWER BATH AND HOT-WATER LINE CONTROLLERS

Type A Controller—Brass body, screwed connections.....List price, $100.00
Under this type are included:
Controller No. 1 for individual shower; ½-in. inlets, ¾-in. outlet.
Controller No. 2 for continuous flowing bath, ¾-in. inlets, 1-in. outlet; capacity 20 gallons per minute.
Controller No. 3 for gang showers, 4 heads; ¾-in. inlets, 1-in. outlet; capacity 25 gallons per minute.

Type B Controller—Brass body, screwed connections.....List price, $150.00
Under this type is:
Controller No. 4 for gang showers, 8 heads; 1-in. inlets, 1¼-in. outlet; capacity 50 gallons per minute.

Type C Controller—Iron body, flanged connections.....List price, $175.00
Under this type are included:
Controller No. 5 for gang showers, 15 heads; 1¼-in. inlets, 1½-in. outlet; capacity 80 gallons per minute.
Controller No. 6 for gang showers, 20 heads; 1½-in. inlets, 2-in. outlet; capacity 100 gallons per minute.

Type D Controller—Iron Body, flanged connections.....List price, $200.00
Under this type are included:
Controller No. 7 for gang showers, 40 heads; 2-in. inlets, 2½-in. outlet; capacity 200 gallons per minute.
Controller No. 8 for gang showers, 50 heads; 2½-in. inlets, 2½-in. outlet; capacity 250 gallons per minute.

Shower Controllers will be furnished with a maximum temperature adjustment of 110 degrees Fahr., unless otherwise specified. Higher temperatures for hot-water line control will be furnished when desired.

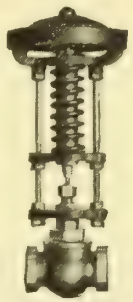
Always state purpose for which controller will be used.

NOTE—The above capacities are based upon thirty pounds' water pressure. To conform to general practice outlets in these machines are one size larger than inlets, but may be varied to suit piping.

Liberal discount to the trade. Send for Bulletin 124, more completely descriptive.

Powers Pressure Reducing Valve (for Steam or Air).

We had to have a good reducing pressure valve for our work in the temperature controlling field, and to get it we had to make it. We offer it here under the Powers Guaranty.



POWERS PRESSURE REDUCING VALVE

PRICE-LIST

½ inch	$20.00	1¼ inch	$25.00
¾ inch	21.00	1½ inch	30.00
1 inch	22.00	2 inch	40.00

Liberal discount to the trade. Send for Bulletin 118, more completely descriptive.

Powers Gas Valve.

A frictionless (mercury seal) Gas Valve adapted to the control of gas for heating purposes. May be operated by the ordinary diaphragm lever of a steam boiler, or by any of the automatic regulators. With its peculiar positive shut off, it eliminates the annoyance of "back firing" gas burners.

POWERS GAS VALVE

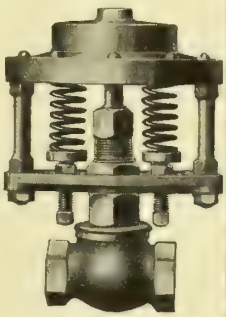
PRICE-LIST

1 inch	$12.00	1½ inch	$16.00
1¼ inch	14.00	2 inch	20.00

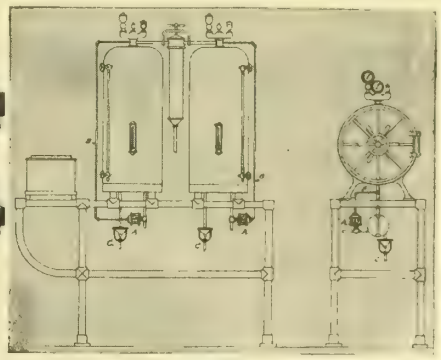
Liberal discount to the trade. Send for Bulletin 121, completely descriptive.

Sterilizer Controlling Valve.

For the safety of the steam sterilizers used in the operating rooms of modern hospitals, they should be equipped with the Powers Sterilizer Controlling Valve. It silently controls the steam to the desired pressure and temperature, and eliminates the objectionable blowing-off of the safety valve. It is adapted to all sterilizers, and will be furnished by the makers, if specified as the Powers Valve.



STERILIZER CONTROLLING VALVE



INSTALLATION

PRICE-LIST

Controller Valve for Steam Sterilizer, full nickel:

⅜ inch	$20.00	½ inch	$22.00

Liberal discount to the trade. Send for Bulletin 122, for complete information.

THE POWERS REGULATOR CO.

Manufacturers of Automatic Temperature Controlling Systems

5 South Wabash Avenue
CHICAGO, ILL.

101 Park Avenue
NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS., 136 Federal Street
CINCINNATI, OHIO, Gerke Building
DETROIT, MICH., Kerr Building
CLEVELAND, OHIO, 8001 Whitethorne Avenue
SEATTLE, WASH., Alaska Building
KANSAS CITY, MO., Reliance Building

CANADIAN POWERS REGULATOR COMPANY, LIMITED, TORONTO, ONT.

Products.

We Manufacture and Install Automatic Temperature Controlling Systems, applying them to the Heating Plants in residences, offices, schools, colleges, hospitals, etc., and to any other condition of Artificial Heating where uniform temperature is desired.

The Temperature Controlling Apparatus includes Thermostats, Diaphragm Radiator Valves, Diaphragm Motors, Air Compressors, Mixing Dampers, etc.

Services.

These Temperature Controlling Systems differ greatly in detail, and should have in every case special study so as to meet the particular conditions that exist in the building to be controlled. To insure this proper application of Powers system we maintain branch offices with a competent engineering and erecting force in the principal cities of the country. Clients at a distance from our home office may, therefore, feel assured of getting the best of attention.

Much of the dissatisfaction with other regulating apparatus is due to a "rule of thumb" application that takes no account of the peculiar conditions existing in every heating plant.

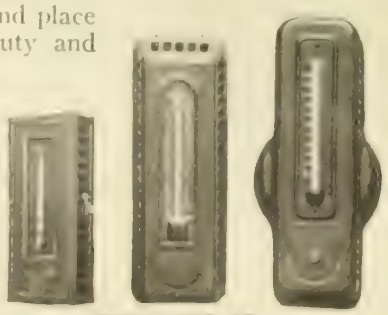
As Specialists in Temperature Control, we have unusual facilities for solving problems in this particular field.

Temperature Controlling Apparatus.

Special Features—All Powers apparatus is distinguished for its great efficiency, capacity for long service, and low cost of maintenance.

Powers thermostats are accurate in their workings, and will maintain their adjustment. They are of the vapor disc type always used in the Powers apparatus.

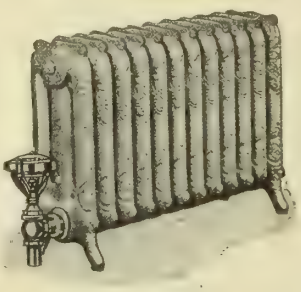
These thermostats, three styles only being here illustrated, are of good design and as small in dimensions as is consistent with the reliability so necessary in such instruments. Those employed in fine residence work are of special small design, and we take second place to no one in the beauty and perfection of finish given these instruments.



THERMOSTATS

Diaphragm valves, diaphragm motors, mixing dampers, air compressors and other equipment are of especially rugged construction, being built regardless of expense so far as durability and efficiency are affected.

Compressed air is the motive power used in these systems of temperature control, and our compressors are specially adapted to the work. We build them ourselves, and they are characterized by their noiseless operation, perfect control and durability.

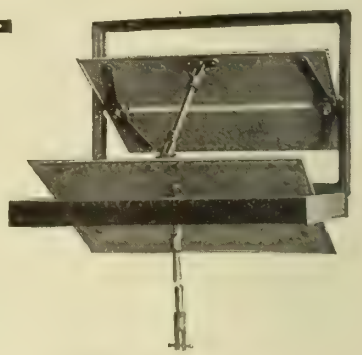


VALVE ATTACHED TO RADIATOR

RADIATOR VALVE

DIAPHRAGM MOTOR

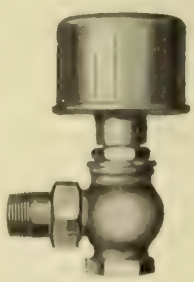
Installations are invariably made by our own employees, who are specially educated in the work, and we spend the money necessary to maintain such a force at its highest efficiency.



MIXING DAMPERS

Prices.

Price invariably covers the system complete, and can only be given after study of the requirements. We are not low priced, believing that real quality must be paid for in everything. The aim is to give our customers such value that the difference in price between ours and cheaper systems will be entirely lost sight of.



ALL METAL RADIATOR VALVE

We solicit the opportunity of submitting to architect or engineer a detailed specification accompanied with a guaranteed price to cover system of temperature control—the price to hold if the specification is used; thus guaranteeing full protection to the client against any one taking advantage of a close specification.

SARCO COMPANY, INC.

MANUFACTURERS OF

Steam and Radiator Traps, Temperature Regulators

South Ferry Building
NEW YORK, N. Y.

Old Colony Building
CHICAGO, ILL.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products.

Sarco Radiator Traps for Vapor, Vacuum or Low Pressure Heating Systems; Sarco Temperature Regulators for Liquids or Air; Sarco Steam Traps; Air Line Valves.

Sarco Radiator Trap.

Designed for any two-pipe system of heating; can be attached to return end of radiators or coils, at any angle; will operate in any position, and adapts itself to any location of return piping, thus eliminating extra cost of special fittings, or *special traps,* having elbows cast integral with bodies and opening in different directions.

Construction—Few working parts; none to get out of order. In the body of the trap is a cartridge containing an easily expansible fluid which operates an inner corrugated tube, on lower end of which is attached a piston carrying the valve head. Contact between valve head and seat is a circular line, *not a surface.* No dirt can lodge at seat, to cause leakage. No levers, gauges, packing, stuffing boxes, etc.

Operation—After a simple adjustment, the spirally corrugated tube is automatically operated by the liquid expanding and contracting. When water collects, the operating liquid contracts, valve opens, and condensation is expelled into return line; then, entry of steam causes operating liquid to expand, and to force piston down, closing valve.

Advantages—Noiseless operation; self-cleaning; no air binding; no water-hammer; no freezing, because no water seals; no moving parts to corrode; no leakage of steam; can be set at any angle.

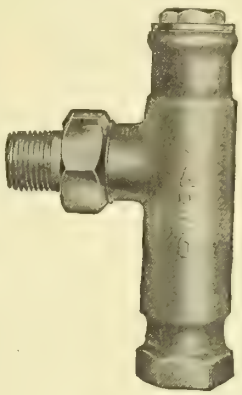
Sarco Temperature Regulators.

For maintaining a constant temperature of liquids and atmosphere. Substantially constructed on same thermostatic principle as the Radiator Trap, Sarco, (above described), and Steam Traps, Sarco (not illustrated or described, about which write for full particulars).

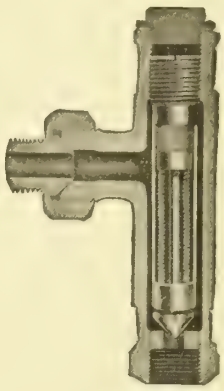
Operation—Slight increase in temperature of surrounding liquid or atmosphere expands operating fluid, producing a powerful hydraulic pressure tending to close valve; a decrease in temperature contracts fluid, and gradually opens valve.

Sarco Regulators operate steam, water or gas valves.

Uses—They are being widely adopted and are suitable for public institutions, schools, hotels, breweries, packing houses, canning factories, bottle works, paper mills, gas condensers and producers, ammonia stills, etc.

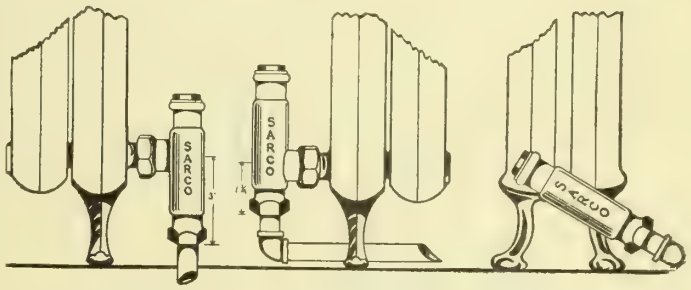


Full View



Section

THE RADIATOR TRAP, SARCO
350,000 Sarcos sold in five years



No. 1. Trap attached to radiator; center of inlet to face of outlet, 3 ins.; for use on all standard radiators

No. 2. Between openings, 1¾ ins.; for use where piping is above floor on cement floors or where radiator has short legs

No. 3. Trap connected to radiator at an angle; works perfectly at any degree of angle

A FEW SARCO APPLICATIONS

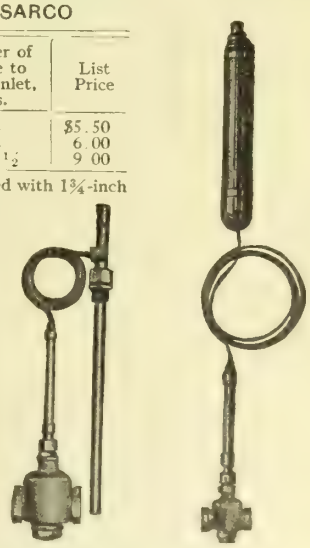
DATA, RADIATOR TRAP, SARCO

Size, Ins.	Over-All Length, Ins.	Center Inlet to Outlet, Ins.	Center of Valve to Face Inlet, Ins.	List Price
⅜	5	3	2	$5.50
½	5	3	2	6.00
¾	5	3	2½	9.00

⅜- and ½-inch Traps can be supplied with 1¾-inch distance from center of inlet to outlet.
Apply for discounts.

SARCO TANK REGULATOR

Size, Ins.	Weight, Lbs.	Face to Face of Valve, Ins.	List Price
½	8	2¾	$75
¾	8	3⅛	80
1	9	3½	85
1¼	13	4	90
1½	22	6	95
2	28	6½	100
2½	37	8½	115
3	51	10½	135
4	81	11¾	185
5	132	13¾	250
6	158	15½	300



For tanks, etc. For rooms

SARCO TEMPERATURE REGULATORS

SARCO ROOM REGULATOR

Size of Valve, Ins...	½	¾	1	1¼	1½	2	2½	3	4
List Price.....	$40	$45	$50	$60	$70	$90	$105	$130	$170

THE YODER-THOMAS MFG. CO.

Manufacturers of Thermostats
Engineer's Building
CLEVELAND, OHIO

Product.

The YODER THERMOSTAT, a GAS REGULATOR, used in connection with Hot-Water Tanks, Rooms, Basements, Garages, etc.

Description.

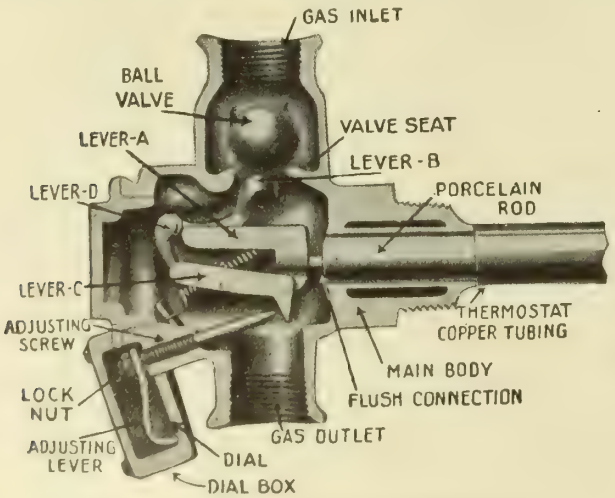
The Yoder Thermostat is an inexpensive, simple, compact mechanism. It may be attached to any hot-water boiler heated by gas, or to the feed-pipes of any gas-heated room. It will maintain the temperature of the water or of the room at the desired degree. It may be installed in water or in air, in the boiler or on the outside.

Construction.

This thermostat is simple and compact. It is made of the best materials. Its simplicity makes it durable, easy to regulate, and always dependable.

It has no rubber, leather or destructible parts; no stuffing-box to dry out and leak.

A compact system of internal multiple levers, requiring a smaller body than any other make, offers a minimum resistance to thermostatic action and makes the Yoder Thermostat more efficient than any other.



SECTIONAL VIEW OF YODER THERMOSTAT

Quick Action.

The quick action of this thermostat is most noticeable. It will be the more appreciated when it is understood that a unit of expansion, or of contraction, is multiplied one hundred and twenty-five times. The action is really snap action.

The Yoder Thermostat is so sensitive that a change of only three or four degrees is sufficient to start the gas flow automatically, or to stop it promptly, if the desired temperature has already been obtained.

The expansion tube is so finely adjusted that the warmth of the touch of a hand is sufficient to shut off the flame. A test more delicate than this is never required, even under the most exacting conditions.

When this thermostat is used to heat rooms, basements, garages, etc., if an outside door is opened for a moment or two and admits cold air, the valve will cause the gas to flow until the required temperature is regained.

Advantages.

The Yoder Thermostat assures cheap hot water at all times. It prevents water from becoming either too cold or superheated.

It makes impossible any explosions caused by overheating.

It makes none of the disturbing noises that are caused by an overheated boiler or heating system.

The mechanism works perfectly, because of the simplicity of construction and the perfect gas control secured through the valve.

Its perfect flame-control increases the life of the heating apparatus.

Because it requires no attention this thermostat saves the owner's time, and relieves him from thought and annoyance.

It saves many times its cost by preventing needless waste of gas.

YODER THERMOSTAT INSTALLLED

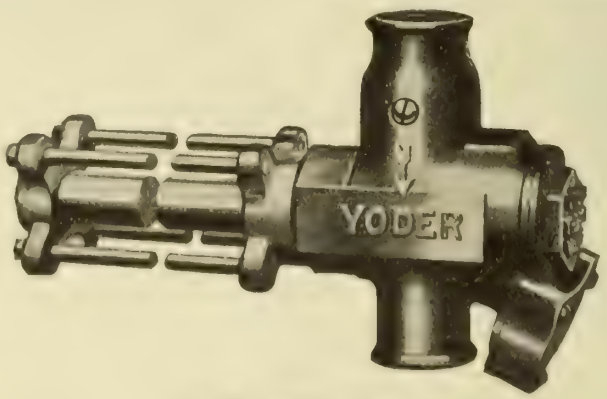
When used to regulate garages it means not only comfort, but also a saving in gasoline and tires. Preserves the finish of automobiles.

May be installed in the boiler or externally as shown.

Uses.

The Yoder Thermostat is especially valuable and desirable in homes, hotels, restaurants, work shops, barber shops, hair-dressing establishments and wherever else gas is used as a fuel.

It keeps the temperature of garages, basements, etc., at any desired degree of temperature, regardless of the temperature of the air or climatic conditions. It keeps the water in your tank at any desired temperature.



YODER THERMOSTAT
Adapted for Air Installation

Guarantee.

The Yoder Thermostat is positively guaranteed by THE YODER-THOMAS MFG. CO., Cleveland, Ohio.

THE AMERICAN BRASS COMPANY

BENEDICT & BURNHAM BRANCH

Manufacturers of Benedict Nickel

WATERBURY, CONN.

NEW YORK, N. Y., 195 Broadway
BOSTON, MASS., 172 High Street
CHICAGO, ILL., 29 East Madison Street
CLEVELAND, OHIO, 1210 Swetland Building
CINCINNATI, OHIO, 432 Walnut Street

Products.

Manufacturers of BENEDICT NICKEL in the form of SEAMLESS TUBES, STEEL-LINED SEAMLESS TUBES, SHEETS, WIRE, RODS, MOULDINGS, ANGLES, CHANNELS, and INGOT METAL.

Also, BRASS, COPPER and GERMAN SILVER in every variety of SHEETS, ROLLS, PLATES, WIRE and RODS; SEAMLESS and BRAZED TUBING, ANGLES, CHANNELS, CIRCLES and SHELLS; ARCHITECTURAL MOULDINGS.

ALBANY HIGH SCHOOL, ALBANY, N. Y.
GOLDWIN, STARRETT & VAN VLECK, New York, N. Y., Architects; ASHLEY & KAUFMAN, New York, N. Y., Consulting Engineers
A. E. STEPHENS CO., New York, N. Y., Builders; A. J. ECKERT CO., Albany, N. Y., Contracting Plumbers
JAS. B. CLOW & SONS, Chicago, Ill., Plumbing Fixtures
Benedict Nickel used for all exposed metal trimmings to Plumbing Fixtures and Hardware

Benedict Nickel.

Color—Benedict Nickel is a white metal which compares favorably with sterling silver in appearance and permanency of color. Like sterling silver, it requires cleaning occasionally. With ordinary care Benedict Nickel will *always* remain bright.

Strength—Benedict Nickel is stronger and more durable for wear than brass or red metal; therefore, in addition to its attractive color, these high physical qualities make the use of this material especially desirable. Common grades of white metals, composed chiefly of zinc or other cheap materials, should not be compared with Benedict Nickel.

Uses—For exposed plumbing in fine residences, offices and public buildings; for ornamental work, railings, hardware, and, in fact, for all purposes where nickel-plated brass or bronze has been used, Benedict Nickel has become the standard.

It is superior to all other metals for such uses because it combines elegance, durability, non-corrosiveness and sanitation. When the luster and finish of a once nicely appointed nickel-plated job is worn off, the brassy spots look very unsightly; but where Benedict Nickel is used its distinctive white color is as permanent and lasting as the metal itself.

Seamless Tubing.

Benedict Nickel Seamless Tubing is made in all the ordinary commercial, iron pipe and plumbers' sizes. It is applicable to standards, railings, and all construction which requires hollow cylindrical forms.

Sheets.

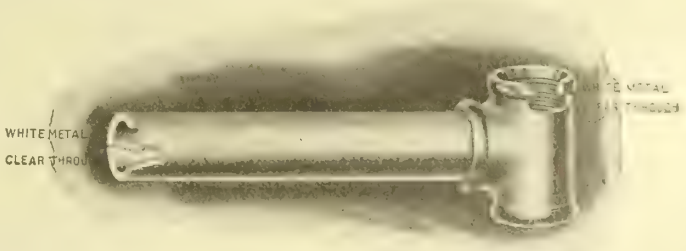
Benedict Nickel Sheet can be furnished in all the widths and gauges commonly made in brass or bronze. In sheet form, it is used for linings, flashings, kick plates, etc.; also, for coverings and trimmings on pantry sinks, soda fountains and bars.

Rods, Wire, etc.

Benedict Nickel Rods, Wire, Angles, Channels, and Architectural Mouldings are manufactured to match the sheet or tubing in color.

Ingot.

Benedict Nickel Ingot is a thoroughly mixed alloy of uniform composition, and can be melted at a comparatively low heat. Properly cast, it can be made into all kinds of plumbing fittings, soda fountain and bar fixtures, laboratory fittings, grilles and a large variety of architectural work which has hitherto been made of brass or bronze.



BENEDICT NICKEL WHITE METAL SEAMLESS TUBING
Sample as above and descriptive booklet, sent upon request

NATIONAL LEAD COMPANY

Manufacturers of Lead Pipe and Building Materials

NEW YORK BOSTON BUFFALO CHICAGO
CINCINNATI CLEVELAND ST. LOUIS SAN FRANCISCO
PHILADELPHIA (John T. Lewis & Bros. Co.) PITTSBURGH (National Lead & Oil Co.)

Products.

PLUMBING MATERIALS, LEAD SERVICE PIPE, WASTE PIPE and TUBING; TIN TUBING, TIN-LINED LEAD PIPE and BLOCK TIN PIPE; SASH WEIGHTS; CAME LEAD and ART GLASS ORNAMENTS; TRAPS and BENDS and SHEET LEAD; EXPANSION BOLTS.

Also, PAINTING MATERIALS, for which see our name in General Index.

Lead Service Pipe.

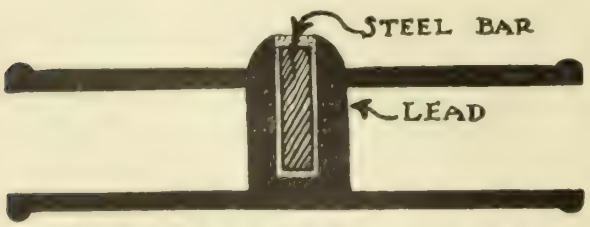
Lead pipe is worth all it costs and should be specified in all plumbing. It not only is safer from the health standpoint, but is much more economical in the long run. Our lead pipe is made from the best new pig lead.

Came Lead and Art Glass Ornaments.

Our line of came lead is complete and perfect in material and workmanship, and includes flat and round, plain and beaded; also a new-idea came lead reinforced with an invisible steel bar. We have sets of detachable samples enabling architects to test for size before specifying. Any architect doing work in art glass may have a set free on request; also booklet showing cuts of different sizes of leads and illustrated designs of windows made from various styles of leads.

Reinforced Came Lead.

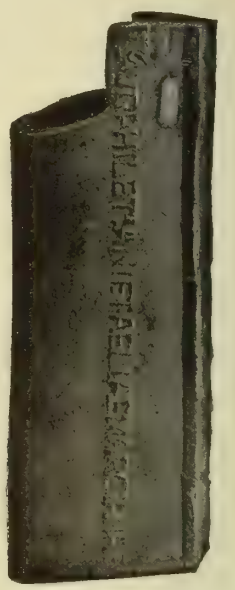
In offering reinforced came lead to architects we feel that for public buildings and country houses, where the need of cleaning and repairs is always to be thought of, this method of leading is far superior to the old one, of stay bars, copper wires, etc. All work in reinforced lead is absolutely flat, and is therefore easy to clean, and, being made in lead, is easy to repair; at the same time it has the stability to withstand any wind pressure and the strain to which such work is subjected, while retaining the freedom of character of the early lead work.



ENLARGED CROSS-SECTION OF REINFORCED CAME

Our offering of lead ornaments for leaded glass windows is unusual. It includes solid ornaments and a number of unusual designs in filigree casting, etc. Illustrations on request.

IRON PIPE INSTALLED 4 YEARS
Rusted full of holes


LEAD PIPE LAID 2,000 YEARS AGO
In perfect condition today. See our booklet, "Good Plumbing"

Sheet Lead for Roofing and Flashings.

We wish to call attention to sheet lead as a material for roofing and flashings.

Sheet lead, if properly laid, will last forever, without any expense for repairing or painting.

We issue a booklet on this subject which will be helpful to those undertaking such work.

If you have in mind the erection of any country houses of the better class, especially in the old and beautiful style of early English architecture, and, if a thorough copy of details is made (which, of course, ought to be made to get the desired effect), a liberal use of lead in roofing will be required, and we would be glad to give you or your contractors further information on this subject.

Miscellaneous Building Materials.

Our traps and bends are the best finished of any in the market. Sheet lead in largest sheets made. For painting materials and specifications (white lead, red lead, linseed oil, etc.) described elsewhere in this Catalogue, for which see our name in General Index.

SOUTH CHESTER TUBE CO.

Manufacturers of Wrought Iron Tubular Goods

CHESTER, PA.

SALES OFFICES: NEW YORK, PITTSBURGH, SAN FRANCISCO

Products.

WROUGHT IRON PIPE: TUBING, CASING, LINE and DRIVE PIPE, ROTARY DRILL PIPE; STANDARD GAS, STEAM and WATER PIPE, AMMONIA PIPE, COUPLINGS for all characters of pipe.

Description.

Every tube is made from strictly wrought iron plates. All tubes tested to very high pressures and inspected before shipping. Threads conform to Briggs Standard. All couplings are Taper Tapped.

Weights and Dimensions.

All weights and dimensions are nominal. Weight variation permissible is five per cent above and below card weight; but, in case of double extra strong pipe, such variation is ten per cent.

Length of Pipe.

Full-weight Wrought Iron Pipe furnished in random lengths with threads and couplings, unless otherwise ordered. Extra Strong and Double Extra Strong furnished with plain ends. A random length of extra strong or double extra strong is 12 feet to 22 feet, we to have the privilege of supplying (not exceeding five per cent of the total order) in lengths from 6 feet to 12 feet.

Caution.

"Wrought Pipe" is steel. When Iron Pipe is required, specify "Genuine Wrought Iron Pipe" or, "Strictly Wrought Iron Pipe," otherwise a dealer may (in good faith) furnish steel.

Prices.

See tables. Discounts and further information sent on request.

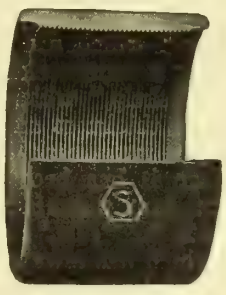
LINE PIPE AND CASING JOINT

DRIVE PIPE JOINT

NOMINAL DIMENSIONS AND WEIGHTS OF WROUGHT IRON PIPE

Nom. Diam., Inches	Ext. Diam., Inches	Standard Weight Pipe				Extra Strong Pipe				Double Extra Strong Pipe			
		List Price per Foot	Int. Diam., Inches	Thickness, Inches	Nom. Wt. (Lbs.) per Foot, Threads and Couplings	List Price per Foot	Int. Diam., Inches	Thickness, Inches	Nom. Wt. (Lbs.) per Foot, Plain Ends	List Price per Foot	Int. Diam., Inches	Thickness, Inches	Nom. Wt. (Lbs.) per Foot, Plain Ends
⅛	.405	$.05½	.269	.068	.245	$.12	.215	.095	.314				
¼	.540	.06	.364	.088	.425	.07½	.302	.119	.535				
⅜	.675	.06	.493	.091	.568	.07½	.423	.126	.738				
½	.840	.08½	.622	.109	.852	.11	.546	.147	1.087	$.32	.252	.294	1.714
¾	1.050	.11½	.824	.113	1.134	.15	.742	.154	1.473	.35	.434	.308	2.440
1	1.315	.17	1.049	.133	1.684	.22	.957	.179	2.171	.37	.599	.358	3.659
1¼	1.660	.23	1.380	.140	2.281	.30	1.278	.191	2.996	.52½	.896	.382	5.214
1½	1.900	.27½	1.610	.145	2.731	.36½	1.500	.200	3.631	.65	1.100	.400	6.408
2	2.375	.37	2.067	.154	3.678	.50½	1.939	.218	5.022	.91	1.503	.436	9.029
2½	2.875	.58½	2.469	.203	5.819	.77	2.323	.276	7.661	1.37	1.771	.552	13.695
3	3.500	.76½	3.068	.216	7.616	1.03	2.900	.300	10.252	1.86	2.300	.600	18.583
3½	4.000	.92	3.548	.226	9.202	1.25	3.364	.318	12.505	2.30	2.728	.636	22.850
4	4.500	1.09	4.026	.237	10.889	1.50	3.826	.337	14.983	2.76	3.152	.674	27.541
4½	5.000	1.27	4.506	.247	12.642	1.80	4.290	.355	17.611	3.26	3.580	.710	32.530
5	5.563	1.48	5.047	.258	14.810	2.08	4.813	.375	20.778	3.86	4.063	.750	38.552
6	6.625	1.92	6.065	.280	19.185	2.86	5.761	.432	28.573	5.32	4.897	.864	53.160
7	7.625	2.38	7.023	.301	23.769	3.81	6.625	.500	38.048	6.35	5.875	.875	63.079
8	8.625	2.50	8.071	.277	25.000	4.34	7.625	.500	43.388	7.25	6.875	.875	72.424
8	8.625	2.88	7.981	.322	28.809								
9	9.625	3.45	8.941	.342	34.188	4.90	8.625	.500	48.728				
10	10.750	3.20	10.192	.279	32.000	5.48	9.750	.500	54.735				
10	10.750	3.50	10.136	.307	35.000								
10	10.750	4.12	10.020	.365	41.132								
11	11.750	4.63	11.000	.375	46.247	6.10	10.750	.500	60.075				
12	12.750	4.50	12.090	.330	45.000	6.55	11.750	.500	65.415				
12	12.750	5.07	12.000	.375	50.706								

All prices subject to change without notice. Extra charge for Galvanized, or Coated pipe, above Black pipe; and for cut lengths above random lengths.



LINE PIPE AND CASING COUPLING
Taper Threads, Recessed Ends

STANDARD PIPE COUPLING
Taper Threads, Recessed Ends

ESTABLISHED 1864

A. M. BYERS COMPANY

Genuine Wrought Iron Pipe, Couplings and Nipples

PITTSBURGH, PA.

Products.

Guaranteed Full-Weight GENUINE WROUGHT IRON PIPE; TUBING, CASING, LINE PIPE and DRIVE PIPE; NIPPLES and COUPLINGS.

Facilities.

In the production of its wrought iron pipe the Byers organization has complete ownership and control of every step from the mining and refining of the ore to the final galvanizing, finishing, weighing and delivery of the finished product.

Materials and Processes.

Ore—The Byers ore mines are located in the Lake Superior region, where the best and purest iron ore is found. These mines produce, moreover, the most suitable grade of ore for smelting into pig iron used in the manufacture of pipe.

Pig Iron—Byers ore, together with selected limestone and the best grade of Connellsville coke, are assembled at the Byers blast furnace for reduction into pig iron.

Puddling—Puddling is the conversion of "cast iron" into "wrought iron."

The refining of pig iron, with no admixture of scrap, in a puddling furnace, forms the basis of superiority of Byers pipe. To this process is also chiefly due the higher cost of Byers pipe.

Rolling—When the small puddle-ball emerges from the squeezer, it is known as a "bloom," and after passing through the "muck-rolls," it is known as "muck bar." This muck bar is sheared into short lengths from two to three feet long, and stacked into small bundles or "piles" which are put into a re-heating furnace, brought to a white welding heat, and then re-rolled into finished "skelp," which are flat, thin strips of metal varying in thickness and width according to the exact size of pipe into which they are to be welded.

Since it has become common practice of many wrought iron manufacturers to insert miscellaneous scrap into the "pile," it is pertinent here to emphasize a fact which has always been one of the distinguishing features of Byers practice, viz., that only Byers Muck Bar is used in the "pile." No foreign scrap of any description has ever been used.

There is a price difference of over $10.00 per ton between pure muck bar and piling scrap, and the use of scrap is impossible to detect in the *appearance* of finished new pipe.

General Description.

Application—Byers pipe is suitable for all purposes for which iron pipe is ordinarily employed (with the exception of boiler tubes), and is used mainly for water, steam, gas or vacuum, compressed air and lines of every character. The sizes made range from ⅛-inch up to 12-inches inside diameter.

In its manufacture no scrap is used—only Byers pig iron, especially suitable for pipe manufacture, made in Byers' own blast furnaces from Byers-mined ore. Further, all the pig iron is hand-puddled, as distinguished from "busheled" iron, and from the Bessemer process of making soft steel for pipe.

Welding—All Byers pipe is welded either by the butt-weld or lap-weld process. See tables on following page.

Black and Galvanized Pipe.

Byers pipe is furnished either black or galvanized, as desired. The galvanizing is done by the hot metal process in Byers' own galvanizing plant, and nothing but pure prime western spelter is used. By maintaining a relatively low heat of spelter bath and a long period of immersion, a very heavy galvanized coating is applied, which adheres strongly to the metal, owing to the characteristic rough surface of genuine wrought iron. The galvanizing, therefore, will not chip or scale off, even under the most severe tests devised especially for the purpose. The coating is approximately forty per cent heavier than on steel pipe; namely, as follows:

WEIGHT OF SPELTER PER SQUARE FOOT OF SURFACE

Sizes ⅛ inch to 1½ inches Butt-weld	18 pounds
Sizes 1¼ inches to 2 inches Lap-weld	20 pounds
Sizes 2½ inches Lap-weld	25 pounds

These figures are for full standard weight pipe; on extra heavy and double extra heavy pipe, the coating is from ten to twenty per cent heavier.

Weights—Byers pipe is made in three weights: standard, extra heavy, and double extra heavy. All Byers pipe is guaranteed to be not more than *two and one-half per cent below or five per cent above* the weights specified in the table under "Chemical Analysis."

Nipples.

The A. M. BYERS COMPANY is now able to furnish nipples made from the same material, and of the same high grade workmanship, as Byers pipe. Threads are accurately cut, in all cases being true to Briggs' Standard gauge, clean, unbroken and free from imperfections of any kind.

NIPPLE

By specifying Byers nipples in conjunction with Byers pipe, architects can now be assured that the installation will be of genuine wrought iron, of the same high quality throughout. Prices and sizes on request.

Couplings.

Heretofore, couplings have had the name "Byers" rolled in the metal, but they are now furnished plain.

Guarantee.

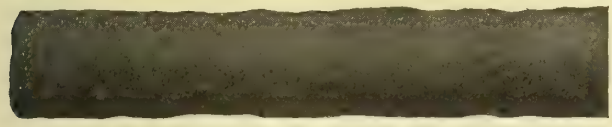
As some confusion exists in regard to the term "wrought iron," and as much pipe *not* wrought iron is sold as such, the following guarantee is given with all Byers pipe:

Continued on next page

All Byers pipe is guaranteed to be made from Byers pig iron, refined exclusively by the hand-puddling process, rolled into muck bar, and converted into skelp without the addition of scrap in any of the processes of manufacture.

Service of Byers Pipe.

For over fifty years the A. M. Byers Company has produced the one product—wrought iron pipe—in strict adherence to a standard of purity of material and honesty of manufacture established long before cheap steel was known. The record of the company is on millions of feet of pipe, installed under varying conditions during half a century, and still enduring. No claims that the A. M. Byers Company could make would offset this record if it were a poor one; and likewise no reasons that can be advanced for the superiority of Byers pipe can be as eloquent a witness to its long and satisfactory service.



BYERS BLACK PIPE, FORTY-FIVE YEARS OLD

Sample from ¾-inch water-service line laid in 1870 by the late Mr. Brooks, quality plumber of Dayton, Ohio. Recovered by Brooks' son. The firm of Brooks have never used anything but Byers genuine wrought iron pipe. Ask for Byers Bulletin No. 26, containing list of service records

Chemical Analysis.

The following is an average analysis of Byers pipe:

Silicon	.15%	Phosphorus	.15%
Manganese	.05%	Carbon	.04%
Sulphur	.02%		

Corrosion.

From a scientific viewpoint, the longer life of wrought iron, such as has been made by Byers for over half a century, is explained by the presence of approximately six per cent of silicates or slag (not shown in regular analysis) evenly distributed in successive layers, each consisting of fine bands and fibers. Microscopic examination of Byers pipe reveals over 125,000 such slag fibers to the square inch, so closely spaced as to form a practically impervious sheet. Pitting of Byers pipe is therefore quickly arrested before the pit attains any considerable depth, while in steel pipe, no such obstacle is present to arrest corrosion.

Identification Marks.

Rule—Several feet apart on every length of pipe the name of "Byers" and year of manufacture are rolled in raised letters, as illustrated below.

PIPE SHOWING IDENTIFICATION MARKS

Exceptions—Small sizes, including one-eighth inch regular and extra heavy and one-quarter inch extra heavy, do not have the name and year rolled in the metal, but are bundled and identified by a tin tag having the name "Byers" embossed across the top.

Ask for free Copies of Byers Genuine Wrought Iron Pipe Specifications.

BYERS GENUINE WROUGHT IRON PIPE, BLACK OR GALVANIZED

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size	List Price per Ft.	Outside Diam., Ins.	Inside Diam., Ins.	Std. Wt. Plain Ends, Lbs. per Ft.	Couplings: Outside Diam., Ins.	Couplings: Length, Ins.	Couplings: Weight, Lbs.
STANDARD—BUTT WEIGHT							
⅛	$0.05½	.405	.264	.244	.640	.937	.053
¼	.06	.540	.367	.424	.750	1 000	.059
⅜	.06	.675	.489	.567	.968	1.343	.156
½	.08½	.840	.617	.850	1.078	1 343	.168
¾	.11½	1.050	.819	1.130	1.312	1.531	.243
1	.17	1 315	1.043	1 678	1.656	1.718	.425
1¼	.23	1 660	1.369	2.272	1.984	2.062	.631
1½	.27½	1 900	1.604	2.717	2.281	2.312	.884
2	.37	2.375	2.060	3.652	2.781	2.500	1.300
STANDARD—LAP-WELD							
1¼	.23	1.660	1.369	2.272	1 984	2.062	.631
1½	.27½	1.900	1.604	2.717	2 281	2.312	.884
2	.37	2.375	2.060	3.652	2.781	2.500	1.300
2½	.58½	2.875	2.460	5.793	3.315	3.125	2.250
3	.76½	3.500	3.059	7.575	4.031	3.125	3.025
3½	.92	4.000	3.538	9.109	4.500	3.687	3.900
4	1.09	4 500	4.016	10.790	5.000	3.687	4.500
4½	1.27	5.000	4.496	12.538	5.531	4.218	6.200
5	1.48	5 563	5.036	14 617	6 281	4.125	8.250
6	1.92	6.625	6.053	18.974	6.375	4.125	9.750
7	2 38	7.625	7.010	23 544	8 281	5.000	12.750
8	2 50	8 625	8.059	24 696	9.281	5.000	14.850
8	2.88	8 625	7.967	28 554	9 281	5 000	14.850
9	3 45	9 625	8.927	33.907	10 937	6 187	30.050
10	3.20	10.750	10.181	31.201	11.925	6.750	40.500
10	3.50	10 750	10.124	34 240	11.925	6 750	40.500
10	4.12	10 750	10 005	40 483	11.925	6 750	40.500
11	4.63	11 750	10.985	45 557	12.945	6.750	43.000
12	4.50	12 750	12.077	43 773	13.945	6 750	47.000
12	5 07	12 750	11.985	49 562	13.945	6.750	47.000
EXTRA HEAVY—BUTT-WELD							
⅛	.12	.405	.207	.314	.640	.937	.053
¼	.07½	.540	.295	.535	.843	1.250	.125
⅜	.07½	.675	.417	.738	.968	1.343	.156
½	.11	.840	.539	1.087	1.109	1.500	.200
¾	.15	1.050	.735	1.473	1.375	2.000	.443
1	.22	1.315	.949	2.171	1.687	2.562	.743
1¼	.30	1.660	1.269	2.996	2.094	2 750	1.150
1½	.36½	1.900	1.491	3.631	2.375	2 750	1.300
2	.50½	2 375	1.929	5 022	2.921	3.625	2.325
EXTRA HEAVY—LAP-WELD							
1¼	.30	1.660	1.269	2.996	2.094	2.750	1.150
1½	.36½	1 900	1.491	3.631	2 375	2 750	1.300
2	.50½	2.375	1.929	5.022	2.921	3 625	2.325
2½	.77	2.875	2 311	7.661	3.625	4.125	4.550
3	1.03	3.500	2.887	10.252	4.156	4.125	4.870
3½	1.25	4.000	3.350	12.505	4.703	4.375	6.350
4	1.50	4.500	3.811	14 983	5 250	4 375	7.350
4½	1.80	5.000	4.275	17.611	5.671	4.375	7.700
5	2.08	5.563	4.797	20.778	6.437	5.125	11.750
6	2.86	6.625	5.743	28.573	7.500	5.375	14.250
7	3.81	7.625	6.603	38.048	8.560	6.375	22.700
8	4.34	8.625	7.604	43.388	9 625	6.187	27.450
9	4.90	9.625	8 604	48 728	10.937	6 187	30.050
10	5.48	10.750	9.729	54.735	11.925	6.750	40.500
11	6.10	11.750	10 729	60.075			
12	6.55	12.750	11 729	65 415	13.945	6 750	47.000
DOUBLE EXTRA HEAVY—BUTT-WELD							
½	.32	.840	.226	1.714			
¾	.35	1.050	.413	2.440			
1	.37	1.315	.576	3.659	Same as for Extra Heavy		
1¼	.52½	1.660	.874	5 214			
1½	.65	1.900	1 078	6 408			
2	.91	2 375	1 480	9.029			
DOUBLE EXTRA HEAVY—LAP-WELD							
1½	.65	1.900	1.078	6.408			
2	.91	2.375	1.480	9.029			
2½	1.37	2.875	1.742	13.695			
3	1.86	3.500	2.270	18 583			
3½	2.30	4.000	2.697	22 850	Same as for Extra Heavy		
4	2.76	4.500	3.119	27 541			
4½	3.26	5.000	3.546	32 530			
5	3.86	5.563	4.028	38 552			
6	5.32	6.625	4.857	53.160			

Permissible variation in weight is 2½ per cent below and 5 per cent above.

Standard pipe furnished with threads and couplings and in random lengths; Extra Heavy and Double Extra Heavy with plain ends and in random lengths unless otherwise ordered. Extra Heavy and Double Extra Heavy pipe fitted with threads and couplings at an extra charge above regular.

For cut lengths, an extra charge will be made above random lengths.

For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard.

For coated- galvanized, asphalted, painted—pipe, an extra charge will be made above black.

NATIONAL TUBE COMPANY

GENERAL SALES OFFICES

Frick Building

PITTSBURGH, PA.

DISTRICT SALES OFFICES

ATLANTA, Candler Building
BOSTON, John Hancock Building
CHICAGO, 208 South La Salle Street
DENVER, Majestic Building
KANSAS CITY, R. A. Long Building
NEW ORLEANS, Maison Blanche
NEW YORK, Hudson Terminal Building
OMAHA, City National Bank Building
PHILADELPHIA, Widener Building
PITTSBURGH, Frick Building
ST. LOUIS, Third National Bank Building
ST. PAUL, Pioneer Building
SALT LAKE CITY, Walker Bank Building

PACIFIC COAST REPRESENTATIVES
U. S. STEEL PRODUCTS CO.

SAN FRANCISCO, Rialto Building
LOS ANGELES, Central Avenue and Jackson Street
PORTLAND, Selling Building
SEATTLE, Fourth Avenue, South (Cor. Connecticut)

EXPORT REPRESENTATIVES
U. S. STEEL PRODUCTS CO., NEW YORK, N. Y., Hudson Terminal Building

Products.

National Tube Company makes a full line of Pipe and Tubular Products, designed for a variety of Mechanical, Manufacturing and Engineering Purposes. These include:

"National" Pipe (butt-weld and lap-weld, sizes ⅛-inch to 30-inch, inclusive): Conductor, Refrigerating, Sewer, Gas, Water, Steam, Signal, Irrigation, Hydraulic, Mine, Natural Gas, Matheson Joint, Kimberly Joint, Converse Joint, Railing, Fence, Ladder, Round, Odd-Shaped Pipe and Oil Country Pipe and Casing.

Pneumatic and Speaking Tubes; Spellerized Steel Lap-Welded Boiler Tubes for Locomotive, Marine or Stationary Boilers; Tubular Steel Street Poles and Posts; Flag Poles and Fittings; Steel Pipes.

"Shelby" Seamless Cold-Drawn Steel Mechanical Tubing for a variety of mechanical uses and for Beams, Columns, Struts, etc. "Shelby" Seamless Hot-Finished Steel Tubing; "Shelby" Seamless Cold-Drawn or Hot-Finished Steel Boiler Tubes for Stationary, Locomotive or Marine Boilers.

"Shelby" Seamless Cold-Drawn Steel Trolley Poles; Cylinders of all types; Fence Posts; Steel Tanks; Tubes, Square and Round.

"Kewanee" Specialties, which include "Kewanee" Octagon, Hexagon, Round, Air Pump, M. & F., Hose, Air Drill, Eccentric, Extra Heavy, Hydraulic, and Flange Unions; "Kewanee" Valves and Cocks; "Kewanee" Boiler Couplings; "N. T. C." Regrinding Valves; Well Points and Well Supplies.

Also, a complete line of "N. T. C." Malleable and Cast-Iron Fittings; Brass Fittings; Brass Cocks and Valves; "National" Flange Unions; Gas, Water and Steam Fittings; Radiators, Wrought and Staggered Tube; Radiator Valves; Nipples; Foot Valves; Boiler Couplings; Pipe Bends; Pipe Saddles, and Clamps; Acid Cocks, Fittings and Valves; Brass and Malleable Unions; Brass and Iron-Body Gate, Globe, Angle and Check Valves.

Expansion Joints; Floor Plates; Gas Fittings; Hangers; Conductor Pipe Hangers; Pipe or Shaft Hangers; Conductor Pipe Hooks; Hose Couplings, Pipes and Valves; Post-Caps and Bases; Railing Fixtures; Steam and Hot-Water Fittings and Specialties; Steam Traps; Wall Plates; Water Columns.

I—Evolution and Trend of Opinion Regarding the Increasing Use and the Relative Merits of Wrought Steel and Wrought Iron Pipe.

Q—What is the general trend of opinion regarding the relative merits and use of wrought steel and wrought iron pipe in the architectural, engineering and allied fields?

A—That the present trend of opinion is favorable to wrought steel pipe is positively indicated by the statements of architects, engineers and others in articles written by them for the technical and trade press and, by their specifications which definitely specify by name. It will be of interest to quote from recent opinions of authorities in their respective fields:

(a) "Viewing impartially all of the data presented so far, there seems to be little to choose between wrought iron and steel pipe, on the whole, as regards their resistance to corrosive influences, but one point may be mentioned with reference to the manner in which these materials corrode: With steel the rusting takes place more or less uniformly over the surface, while wrought iron shows a decided inclination to form deep pits. That this is a dangerous tendency can hardly be doubted."—L. C. Wilson, "Wrought Iron or Steel Pipes." Engineering Magazine, November, 1915, pages 253, 254.

(b) One of the leading newspapers in the iron and steel district in a review of Mr. Wilson's article remarks:

"To paraphrase an old saying, a pipe wall is no stronger than its thinnest spot, therefore, to the extent in which wrought iron exhibits this defect in greater measure than steel, it may be considered correspondingly inferior."—Pittsburgh Gazette-Times, November 7, 1915.

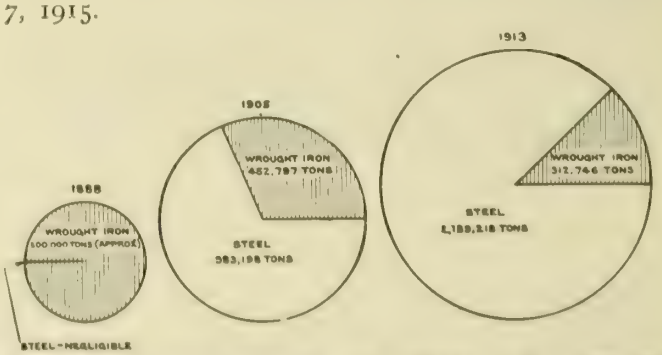


DIAGRAM SHOWING GROWTH OF INDUSTRY AND RATIO OF WROUGHT IRON TO STEEL PIPE MANUFACTURED FROM 1888 TO 1913

Continued on next page

(c) The "Power Piping Society" of Pittsburgh, Pa., consisting of power plant consulting engineers and erectors, formed and adopted standard specifications for power plant pipe and fittings. The specification is definite, and reads: "Wrought Pipe Shall Be Steel."

In view of the increasingly high steam pressures and the superheated steam now being used, all steam service conditions have become so severe that it is very significant that steel pipe has been adopted for such standard specifications.

(d) At the annual meeting of the Iowa District Gas Association, Clinton, Iowa, May 26, 27, and 28, 1915, A. W. Borden, Chairman of the Committee on Distribution, reported in part as follows:

"There has been much discussion as to the relative merits of steel and wrought iron for main and service work. The latter material was formerly attributed with many advantages not accorded the steel pipe, but, in recent years, the improvement of this product has contributed very largely to dissipating the prejudices, which, based on real or fancied causes, formerly existed; until today it is claimed with conservatism that the best prepared steel pipe will surpass wrought iron in strength and ductility and has the added advantage of much lower cost."—Gas Record, June 9, 1915, page 428.

(e) The city of St. Louis, Mo., definitely specified steel pipe for all steam piping in the engine and boiler rooms in the Low Service Pumping Station, Chain of Rocks, St. Louis Water Works. The specification regarding this material reads as follows:

"Clause 7, Pipe and Bends."

"All Pipe over 4" diameter, including all pipe bends, unless shown otherwise, shall be full weight lap-welded steel. All pipe 4" diameter and under shall be of full weight Spellerized Steel."

"Offset bends (25) and (28) shall be of extra strong, lap-welded, steel pipe. All bends shall be carefully made by heating the pipe and bending same to the proper radius and true to dimensions. They shall be free from buckles or blisters and circular in cross-section."

(f) The American Society for Testing Materials includes in its membership both users and manufacturers of wrought iron and wrought steel pipe. The Standard Specifications adopted in 1915 for "Welded Steel and Wrought Iron Pipe" is a practical admission by all concerned that wrought iron is not equal to wrought steel in general physical properties.

Q—When was wrought steel pipe first introduced?

A—The first steel pipe—about 500 tons—was made and marketed about 1888. In the short period of twenty-five years—or by 1913—the production of steel pipe had been increased to 2,189,218 tons per year.

Q—How do these figures compare with the production of wrought iron pipe?

A—The approximate tonnage of wrought iron pipe in 1888 was 500,000 tons; in 1913 this production had decreased to 312,746 tons—or 187,254 tons less in 1913 than in 1888.

Q—Have you any statistics showing the production of wrought iron and wrought steel in the intervening years between 1888 and 1913?

A—Yes; the following figures, compiled by the American Iron and Steel Institute and published in Special Statistical Bulletin No. 8, show the relative production of wrought iron and wrought steel pipe.

PRODUCTION OF IRON AND STEEL SKELP IN UNITED STATES FROM 1905-1914—GROSS TONS

Year	Iron	Steel	Total	Per Cent Iron	Per Cent Steel
1905	452,797	983,198	1,435,995	31.5	68.5
1906	391,517	1,137,068	1,528,585	25.7	74.3
1907	444,536	1,358,091	1,802,627	24.6	75.4
1908	297,049	853,534	1,150,583	25.8	74.2
1909	370,151	1,663,230	2,033,381	18.2	81.8
1910	350,578	1,477,616	1,828,194	19.2	80.8
1911	322,397	1,658,276	1,980,673	16.3	83.7
1912	327,012	2,119,804	2,446,816	13.3	86.7
1913	312,746	2,189,218	2,501,964	12.5	87.5
1914	264,340	1,718,091	1,982,431	13.3	86.7

The graphic chart below shows the relative production in diagram form.

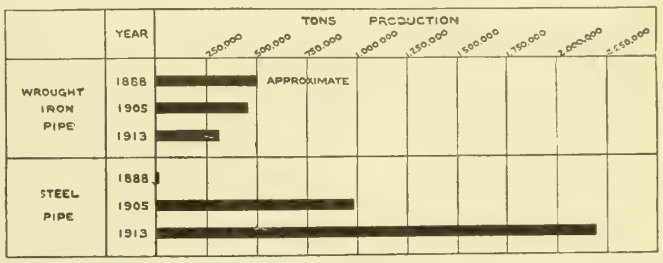


DIAGRAM SHOWING PRODUCTION OF WROUGHT IRON AND STEEL PIPE FROM 1888 TO 1913

Q—What is the reason for this enormous increase in the manufacture and use of "National" Steel Pipe?

A—Principally the production and development of a soft, weldable, low-carbon steel, possessing such uniform physical and chemical properties that, owing to improved special manufacturing processes, steel pipe has proved not only the equal but the superior in service and durability of the earlier product—wrought iron.

Q—When was the first steel pipe manufactured by National Tube Company?

A—"National Works" of National Tube Company manufactured steel pipe in the early nineties, but the first steel pipe made in America was produced by the Riverside Iron Works, Wheeling, W. Va., about 1887; this mill is now "Riverside Works" of National Tube Company.

Q—Did National Tube Company ever manufacture wrought iron pipe?

A—Yes, National Tube Company was for many years the largest single manufacturer of wrought iron pipe in America, having begun the manufacture of wrought iron pipe in 1868.

Q—When did National Tube Company discontinue making wrought iron pipe?

A—After many years of investigation of actual service conditions, the evidence in favor of steel pipe was found so convincing that in 1909 National Tube Company abandoned entirely the manufacture of wrought iron pipe, making thereafter only one type of steel pipe—"National" Pipe.

II—Manufacture of Wrought Steel Pipe—"National" Pipe.

Q—Is "National" Pipe always the same in quality?

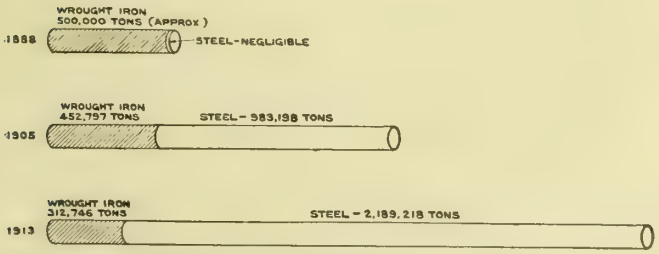


DIAGRAM SHOWING RELATIVE WEIGHT OF WROUGHT IRON AND STEEL PIPE MANUFACTURED FROM 1888 TO 1913

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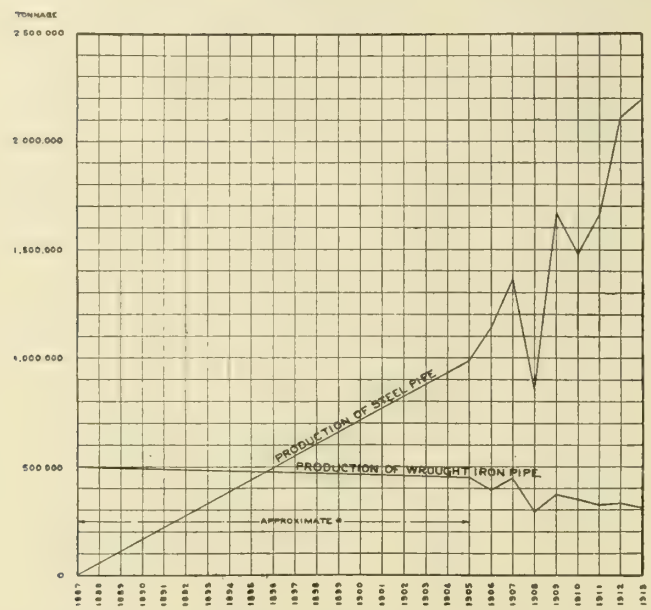


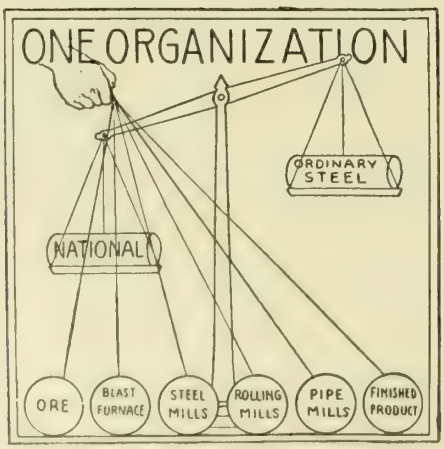
CURVES SHOWING RELATIVE PRODUCTION OF WROUGHT IRON AND STEEL SKELP SINCE THE INTRODUCTION OF STEEL PIPE IN 1887

1905 being the first year for which separate skelp statistics were gathered, only approximate relative tonnage can be shown for the years 1887 to 1904, inclusive

A—Yes; because the raw materials and all manufacturing processes from the ore to the finished product are under the control of one organization.

Q—Is this of special advantage?

A—One controlling organization eliminates the probability of inferior material; it ensures uniform chemical composition and physical structure; and only by unified control is it possible to maintain the high, unvarying standards of quality of "National" Pipe.



Q—How many plants do National Tube Company operate?

A—Eleven. In the Pittsburgh District are National Works, Christy Park Works and Versailles Works, at McKeesport, Pa.; the Pennsylvania, the Continental and Republic Works, at Pittsburgh, Pa.; the Riverside Works, at Wheeling, W. Va.; the Lorain Works, at Lorain, Ohio; the Syracuse Works, at Syracuse, N. Y.; the Standard Works ("Shelby"), at Elwood City, Pa., and the "Kewanee" Works, at Kewanee, Ill.

Q—What is the annual manufacturing capacity of these eleven plants?

A—Upwards of 1,500,000 tons of "National" Pipe and allied products.

Q—What are the "allied products"?

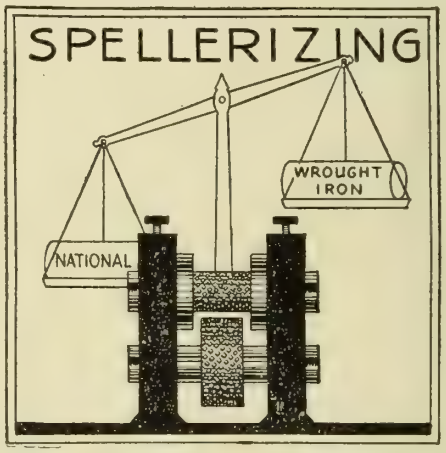
A—"Shelby" Seamless Tubing, "N. T. C." Valves and Fittings, and the now famous "Kewanee" Unions and "Kewanee" Specialties.

Q—Have there been improvements in the manufacturing processes of pipe?

A—Practically all improvements in pipe manufacture have been confined to the production of wrought steel pipe. Probably the most important improvement in steel pipe manufacture is the process of Spellerizing the smaller sizes of "National" Pipe (4" and under) to minimize the natural tendency to corrosion.

Q—What is the "process of Spellerizing"?

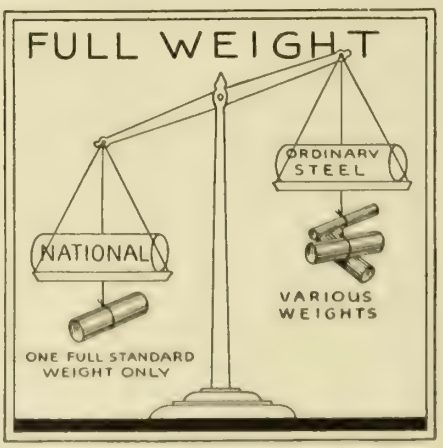
A—Spellerizing is a method of treating metal which consists in subjecting the heated bloom to the action of rolls having regularly shaped projections on their working surfaces; then, subjecting the bloom while still hot to the action of smooth-faced rolls and repeating the operation, whereby the surface of the metal is worked so as to produce a uniformly dense texture bet-



ter adapted to resist corrosion, especially in the form of pitting. This special process is under the exclusive control of National Tube Company. "National" Pipe *only* is Spellerized. Pipe that is not "National" Pipe is *not* Spellerized.

Q—Why are the small sizes (4" and under) only subjected to the Spellerizing process?

A—Because the large sizes with thicker walls are made from heavier plates of such uniform quality that corrosion does not seriously affect them to any appreciable extent.



Q—Is "National" Pipe made in "merchant weights"?

A—No. "National" Pipe since January 1, 1913, is made full standard weight only. There is no "merchant weight" "National" Pipe.

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Q—What is the exact meaning of "full standard weight"?

A—Just this: "NATIONAL" Pipe does not appreciably vary in weight. For instance, mill records for a recent month show that out of twenty-six sizes, nineteen averaged heavier than the published list of weights and, of the balance, none of the sizes weighed less than three per cent above the minimum weights allowed, while a variation of five per cent above or below the given weights is permissible.

Q—What is the average length of "NATIONAL" Pipe?

A—About 20 feet; although, if desired, lengths up to and including 40-foot lengths may be obtained.

"NATIONAL" PIPE

FULL STANDARD WEIGHT—BLACK AND GALVANIZED
ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size	List Price per Foot	Diameters		Thickness	Weight Per Foot		Threads per Inch
		External	Internal		Plain Ends	Threads and Couplings	
⅛	$ .05½	.405	.269	.068	.244	.245	27
¼	.06	.540	.364	.088	.424	.425	18
⅜	.06	.675	.493	.091	.567	.568	18
½	.08½	.840	.622	.109	.850	.852	14
¾	.11½	1.050	.824	.113	1.130	1.134	14
1	.17	1.315	1.049	.133	1.678	1.684	11½
1¼	.23	1.660	1.380	.140	2.272	2.281	11½
1½	.27½	1.900	1.610	.145	2.717	2.731	11½
2	.37	2.375	2.067	.154	3.652	3.678	11½
2½	.58½	2.875	2.469	.203	5.793	5.819	8
3	.76½	3.500	3.068	.216	7.575	7.616	8
3½	.92	4.000	3.548	.226	9.109	9.202	8
4	1.09	4.500	4.026	.237	10.790	10.889	8
4½	1.27	5.000	4.506	.247	12.538	12.642	8
5	1.48	5.563	5.047	.258	14.617	14.810	8
6	1.92	6.625	6.065	.280	18.974	19.185	8
7	2.38	7.625	7.023	.301	23.544	23.769	8
8	2.50	8.625	8.071	.277	24.696	25.000	8
8	2.88	8.625	7.981	.322	28.554	28.809	8
9	3.45	9.625	8.941	.342	33.907	34.188	8
10	3.20	10.750	10.192	.279	31.201	32.000	8
10	3.50	10.750	10.136	.307	34.240	35.000	8
10	4.12	10.750	10.020	.365	40.483	41.132	8
11	4.63	11.750	11.000	.375	45.557	46.247	8
12	4.50	12.750	12.090	.330	43.773	45.000	8
12	5.07	12.750	12.000	.375	49.562	50.706	8
13	5.60	14.000	13.250	.375	54.568	55.824	8
14	6.10	15.000	14.250	.375	58.573	60.375	8
15	6.50	16.000	15.250	.375	62.579	64.500	8

The permissible variation in weight is 5 per cent above and 5 per cent below.
Furnished with threads and couplings and in random lengths, unless otherwise ordered.
All weights given in pounds. All dimensions given in inches.
For cut lengths, an extra charge will be made above random lengths.
For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.
For Galvanized, or Coated Pipe, an extra charge will be made above Black Pipe.

"NATIONAL" PIPE

EXTRA STRONG PIPE—DOUBLE EXTRA STRONG PIPE
FULL STANDARD WEIGHT
EXTRA STRONG PIPE—BLACK AND GALVANIZED
ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size	List Price per Foot	Diameters		Thickness	Weight per Foot Plain Ends
		External	Internal		
⅛	$.12	.405	.215	.095	.314
¼	.07½	.540	.302	.119	.535
⅜	.07½	.675	.423	.126	.738
½	.11	.840	.546	.147	1.087
¾	.15	1.050	.742	.154	1.473
1	.22	1.315	.957	.179	2.171
1¼	.30	1.660	1.278	.191	2.996
1½	.36½	1.900	1.500	.200	3.631
2	.50½	2.375	1.939	.218	5.022
2½	.77	2.875	2.323	.276	7.661
3	1.03	3.500	2.900	.300	10.252
3½	1.25	4.000	3.364	.318	12.505
4	1.50	4.500	3.826	.337	14.983
4½	1.80	5.000	4.290	.355	17.611
5	2.08	5.563	4.813	.375	20.778
6	2.86	6.625	5.761	.432	28.573
7	3.81	7.625	6.625	.500	38.048
8	4.34	8.625	7.625	.500	43.388
9	4.90	9.625	8.625	.500	48 728
10	5.48	10.750	9.750	.500	54 735
11	6.10	11.750	10.750	.500	60 075
12	6.55	12.750	11.750	.500	65 415

The permissible variation in weight is 5 per cent above and 5 per cent below.

DOUBLE EXTRA STRONG PIPE—BLACK AND GALVANIZED
ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size	List Price per Foot	Diameters		Thickness	Weight per Foot Plain Ends
		External	Internal		
½	$.32	.840	.252	.294	1.714
¾	.35	1.050	.434	.308	2.440
1	.37	1.315	.599	.358	3.659
1¼	.52½	1.660	.896	.382	5.214
1½	.65	1.900	1.100	.400	6.408
2	.91	2.375	1.503	.436	9.029
2½	1.37	2.875	1.771	.552	13.695
3	1.86	3.500	2.300	.600	18.583
3½	2.30	4.000	2.728	.636	22.850
4	2.76	4.500	3.152	.674	27.541
4½	3.26	5.000	3.580	.710	32.530
5	3.86	5.563	4.063	.750	38.552
6	5.32	6.625	4.897	.864	53.160
7	6.35	7.625	5.875	.875	63.079
8	7.25	8.625	6.875	.875	72.424

The permissible variation in weight is 10 per cent above and 10 per cent below.
The following notes apply to both tables:
Furnished with plain ends and in random lengths, unless otherwise ordered.
All weights given in pounds. All dimensions given in inches.
Random length of Extra Strong and Double Extra Strong Pipe is considered to be 12 feet to 22 feet, we to have the privilege, however, of supplying not exceeding 5 per cent of total order in lengths from 6 feet to 12 feet.
For pipe fitted with threads and couplings, an extra charge will be made above plain ends.
For cut lengths, an extra charge will be made above random.
For Galvanized, or Coated Pipe, an extra charge will be made above Black Pipe.

Q—What is the range of sizes of "NATIONAL" Pipe?

A—"NATIONAL" Pipe is made in sizes ranging from ⅛-inch up to 30-inch, inclusive.

Q—Does NATIONAL TUBE COMPANY manufacture a full and complete line of "NATIONAL" tubular products?

A—Yes, there is practically a "NATIONAL" Tube for every purpose.

Q—What are the standard weights and dimensions of "NATIONAL" Pipe?

A—The preceding table gives the weights and dimensions of Full Standard Weight "NATIONAL" Pipe up to 15-inch diameter.

Q—Where can be obtained all the requisite information about "NATIONAL" Tubes for every purpose?

A—Write to the nearest District Sales office of the NATIONAL TUBE COMPANY or to your jobber.

Q—Are there booklets containing the various lists of "NATIONAL" Pipe?

A—Yes; List No. 5 contains list prices, weights and dimensions of the following: "NATIONAL" Pipe—Full Standard Weight, Black and Galvanized; Extra Strong, Double Extra Strong, Full Standard Weight, Black and Galvanized.

"NATIONAL" Hydraulic Pipe
"NATIONAL" Reamed and Drifted Pipe
"NATIONAL" Bedstead Tubing
"NATIONAL" Redrawn Pipe, specially recommended for Ammonia purposes
"NATIONAL" Dry Kiln Pipe
"NATIONAL" Tuyere Pipe
"NATIONAL" Large O. D. Pipe, plain ends
"NATIONAL" Line Pipe
"NATIONAL" Air Line Pipe
"NATIONAL" Standard Boston Casing
"NATIONAL" Standard Oil Well Boston Casing
"NATIONAL" Steel Drive Pipe
"NATIONAL" Oil Well Tubing
"NATIONAL" Steel Tubing with Allison Vanishing Threads, Ends Upset and Ends not Upset
"NATIONAL" Flush Joint Steel Tubing
"NATIONAL" California Special External Upset Tubing
"NATIONAL" Diamond B X. Steel Drive Pipe
"NATIONAL" California Diamond B X. Casing

Continued on next page

"National" Full Weight Drill Pipe
"National" Special Rotary Pipe
"National" Special Upset Rotary Pipe
"National" Lap Welded Steel Boiler Tubes
"National" Standard Locomotive Boiler Tubes —Lap-welded
"National" Converse Lock Joint Pipe
"National" Matheson Joint Pipe
"National" Kimberley Joint Pipe
"National" Wrought Pipe Couplings
"National" Boston Casing Couplings
"National" Line, Tubing and Drive Couplings and a list of "National" Tubular Products.

Q—Where can List No. 5 be obtained?

A—From the nearest Jobber, or the nearest District Sales Office of National Tube Company. This book also contains list prices, which are subject to the prevailing market discounts.

Q—Can I obtain list of discounts from the same sources?

A—Yes; and also specifications covering the various "National" Tubular Products. The following is the standard specification for "National" Standard Full Weight Pipe.

General Specifications—"NATIONAL" Pipe.

For the benefit of architects and engineers, who continually specify pipe, we submit our Standard Welded Pipe Specification No. 1. This specification, being somewhat more severe than usual, we believe will meet with approval, and when used will insure reliable, serviceable pipe. Always specify "National" Pipe made by National Tube Company.

Specifications for "NATIONAL" Standard Welded Pipe.

(1) Material—Welded pipe is to be made of uniformly good quality soft weldable steel rolled from solid ingots. Sufficient crop shall be cut from the ends to insure sound material, and the steel shall be given the most approved treatment in heating and rolling.

(2) Process of Manufacture—All pipe shall be made either by the lap-weld or butt-weld process as specified on order, according to the best methods and practice.

(3) Surface Inspection—The pipe must be reasonably straight and free from blisters, cracks or other injurious defects. Liquor marks incidental to the manufacture of lap-weld pipe will not be considered as surface defects. The pipe shall not vary more than one per cent either way from being perfectly round or true to the standard outside diameter, except on the small sizes where a variation of one sixty-fourth of an inch will be accepted. The pipe must not vary more than five per cent either way from standard weight.

(4) Threading and Reaming—Where required, the pipe must have a good Briggs Standard thread, which will make a tight joint when tested by hydraulic pressure at the mill (paragraph 5). The thread must not vary more than one and one-half turns either way when tested with a Pratt & Whitney Briggs standard gauge. All burrs at the ends are to be removed.

(5) Internal Pressure Test—The following test pressures will be applied to the respective sizes of standard butt-weld and lap-weld pipe as indicated in table:

Nominal Size	Method of Manufacture	Test Pressure
[illegible]	Butt-weld	700 pounds
2½ inches and 3 inches	Butt-weld	800 pounds
[illegible]	Lap weld	1000 pounds
[illegible]	Lap weld	900 pounds
[illegible]	Lap weld	800 pounds
[illegible]	Lap weld	700 pounds
[illegible]	Lap weld	600 pounds

Note—On 8, 10 and 12 inch sizes which have more than one weight as standard we have shown the hydraulic test pressure for the heaviest weight.

(6) Testing of Material—The steel from which the pipe is made must have the following physical properties:

Tensile strength	Over 50,000 pounds
Elastic limit	Over 30,000 pounds
Elongation in 8 inches	18 per cent
Reduction of area	50 per cent

A test piece cut lengthwise from the pipe and filed smooth on the edges should bend through 180 degrees with an inner diameter at the bend equal to the thickness of the material, without fracture.

(7) Couplings—The material to be sound and free from injurious defects. Threads must be clean cut, tapped straight through, and of such pitch diameter as will make a tight joint. The ends must be countersunk.

(8) Thread Protection—Solid tapped rings or split couplings will be provided as thread protectors on all sizes 4 inches in diameter or larger. Protection will be provided for smaller sizes when specifically called for on order.

(9) All tests shall be made at mill.

Q—Where can "National" Pipe be obtained?

A—"National" Pipe is carried in stock in all the principal cities and towns in the United States, and is sold to the consumer through the jobbing trade. "National" Pipe is so widely distributed that it can be obtained from any reputable jobber anywhere.

Q—When "National" Pipe is specified, are shipments made when promised?

A—Mill records for a recent year show that 95 per cent of all orders received were shipped out on schedule time.

Q—Is "National" Pipe marked so that one can be sure the pipe received on an order *is* "National" Pipe?

A—All "National" Pipe, sizes ¾-inch and over, is marked with the name "National" rolled in raised letters on every few feet of each length. The sizes below ¾-inch are bundled, and each bundle is tagged with the name "National."

Q—Why is "National" Pipe marked with the name "National"?

A—All "National" Pipe is marked with the name "National" for the protection of the consumer. The indifferent service given by many grades of wrought pipe has been the cause of so much dissatisfaction that in order to enable the consumer to be certain he is receiving a quality product the name "National" is rolled on every few feet of "National" Pipe. The name "National" is the consumers' guarantee of quality, and "represents the highest development of the art."

NAME ROLLED IN RAISED LETTERS ON NATIONAL TUBE COMPANY PIPE

To readily identify "National" material and as protection to manufacturer and consumer alike, the practice of National Tube Company is to roll in raised letters of good size on each few feet of every length of welded pipe the name "National" (except on the smaller butt-weld sizes, on which this is not mechanically feasible; on these smaller butt-weld sizes the name "National" appears on the metal tag attached to each bundle of pipe).

When writing specifications or ordering tubular goods, always specify "National" Pipe, and identify as indicated.

In addition, all sizes of "National" welded pipe four inches and under are subjected to a roll knobbling process known as Spellerizing, to lessen the tendency to corrosion, especially in the form of pitting. This Spellerizing process is peculiar to "National" Pipe, to which process National Tube Company has exclusive rights.

III—Chemical and Physical Properties and the Tests of "NATIONAL" Pipe.

Q—What is the chemical composition of "National" Pipe?

A—The average chemical analysis of the steel used for the production of "National" Pipe is about as follows:

Carbon	.07 per cent
Manganese	.30 per cent
Sulphur	.045 per cent
Phosphorus	.100 per cent

Continued on next page

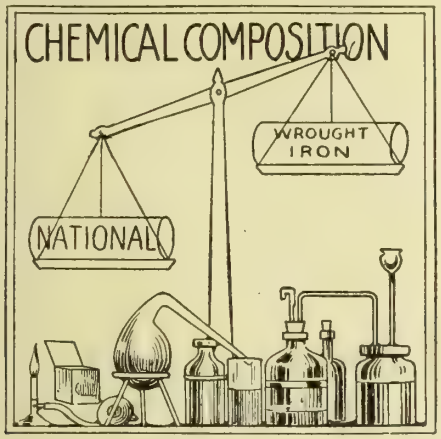
Q—Is there any important differences between the chemical analysis of "NATIONAL" and of wrought iron pipe?

A—The average analysis of wrought iron pipe is given below:

Carbon	Trace to .10 per cent
Manganese	Trace to .15 per cent
Sulphur	.030 per cent
Phosphorus	.170 per cent
Oxides and Silicates	1.20 to 2.00 per cent

It will be noted that the important difference between the two chemical analyses lies in the content of slag and oxides; from these "NATIONAL" Pipe is practically free, while wrought iron contains from 1.20 to 2.00 per cent. "NATIONAL" Pipe is practically 99.5 per cent pure iron.

Q—Does the difference in the chemical analyses produce any difference in the ultimate durability of either type of pipe?



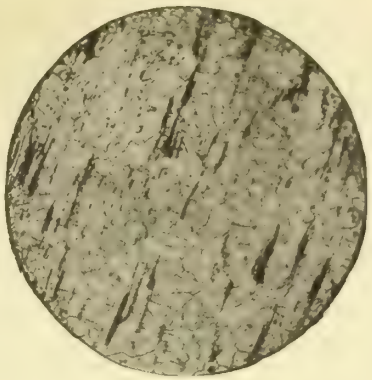
A—A metal, consisting of materials which differ chemically and are only mechanically mixed in small quantities, when subjected to corrosive influences, will rapidly disintegrate, owing to the different electro potentials set up in the material; but if the materials of which the metal is composed are in the form of a solid solution or chemical mixture produced in large unit quantities by machinery, there will not be points of varying electro potential, and, therefore, no disintegration due to local electrolysis. A microscopic examination of any carefully manufactured steel pipe will reveal only a homogeneous collection of ferrite crystals, all of which have the same electric potential. But this is not true of any form of iron which has slag enclosures where the metal is not heated to the melting point before fabrication.

Q—Are there any basic differences between steel and wrought iron skelp?

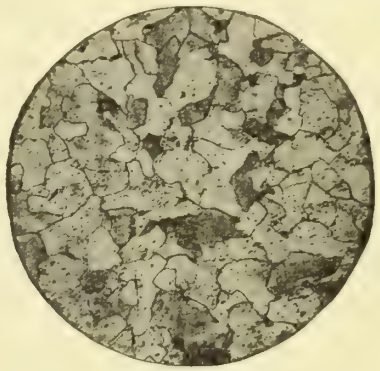
A—Fundamentally these two metals are the same, except for such elements as will be noted later, containing similarly developed ferrite crystals, which have on an average the same general appearance, practically the same chemical composition, except for the slag and oxide content.

Q—Can the comparative structure of the two metals be shown?

A—Yes; the accompanying micro-photographs are representative enlargements of the structure of wrought iron and steel and clearly show the streaks and spots of slag, which are characteristic of all wrought iron, not uniformly distributed but always irregularly throughout the structure. In comparison, note that .5 per cent of impurities contained in steel pipe will be seen by careful inspection to be uniformly and regularly distributed throughout the structure. It is frequently stated that the slag content has protective properties, but as the



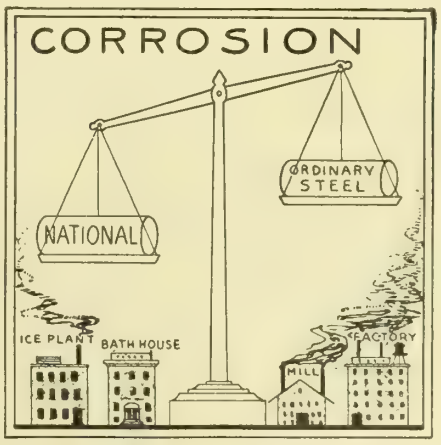
Wrought Iron



Mild Steel—"NATIONAL" Pipe

MICRO-PHOTOGRAPHS (MAGNIFIED 60 TIMES) SHOWING DIFFERENCE IN PHYSICAL STRUCTURE OF MILD STEEL ("NATIONAL") PIPE AND WROUGHT IRON

slag occurs in strings and pockets surrounded by unprotected ferrite crystals, and not as enveloping covers to the crystals, it would seem more probable that the slag is a real danger rather than a protection. Investigations tend to prove that these slag enclosures are liable to accelerate corrosion.



On the theory of cinder-coated iron fibres, Professor Sauveur of Harvard University, an eminent authority on the structure of metals, says, quoting from "Electrochemical and Metallurgical Industry," April, 1907:

"From the above description and accompanying illustrations it will be evident that the ferrite of which wrought iron is composed does not assume a fibrous structure, the slag alone being drawn into fibres. Wrought iron, therefore, should not be described as being fibrous; for, leaving aside the presence of slag, it is as distinctly crystalline as steel. The general belief in the fibrous character of the wrought iron, however, is so deeply rooted that even many modern writers of

Continued on next page

repute still refer to that metal as being fibrous, and many qualities have been and still are claimed for wrought iron because of the presence of these fibres, which are denied to steel, owing to its crystalline character."

Q—Is there an explanation for this statement?

A—Yes; these slag enclosures tend to accelerate corrosion, as all oxides are electro-negative to iron and would, therefore, cause the iron to go into solution. That this is true is shown by the streaked or grooved appearance frequently to be seen in corroded wrought iron.

Q—Does steel pipe have a slag content?

A—No. The slag content in "National" Steel Pipe is practically eliminated and, therefore, is not attacked by corrosion in this manner.

Q—Does carbon tend to accelerate corrosion?

A—Experiments carried on by a number of the leading metallurgists of this country have proved conclusively that there is no difference in the rate of corrosion in steels whose carbon content varies from .02 to .14 per cent. The carbon content in "National" Pipe steel will average about .07 per cent. Therefore, since both steel and wrought iron pipe have a carbon content that is within this range, it can be said that carbon has no effect upon the durability of wrought steel pipe.

Q—What effect has the phosphorus content?

A—It cannot be said that the presence of phosphorus would make steel more susceptible to corrosion than wrought iron, because the average phosphorus content of wrought iron is equal to and often greater than in steel. Furthermore, the wide variations of this element in wrought iron of any particular brand would in itself tend to show that phosphorus has little or no effect on corrosion.

Q—What influence has the sulphur content of wrought pipe on the ultimate durability?

A—Sulphur, when present in abnormal quantity, seems to increase the tendency to corrosion, but the sulphur content is easily controlled in "National" Pipe and seldom rises above .05 per cent. Its effect is negligible. It is only objectionable when present in such amount that there is insufficient manganese with which it can combine and be rendered harmless thereby.

Q—What is the effect of manganese?

A—Manganese forms a homogeneous alloy with iron and does not tend to set up a local electrolytic corrosion and, when present in the form of manganese sulphide, presents so high an electrical resistance that its tendency to form an electrical couple is negligible.

Q—What is the influence of silicon?

A—Silicon, like sulphur, tends to accelerate corrosion if present in an abnormal quantity, but in steel this element is very easily controlled, and in "National" Pipe seldom rises above .015 per cent. The percentage in wrought iron pipe is much higher, a fact that shows that silicon cannot be held responsible for the erroneous opinion that steel pipe corrodes more rapidly than wrought iron pipe.

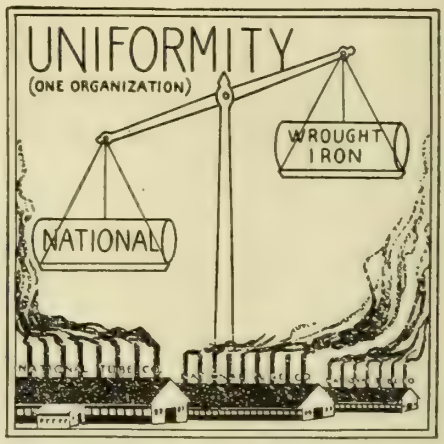
Q—Has a definite conclusion been reached regarding the comparative effects of these various elements?

A—These facts, together with a vast amount of research into the results obtained in actual service from wrought iron and steel pipe under identical conditions, all of which have been carefully collected and tabulated by National Tube Company and other independent and authoritative investigators, prove that "National" Pipe is equal in durability to the best grades of wrought iron pipe now on the market, and in many cases has proved superior.

"National" Pipe has now been in use for over twenty-five years, and numerous cases can be shown where it is practically as good as new after this length of service. The isolated samples of wrought iron pipe which are exhibited as what may be expected after forty-five or fifty years of service, are not in themselves evidence of superiority, but rather are indicative of conditions which tend to prevent corrosion, or at most are only mildly corrosive. Comparisons between wrought iron and wrought steel which have been in service under different conditions lead to false conclusions. Opinions which are not founded on *facts* are equally false. The conclusions reached regarding the comparative durability of wrought iron and steel pipe —"National" Pipe—have been made by unbiased authorities and are based on scientific comparisons and unassailable facts. *Corrosion is found to be more a question of conditions, rather than based on any differences in the material.*

Q—Is it possible to control the chemical properties of "National" Pipe?

A—The chemical properties of "National" Pipe are controlled and maintained in unvarying proportion, because all processes and material are under one management—one organization. As a concrete example, the carbon content of "National" Pipe does not vary beyond .01 per cent in a year's work.



Q—Is "National" Pipe more uniform in chemical properties than wrought iron pipe?

A—Let us compare the method of production. Wrought iron is made in small unit quantities, and the quality is dependent largely on the skill of the puddler. "National" Pipe is made in immense unit quantities, by machinery, and the personal attention is reduced to a few highly trained men—manual labor and skill are practically eliminated. Thus the quality of the steel in chemical and physical properties does not vary from year to year, this uniformity being the most reliable protection against corrosive influences.

Q—What are the physical properties of "National" Pipe?

A—The physical properties of "National" Pipe will average approximately as follows:

Tensile strength	58,000 pounds per sq. in.
Elastic limit	36,000 pounds per sq. in.
Elongation in 8 inches	22 per cent
Reduction in area	55 per cent

Now compare the average physical properties of wrought iron pipe:

Tensile strength	46,000 pounds per sq. in.
Elastic limit	28,000 pounds per sq. in.
Elongation in 8 inches	12 per cent
Reduction in area	25 per cent

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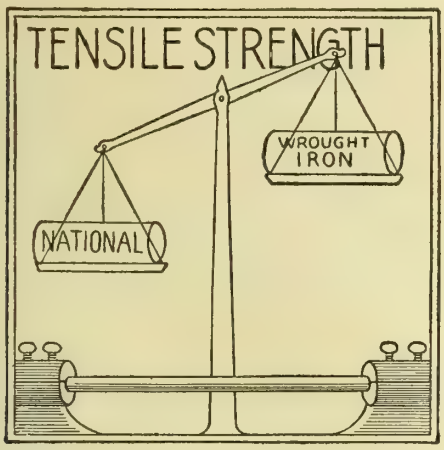


Q—If wrought iron and steel are fundamentally (although not absolutely) the same in physical structure and chemical composition, how do you account for the great difference in physical strength?

A—The physical strength of the two materials is dependent upon several factors. In wrought iron the slag content is unevenly distributed in irregular streaks which lowers the tensile strength, particularly transverse to the axis of the pipe, and in steel the tensile strength is equal in all directions. Wrought iron pipe consists of a number of layers of wrought iron piled together, heated and then rolled into skelp. It is evident that it would be a manufacturing impossibility to secure always a uniform and permanent weld between the layers; as a matter of fact this rolling of the layers frequently results in laminations which impair the ultimate strength, as shown by the table of physical properties. "National" Pipe is made entirely from skelp, which is rolled from a solid billet of uniform chemical composition and homogeneous physical structure.

Q—"National" Pipe is steel—will it take a temper?

A—No. The carbon content is so low that "National" Pipe will not take a temper when heated to redness and quenched in water, and will bend without fracture through 180 degrees before and after quenching.

Q—What is the relative bursting strength of "National" and wrought iron pipe?

A—Professor R. T. Stewart, Dean of the College of Engineering, University of Pittsburgh, read a paper before the American Society of Mechanical Engineers, which was published in their Proceedings, April, 1912, in which he gave the results of a number of bursting tests on wrought iron and steel pipe. The tests revealed that butt-weld wrought iron pipe was 70 per cent as strong as similar butt-weld steel pipe, and lap-weld wrought iron pipe was 57 per cent as strong as lap-weld steel pipe.

Q—Is "National" Pipe inspected and tested?

A—At every important stage of the manufacturing processes "National" Pipe is carefully inspected for possible defects, and is thoroughly tested to insure the shipment of sound and serviceable tubular material. "National" Pipe is subjected to an hydraulic pressure varying from 450 to 3000 pounds per square inch, according to the class of pipe and the character of service indicated by the specifications.

Q—Are there other tests besides the hydraulic tests?

A—"National" Pipe will withstand very severe physical tests. For example, a ring cut from a piece of "National" Pipe can be hammered flat until the inside surfaces meet in a straight line; but when this test is applied to wrought iron pipe, the pipe walls fracture before the flattening is completed. The importance of this test is evidenced by this fact:

One of the largest railroad systems in this country recently added to the clause of their pipe specifications relating to this test the following paragraph:

> "It is not expected that wrought iron pipe will always stand this test without rupture, but the fracture should show good welding and material."

Q—Do the inspections and tests to which "National" Pipe is subjected eliminate all defective material?

A—All inspections and tests of "National" Pipe are so severe that the shipment of defective pipe is practically eliminated.

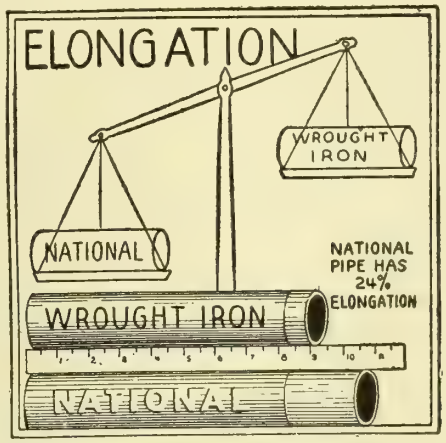
Q—What is done with defective pipe?

A—All defective "National" Pipe is scrapped, therefore there are *no "seconds"* in shipments of "National" Pipe.

Q—How about the finish of the surfaces of "National" Pipe?

A—Both the interior and exterior surfaces of "National" Pipe are smooth and well finished, allowing a full, free flow through the interior, and presenting no rough indentations on the exterior to invite corrosion.

Q—Is not wrought iron equally smooth and well finished?



A—This question will be answered by a recent comparison, the opportunity for making it occurring in a large city in Western Pennsylvania. The plumbing and heating contractors were installing the plumbing and heating lines in a new and imposing hotel. A number of lengths of wrought iron and "National" Pipe were selected at random from the pipe being installed and inspected for surface defects, finish, etc. The pipes were then split open and closely examined. The results were decidedly in favor of "National" Pipe, as many sections of the wrought iron pipe were laminated, full of blisters and quite rough. The galvanized wrought iron pipe, when the blisters were opened, showed signs that corrosive action had started even before the pipe was installed. "National" Pipe, on the contrary, had a much smoother surface, and was free from the defects found in the wrought iron. (See micro-photographs on page 1223.)

Q—Are "blister rolls" used in the manufacture of "National" Pipe?

A—"National" Pipe is rolled from solid skelp rolled from a solid billet; therefore, there are no such laminations as occur in wrought iron skelp, which is rolled from layers of wrought iron piled together, and no "blister rolls" are used in the manufacture of

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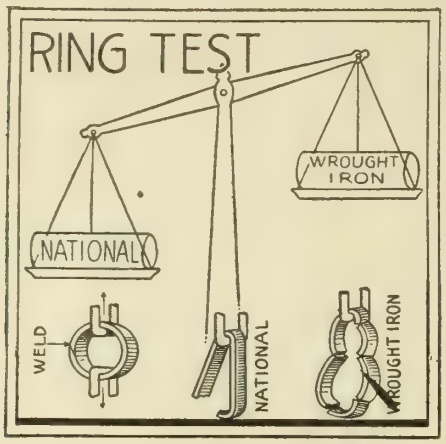


"National" Pipe, because there are no blisters on the skelp to roll out.

Q—Do the laminations and blisters which occur in wrought iron have any effect upon the physical strength and ultimate durability of the pipe?

A—It would seem to be self-evident that a piece of metal composed of homogeneous elements thoroughly united would be stronger than a number of sheets of varying qualities laid one on top of the other, heated and rolled together. "National" Pipe is rolled from a solid billet, and wrought iron from welded sheets. "National" Pipe is free from laminations and blisters too often formed on both surfaces of wrought iron pipe. Even with the "blister rolls" this only affects the exterior surface of wrought iron pipe, and cannot touch the interior; therefore, even if the exterior surface of wrought iron pipe is smooth, the interior may be the reverse. But "National" Pipe is smooth both inside and outside, and no "blister rolls" are required because there are no defects of this kind in either skelp or finished pipe.

IV—Durability of "National" Pipe, Conclusions of Authorities, etc.

Q—Is "National" Pipe a new product?

A—No. "National" Pipe has been on the market for fifty years.

Q—Has "National" Pipe always been made from steel?

A—No. For many years National Tube Company made wrought iron pipe only; but shortly after the introduction of steel for pipe the possibilities of steel for this purpose were recognized and the manufacture of wrought iron pipe was entirely abandoned in favor of the more modern and equally durable steel pipe.

Q—What is the approximate life of "National" Pipe?

A—The life of any pipe installation depends largely upon the service conditions under which the line operates. Therefore the length of service may be fifty years, fifty months or fifty days, determined by conditions of service.

Q—Wrought iron pipe seems to have given comparatively good service in the older buildings, has it not?

A—Service conditions in the smaller buildings of twenty-five or more years ago are seldom as severe as those of the modern sky-scraper for several reasons. For example:

(a) The older buildings are comparatively small, and the proportion of water fixtures on each floor are far below the number considered necessary in the modern building.

(b) Water conditions in the larger cities have become more severe in the last fifteen or twenty years, and the natural tendency to corrosion has been accelerated.

(c) The modern buildings are not piped with extra heavy pipe, as was frequently done in the older buildings.

(d) The protective oil films often found in the steam lines of the older buildings are rarely found in the modern buildings.

(e) Much of the "genuine wrought iron" which was specified in many of the older buildings, upon careful investigation has been proved to be steel instead of the wrought iron specified.

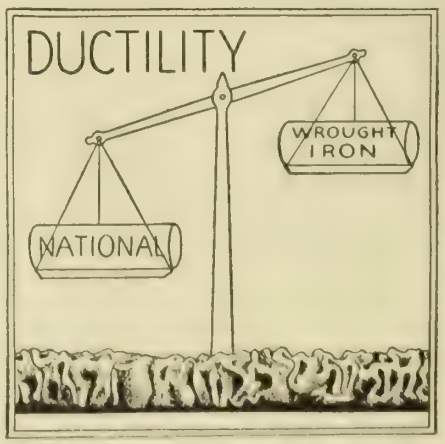
(f) The ever-increasing quantities of acid fumes and gases, such as sulphur dioxide, have much to do with the outside corrosion of both wrought iron or steel pipe.

Q—Can pipe corrosion be resisted successfully?

A—Much of the disintegration of wrought pipe can be overcome, particularly in the hot water supply lines where corrosion may bring a great deal of trouble. The proper design for hot water supply systems eliminates confined gases and does much toward increasing the life of pipe installations. A careful study of service conditions, in addition to protective measures, will do much to alleviate trouble from corrosion.

Q—Then you do not claim that "National" Pipe is entirely free from corrosion?

A—Without a protective coating any wrought iron



or steel pipe is liable to corrode, but the corrosion of "National" Pipe is uniformly distributed over the surface.

Q—How can you explain this?

A—"National" Pipe is uniform in chemical and

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physical properties, and such elements in the material which are likely to cause corrosion are so evenly distributed that corrosion is not severe in spots, as in a non-uniform material.

Q—Is "NATIONAL" Pipe less liable to corrosion than wrought iron?

A—Wrought iron being made in small unit quantities cannot be made so uniform as "NATIONAL" Pipe, which is made in large quantities by machinery, as shown in previous section; therefore, corrosion is more likely to be severe in some places, and this is one cause of "pitting."

Q—Do the impurities found by the chemical analysis in wrought iron affect the durability?

A—Decidedly. As before mentioned, the difference in the electric potential of the several impurities found in wrought iron is the main cause of corrosion.

Q—Are not the impurities found in wrought iron also found in "NATIONAL" Pipe?

A—The most destructive impurities found in wrought iron pipe are the slag and silicate oxides and from these "NATIONAL" Pipe is practically free. Therefore, "NATIONAL" Pipe is secure from corrosion from this source. "NATIONAL" Pipe averages less than .5 per cent of impurities, while wrought iron shows from 1.20 to 2.00 per cent. "NATIONAL" Pipe is practically pure iron, 99.5 per cent.

Q—Which is considered the most durable—wrought iron or "NATIONAL" Pipe?

A—Hundreds of installations of wrought iron and steel pipe have been scientifically investigated by experts—hundreds of comparative tests have been made, and the results show that "NATIONAL" Pipe is at the least as durable as wrought iron pipe, and in many cases has proved more durable.

Q—How do you account for this?

A—"NATIONAL" Pipe is the last word in pipe manufacture. "NATIONAL" Pipe is a modern product, made of the best materials by modern methods, and not by the antiquated processes invented by our grandfathers. In order to make "NATIONAL" Pipe able to withstand successfully all the destructive conditions of modern service, conditions have been carefully studied and manufacturing processes improved. One of the most important improvements to secure greater durability for the small sizes, on which corrosion is the most dangerous, is the process of Spellerizing.

Q—What is Spellerizing?

A—Spellerizing is a special process of mechanically treating the smaller sizes of "NATIONAL" Pipe (4 inches and under) which consists in subjecting the heated bloom to the action of rolls having regularly shaped projections on their working surfaces; then subjecting the bloom to the action of smooth-faced rolls, and repeating the operations, whereby the surface of the metal is worked to produce a uniformly dense texture better adapted to resist corrosion, especially in the form of pitting.

Q—What is the special advantage of the Spellerizing process?

A—The Spellerizing process has a tendency to reduce corrosion to a minimum.

Q—Why are only the smaller sizes of "NATIONAL" Pipe Spellerized?

A—Because the sizes over four inches have a thicker wall, and are therefore better able to resist corrosion.

Q—Is there any consensus of opinion regarding the value of the Spellerizing process?

A—The following quotations are representative and clearly show the consensus of opinion in the engineering world regarding the Spellerizing process:

The Gas Record (Sept. 23, 1914, page 5), in publishing an abstract from a paper by R. B. Duncan of the United Gas Improvement Company, Philadelphia, Pa., "Installation and Maintenance of Service," states, in regard to the value of the Spellerizing process which is applied to "NATIONAL" Pipe only (sizes four inches and under) that:

"The consensus of opinion is that modern steel pipe, particularly if Spellerized, is as durable as wrought iron, and is, besides, cheaper, stronger and more ductile and more uniform in composition."

G. I. Vincent, in a paper "Street Main Standards," October, 1913, issue American Gas Institute News—Volume II., No. 7, pages 73-108, read before the Eighth Annual Convention of the American Gas Institute, October, 1913, presented a summary of standards, suggestions derived from the best practice, and recommendations from over two hundred gas companies relative to the best materials for pipe manufactured for gas service. The following quotation is from this paper:

"The mild steel now being turned out by the tube mills is really the so-called wrought pipe, and an order for wrought pipe or black pipe will be filled with steel. The so-called genuine wrought iron pipe commands a premium of about 15 per cent over steel. Its additional value is not apparent. Spellerized steel pipe is probably as durable as the wrought iron."

The unbiased opinion of a recognized authority on any certain subject has a definite and ascertainable value. The following quotation is significant, being taken from a paper, "Some Causes of Corrosion or Oxidation of Metals in a Refrigerating System," by Morgan B. Smith, published in "Ice," October, 1913, issue, relating to the merits of the Spellerizing process:

"Steel Pipe, which has been treated in such a manner as to eliminate or at least distribute evenly the mill scale may be joined with wrought iron or cast iron safely as a rule. . . . The same stock without the treatment for mill scale will show a decided tendency to corrode when joined with wrought iron or cast iron. The so-called Spellerized steel fulfills this condition with respect to the scale."

Pipe steel made in 1906, by this roll-knobbling process, tested against pipe steel made in 1897, resulted not only in a somewhat greater loss of weight by corrosion of the latter, but a decidedly deeper pitting of the 1897 steel in six months than occurred in the 1906 steel in thirteen months. In comparison with wrought iron it was found that the two materials lost practically the same weight by corrosion, yet the steel had the advantage of uniform corrosion since *"the wrought iron skelp pitted in seven months much deeper than the steel did in thirteen months."*—Prof. H. M. Howe, Am. Soc. for Testing Materials, 1908.

Q—Have there been any independent investigations of the relative service of steel and wrought iron pipe?

A—There have been hundreds of independent investigations in all parts of the country and in all kinds of service.

Q—Have the results brought a general conclusion?

A—The various tests and investigations have conclusively proved that "there was absolutely no difference in the corrosion of the two classes of pipe; they appear to be equally susceptible to the attack." This is Professor Woolson's conclusion, after the investigation of the service of wrought iron and steel pipe in bathhouse service in New York. (See Engineering News, December 8, 1910.)

Q—Was Professor Woolson the only independent investigator?

A—No, indeed. Quotations and references from a few of the independent investigators follow. The tests and conclusions referred to have all been made

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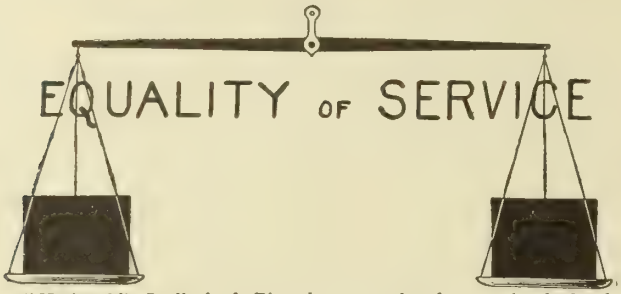


"National" Spellerized Pipe is not only the equal of the best puddled iron pipe, but has been found to be superior, in many instances, under actual identical service conditions, to the ordinary grade of wrought iron pipe on the market

by men of recognized authority. A partial list of authorities, with quotations from their opinions, follow.

Q—Is the value of "NATIONAL" Pipe service recognized?

A—"NATIONAL" Pipe has been made entirely from steel during a few years only; yet, last year, 86.7 per cent of the total wrought pipe production was steel. That steel pipe—"NATIONAL" Pipe—is being specified by an ever-increasing number of prominent architects and engineers is shown by this large percentage of steel pipe to the total of all wrought pipe. This seems ample evidence that "NATIONAL" Pipe leads the wrought pipe industry.

Tests.

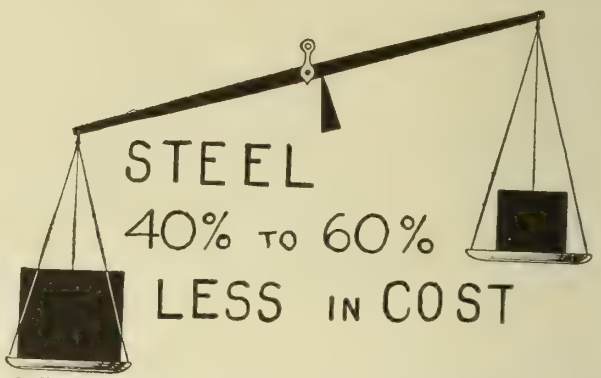
Thomson—Professor T. N. Thomson, in March, 1906, installed alternate pipes of the two metals in a hot-water line, and at the end of a year discovered that steel pipe had approximately 7½ per cent longer life than wrought iron under such conditions. See "NATIONAL" Bulletin No. 4. (A. S. H. & V. Engineers, 1906).

In a similar test carried on by a committee appointed by the American Society of Heating and Ventilating Engineers with iron and steel pipe made by various companies, Professor Thomson reported:

"We believe this test demonstrates that modern steel pipe of good quality is at least as durable as modern strictly wrought iron, and is very much superior to a poor quality of wrought iron in this class of work." (A. S. H. & V. Engineers, 1909.)

"Therefore, a rational deduction to draw from the preceding facts is that steel pipe is more durable than plain wrought iron pipe when used to convey hot water and subject only to internal corrosion. I know that the above summary is not in perfect harmony with the opinions of many engineers and contractors, but I can only record the facts as they are found to be without comment." "The Relative Corrosion of Wrought Iron and Soft Steel Pipes."—T. N. Thomson. (Proceedings American Society of Heating and Ventilating Engineers, Vol. XIV, 1908.)

"This test checks up well with the aforesaid 1908 paper, and we believe demonstrates that modern steel pipe of good



Ordinary steel pipe is 40 to 60 per cent less in cost than wrought iron. "National" Spellerized Pipe gives better service at approximately same reduction in price. See chart on pages 1231 and 1232

quality is at least as durable as modern strictly wrought iron pipe of good quality, and is very much superior to a poor quality of wrought iron in this class of work.

"In closing we desire to call special attention to the fact that we find it is not safe to accept reports regarding the corrosion of wrought iron and steel pipes without first identifying the materials, because so many engineers cannot ordinarily distinguish the difference between them." "Report of Committee on Corrosion of Wrought Iron and Steel Pipes." (Proceedings American Society of Heating and Ventilating Engineers, Vol. XVI, 1910.)

Coal Mine Corrosion—"Corrosion tests in running mine water were carried on by Professor Thomson, The Pittsburgh Coal Company, H. C. Frick Coal Company and others, these indicating that steel is at least equal to wrought iron in resisting corrosion." (Iron Age, July 12, 1906.)

The results of these tests of wrought iron and steel pipe in coal mines may be gleaned from the following extracts:

"The results indicate to us that steel is just as durable in the water in this mine as wrought iron."

Says one of the largest coal operators in Kentucky:

"We thought the data decidedly in favor of steel, in view of the fact that we had anticipated a reversal of the leaning. . . . The results of this investigation would appear to indicate no practical difference in the life to be obtained from either iron or steel piping in the hot water service."

This from a coal operator in Pennsylvania. Comparisons of new steel and iron pipes in the boiler feed and other lines led this large company, which made the test, to the exclusive use of "NATIONAL" Pipe.

"While corrosion was about the same, there was a pitting in the iron that we did not find in the steel, and the steel was corroded more uniformly. From the tests made, I know that the steel pipe is the better for such conditions."

This conclusion from an operator in the largest bituminous coal field in the world indicates the advantages gained by uniform material worked by the Spellerizing process in connection with "NATIONAL" Pipe.

A SECTION OF "NATIONAL" PIPE

The name "NATIONAL" is rolled in raised letters on National Tube Company's Pipe. This marking is the consumers' guarantee of quality

USE "CAMELOT"

Continued on next page

Stoughton—In his text book, "The Metallurgy of Iron and Steel" (Hill Publishing Co., New York), Bradley Stoughton, one of those who have carried out exhaustive investigations, says:

"The evidence goes to show that properly made steel corrodes no more than wrought iron."

Howe and Stoughton—An investigation was made and the results arrived at were incorporated in a paper, "The Relative Corrosion of Steel and Wrought Iron Tubing"—H. M. Howe and Bradley Stoughton (Proceedings of the American Society for Testing Materials. Volume 8, 1908), read before the American Society for Testing Materials, which concluded with the following significant words:

"This is all the evidence which we have found and received permission to cite, though we have asked manufacturers prominently and financially interested in showing that steel is worse than iron, to give the addresses of those who could give us evidence. None of that which we have found, but have not yet received permission to cite, is unfavorable to steel."

(See "National" Bulletin No. 11.)

Friend—J. Newton Friend, in his recent book, "The Corrosion of Iron and Steel" (Longmans, Green Co., 1911), states:

"It would appear therefore that when everything is taken into consideration there is practically nothing to choose between wrought iron and steel as at present manufactured." (Page 286.) And finally concludes with these words: "These and many other instances might be cited as illustrating the fact that good steel corrodes at much the same rate as good wrought iron." (Page 288.)

Sang—A. Sang, in a thorough résumé of the question entitled, "The Corrosion of Iron and Steel," (McGraw Hill Book Co., New York, 1910), says:

"Properly protected steel and iron rust to about the same extent, the steel doing so more uniformly," and adds: "The best quality of charcoal iron is practically as resistant as the best quality of steel used for similar purposes." (Page 49.)

In regard to pipe, Sang remarks:

"The carefully acquired experience of the largest manufacturers of tubes in the world, which induced them recently to abandon the manufacture of wrought iron pipe, teaches that the use of steel in place of iron, at least in the United States, for the special purpose of tubing, is to be preferred; the tendency of steel to pit is somewhat less than that of iron and it welds at the joint fully as well." (Page 73.)

(See "National" Bulletin No. 4.)

Woolson—Prof. Ira H. Woolson (Engineering News, December 8, 1910) secured 89 samples of corroded pipe from seven bath houses in New York City. Seventeen of these samples proved to be wrought iron and the remainder steel. Professor Woolson says:

"In my judgment, from the evidence collected, there was absolutely no difference in the corrosion of the two classes of pipe; they appear to be equally susceptible to the attack."

This pipe was tested to destruction.

(See "National" Bulletin No. 2.)

Walker—A most convincing investigation reported is that of Dr. W. H. Walker (New England Water Works Association, March 1912), of the Massachusetts Institute of Technology, who secured sixty-four samples of wrought iron and steel pipe in adjacent service. These samples had been in service from two to seventeen years.

Dr. Walker reported that of the sixty-four samples secured twenty pairs favor steel, eighteen iron, nine show no difference in corrosion and seventeen no corrosion at all. Dr. Walker says in this paper:

"These results again demonstrate that taken on the average there is no difference in the corrosion of iron and steel pipe. Conversations held with engineers in charge of plants during this investigation confirm the statement already made that a pipe is frequently called steel when corrosion is found to be excessive, while it is set down as iron if it rusts but little."

(See "National" Bulletin No. 10.)

Ball—P. DeC. Ball (Cold Storage and Ice Trade Journal), in a paper read before the American Society of Refrigerating Engineers, stated:

"From thirty-three years of personal observation, constructing, erecting and operating ice-making and refrigerating machines, absorption and compression types, and using iron pipes for the first fourteen years and iron and steel pipe for the next nineteen years, we are convinced that local conditions only govern the corrosion of pipes in refrigerating and ice-making machines, and that, chemically and mechanically, mild steel pipe meets the requirements of the refrigerating engineer in all respects, and better than any other pipe for the reason that it is superior in point of finish, strength, strength of seam and uniformity of material."

(See "National" Bulletin No. 5.)

Cosgrove—"Wrought Pipe Drainage Systems," by J. J. Cosgrove (published by Standard Sanitary Mfg. Co., Pittsburgh, Pa.), contains many significant statements relative to the value of steel pipe when compared with wrought iron. We quote as follows:

Page 3—"Such progress has been made toward improving the temper and weld of pipe steel, * * * that today wrought iron pipe can scarcely be distinguished from steel pipe, so far as the cutting, threading and splitting are concerned." * * *

Page 7—"So far as wrought iron and steel pipes are concerned there is no appreciable difference between their length of life under similar conditions of exposure to corrosion, and one can be accepted as equally good as the other." * * *

Page 9—"As wrought iron and steel pipes are practically the same, they will be considered in this work, together with all other pipes of whatever metal or alloy which are put together with screw joints, as wrought pipes."

Woodworth—Mr. H. A. Woodworth, M. E., associated with the Merchant's Heat and Light Company, of Indianapolis, Ind., who read a paper "District Heating Distribution Systems" before the Annual Meeting of the National District Heating Association (1914) held in Rochester, N. Y., in regard to the merits of wrought iron and steel pipe, states that:

"The use of steel pipe is becoming more popular every day, due to the good results found from practical experience. The author recently took up some 10-inch and 12-inch mains of steel pipe and laid 16 inches in their place, and was surprised to find that the removed pipe showed the original stamping of the manufacturers[1] after thirteen years of usage on a hot water heating system. * * * The pipe was laid again on our steam lines, being insulated with sectional covering and tile, and we expect it to last twenty-five years longer." * * *

"Since steel pipe is equally as good as wrought iron, it certainly is not a good policy to pay the difference in price for the latter pipe. Many other instances of steel pipe's good qualities might be cited, but the discussion will no doubt bring out some mighty interesting features along this line."

Vincent—G. I. Vincent, in a paper "Street Main Standards,"[2] read before the Eighth Annual Convention of the American Gas Institute, October, 1913, presented a summary of standards, suggestions derived from the best practice, and recommendations from over two hundred gas companies relative to the best materials for pipe manufactured for gas service. The following quotations from this paper indicate the majority expression in favor of mild steel pipe—"National" Pipe:

"Steel or Wrought Iron—* * * The mild steel now being turned out by the tube mills is really the so-called wrought pipe, and an order for wrought pipe or black pipe will be filled with steel. The so-called genuine wrought iron pipe commands a premium of about fifteen per cent over steel. Its additional value is not apparent. Spellerized steel pipe is probably as durable as the wrought iron." * * * * * *

"Sixty-four per cent of the companies specified steel pipe, thirty-six per cent specified wrought iron. As heretofore stated the advantages of wrought iron pipe as now rolled, over the mild steel pipe of the trade is not apparent. Wrought iron pipe of charcoal iron might be more durable than mild steel, but pipe is not manufactured of this material." * * *

[1] Investigation revealed the fact that the pipe in question was "National" Pipe, made by NATIONAL TUBE COMPANY.

[2] October, 1913, issue American Gas Institute News—Volume II. No. 7, pages 73-108.

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SUMMARY

This summary is prepared for convenience in reference. It gives each item and the suggested best practice. * * * * * *

STEEL MATERIAL FOR STREET MAINS—LOW PRESSURES

Steel vs. Wrought Iron	Steel
Merchant or Full Weight	Full Weight
Size in Preference to Cast Iron	Less than 4" diameter
Life of Steel Mains Expected	No suggestion
Coating	None, except in bad soils

STEEL MATERIAL—HIGH PRESSURE—PIPE LINES

Steel vs. Wrought Iron	Steel
Weight	Line Pipe
Coating	None, except in bad soils

Shattuck—J. D. Shattuck, in a paper "Welding of High Pressure Mains," read before the Ninth Annual Meeting of the American Gas Institute (1914) in reporting the results of some tests on strength of autogenous welded pipe joints made on wrought iron and steel pipe by the Engineering Department of Swarthmore College states:

"This test shows that steel pipe is stronger and more *ductile* than wrought iron pipe."

Duncan—R. B. Duncan, associated with the United Gas Improvement Company of Philadelphia, Pa., in a paper "Installation and Maintenance of Service," read before the Ninth Annual Meeting of the American Gas Institute, 1914, states:

"Succeeding the old lead pipe of the early days of the gas industry, wrought iron pipe was used almost exclusively for service work, for many years. It was far superior to lead from the standpoint of rigidity, being less liable to trap, and then it was cheaper. In the early 90's, the steel industry began making steel pipe cheaper than wrought iron and ever since that time the use of wrought iron has been gradually falling off. The first impression of steel pipe gained by engineers was far from good; it had the reputation of being very uncertain as to temper and weld. Many claimed that great difficulty was experienced in cutting threads and that split pipe very frequently occurred. The general opinion of engineers that steel pipe was markedly inferior to wrought iron in resistance of corrosion is one that has caused much discussion.

"Year by year the steel industry perfected their product until the pipe became as soft as wrought iron with no more power needed to thread same than wrought iron. As to the question of the corrosion of steel pipe versus wrought iron it is a feature that has been discussed by many prominent metallurgists of the country. The consensus of opinion seems to be that there is practically no difference between the two on this point. There have been many tests made both in laboratory and field. The United Gas Improvement Company have made many such tests. From laboratory experience, as far back as 1905, it was decided that there was little difference between wrought iron and steel in reference to corrosion; in fact, it was discovered that the new steel pipe appeared to have an outer coating of oxide which would resist corrosion far better than wrought iron. Many tests have been made of actual conditions in the field, and it has been the general opinion that both kinds of pipe showed almost the same loss of weight by corrosion, the tendency toward pitting being somewhat less in steel.

"The steel industry has been developing a new process which, after several years' time, has given many encouraging results. By this process the steel is treated mechanically and does not in any way depend upon skilled labor beyond keeping up the machinery involved, hence uniform treatment is assured.

"This new process is a method of treating metal which consists in subjecting the heated bloom to the action of rolls having regularly shaped projections on their working surfaces, then subjecting the bloom, while still hot, to the action of smooth faced rolls and repeating the action whereby the surface of the metal is worked so as to produce a uniform dense texture better adapted to resist corrosion, especially in the form of pitting.

"Summing up the comparison, I would say that the steel pipe has four points to its advantage, that would justify its use in preference to wrought iron, as follows:

(1) It costs much less.
(2) It is stronger and more ductile than wrought iron.
(3) It is more uniform in composition.
(4) The threads cut on steel pipe appear to be stronger."

The Gas Record[1] in publishing an abstract from Mr. Duncan's paper states, in regard to the value of the Spellerizing process which is applied to "NATIONAL" Pipe only (sizes four inches and under) that:

"The consensus of opinion is that modern steel pipe, particularly if Spellerized, is as durable as wrought iron, and is, besides, cheaper, stronger and more ductile and more uniform in composition."

Smith—The unbiased opinion of a recognized authority on any certain subject has a definite and ascertainable value. The following quotation is significant, being taken from a paper "Some Causes of Corrosion or Oxidation of Metals in a Refrigerating System," by Morgan B. Smith, published in "Ice," October, 1913, issue relating to the merits of the Spellerizing process.

"Steel Pipe which has been treated in such a manner as to eliminate or at least distribute evenly the mill scale may be joined with wrought iron or cast iron safely as a rule. * * * The same stock without the treatment for mill scale will show a decided tendency to corrode when joined with wrought iron or cast iron. The so-called Spellerized Steel fulfills this condition with respect to the scale."

Speller—F. N. Speller, in summing up a series of articles on the relative durability of Wrought Iron and Steel Pipe under the heading "Plain Facts about 'NATIONAL' Pipe for the Plumber and Steamfitter," published in the Plumber's Trade Journal, December 15, 1913,[5] Jan. 1[6] and 15[7] and Feb. 1,[8] 1914, states:

"It should be borne in mind by all thoughtful members of the trades handling pipe that:

"(1) Steel pipe is no longer an experiment, but has a record of twenty-five years' service—and in that time has increased in use to ninety per cent of the entire production.

"(2) Opinions should be based on a real personal knowledge, taking nothing for granted—the average user of pipe has abundant opportunity to investigate for himself.

"(3) All the comparisons, which have been made in service covering the average life of pipe today, indicate clearly that there is no difference in life between iron and steel pipe as a class, although there is something to say between the various makes of each class.

"(4) All reputable makes of pipe are now marked so that substitution or mistakes are no longer possible. The fact that so much steel pipe has been used, supposedly as wrought iron, in the past is very significant in the light of real experience.

"(5) It is advisable to inquire carefully into the basis of statements made on the general question of iron and steel pipe—hearsay and supposition are dangerous substitutes for real experience in such matters."

Iron Trade Review—In a leading editorial The Iron Trade Review, October 15, 1914, page 699, comments upon the tremendous growth of the steel pipe industry in the past decade and gives statistics showing tonnages of both wrought iron and steel pipe for years 1905 to 1913 inclusive, as compiled by the Bureau of Statistics of the American Iron and Steel Institute, issued in a Special Statistical Bulletin No. 8, and in conclusion states:

"The popularity of steel pipe is due to a number of causes. Undoubtedly its economy has been an influential factor, but the great increase in production during the past two decades cannot be attributed to price alone. Quality also has played an important part. The uniform character of well-made steel pipe is a factor in its favor, and its ductility adds to its serviceableness. * * * * * * * * * * *

"As far as the subject of corrosion is concerned, without going into exhaustive arguments, it may be said that prominent metallurgists now agree that any special fears which may have been entertained regarding the resistance of steel pipe to corrosion are groundless. It seems, therefore, that there are sound economic reasons behind the tremendous increase in the production of steel pipe during the past twenty-five years."

Q—Has NATIONAL TUBE COMPANY made separate investigations?

A—The Metallurgical Department of NATIONAL TUBE COMPANY has conducted separate investigations into the relative service of "NATIONAL" Pipe and wrought iron pipe, and these investigations have been very thorough and have extended over a number of years.

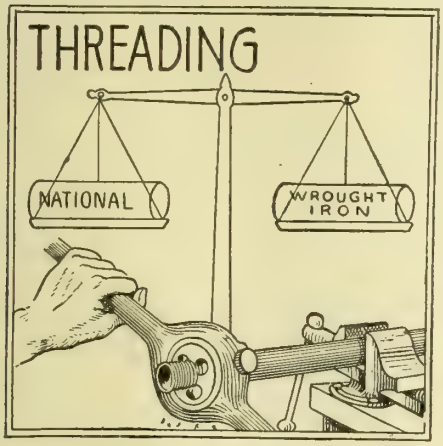
Q—What is the purpose of the Metallurgical Department?

[1] Page 222, Sept. 23, 1914, Vol. 6, No. 6, page 5.
[5] Pages 807-808
[6] Pages 29-30
[7] Pages 107-108
[8] Pages 191-192.

Continued on next page

A—The scope of the Metallurgical Department is principally educational. The every day problems of the pipe consumer are systematically studied; various service conditions are investigated; the smallest up to the largest detail of manufacturing processes are carefully considered—all with one end in view, to improve, where possible, the material and service of "National" Pipe and to educate the consumer to a full understanding and appreciation of the special advantages he secures by the use of "National" Pipe.

To make the service tests and investigations scientific, thorough and complete, the Metallurgical Department spends many thousands of dollars in preparing the data and information for this educational work, which is of value to the entire wrought pipe industry.



V—Threading "National" Pipe.

Q—How about threading and cutting? Does "National" Pipe thread as easily as wrought iron pipe?

A—Yes. Recently, letters were addressed to twenty-eight large pipe threading die manufacturers asking:

"Do your dies thread 'National' Pipe and wrought iron pipe equally well"? The replies are divided as follows:

Favor steel pipe..... 3
Favor wrought iron..... 3
No difference.....22

On the surface this would indicate a "tie," but the fact is the three die manufacturers who favored wrought iron, are small concerns and not familiar with the advances made in die design during the past decade.

Q—How do the threads on "National" Pipe compare with those on wrought iron?

A—They are stronger and better, due to the fact that steel, being tough and homogeneous, does not crumble and scrape off as does wrought iron. "National" Pipe invariably yields cleaner-cut and stronger threads than wrought iron when properly designed and sharp dies are used.

Q—Will "any kind" of dies thread "National" Pipe?

A—Absolutely no. "Any kind" of dies will not thread "any kind" of pipe, although unfortunately many pipe users do not recognize this fact. Dies should be sharp, with a lip of proper angle; have clearance at the heel of the die, and a correct "lead." (Ask for copy of "National" Bulletin No. 6 which describes proper and improper threading practices).

Q—Then are special dies required for threading "National" Pipe?

A—Again—absolutely no. The worst set of dies can be reground, sharpened, and put in condition to cut either steel or wrought iron pipe easily and quickly. Dies are machine tools and must be kept in proper shape if good work is to result. "National" Bulletin No. 6 is free for the asking. It tells how to sharpen dies, and keep them in first-class working order.

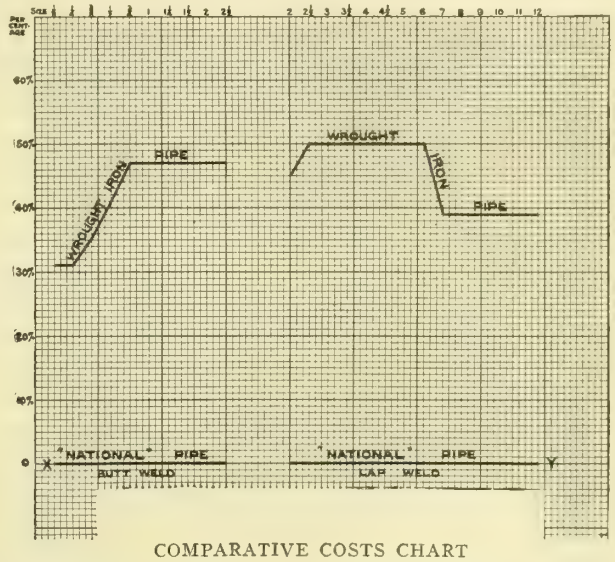
VI—Cost and Service of "National" Pipe.

Q—How does the cost of "National" Pipe compare with that of wrought iron?

A—"National" Pipe costs considerably less than wrought iron pipe.

Q—What is the difference in cost?

A—The accompanying charts show the comparative costs of "National" and wrought iron pipe.



COMPARATIVE COSTS CHART

Chart showing relative increase in cost of wrought iron pipe over "National" Pipe in percentage as based on "Iron Age" general market prices. The line X Y represents the price of "National" Pipe

Q—Does not the lower cost of "National" Pipe tend to lower the high standard of quality?

A—Not at all. When it is remembered that "National" Pipe is made entirely by machinery, under the supervision of a few specially trained men, and not in small unit quantities which depend on a man's individual strength and judgment, it will be apparent that the uniformity of "National" Pipe must be far beyond the possibilities of wrought iron pipe.

Q—Is it not a favorite argument with some salesmen that the higher the price the higher the quality?

A—In many cases this is true; but not in the case of "National" Pipe, which, being produced by machinery in enormous unit quantities, can be supplied to the consumer at a lower cost than wrought iron (which is made in small unit quantities by hand and by old methods now superseded) by the modern processes of making "National" steel.

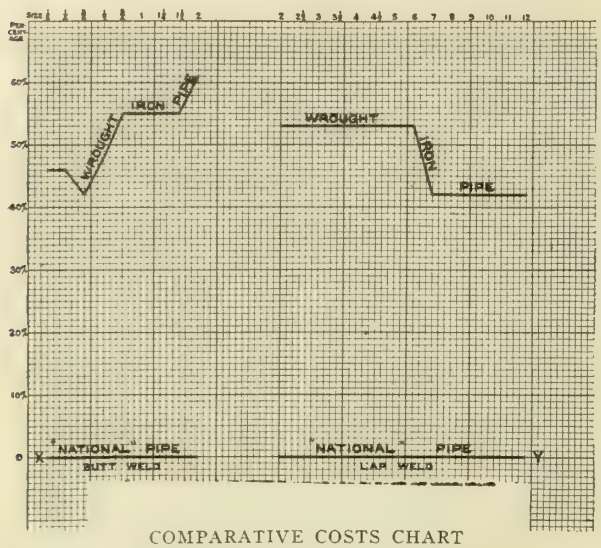
Q—Is the value of "National" Pipe recognized?

A—"National" Pipe has been made entirely from steel during a few years only; during the year 1914, 86.7 per cent of the total wrought pipe production was steel (see table on page 1219). That steel pipe—"National" Pipe—is being specified by an ever increasing number of prominent architects and engineers is shown by this large percentage of steel pipe to the total of all wrought pipe. This seems ample evidence that "National" Pipe leads the wrought pipe industry.

VII—Installations of "National" Pipe.

Q—Can you refer to installations of "National" Pipe in many cities?

Continued



COMPARATIVE COSTS CHART

Chart showing relative increase in cost of wrought iron pipe over "National" Pipe in percentage as based on dealer resale prices to consumers. The line X Y represents the price of "National" Pipe

A—Installations are to be found everywhere, in all types of buildings; not only in the large and important buildings, but in small and unpretentious structures. In fact, wherever pipe is used you will find "National" Pipe.

Q—What are some of the largest buildings in which "National" Pipe has been used?

A—The most recent large building is the Equitable Building, New York, in which the total length of "National" Pipe lines is approximately 235 miles, about the distance from New York to Boston. Although almost 100,000 cast and malleable iron fittings and about 13,500 valves were installed in this building in connecting the wide range of sizes of "National" Pipe—all of which had to be cut, rethreaded and marked for particular places in the building—yet not one single length of "National" Pipe was rejected on account of defective material.

The Continental and Commercial National Bank Building, Chicago, Ill.; the new Hotel Traymore, Atlantic City, N. J.; the department store of Marshall Field & Company, Chicago, may be mentioned among hundreds of large and important buildings throughout the country.

Q—Have you a list of the important buildings in which "National" Pipe has been used?

References.

A—The following list contains the names of some of the more important Office, Bank and Financial Buildings, Hotels, Clubs and Apartment Houses, Universities, Schools and Public Institutions, all of which contain "National" Pipe. This is not intended in any way as a complete list of buildings containing "National" Pipe.

Atlanta, Georgia

Ansley Hotel
Candler Building
Fulton County Court House
Healy Building
Hurt Building
Piedmont Hotel
Third National Bank Building
Winecoff Hotel

Atlantic City, New Jersey

Hotel Traymore

Boston, Massachusetts

Merchants' National Bank Building
E. H. Sterns and Company

Brooklyn, New York

Elks' Club

Brownwood, Texas

Brownwood National Bank Building

Buffalo, New York

Marine National Bank Building
Ward and Ward, Inc.

Chicago, Illinois

Continental and Commercial National Bank Building
Conway Building
Crane Company
Edison Building (formerly Commercial National Bank Building)
First National Bank Building
Harris Trust Company Building
Karpen Building
Marshall Field and Company
Northwestern Railway Station
People's Gas Building
Railway Exchange Building
State Building

Columbia, South Carolina

National Loan and Exchange Building

Dallas, Texas

Butler Bros.
Hotel Adolphus

Detroit, Michigan

Detroit Stove Works
Dodge Bros. Motor Car Company
Michigan Central Railway Co.

Galveston, Texas

Hotel Galvez

Houston, Texas

The Texas Company Building

Jefferson City, Missouri

Missouri State Capitol

Jacksonville, Florida

Heard National Bank Building
Hotel Burbridge
Hotel Seminole
Mason Hotel
St. James Building

Kansas City, Missouri

Commerce Building
Montgomery Ward and Company
Rialto Building
R. A. Long Building
Scarritt Building
St. Regis Hotel

Los Angeles, California

Hollingsworth Building
Hotel Clark
Trust and Savings Building
Van Nuys Building

Manville, New Jersey

H. W. Johns-Manville Company

Minneapolis, Minnesota

First National-Soo Line Building
Minneapolis Athletic Association

Nashville, Tennessee

Hermitage Hotel
Kissam Hall, Vanderbilt University
Stahlman Building
Y. M. C. A. Building

New York City

Adams Building
Architects' Building
Bankers' Trust Building
Emmett Building
Equitable Building
Fifth Avenue Building
Fifty Broad Street Building
Hill Building
Hudson Terminal Building
Lord and Taylor
Singer Building
Whitehall Building

Omaha, Nebraska

City National Bank Building
Hotel Fontenelle
Union Pacific Building
Woodmen of the World Building

Philadelphia, Pennsylvania

Bailey, Banks and Biddle Company
Hotel Adelphia
John Wanamaker Company
Penn Mutual Life Insurance Company Building
Philadelphia Stock Exchange Building

Continued on next page

PITTSBURGH, PENNSYLVANIA
Alling and Cory Company
Dillworth Grade School
First-Second National Bank Building
Gladstone Grade School
H. J. Heinz Company Office Building
James E. Rodgers Grade School
Schenley High School
Vanadium Building
Watt Grade School
Wm. H. McKelvie Grade School

PORTLAND, OREGON
Bensen Hotel
Holtz Store
Ice Hippodrome
Journal Building
Lipmann Wolfe Building
Muir and Frank
Multnomah Hotel
Northwestern Bank Building
Pittock Block
Public Library
Reed College
Selling Building
Telephone Building
Wilcox Building

ST. LOUIS, MISSOURI
Bank of Commerce Building
Buckingham Hotel
Coliseum and Store Building
Hotel Jefferson
Maryland Hotel
Pierce Building
Railway Exchange Building
St. Louis Public Library (Main Building)
Syndicate Trust Building
Third National Bank Building
Times Building
Title Guarantee and Trust Company Building
Washington Hotel

ST. PAUL, MINNESOTA
Merchants' National Bank Building
Railroad Building
St. Paul Library

SALT LAKE CITY, UTAH
Hotel Utah
Mormon Temple
Walker Bank Building

SAN DIEGO, CALIFORNIA
Timkin Building
Watts Building

SAN FRANCISCO, CALIFORNIA
Fairmont Hotel
Hotel St. Francis
Palace Hotel

SANTA BARBARA, CALIFORNIA
San Marcos Building

SEATTLE, WASHINGTON
Alaska Building
American Bank and Empire Building
Arcade Building
Cobb Building
Hotel Washington
Providence Hospital
Stuart Building
Waldorf Apartments
White and Henry Buildings

SPOKANE, WASHINGTON
Davenport Hotel and Restaurant
Old National Bank Building

WASHINGTON, D. C.
New Theatre Building

Q—This list seems to contain important buildings recently erected?

A—This is an indication of the position now held by "NATIONAL" Pipe. "NATIONAL" Pipe has proved so satisfactory in service as to command the confidence of the most successful architects and engineers, who now are careful to specify and insist on securing "NATIONAL" Pipe.

Q—Is "NATIONAL" Pipe used in other types of construction?

A—Wherever pipe is used "NATIONAL" Pipe is suitable and satisfactory. As a matter of fact, building construction represents, comparatively speaking, a lesser part of the general consumption. "NATIONAL" Pipe is used for Water, Gas and Oil lines, Water and Gas wells, Refrigeration lines, Power Plant lines, Irrigation lines, Mechanical purposes, and in short hundreds of other purposes.

VIII—"NATIONAL" Pipe the Recognized Leader of all Wrought Pipe.

Q—Why is "NATIONAL" Pipe considered the leader of modern wrought pipe?

A—Because, after fifty years, "NATIONAL" Pipe has been constantly improved both in material and manufacturing processes, until today the unvarying high standard of quality is beyond any other wrought tubular product. Services have been made a scientific study, the dangers from corrosion have been minimized by special manufacturing processes, and, in short, nothing has been left undone that will give the best possible pipe service to all classes of consumers. The superior quality of "NATIONAL" Pipe was recently recognized by the Jury of Awards of the Panama-Pacific International Exposition.

Q—Was "NATIONAL" Pipe awarded a prize at the Exposition?

A—"NATIONAL" Pipe and Allied Tubular Products were awarded the *Grand Prize* by the Superior Jury of Awards at the Panama-Pacific International Exposition *"as representing the highest development of the art."*

Q—Was there more than one Grand Prize?

A—There was only one Grand Prize awarded to *each class* of material exhibited. The Medal of Honor represented 100 points of excellence, but the Grand Prize ranks still higher—in fact, the Grand Prize represents *Overshadowing Supremacy.*

Q—Has the Grand Prize improved the quality of "NATIONAL" Pipe?

A—No; the award is only the recognition by the consumer of the superior quality inherent in "NATIONAL" Pipe.

IX—"NATIONAL" Pipe and Allied Products in Literature.

Q—Is there any literature concerning "NATIONAL" Pipe and Allied Products?

A—Until recent years there has been very little reliable literature about pipe. In the last few years the investigations of prominent scientific men and others interested in the durability and service of pipe has resulted in accumulation of reliable information concerning pipe and all that relates to it.

Q—Where can I find such literature as I may need on this subject?

A—Because the average architect, engineer and pipe consumer found it difficult to obtain such information as was required promptly and in desirable form, NATIONAL TUBE COMPANY collected, arranged and classified for publication a wide range of information about tubular products, and this information is published in the form of "NATIONAL" Bulletins.

Q—What is the general character of these "NATIONAL" Bulletins?

A—They are engineering in scope and are regarded by the architectural and engineering professions as authoritative. Each "NATIONAL" Bulletin covers only one subject, treating as fully as possible a certain class of service.

Q—How can "NATIONAL" Bulletins be obtained?

A—By writing to the nearest District Sales Office of NATIONAL TUBE COMPANY. These Bulletins can be obtained free of charge by any one whose letterhead or business position indicates a legitimate use.

Continued on next page

Q—Does NATIONAL TUBE COMPANY publish other literature beside the "NATIONAL" Bulletins?

A—Yes; many important and useful booklets, circulars, catalogues, etc. "NATIONAL" Bulletin No. 12 contains a complete list of all publications of NATIONAL TUBE COMPANY.

Q—What is the purpose of these publications?

A—The prime purpose is educational; to place at the disposal of those interested, authoritative facts regarding the use and manufacture of pipe and "NATIONAL" Tubular and Allied Products.

"NATIONAL" BULLETINS

"NATIONAL" Bulletin No. 1—"Some Recent Developments in Testing Boiler Tubes" (eight pages, seven illustrations). This Bulletin contains a paper prepared by F. N. Speller, Metallurgical Engineer, National Tube Company, and was presented at 14th Annual Meeting American Society for Testing Materials, Atlantic City, N. J., June 27th to July 1st, 1911. The test applied to each Spellerized Steel Locomotive Boiler Tube is described in full. Briefly this test is made on the two crop ends from each tube, whereby a special manipulation test is given, containing in one piece the vertical crushing, horizontal flattening, expanding and flanging tests. This Bulletin also contains Standard Specification for Lap-Weld and Seamless Steel Boiler Tubes, Safe Ends and Arch Tubes (including Super-heater Tubes), as jointly recommended and adopted in 1913 by the American Railway Master Mechanics' Association and the American Society for Testing Materials, and a summary of data relative to Steel vs. Iron Flues and Tests applied to "NATIONAL" Boiler Tubes.

"NATIONAL" Bulletin No. 2—"Corrosion of Hot Water Piping in Bath Houses" (eight pages, two illustrations). This Bulletin contains a report of an investigation conducted by Ira H. Woolson, M. Am. Soc. M. E., Consulting Engineer to National Board of Fire Underwriters, New York City, relative to the corrosion of iron and steel in hot water piping in a New York bath-house system. 89 samples of pipe from various bath houses were collected, and from the evidence, Mr. Woolson arrived at the following conclusion:

"In my judgment, from the evidence collected, there was absolutely no difference in the corrosion of the two classes of pipe.* They appeared to be equally susceptible to the attack."

*That is, wrought iron and steel.

This Bulletin also contains a paper on "The Design of Hot Water Supply Systems to Minimize Corrosion," by F. N. Speller, Metallurgical Engineer, National Tube Company, published in Engineering News, issue February 13, 1913. This paper is particularly valuable in that the suggested designs tend to reduce corrosion of pipe to a minimum.

"NATIONAL" Bulletin No. 3—"The Durability of Welded Pipe in Service" (eight pages, two illustrations). This Bulletin contains a paper prepared by F. N. Speller, Metallurgical Engineer, National Tube Company, read before the annual meeting of the American Society of Heating & Ventilating Engineers and published in "Engineering Review," April, 1911. This article covers considerable information relative to the durability of welded pipe as found under various conditions; also detailed notes on corrosion of wrought iron and steel pipe in service lines in over 21 separate investigations, and the net results obtained in each case are compiled and tabulated, with some notes regarding the prevention of corrosion in pipes.

"NATIONAL" Bulletin No. 4—"Corrosion of Boiler Tubes" (twelve pages, 33 illustrations). This Bulletin contains an abstract from a paper on "Corrosion of Boiler Tubes," covering a report of results obtained in an investigation by Rear Admiral John D. Ford, U. S. N., member and President of the American Society of Naval Engineers. The entire report was published in the Journal of American Society of Naval Engineers, May, 1904, and from it the abstract for this Bulletin was taken. The report covers a very full investigation relative to the comparative corrosion of wrought iron and steel boiler tubes. The tests continued over a period of 64 weeks. The Bulletin contains several tables of summaries of results, which indicate least, greatest and average loss in grammes per square inch. Also summary of various corrosion tests of wrought iron and steel, and particularly a table showing summary of results of investigations. Several different and independent investigations are referred to, giving date, locality, length of time of service, authority of test, number of cases on record, reference to details, remarks, etc., etc.

"NATIONAL" Bulletin No. 5—"'NATIONAL' Pipe for Refrigerating Systems" (32 pages, 21 illustrations). This bulletin contains information relative to the several types of systems employed in refrigerating work, with a brief statement of principles upon which the two most commonly used systems are based—The Compression and Absorption systems—together with a short discourse on the relative merits of "NATIONAL" and Wrought Iron pipe for refrigerating work. In addition there are two papers of general interest to all those interested in this subject—"Steel Pipe vs. Wrought Iron Pipe in Refrigerating Work" by P. DeC. Ball and "Corrosion of Pipe in Refrigerating Systems" by F. N. Speller, considerable engineering data applying to refrigerating work and a list of all "NATIONAL" Bulletins, Nos. 1 to 23, inclusive.

"NATIONAL" Bulletin No. 6—"Pipe Threading Dies" (12 pages, 21 illustrations). Because this subject is more or less misunderstood, the information contained in this Bulletin is especially valuable. The illustrations clearly demonstrate by comparison the working of a properly and improperly shaped die. The information is grouped under the following headings: "Lip," "Chip Space," "Clearance," "Lead," "Number Chasers," "Oil," "General Summary," and an article on the "Briggs' Standard" Thread.

"NATIONAL" Bulletin No. 7—"N. T. C." Regrinding Valves (eight pages, seven illustrations). The particular advantages of this type of valve are described in detail in this Bulletin. Three illustrations show a valve, from photographs taken at three different angles, which was opened and closed 327,094 times. The valve was then reground and after being opened and closed over three million times is still in service! The various headings will afford some idea of the value of the contents: "Durability," "Construction," "Types of Discs," "Bonnet," "Body," "Bonnet Ring," "Stem," "Packing Under Pressure," "Packing Gland," "Metal," "Lift," "Wheel," "Testing," "Working Pressure," "Patterns" and "General Summary."

"NATIONAL" Bulletin No. 8—"'NATIONAL' Coating" (eight pages, eleven illustrations). This Bulletin describes in detail a new method of protecting underground piping systems against external corrosion and electrolysis, known as "NATIONAL" Coating. The headings indicate the scope of the information: "Necessity for Protection Other than That Afforded by the Use of Good Steel," "Process of Applying 'NATIONAL' Coating." "Summarizing the Advantages of 'NATIONAL' Coating," "Suggestions Regarding the Laying of Pipe Covered with 'NATIONAL' Coating," "Specifying."

"NATIONAL" Bulletin No. 9—"Some Tests of 'KEWANEE' Unions" (eight pages, five illustrations). This Bulletin contains a full description of several special tests made on "KEWANEE" Unions, including the following: Expansion Test of "KEWANEE" Unions, with tabulated details; Air Test Under Water of "KEWANEE" Unions (the test to which every individual "KEWANEE" Union is subjected before leaving the factory), with illustrations; Service Test on "KEWANEE" Unions (illustrations of two "KEWANEE" Unions which were disconnected and reconnected over 1000 times, and remained tight at the end of the test). The headings indicate something of the information given: "Inspections and Tests," "Construction," "Three Solid Parts," "Brass to Iron Thread Connection at the Ring," "Patterns," "Summary of Advantages."

"NATIONAL" Bulletin No. 10—"Relative Corrosion of Iron and Steel Pipe as Found in Service" (24 pages, 20 illustrations). This Bulletin contains abstract from a paper by William H. Walker, Ph. D., read before the New England Water Works Association, December 13, 1911, and which related in detail the results of an investigation undertaken by Professor Walker with reference to the subject indicated. Something like 64 comparisons of iron and steel were obtained where the history of installation was known. Prof. Walker's conclusion follows:

"These results again demonstrate that taken on the average there is no difference in the corrosion of iron and steel pipe. Conversations held with the engineers in charge of plants during this investigation confirm the statement already made that a pipe is frequently called steel when corrosion is found to be excessive, while it is set down as iron if it rusts but little."

This Bulletin also contains several papers by F. N. Speller, Metallurgical Engineer, National Tube Company, on the relative merits of steel and wrought iron pipe.

"NATIONAL" Bulletin No. 11—"History, Characteristics and the Advantages of 'NATIONAL' Pipe" (48 pages, 33 halftones, 57 zinc etchings). This Bulletin contains interesting information relative to the history of pipe and its manufacture with particular reference to "NATIONAL" Pipe, together with authenticated data on service tests. The text is arranged under the following heads: A Short History of Pipe and Early Methods of Manufacturing, First American Pipe Furnace, History of National Tube Company, Material for Pipe, The First Steel Pipe, Pipe Threading, Spellerizing "NATIONAL" Pipe, Full Standard Weight Pipe Only Manufactured, The Continuous Uniformity of "NATIONAL" Pipe, Physical Properties, Remarkable Ductility of "NATIONAL" Pipe, Bursting Pressure, The Inspection and Tests of "NATIONAL" Pipe,

(Continued on next page)

Changes in the Tubular Industry, "National" Pipe for Refrigerating Systems, Corrosion of Pipe in Hot Water Systems, The Design of Hot Water Supply Systems to Minimize Corrosion. Corrosion of Pipe in Coal Mines, Corrosion of Pipe in General Service, Corrosion of Pipe in Greenhouse Service, "National" Pipe for Gas Lines, Corrosion of Pipe in Boiler Feed-water Service, Relative Corrosion of Iron and Steel Pipe for Plumbing Service, A Summary of Results of Investigations of the Corrosion of Iron and Steel Pipe in Actual Service, Corrosion of Iron and Steel Pipe Under Atmospheric Conditions, Diagrammatic Representations of the merits of "National" Pipe compared to Wrought Iron and Ordinary Steel Pipe with references, Index to important subjects covered in Bulletin, and a summarized list of "National" Bulletins Nos. 1 to 23, inclusive.

"National" Bulletin No. 12—"'National' Pipe" (twenty pages, seven illustrations). This Bulletin contains a summary of information in regard to "National" Pipe. The data is supplied under the following headings: Steel Pipe, Uniformity, Physical Properties, Chemical Composition, Improvements, Full Weight Pipe, Spellerizing, Threading, Corrosion (résumé of opinions), Specifications, Metallurgical Dept., Literature, Summary of Advantages, list of uses of "National" Pipe, four charts illustrating graphically the "Rise of Steel Pipe" based on statistics compiled by The American Iron and Steel Institute and published in Special Statistical Bulletin No. 8, and list of publications issued by National Tube Company.

"National" Bulletin No. 13—"'N. T. C.' Iron Body Brass Mounted Wedge Gate Valves" (12 pages, 21 halftone and 8 line illustrations). Contains complete information in regard to this new line of wedge gate valves.

"National" Bulletin No. 14—"'National' Tubular Steel Poles" (32 pages, 25 halftone and 2 line illustrations). This Bulletin contains a complete description of these poles, the information is supplied under the following headings: Uniformity, Lighting, Physical Properties, Joints, Dog Guards, Street Railway Poles, Painting, Pole Tables, Pole Fittings, Specifications, etc. There are also ten pages of pole tables giving full information in regard to poles.

"National" Bulletin No. 15—"'National' Pipe for Drilling Purposes" (8 pages, 6 halftone illustrations). This Bulletin contains a full description of this product, the information is supplied under the following captions: Process of Manufacture, Material, Physical Properties, Bending Tests on Welded Pipe, Internal Pressure Test, Length, Permissible Variations, Upsetting, Threading and Reaming, Couplings, Marking, Finish, Inspection, Galling of Threads, Strength of Joint, Torsional Tests with Tables, "National" Drill Pipe with Table, "National" Special Rotary Pipe with Table, "National" Special Upset Rotary Pipe with Table, "National" Seamless Interior Upset Drill Pipe with Table, Precautions in Handling Drill Pipe, and Trade Customs.

"National" Bulletin No. 16—"'National' Stationary and Marine Boiler Tubes" (12 pages, 8 halftone illustrations). This Bulletin contains a description of these boiler tubes with illustrations of tests. The information is supplied under the following heads: Reasons for Manufacturing Only Steel Tubes, Spellerizing, Material, Physical Properties, Inspection, Physical Tests, Opinions of Experts, etc.

"National" Bulletin No. 17—"The Manufacture and Use of 'Shelby' Seamless Steel Tubing" (44 pages, 25 halftone plates and 5 pages of line engravings, showing various manipulations of 'Shelby' Seamless Steel Tubing). This Bulletin contains extracts from an address to the U. S. Naval School of Marine Engineering (prepared by Messrs. J. H. Nicholson and Emil Holinger) and covers the following subjects: Process of Manufacture; Materials for Steel Pipes; Making of Specifications; Mill Inspection; Application of Tubular Sections to Machine Design, and Descriptions of the Halftone Plates.

"National" Bulletin No. 18—"'National' Reamed and Drifted Pipe" (12 pages, 33 halftone illustrations). This Bulletin contains a complete description of this product, with a short introduction explaining the process of Well Drilling and information relative to the various accessories necessary for the drilling and pumping of wells. For example—Well Cylinders, Points, Valves, Strainers, Drive Shoes, Couplings, Drip Caps, Seating Tool, etc.

"National" Bulletin No. 19—"List of Products" (eight pages, no illustrations). To supply a quick and ready reference is the purpose of this Bulletin. The products manufactured by this company are designed for a great variety of mechanical and commercial purposes, hence a single catalogue containing a detailed description of each separate product would be cumbersome. This Bulletin contains a concise list, which gives to the trade reliable information of National Tube Company products.

"'National" Bulletin No. 20—"Index of 'National' Bulletins 1 to 20" (32 pages, 5 illustrations). This Bulletin is a cross-indexed guide to the information contained in all "National" Bulletins from 1 to 20.

"National" Bulletin No. 21—"'National' Bedstead Tubing" (eight pages, ten illustrations). This Bulletin gives much information and data, and shows the advantages of using "National" Tubing in the manufacture of modern steel beds, cribs, bungalow beds, bed springs, costumers, etc.

"National" Bulletin No. 22—"'National' Pipe for Railway Signal Service" (12 pages, 18 illustrations). This Bulletin contains a brief description of several classes of modern railway signal systems with illustrations of a number of installations in which "National" Pipe has been used; Standard Signal Pipe Specifications, as approved by The Railway Signal Association, October, 1910; and considerable information relative to "National" Pipe for this character of service. This information is given under the following headings: Strength: Physical Properties, Chemical Purity, Resistance, Durability and Threading Qualities. In addition there is a brief summary of all "National" Bulletins.

"National" Bulletin No. 23—"'National' Dry Kiln Pipe" (20 pages, 13 illustrations). This Bulletin contains information relative to this class of "National" Pipe and its use. The text matter is grouped under the following headings: Material Used, Method of Manufacture, Uniformity, Chemical Composition, Physical Properties, Bursting Strength, Durability (Resistance to Corrosion), Full Weight, Special Treatments (Spellerizing), Threading Properties and Tests. There are also tables giving Weights and Dimensions of "National" Dry Kiln Pipe and Couplings and "National" Standard Pipe—Black and Galvanized, and considerable engineering data relating to Dry Kiln work, closing with a summary of all "National" Bulletins, Nos. 1 to 23, inclusive.

"National" Bulletin No. 24—"The Rise of Steel Pipe" (8 pages, 4 illustrations). This Bulletin contains three editorials, covering the general subject of "The Rise of Steel Pipe," which appeared in the American Metal Market and Daily Iron and Steel Report, August 20, 1914, The Iron Trade Review, October 15, 1914, and The Iron Age, December 3, 1914. There are some comments on these editorials, together with a list of advantages of "National" Pipe and complete summary of "National" Bulletins Nos. 1 to 24, inclusive.

"National" Bulletin No. 25—"'National' Pipe in Large Buildings" (88 pages, 222 illustrations). This Bulletin contains a brief outline of the progress of the last twenty years in building construction; a summary of the advantages of "National" Pipe service and the value of marking manufactured products as brought out in a recent editorial in The American Architect; a short summary of the results of tests and investigations of independent authorities relative to the durability of wrought iron and steel pipe; illustrations of Banking, Financial and Office Buildings, Mercantile and Industrial Buildings, Hotels, Clubs and Apartments, Universities, Colleges, Schools, Churches, Libraries and similar public buildings in which "National" Pipe has been installed; "The Design of Hot Water Supply Systems to Minimize Corrosion," a paper by F. N. Speller, published in Engineering News, February 13, 1913; Specifications covering "National" Standard Welded Pipe, "National" Air Line Pipe, and "National" Special Ammonia Pipe together with tables giving dimensions and weights; Engineering data extracted from "Book of Standards" 1913 Edition, National Tube Company, relative to piping and its use in building construction; an index to the important subjects and illustrations contained in this Bulletin and a short summary of all "National" Bulletins Nos. 1 to 26, inclusive.

"National" Bulletin No. 26—"Autogenous Welding of 'National' Pipe" (52 pages, 91 illustrations). This Bulletin contains information relative to the general subject of autogenous welding of "National" Pipe; a brief statement of the advantages of "National" Pipe for work of this character: a number of articles and papers on autogenous welding of pipe lines written by men who are acknowledged leaders and authorities in the water and gas works industry; cost and engineering data; table of contents and cross indexed guide to the important subjects covered in this Bulletin and a summary of all "National" Bulletins from 1 to 26 inclusive.

THE YOUNGSTOWN SHEET & TUBE COMPANY

AND

THE WESTERN CONDUIT COMPANY (SUBSIDIARY)

GENERAL SALES OFFICE

YOUNGSTOWN, OHIO

DISTRICT SALES OFFICES

NEW YORK, N. Y., 30 Church Street
PHILADELPHIA, PA., 1518 Widener Building
BOSTON, MASS., 120 Franklin Street
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PITTSBURGH, PA., 1626 Oliver Building
DENVER, COLO., 725 First National Bank Building
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SAN FRANCISCO, CAL., 604 Mission Street
ST. LOUIS, MO., 902 Third National Bank Building
SEATTLE, WASH., 535 Central Building
ATLANTA, GA., 1514 Healey Building

Products.

"YOUNGSTOWN" STEAM, GAS and WATER PIPE; "YOUNGSTOWN" STEEL, ⅛-inch up to and including 20-inch outside diameter; "YOUNGSTOWN STAR BRAND" IRON (Genuine Wrought Iron), ⅜-inch up to and including 12-inch nominal inside diameter, black and galvanized; EXTRA STRONG and DOUBLE EXTRA STRONG "YOUNGSTOWN" STEEL and "YOUNGSTOWN STAR BRAND" IRON.

Also, PIG IRON; BESSEMER and OPEN-HEARTH STEEL BILLETS, SLABS and SHEET BARS; PUDDLED IRON MUCK BAR; DOUBLE REFINED PUDDLED IRON SHEET BARS; IRON and STEEL PLATES and SKELP.

BARS AND SHAPES: Rounds and squares, ¼ inch to 2 inches; Flats up to 4½ inches wide; Angles up to 3 inches wide.

LINE PIPE for Oil and Gas, fitted with recessed extra heavy taper sockets; TUBING and DRIVE PIPE; ROTARY DRILL PIPE; CASING; SCREW and SOCKET and INSERTED JOINT.

DRY-KILN PIPE; SIGNAL PIPE; AMMONIA PIPE; and PIPE for various other purposes, such as PIPE WATER LINES fitted with flanges, etc.; ASPHALTED PIPE.

"YOUNGSTOWN" IRON and STEEL SHEETS, black and "New Process" galvanized.

"YOUNGSTOWN" IRON and STEEL ROOFING, painted and "New Process" galvanized (corrugated, V crimp, roll and standing seam).

BARBED WIRE, painted and galvanized; WIRE RODS; PLAIN WIRE, black and galvanized; WIRE NAILS, STAPLES and HOOPS; "YOUNGSTOWN" and "BUCKEYE" WOVEN WIRE FIELD FENCE.

For Electrical Conduits, "Buckeye" Rigid, galvanized and enameled; "Realflex" Armored Conductors, see Western Conduit Company's pages.

"Ore to Finished Product."

"Youngstown" Pipe.

Like all of our products, "Youngstown" pipe is made by us straight through from the ore in one plant by one organization. With such manufacturing facilities the utmost in quality and service is assured. Our works cover an area of 500 acres, entirely devoted to the manufacture of our products.

We manufacture half a million tons of tubular products annually. This includes both "Youngstown" steel and "Youngstown Star Brand" genuine old-fashioned hand-puddled iron pipe, to meet the architects' and engineers' every demand for high-grade tubular products.

Marking.

"Youngstown" steel pipe is distinguished by the word "Youngstown" in raised letters on every length of pipe. See illustration.

"YOUNGSTOWN" STEEL PIPE

Specifications for "Youngstown" Steel Steam Pipe.

For the convenience of architects and engineers we submit the following specifications for Steel Pipe:

Material—All "Youngstown" Steel Pipe will be made of soft weldable steel of uniformly good quality. This steel to be particularly adaptable to the requirements for wrought pipe, and sufficient crop shall be cut from the top of each ingot to secure solid metal in the skelp.

Properties—The steel from which the pipe is made shall have approximately the following physical properties:

Tensile strength, not less than 50,000 pounds.
Elastic Limit, not less than ½ tensile.
Elongation in 8 inches, not less than 20 per cent.
Reduction in area, not less than 50 per cent.

Test Specimens—Test specimens for determining physical properties shall be cut from skelp or finished pipe.

Crushing Test—When required, cross sections cut from any pipe shall stand crushing down to within three times the thickness of the metal without showing cracks on the outside of the bend; except that, in the case of butt-welded pipe, any fracture at the weld must give evidence of having been firmly welded.

Bend Test—When required, a test specimen cut lengthwise from skelp or finished pipe and filed smooth on the edges shall bend through an angle of 180 degrees with an inner diameter equal to the thickness of the material, without fracture.

Hydrostatic Test—All sizes shall be tested at mill to an internal pressure, as shown in the following table:

⅛ to 2 inches, butt weld, 700 pounds.
2½ and 3 inches, butt weld, 800 pounds.
Up to 8 inches, lap weld, 1,000 pounds.
9 and 10 inches, lap weld, 900 pounds.
11 and 12 inches, lap weld, 800 pounds.

On the 8-inch, 10-inch and 12-inch sizes, which have more than one weight as standard, we have shown the test pressure for the heaviest weight.

Lengths—Unless otherwise specified, standard pipe will be furnished in random lengths with threads and couplings; extra strong pipe will be furnished plain ends.

Threading—Pipe and couplings shall be threaded and tapped according to Briggs' Standard. Threads must be perfect in every respect and must not leak under the specified pressure (paragraph 5). The thread must not vary more than one and one half turns, either way, when tested with a Pratt and Whitney Briggs' Standard Gauge. All burrs at the ends shall be removed.

Couplings—Chamfered or slightly beveled couplings will be furnished on all steam pipe, and shall be of soft puddled iron, thoroughly welded and free from all blisters, pits or other defects that would break the continuity of the thread.

Tolerance—The pipe shall not vary more than one per cent, either way, from being perfectly round and true to the standard outside diameter, and shall not vary more than five per cent either way from weight as listed.

Tests—All tests shall be made at the mill.

Continued on next page

"Youngstown Star Brand" Pipe.

Genuine Old-Fashioned Hand-Puddled Iron Pipe, guaranteed full weight.

We own and control extensive iron ore properties. From properly selected ore we manufacture our own pig iron. This pig iron is in turn worked by hand in our puddle mill into *genuine wrought iron.*

We then roll this high grade hand-puddled iron into skelp. The skelp is made into "Youngstown Star Brand" iron pipe.

Those who prefer iron pipe to steel will find in "Youngstown Star Brand" an honestly made, full weight product that will meet their every requirement.

Marking.

All of our "Youngstown Star Brand" iron pipe is marked with the word "Youngstown" in raised letters followed by a star.

Specifications for "Youngstown Star Brand" Pipe.

For "Youngstown Star Brand" genuine old-fashioned hand-puddled iron pipe (black and galvanized) we submit the following specifications:

Material—All "Youngstown Star Brand" pipe will be made of strictly genuine wrought iron, free from injurious flaws, seams and surface defects, and finished in a workmanlike manner.

Properties—The iron from which the pipe is made shall have approximately the following chemical and physical properties:

CHEMICAL PROPERTIES

Carbon,	Not over .06
Manganese,	Not over .12
Sulphur,	.04 and under
Phosphorus,	.10 to .25
Silicon,	.10 to .25

PHYSICAL PROPERTIES

Tensile strength, 40,000 to 48,000 pounds per square inch.
Elastic Limit, not less than ½ tensile strength.
Elongation in 8 inches, not less than 12 per cent.
Reduction in area, not less than 25 per cent.

Crushing Test—When required, cross sections cut from any pipe must stand crushing down to within three times the thickness of the material with slight splitting; except that, in the case of butt-welded pipe, any fracture at the weld must show a clean fibrous structure and give evidence of having been firmly welded.

Hydrostatic Test—All sizes shall be tested at the mill to an internal pressure, as shown in the following table:

⅛ to 2½ inches, butt weld, 700 pounds.
Up to 8 inches, lap weld, 1,000 pounds.
9 and 10 inches, lap weld, 900 pounds.
12 inches, lap weld, 800 pounds.

On the 8-inch, 10-inch and 12-inch sizes, which have more than one weight as standard, we have shown the test pressure for the heaviest weight.

Lengths—Unless otherwise specified, standard pipe will be furnished in random lengths with threads and couplings. Extra strong pipe will be furnished plain ends.

Threading—Pipe and couplings shall be threaded and tapped according to Briggs' Standard. Threads must be perfect in every respect and must not leak under the specified pressure (paragraph 4). The thread must not vary more than one and one half turns, either way, when tested with a Pratt and Whitney Briggs' Standard Gauge. All burrs at the ends shall be removed.

Couplings—Chamfered or slightly beveled couplings will be furnished on all steam pipe, and shall be of soft puddled iron, thoroughly welded and free from all blisters, pits or other defects that would break the continuity of the thread.

Tolerance—The pipe shall not vary more than one per cent, either way, from being perfectly round and true to the standard outside diameter, and shall not vary more than five per cent, either way, from weight as listed.

Tests—All tests shall be made at the mill.

"YOUNGSTOWN" STEEL AND "YOUNGSTOWN STAR BRAND" IRON PIPE

FULL STANDARD WEIGHT—BLACK AND GALVANIZED
ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size	List Price per Foot	Diameters External	Diameters Internal	Thickness	Weight per Foot Plain Ends	Weight per Foot Threads and Couplings	Threads per Inch
⅛	$ 05½	.405	.269	.068	.244	.245	27
¼	.06	.540	.364	.088	.424	.425	18
⅜	.06	.675	.493	.091	.567	.568	18
½	.08½	.840	.622	.109	.850	.852	14
¾	.11½	1.050	.824	.113	1.130	1.134	14
1	.17	1.315	1.049	.133	1.678	1.684	11½
1¼	.23	1.660	1.380	.140	2.272	2.281	11½
1½	.27½	1.900	1.610	.145	2.717	2.731	11½
2	.37	2.375	2.067	.154	3.652	3.678	11½
2½	.58½	2.875	2.469	.203	5.793	5.819	8
3	.76½	3.500	3.068	.216	7.575	7.616	8
3½	.92	4.000	3.548	.226	9.109	9.202	8
4	1.09	4.500	4.026	.237	10.790	10.889	8
4½	1.27	5.000	4.506	.247	12.538	12.642	8
5	1.48	5.563	5.047	.258	14.617	14.810	8
6	1.92	6.625	6.065	.280	18.974	19.185	8
7	2.38	7.625	7.023	.301	23.544	23.769	8
8	2.50	8.625	8.071	.277	24.696	25.000	8
8	2.88	8.625	7.981	.322	28.554	28.809	8
9	3.45	9.625	8.941	.342	33.907	34.188	8
10	3.20	10.750	10.192	.279	31.201	32.000	8
10	3.50	10.750	10.136	.307	34.240	35.000	8
10	4.12	10.750	10.020	.365	40.483	41.132	8
11	4.63	11.750	11.000	.375	45.557	46.247	8
12	4.50	12.750	12.090	.330	43.773	45.000	8
12	5.07	12.750	12.000	.375	49.562	50.706	8
13	5.60	14.000	13.250	.375	54.568	55.824	8
14	6.10	15.000	14.250	.375	58.573	60.375	8
15	6.50	16.000	15.250	.375	62.579	64.500	8

The permissible variation in weight is 5 per cent above and 5 per cent below.
Furnished with threads and couplings and in random lengths unless otherwise ordered.
All weights given in pounds. All dimensions given in inches.
For cut lengths, an extra charge will be made above random lengths.
For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.
For Galvanized, or Coated pipe, an extra charge will be made above Black.

EXTRA STRONG PIPE—BLACK AND GALVANIZED
ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size, Inches	List Price per Foot	Diameters External	Diameters Internal	Thickness	Weight per Foot, Plain Ends
⅛	$.12	.405	.215	.095	.314
¼	.07½	.540	.302	.119	.535
⅜	.07½	.675	.423	.126	.738
½	.11	.840	.546	.147	1.087
¾	.15	1.050	.742	.154	1.473
1	.22	1.315	.957	.179	2.171
1¼	.30	1.660	1.278	.191	2.996
1½	.36½	1.900	1.500	.200	3.631
2	.50½	2.375	1.939	.218	5.022
2½	.77	2.875	2.323	.276	7.661
3	1.03	3.500	2.900	.300	10.252
3½	1.25	4.000	3.364	.318	12.505
4	1.50	4.500	3.826	.337	14.983
4½	1.80	5.000	4.290	.355	17.611
5	2.08	5.563	4.813	.375	20.778
6	2.86	6.625	5.761	.432	28.573
7	3.81	7.625	6.625	.500	38.048
8	4.34	8.625	7.625	.500	43.388
9	4.90	9.625	8.625	.500	48.728
10	5.48	10.750	9.750	.500	54.735
11	6.10	11.750	10.750	.500	60.075
12	6.55	12.750	11.750	.500	65.415

The permissible variation in weight is 5 per cent above and 5 per cent below.

DOUBLE EXTRA STRONG PIPE—BLACK AND GALVANIZED
ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

Size, Inches	List Price per Foot	Diameters External	Diameters Internal	Thickness	Weight per Foot, Plain Ends
½	$.32	.840	.252	.294	1.714
¾	.35	1.050	.434	.308	2.440
1	.37	1.315	.599	.358	3.659
1¼	.52½	1.660	.896	.382	5.214
1½	.65	1.900	1.100	.400	6.408
2	.91	2.375	1.503	.436	9.029
2½	1.37	2.875	1.771	.552	13.695
3	1.86	3.500	2.300	.600	18.583
3½	2.30	4.000	2.728	.636	22.850
4	2.76	4.500	3.152	.674	27.541
4½	3.26	5.000	3.580	.710	32.530
5	3.86	5.563	4.063	.750	38.552
6	5.32	6.625	4.897	.864	53.160
7	6.35	7.625	5.875	.875	63.079
8	7.25	8.625	6.875	.875	72.424

The permissible variation in weight is 10 per cent above and 10 per cent below.
The following notes apply to both tables:
Furnished with plain ends and in random lengths, unless otherwise ordered.
All weights given in pounds. All dimensions given in inches.
Random length of Extra Strong and Double Extra Strong pipe is considered to be 12 feet to 22 feet, we to have the privilege, however, of supplying not exceeding 5 per cent of total order in lengths of from 6 feet to 12 feet.
For pipe fitted with threads and couplings, an extra charge will be made above plain ends.
For cut lengths, an extra charge will be made above random.
For Galvanized or Coated pipe, an extra charge will be made above black.

H. W. JOHNS-MANVILLE CO.

J-M Heat Insulation Service

NEW YORK AND EVERY LARGE CITY
SEE BRANCH ADDRESSES IN OUR CATALOGUE IN ROOFING SECTION

Products.

HIGH PRESSURE PIPE COVERING: J-M ASBESTO-SPONGE FELTED, J-M ASBESTOS FIRE FELT (85% Magnesia), VITRIBESTOS, J-M SAFETY BLOW-OFF, J-M ASBESTOS HAIR FELT.

MEDIUM and LOW PRESSURE PIPE COVERINGS: J-M ASBESTOCEL, J-M AIR-CELL SECTIONAL, J-M MOLDED ASBESTOS.

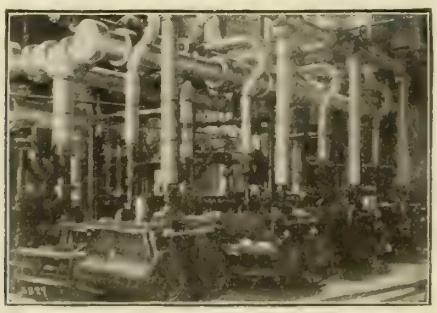
LOW PRESSURE STEAM or HOT-WATER PIPE COVERINGS: J-M WOOL FELT, J-M WOOL CELL, J-M EUREKA.

HOT-AIR FURNACE PIPE COVERINGS: J-M ASBESTOCEL CORRUGATED FIREPROOF PAPER, J-M ASBESTOS ROLL FIRE FELT, J-M NON-BURN ASBESTOS FELT and ROLL BOARD.

COLD WATER, BRINE and AMMONIA PIPE COVERINGS: J-M ANTI-SWEAT, J-M KEYSTONE PLUMBING PIPE COVERING, J-M FROST PROOF, J-M ZERO, J-M STANDARD BRINE and AMMONIA.

PIPE COVERING ACCESSORIES: J-M REMOVABLE PIPE COVERING FLANGES, J-M STANDARD ASBESTOS WEATHERPROOF JACKET, J-M ASBESTOS ACIDPROOF, J-M LACING JACKETS.

For complete list of J-M Building Materials, see our name in Roofing Section.



BIRMINGHAM RAILWAY, LIGHT & POWER CO., BIRMINGHAM, ALA.

J-M Heat Insulation Service.

Our service department is organized to handle any insulation problem that confronts the architect.

We are prepared to plan, recommend and install such work anywhere in this Country.

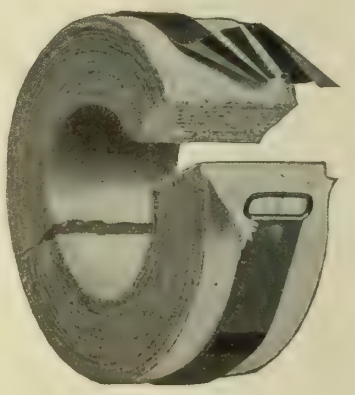
Every J-M branch carries a contract department which specializes on heat insulation. They are skilled in the application of insulation, which factor is most important in this line of work. They have twenty-one separate and distinct materials that as a whole meet every insulation requirement.

When you depend on J-M insulation service, you invite the use of proven materials, and have the assurance of this Company for the satisfactory completion of the work.

J-M Asbesto-Sponge Felted Pipe Covering.

J-M Asbesto-Sponge Felted Pipe Covering, for insulating high pressure and superheated steam pipes, is made of layers of thin felt composed of pure, long-fibered asbestos and granulated sponge. Furnished in three-foot sections, in thicknesses of one half to three inches, to fit all standard sizes of pipe.

Advantages—J-M Asbesto-Sponge Felted Pipe Covering, because of its laminated construction and its constituent materials, contains a maximum of sealed air-cells. The dead air content (the greatest non-forward conductor) produces the most efficient insulation thermally, which fact argues for its use on high pressure work.



J-M ASBESTO-SPONGE FELTED PIPE COVERING

Durability—This insulation can be removed and replaced many times without injury. It will not crack, break nor crumble when subjected to rough usage and severe vibration.

Specifications—On connections from boilers to main steam header, and on main steam header, apply J-M Asbesto-Sponge Felted Sectional Covering in two layers, each 1 inch thick, in such a manner that all joints will be "staggered" or "broken."

Cover fittings in connection with these pipes with J-M Asbesto-Sponge Cement Felting, to a thickness corresponding to adjoining pipe covering. Over all this covering apply an additional protection of 8-ounce canvas neatly sewed on.

On flanges of these pipes apply J-M Asbesto-Sponge Felted Sectional Covering in such a manner that same can be removed and replaced without injury to covering, and finish same with 8-ounce canvas neatly pasted on.

On all other pipes of the High-Pressure System apply J-M Asbesto-Sponge Felted Sectional Covering, 1 inch thick, with its usual canvas finish and bands complete, covering fittings with J-M Asbesto-Sponge Cement Felting to a thickness corresponding to adjoining covering, and finished with canvas neatly pasted on. Lacquered metal bands are to be applied at 18-inch intervals at least on this covering.

Cover tops of boilers and boiler drum-ends with J-M Asbesto-Sponge Felted Sheet, 1½ inches thick, secured in place with galvanized wire cables and hexagonal wire netting, and finish same hard and smooth with J-M Asbestos Cement, No. 302, ½ inch thick.

Cover smoke breeching and connections from boilers to vertical smoke-stack with 1½ inch thick J-M Asbesto-Sponge Felted Sheets, thoroughly secured

(Continued on next page)

with galvanized wire cables over air space 1 inch deep, formed by V-rib metal lath. Finish over sheets with J-M Asbestos Cement, No. 302, ½ inch thick, troweled hard and smooth.

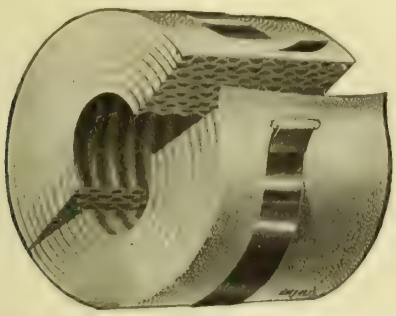
Cover blow-off tank, return tank, pump governor, steam separators, high pressure drip traps and tank in same manner as breeching, but omit air space.

On all covering exposed to weather apply two coats of lead and oil paint, of colors selected by architect. On other coverings apply two coats J-M Asbestos Fireproof Paint.

J-M Asbestocel Sectional Pipe Covering.

J-M Asbestocel Pipe Covering, for hot-water heating pipes, and low and medium pressure steam pipes, is built of successive layers of plain and corrugated asbestos paper on the arch principle; the channels of dead air run around the pipe instead of parallel to it. Made in thicknesses of one half to three inches, to fit standard pipes one half to sixteen inches in diameter.

Advantages—J-M Asbestocel is a most efficient low pressure insulation because it, too, confines a great quantity of dead air. It is the only low pressure covering which holds the trapped air in an absolutely "dead" state. The air can not circulate. Asbestocel is built on the arch construction, and is therefore far stronger than any other low pressure insulation.



J-M ASBESTOCEL SECTIONAL PIPE COVERING

Specifications—On low pressure steam and hot-water heating pipes, and on hot-water supply pipes, together with returns and drips from former and circulation lines of latter, apply J-M Asbestocel Sectional Covering, 1 inch thick, with regular canvas finish and lacquered metal bands on pipes, and J-M Asbestos Cement, No. 302, to a corresponding thickness on all fittings, traps, etc., in connection with these pipes, the cement to be finally jacketed with canvas pasted on to correspond with adjoining pipe covering.

Where covering is exposed to view, apply over same an additional protection of 8-ounce canvas neatly sewed on, and where exposed to weather a further protection of two coats of lead and oil paint. In all other places covering to be finished with two coats of J-M Asbestos Fireproof Paint.

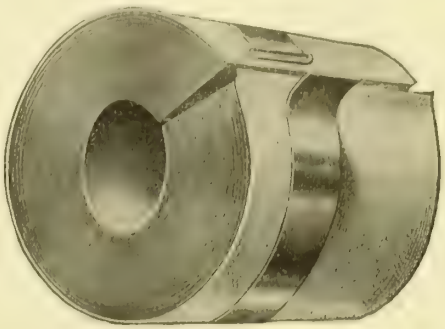
Cover hot-water heater with J-M Asbestos Cement, No. 302, 2 inches thick, secured with galvanized hexagonal wire netting and finished hard and smooth on exterior. Cover hot-water tank with 1 inch thick J-M Asbestocel Sheets, secured with galvanized hexagonal wire netting and finished hard and smooth with ½ inch thick J-M Asbestos Cement, No. 302.

Cover casings of heating stacks and connecting ducts from same to vertical flues in walls with J-M Asbestocel Sheets, 1 inch thick, joints "pointed up" with Asbestos Cement, and finally finished with 8-ounce canvas neatly sewed on.

Paint heater, tank, and stack and duct coverings to correspond with pipe covering.

J-M Wire-Stitched Anti-Sweat Sectional Pipe Covering.

J-M Wire-Stitched Anti-Sweat Sectional Pipe Covering for insulating cold-water pipes is made of alternate layers of waterproof insulating paper and wool felt paper, securely stitched together—a more permanent assembly than by pasting or gluing. It is finished with a canvas jacket, and metal bands are provided for fastening.



J-M WIRE-STITCHED ANTI-SWEAT SECTIONAL PIPE COVERING

Advantages—J-M Anti-Sweat Covering prevents condensation on the surface of the pipes by insulating the cold pipe from warm atmosphere, thus preventing damage to plaster, furnishings, etc. Especially advantageous for insulating drinking systems for offices, houses, hotels, etc.

J-M Sectional Conduit.

Has many advantages over other conduits for carrying pipes containing steam, water, gas, brine, ammonia, or any other liquid, underground. It will carry steam thousands of feet with practically no loss. Saves over ninety per cent of the heat lost in transmission through unprotected or poorly insulated pipes. It is waterproof and impervious to the action of acids, gases or soils. It can be easily opened after installation. Costs nothing for maintenance, and can be readily taken up and relaid should occasion demand.

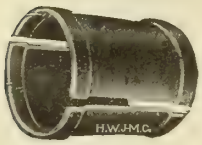
Efficiency ninety per cent and up. Depreciation negligible. A complete bulletin on J-M Sectional Conduit can be had from any branch.

INSTALLATION OF J-M SECTIONAL CONDUIT

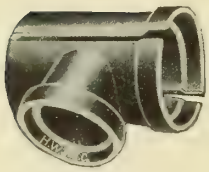
J-M Keystone Hair Insulator.

This sheathing is made of a heavy layer of cleansed and sterilized cattle hair, securely fastened between two sheets of strong, non-porous building paper.

Continued on next page



UNION

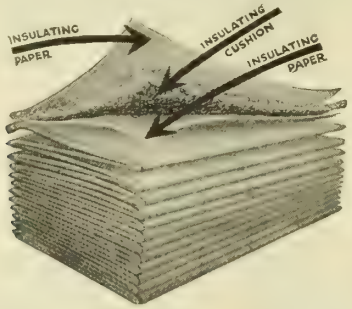


SUPPORTING TEE

INSTALLING J-M SECTIONAL CONDUIT AT THE STATE SCHOOL OF MINES, RAPID CITY, S. DAK.

The hairs cross and recross each other at every conceivable angle, forming small air chambers, and the paper on each side seals up the dead air between the hair fibers. This makes a material more effective than many layers of building paper for keeping a building warm in winter and cool in summer.

As a non-conductor of sound it has no equal when placed between floors and walls. It will not pack down nor settle, dry out nor split. It is proof against rot, moisture, and vermin, and is slow burning.



CONSTRUCTION OF J-M KEYSTONE HAIR INSULATOR

[illegible] COURT, PHILADELPHIA, PA
JOHN D. ALLEN, Architect
[illegible] Hair Insulation

FRANKLIN HIGH SCHOOL, SEATTLE, WASH
EDGAR BLAIR, Architect
J-M Keystone Hair Insulator installed

STEVENS APARTMENT, MINNEAPOLIS, MINN.
WILLIAM T. MULTGREN, Architect
Walls insulated and floor deadened with J-M Keystone Hair Insulator

COLONIAL APARTMENTS, KANSAS CITY, MO.
E. P. MADORIE, Architect
J-M Keystone Hair Insulator used exclusively in this apartment house for sound deadening

THE RIC-WIL UNDERGROUND PIPE COVERING COMPANY

CLEVELAND, OHIO

Products.

Ric-wiL Underground Conduit and Ric-wiL Underground Pipe Covering used in the "Ric-wiL Method" of Insulating Underground Steam and Hot-Water Pipes.

Conduit Insulation.

"Ric-wiL Method" of insulating underground steam and hot-water pipes consists of a specially designed vitrified salt glazed sectional tile conduit, the inside surface of which is lined in a substantial manner with a mineral insulating material of very low conductivity. The amount and type of insulation is governed by the conditions under which the piping system will be operated. When two or more pipes, conveying fluids at different temperatures are to be insulated, the space between the pipes and the insulation which is integral with the tile, is packed with Ric-wiL Conduit Filler. Ric-wiL insulation has no chemical effect on iron pipes, is not injured by water, and will not disintegrate or char.

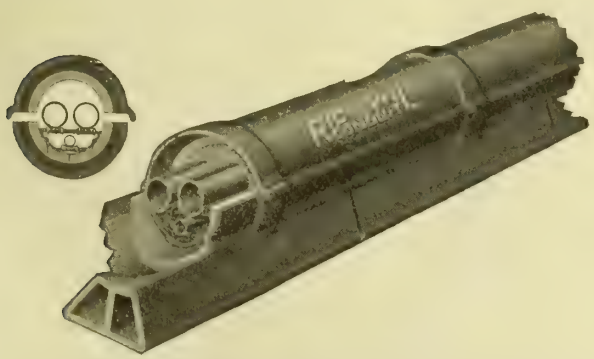
For supporting pipes, a roller expansion bearing, consisting of a main malleable iron casting, supports steel spindles and brass rollers. These supports are usually spaced ten feet center to center, and are entirely confined within the conduit.

All conduit joints are easily sealed with Ric-wiL Elastic and Waterproof Cement which prevents opening of joints due to possible settling of ground, etc., and takes care of irregularities in the pipe line.

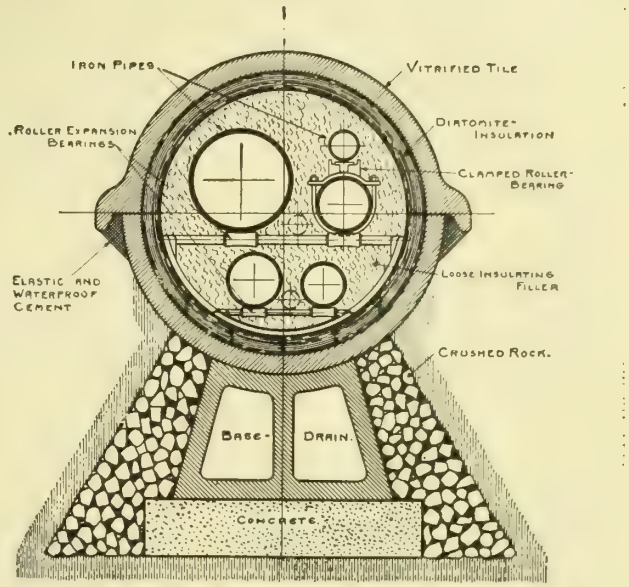
Underdrainage.

The life of any underground heating system and its efficiency depend principally on the class and manner of installing the underdrain. This is the essence of a first-class and permanent installation. All authorities are agreed that proper underdrain should be provided without any exceptions whatsoever.

Ric-wiL base drain (patented) is made of vitrified tile, giving it great strength to support the conduit. The top surface is made to conform to the curvature of the tile, and the lower surface is flat, a form of construction recommended in all underground work to make a solid foundation. Ric-wiL base drain makes a compact and substantial construction and provides liberal free drainage area. Ric-wiL base drain is made the same length as Ric-wiL conduit, and is installed so that joints of same stagger with the joints of the conduit, thereby interlocking and giving added rigidity to the construction. Ric-wiL base drain will repay handsomely for its cost as part of an underground system.



RIC-WIL CONDUIT, MULTIPLE PIPE CONSTRUCTION, WITH BASE DRAIN



RIC-WIL CONDUIT, MULTIPLE PIPE CONSTRUCTION, WITH BASE DRAIN

Specially designed Ric-wiL shutters are used for closing the ends of the conduit when entering buildings, manholes, or anchor boxes.

A substantial concrete foundation to support base drain and conduit is recommended when firmness of ground is in the least doubtful.

Specifications.

All underground piping outside of the buildings which is subject to thermal losses shall be insulated as hereinafter described.

Excavation, Levels, Backfilling, etc.—This work shall be executed as shown on the plans or as may be required.

Underdrainage—Under the entire length of conduit install Ric-wiL interlocking base drain (patented); provide drainage connections from base drain. Stone or gravel ballast shall be placed about the base drain and lower section of conduit. The above work and materials to be approved by the engineer and manufacturer.

Conduit—Install Ric-wiL sectional tile conduit (patented) of a size approved by the manufacturer.

Pipe Supports—Ric-wiL expansion roller bearings shall be furnished and installed.

Insulation—Ric-wiL insulation shall be furnished and installed, as approved by the manufacturer.

Shutters—Finish ends of conduit with Ric-wiL shutters.

General—Conduit, insulation, pipe supports, base drain, and shutters shall be installed by the Ric-wiL Underground Pipe Covering Company, Cleveland, Ohio, or under their supervision.

Catalogue.

Catalogue and engineering data sent upon request.

TYLER UNDERGROUND HEATING SYSTEM

PITTSBURGH, PA.

Products.

Manufacturers and designers of UNDERGROUND HEATING SYSTEMS, including CASING; PIPING; BALL-BEARING PIPE SUPPORTS, for ditch or tunnel floor; WALL BRACKETS to hold one, two, three, or four pipes, for tunnel or power-house work; EXPANSION JOINTS, and ANCHORS for tunnel or ditch construction; WATER WEIGHING MACHINES for power-house work; CONDENSATION METERS, that work either on gravity or vacuum systems; HOT-WATER METERS for measuring quantity water, and also temperature water; and STEAM TRAPS.

Tyler Underground Heating System.

In designing the Tyler underground heating system the makers went farther than the consideration of first cost, making it secondary to permanency, durability, and efficiency.

Insulation, expansion, and proper anchorage have been provided for, as well as numerous other features, which will prove extremely interesting to any one considering the installation of a system of this kind.

Advantages.

Proper Insulation—Tyler ditch construction is so thoroughly insulated that heat loss is almost negligible; in fact, if the pipe is buried but eighteen inches it will not melt snow on the ground surface.

Pipe Expansion—The construction of Tyler expansion joints allows the pipe to expand and travel freely and without leakage of steam.

Anchors—Anchors are designed so that full-sized outlets may be taken out of top or sides. Drip pocket outlet is provided.

Pipe may be Rotated—After the pipe is connected, it may be rotated so as to distribute the corroding effects of the condensation water. This feature adds from thirty to forty years to the life of the pipe.

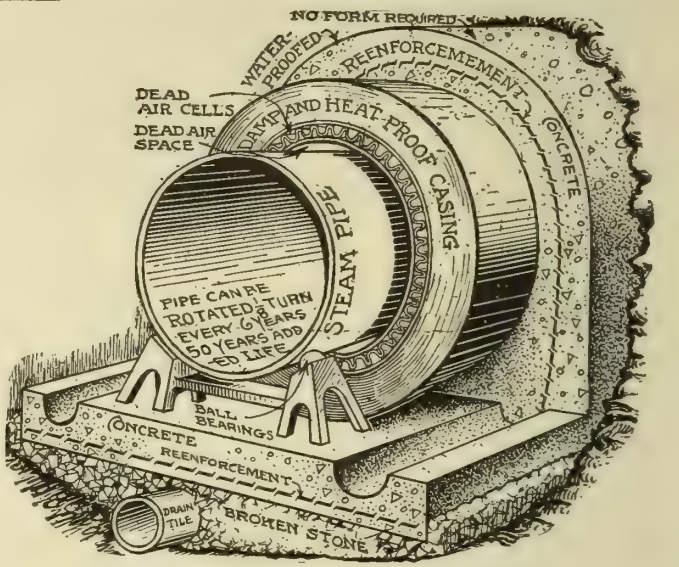
For further description see SWEET'S ENGINEERING CATALOGUE, pages 465 to 467.

Specifications.

All underground steam mains and returns shall be set up and carried through a ditch construction, as follows: A clear ditch shall be prepared, a drain tile laid in bottom and covered with broken stone. On this as a bed, a reinforced concrete base shall be laid, and pipe rests placed on same twelve feet apart. The pipe shall be put in position, connected up, and anchored approximately every 150 feet, alternately, with anchors and expansion joints. Pipe shall then be cased in such a manner as to leave a space between pipe and casing, and casing covered with cinder concrete. Fittings shall be placed in properly reinforced manholes, the expansion joint being made accessible by a double lidded manhole, with gasket on inner lid. Where pipe enters expansion joint and anchor manholes, or enters the walls of building, space between casing and pipe is closed by a special collar.

Anchors and expansion joints shall be of such ample proportions and of such construction—without baffle plates or other obstructions—that steam shall have a free passage through them, and it shall be possible to take off full-sized outlets from top and sides. They shall be provided with drip pockets in bottom. Expansion joints shall be equipped with brass follower, traveling at least four inches in a bored guide, a portion of the follower running through a large stuffing-box containing six packing rings. It shall be possible—after the pipe is connected up—to easily rotate it every five or six years, and thus distribute corroding effects of condensation water.

Pipe rests to be metal stands containing antifriction ball bearings carrying the pipe. These stands to be of such height that pipe is held up out of contact with the surrounding casing, and of dimensions appropriate to size of pipe carried.



SINGLE PIPE DITCH CONSTRUCTION
Designed also for two or more pipe

The casing shall be a hard casing—such as made by the TYLER UNDERGROUND HEATING SYSTEM of Pittsburgh, Pa., and of such a size that it clears the pipe couplings. This casing is to be treated with a damp- and fire-proofing process.

In tunnels, or interiors of buildings, pipe shall be covered by a special air cell casing, coming in direct contact with pipe. Pipe shall be supported by brackets specially constructed to securely hold in place pipe rests (as above described), and place the pipe in such a position as to leave all bolts accessible.

After underground conduit has been completed, exterior surface shall be waterproofed—when it will be ready for backfilling.

Expansion Joints, Anchors, etc.

This Company manufactures all accessories to the heating system, including expansion joints, anchors, ball-bearing pipe supports, wall brackets, etc. They are all made along scientific principles and possess the same dependability which is characteristic of all Tyler products.

Guarantee.

The guarantee which goes with all Tyler products is so broad that only the manufacturer of high-grade material could afford to give it.

Co-operative Service.

Architects and engineers confronted with the problem of designing an underground heating system are earnestly invited to correspond with this Company, who will co-operate with them fully in submitting sketches of layouts and estimates.

References.

A few of the many installations of this system are given below:

Charles L. Pillsbury Co., State Engineers of Minnesota
Canadian Locomotive Works
Pennsylvania Railroad Co.
Atlantic Coast Line Railroad Co.
New Union Depot at Kansas City, Mo.
New State Capitol, Jefferson City, Mo.
Harold M. Bush, M.E., Columbus, Ohio
The Tome School for Boys, Port Deposit, Md.
New York Central R. R. Co.
American Locomotive Works, Schenectady, N. Y.
The State Agricultural College, Morris, Minn.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lake Shore Railroad Co.

ESTABLISHED 1877

DETROIT LUBRICATOR COMPANY

MANUFACTURERS OF

Detroit Packless Radiator Valves

DETROIT, MICH.

CANADIAN-DETROIT LUBRICATOR COMPANY, LTD., WALKERVILLE, ONTARIO, CAN.

Products.

DETROIT RADIATOR VALVES, SIGHT FEED LUBRICATORS, MECHANICAL FORCE FEED OILERS.

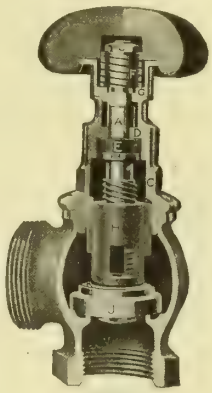
Detroit Packless Radiator Valves.

These valves differ from the ordinary packed valves by being absolutely tight and free from leakage around the stem. They remain tight, as there are no parts to become loose, wear out or disintegrate, as in packed valves with stuffing boxes.

Simple inside and out; beautifully proportioned; they may be used with safety in the most luxuriously fitted residences. Cleanliness, and freedom from rusting or streaking caused by leakage, are assured with the Detroit Packless Radiator Valves.

Handle is of mahogany, and so shaped that it affords a perfect grip without touching the hand to hot metal. It can not hold or collect dust, as in the ordinary style of valve handle. (See illustrations.)

Packless Feature—The packless feature consists of a disc "E," of special composition, arrived at after exhaustive experiments, forced under pressure into chamber formed by stem "A" in combination with the interior of the bonnet "D" and supporting collar "B." A heavy spring tension maintains a tight joint.



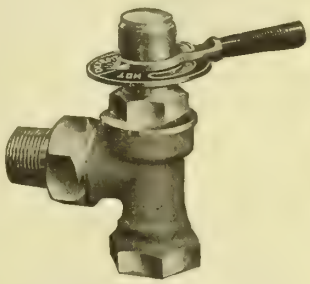
DETROIT PACKLESS RADIATOR VALVE

Detroit Multi-Port Radiator Valve.

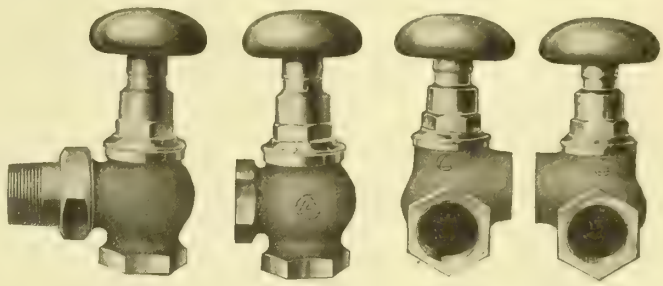
A graduated packless valve for use on vapor systems, so constructed that after installation, size of delivery opening may be adjusted for the right amount of vapor.

Adjustment is made by removing stop-screw from handle arm and revolving it. This raises or lowers interior shell, which resembles the shell in a hot-water valve and contains a port opening of same size as outlet opening in the body, thereby increasing or decreasing size of delivery opening by causing shell port to lap body port.

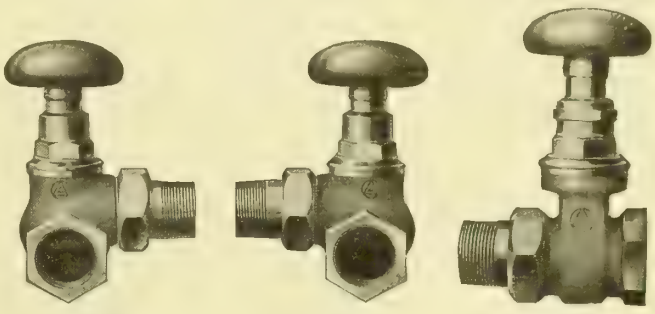
After right size is determined, set screw is replaced, making adjustment permanent. Regulation is made by moving pointer between "Hot" and "Cold."



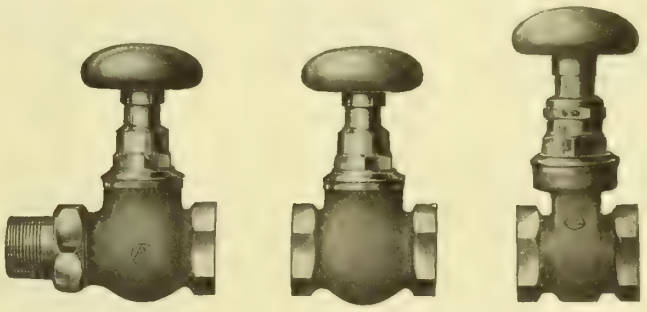
DETROIT MULTI-PORT RADIATOR VALVE



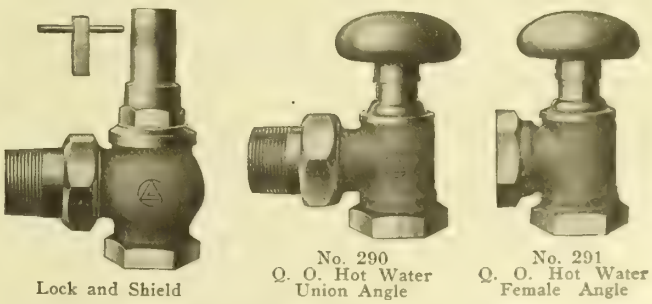
No. 260 Union Angle — No. 261 Female Angle — No. 264 R. H. Corner — No. 265 L. H. Corner



No. 262 R. H. Corner — No. 263 L. H. Corner — No. 266 Union Gate



No. 280 Union Globe — No. 281 Female Globe — No. 267 Female Gate



Lock and Shield — No. 290 O. O. Hot Water Union Angle — No. 291 O. O. Hot Water Female Angle

DETROIT PACKLESS RADIATOR VALVES

Specification.

"All radiator valves to be Genuine Detroit Packless, manufactured by the DETROIT LUBRICATOR COMPANY."

If the stock numbers of valves are given, possibility of mistakes will be avoided.

Sizes and Types.

The Detroit Packless Line contains types and sizes for every kind of heating system.

JENKINS BROS.

Manufacturers of Jenkins Bros. Valves

80 White Street 524 Atlantic Avenue 133 North 7th Street 300 West Lake Street
NEW YORK, N. Y. BOSTON, MASS. PHILADELPHIA, PA. CHICAGO, ILL.

JENKINS BROS., LIMITED: CANADIAN WORKS AND HEAD OFFICE, MONTREAL, QUE., 103 St. Remi Street
JENKINS BROS., LIMITED: LONDON OFFICE, 95 Queen Victoria Street, E. C.
JENKINS RUBBER CO.: WORKS AND HEAD OFFICE, ELIZABETH, N. J.

Products.

JENKINS BROS. VALVES: GLOBE, ANGLE, CROSS, CHECK, HOSE, BLOW-OFF and SAFETY VALVES; RADIATOR VALVES, in a variety of types; AIR VALVES and STEAM TRAPS; BACK-PRESSURE or EXHAUST VALVES; FRACTIONAL and VACUUM VALVES, for Heating Systems; EXTRA-HEAVY VALVES, specially designed for high pressures and severe conditions, in GLOBE, ANGLE, CROSS, CHECK, BLOW-OFF, AUTOMATIC EQUALIZING STOP and CHECK, and other patterns; GATE VALVES, in Standard, Medium and Extra-Heavy patterns. VALVES in Brass, Iron-Body and Cast Steel, for all pressures and purposes; WATER GAUGES, GAUGE COCKS and INJECTORS.

MECHANICAL RUBBER GOODS: JENKINS '96 and JENARCO SHEET PACKING and GASKETS, GASKET TUBING, PUMP VALVES, JENKINS COMPOSITION VALVE DISCS, and the like.

REG. U.S. PAT. OFF. TRADE JENKINS MARK
Jenkins Bros
TRADE-MARK

FIG. 106
Globe, Screwed

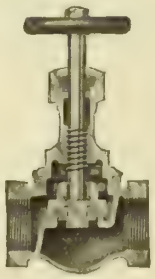


FIG. 105
Sectional View

FIG. 114
Angle, Hose End

BRASS VALVES, STANDARD PATTERN

Brass and Iron Body Valves, Standard Pattern.

Jenkins Bros. Valves, Standard Pattern, all have the feature of renewable disc and disc-holder as shown in the sectional cut (Fig. 105). The renewable disc, first introduced by JENKINS BROS. many years ago, assures absolute tightness because the flexibility of the Jenkins Disc secures perfect seat contact and is one of the most important improvements ever put into a valve. For steam use the discs are made of hard composition, which becomes pliable under the action of steam; for water, gas and air service, somewhat softer compounds are furnished.

If grit or scale lodges on the seat it does not seriously injure the valve body, but becomes imbedded in the composition disc, thus saving the valve seat. If the disc becomes worn out in service it can be replaced easily and quickly at very little expense. A new disc makes practically a new valve, but all other parts are standardized and perfectly interchangeable. The complete valves seldom wear out.

Radiator Valves.

Jenkins Bros. Globe and Angle Radiator Valves are of the same pattern and construction as the Standard Pattern Valves, previously described. They are superior to the average valves on the market, because a better grade of metal is used, and they are heavier and much stronger. Finished valves take a rich bronze color when polished, making them particularly desirable for the best grades of work.

FIG. 166
W. W. Angle, Screwed

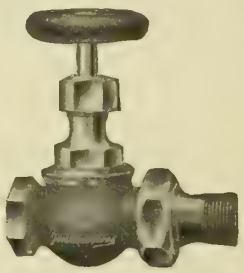


FIG. 167
W. W. Globe, with Union

FIG. 168
W. W. Angle, with Union

RADIATOR VALVES

Regularly furnished with black hardwood wheels; or, with brass, wire or iron wheels, if desired. Lock Shield Valves, to be operated with key (as Figs. 170 and 171), designed to circumvent annoyance of tampering, can be supplied in all the different patterns. Corner Valves are made in two patterns—regular and offset. Offset Globe and Corner Valves (Figs. 173a and 180) have the inlet at the lowest point, to avoid trapping of water and hammering on first admission of steam.

FIG. 310
Brass Wheel Globe

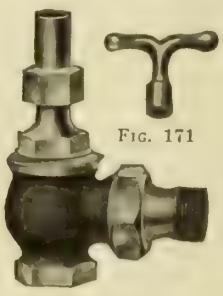


FIG. 171

FIG. 170
Lock-Shield Angle

FIG. 173A
Offset Globe

RADIATOR VALVES

When so desired, for hot-water heating, valves will be furnished, without extra charge, with a small hole drilled through diaphragm to permit slight circulation of water through radiator. When specified for hot-water heating systems *using forced circulation*, valves are specially fitted for the service.

Regular styles of finish follow:

Rough Body, Finished Trimmings	No. 1 screwed, No. 6 with union
Finished and Polished all over	No. 2 screwed, No. 7 with union
Rough Body, Nickel-plated Trimmings	No. 3 screwed, No. 8 with union
Rough Body, Nickel-plated all over	No. 4 screwed, No. 9 with union
Finished and Nickel-plated all over	No. 5 screwed, No. 10 with union

Continued on next page

Jenkins Improved Automatic Air Valves (Figs. 190 to 193) are designed to automatically remove air from radiators and heating coils. All finished and nickel-plated. Regular sizes ⅛ and ¼ inch; also, ⅜-inch size for long runs or large stacks, and the Jenkins Diamond Traps, sizes ½ and ¾ inch.

Fig. 190 Fig. 191 Fig. 193

IMPROVED AUTOMATIC AIR-VALVES

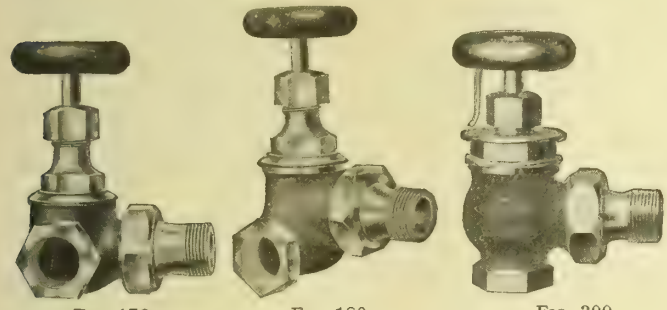


Fig. 176 Regular Corner

Fig. 180 Offset Corner

Fig. 300 Fractional

RADIATOR VALVES

Recent developments in the manufacture of valves for steam heating apparatus have enabled us to place upon the market a line of devices suitable for all classes of steam circulation in connection with Atmospheric, Vacuum Return Line and Vapor Systems, and include Differential and Automatic Impulse Check Valves, and the Jenkins Bros. Fractional Radiator Valves (as Fig. 300). The Fractional Valve has dial indicator, and opens wide in five sixths of a turn. The opening is correctly graduated and partial heating of the radiator is easily controlled.

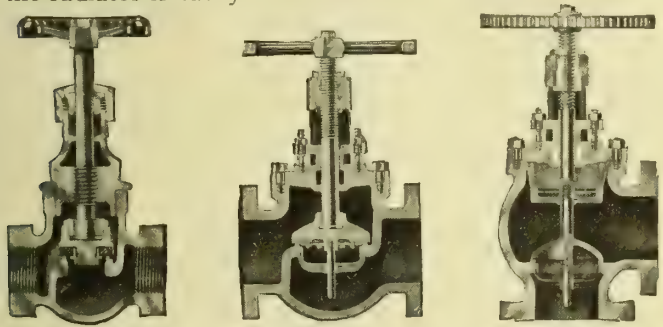


Fig. 128 Brass Globe

Fig. 162 Iron-Body Globe

Fig. 293 Automatic Equalizing Stop and Check

EXTRA-HEAVY VALVES

Extra-Heavy Valves.

Jenkins Bros. Extra-Heavy Valves (Figs. 128, 162 and 293) are a distinct line, especially designed for use under high pressure and very severe conditions. No effort has been spared to make them representative valves of their class, and in line with Jenkins Bros. established policy of making only the best. They were very carefully designed; are well proportioned and handsomely finished.

The brass globe, angle, cross, check and Y valves are made either screwed or flanged; and guaranteed for working steam pressures up to 300 pounds, or hydraulic and air pressures up to 800 pounds.

The iron-body valves are made in globe, angle, cross, check, automatic equalizing stop and check, and Y patterns, either screwed or flanged. The larger sizes can be supplied with by-passes, which are cast integral with the body. The bodies, yokes and disc-holders are made of high-grade cast iron; the spindles, renewable seat rings and discs of durable steam metal composition. Flanges have raised faces inside of bolt holes; and are made in accordance with the new American Extra-Heavy Standard, unless otherwise specified.

Before leaving the factory they are carefully tested under 800 pounds hydraulic pressure, and guaranteed for working steam pressures up to 250 pounds.

Particular attention is called to the Jenkins Bros. Automatic Equalizing Stop and Check Valves (Fig. 293), made in extra heavy globe or angle patterns, either iron-body or cast steel.

They are designed to prevent accidents in the boiler room, also equalize the pressure between the different boilers in a battery.

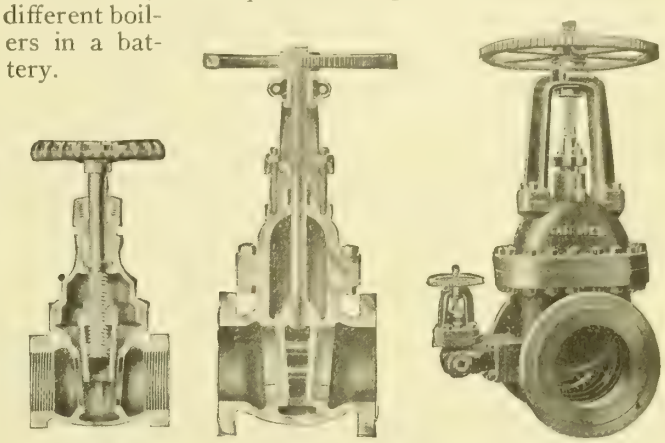


Fig. 270 Brass Gate, with Inside Screw

Fig. 245 Extra-Heavy Iron Body Gate, with Outside Screw and Yoke

Fig. 389 Cast-Steel Gate, Outside Screw and Yoke, with By-Pass

GATE VALVES

Gate Valves.

Jenkins Bros. Gate Valves (Figs. 270, 245 and 389) are made in brass or iron-body in three patterns: Standard, for 125 pounds working steam pressure or 175 pounds water; Medium, for 175 pounds steam or 250 pounds water; Extra-Heavy, for 250 pounds steam or 400 pounds water.

They are of the solid-wedge, double-face type. One of the important features of these valves is the improved globe-shaped body, a novel design which is used because it secures the greatest possible strength, good proportion, and neat appearance. They are made with inside screw, stationary spindle; or, with outside screw and yoke, traveling spindle.

Cast-Steel Valves.

Jenkins Bros. Cast-Steel Valves are made in globe, angle, gate, check, and automatic equalizing stop and check patterns, and are well adapted for the severe conditions incident to high-pressure superheated steam service. The valves are suitable for working steam pressures up to 350 pounds, and 360 degrees superheat, making a total temperature of 800 degrees Fahr.

Quality and Guarantee.

All genuine Jenkins Bros. Valves bear the Diamond trade-mark, and are absolutely guaranteed to be perfect in workmanship and suitable and efficient in the service for which they are designed.

Specification.

"All Valves to be genuine Jenkins Bros., bearing the registered Diamond Trade-Mark."

Catalogue.

A catalogue of all the Jenkins Bros. products, giving sizes, styles and list prices, mailed on request.

PRATT & CADY COMPANY, INCORPORATED

Manufacturers of Valves, Cocks, Steam Traps, and Hydrants

HARTFORD, CONN.

BRANCH HOUSES

BOSTON, MASS., 130 High Street
CHICAGO, ILL., 604-606 West Lake Street
DETROIT, MICH., 85 Jefferson Avenue
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PITTSBURGH, PA., 321 Third Avenue

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JACKSONVILLE, FLA., Cameron & Barkley Co.
LONDON, ENG., Edw. Le Bas & Co.
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NEW ORLEANS, LA., Whitney Supply Co., 418 South Peters Street
PHILADELPHIA, PA., McArdle & Cooney, 519 Arch Street
SAN FRANCISCO, CAL., Paine, Bailey & Co., 440 Market Street
ST. LOUIS, MO., J. R. Brockman Mfg. Co., 617 North Second Street
SYRACUSE, N. Y., John Weekes & Son Co.
TAMPA, FLA., Cameron & Barkley Co.

Products.

Angle, Back-pressure, Blow-off, Check, Cross, Gate, Globe, Radiator, Safety, Stop and Check, Throttle, Triple-duty, and "Y" Valves, in Bronze, Iron, and Steel.

Ammonia Gauges and Bronze Water Gauges.

Asbestos-Packed Cocks, in Bronze and Iron.

Fire Hydrants.

Indicator Posts, Floor Stands, Valve Boxes, and Return Steam Traps.

Bronze Renewable Disc Valves.

Equipped with Asbestos, Bronze or Special Metal Discs that are quickly removable and replaceable.

Fig. 1. Globe Valve, Screwed, Asbestos Disc

Fig. 8. Angle, with Union for Radiator

Fig. 31. Extra Heavy Globe Screwed, Brass Disc

BRONZE GLOBE AND ANGLE RENEWABLE DISC VALVES

Fig. 1. Asb. Disc, Globe, Scrd. Fig. 3. Asb. Disc, Angle, Scrd.
Fig. 2. Asb. Disc, Globe, Flgd. Fig. 4. Asb. Disc, Angle, Flgd.

For 150 Lbs. Working Steam Pressure.

Size, Inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
End to End, Globe, Scrd.	1 1/2	1 13/16	2	2 13/16	3 3/16	3 11/16	4 1/4	4 13/16	5 1/8	6 7/16	7 1/4
Face to Face, Globe, Flgd.						3 3/4	4 5/16	4 13/16	6	6 7/16	7 1/4
Center to End, Angle, Scrd.	3/4	1 1/8	1	1 7/16	1 5/8	1 13/16	2 3/16	2 3/8	2 13/16	3 1/4	3 7/8
Center to Face, Angle, Flgd.						2 1/16	3 1/4	3 5/8	4	4 1/2	5
Diam. of Flange						4	4 1/2	5	6	7	7 1/2

Fig. 5. Asb. Disc, Radiator Globe, No Union.
Fig. 6. Asb. Disc, Radiator Angle, No Union.
Fig. 7. Asb. Disc, Union, Radiator Globe.
Fig. 8. Asb. Disc, Union, Radiator Angle.

Size, Inches	1/2	3/4	1	1 1/4	1 1/2	2
End to End, Globe, no Union	2 13/16	3 3/16	3 11/16	4 1/4	4 13/16	5 1/16
Center to End, Angle, no Union	1 7/16	1 5/8	1 13/16	2 3/16	2 3/8	2 13/16
End to End, Globe, inc. Union Nipple	4 1/4	4 7/8	5 5/8	6 1/4	6 7/8	8 1/8
Center to End, Angle, inc. Union Nipple	1 5/8	1 7/8	2 1/16	2 1/2	2 3/4	3 1/8
Center to End of Union Nipple	2 3/8	2 3/4	3 1/16	3 5/16	3 7/16	4 1/8

Fig. 31. Ex. Hvy. Globe, Scrd., Bronze Disc.
Fig. 32. Ex. Hvy. Globe, Flgd., Bronze Disc.
Fig. 33. Ex. Hvy. Angle, Scrd., Bronze Disc.
Fig. 34. Ex. Hvy. Angle, Flgd., Bronze Disc.

For 200 Lbs. Working Steam Pressure.

Size, Inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
End to End, Globe, Scrd.	3 1/4	3 1/4	3 1/4	3 1/4	4 1/8	4 5/8	5	6	7 1/8	8 1/8
Face to Face, Globe, Flgd.					4	4 1/8	5 1/4	6 1/2	8	8 1/2
Center to End, Angle, Scrd.	1 1/4	1 1/4	1 1/4	1 1/4	2 1/16	2 1/2	2 1/2	3	4 1/4	4 1/2
Center to Face, Angle, Flgd.					2	2 1/16	2 5/8	3 1/8	4 1/8	4 1/4
Diam. of Flange					4 1/2	5	6	6 1/2	7 1/2	8 1/4

Made also in iron body, in sizes from 2 inches to 12 inches, for all steam pressures.

Bronze, Renewable Seat Gate Valves.

In these valves the seats are separate rings, made of asbestos, bronze or special metal. These seat rings are held in the body of the valve by retaining rings that screw into the body. This construction makes it simple to renew the seat rings, when they become worn or scored, *without having to remove the valve from the pipe line.*

Fig. 101. Screwed 150 lbs. Pressure

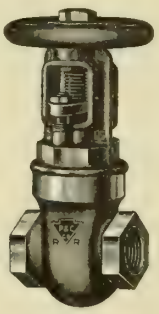


Fig. 114. Screwed Rising Spindle 150 lbs. Pressure

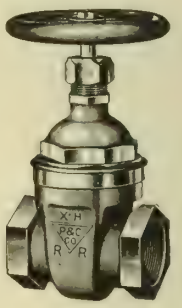


Fig. 118. Extra Heavy Screwed 250 lbs. Pressure

BRONZE GATE VALVES, WITH RENEWABLE SEAT RINGS

Fig. 101. Inside Screw, Scrd. Fig. 114. Rising Spindle, Scrd.
Fig. 102. Inside Screw, Flgd. Fig. 115. Rising Spindle, Flgd.
Made in sizes 1/4 to 6 ins. Made in sizes 1/2 to 2 ins.
Fig. 112. Quick Opening with Sliding Stem, and Lever, Scrd.
Fig. 113. Quick Opening with Sliding Stem, and Lever, Flgd.
Made in sizes 3/8 to 3 ins.

All for 150 lbs. Working Steam Pressure.

Size, Inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
End to End, Scrd.	2 1/2	2 1/2	2 1/2	2 7/8	3 1/16	3 3/4	4 1/16	4 7/8	5 3/4	6 1/4	6 3/4	7 1/4	7 1/2	7 7/8	8 1/2
Face to Face, Flgd.			3	3 1/4	3 1/2	4 3/8	4 7/8	5 5/8	6 1/2	7	8	8 1/2	8 3/4	9	9 1/2
Diam. of Flanges			3	3 1/2	4	4 1/2	5	6	7	7 1/2	8 1/2	9	9 1/4	10	11

Fig. 118. Ex. Hvy, Inside Screw, Scrd.
Fig. 118A. Ex. Hvy, Rising Spindle, Scrd.
Fig. 119. Ex. Hvy, Inside Screw, Flgd.
Fig. 118B. Ex. Hvy, Rising Spindle, Flgd.
Made in sizes 1/2 to 3 ins.
Made in sizes 1/2 to 2 ins.

All for 250 lbs. Working Steam Pressure.

Size, Inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
End to End, Scrd.	2 5/8	3	3 1/2	4	4 5/8	5 1/4	6	6 1/2
Face to Face, Flgd.			4 1/2	5 1/4	5 1/2	7 1/4	7 1/2	8
Diam. of Flanges			4 1/2	5	6	6 1/2	7 1/2	8 1/4

Fig. 120. Hydraulic, Inside Screw, Scrd.
Fig. 121. Hydraulic, Inside Screw, Flgd.

For 800 lbs. Working Water Pressure.

Size, Inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
End to End, Scrd.	3 3/8	3 3/4	4 1/2	4 7/8	5	6	6	6 1/2
Face to Face, Flgd.	3 1/4	4 1/8	5	5 1/2	6	7 1/2	7 7/8	8 1/4
Diam. of Flanges		3 1/2	4 1/2	5	6	6 1/2	7	7 1/2

Made also in iron body, in sizes from 2 inches to 24 inches, for all pressures.

Continued on next page

Bronze Swing Check Valves with Renewable, Rotating Bronze Discs and Regrindable Seats.

A valve of this type is easily reground. By removing the cap, inserting a screw-driver blade into the slot in the disc head, the disc may be rotated on the seat until the damaged surface of the latter is restored to perfect shape.

Should the disc become badly worn, it is the work of an instant to substitute a new one by unscrewing the side plugs and removing the interior parts.

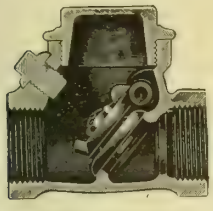


Fig. 201. Horizontal or Vertical Pattern, Screwed

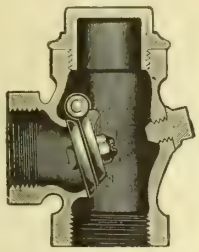


Fig. 203. Angle Pattern, Screwed

For 150 lbs. Working Steam Pressure
BRONZE SWING CHECK VALVES

FIG. 201. HORIZONTAL OR VERTICAL PATTERN, SCRD.
FIG. 202. HORIZONTAL OR VERTICAL PATTERN, FLGD.
FIG. 203. ANGLE PATTERN, SCRD.
FIG. 204. ANGLE PATTERN, FLGD.

For 150 Lbs. Working Steam Pressure.

Size. Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
End to End } Horizontal or { Scrd.	2⅛	2½	2½	2 11/16	3⅜	3 13/16	4¼	5⅛	6⅞	7½
Face to Face } Vertical Patt. { Flgd.	...	...	...	...	5	5⅝	6½	6⅝	8¼	7¼
Center to End } Angle { Scrd.	...	...	1½	1½	1 5/8	1 7/8	2⅛	2¾	3 5/16	3¾
Center to Face } Patt. { Flgd.	...	...	2	2¼	2⅛	2¾	3	3⅝	4¼	4½
Diam. of Flanges	...	...	3	3½	4	4½	5	6	7	7½

FIG. 205. HORIZONTAL OR VERTICAL PATTERN, SCRD. WITH ROTATING ASBESTOS RING DISC.
For 150 Lbs. Working Steam Pressure.

Size, Inches	½	¾	1	1¼	1½	2
End to End, Hor. or Vert. Patt., Scrd.	2⅞	3¼	3¾	4¼	4⅞	5½

FIG. 212. EX. HVY, HORIZONTAL OR VERTICAL PATTERN, SCRD.
For 250 Lbs. Working Steam Pressure.

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
End to End, Hor. or Vert. Patt., Scrd.	2 5/8	2 5/8	2 5/8	3 1/8	3 5/8	4	4 3/8	5 3/8	6 5/8	7¾

FIG. 217. HYDRAULIC, HORIZONTAL OR VERTICAL PATTERN, SCRD.
For 800 Lbs. Working Water Pressure.

Size, Inches	½	¾	1	1¼	1½	2
End to End, Hor. or Vert. Patt., Scrd.	4	4¾	5½	6	6¾	7¼

FIG. 218. EX. HVY, HYDRAULIC, HORIZONTAL OR VERTICAL PATTERN, SCRD
For 1000 Lbs. Working Water Pressure.

Size, Inches	½	¾	1	1¼	1½	2
End to End with Calking Recess, Hor. or Vert. Patt., Scrd.	5	5¼	5¾	6¼	7	7¾
Depth of Calking Recess	⅜	⅜	⅜	⅜	⅜	⅜

FIG. 213. EX. HVY HORIZONTAL OR VERTICAL PATTERN, SCRD.
FIG. 214. EX. HVY HORIZONTAL OR VERTICAL PATTERN, FLGD.
FIG. 215. EX. HVY ANGLE PATTERN, SCRD.
FIG. 216. EX. HVY ANGLE PATTERN, FLGD.

These four styles have bolted caps.
For 250 Lbs. Working Steam Pressures.

Size, Inches	2½	3	3½	4
End to End, Scrd.	7⅜	8	9¾	10
Face to Face, Flgd.	9½	10¼	12	12½
Center to End, Scrd.	3¾	4	4⅞	5
Center to Face, Flgd.	4⅛	4	4¾	5¼
Diam. of Flanges	7½	8¼	9	10

Iron Asbestos-Packed Cocks, Bushing Pattern.

In this style of asbestos-packed cock the body is packed with a moulded asbestos bushing, and an asbestos ring rests on top of this, to form the top packing. Because of this construction, the plug comes in contact only with asbestos, the elasticity of which compensates the different expansions of body and plug. They are used with success for hydraulics, ammonia, gas, oil, and air where pressures do not exceed 125 pounds.

FIG. 246D SCRD. BUSHING PACKED COCK

FIG. 282. ASBESTOS TOP RING

FIG. 282C. ASBESTOS MOULDED BUSHING

FIG. 246D. STRAIGHTWAY, SCRD.
FIG. 246E. STRAIGHTWAY, FLGD.
For 125 lbs. Working Steam Pressure.

Size, Inches	½	¾	1	1¼	1½	2	2½	3	3½	4
End to End, Scrd.	3	3 3/8	4	4 3/8	5 7/8	6	7	8 1/8	8¾	9½
Face to Face, Flgd.			5½	5¾	5⅞	7⅛	8¼	9¼	10¼	11½
Diam. of Flanges			4	4½	5	6	7	7½	8½	9

Iron Asbestos-Packed Cocks, Groove-Packed Pattern.

Instead of having a removable asbestos bushing, cocks of this design are packed with loose asbestos in U-shaped grooves in the body. This packing is done by hand, and afterwards the entire cock is subjected to a special vulcanizing process. This vulcanizing process makes the cock more serviceable and better able to withstand higher pressure and temperature.

"Pratt" Return Steam Traps.

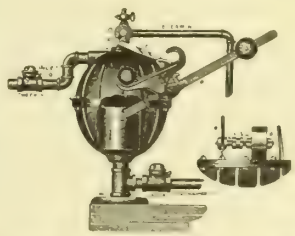
For use on boilers carrying steam pressures up to 175 pounds.

This trap will automatically return water of condensation from a receiver of a steam heating system, steam separator or any such source, from which water of condensation is obtained, and deliver it into boiler or boilers at the highest attainable temperature.

In cases where most of the steam is used in heating, the trap can be made to do all the feeding of the boiler (if there is sufficient pressure of cold water) by introducing into the trap cold water enough to make up the whole quantity of water wanted for the boiler.

In heating by direct steam, there is a large amount of heat wasted, even when condensation is run into a tank and pumped into boilers; while allowing it to go to waste entirely is a loss that no one, who wishes to use steam with economy, will allow. In using the return steam trap, there is no outlet for steam used in heating, etc., except into the boiler from which it comes; therefore there can be no loss of heat, except by radiation from heating surfaces.

Trap will return all condensation received by it to boiler or boilers at a temperature due to the pressure under which steam was condensed. With 75 pounds of steam in boilers we have known it to be as high as 300 degrees.



"PRATT" RETURN STEAM TRAP

These traps have been in use about thirty-eight years, during which time a great quantity of them have been sold, and all have given perfect satisfaction.

Size	No. 1	No. 2	No. 3	No. 4
Inlet	1 in.	1¼ in.	1½ in.	2 in.
Outlet	1½ in.	2 in.	2½ in.	3 in.
Steam Inlet	¾ in.	1 in.	1¼ in.	1½ in.
Will Drain 1" Pipe, feet	4,000 to 5,000	8,000 to 10,000	15,000 to 20,000	30,000 to 40,000
Water Delivery, per hour	200 gals.	350 gals.	550 gals.	800 gals.

LAVIGNE MANUFACTURING CO.

Radiator Valves

625-647 Commonwealth Avenue

DETROIT, MICH.

Products.

Manufacturers of a line of PACKLESS STEAM RADIATOR VALVES in many styles; including Round Wheel Handle, Graduated Dial with Lever Handle, Plain Lever Handle, Extension Handle and Lock Shield, either plain or graduated.

QUICK-OPENING HOT-WATER RADIATOR VALVES; a full line of STANDARD TYPE STEAM RADIATOR VALVES and UNION ELBOWS; GAS ENGINE TRIMMINGS; AUTOMOBILE SPECIALTIES; MECHANICAL OILERS; and a kindred line of BRASS and ALUMINUM GOODS.

Scope of Use, Lavigne Packless Steam Valves.

These valves can be used on vapor or vacuum installations and to advantage on any low pressure steam heating systems, because the packless arrangement prevents leakage due to use of ordinary valves; also, the easy regulation renders them *economical* for use on central station steam plants.

Extension handle packless steam radiator valves are operated behind wood or rattan grilles, and an overhead device permits operation of valves by means of a chain pull when radiators are placed beyond easy access.

The "Packless" Feature.

The Lavigne construction dispenses with the ordinary method of packing around stem, and substitutes therefor a permanent packing arrangement which illustrates the push and pull principle and *absolutely prevents leakage of steam, air or water.* Valve has double washers of non-deteriorating composition, is independent of metal joints, and always stays tight.

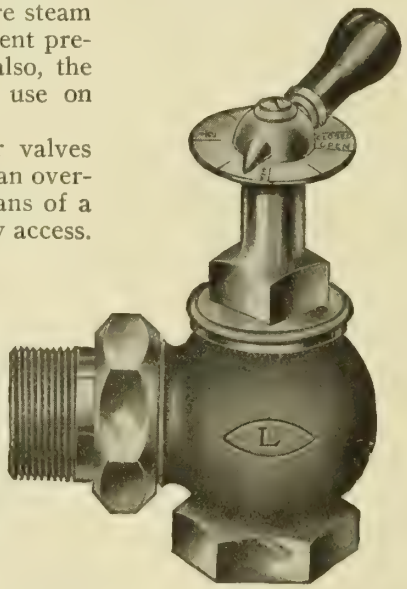
Lavigne Graduated Packless Valve.

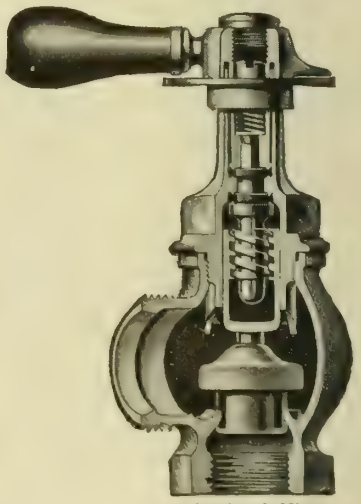
By reason of such construction, this valve opens quickly, closes quickly; and a seven eighths turn of handle completely opens or closes it and locks it closed —whether handle be graduated, wood wheel, lever or extension. Extra large handle remains cool, prevents hand from coming in contact with heated metal parts, and is fastened with one accessible screw to cast lugs (part of valve itself). Valve not injured by standing on handle, by side thrusts, etc., and is of normal dimensions and neat appearance.

Installation—Each valve can be accurately adjusted by any steam fitter to a wide range of sizes of radiators, thus enabling jobbers and heating contractors to carry these valves in stock. Any one of four shells (furnished with valves), with appropriate number of upright slots, may be attached to disk-holder below disk. Shell with one slot is used with valve when connected to a small radiator; and shells with two, three or four slots are, respectively, employed on medium or large size radiators; radiator being heated entirely, three fourths, one half or one quarter, etc., as desired.

Advantages—(1) A non-leaking, permanent tight joint. (2) A quick-opening and closing feature—by a seven-eighths turn; also permitting valve to remain partly open at any desired position. (3) Valve is fool-proof, all working parts being protected by valve bonnet from outside kicks, etc. (4) Comfort and economy of heat regulation are obtained.

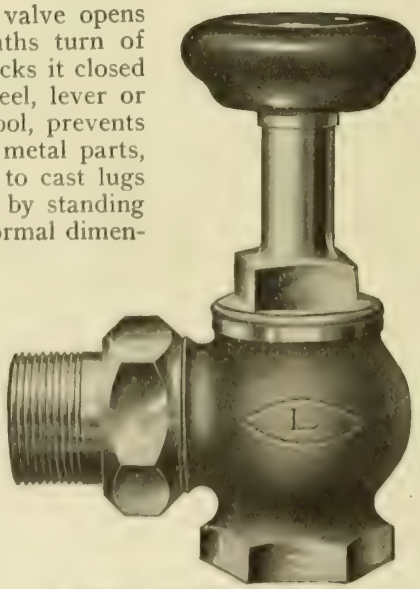
PACKLESS CORNER VALVE



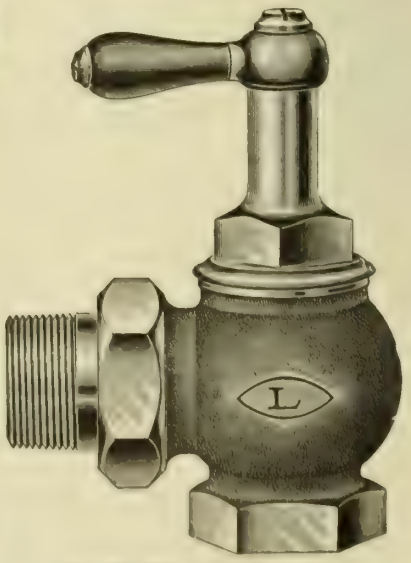


Sectional View

GRADUATED PACKLESS VALVE



WOOD WHEEL PACKLESS VALVE



PACKLESS VALVE WITH LEVER HANDLE

SYRACUSE FAUCET AND VALVE CO.

SYRACUSE, N. Y.

NEW YORK OFFICE: 220-224 West 42nd Street
TELEPHONE, BRYANT 6886

Products.

The SYRACUSE PACKLESS RADIATOR VALVE; SYRACUSE PACKLESS HOT-WATER RADIATOR VALVE.

Description.

We manufacture Globe, Angle, Corner, Radiator Valves, with Union Connections, all constructed exactly alike with Packless features, and adapted to steam, hot water, vapor and vacuum systems. (Fig. 1.)

This Syracuse Packless Valve differs from all others in that a substitute for unreliable packing is provided by an arrangement whereby leakage around valve stem is positively prevented in all cases, whether valve is used for air, water or steam. Stem is encased, no part of it being exposed to side thrusts, kicks, standing on, or other hard usage.

There is a metal-to-metal joint between top and bonnet, and instead of wicking or asbestos packing, a composition disc forms the stem steam seat (see Fig. 2), which is proof against the leakage of steam, air, and water.

High-grade in workmanship, material and design, Syracuse Packless Valves last for years without repair.

Construction.

Syracuse Packless Valves are simple and durable in construction. Leak-proof joints are made as above mentioned, and no asbestos or other packing is necessary. All features, including unions, are thoroughly tested under 100 pounds steam pressure. Tension of spring at all times holds composition stem steam seat disc against upper seat, rendering leakage impossible. Disc holder, which holds composition disc forming lower valve seat, is spun on disc carrier in such a way that it may revolve and also allow valve to take its seat properly when closed. All metal in Syracuse Packless Valves is of even thickness.

Valves for Water Heating.

Specify if valve is for water heating. In that event, a hole will be bored under seat.

Specifications.

Furnish and install on all direct radiators a Syracuse Packless Valve so constructed that the valve can be closed and the stem steam seat renewed without taking off the bonnet, or affecting any other part of the heating system.

PRICES AND SIZES

SYRACUSE PACKLESS ANGLE VALVE AND MALE UNION

Sizes	½	¾	1	1¼	1½	2
Rough body, plated all over	$3.15	$3.80	$4.75	$6.40	$8.10	$13.10

SYRACUSE PACKLESS CORNER VALVE WITH UNION
Right-Hand Style No. 33—Left-Hand Style No. 34

Sizes	½	¾	1	1¼	1½	2
Rough body, plated all over	$3.45	$4.20	$5.25	$7.05	$8.95	$14.45

SYRACUSE PACKLESS STANDARD GLOBE VALVE

Sizes	½	¾	1	1¼	1½	2
Rough body.....	$2.30	$3.15	$3.95	$5.30	$7.30	$11.95

Advantages

(1) One complete turn opens and closes either the wood wheel or lever-handle Valve. (2) Syracuse Packless Valves save bother and unreliability of packing. (3) Metal-to-metal joints absolutely prevent leakage. (4) They prevent damage to hardwood floors and beautiful rugs, and ruin to decorations by reason of falling plaster. (5) Repacking valve stems every year is eliminated. (6) Wheel handle, of best hardwood, is shaped to avoid injury to hand while operating valve. (7) No part of stem is exposed to outside rough usage. (8) Expense of new parts saved because Syracuse Packless Valves last an indefinite period.

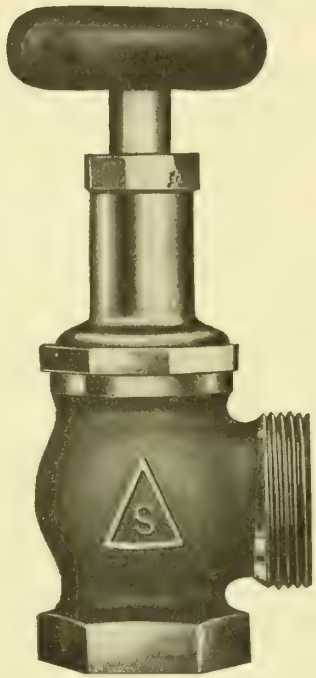


FIG. 1. SYRACUSE PACKLESS RADIATOR VALVE
Style 31

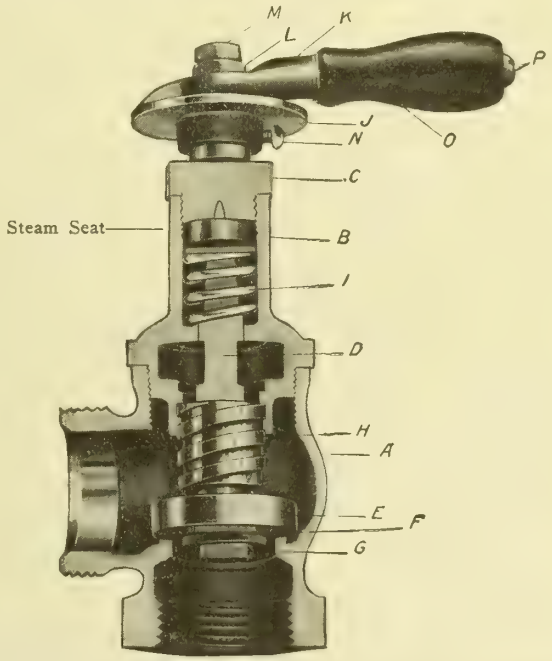


FIG. 2. SECTIONAL VIEW OF CONSTRUCTIVE PARTS
Style 32

A—Body
B—Bonnet
C—Top
D—Stem
E—Disc Holder
F—Disc
G—Disc Nut
H—Disc Carrier
I—Spring
J—Dial Plate
K—Lever
L—Stem Nut
M—Stem Lock Nut
N—Screw
O—Wood Handle
P—Screw

Lever Handle 15 cents extra

Guarantee.

All Syracuse Packless Valves are guaranteed to stand pressures to 150 pounds. If purchaser is not satisfied with them in every detail, purchase price will be gladly refunded.

THE FOOS GAS ENGINE CO.

SPRINGFIELD, OHIO

Products.

Natural and Artificial Gas, Producer Gas, Gasoline, and Oil Engines; Electric Light Plants, Pumps, Water Systems, Hoisting Outfits.

Scope.

Electric lighting, water systems, hoisting, mechanical ventilation, and operating machinery of all kinds; suitable for general power requirements. Foos Engines are noted especially for their scientific design, high quality of material, and reliability.

Type V.

This type is built in a number of sizes for operation on producer and natural gas. It is suitable for all heavy duty industrial service, and is also used extensively for the operation of city light and water works.

Type SE, Special Electric.

Designed especially for the finest electric service, either belted or direct-connected to generators. Used for laboratory work in colleges, for telephone and telegraph service, motion picture theaters, town lighting, churches, schools, residences, etc. Sizes, 6 to 50 horse-power.

Type J, Equipment K-15.

This is a small water system for pressure plants used in connection with pneumatic tanks and for other pumping service in residences, schools, churches, etc. Engine, 1½ horse-power. Capacity of pump, twelve gallons per minute. Limit of suction lift, twenty-five feet. Maximum pressure, fifty pounds. Brass lined pump cylinder 3 by 4¾ inches.

Type J, Equipment No. 11.

This is a 2½ horse-power engine direct-connected to a bull-dozer pump.

Pump Cylinders

Size, Ins.	Maximum Pressure, Lbs.	Capacity, Gals.	Discharge, Ins.	Suction, Ins.
Regular 5x5½	50	40	2	2
Special 4x5	80	24	1½	1½
Special 3x5	125	13	1¼	1¼

Installations.

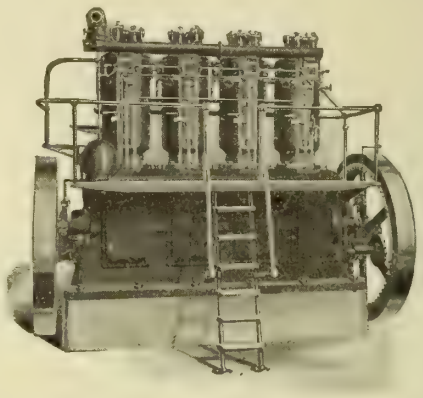
This factory maintains an engineering force capable of handling power installations of any size and for all kinds of service. Its ability to handle water systems and plants for mechanical ventilation can be demonstrated by thousands of installations it has made in public buildings. Architects and engineers are requested to invite its co-operation, or send for catalogues showing the complete line.

Experience.

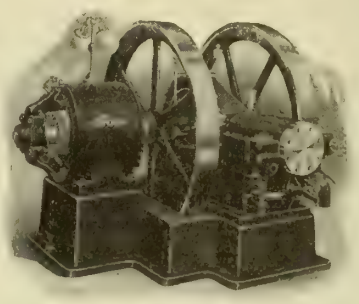
The factory is the oldest (probably also the largest) in America, having been in existence for nearly thirty years. Its machine shop practice and experience insure close fitting and complete standardization of all parts. Each engine is tested individually for horse-power and efficiency, and is thoroughly worked out under full load.

Specifications and Catalogues.

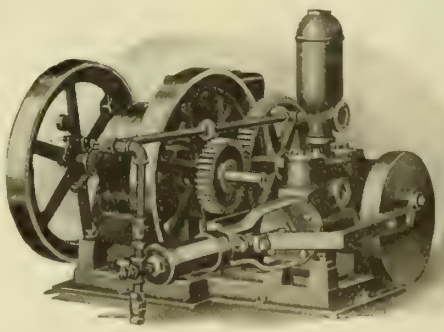
Type J, 1½ to 12 Horse-power, Catalogue 91B
Type S, 6 to 90 Horse-power, Catalogue 87
Type V, 35 to 400 Horse-power, Catalogue 85



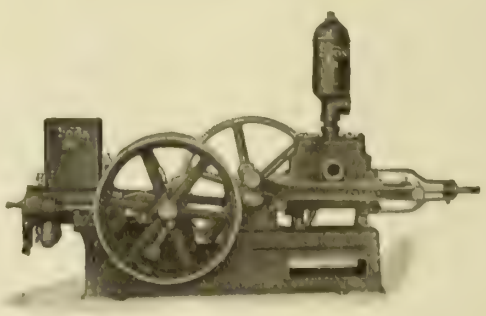
TYPE V, 35 TO 400 H.P.



TYPE SE, SPECIAL ELECTRIC



TYPE J, EQUIPMENT K-15



TYPE J, EQUIPMENT NO. 11

N. F. HARRIS, Secretary and Treasurer H. V. HARRIS, General Manager and Asst. Treasurer

ARTESIAN WELL AND SUPPLY CO.

PROVIDENCE, R. I.

TELEPHONE, East Providence 198. NEW YORK OFFICE—Telephone, Cortlandt 5576

Products and Services.

Artesian Well Drilling and Installation of Water-Works.

Also, Test Borings for Foundations; Prospecting for Minerals; Driving Pipe or Drilling Holes for Elevator Shafts.

Facilities and Territory.

The men engaged in these drilling and boring operations and installations of water-works, etc., are thoroughly experienced in the work, practical and competent.

The equipment in these lines is complete, to meet all conditions and requirements; especially for drilling wells in rock, and for drilling or washing in pipe through clay and sand to beds of water-bearing gravel. Wells will be dug any depth up to 2,000 feet.

The territory of the operations of this company includes New England, the Middle Atlantic and Southern States.

Artesian Wells.

The earth being a natural filter, artesian water is usually of splendid quality. It is a constant, unfailing supply. A deep well will meet all requirements, for water drawn from the never-failing water strata and where the surface water is properly cased off, is free from impurities and at the most healthful temperature (40 to 60 degrees Fahr.) for drinking purposes. It has been filtered and purified and made ready for man's use by Nature's best process.

The Artesian Well and Supply Co. has, during many years, drilled and driven artesian wells as a source of water supply for cities, towns, manufacturing plants of all kinds, such as tanneries, bleacheries, knitting mills, fabric mills, rubber plants, paper plants; for hotels, hospitals, sanatoriums and other public institutions; for country and suburban residences; for breweries, food packing plants and chemical works; also, for supplying water generally for domestic use, for spraying and sprinkling, for greenhouses and for fire protection.

Water Supply Systems.

The Company is prepared also to furnish and install pneumatic water supply systems, and will gladly lend assistance in solving any difficulties, and prepare specifications on equipments best suited to fulfil the requirements.

Estimates and Further Information.

Estimates for all kinds of artesian well operations will be furnished.

Write for further information, general prices, etc.

Any desired assistance will be given by correspondence or personal care of the representative.

PARTIAL LIST OF REFERENCES

Paper Companies

Saxer Paper Mills,	Skaneateles Falls, N. Y.
L. L. Brown Paper Co.,	Adams, Mass.
Crocker Burbank Co., Inc.,	Fitchburg, Mass.
Nashua Gummed & Paper Co.,	Nashua, N. H.

Rubber Companies

Revere Rubber Co.,	Providence, R. I.
Fisk Rubber Company,	Chicopee Falls, Mass.

Leather Companies

A. C. Lawrence Leather Co.,	Peabody, Mass.
Peter Sims & Son,	Salem, Mass.
F. M. Hoyt Shoe Co.,	Manchester, N. H.

Breweries

Anheuser Busch Agency,	164th Street and Brook Avenue, New York, N. Y.
Providence Brewing Co.,	Providence, R. I.
Enterprise Brewing Co.,	Fall River, Mass.
Frank Jones Brewing Co.,	Portsmouth, N. H.

Hospitals

Foxborough State Hospital,	Foxborough, Mass.
Norwich State Hospital for Insane,	Norwich, Conn.
Otilie Orphan Asylum,	Jamaica, N. Y.
Jewish Agricultural and Industrial Aid Society,	Kings Park, L. I., N. Y.

Y. M. C. A. Buildings

Brooklyn,	Elliot Place, Brooklyn, N. Y.
Providence,	Broad Street, Providence, R. I.

Manufacturing Plants

Diamond Match Company,	Oswego, N. Y.
Wright Health Underwear Co.,	Troy, N. Y.
Alex Smith & Sons Carpet Co.,	Yonkers, N. Y.
Sheffield Farms-Slawson Decker Co.,	New York, N. Y.
New Haven Clock Co.,	New Haven, Conn.
Cheney Brothers,	South Manchester, Conn.
Eastern Mfg. Co.,	South Brewer, Me.
Pacific Mills,	Lawrence, Mass.
Richard Borden Mfg. Co.,	Fall River, Mass.
Crompton & Knowles Loom Works,	Providence, R. I.
Lorraine Mfg. Co.,	Pawtucket, R. I.

Town and City Supplies

Newburyport, Mass.	Bloomingdale, N. Y.
Adams, Mass.	Eastman, Ga.
Dover, N. H.	Essex Junction, Vt.

Schools and Colleges

Harvard Medical School,	Brookline, Mass.
New Hampshire College,	Durham, N. H.

Residences

Elton G. Cushman,	Barrington, R. I.
Arthur Curtis James,	Newport, R. I.
Mrs. Cameron Bradley,	Southboro, Mass.
C. R. I. Martin,	Ridgefield, Conn.
C. D. Huyler,	Greenwich, Conn.
T. L. Chadbourne, Jr.,	Greenwich, Conn.
Henry T. Schwarz,	Greenwich, Conn.
Charles A. Moore,	Greenwich, Conn.
Charles S. Mann,	Orford, N. H.
Billings Farm,	Woodstock, Vt.
Cornelius Provost,	East Norwich, L. I., N. Y.
J. E. Berwind,	Bridgehampton, L. I., N. Y.
J. Stuart Blackton,	Oyster Bay, L. I., N. Y.
Otto H. Kahn,	Woodbury, L. I., N. Y.
Robert Gair,	Westhampton, L. I., N. Y.

THE BISHOP-BABCOCK-BECKER COMPANY

Manufacturers of the Reliable Air Line and Return Line Vacuum and Vacu-Vapor Heating Equipment

CLEVELAND, OHIO

BRANCHES

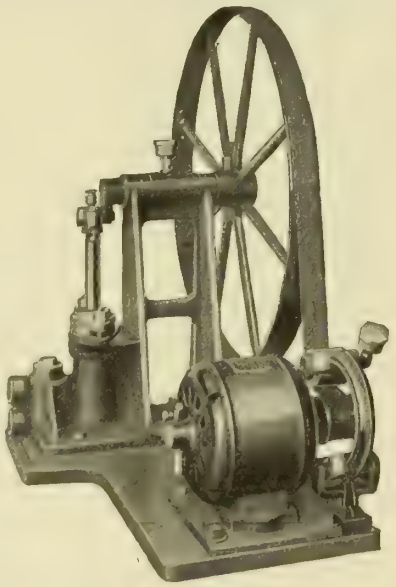
NEW YORK, N. Y., 376-380 Lafayette Street
CHICAGO, ILL., 219-225 West Washington Street
CINCINNATI, OHIO, 1025 Central Avenue
SAN FRANCISCO, CAL., 950-952 Mission Street
ST. LOUIS, MO., 210-212 South Broadway
MILWAUKEE, WIS., 229 Cedar Street
ST. PAUL, MINN., 338-340 Minnesota Street
LONDON, ENGLAND; BASEL, SWITZERLAND

Products.

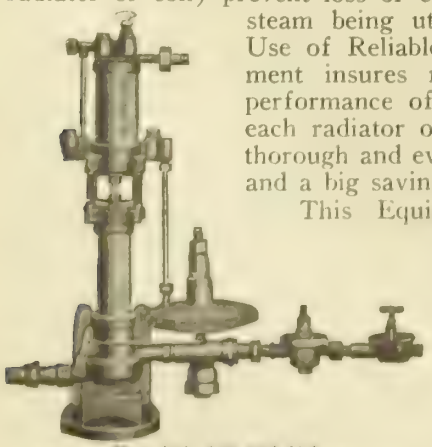
RELIABLE ELECTRIC and HYDRAULIC VACUUM PUMPS; VACUSTATS, VACU-TRAPS (LITTLE WONDER and Nos. 1 and 2), VACU-GRADUATE PACKLESS VALVES, "4-V" VACU-VAPOR VENT VALVES; VACU-CHECKS, AUTOMATIC ELECTRIC SWITCH and VACUUM CONTROLLER; AUTOMATIC CUT-OFF and VACUUM CONTROLLER; STRAINERS; AUTOMATIC AIR SEPARATING TANK; AIR SEPARATORS; EXPANSION TANKS; VACUUM and COMPOUND GAUGES.

The Reliable Air Line Vacuum Heating Equipment.

The Reliable Air Line Vacuum Heating Equipment is used to perfect one-pipe low pressure, new or old steam systems of any size. By means of a Reliable Electric or Hydraulic Vacuum Pump, the system is kept free from air resistance and heat is instantly pulled into all radiators, thus providing quick heating. No fuel is burned to produce steam pressure for driving out air before steam can circulate freely. The VacUstats (one is placed on each radiator or coil) prevent loss or escape of steam, all steam being utilized for heating. Use of Reliable Air Line Equipment insures rapid heating and performance of its full duty by each radiator or coil, resulting in thorough and even heat circulation and a big saving in fuel.

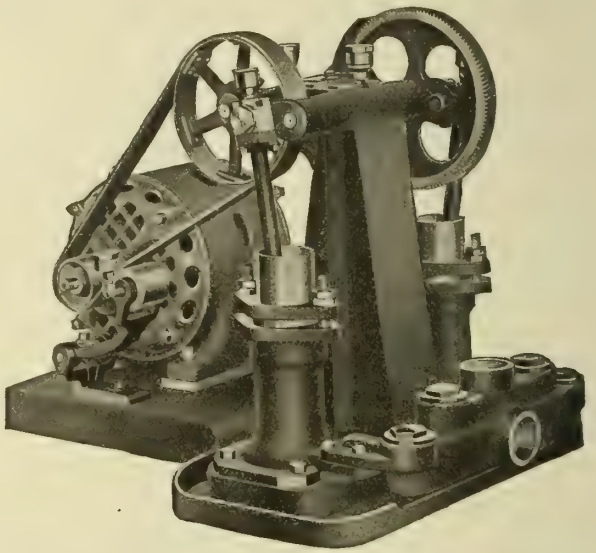


No. 1279. RELIABLE AIR LINE ELECTRIC VACUUM PUMP



Nos. 101, 102 and 104 RELIABLE AIR LINE HYDRAULIC VACUUM PUMP

This Equipment is entirely automatic and noiseless. Operating expense is exceptionally low. All the equipment is manufactured, thoroughly tested and properly adjusted at the factory. No adjustments being necessary on the job, it is quickly and easily installed, at low cost.



RELIABLE AIR LINE ELECTRIC VACUUM PUMP
Plunger Type

The Reliable Air Line Equipment is used with plants operated by steam from a low pressure boiler; by steam from a central station; by exhaust steam; or by steam from a high pressure boiler if reduced and regulated not to exceed fifteen pounds pressure. With Air Line Equipment, a pound or two of steam pressure provides ample heat in coldest weather, while in mild winter weather a few ounces is generally sufficient. The Air Line Equipment can be used to perfect an old steam system by adding air line piping to each radiator and main air line in basement.

Equipment—Air Line Equipment consists of a Reliable Electric or Hydraulic Vacuum Pump with Equipment, and VacUstats (see sectional illustration of VacUstat). Electric Pump Equipment consists of automatic electric switch and vacuum controller, strainer, expansion tank, vacuum gauge and flanged screw connections. Hydraulic Pump Equipment consists of automatic cut-off and vacuum controller, air separator with strainer, water pressure regulator, water strainer, vacuum gauge and necessary couplings.

CAPACITIES OF RELIABLE AIR LINE VACUUM PUMPS

Electric		Hydraulic		
No.	Square Ft. Direct Radiation.	No.	Square Ft. Direct Radiation Water Pressure	
			20 Lbs.	40 Lbs.
1279	1000	101	700	800
111	5000	102	900	1100
112	10000	104	2500	4000
113	18000	106	6600	9600
114	28000			
115	35000			

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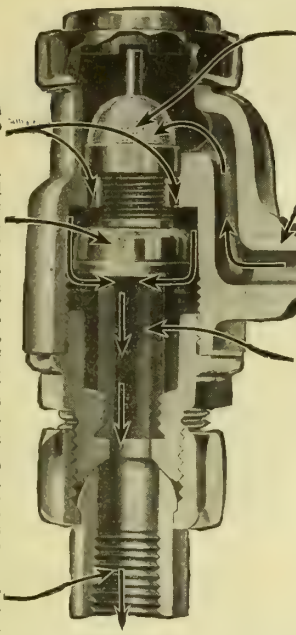


THE VACUSTAT, PATENTED JUNE 23, 1914
Capacity 150 square feet direct radiation, made in one size only

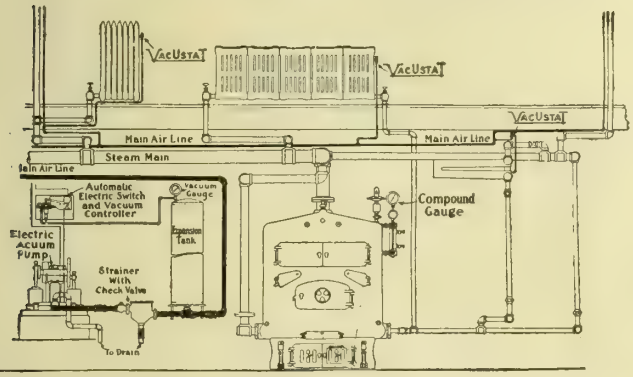


DIAGRAM SHOWING METHOD OF INSTALLING RELIABLE AIR LINE
When electric pump is used

VACUSTAT
TRADE MARK REG. U.S. PAT. OFF.

Suggestions for Specifications.

When specifying the Reliable Air Line Vacuum Heating Equipment, the following suggestions are of value:

Piping—All piping shall be installed and graded in accordance with good engineering practice.

Automatic Air Valves—The Bishop-Babcock-Becker Company's VacUstat shall be placed on each radiator and coil, at highest vent tapping. Each VacUstat shall include a flushing fitting, for use when cleaning the system.

Vacuum Pump and Equipment—The Bishop-Babcock-Becker Company's No. ..... Reliable Electric or Hydraulic Vacuum Pump and Equipment shall be used. The installation shall be done in accordance with chart and instructions furnished by THE BISHOP-BABCOCK-BECKER COMPANY.

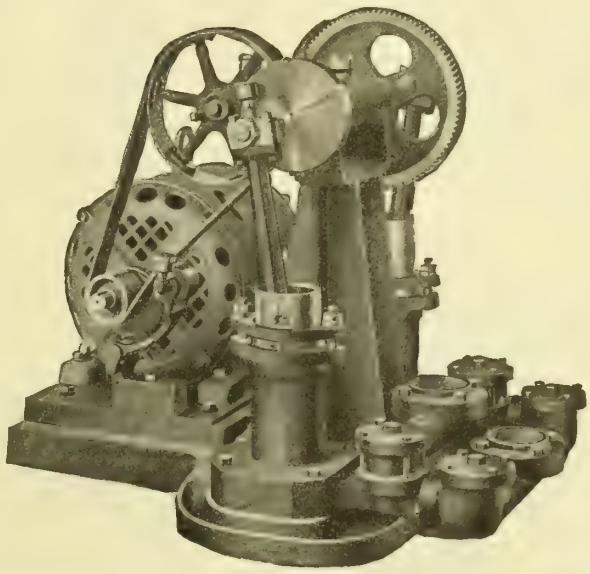
Important—The system shall be made perfectly tight.

Cleaning the System—The system should be thoroughly cleaned before it is operated. This shall be done in accordance with instructions furnished by THE BISHOP-BABCOCK-BECKER COMPANY.

NOTE—The Company will mail detailed drawings, roughing-in dimensions, table of pipe sizes, and any other specific data, on request.

The Reliable Return Line Vacuum Heating Equipment.

The Reliable Return Line Vacuum Heating Equipment is used to perfect two-pipe steam systems of any size. By means of a Reliable Electric Vacuum Pump, the system is kept free from air resistance and heat is instantly pulled into all radiators, thus providing quick heating. No fuel is burned to produce steam pressure for driving out the air before steam can circulate freely. Another function of the vacuum pump is to draw condensation out of radiators and return piping, thereby assuring thorough draining. Vacu-Traps (one is used on return end of each radiator or coil) effectually trap the steam; so that all steam is utilized for heating. Vacu-Traps also drain radiators and coils of condensation as fast as it accumulates. If Vacu-Graduate Packless Valves are used on supply end of each radiator or coil, rooms can be fully or only partially heated, so desired temperature can be maintained in each room, regardless of weather conditions. When No. 2 Flushing Vacu-Traps are used, heating system can be quickly cleaned without changing valves or piping, or shutting down the system. In short, Reliable Return Line Equipment insures rapid, thorough and even heating, with a great fuel saving.



RELIABLE RETURN LINE ELECTRIC VACUUM PUMP
Plunger Type

The Reliable Return Line Equipment is entirely automatic and noiseless. Operating expense is exceptionally low. All the equipment is manufactured, thoroughly tested and properly adjusted at the factory. No adjustment being necessary on the job, it is quickly and easily installed, at low cost.

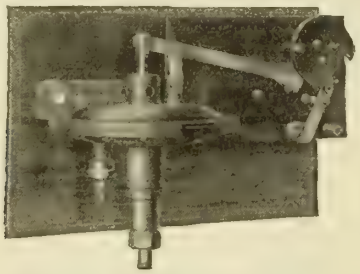
CAPACITIES

No.	Square Ft. Direct Radiation
2779.....	2000
122.....	5000
123.....	10000
124.....	17000
125.....	25000

The Reliable Return Line Equipment is used with plants operated by steam from a low pressure boiler; by steam from a central station; by exhaust steam; or by steam from a high pressure boiler, if reduced and regulated not to exceed fifteen pounds pressure. With Return Line Equipment a pound or two of steam pressure provides ample heat in coldest weather, while in mild winter weather a few ounces is generally sufficient. The Return Line Equipment can be used to perfect an old steam system by connecting return piping to pump, and return main in basement.

Continued on next page

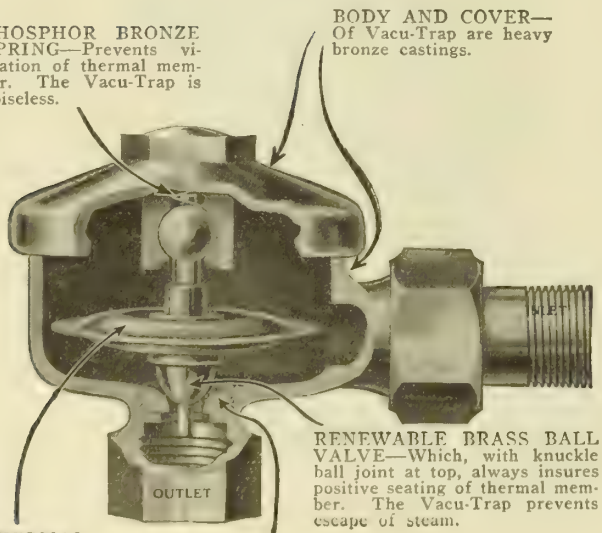
Equipment—The Return Line Equipment consists of a Reliable Electric Vacuum Pump with automatic electric switch and vacuum controller, strainer, expansion tank, vacuum gauge and flanged union connections; automatic air separating tank (if condensation is returned to low pressure boiler, closed receiving tank or closed feed-water heater); Vacu-Graduate Packless Valves; and Little Wonder, No. 1 or No. 2 Vacu-Traps. The following table shows the proper size valves to use:



AUTOMATIC ELECTRIC SWITCH AND VACUUM CONTROLLER

VACU-TRAP

TRADE-MARK

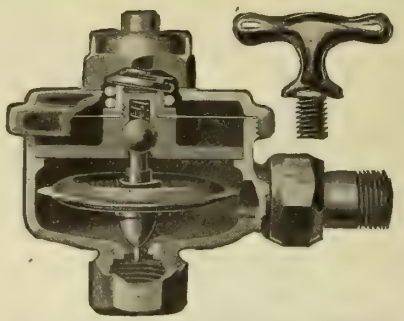


½-INCH LITTLE WONDER VACU-TRAP

Made also in ¾", 1", 1¼" and 1½" sizes

PROPER SIZE VALVES TO USE WITH RELIABLE RETURN LINE EQUIPMENT

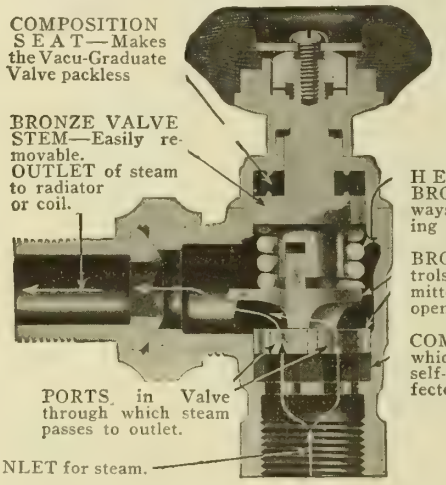
Sq. Ft. Radiation or Coil Sq. Ft. Direct Radiation	Vacu-Graduate Packless Valve	Little Wonder Vacu-Trap
Up to 150	¾ inch	
150 to 250	1 inch	½ inch No. 1 or No. 2
250 to 350	1¼ inch	¾ inch No. 1 or No. 2
350 to 500	1½ inch	1 inch No. 1 or No. 2



NO. 2 FLUSHING VACU-TRAP WITH KEY

½-, ¾- and 1-inch sizes

NOTE—No. 1 Vacu-Traps are also made in 1-, 1¼- and 1½-inch sizes; and we also make a 1-inch No. 2 Flushing Vacu-Trap. These larger valves are generally used on coils. Vacu-Graduate Packless Valves are furnished with wheel or lever handle, or lock shield. Valves finished in brass, or nickel-plated, as desired.



¾-INCH VACU-GRADUATE PACKLESS VALVE WITH WHEEL HANDLE

Suggestions for Specifications.

When specifying the Reliable Return Line Vacuum Heating Equipment, the following suggestions are of value:

Piping—All piping shall be installed and graded in accordance with good engineering practice.

Electric Vacuum Pump and Equipment—The Bishop-Babcock-Becker Company's No. .... Reliable Electric Vacuum Pump and Equipment shall be used. The installation shall be done in accordance with chart and instructions furnished by THE BISHOP-BABCOCK-BECKER COMPANY.

Automatic Air Separating Tank and Equipment—The Bishop-Babcock-Becker Company's Reliable Automatic Air Separating Tank and Equipment shall be used, if returns are made to low pressure boiler, closed receiving tank, or closed feed-water heater. The installation shall be done in accordance with chart and instructions furnished by THE BISHOP-BABCOCK-BECKER COMPANY.

Automatic Return Line Valves—The Bishop-Babcock-Becker Company's Vacu-Trap, of proper size, shall be installed on the return end of each radiator or coil, and on drips from the steam mains.

Packless Supply Valves—The Bishop-Babcock-Becker Company's Vacu-Graduate Packless Valve, of proper size, shall be installed on the supply end of each radiator or coil.

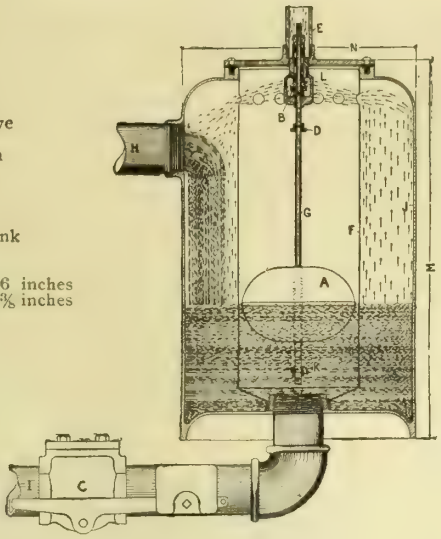
Important—The system shall be made perfectly tight.

Cleaning the System—After system has been properly installed, it shall be thoroughly cleaned in accordance with instructions furnished by THE BISHOP-BABCOCK-BECKER COMPANY.

NOTE—The company will mail detailed drawings, roughing-in dimensions, table of pipe sizes, and any other specific data on request.

Continued on next page

A—Float
B—Air Valve
C—Back Pressure Valve
D—Float Stop
E—Air Vent, 1½-inch
F—Float Shield
G—Air Valve Stem
H—Inlet, 3-inch
I—Outlet, 3-inch
J—Galvanized Iron Tank
K—Float Stop
L—Air Valve Seat
M—Height of Tank, 26 inches
N—Width of Tank, 16⅝ inches



AUTOMATIC AIR SEPARATING TANK

For returning condensation to a low pressure boiler, closed receiving tank or closed feed-water heater

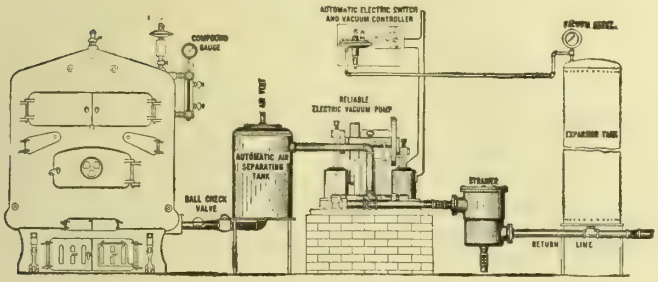


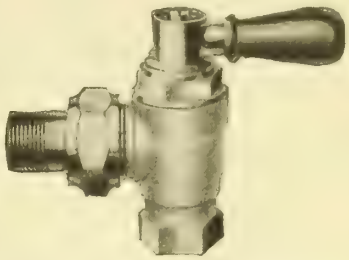
DIAGRAM SHOWING METHOD OF INSTALLING RELIABLE RETURN LINE ELECTRIC VACUUM HEATING EQUIPMENT

The Reliable Vacu-Vapor Heating Equipment.

The Reliable Vacu-Vapor Heating Equipment is designed especially for use with two-pipe low pressure steam systems in residences or other buildings having up to 1500 square feet of direct radiation. Parts of equipment can, however, be used with larger steam plants.

With our Vacu-Vapor Equipment there is no vacuum pump to exhaust the air; but, owing to large openings in valves, air is freely expelled from the system without creating the high steam pressure that is required with an ordinary plant to force the air out. A "4-V" Vacu-Vapor Vent Valve is installed on the end of the dry return, its functions being to freely vent the air; to automatically prevent air getting back into the system; and to insure proper return of condensation to boiler at all times. The Vacu-Traps (one is used on return end of each radiator or coil) effectually trap the steam and drain radiators and coils of condensation as fast as it accumulates, thus making all radiation fully efficient. The Vacu-Graduate Packless Valves (one is placed on supply end of each radiator or coil) enable rooms to be entirely or only partially heated; therefore, rooms can be heated *independently* and desired temperature can be maintained, regardless of weather conditions. Vacu-Checks (one is installed on end of each steam main or circuit) assist in venting air, but absolutely prevent escape of steam.

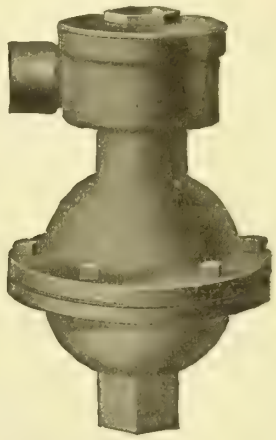
The vacuum created through vapor and steam condensing in radiation is utilized by the Reliable Vacu-Vapor Equipment to pull more vapor and steam into radiators and coils. Equipment provides rapid and thorough circulation of vapor and steam throughout entire system, using much less fuel than is required with an ordinary steam plant; is entirely automatic and



¾-INCH VACU-GRADUATE PACKLESS VALVE
With lever handle and graduated dial

VACU-CHECK
TRADE-MARK

VACU-CHECK
½-inch size



"4-V" VACU-VAPOR VENT VALVE

absolutely noiseless; no operating expense; is manufactured by this Company complete; and is thoroughly tested and properly adjusted at the factory. No adjustments being necessary on the job, it is quickly and easily installed, at low cost.

PROPER SIZE VALVES TO USE WITH RELIABLE VACU-VAPOR EQUIPMENT

Size Radiator or Coil Sq. Ft. Direct Radiation	Vacu-Graduate Packless Valve	Little Wonder Vacu-Trap
Up to 60	¾-inch	½-inch No. 1
60 to 170	1 -inch	½-inch No. 1
170 to 250	1¼-inch	¾-inch No. 1
250 to 400	1½-inch	

NOTE—Specifications for Vacu-Vapor Equipment will be sent upon request. The Vacu-Graduate Packless Valves are furnished with wheel or lever handle, or lock shield, and are finished in brass or nickel-plated, as are the Vacu-Traps

This equipment is used with plants operated by steam from a low pressure boiler; by steam from a central station; or by steam from a high pressure boiler, if reduced and regulated not to exceed ¾ of a pound pressure. With Vacu-Vapor Equipment, ¾ of a pound of steam pressure provides ample heat in the coldest weather, while in mild winter weather a few ounces is generally sufficient.

Equipment—The Vacu-Vapor Heating Equipment consists of "4-V" Vacu-Vapor Vent Valves, Vacu-Graduate Packless Valves, Vacu-Traps (Little Wonder and No. 1) and Vacu-Checks. The venting capacity of the "4-V" valve is 1500 square feet of direct radiation; of ½-inch vacu-check, 500 square feet; of 1-inch vacu-check, 1500 square feet. See above table for proper size of vacu-traps and vacu-graduate valves to use.

THE CONNERSVILLE BLOWER COMPANY

BUILDERS OF

Valveless Rotary Vacuum Pumps

CONNERSVILLE, IND.

BRANCH OFFICES

CHICAGO, ILL., 929 Monadnock Block NEW YORK, N. Y., 114 Liberty Street

Products.

VALVELESS ROTARY VACUUM PUMPS, for Vacuum Heating.

Also, ROTARY BLOWERS, for Moving Air under Pressure or Vacuum. CONNERSVILLE VACUUM CLEANING SYSTEM. VALVELESS ROTARY PUMPS for Handling Tar, Oil, Lard, Soapstock, etc.

Description and Advantages.

The Connersville Valveless Vacuum Pump is used on either the Return Line or Air Line Systems of Vacuum Heating. It maintains a uniform vacuum in the return mains, increasing the efficiency and positive action of the radiation. It also returns the water of condensation direct to low-pressure boiler.

Simplicity of design is shown by Fig. 1, a sectional diagram.

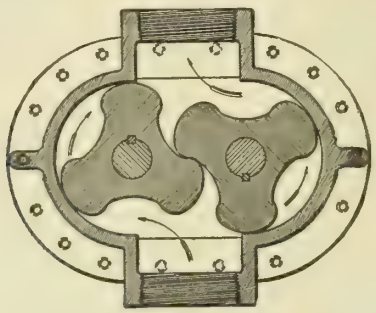


FIG. 1. SECTION THROUGH IMPELLERS AND CASE

There are only two moving members in the pump and there is no internal contact or rubbing. A uniform clearance is maintained between the rotating impellers and the enclosing case. Each pump has six ring-oiling bearings lined with genuine babbitt. The gears are in an oil- and dust-tight housing running in a bath of oil.

The use of this pump simplifies the heating system, as it returns the condensation direct to the boiler and does away with the usual boiler feed pump. It will be seen that this pump really does the work of two pumps and makes the system more easily cared for.

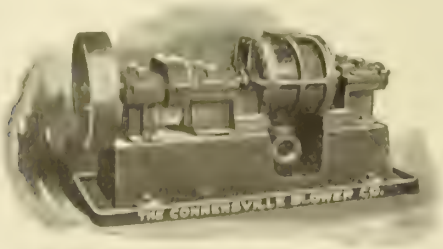


FIG. 2. VALVELESS VACUUM PUMP
Belt-Driven Type

Fig. 2 shows the belt-driven pump, which is the commonest form, and which is strongly recommended. However, a gear and pinion drive with motor mounted on extended bed-plate can be furnished (Fig. 3).

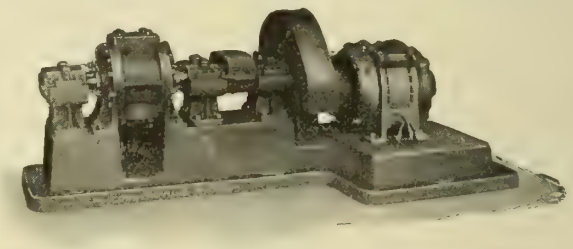


FIG. 3. VALVELESS VACUUM PUMP
Gear-Driven Type

Location of Pump.

Always place the pump at the lowest point in the system, so that the water of condensation will run to it, forming a seal. As explained previously, the rotating impellers do not come in contact with any part of the pump. It is therefore not air-tight and must be sealed

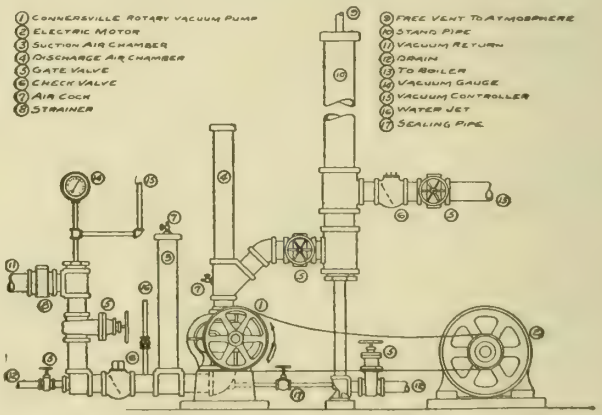


FIG. 4. STANDARD METHOD OF INSTALLATION
Pump at lowest point in System. Belt drive

for effective work. Fig. 4 shows a recommended standard method of installation, and will be of assistance in laying out plans for the Heating System. Other plans are shown in Bulletin 12S, which will be sent on request.

Dimensions.

Sketches, with dimensions, are shown (Figs. 5 and 6) for the standard belt-driven pumps and also for the pumps driven through gear and pinion. If desired automatic controlling apparatus may be used.

Requisite Information for Details and Prices.

In writing for description and prices of such apparatus, please give voltage, phase and cycle of current. Full information and drawing will be gladly given on request.

Continued on next page

SIZES, CAPACITIES, SPEEDS, ETC.

Code	Size, Inches	Gal. per Rev.	Diam. Openings, Inches	Pulley, Inches	Speeds, R.P.M.	Horse Power	Gallons per Hour	Price	Shipping Weight, Lbs.	Optional Pulley, Inches
Herd.....	3 x 3½	1/6	2	10 x 2½	300 to 500	¾ to 1½	3,000 to 5,000	$165.00	375	18 x 3
Hose.....	4 x 4	1/3	2½	12 x 3	250 to 400	1½ to 2½	5,000 to 8,000	200.00	600	24 x 4
Horn.....	4 x 6	1/2	3	12 x 3	266 to 400	2½ to 4	8,000 to 12,000	220.00	625	24 x 4
Hoop.....	5 x 8	1	3½	14 x 4½	200 to 300	4 to 5½	12,000 to 18,000	300.00	875	30 x 5
Host.....	6 x 9	1.5	5	18 x 5	200 to 250	5½ to 6½	18,000 to 22,500	500.00	1,500	30 x 5

Larger sizes on application.

Horse Power is based on 10 inches vacuum and 10 pounds discharge head. If the discharge is into an open tank without head, the power will be one half.

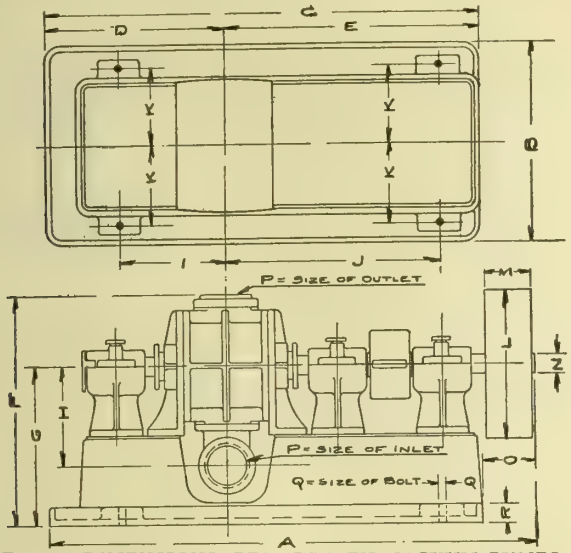


FIG. 5. DIMENSIONS, BELT-DRIVEN VACUUM PUMPS

Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
3x3½	33	15	29⅜	11⅓	17⅜	15	11	7½	7	13	5⅝	10	2½	1 5/16	3½	2	½	1½
4x4	38¾	16½	34¾	14¼	20½	19½	14¼	9½	9	16½	6½	12	3	1 5/16	4	2½	⅝	1⅝
4x6	40¾	16½	35¾	15¼	20½	19½	14¼	9¼	9	16½	6½	12	3	1 5/16	5	3	⅝	1⅝
5x8	46⅞	19	41¼	17	24¾	22	15¼	9¾	10	20½	7½	14	4½	1⅝	5⅝	3½	⅝	1¾
6x9	61⅝	23	53	21½	31½	26¾	19	12¼	13	26	9⅜	18	5	2¼	8⅝	5	⅝	1¾

Dimensions of larger pumps on application.

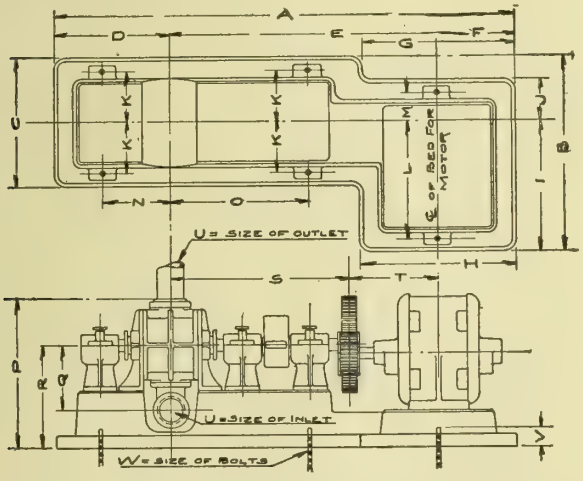


FIG. 6. DIMENSIONS, GEAR-DRIVEN VACUUM PUMPS

Size	A	B	C	D	E	F	G	H	I	J	K	N	O	P	Q	R	S	T	U	V	W
3x3½	51¼	25½	15	11½	28¼	12	..	23	18	7½	5⅝	7	13	15	7½	11	19½	9	2	2½	⅝
4x4	60½	27½	16½	14¼	34¼	11½	..	23	19½	6	6½	9	16½	19¾	9½	14¼	23	7½	2½	2½	⅝
4x6	58½	28¼	16½	14¼	32¼	11½	21	23	20	5½	6½	9	16½	19¾	9½	14¼	21⅝	9½	3	2½	⅝
5x8	65	28¾	19	17	36½	11½	..	23	19¼	6¼	7½	10	20½	22	9½	15¼	26⅜	13⅜	3½	2¼	⅝
6x9	80	31¼	23	21½	47⅞	10⅝	24	21½	20¼	6¾	9⅜	13	26	26¾	12¼	19	33⅜	14½	5	2¾	⅝

For reference only.

Specification Form.

Make specifications read as follows:

"Furnish and install at point shown on plan 1.....x..... Connersville Valveless Vacuum Pump, having a displacement of ..... to ..... gallons per hour, as made by THE CONNERSVILLE BLOWER COMPANY, Connersville, Ind."

NOTE—For equal displacements our pump is more effective than a piston pump.

SEVENTY REPRESENTATIVE INSTALLATIONS

Montgomery Court House, Montgomery, Ala.
State Capitol Building, Little Rock, Ark.
Title Guarantee Building, Los Angeles, Cal.
Standard Oil Building, San Francisco, Cal.
Bureau of Standards, Washington, D. C.
Perskey & Starin Building, New Haven, Conn.
Shubert Theater, Denver, Col.
Sunny Brook Gardens Co., Jacksonville, Fla.
Rhodes Building, Atlanta, Ga.
Springer Hotel, Columbus, Ga.
Gaynor Theater, Chicago, Ill.
Hamilton Club Building, Chicago, Ill.
Kesner Building, Chicago, Ill.
Medinah Temple, Chicago, Ill.
Washington School Building, Peoria, Ill.
L. S. & M. S. Passenger Station, Gary, Ind.
Washington Hotel, Indianapolis, Ind.
Severin Hotel, Indianapolis, Ind.
St. Mary's-of-the-woods, Terre Haute, Ind.
St. John's Church, Des Moines, Iowa
Iowa City Bank, Iowa City, Iowa
State Soldiers' Home, Leavenworth, Kan.
Bell Telephone Building, Topeka, Kan.
F. Walker Co., Florist, Louisville, Ky.
New Orleans Court House, New Orleans, La.
Hauselman Building, Kalamazoo, Mich.
Hermitage Hotel, Grand Rapids, Mich.
Soo High School, Sault Sainte Marie, Mich.
Blake School, Minneapolis, Minn.
Commerce Building, St. Paul, Minn.
Jefferson Monument Building, St. Louis, Mo.
Municipal Court Building, St. Louis, Mo.
Rieger Building, Kansas City, Mo.
Commerce Building, Kansas City, Mo.
Waldheim Building, Kansas City, Mo.
Custer County Hospital, Miles City, Mont.
Court House, Lincoln, Neb.
First Trust Co., Lincoln, Neb.
Flatiron Building, Omaha, Neb.
Eastwood Apartments, Paterson, N. J.
Buffalo Natural Gas Fuel Co. Building, Buffalo, N. Y.
Hess Building, New York, N. Y.
New York Edison Co., New York, N. Y.
Y. W. C. A. Building, Rochester, N. Y.
Kings Park State Hospital, Kings Park, N. Y.
National Cash Register, Dayton, Ohio
New Standard Theater, Cincinnati, Ohio
Ohio National Bank Building, Columbus, Ohio
Michigan Apartments, Toledo, Ohio
Iowa Building, Tulsa, Okla.
Robinson Hotel, Tulsa, Okla.
C. R. I. & P. Office Building, El Reno, Okla.
Evans Building, Klammath Falls, Ore.
Dwight Hamlin Building, Pittsburgh, Pa.
Kirkwood Building, Pittsburgh, Pa.
Jefferson Hotel, Columbia, S. C.
Vanderbilt University, Nashville, Tenn.
University of Texas, Austin, Tex.
Lamb Apartments, Houston, Tex.
State House, Waco, Tex.
Altadena Apartments, Spokane, Wash.
New Boston Store, Milwaukee, Wis.
Wisconsin Consistory, Milwaukee, Wis.
Orville Beach School, Oshkosh, Wis.
Continental Life Building, Toronto, Ont.
Arena Rink, Vancouver, B. C.
Dominion Trust, Vancouver, B. C.
Alcazar Hotel, Vancouver, B. C.
Northern Crown Bank, Winnipeg, Man.
Winnipeg Elec. Ry. Building, Winnipeg, Man.

THE DEMING COMPANY

Manufacturers of Hand and Power Pumps for all Uses, Pumping Systems for Public and Private Water Supply

SALEM, OHIO

GENERAL AGENCIES FOR DEMING POWER PUMPS

CHICAGO, Henion & Hubbell, 223-231 North Jefferson Street
PITTSBURGH, Harris Pump & Supply Co.
BUFFALO, Root, Neal & Co., 178-180 Main Street
NEW YORK, Ralph B. Carter Co., 152 Chambers Street
BOSTON, C. J. Jager Co., 13-15 Customs House Street
DENVER, Hendrie & Bolthoff Mfg. & Supply Co.
RICHMOND, Sydnor Pump & Well Co., 1310 East Main Street
KANSAS CITY, English Tool & Supply Co.
DETROIT, David M. Kerr Machinery Co., Kerr Building
CANADA: MONTREAL, TORONTO, WINNIPEG, Darling Bros., Ltd.

Products.

Pumping Machinery, for operation by any power, including Single- and Double-Acting Triplex Pumps for various services, Deep-Well Power Working Heads, Artesian Well Cylinders, Rotary and Centrifugal Pumps.

Deming Hydro-Pneumatic Systems, operated by Hand, or Windmill; Gas, Gasoline, or Steam Engine; Hydraulic Ram, or Electric Motor.

Agencies for Deming Pumps.

Many agencies, not mentioned above, carry in stock our Hand and Windmill Pumps and Cylinders, Spray Pumps, Hydraulic Rams, etc. The above agencies, however, specialize on Deming Power Pumps.

Co-operative Engineering Service.

Architects and engineers are invited to refer their pumping and water system problems to our engineering department. On receipt of layout of conditions and statement of requirements, an estimate for the pumping equipment will be submitted. Blue-prints and photographs showing typical installations on request.

Information Required for Estimate Basis.

To determine size and capacity of pump or water system required, the following information should be furnished:

(1) The source of water supply. If a deep drilled well, give diameter and depth; also distance from surface of ground to water level maintained under continuous pumping.

(2) The approximate number of people using the water, or the amount in gallons used per day.

(3) The vertical distance from the pump (or pressure if hydro-pneumatic system) to the highest point of plumbing fixtures.

(4) The number and kind of water fixtures in the house, and the number of garden and barn fixtures, such as hydrants; and if there is live stock to water, state number of head.

(5) Method of pumping; whether by electric motor, gasoline engine, or hydraulic ram. If electricity is used, give voltage and state if alternating or direct current. If alternating, give phase and cycles.

Triplex and Other Power Pumps.

Deming Power Pumps are made in such a variety of styles and sizes that their range of application is practically unlimited where belts, water wheels, electric motors, or steam, gas or gasoline engines are available sources of power. Their efficiency is much higher than direct-acting steam pumps.

Belt Driven—For water-works, boiler feeding, paper and pulp mills, and for all kinds of factory pumping.

Electric Driven—For water-works, compression and open tank pumping, for private water supply, fire service, boiler feeding, brine circulating, hydraulic elevators, hydraulic pressure accumulators, mine pumping, irrigating, etc.

Gas or Gasoline Driven—For water-works, railway tank service, private water supply, mine pumping, irrigating, etc.

Water-Wheel Driven—For irrigating and other purposes.

Deep-Well Pumps—Made in both the Triplex Type for open wells and Single Cylinder Type for drilled wells. For these pumps all the sources of power are applicable. Where a pure water supply, otherwise unobtainable, is essential, the Deming Deep-Well Pumps are recommended.

Deming Hydro-Pneumatic Water Supply Systems.

Source of Supply—The water is pumped from deep wells, springs, cisterns, or other sources, direct into the pressure tank, which may be located in the basement or buried underground. The pumping creates an air pressure sufficient to force the water out of the tank and into the distribution pipes of the house; to outside hydrants, lawn sprinklers, etc., insuring a constant supply.

Operation—The systems may be operated by hand, windmill, hydraulic ram, or electric motor. Each has its advantages, according to conditions and requirements. It is necessary to re-charge the tank with air to replenish that lost through absorption by the water. This is done by a special air pumping attachment furnished with the pump.

Capacities—We can furnish these water systems to pump from 100 to 60,000 gallons per hour, and all sizes of tanks from 60 to 20,000 gallons capacity.

Advantages—(1) No elevated tanks to freeze or topple over; no upstairs tanks to leak; no frozen pipes in winter. Ample water supply under pressure and of even temperature.

(2) Less plumbing than with other systems.

(3) System need not be visible from outside.

(4) Sufficient pressure assures positive fire-protection, and materially decreases insurance rates.

Write for complete 36-page catalogue, "Deming Water Supply Systems."

Smith's Cyclopedia

Continued on next page

Deming Triplex Plunger Pump, Fig. 50.

Standard Design, Single-Acting—Fig. 50 is designed for water-works, hydraulic elevator service, boiler feeding, mine pumping and for general water supply where the suction lift is twenty-five feet or less.

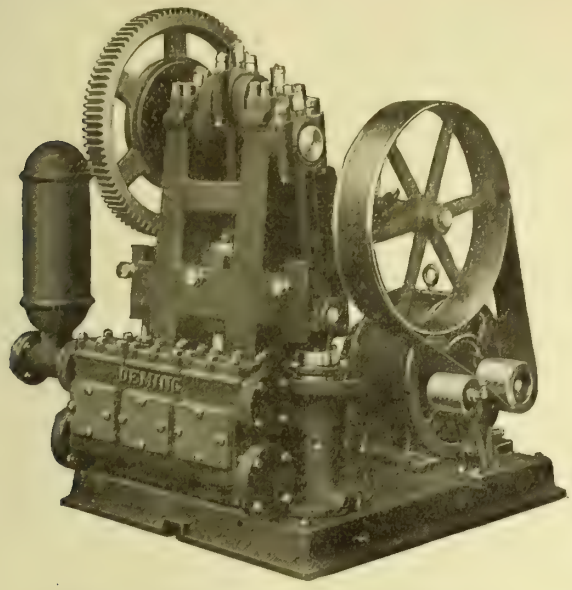


FIG. 50. DEMING TRIPLEX PLUNGER PUMP
Size 5½ x 8 with Type "C" Drive

Specifications—Frame of large sizes made in one casting with guides and crank-shaft bearings lined with anti-friction metal. In sizes 4 x 4 and smaller, frame and cylinder cast in one piece. Gearing is machine cut, and is double in sizes 9 x 10 and larger. Pinion shaft of steel, running in anti-friction metal, and bolted to main housings. Connecting rods, in sizes 4 x 6 and larger, have bronze boxes with wedge and screw adjustment at cross-head end, and marine type babbitted boxes at crank end. Smaller sizes have bronze bushings at cross-head ends. Crossheads run in bored guides. Sizes 4 x 6 and larger have bronze adjustable shoes. Plungers of best cast iron, finished true and smooth; packing of ample depth. Cylinders and base in one casting in sizes 10 x 10 and smaller, in larger sizes the cylinders are in separate castings. Valve chambers, in sizes 3½ x 4 and larger, separate castings bolted to cylinders. Valves of large area and readily accessible—for cold water are rubber discs, protected on top from cylindrically wound springs by brass plates; for hot water either special hard composition or bronze valves. Valve seats, bronze, of grid type, screwed into decks. Iron seats and valves furnished if required. Grease cups with all pumps. Gear Ratios 5 to 1.

Pumps furnished with bronze plungers, and varying otherwise from standard construction, at extra price.

Types of drive are shown in Deming Power Pump Catalogue.

SIZES, CAPACITIES, PRICES, ETC., FIG. 50

Plungers		Capacity		Maximum Working Pressure, Lbs.	Diam. of Pipes		*Tight and Loose Pulleys	List Price, with Pulleys
Diam., Ins.	Stroke, Ins.	Usual Revs. per Min.	Gals. per Min.		Suction, Ins.	Dischg., Ins.		
2	2	70	5.67	150	1½	1	8 x 2	$75.00
2½	2	70	8.89	150	1½	1	10 x 2	85.00
2½	3	60	11.4	150	2	1½	12 x 3	110.00
3	3	60	16.2	150	2	1½	14 x 3	125.00
3½	3	60	22.	150	2	1½	16 x 3	140.00
3½	4	60	30.	150	2½	2	16 x 4	175.00
4	4	60	39.	150	2½	2	18 x 4	200.00
4	6	60	59.	160	2½	2	20 x 5	275.00
4½	6	60	74.	150	3	2½	20 x 5	300.00
5	6	60	91.	150	3	2½	24 x 5	325.00
5½	8	60	147.	150	4	3	28 x 6	425.00
6	8	55	161.	140	4	3	30 x 6	475.00
7	8	55	220.	150	5	4	30 x 8	650.00
8	8	55	287.	150	5	4	36 x 8	700.00
8½	8	55	324.	140	6	5	36 x 8	750.00
9	10	50	413.	160	8	6	42 x 10	1600.00
10	10	45	459.	150	8	6	42 x 12	1800.00
11	12	42	622.	160	10	8	48 x 14	2500.00
12	12	42	740.	150	10	8	48 x 16	2700.00
12	14	40	820.	150	12	10	48 x 18	2900.00
13	14	40	964.	140	12	10	48 x 20	3100.00

*NOTE—Sizes 9 x 10 and larger regularly furnished with tight pulley only.

Deming Deep-Well Working Head.

Fig. 62 is adapted especially for supplying water from deep wells for private estates, manufacturing plants, farms, etc. It is very substantially built, and the "low-down" design, as well as other features, make it the most accessible deep-well pump on the market. By disconnecting the differential plunger from the crosshead and the walking beam from the connecting rod, and removing the stuffing-box cap, the plunger can be readily withdrawn without disturbing the pipe connections. The stroke is adjustable, thereby permitting the easy regulation of the pump capacity to the flow of the water in the well.

Specifications—Main base of cast iron, and carries crank and pinion shaft bearings, which are lined with best babbitt metal. Gearing is machine cut, the main gear being bolted to a flange integral with crank shaft. Crosshead is babbitt lined, and guide rods are of polished steel.

Each pump has a differential plunger which discharges part of the water on the down stroke, equalizing load and giving a more uniform flow of water. Stuffing-box is easy of access for repacking, gland being of the bolted type. Air chamber furnished at extra price.

Types of drive showing Fig. 62, direct-connected to electric motor, gas engine, etc., shown in complete Power Pump Catalogue.

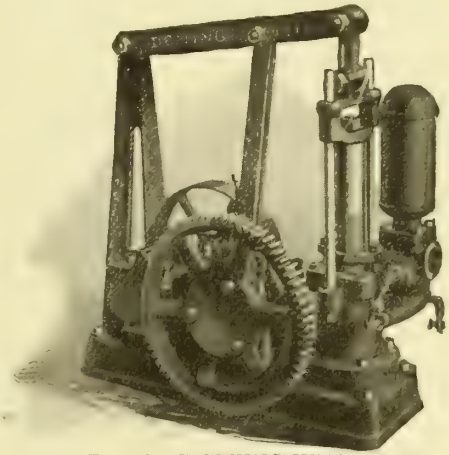


FIG. 62. WORKING HEAD
With Fig. 63 Air Pumping Attachment and Tight and Loose Pulleys for Belt Drive

FIG. 324
BRASS ARTESIAN WELL CYLINDER

FIG. 62, CAPACITIES OPERATING CYL., FIG. 324

Sizes, Prices, Etc.						
Stroke, Ins.	Maximum Diameter of Pipes		Gear Ratio	Tight and Loose Pulleys	Maximum Height, Ins.	Price, with Pulleys
	Suction, Ins.	Discharge, Ins.				
8, 9 and 10	4½	2½	6 to 1	16 x 3	40½	$80.00
12, 14 and 16	6	3	7 to 1	20 x 5	51	150.00
20, 22 and 24	8	4	6⅔ to 1	28 x 6	73	250.00

Diam. and Stroke of Cylinder, Ins.	Capacity			†Maximum Depth of Well, Ft.
	Gals. per Rev. of Crank Shaft	Maximum Revs. per Min.	Gals. per Min.	
2¾ x 10	.257	40	10.2	300
2¾ x 16	.411	35	14.3	300
2¾ x 24	.617	28	17.2	350
3¾ x 10	.478	40	19.1	175
3¾ x 16	.765	35	26.7	175
3¾ x 24	1.147	28	32.1	190
4¼ x 10	.614	40	24.5	130
4¾ x 16	1.227	35	42.9	100
4¾ x 24	1.841	28	51.5	120
5¾ x 16	1.798	35	62.9	70
5¾ x 24	2.696	28	75.4	80
6¾ x 24	3.716	28	104.0	60
7¾ x 24	4.900	28	137.2	45

† Refers to vertical distance from lowest surface of water in well to highest point of delivery.

Continued on next page

Deming "Atlas" Double-Acting Pump.

The "Atlas" Pump, Fig. 691, is especially designed for use with hydro-pneumatic water systems. On this and the following page are water systems representing the "Atlas" pump in conjunction with gasoline engine and electric motor. Fig. 691 is also adapted for open tank supply and for any service of 75 pounds pressure or less. The "Atlas" pump is thoroughly reliable.

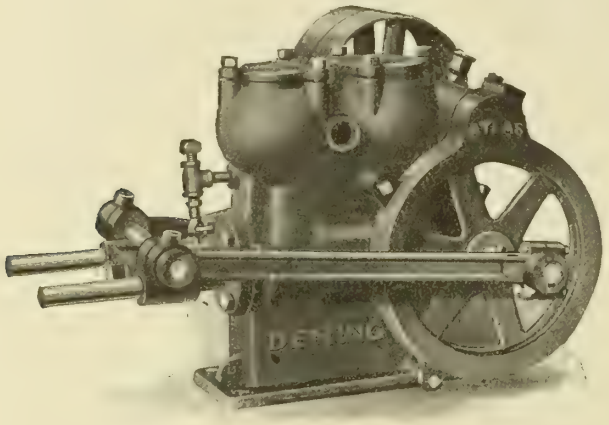


FIG. 691. DEMING "ATLAS" DOUBLE-ACTING PUMP
With Tight and Loose Pulleys and Air Charging Device. For wells and cisterns 25 feet deep or less

PUMP ONLY

Cylinder—Brass lined. Cast in one piece with base.
Gearing—Machine cut and fully guarded. Ratio 5 to 1.
Bearings—Babbitt lined and provided with large oil pockets.
Piston—Furnished with cup packing.
Piston Rod—Drawn brass.
Crosshead—Guided by two rigid steel guide rods.
Valves—Easily accessible without disturbing pipe connections.
Air Charging—Size 2¼ in. x 5 in. is furnished regularly with air snifter. See illustration above.
Special Air Compressor—Supplied (see illustration System No. 2014) when desired, at extra price, as listed below.

TYPES OF DRIVE

Type "B" Drive—Includes cast-iron sub-base, intermediate gear and rawhide pinion for connecting electric motor.
Type "C" Drive—Same as Type "CI" Drive with addition of cast-iron sub-base under pump and motor. Belt is included. Motor furnished at extra price.
Type "CI" Drive—Includes tight pulley, 20 inches diameter or smaller, with belt tightener of gravity type for driving by electric motor or gas engine with short belt pulley centers. Larger diameter pulley supplied at extra price. Belt is not included.
Type "G" Drive—Includes a horizontal or vertical water-cooled, or a vertical air-cooled, gasoline engine mounted on a cast-iron sub-base with pump, and connected by gearing. See below for prices of outfits with different styles of engines.
Hand Operation—Size 2¼ x 5 is furnished with lever, link and attachments as illustrated, for operating by hand in emergency. Price, $4.00 extra.

SIZES, CAPACITIES, PRICES, ETC., FIG. 691

Pistons Diam.	Pistons Stroke	Capacity Revs. per Minute	Capacity Gals. per Min. at Maximum Speed	Maximum Working Pressure, Lbs.	Diameter of Pipes Suction, Ins.	Diameter of Pipes Discharge, Ins.	Tight and Loose Pulleys	Price With Standard Pulleys	Price Extra for Air Compressor
2¼	5	60	9 6	75	1¼	1	8 x 2½	$40 00	$10 00
3	6	55	19 2	75	1½	1¼	14 x 3	70 00	12 00
4	8	60	40 8	75	2	1½	16 x 4	95 00	15 00

Pistons Diam.	Pistons Stroke	Motor or Engine Not Included With "B" Drive	Motor or Engine Not Included With "C" Drive	Motor or Engine Not Included With "CI" Drive	With "G" Drive—Engine Included Horizontal Engine Water-cooled H P	Horizontal Engine Water-cooled Price	Vertical Engine Water-cooled H P	Vertical Engine Water-cooled Price	Vertical Engine Air-cooled H P	Vertical Engine Air-cooled Price
2¼	5	$	$	$	1½	$	1½	$	1½	$
3	6				2½	260 00	3		2½	280 00
4	8				4	375 00	4		3½	360 00

Deming "Atlas" Water System No. 2014.

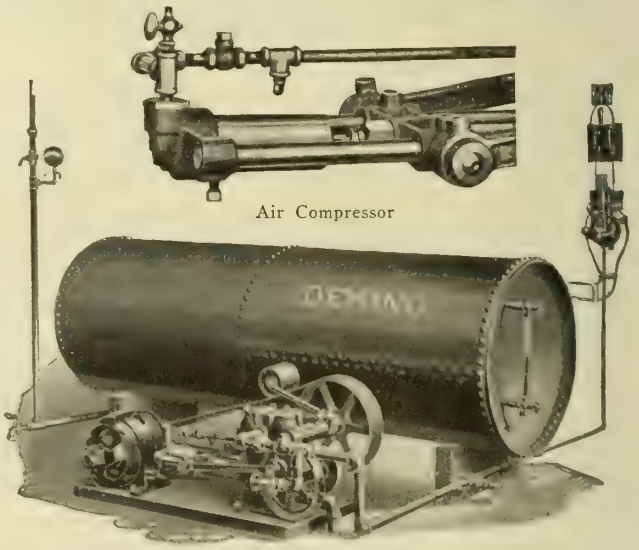
In System No. 2014, the air supply is provided by a special air compressor, instead of the air charging device. In many cases the air compressor is preferable; especially when the pump is to be placed below the water level such as pumping from a cistern with the pump located in the cellar. With the independent compressor, the air is pumped into the air chamber and is not taken through the valves of the pump.

The pump and motor are mounted on a cast-iron sub-base, 3 feet 3 inches by 18 inches, with pump belted to motor. This insures permanent alignment of the pump and motor. The pump is automatically controlled. Capacity of pump, 575 gallons per hour at 60 revolutions per minute. We should be informed regarding the kind of current available and also the voltage. This outfit is practically noiseless in operation.

Equipment Specifications of System No. 2014—One 30-in. x 8-ft. horizontal tank.

One Fig. 691, 2¼-in. x 5-in. "Atlas" double-acting power pump with brass-lined cylinder and special independent air compressor; with Type "C" drive (including cast-iron sub-base and 20-in. x 3-in. pulley).

One ¾ horse-power, A. C., single-phase, 60-cycle, 110-220-volt motor. Price varies slightly with motor required. See list below. Motor includes canvas belt for connecting to pump.



WATER SYSTEM NO. 2014
With Electric Motor and Air Compressor. For wells or cisterns 25 feet deep or less

One Fig. 1508 automatic pressure regulator for starting and stopping motor. One Fig. 1526 ¾-in. relief valve. One Fig. 688 pressure gauge. One Fig. 904 1-in. check valve. One Fig. 900 1-in. globe valve. One Fig. 913 1-in. stop and waste cock. One Fig. 917 ½-in. hose bibb. One glass water-gauge. One 2-pole switch.

The above system shows the usual arrangement of the various units which enter into the construction of the many Deming Water Supply Systems.

In several other Deming systems the "Atlas" power pump operated by electric motor or gasoline engine is used, the pump being in some cases direct-connected to the drive and sometimes belt-connected.

Deming Hydro-Pneumatic Water Systems are fully described in our 36-page Catalogue "Deming Water Supply Systems," which illustrates and describes Deming hand- and power-operated systems for shallow and deep wells. A copy of this book will be sent upon request.

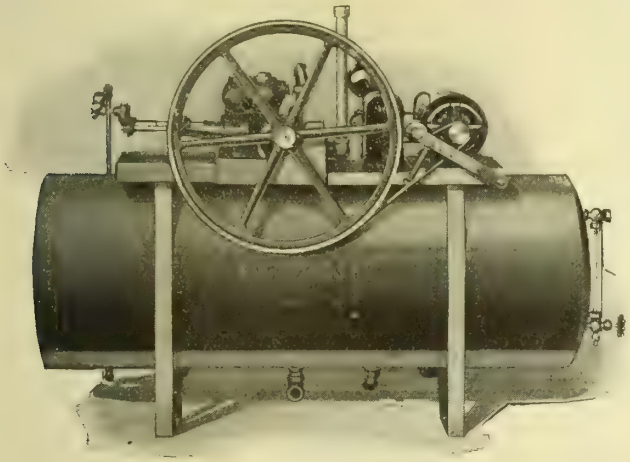
SIZES, CAPACITIES, PRICES, ETC., No. 2014

Pump Diam. Cyl., Ins.	Pump Stroke, Ins.	Pump Capacity per Min. at 60 Strokes, Gals.	Pump Weight, Lbs.	Pump Good for Maximum Pressure, Lbs.	Capacity of 30"x8' Tank, Gals.	Weight of Complete Outfit, Lbs.	Price With ¾ H P. A. C. Motor	Price For D. C. Motor Deduct from List	Price For A. C. Two- or Three-Phase Motor Deduct from List
2¼	5	9 6	140	75	275	1100	$335 00	$25 00	$30 00

Continued on next page

Deming "Atlas Junior" System No. 2007.

The "Atlas Junior" pump is in general modeled after the "Atlas" described on the preceding page, except that it is much smaller and is equipped with brass valve chamber caps which are screwed in. It also has a special independent air cylinder which insures a positive supply of air, since the air is pumped directly into the tank and is not taken through the valves of the pump. It is regularly fitted with a reliable automatic electric switch which starts or stops the pump when the pressure in the tank lowers or rises to a predetermined point.



DEMING "ATLAS JUNIOR" SYSTEM NO. 2007
With 180 gallon Pump, 53 gallon Tank and one-sixth horse-power Motor

For pumping soft water to supply the requirements of bathroom, laundry and kitchen, this is an especially good pumping unit. In many cases the city water pressure is insufficient to operate a water motor, and a pump of this type is much to be preferred. The "Atlas Junior" pump is less expensive to operate than the water motor, and will provide a better and more reliable pressure.

Based on an electric light rate of ten cents per kilowatt hour, the average cost of pumping water will be about eight to ten cents per one thousand gallons.

An adjustable spring belt tightener takes up the slack in the belt and prevents slippage. The usual maximum and minimum pressures maintained are forty and twenty pounds respectively.

The pump, tank, motor and automatic controller are shipped completely assembled, making it necessary only to connect the wires and pipes. The complete outfit is 54 inches long, 18 inches wide and 38 inches high.

Equipment Specifications of System No. 2007—One 18-in. x 48-in. horizontal tank.

One Fig. 1691 "Atlas Junior" pump.

One 1/6 horse-power, A. C., single-phase motor. One pump stand. One automatic controller. One pulley, 20-in. x 1¼-in. One spring tightener with 6 feet of belting.

One Fig. 1526 ½-in. relief valve.
One Fig. 688 pressure gauge.
One Fig. 900 ¾-in. globe valve.
One Fig. 917 ½-in. rough hose bibb.
One Fig. 913 ¾-in. stop cock.
One Fig. 904 ¾-in. check valve.
One water gauge.

SIZES, CAPACITIES, PRICES, ETC., NO. 2007

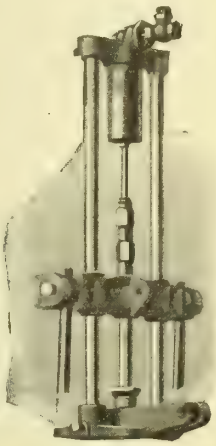
Pump			Total Capacity of Tank, Gallons	Complete Weight of Outfit, Lbs.	Price	
Diam. of Cylinder, Inches	Stroke, Inches	Capacity per Hour, Gallons			With ½ H. P. A.C. Motor	Furnished with A.C. Two- or Three-Phase Motor or D.C. Motor at Same Price
1¼	2	180	53	425	$210.00	

Straight-Line Working Head, Fig. 1717.

Specifications—A substantial base in which is cast the shaft bearings insuring accurate and permanent alignment; a separate flange supported by the base is provided for attaching to the drop pipe for the cylinder. Air-chamber is fastened to base with bolts through drop pipe flange. Air-chamber supports stuffing-box and guide rods.

Compression cock allows water to be discharged at the spout. When closed it may be forced to an elevated tank through pipe attached to the back outlet which is tapped for pipe.

Hand lever is provided for use when power fails. We can also provide an attachment which enables pump to be operated by windmill. Gears are cut from solid and are well guarded. To operate by hand or windmill remove the cross-head pins and drop the connecting rods out of the way.



AIR COMPRESSOR
See description below

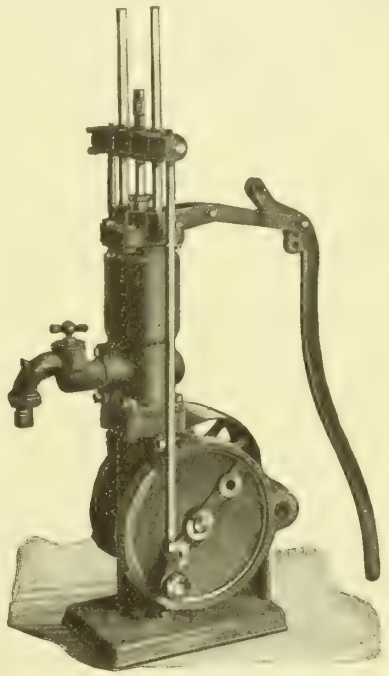


FIG. 1717. WORKING HEAD
For operating shallow and deep well cylinder. For wells 300 feet deep or less

How to Install—To install in well put a length of pipe and rod on cylinder, remove air-chamber from base, then place base over well and draw cylinder pipe and rod up through base. Put desired lengths of pipe on cylinder, dropping them down through base and screw pipe flange to last thread of pipe. Pump base will then support entire weight of cylinder and pipe. Remove plunger rod from cross-head; connect it to cylinder rod, then place air-chamber in position and bolt fast.

Adaptability—Fig. 1717 may be arranged to discharge into underground pipe by using a tee in the drop pipe the required distance below the ground. A shut-off should be placed in the underground pipe to check the flow when desired. Fig. 1717 may also be equipped with air compressor at $15.00 extra list, as shown, thus adapting it for use with pneumatic water supply systems. The discharge from compressor is preferably piped direct into the pneumatic tank. It may, however, be connected to the discharge pipe from pump where the tank is a distance away.

SIZES AND PRICES, FIG. 1717

Largest Drop Pipe, Ins.	Back Outlet, Ins.	Stroke, Ins.	Gear Ratio	Tight and Loose Pulleys	Dimens. of Base, Ins.	Approx. Weight, Lbs.	Price
3	2	6–8–10	6-1	14x3	10x16	235	$45.00

CAPACITIES

Diameter and Stroke of Cylinder, Inches	Gals. per Revolution Of Crank Shaft	Maximum Revolutions per Minute	Gallons per Minute	Maximum Lift in Ft., Surface of Water to Point of Discharge
2¼x10	.172	40	7	300
2¾x10	.257	40	10	190
3¼x10	.359	40	14	140
4 x10	.544	40	21.7	90

THE GOULDS MANUFACTURING CO.

Pumps and Hydraulic Machinery

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HAND and POWER PUMPS for every service; CISTERN and WELL, LIFT and FORCE PUMPS; HOUSE FORCE PUMPS; WATER LIFTERS; HYDRAULIC RAMS; PUMP JACKS; DOUBLE-ACTING PISTON PUMPS, Hand and Power; SINGLE- and DOUBLE-ACTING TRIPLEX POWER PUMPS; ROTARY PUMPS; SINGLE- and MULTI-STAGE CENTRIFUGAL PUMPS; DEEP-WELL TRIPLEX PUMPS; DEEP-WELL POWER WORKING HEADS and CYLINDERS; VACUUM PUMPS; AIR COMPRESSORS; SUMP PUMPS; DIAPHRAGM PUMPS; HYDRAULIC PRESSURE PUMPS.

TRADE-MARK

Specification Goulds Standard Triplex Power Pump.

The following is specification for Goulds Standard Triplex Power Pump, small and moderate capacity type, Fig. 1009, 1¼ x 2 inch to 8 x 10 inch, capacity 2 to 350 gallons per minute:

Frame—Close-grained iron cast in one piece with crosshead guides and cylinders, forming exceptionally rigid construction and accurate alignment of all working parts.

Crank Shaft—High carbon open-hearth steel, accurately machined to gauge.

Bearings—Crank shaft and pinion shaft bearings are of babbitt metal.

Gearing—Gear and pinion charcoal iron, machine cut from the solid. A gear guard covers the pinion and adjacent teeth of the gear. Gear ratio 5 to 1.

Crossheads—Sizes 4 x 6 in. and larger, fitted with adjustable bronze shoes which run in bored guides. Sizes 3½ x 4 in. and smaller; the crossheads are cylindrical in form, made of bronze and run in bored guides.

Connecting Rods—Sizes 4 x 6 in. and larger, strap head and wedge adjustment with bronze boxes at crank end and adjustable bronze boxes, marine type, at crosshead end. Sizes 3½ x 4 in. and smaller have adjustable boxes babbitted at crank end and bronze bushings at crosshead end.

Cylinders—Close-grained iron cast in one piece with standards.

Plungers—Sizes 2½ x 4 in. and larger are fitted with hard cast-iron plungers. Sizes 2 x 3 in. and smaller have bronze plungers accurately machined and ground true and smooth.

Glands—Sizes 2½ x 4 in. and larger have iron glands. Sizes 2 x 3 in. and smaller have bronze glands.

Base and Valve Boxes—Charcoal iron in one casting, of liberal proportions, affording large valve area.

Valves—3 x 4 in. and smaller bronze valves. 3½ x 4 in. and larger—for cold water, rubber discs on bronze grid seats, cylindrically wound springs. For hot water we recommend the grid seat valve with special disc.

Air Chamber—Supplied with pump. Vacuum chamber to order.

Special Construction—Phosphor Bronze Plungers, Lined Cylinders and Glands, Rawhide Pinions, etc., to order.

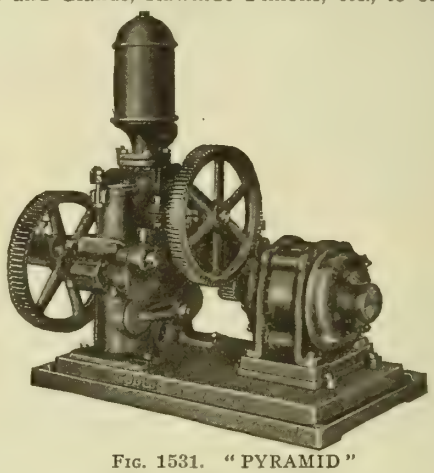


FIG. 1531. "PYRAMID"
With Gear-Connected Motor

Catalogues, Dimension Sheets and Prices.

Complete specifications on all types and capacities of Goulds Power Pumps are given in a set of bulletins. A bound set of these bulletins, including a special bulletin containing all the handy data and tables needed in making pump calculations, will be furnished to architects on request. A set of dimension sheets on all standard sizes will also be provided if desired. Blueprints and data on special types and sizes will be furnished by our engineering department on request.

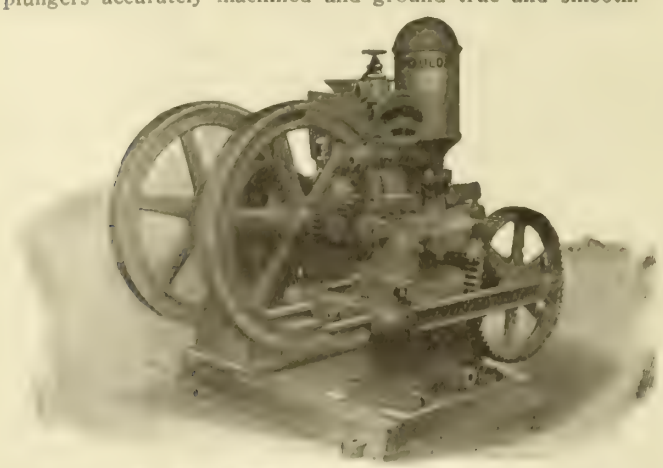


FIG. 1531. "PYRAMID" POWER PUMP
For Homes, Apartment Houses, Small Factories, etc. Furnished to pump both air and water when wanted for service on pneumatic systems.

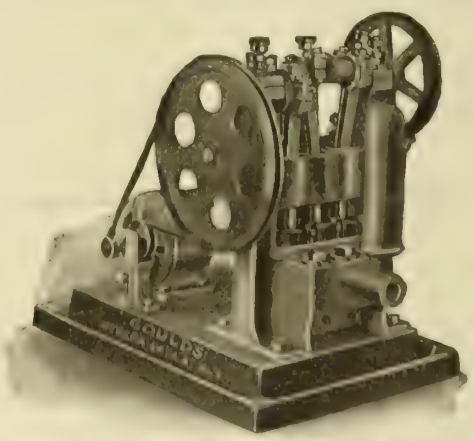


FIG. 1009. TRIPLEX PUMP
Belt connected to motor. For Houses, Small Factories, etc.

Continued on next page

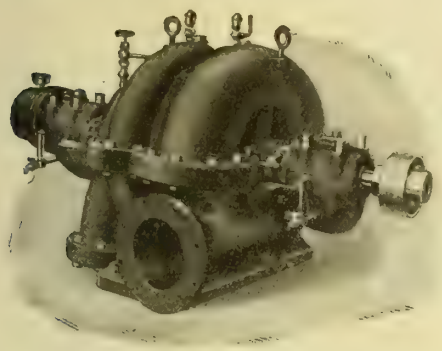


FIG. 3014. GOULDS TWO- AND THREE-STAGE CENTRIFUGAL FIRE PUMP

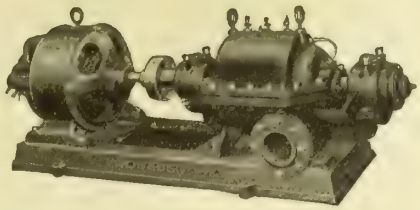


FIG. 3300. GOULDS MULTI-STAGE CENTRIFUGAL PUMP
For Heads up to 700 feet, and Capacities up to 1500 gallons per minute

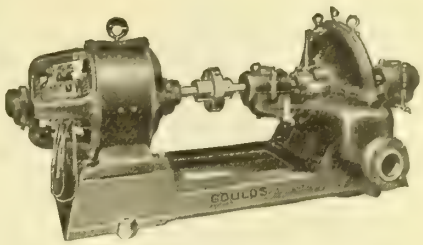


FIG. 3030. GOULDS SINGLE-STAGE DOUBLE-SUCTION CENTRIFUGAL PUMP
Direct-Connected to Electric Motor. For Heads up to 150 feet

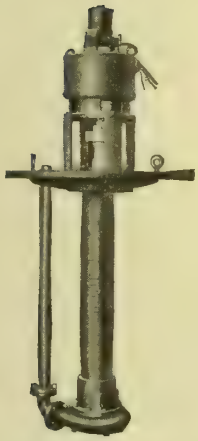


FIG. 3013. GOULDS DIRECT-CONNECTED CENTRIFUGAL SUMP PUMP

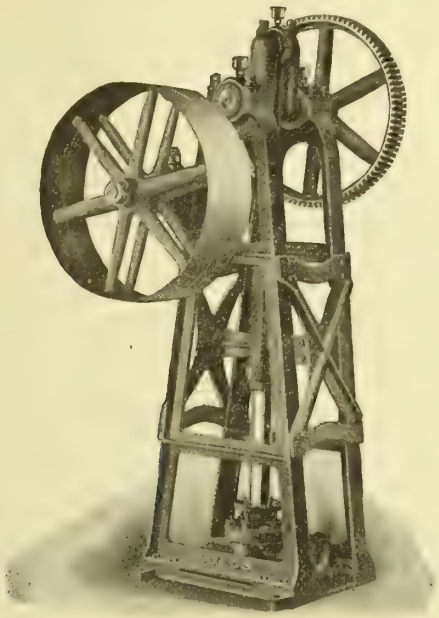


FIG. 1030. GOULDS POWER WORKING HEAD
For operating Cylinders in Deep Wells

FIG. 1604. GOULDS AIR AND WATER FORCE PUMP
For use with Pneumatic Pressure Water Supply Systems

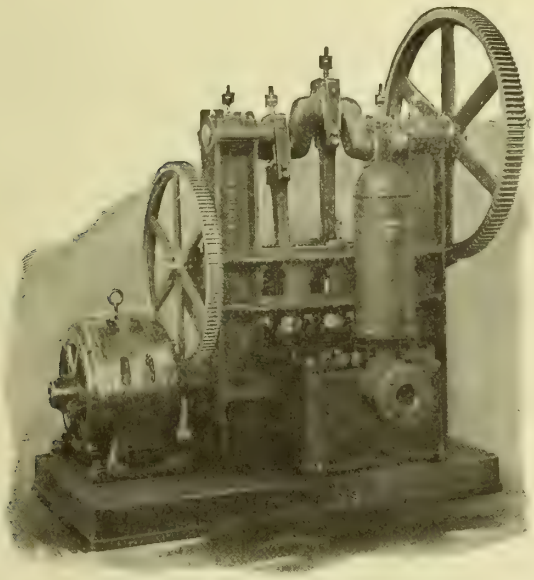


FIG. 1009. GOULDS TRIPLEX PUMP
With Gear-Connected Motor

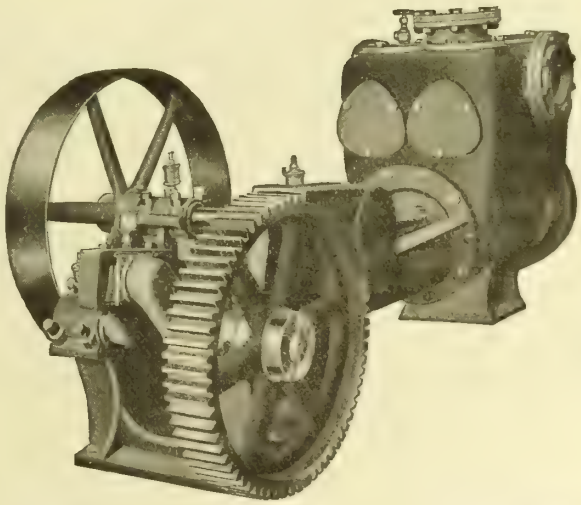


FIG. 1049. GOULDS DOUBLE-ACTING VACUUM PUMP
For Vacuum Heating Systems. Displacement 10,200 to 81,000 gallons per hour

HILL PUMP COMPANY

Manufacturers of Centrifugal and Reciprocating Pumping Machinery

ANDERSON, IND.

AGENCIES

NEW YORK, N. Y., Edward J. Smith, 30 Church Street
CHICAGO, ILL., Hodgart & Co., Peoples Gas Building
CINCINNATI, OHIO, Henry B. Thompson, Mercantile Library Building
MILWAUKEE, WIS., Fred. H. Dormer, 436 Wells Building
CLEVELAND, OHIO, G. S. Groves, Leader-News Building
INDIANAPOLIS, IND., J. E. Kamps, Telephone Building
GARDEN CITY, KANS., Well Works Mfg. Co.
DETROIT, MICH., William L. Ruttledge, 919 Dime Bank Building
BOSTON, MASS., Lunt, Moss & Co., 43 South Market Street
BALTIMORE, MD., Morton McI. Dukehart & Co., 100 West Fayette Street
SPRINGFIELD, MO., C. H. Guckel, 1046 Landers Building
SAN FRANCISCO, CAL., Simonds Machinery Co.

SAN FRANCISCO, SEATTLE, SPOKANE, LOS ANGELES, SALT LAKE CITY, TUCSON, ARIZ., Charles C. Moore & Co., Engineers

Products.

"Electri-Pression" Private Water Supply Systems, for operation with Electric, Gas, Gasoline or other Power; Centrifugal and Reciprocating Pumps for Water-Works, Industrial Plants, Hotels, Public Buildings, etc.

"Electri-Pression" TRADE-MARK

"Electri-Pression" Water Supply Systems.

Hill "Electri-Pression" Water Systems provide a simple, reliable, and permanent outfit for pumping water from any natural source to a compression tank, whither it is forced by the compressed air in the tank to all faucets in the system.

The air in the closed tank is pumped in simultaneously with the water, and since it rises to the top of the tank, is compressed by the incoming water which enters at the bottom. The supply of air is discontinued, on the first filling, after the proper quantity has been introduced, and the pumping of the water is permitted to continue until sufficient pressure (40 pounds) has been created, to force the water to the highest faucet. The degree of air pressure in the tank is shown on the gauge; and this pressure, in the electrical installations, automatically starts or stops the machine, the pump stopping as soon as forty pounds' pressure has been reached.

Aside from the replenishing, from time to time, of the air supply in the tank, some of which is absorbed by the water, and the occasional oiling of bearings, the *electric power* Hill "Electri-Pression" Water System requires scarcely any attention whatever. With the *gas* or *gasoline power* installations all that is necessary is the extra care demanded by the engine and the necessity of starting and stopping this by hand. But even the latter systems can be equipped for automatic stopping.

Hill "Electri-Pression" Systems will draw water any reasonable horizontal distance and from a maximum of twenty feet below the apparatus.

Advantages.

Elimination of worry and responsibility on the owner's part over the question of a reliable home water supply.

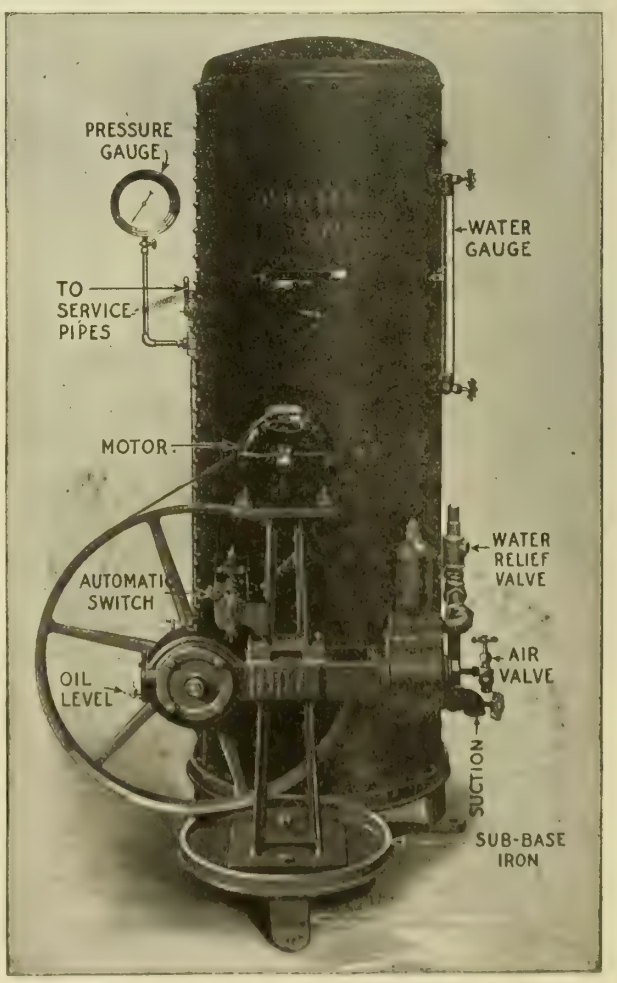
The furnishing of a supply for every home, wherever located, comparable in service and satisfaction to that secured from a well regulated city system.

Self lubricating working parts with automatic control; silent operation; outfits placed out of reach of freezing; less installation expense; little skill required; systems can be placed entirely within building (no unsightly apparatus visible), protected and accessible in all kinds of weather; "Fresh Water Attachment," consisting of special pipe connection leading from pump to faucet, permitting the drawing of fresh water directly from well at any time without first passing it through the storage tank.

Safety Features.

All Hill outfits are conservatively rated and tested.

The tanks furnished are made of heavy steel, $\frac{3}{16}$-inch thick shell and $\frac{5}{16}$-inch thick heads, with longi-



COMPLETE HILL PUMP OUTFIT

Fig. 53ET—Outfit with silent belt drive pump. Electric drive—150 to 180 gallons per hour capacity. For other and larger combinations to suit all conditions, see next page

Continued on next page

tudinal seams, double riveted. Each tank is carefully tested several times before shipment, to make sure that it is not only water-tight, but air-tight also.

If for any reason at all the equipment should run past the 40 or 50 pounds' pressure limit, there is provided a water safety valve which will open automatically, long before the capacity of either pump, motor, engine or tank has been passed, and allow the water to run harmlessly out until the pressure has again been reduced to a point of safety. This valve is to be connected with a pipe leading into the sewer or cellar drain.

Installation.

The Hill Figs. 45 ET and 53 ET (the latter shown on preceding page) outfits are built and shipped as complete units. Pump, motor and tank stand upon a single iron base. Getting our Electric Power "Electri-Pression" System ready for service is the work of only a few hours. Any good steamfitter can set the outfit in place, connecting two pipes—one leading to the source of supply and the other to the house service line. All the electrician has to do is to run two wires from the lighting circuit, pass them through a common snap switch, and attach them to the poles of the motor, or automatic switch. Usually installed in basement of house.

Prices.

The following are our "Consumer's Prices," at which the outfits may be purchased from dealer or jobber handling our goods, or we will furnish direct, at the same prices. In either event the rate is for delivery f. o. b. Anderson, Indiana.

Fig. 53 ET, as shown with electric motor and automatic starting and stopping device	$119.00
Fig. 53 GT, with one-horsepower Alamo Gasoline Engine, arranged for hand starting and stopping only	124.00
Automatic stopping device for use with gas or gasoline engine, additional	10.00
"Fresh Water Attachment," as explained under "Advantages," additional	5.00

Figs. 45 and 53 (the latter shown on preceding page) are for house service strictly, and as such will prove of ample capacity—sufficient for the needs of the occupants of a large house. Where water is wanted for sprinkling lawns, for fire protection, etc., however, a larger Hill Outfit should be specified. We show several types on this page, and will be glad to furnish full information concerning these and others, upon request.

To the Architect.

The outfit shown and described on the preceding page is for the moderate sized house and, of course, does not suit all conditions. It is not large enough in many cases and does not cover the many places requiring a deep-well type of pump.

We believe it is your desire in best serving your client to specify that which is best suited to conditions, such as pumping, power available, space, location, lay of land, etc. Therefore we think it best to let us know these conditions so we may recommend the proper thing for the place, acting on your suggestions as to automatic features, belt- or direct-gear drive, etc.

Deep-well pumps are our specialty, but such pumps must necessarily be placed immediately over and into the wells—which may require a pump house, if located away from building. The pneumatic tank can be placed in this same pump house, buried in the ground or located in the basement of house.

We display here some of the different types of pumps required, it being impossible to make one type of pump to suit all pumping and power conditions; nor is it practicable to tabulate intelligently a table or list of prices covering all these different combinations necessary.

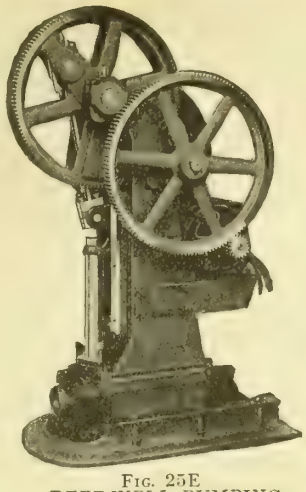


Fig. 25E
DEEP-WELL PUMPING HEAD

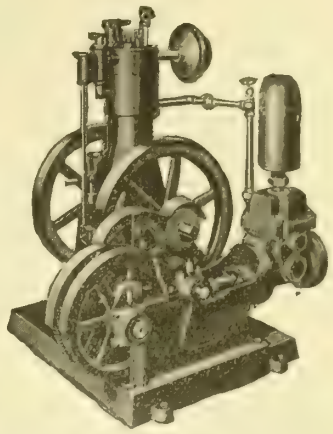


Fig. 33G
POWER PUMP AND GASOLINE ENGINE

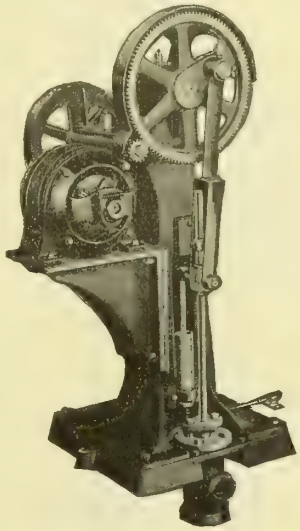


Fig. 47E
ELECTRIC DEEP-WELL PUMPING HEAD

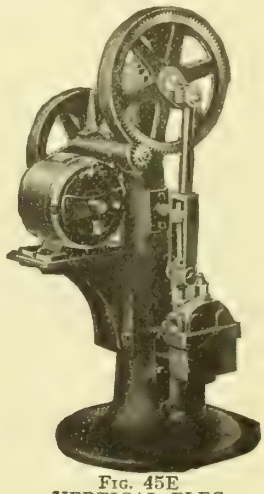


Fig. 45E
VERTICAL ELECTRIC HOUSE PUMP

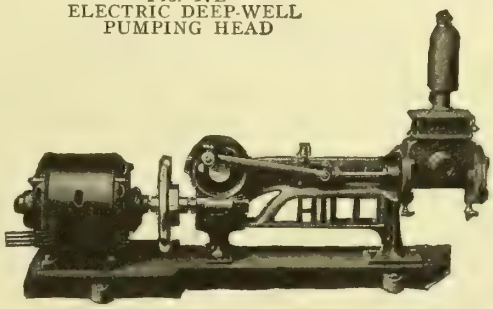


Fig. 42E. HILL SILENT ELECTRIC HOUSE PUMP

Showing a number of different types of Hill pumps which can be adapted for successful operation by electric motor or gasoline engine, with compression tank and automatic or semi-automatic control, as in Fig. 53ET on opposite page

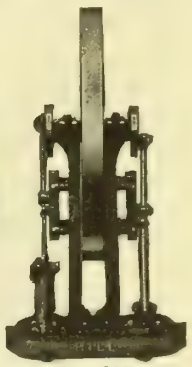


Fig. 39D
HILL DOUBLE CYLINDER NOISELESS HOUSE PUMP

Information Required.

To make the proper recommendations on a Hill Outfit best adapted to the service required, we should know:

Openings required for getting tanks into basements and space required for installation.

Kind of power available—Electric current, Gas or Gasoline Engine. .....

Water to be obtained from well, spring, stream, cistern? ..... How located relative to building? .....

If well, please state inside diameter ..... Total depth ..... Distance down to standing water .....

What is the greatest maximum height to which water will be forced above its original level? .....

Quantity of water required per hour? ..... Or, what buildings or rooms do you want to supply? .....

If to be electric pump, please state whether current is direct or alternating, and what voltage? ..... If alternating, please state.....and cycle also.....

(This data can be secured from company supplying current at point of installation.)

If to be operated by gas or gasoline engine, please state whether we are to furnish ..... If client already has engine, please advise horse-power, speed and diameter of pulley.....

CHICAGO PUMP COMPANY

Electric Pumping Machinery

918 West Lake Street
CHICAGO, ILL.

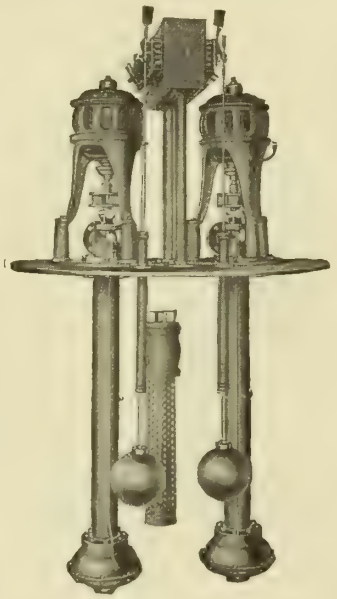
Products.

DUPLEX ELECTRIC SEWAGE EJECTORS.
AUTOMATIC ELECTRIC BILGE PUMPS.
LITTLE GIANT ELECTRIC CELLAR DRAINERS.
MULTI-STAGE TURBINE HOUSE PUMPS.
PNEUMATIC WATER SYSTEMS.
AUTOMATIC CONDENSATION PUMPS and RECEIVERS.

Duplex Electric Sewage Ejector.

This is expressly designed to raise large quantities of sewage into the sewer, from basements that are located below sewer level.

All working parts are visible and of easy access. No climbing down into the pit is necessary to open or close valves or to do any adjusting, oiling or repairing. Should one of the ejectors require removal for any reason it can be disconnected and moved from the pit without interrupting the service of the second ejector.



TYPE "S.E." DUPLEX ELECTRIC SEWAGE EJECTOR

Automatic Electric Bilge Pumps.

For pumping water out of basements that are below the sewer level, this pump represents the acme of perfection and contains everything that a high-class Automatic Bilge Pump can possibly be equipped with.

Bulletin S22 fully illustrates and describes our complete line of Bilge Pumps and Sewage Ejectors.

CAPACITIES, SIZES AND HORSE-POWER OF TYPE "S.E." DUPLEX SEWAGE EJECTORS

Type	Size of Discharge	Capacity in G. P. M. per Pump	Horse-power per Foot Head
SE 3	3 inch	150	.12
SE 3½	3½ inch	250	.21
SE 4	4 inch	350	.31

The diameter of basin accommodating our Type E Duplex Sewage Ejector is five feet.
The depth of basin should be four feet deeper than lowest inlet entering it.

CAPACITIES, SIZES AND HORSE-POWER OF TYPE "S.A.E." 52 BILGE PUMPS

Type and No. of Pump	Size of Discharge, Ins.	Capacity in Gallons per Minute	Horse-power per Foot Head
SLG 1	1	10– 15	.02
SLG 2	1¼	25– 30	.041
SLG 3	1½	50– 55	.0415
SAE 52 1¼	1¼	50– 70	.0415–.06
SAE 52 2	2	100–125	.083 –.104
SAE 52 2½	2½	125–150	.104– .12
SE 3	3	200	.154
SE 3½	3½	300	.2

The diameter of basin accommodating Type SAE 52 Duplex Bilge Pumps is four feet. Simple Bilge Pump is three feet. The depth of basin should be three feet deeper than lowest inlet entering it.

TYPE "S.A.E." 52 AUTOMATIC ELECTRIC BILGE PUMP

Multi-Stage Turbine House Pump.

Enclosed type balanced impellers, outer board ring oiled bearings and careful workmanship make these very efficient and quiet running pumps, and are therefore best adapted for hotels, office buildings, schools, hospitals and such other buildings where quiet-running pumps are essential. Write for Turbine Pump Catalogue No. S23.

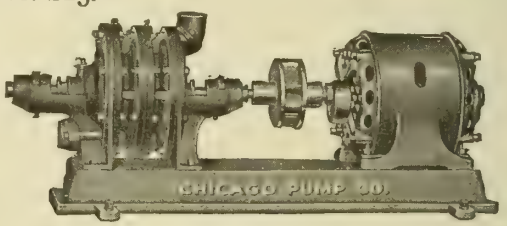


FIG. S. MULTI-STAGE TURBINE HOUSE PUMP WITH OUTER-BOARD RING-OILED BEARINGS

TYPES, SIZES AND CAPACITIES, MULTI-STAGE TURBINE HOUSE PUMP

Type of Pump	No. and Size of Discharge, Ins.	Size of Suction, Ins.	Capacity in G. P. M.	Maximum Head in Feet per Stage at 1,750 R. P. M.	Maximum Horse-power per Stage at 1,750
SB	¾	¾	5	15	⅙
SB	1	1	10	30	.300
SB	1	1	15	27	.340
SB	1¼	1¼	25	20	.417
SC	1¼	1¼	35	50	1.00
SC	1½	1½	50	40	1.11
SC	2	2	75	35	1.31
SC	2½	2½	100	50	2.5
SC	3	3	150	50	3.75

NOTE—To determine the number of stages required to pump a given quantity against a given head use that number of stages that will develop a head nearest to that required. If the head developed by the number of stages selected is less than that required, the capacity will be somewhat decreased; if the head developed is greater, the capacity will be somewhat increased.
We recommend that a motor be specified of sufficient size so that maximum load will be 80 per cent of rated capacity of motor.

Automatic Condensation Pump and Receiver.

Saves digging a boiler pit; pumps the heating returns into boiler from radiation, heating coils, cooking kettles, etc., that may be located below boiler level. Operates automatically; improves the heating plant, and saves coal. Write for Catalogue S25, which fully describes it.

FIG. S-7. AUTOMATIC CONDENSATION PUMP AND RECEIVER

DATA "CHICAGO" AUTOMATIC ELECTRIC CONDENSATION PUMP AND RECEIVER

No. of Pump	Max. Square Feet Direct Radiation	Price with 110 or 220 Volt, Single Phase 60 Cycle A. C. Motor	Price with 110 or 220 Volt, Direct Current Motor	Horse-Power Motor	Approximate Shipping Weight	Boiler•• Pressure
S1	1,500	$250.00	$240.00	¼	300	7 lbs.
S3	6,000	395.00	350.00	½	600	10 lbs.
S4	10,000	455.00	420.00	¾	700	15 lbs.
S5	15,000	525.00	495.00	1	800	20 lbs.
S6	25,000	690.00	630.00	2	900	20 lbs.

•• These pumps will operate against a boiler pressure equal to the pressure for which they are listed plus that pressure on the return pipe at receiver.

KERR MACHINERY & SUPPLY CO.

Manufacturers of Electric-Driven Pumps and Water Systems

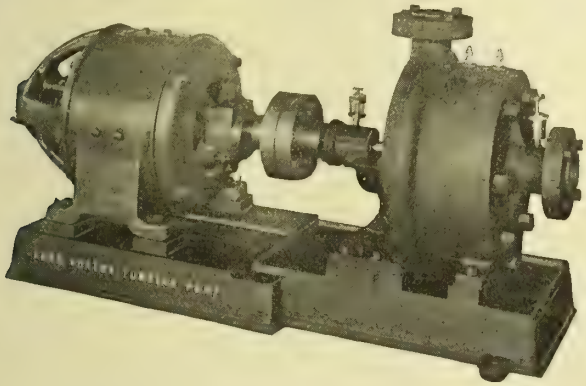
GENERAL OFFICES AND FACTORY
Kerr Machinery Building, Fort and Beaubien Streets
DETROIT, MICH.

Products.

KERR VORTEX, HIGH-SPEED, DIRECT-CONNECTED CENTRIFUGAL PUMPS; VACUUM PUMPS; EJECTOR PUMPS; AIR COMPRESSORS.

Multi-Stage Turbine Pump.

Kerr multi-stage turbine pumps are designed and built for high efficiencies when pumping small capacities against relative high heads. They are built for capacities from 5 to 300 gallons per minute, and are especially adapted for supplying water to apartments, office and mercantile buildings, factories and other buildings where pressure of city water is insufficient.



NO. 43 THREE-STAGE TURBINE PUMP—3-INCH DISCHARGE

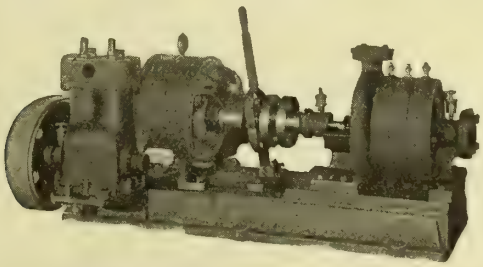
SIZES AND CAPACITIES

Size Suction, Inches	Size Discharge, Inches	Capacity Gallons per Minute	Speed Revolutions per Minute	*Head in Feet per Stage	*Horse-power per Stage
1	¾	5	†1730—2200	30— 50	¼— ½
1¼	1	20	†1730—2200	25— 40	½— ¾
1¼	1¼	30	†1730—2200	35— 60	¾—1½
2	1½	60	†1730—2200	50— 80	1¾—3
2½	2	110	†1730—2100	65—110	3½—6
3	2½	125	†1730—2100	80—130	4½—7½
3	3	200	†1730—2100	85—140	7½—12

*Multiply head per stage by number of stages.
†Alternate current speed is limited to 1730 R.P.M.; direct current either speed.

Combination Filling Pump and Air Compressor for Sprinkler Tank Service.

The Kerr Vortex turbine pump, when direct-connected to electric motor by means of Kerr clutch type flexible coupling and mounted on base with Kerr duplex high speed, water-cooled Air Compressor, is especially suited for filling the pressure and open tanks used in connection with fire extinguisher sprinkler systems; and the same pump can be used in connection with an automatic motor starter and tank for a house service pump, when required.

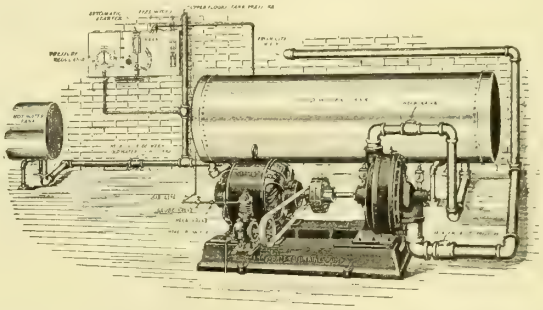


KERR COMBINATION TURBINE PUMP AND AIR COMPRESSOR FOR SPRINKLER TANK SERVICE

Hydro-Pneumatic Pumping Systems.

Kerr multi-stage electric-driven turbine pumps, used in connection with open or closed storage tanks and automatic motor control, make ideal systems for increasing city water pressure; they are noiseless in operation.

After pump forces water into bottom of tank, the air in the tank becomes compressed into space above water. Pump automatically shuts off on reaching desired pressure. By varying pressure in tank, either high or low water pressure is secured, as required in different localities.

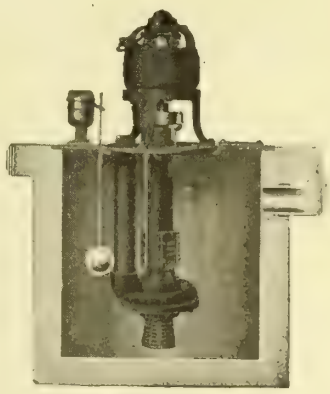


NO. 42 B, PUMP OUTFIT WITH AIR COMPRESSOR.
Showing method of supplying hot and cold water to the entire building. Where city water pressure is sufficient, lower floors may be supplied directly by separate risers from supply main
Air compressor, shown above, should be used with all systems except open roof tank, or where compressed air from other source is available

Electrically Driven Automatic Sump and Sewage Ejector.

The Kerr vertical, motor-driven, centrifugal bilge pump, or ejector, for pumping sewage, draining basements, etc., is entirely automatic in its action; and as the pump case is always submerged in the liquid to be pumped, no priming is necessary.

The motor is direct-connected to the pump, and is automatically controlled by a float, starting when the liquid reaches a given height in the pit and stopping when pit is empty. The pump, discharge pipe, etc., are supported from a motor floor plate providing for easy removal of the pump for inspection and repair.



AUTOMATIC EJECTOR PUMP
Showing installation in iron basin, with automatic float switch

Pump has a semi-enclosed bronze impeller, bearing in the pump case being lined with high grade babbitt, and a combined radial and thrust ball bearing on the motor floor plate.

Where conditions require, two pumps may be used in one basin.

Catalogues.

Report conditions in as full detail as possible, and the correct specifications will be sent you promptly.

LEADER IRON WORKS

MANUFACTURERS OF

Private Water Supply Systems, Electric Lighting Systems, Etc.

DECATUR, ILL. OWEGO, N. Y.

SALESROOMS

NEW YORK, N. Y., 103 Park Avenue CHICAGO, ILL., 327 South La Salle Street.

Products.

"Leader" Water Supply Systems; Air Storage Systems and Pumping Machinery; Electric Lighting Systems; Gasoline Storage and Pumping Systems; Portable and Stationary Air Supply Outfits; Steel and Iron Pressure, Storage and Air Tanks, for every requirement.

Also, Washing Machines and Suction Cleaners.

"Leader" Quality and Co-operative Service.

The quality of all "Leader" appliances is based upon the simplicity of design and thoroughness of construction of each individual part, combined with the highest type of modern manufacturing facilities and a thorough knowledge of the requirements of the problems which confront architects and engineers.

This Company will furnish standard specifications describing outfits with various kinds of power and outline the proper manner of constructing tanks and other material designed for any pressure. Our broad experience in this line enables us to draft specifications suitable to all conditions. Much time can be saved by the use of "Leader" Architects' Specifications.

We also furnish plans, specifications and estimates for water service systems for large plants, such as State and County infirmaries and other public and private institutions where an independent water service is required.

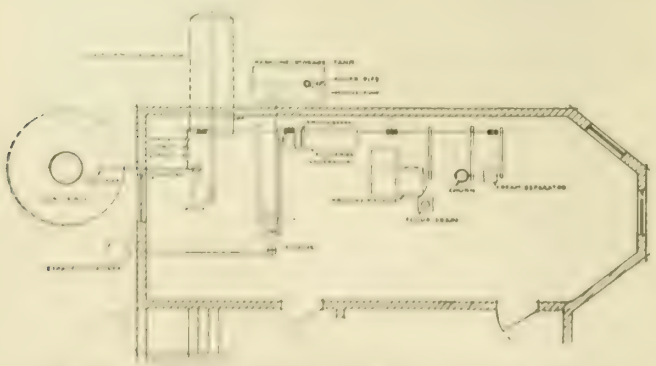
Guarantee.

This Company guarantees material and workmanship of each complete "Leader" Water System, that tank has been tested with air and water to 125 pounds to the square inch, and that it is absolutely air-tight when leaving factory. Should defect develop when installed according to our instructions, new parts will be furnished without charge or defect will be remedied without expense to customer.

Characteristic Description.

In the "Leader" Water System an air-tight steel tank is located in basement, or away from danger by frost, having connected to the bottom a pipe with suitable force pump attached and with pipe connecting pump to source of supply. The water being forced into the tank compresses the air, which is then available at all times to force the water through the service pipes to outlets on any floor, the pressure depending upon the height to which water is to be delivered.

See second page following for illustrations and data on standard outfits.



A PARTIAL BASEMENT PLAN SHOWING TYPICAL INSTALLATION OF COMPLETED WATER AND LIGHTING SYSTEMS

Pumping Machinery.

Pumping machinery for the "Leader" Water Supply Systems consists of hand, windmill, gasoline-engine and electric-motor operated units; also, water- and air-lift types, thereby covering every possible type of power applicable for pumping water and air.

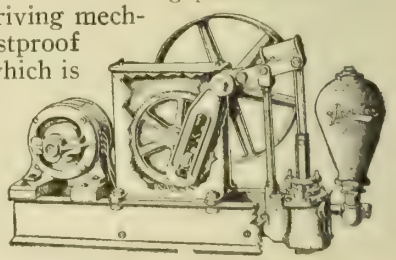
The hand outfits are made with vertical and horizontal tanks. The pumps are of the highest grade, with brass-lined cylinder, fitted with air attachments, and are directly or separately connected to the tanks. All valves, gauges, wood supports, pipe and fittings are carefully fitted to suit actual working conditions.

Gasoline-engine-driven pumps are carefully selected for the purpose to which they are especially adapted and are described on second page following, under table of data, list prices, etc.

Electric-driven outfits can be furnished with automatic controllers for starting and stopping the motor by pressure in tank.

Silent Oil-Cased Pumps.

This silent type pump represents a principle of operation entirely new, and is shown in its highest development in Figs. 5, 6 and 9 pumps, on the following pages. The complete transmission in these pumps consists simply, in Fig. 6, of a crank type transmission, in Fig. 5, of a bell-crank type slotted lever, and in Fig. 9, of a transmission arrangement based on the eccentric principle. The small number of working parts allows for concentration of all driving mechanism in an oil-tight, dustproof gear case or housing, which is partly filled with oil. Lower part of gear is immersed at all times and during its revolution carries oil upwards and distributes it to the bearings.



OIL-CASED PUMP

Fig. 6 Automatic Electric Pump.

Fig. 6 is an electric pumping unit for use where vertical suction distance is not more than twenty feet.

The pump is of fine workmanship, with brass-lined cylinder and all working parts enclosed in a dust-proof case and running constantly in an oil bath, which feature, together with a flexible flat belt drive, insures the maximum power being transmitted to the pump piston and permits the use of a medium speed motor.

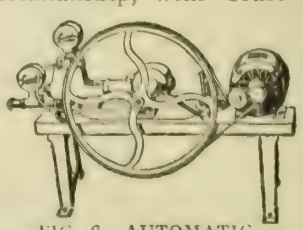


FIG. 6 AUTOMATIC ELECTRIC PUMP

Where it is desired to use the pump in connection with an open tank, we can furnish a float switch, which answers the purpose of the controller in a pressure system.

Continued on next page

A motor to suit local conditions will be furnished, as noted in table. In specifying be sure to state voltage, whether current is direct or alternating, whether one-, two- or three-phase and what cycle; also, type and number of pump.

DATA, FIG. 6 AUTOMATIC ELECTRIC PUMP

No.	Cap. per Hour, Gals.	Pipe Connections: Suction	Pipe Connections: Discharge	Total Head in Ft.	Max. Pressure, Lbs.	Shipping Weight, Lbs.	Type R	Type S	Type T
1	180	¾ in.	½ in.	110	50	160	With A.C. S.P. 60-cycle Motor 110 or 220 Volts	With D. C. 110 or 220 Volt Motor	With D. C. 30 or 60 Volt Motor
2	180	¾ in.	½ in.	75	35	140			
3	360	1 in.	¾ in.	110	50	245			

Fig. 242 Double-Acting Power Pump.

Fig. 242 Power Pump is for use where vertical suction distance does not exceed twenty vertical feet.

It is a desirable pump for pressure tank work.

This pump has been designed to meet a demand for a reasonably priced power pump for belt drive direct from gasoline-engine, electric-motor or line shaft.

Cylinder 2½ inches, brass lined, fitted with brass drain screws. Piston-rod is one piece of solid bronze. Cup leathers fitted with bronze spring expanders, insuring full capacity of the pump. Has tight and loose pulley and belt shifter.

The regular equipment furnished is handle attachment, belt shifter and air-intake valve.

A complete pumping unit on channel steel base, using either gasoline or electric motor, can be furnished, as shown with outfit 154. Prices of various types on application.

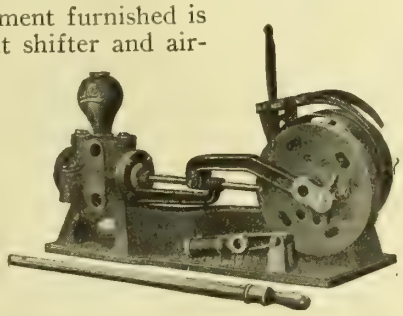


FIG. 242 DOUBLE-ACTING PUMP

Fig. 9. Oil-Cased Pump.

Fig. 9 embodies in a horizontal double-acting suction pump the typical features of the "Leader" line of oil-cased pumps. The unusual strength and wear-resisting features of this pump are due to compact design, one-piece main gear and eccentric, shafts extending through and doubly supported and journaled in casing, and the enclosing in dust-proof case of all wearing parts so that they run in a bath of oil. Safety always is assured by avoiding the possibility of injury. Noiseless operation contrasts agreeably with the grating din of the common type of open-gear drive. Pump cylinders are brass lined, pistons have bronze rods and cup leather packing, and valves are of the poppet type with leather discs. Each pump is provided with auxiliary air device. Channel steel base provides for convenient mounting of either motor or gasoline engine for power.

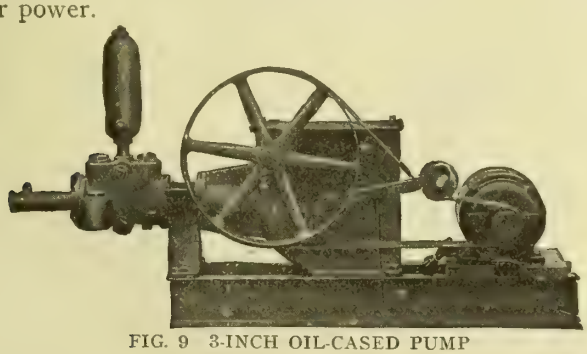


FIG. 9 3-INCH OIL-CASED PUMP
Electric-motor driven

DATA, FIG. 9 ELECTRIC MOTOR DRIVEN PUMP

Pounds Pressure per Square Inch at Pump Discharge	15	35	50	75	100	120	165	200
Total head in feet	50	100	150	200	250	300	400	500

Diam. of Pump Cyl.	Stroke	Diam. of Suction	Diam. of Discharge	Nom. Cap. Gal. per Hr.	Horse-Power Recommended, Based on Above Pressures or Heads and Pump Speed 40 R. P. M.							
3"	5"	1½"	1½"	700	Engine			1½	1½	1½	2	3
					Motor			1	1½	1½	2	2
4"	5"	2 "	2 "	1200	Engine		1½	2	2	3	3	....
					Motor		1	1½	1½	3	3	....
5"	5"	2½"	2 "	2000	Engine	1½	1½	2	2	3	....	....
					Motor	1	1	1½	2	3	....	....

SCHEDULE OF PULLEY DIAMETERS FOR ENGINES—BELT—2½" LEATHER

Pump Speed	1½ H. P. 600 R. P. M.		2 H.P. 525 R. P. M.		3 H. P. 525 R. P. M.	
	Engine	Pump	Engine	Pump	Engine	Pump
30 R.P.M.	5" Diam.	15" Diam.	8" Diam.	20" Diam.	10" Diam.	25" Diam
40 R.P.M.	6" Diam.	12" Diam.	8" Diam.	15" Diam.	10" Diam.	20" Diam
50 R.P.M.	7" Diam.	12" Diam.	8" Diam.	12" Diam.	10" Diam.	15" Diam

Schedule of Pulley Diameters for Motors

Motors 1-2-3 H. P.		Pumps	
Speed	Pulley	Speed	Pulley
1750 R.P.M.	4" Diam.	50 R. P. M.	20" Diam.
1750 R.P.M.	3½" Diam.	38 R. P. M.	20" Diam.
1750 R.P.M.	3" Diam.	30 R. P. M.	25" Diam.

Displacement Capacities in Gallons per Hour at Various Speeds

Speed R. P. M.	3" Cyl.	4" Cyl.	5" Cyl.
30	550	979	1530
40	734	1305	2040
50	918	1632	2550

Fig. 5. Deep-Well Pumps.

Fig. 5 Deep-Well Pumps are silent in operation owing to the principle of construction described on opposite page under heading "Silent Oil-Cased Pumps."

Pinion of 50-point carbon steel has great wear-resisting properties. Gear and pinion are machine cut and tested for accuracy. Crank-pin is fitted with sleeve, forming a roller bearing between crank-pin and bell crank. Renewable bushing, splash oiled, forms main pulley bearing.

DATA, FIG. 5 PUMPS, 6- AND 10-INCH STROKES

Nominal inside diameter of Well Casing or Drop Pipe, Ins.	Exact inside diam. of Cylinder or Working Barrel, Ins.	Outside diameter of Differential Plunger or Rod, Ins.	Nominal size of Octagon or Square Wood Rods, Ins.	Nominal inside diameter of Discharge Pipe, Ins.	Revolutions or Up Stroke per minute	Piston Displacement in gallons per hour	Service suitable for 1 H. P. motor or 1½ H. P. gasoline engine: Feet depth of Cylinder in well	Lbs. per sq. in. Pressure at Discharge Outlet	Service suitable for 2 H. P. motor or 3 H. P. gasoline engine: Feet depth of Cylinder in well	Lbs. per sq. in. Pressure at Discharge Outlet	Service suitable for 3 H. P. motor or 4 H. P. gasoline engine: Feet depth of Cylinder in well	Lbs. per sq. in. Pressure at Discharge Outlet
FIG. 5 PUMP WITH 6-INCH STROKE												
2	1 13/16	5/16	1 1/8	1	50	202	25	75	150	100		
					40	161	50	75	250	100		
					30	121	100	75	400	100		
					20	81	150	75	500	100		
2½	2¼	1¾	1 3/8	1¼	50	309			125	75		
					40	247	25	50	175	75		
					30	185	75	50	275	75		
					20	124	200	50	450	75		
3	2¾	1¾	1 5/8	1¼	50	462	50	0	75	50		
					40	370	75	0	125	50		
					30	278	100	0	200	50		
					20	185	150	0	300	50		
3½	3¼	1¾	1 5/8	1½	50	645			75	25		
					40	516			100	25		
					30	388			150	25		
					20	258			250	25		
4	3¾	1¾	1 7/8	1½	50	860			25	0		
					40	688			50	0		
					30	516			75	0		
					20	345			125	0		
FIG. 5 DEEP WELL PUMP, 10-INCH STROKE												
2	1 13/16	¾	1 1/8 or 1 3/8	1¼	50	333	50	100	100	150		
					40	266	100	100	200	150		
					30	199	150	100	350	150		
					20	133	200	100	600	150		
2½	2¼	¾	1 3/8 or 1 5/8	1½	50	516	50	75	75	125		
					40	412	100	75	125	125		
					30	309	150	75	200	125		
					20	206	200	75	300	125		
3	2¾	2¼	1 5/8 or 1 7/8	1½	50	771	50	40	50	100	75	125
					40	618	75	40	100	100	125	125
					30	462	125	40	200	100	200	125
					20	308	200	40	300	100	300	125
3½	3¼	2¼	1 7/8	2	50	1077	50	0	50	50	50	75
					40	861	75	0	100	50	100	75
					30	646	100	0	150	50	150	75
					20	430	150	0	200	50	200	75
4	3¾	2¼	2¼	2	50	1434			50	0	50	50
					40	1147			100	0	100	50
					30	860			150	0	150	50
					20	573			200	0	200	50

Continued on next page

DATA OF "LEADER" STANDARD PRIVATE WATER SYSTEMS

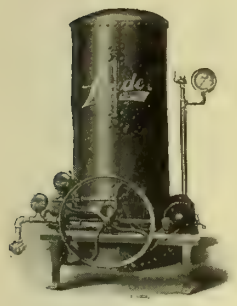
For Illustrations of Systems, see opposite page

Outfit	Size	Tank Diam. Lgth.	Total Cap., Gallons	Working Cap., Gals.	Approx. Weight, Lbs.	Service Best Adapted for	Outline Specifications
Fig. 35	A B C	24"x5' 24"x6' 30"x6'	120 140 220	80 95 145	580 630 760	For any source of supply where vertical suction is not more than twenty feet below pump. Prices on outfit for both hard and soft water on application.	"Leader" Hydro-Pneumatic Tank. Pumping Unit, Fig. 6, No. 1, "Leader" Electric Pumper. Capacity, 180 gallons per hour, against maximum pressure of 50 pounds. Complete, with A.C. S.P. 60-cycle 110 or 220 volt motor and automatic pressure controller.
Fig. 90	A B C D	30"x6' 30"x8' 30"x10' 36"x10'	220 295 365 525	145 195 240 350	860 1000 1130 1365	Same as above	"Leader" Hydro-Pneumatic Tank. Pumping Unit, Fig. 6, No. 3, Electric Pumper. Capacity, 360 gallons per hour, against maximum pressure of 50 pounds. Complete, with motor for A.C. S.P. 60-cycle 110 or 120 volt current and automatic pressure controller,
Fig. 44	A B	18"x48" 22"x60"	53 99	35 66	300 370	For use where vertical suction does not exceed twenty feet; a compact outfit, suitable for handling a soft water supply adequately without the use of water motor.	"Leader" Hydro-Pneumatic Tank. Made of rust-resisting Armco iron; Fig. 6, No. 1, Electric Pumper. Capacity 180 gallons per hour. Complete, with automatic controller and motor for A.C. S.P. 60-cycle 110 or 220 volts.
Fig. 85	A	36"x10'	525	350	2000	For any source of supply where vertical suction distance does not exceed twenty feet. For heavy duties, large volume and high pressure see table page 1269.	"Leader" Hydro-Pneumatic Tank. Pumping Unit, Fig. 9, 3-inch shallow well oil-cased pumping unit, complete, with 1½ H. P. A.C. S.P. 60-cycle 110 or 220 volt motor, 1750 R. P. M. and endless leather belt. Automatic electric controller.
Fig. 85	B	48"x10'	940	626	2995	Same as above, but for heavier duties.	Same as above, with Fig. 9, 4-inch shallow well oil-cased pumping unit and 2 H. P. A.C. S.P. 60-cycle 110 or 220 volt motor, 1750 R. P. M.
Fig. 85	C	48"x16'	1500	1000	3835	Same as above, but for heavier duties.	Same as above, with Fig. 9, 5-inch shallow well oil-cased pumping unit.
Fig. 99	A B C E	30"x6' 30"x8' 30"x10' 36"x10'	220 295 365 525	145 195 240 350	1300 1435 1565 1800	For open or cased deep wells.	"Leader" Hydro-Pneumatic Tank. Pumping Unit, Fig. 5, Type C, 6-inch stroke deep-well pumps. Complete, with Novo, Jr., engine and endless leather belt. Cylinder. Fig. 77, 2½-inch steel cased, brass-lined, Artesian Well Cylinder. Automatic circuit breaker. Anti-freezing Set Length furnished if specified.
Fig. 98		24"x5'	120	80	910	For open or cased deep wells.	Vertical Hydro-Pneumatic Tank, Fig. 5, Type D, 6-inch stroke Deep-Well Pumping Unit. Complete, with ½ H. P. motor for A.C. S.P. 60-cycle 110 or 220 volts.
Fig. 95	A B C	36"x10' 42"x14' 48"x16'	525 1000 1500	350 665 1000	2000 3070 3800	For same service as Fig. 99, where greater capacities are required from deeper wells.	"Leader" Hydro-Pneumatic Tank. Pumping Unit, Fig. 5, Type F, 10-inch stroke. Complete, with 2 H. P. A.C. S.P. 60-cycle 110 or 220 volt motor, 1750 R. P. M. Endless leather belt. Cylinder, Fig. 77, 3-inch by 14-inch. Brass-lined Artesian Well Cylinder. Controller, Fig. 239 "Leader" Automatic Electric Controller. Anti-freezing Set Length furnished if specified.
Fig. 154	A B C D	24"x5' 30"x6' 30"x8' 36"x6'	120 220 295 315	80 145 195 210	935 1115 1300 1260	For well cistern, lake or spring, where water level is not more than twenty vertical feet below pump. Also operated by hand, if desired.	Vertical Hydro-Pneumatic Tank, Fig. 242, No. 5, "Leader" Power Pump, capacity 650 gallons per hour. Complete, with reliable Novo, Jr., frost-proof gasoline engine and endless leather belt. Circuit breaker for stopping engine furnished, if specified. Electric motor may also be used instead of gasoline engine at extra cost.
Fig. 33	A B C	24"x6' 30"x6' 30"x8'	140 220 295	95 145 195	995 1085 1305	For shallow well work. Same Service as Fig. 35.	"Leader" Hydro-Pneumatic Tank. Pump, Fig. 300 "Leader" Gasoline Pumper with magneto ignition and air intake valve. Capacity, 450 gallons per hour. "Leader" automatic circuit breaker for stopping engine.
Fig. 159	A B C D	30"x6' 30"x8' 30"x10' 36"x10'	220 295 365 525	145 195 240 350	1215 1355 1485 1720	For same service as Fig. 154-A.	Tank same as Fig. A-99. Engine, Fig. 271, 1 H. P. "Leader" Hopper cooled gasoline engine. Pump, Fig. 242, No. 3, "Leader" Power Pump. Operated by hand when desired. Automatic circuit breaker for stopping engine.
Fig. 158	A B C D	30"x8' 30"x10' 36"x10' 42"x10'	295 365 525 720	195 240 350 480	1690 1820 2055 2635	For open or cased deep wells. Can also be operated by hand or windmill.	Tank same as Fig. A-99. Engine, Fig. 271, 2 H. P., "Leader" Hopper cooled gasoline engine. Pump, Fig. 209 "Leader" back geared working head, equipped with Fig. 55, No. 1 Hydro-Pneumatic cylinder and Fig. 71, 2½-inch brass-lined water cylinder. Automatic circuit breaker, complete.
Bungalow Outfit	A	30"x6'	220	145	610	Hand-power outfits for any source of supply where water level is not more than twenty vertical feet below pump. Cog-gear handle is easier to operate than other types of handle.	"Leader" Hydro-Pneumatic Tank. Pump, Fig. 3, Double-acting Force Pump, 2½-inch brass-lined cylinder and auxiliary air attachment, cog-gear handle. Vertical Tank.
Fig. 101	A B C D	30"x6' 30"x8' 30"x10' 36"x10'	220 295 365 525	145 195 240 350	760 900 1015 1200	Same as above.	Hydro-Pneumatic Tank. Pump, Fig. 282 "Leader" Double-Acting Force Pump, cog-gear handle; 2½-inch brass-lined cylinder and air compressor attachment. Horizontal Tank.
Fig. 102	A B	30"x6' 30"x8'	220 295	145 210	695 825	Same as above.	Vertical Tank. Same specification as Fig. A, 101-G
Fig. 105	A B C	30"x6' 30"x8' 30"x10'	220 295 365	145 195 240	930 1080 1200	For shallow wells or wells of medium depth. To be operated by hand or windmill	"Leader" Hydro-Pneumatic Tank. Pump, Fig. 10 hand-force pump, complete, with 2½-inch brass-lined cylinder and special intake air valve.

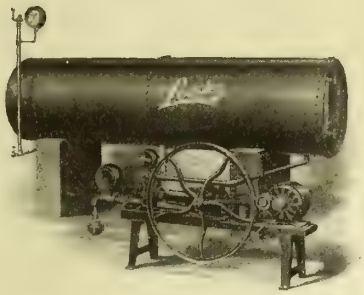
Continued on next page

TYPICAL LEADER WATER SYSTEMS

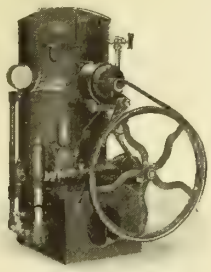
For Data, see previous page



OUTFIT FIG. 35
4′ 3″ x 4′ 7″



OUTFIT FIG. 90
4′ 4″ x 10′ 10″



OUTFIT FIG. 44
3′ 2″ x 3′ 4″

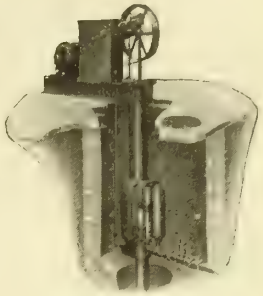
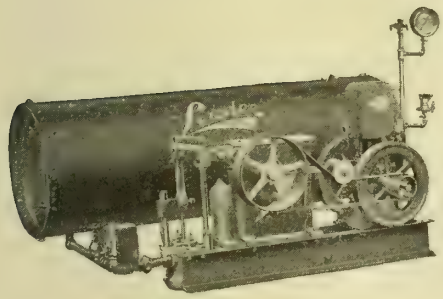
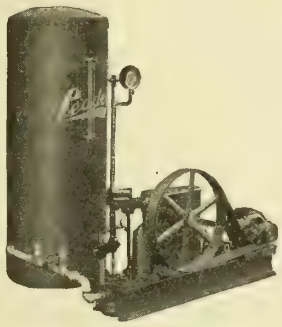


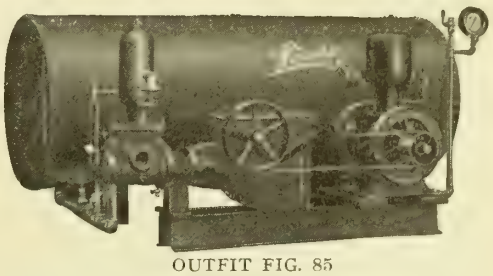
FIG. 5 PUMP
With Anti-freezing Set Length
Requires Pit 4′ 0″ diameter x 5′ 0″



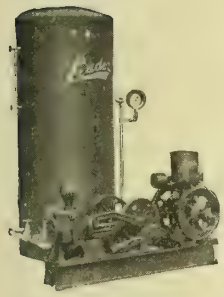
OUTFIT FIG. 99
With Fig. 5 6-inch Pump, Horizontal Tank and Novo Engine
7′ 0″ x 12′ 0″



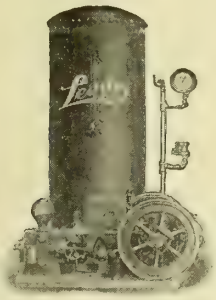
OUTFIT FIG. 98
With Electric Motor
5′ 0″ x 5′ 0″



OUTFIT FIG. 85
With Fig. 9 5-inch Pump, Horizontal Tank, and Novo Engine or Electric Motor Drive
8′ 6″ x 16′ 8″



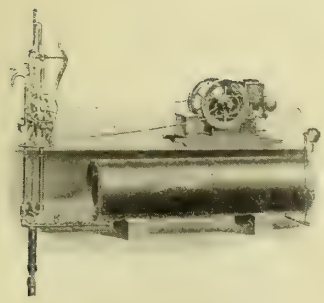
OUTFIT FIG. 154
Fig. 242 Pump on channels; Novo Engine
5′ 0″ x 5′ 6″



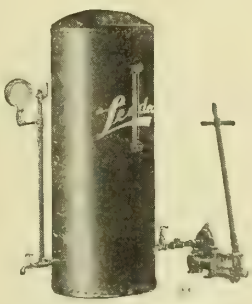
OUTFIT FIG. 33
4′ 8″ x 6′ 8″

OUTFIT FIG. 159
6′ 5″ x 11′ 8″

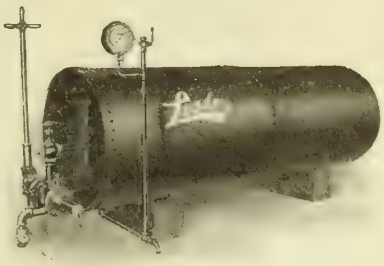
OUTFIT FIG. 102
4′ 2″ x 6′ 0″



OUTFIT FIG. 158



BUNGALOW OUTFIT
4′ 4″ x 6′ 8″



OUTFIT FIG. 101
5′ 2″ x 11′ 6″

OUTFIT FIG. 105

Continued on next page

"Leader" Pneumatic Tanks.

Aside from the standard lines of pressure and storage tanks, this Company manufactures to specification, tanks of every description, riveted and welded, black and galvanized.

When figuring on work where the requirements are special and time is a factor, our facilities for handling and experience in constructing tanks are of great value to the architect or contractor in the matter of service.

Construction—"Leader" tanks have a firmly established reputation for uniform strength and durability. They are made of the highest quality of materials and of heavier gauge than is usually put into tanks for this purpose. The most improved and modern methods of construction known to the trade are employed in building them.

Longitudinal seams are double riveted with large rivets closely spaced. The rivet heads are formed with a hydraulic machine under enormous pressure, which at the same time lays the plates closely together with a lap joint. All heads are flanged and dished to a radius equal to the diameter of shell. Each tank is coated on the inside and outside with Leadercote.

All "Leader" hydro-pneumatic tanks are tested to 125 pounds' air pressure and guaranteed for a working pressure of 85 pounds to the square inch.

Stock Sizes—Material is carried in stock for large size "Leader" tanks of the following size and description: diameter, 54 to 108 inches; length, 16 to 40 feet; capacity, 1900 to 19,000 gallons; shell, 5/16- and 3/8-inch thick; heads, 3/8- to 1/2-inch thick.

If manholes are ordered in "Leader" tanks of diameters forty-eight inches and less, they will be placed in the head unless otherwise specified.

If ordered in "Leader" tanks of diameter over forty-eight inches, up to and including eighty-four inches, manholes will be placed in the shell unless otherwise specified.

In "Leader" tanks eight feet and nine feet in diameter, the manholes are always placed in the shell.

DATA, "LEADER" HYDRO-PNEUMATIC TANKS*

Diam., Ins.	Length, Ft.	Thickness Shell, Ins.	Thickness Heads, Ins.	Thickness Ins.	Approx. Weight, Lbs.	Nominal Cap., Gallons	Diam., Ins.	Length, Ft.	Thickness Shell, Ins.	Thickness Heads, Ins.	Approx. Weight, Lbs.	Nominal Cap., Gals.
20	5	3/16	1/4	1/8	275	80	60	20	3/16	3/16	5,672	2,937
24	5	3/16	1/4	1/8	370	120	60	22	3/16	3/16	6,123	3,230
24	6	3/16	1/4	1/8	420	140	60	24	3/16	3/16	6,573	3,525
24	8	3/16	1/4	1/8	525	190	60	26	3/16	3/16	7,051	3,818
24	10	3/16	1/4	1/8	635	235	60	28	3/16	3/16	7,502	4,112
30	6	3/16	1/4	1/8	550	220	60	30	3/16	3/16	7,951	4,406
30	8	3/16	1/4	1/8	675	295	72	20	3/16	3/16	6,953	4,230
30	10	3/16	1/4	1/8	800	365	72	24	3/16	3/16	8,027	5,076
30	12	3/16	1/4	1/8	930	440	72	26	3/16	3/16	8,509	5,499
36	6	3/16	1/4	1/8	695	315	72	28	3/16	3/16	9,136	5,922
36	8	3/16	1/4	1/8	860	420	72	30	3/16	3/16	9,673	6,345
36	10	3/16	1/4	1/8	1010	525	72	36	3/16	1/4	11,320	7,614
36	12	3/16	1/4	1/8	1165	635	84	20	3/16	1/2	8,477	5,757
36	14	3/16	1/4	1/8	1360	735	84	24	3/16	1/2	9,708	6,909
42	8	1/4	1/4	1/8	1355	575	84	28	3/16	1/2	10,980	8,060
42	10	1/4	1/4	1/8	1610	720	84	30	3/16	1/2	11,596	8,636
42	12	1/4	1/4	1/8	1845	865	84	32	3/16	1/2	12,212	9,212
42	14	1/4	1/4	1/8	2080	1010	84	36	3/16	1/2	12,484	10,363
42	16	1/4	1/4	1/8	2320	1150	84	40	3/16	1/2	14,715	11,515
48	10	1/4	1/4	1/8	1775	940	96	32	3/16	1/2	16,715	12,032
48	12	1/4	1/4	1/8	2060	1140	96	36	3/16	1/2	18,488	13,536
48	14	1/4	1/4	1/8	2545	1315	96	40	3/16	1/2	20,170	15,050
48	16	1/4	1/4	1/8	2805	1560	108	32	3/16	1/2	18,858	15,228
48	18	1/4	1/4	1/8	3125	1650	108	36	3/16	1/2	20,818	17,132
48	20	1/4	1/4	1/8	3440	1850	108	38	3/16	1/2	21,756	18,084
48	24	1/4	1/4	1/8	4090	2260	108	40	3/16	1/2	22,688	19,035

*All 6-foot tanks tapped both ways for vertical or horizontal installation.

Working capacity under average condition is approximately two-thirds of total capacity.

"Leader" Hot Water Storage Tanks for Water Storage Only.

All standard storage tanks are for vertical or horizontal installation, tested to a hydrostatic pressure of 100 pounds to the square inch, and are guaranteed for a working pressure of 65 pounds per square inch.

All extra heavy storage tanks are for vertical or horizontal installation, tested to a hydrostatic pressure of 150 pounds to the square inch, and are guaranteed for a working pressure of 100 pounds per square inch.

DATA, "LEADER" HOT WATER STORAGE TANK FOR WATER STORAGE ONLY

Standard Tanks					Extra Heavy Tanks				
Size Diam. Ins.	Size L'gth Ft.	Weight, Pounds	Size Openings, Ins.	Capacity, Gals.	Size Diam. Ins.	Size L'gth Ft.	Weight, Pounds	Size Openings, Ins.	Capacity, Gals.
					24	5	410	1½	120
20	4	225	1½	66	24	6	470	1½	140
20	5	260	1½	85	30	5	530	2	180
24	4	280	1½	100	30	6	600	2	220
24	5	325	1½	120	30	7	670	2	250
24	6	360	1½	140	30	8	750	2	295
30	4	425	2	150	36	6	950	2	315
30	5	490	2	180	36	7	1060	2	365
30	6	555	2	220	36	8	1170	2	420
30	7	620	2	250	36	10	1390	2	525
30	8	685	2	295	42	6	1140	2	430
36	6	740	2	315	42	7	1270	2	500
36	7	825	2	365	42	8	1400	2	575
36	8	910	2	420	42	10	1660	2	720
36	10	1080	2	525	42	12	1940	2	865
42	6	890	2	430	42	14	2200	2	1000
42	7	985	2	500	48	8	1600	3	750
42	8	1080	2	575	48	10	1900	3	940
42	10	1270	2	720	48	12	2200	3	1130
42	12	1460	2	865	48	14	2500	3	1300
42	14	1650	2	1000	48	16	2800	3	1500
					48	18	3100	3	1700

Prices on tanks with box coils, seamless brass or copper coils on request.

Exemplary Brief Specification Form Suitable for "Leader" Private Water Systems.

This Water System shall be a complete outfit Fig. No. .... Size ....., as manufactured by the Leader Iron Works, Decatur, Ill. Equipment shall conform to the following:

Tank

One "Leader" ..... inches by ..... inches steel hydro-pneumatic tank, having a total capacity of ..... gallons (working capacity under average condition is two-thirds of total capacity) as described on page ..... of Sweet's Catalogue, 1916 Architectural Edition. This tank to be tested to air and water pressures of 125 pounds and guaranteed for a working pressure of 85 pounds.

Power

Electric-Motor—Pump shall be driven by .... volt (direct-current) or (alternating-current ..... phase ..... cycle) ..... horse-power motor speed ..... revolutions per minute.

Gasoline-Engine—Pump shall be driven by ..... horse-power ..... gasoline engine, provided with complete equipment of oilers, tools and exhaust muffler.

Belt-Power—A suitable pulley with friction clutch shall be furnished and mounted on line shaft for driving pump. Connect from same to pulley on pump with suitable leather belt, so aligned that same will run true on pulley and without slipping.

Pumping Machinery

Pump furnished shall be the Fig. ..... Pump, described on page ..... of Sweet's Catalogue, 1916 Architectural Edition. This pump to have a capacity of ..... gallons per hour, when operating at ..... strokes per minute, and must be capable of pumping from a depth of ..... feet, against a maximum pressure of ..... pounds.

Cylinder

For Deep-Well Outfits; suction pumps have cylinder built in.

A "Leader" brass lined, bronze ball valve type cylinder of proper size shall be supplied, the plunger of this cylinder to be fitted with four cup leathers.

Air Attachment

Above specified pumping outfit shall be equipped with air attachment for supplying air to the tank as required.

Foundations

Each piece of machinery shall be set on and securely bolted to a concrete foundation of ample size and weight to prevent excessive vibration.

Tank shall be supported on ..... neatly finished concrete piers formed to curvature of tank, each to be ..... by ..... and ..... high.

Controlling Apparatus

Automatic Electric Controller—For automatically starting and stopping motor, between the pressures in the tank of .....

Continued on next page

pounds minimum and ..... maximum, a "Leader" Automatic Controller, Fig. .... shall be furnished, together with suitable auxiliary starter if required.

NOTE—30 pounds minimum and 50 pounds maximum are customary operating pressures.

Gasoline-Engine Circuit Breaker—A "Leader" Fig. 66 Circuit Breaker shall be furnished for automatically stopping the engine when the pressure in the tank attains ..... pounds.

NOTE—55 pounds is customary maximum pressure.

VALVES, GAUGES, PIPE FITTINGS, ETC.

This outfit shall be furnished with necessary suction pipe, to connect between pump and well, and a galvanized foot valve and strainer, placed at the end of the suction line. To connect between pump and tank, supply a ..... inch pump discharge line; and, in this line, furnish necessary valves and pipe fittings. Water gauges shall be furnished with glass ..... long, and made of best red brass, extra heavy where the greatest strength is required. A "Leader" pressure gauge shall be furnished to register a maximum pressure of .... pounds per square inch, and equivalent head of water in feet. Outlet from tank shall be furnished with a regular service connection, size .... inches, complete with drain and stop and waste cock and fittings.

NOTE—When special conditions are to be met, not covered by above specification form, please send information and the engineering department will gladly co-operate in the development of special plans and specifications.

"Leader" Private Electric Lighting Systems.

These are simple, safe, reliable and easily operated systems for the economical private production of current for the illumination of country homes, farm buildings, country clubs, schools, etc., and also for the production of power to drive fans, vacuum cleaners, and other similar electrical conveniences.

They consist simply of a gasoline engine, which provides power ready for instant use; a generator, which is belted to the engine; a set of storage batteries, which is connected to generator and switchboard, on which all wiring connections are properly made, before shipment. Immediately on setting the various parts of the plant in position and connecting them for operation, the system is ready for use. Few operating instructions are necessary, and the most important are given on brass plates mounted on the switchboard, these being simple and easily understood.

The "Leader" Electric Plant offers a combination of superior design, ample capacity, sterling quality of construction and compactness that is unequalled. The expense for fuel required by engine to produce all of the light and power required in the average home is so small as to seem incredible when compared with the same service at central station rates. And it is, besides, practically impossible for even a child to cause injury to self or plant by tampering, or by mistakes in operating the switchboard equipment.

Description of System.

Many years of lighting and power work furnished the experience that has been consistently utilized in eliminating all complicating and unnecessary features of the older plants, while retaining every principle or device of real value.

Generators—These are developed especially for use with these plants. They are of two-pole shunt-wound type, fitted with commutators and brushes, easily accessible for cleaning and adjustment, and are of extra large size, insuring sparkless commutation. These generators are especially powerful as motors for starting engines. They are fitted with perfectly balanced fly-wheel, to which driving pulley is interchangeably attached. Sliding base with adjusting screws provides means for maintaining the proper belt tension.

Batteries—Each battery is of sixteen rubber-jar cells assembled in four boxes of four cells, is provided with lead tape connections, hydrometer syringe and full instructions. In assembled plants the complete battery is installed and connected in a neatly finished cabinet and has all wiring connections made to generator and switchboard. Open glass jar or sealed and charged glass jar types of batteries substituted, if preferred.

Switchboard—The panels in all sizes of plants are 16 inches by 20 inches by 1 inch, made of best Bangor electrical slate, hone finished with rounded edges and corners. Panels are arranged to be mounted on black enameled iron pipe supports, and all wiring connections between the various instruments, switches, etc., are made on back of board with white flame-proof wire.

Equipment consists of one 3½-inch diameter, 0-60 voltmeter; one 3½-inch diameter, 60-0-60 ammeter; one back-of-switchboard rheostat with insulating wheel handle for regulating output of generator; one circuit breaker, automatic both in opening and closing, and provided with extra heavy copper switch contact and carbon break contact; one double-pole, single-throw fused knife switch for controlling lights; one single-pole, single-throw knife switch for disconnecting generator from switchboard; one single-throw, single-pole knife switch for disconnecting batteries from switchboard. Brass instruction plates for all switches are attached to face of switchboard.

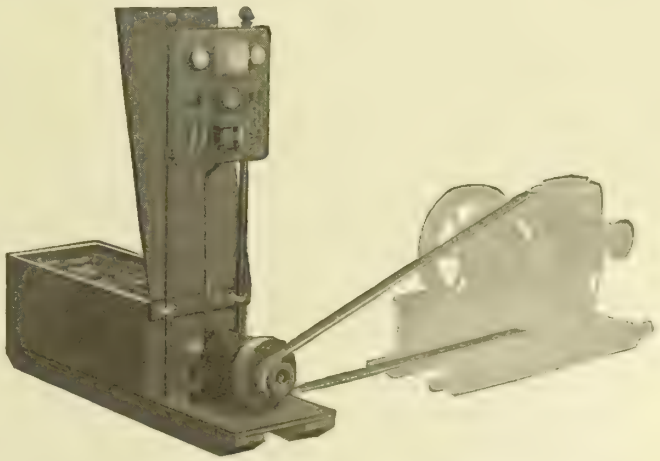
Belt—This is made of best single flexible leather. Ends are joined with special belt glue, making belt endless and avoiding unevenness in running.

Ampere Hour Meter—This registers on a dial, by indicating hand, the input and output from battery, and is useful as a means of showing amount of current stored in battery at any time.

Cost.

Where power of a gasoline engine is used for producing current alone, the cost will be only one third or one half of the average charge made by the electric central station. Where a number of different appliances are operated in conjunction with light plant, taking their power from a line shaft, the cost of operating the light plant is absorbed to such an extent as to be hardly worthy of consideration. This arrangement provides for an application of energy whereby the gasoline engine operates at all times at normal load, and, therefore, at a maximum of efficiency.

Prices are based f. o. b. Decatur, Ill., or Owego, N. Y. Engines are listed separately, as many customers



COMPLETE ASSEMBLED ELECTRIC LIGHT PLANT

Continued on next page

are already provided with engines that will be entirely suitable for this work, the only requirement being that they have sufficient power.

Capacities and Outfits.

Plants are furnished in eight different capacities. Each plant is listed in two ways, as an "Assembled" and as a "Separate Parts" plant.

The Assembled Plant is recommended in all cases to those who have not had experience in installation of lighting equipment. With the instructions furnished, nothing could be simpler than setting up one of these plants. When crate is removed and plant connected to house wiring, it is ready for use, the battery being fully charged at factory.

Assembled Plants—This is shipped in a neatly finished cabinet containing battery, and arranged so it may be locked up. The battery, with generator and switchboard, is mounted on substantial skids. All connections of wiring to switchboard from both battery and generator are permanently attached as in final tests, before shipment, and require no further attention. In installing, it is only necessary to remove crating, set plant and engine where wanted, lift switchboard to vertical position and insert pipe supports, belt engine to generator, connect house wires to switchboard, and the plant is ready for use.

Separate Parts Plants—With the Separate Parts Plants are furnished all the actual working parts as listed with the assembled plants. They are, however, crated separately, with no wiring connections made other than those on back of switchboard, which connect the various instruments; neither are the skids nor cabinet for battery furnished.

The assembling and erection of the Separate Parts Plant, however, is quite simple, as the batteries are shipped fully charged; it is only necessary to set the four wooden trays in position and connect them in series, using the lead tape connectors furnished therewith for that purpose. (Instructions with battery.)

Information Required—If conditions are unusual, or any doubt exists as to the proper plant for any particular installation, send for special information blank, and the Service Department will give every assistance in an advisory way, or in specifying the actual equipment for the job. This service is gratis and implies no obligation.

Brief Specification Form.

Furnish and erect where directed, one "Leader" No..... complete electric lighting plant, as manufactured by Leader Iron Works, Decatur, Ill., and Owego, N. Y. Equipment shall be in accordance with detailed description given on page ..... of Sweet's Catalogue, 1916 Architectural Edition, and shall consist of the following:

Generator—One "Leader" ..... K.W. 30 to 42 volt shunt-wound direct-current generator equipped with sliding base, fly-wheel and suitable steel pulley. To have roller bearings and hard grease lubrication.

Switchboard—One "Leader" ..... ampere capacity complete switchboard with volt-meter, ammeter, rheostat, circuit breaker, light switch, battery switch and generator switch, all properly mounted and connected by white flame-proof wire on back of panel. Size of panel to be 16" x 20" x 1", of best black electrical slate and to be provided with iron pipe supports.

Battery—One "Leader" sealed rubber-jar type storage battery of 16 cells suitable for 32 volts normal working current and having capacity for supplying ..... amperes or ..... 20-watt tungsten lamps for eight hours when fully charged. Battery to be provided with lead tape and lead covered bolts for all connections and furnished with hydrometer syringe and complete instruction book.

Belt—One endless leather flexible belt ..... inches wide by ..... feet long.

Power—One ..... H.P. "Leader" gasoline engine equipped with driving pulley, tools and exhause muffler, complete.

CAPACITIES, DIMENSIONS, PRICES AND WEIGHTS

		No. 0	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Generator	Size..... Speed..... Capacity*.....	½ K. W. 2400 R. P. M. 25 Lamps	1 K. W. 2000 R. P. M. 50 Lamps	1 K. W. 2000 R. P. M. 50 Lamps	1 K. W. 2000 R. P. M. 50 Lamps	1½ K. W. 2000 R. P. M. 75 Lamps	1½ K. W. 2000 R. P. M. 75 Lamps	2 K. W. 2000 R. P. M. 100 Lamps	2 K. W. 2000 R. P. M. 100 Lamps
Switchboard Capacity, Amps.		30	30	30	30	60	60	60	60
Battery Capacity when Fully Charged*	3-Hour Rate.....	12 Amps. or 19 Lamps	20 2-3 Amps. or 33 Lamps	31 Amps. or 49 Lamps	41 1-3 Amps. or 66 Lamps	51 2-3 Amps. or 83 Lamps	62 Amps. or 99 Lamps	72 1-3 Amps. or 116 Lamps	82 2-3 Amps. or 132 Lamps
	5-Hour Rate.....	8 Amps. or 13 Lamps	14 Amps. or 22 Lamps	21 Amps. or 33 Lamps	28 Amps. or 45 Lamps	35 Amps. or 56 Lamps	42 Amps. or 67 Lamps	49 Amps. or 78 Lamps	56 Amps. or 90 Lamps
	8-Hour Rate.....	5⅛ Amps. or 9 Lamps	9¾ Amps. or 15 Lamps	14⅜ Amps. or 23 Lamps	19½ Amps. or 31 Lamps	24⅝ Amps. or 39 Lamps	29¼ Amps. or 46 Lamps	34⅛ Amps. or 54 Lamps	39 Amps. or 62 Lamps
Battery Charging Rate, Amps.	Normal..... Maximum.....	5 8	10 14	15 21	20 28	25 35	30 42	35 49	40 56
Belt [illegible] Flexible Leather.....		2" x 15'	2½" x 15'	2½" x 15'	2½" x 15'	3" x 15'	3" x 15'	3½" x 15'	3½" x 15'
Floor Space Required for Cabinet and [illegible]		15" x 60"	18" x 66"	18" x 66"	22" x 67"	25" x 69"	28" x 69"	31" x 71"	34" x 71"
Cu. Dimensions Assembled Plant Boxed for Export		Width.....21" Length....66" Height....38"	24" 72" 38"	24" 72" 38"	28" 73" 38"	31" 75" 38"	34" 75" 38"	37" 77" 38"	40" 77" 38"
Approx. [illegible] Weight, Lbs.	[illegible] and Separate Parts Plant	535	725	805	1075	1320	1500	1800	1 50
List Prices without engine†	Assembled Plant..... Separate Parts Plant...	$430.00 $445.00	$490.00 $505.00	$550.00 $565.00	$610.00 $625.00	$725.00 $665.00	$785.00 $725.00	$885.00 $820.00	$945.00 $880.00
[illegible] Engine Recommended List Prices and Weight		1 H. P.; $70 200 lbs.	2 H. P.; $116 350 lbs.	2 H. P. $116 350 lbs.	2 H. P., $116 350 lbs.	3 H. P.; $150 450 lbs.	3 H. P.; $150 450 lbs.	4 H. P.; $184 560 lbs.	4 H. P.; $184 560 lbs.

* Lamps—Capacities are based on 25-Watt Tungsten Lamps which produce a 16 candle-power light.

† Extreme height of top of switchboard on assembled plants is five feet above floor.

‡ Belting is not included [illegible] Same can be furnished for any size of plant mounted and connected on switchboard at list price of $36.00

Types of engines are separate and must be added to price of Separate Plant.

The engine recommended in each case is of the smallest horse power that can be used with satisfaction and economy for driving generator only. If other power-driven appliances are to be operated, a larger [illegible] power should be made.

Continued on next page

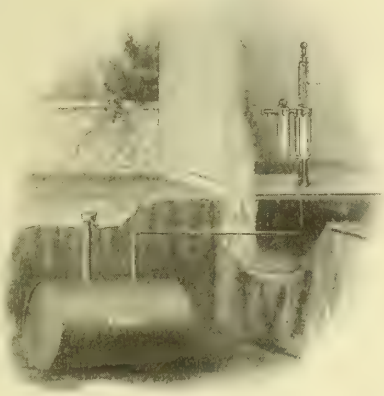
"Leader" Gasoline Storage Equipments.

"Leader" Gasoline Storage Outfits are built on the underground principle.

They permit quantity buying at quantity prices and prevent excessive evaporation. They include anti-drip pumps. They are approved by the National Board of Fire Underwriters, consequently they will not affect insurance rates.

A storage tank can be so installed that a gasoline pump on a stationary engine will draw its supply directly from the tank and, at the same time, gasoline for the automobile or other uses may be pumped in the regular way.

We can furnish from stock, gasoline tanks ranging in capacity from 60 to 560 gallons and built to any specification required.



TYPICAL "LEADER" GASOLINE STORAGE INSTALLATION

"Leader" Long-Distance Measuring Pump, Fig. 203—This pump is adjusted to measure gallons, half gallons, quarts or pints at a stroke; is built of cast and wrought iron with cylinders, valves, stuffing-box and piston-rods of brass; cut-steel gears are used, and the construction throughout is of the best. It is finished in vermilion enamel, with nickel trimmings. Capacity, 10 gallons per minute.

"Leader" Pumps for Inside Use, Figs. 201 and 301—Fig. 201 has a capacity of 5½ gallons per minute at 40 strokes. It is made with heavy seamless brass cylinder and brass valves, and is fitted with a nickel-plated antidrip cock, and locking device. Our 301 pump is of the same design but has capacity of 8 gallons per minute.

Private Garage Pump, Fig. 121—Fig. 121 is similar in construction to Fig. 201, with the exception that it is a straight-draw pump. The pump cylinder is made of heavy seamless brass tubing. The piston proper, valves and gland are of heavy brass.

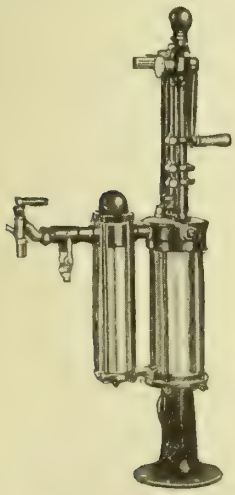


FIG. 203 "LEADER" LONG-DISTANCE MEASURING PUMP

FIG. 121 PRIVATE GARAGE PUMP

"Leader" Gasoline Storage Tanks.

"Leader" tanks, built for underground storage of gasoline and other hazardous fluids, may be furnished in either the riveted or welded types, black or galvanized.

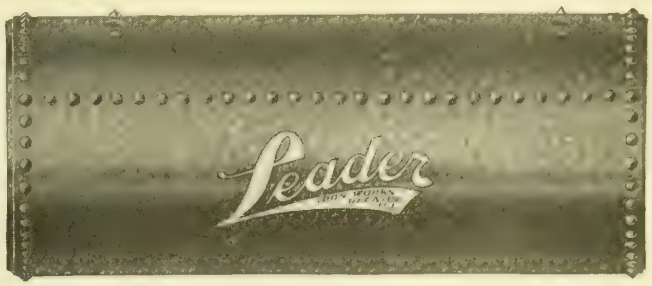
The tanks listed below are regular sizes and can be shipped promptly. Aside from these regular styles, we can build to specification any style or size of tank for special storage requirements.

The lightest material used in black riveted gasoline storage tanks is No. 7 ($\frac{3}{16}$-inch). All tanks are coated with rust-proof paint.

Unless otherwise specified, all gasoline storage tanks up to and including 180 gallons' capacity are tapped for 1¼-inch suction pipe. All tanks over 180 gallons' capacity are tapped for 1½-inch suction pipe, except when used with Fig. 199 or Fig. 204 pumps; then they are tapped for 2-inch suction pipes. All sizes are tapped for 2-inch filler pipes.

The lightest material used in galvanized riveted gasoline storage tanks is No. 10 ($\frac{9}{64}$ of an inch) in the shell and No. 7 in the heads. The tanks are galvanized by the hot process, inside and out.

All riveted seams are done on hydraulic machines under a uniform pressure. Afterwards they are caulked by air hammers, steel on steel, and made absolutely tight under pressure. All sizes can be furnished in black or galvanized.



"LEADER" GASOLINE STORAGE TANK

DATA, "LEADER" GASOLINE STORAGE TANKS

Size	Capacity, Gallons	Thickness Shell, Gauge No.	Thickness Head, Gauge No.	Weight, Pounds	List Price
BLACK RIVETED					
20 x 51	65	7	7	237	$28.00
24 x 62	115	7	7	344	36.00
30 x 61	180	7	7	422	42.00
36 x 54	235	7	7	497	49.00
36 x 68	295	7	7	569	55.00
36 x 80	350	7	7	693	64.00
36 x 97	420	7	7	765	77.00
42 x 95	560	7	7	949	88.00
48 x103	800	7	7	1290	106.00
60 x 83	1000	7	¼"	1488	127.00
GALVANIZED RIVETED					
20 x 51	65	10	7	193	38.00
24 x 62	115	10	7	276	50.00
30 x 61	180	10	7	323	57.00
36 x 54	235	10	7	409	70.00
36 x 68	295	10	7	481	81.00
36 x 80	350	10	7	567	93.00
36 x 97	420	10	7	626	110.00
42 x 95	560	10	7	775	127.00
48 x103	800	10	7	985	158.00
60 x 83	1000	10	¼"	1250	192.00
GALVANIZED WELDED					
24 x 36	65	16	14	185	20.00
30 x 36	100	14	12	175	33.00
30 x 60	175	14	12	245	47.00
30 x 84	250	12	12	325	76.00
30 x 96	285	12	12	365	84.00
36 x 84	355	7	7	700	161.00
36 x 96	410	7	7	810	180.00
36 x132	565	7	7	1075	235.00

UNITED PUMP & POWER CO.

Manufacturers of Individual Fresh Water Systems

TELEPHONE, Lake 3200 MILWAUKEE, WIS.

Products.

Fresh Water Systems for Country and Suburban Homes, Farms, Hotels, Dairies and Factories.

Description.

This System is an independent system of water supply, constructed to deliver live, fresh water direct from well, spring, lake or cistern to faucets without intermediate storage; is operated by compressed air; and, being frost-proof, is ready for service at all times, regardless of climatic changes.

Advantages.

With our Fresh Water System there is no storage of water and, therefore, no deterioration in quality. At the faucet the water is as clear and germless as in the well, spring, lake or cistern, and is delivered at the temperature of the water in the well or spring, both winter and summer. Our Fresh Water System insures a supply of drinking water at every faucet, free from sediment or rust or cultures, and there is no storage tank to clean.

Construction.

When available, electric power is used; otherwise any gas or gasoline engine is serviceable and economical to drive the air compressor.

Both air and water pipes lead from the well up through a sump pit, deep enough below the ground surface to afford immunity from heat or frost and is an additional safeguard against freezing.

The Electric Controller, shown on the wall between switch and pressure gauge, regulates and keeps the pressure in the air tank within predetermined limits. The small air trap provides a steady flow of water to the faucets, and the Pressure Maintaining Valve automatically adjusts the pressure of the air on the pump to just the force essential to lift the water, overcome friction, and provide a constant even pressure at the faucet and on the fixtures.

The perfection of this automatic control is peculiar to our system.

The Fresh Water Pump is located at the proper depth in the well casing, and is in operation only while water is being drawn. The action automatically ceases when the faucets are closed, so that power is only used while the water is being drawn.

Specific Data Requirements.

As the successful operation of a Water Supply System depends entirely upon selecting the proper equipment to fit the local conditions, we give herewith the data that must be obtained in order that an equipment shall be selected that will lift the water to the points where it is to be used in the quantities required without unduly taxing the equipment and with proper reserve capacity for emergencies. Obtain the correct answers to the questions asked, taking actual

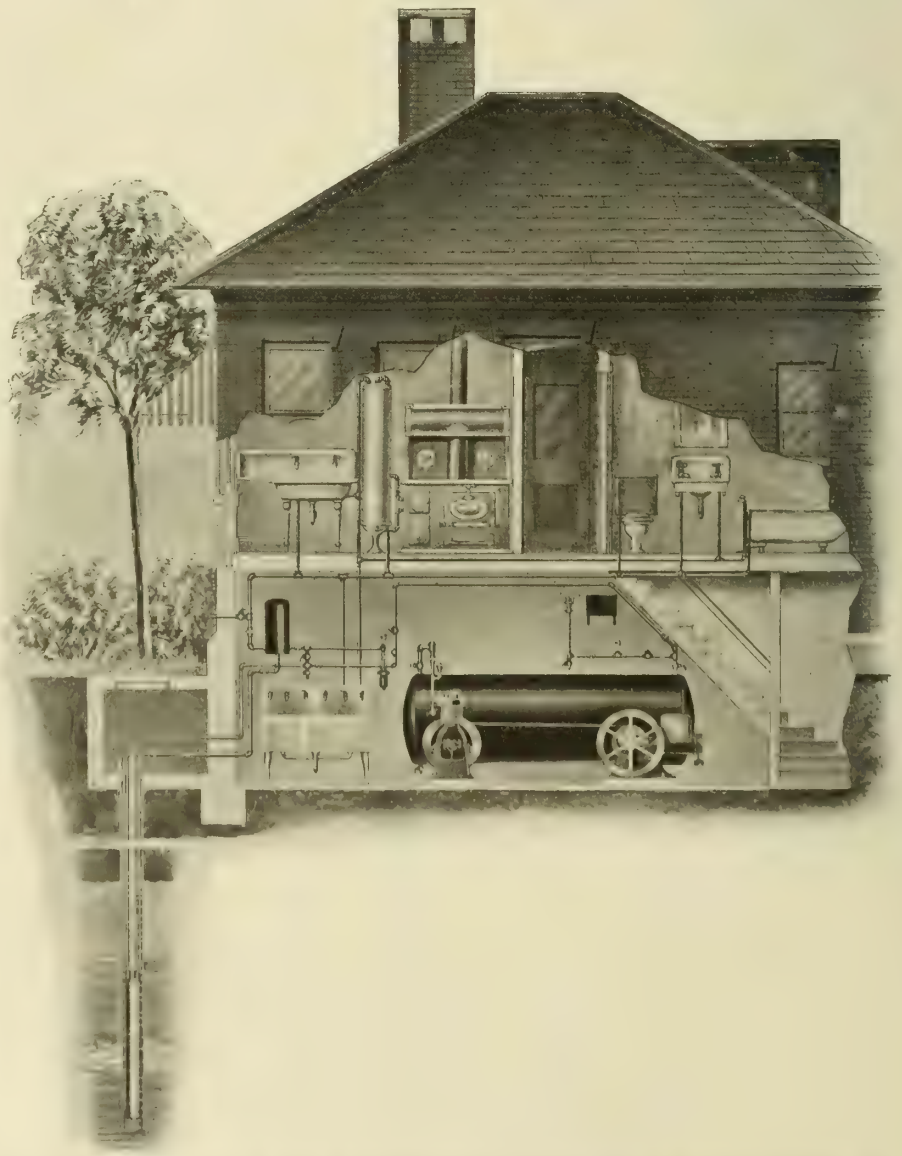


ILLUSTRATION SHOWS FRESH WATER SYSTEM INSTALLED IN THE BASEMENT OF A RESIDENCE

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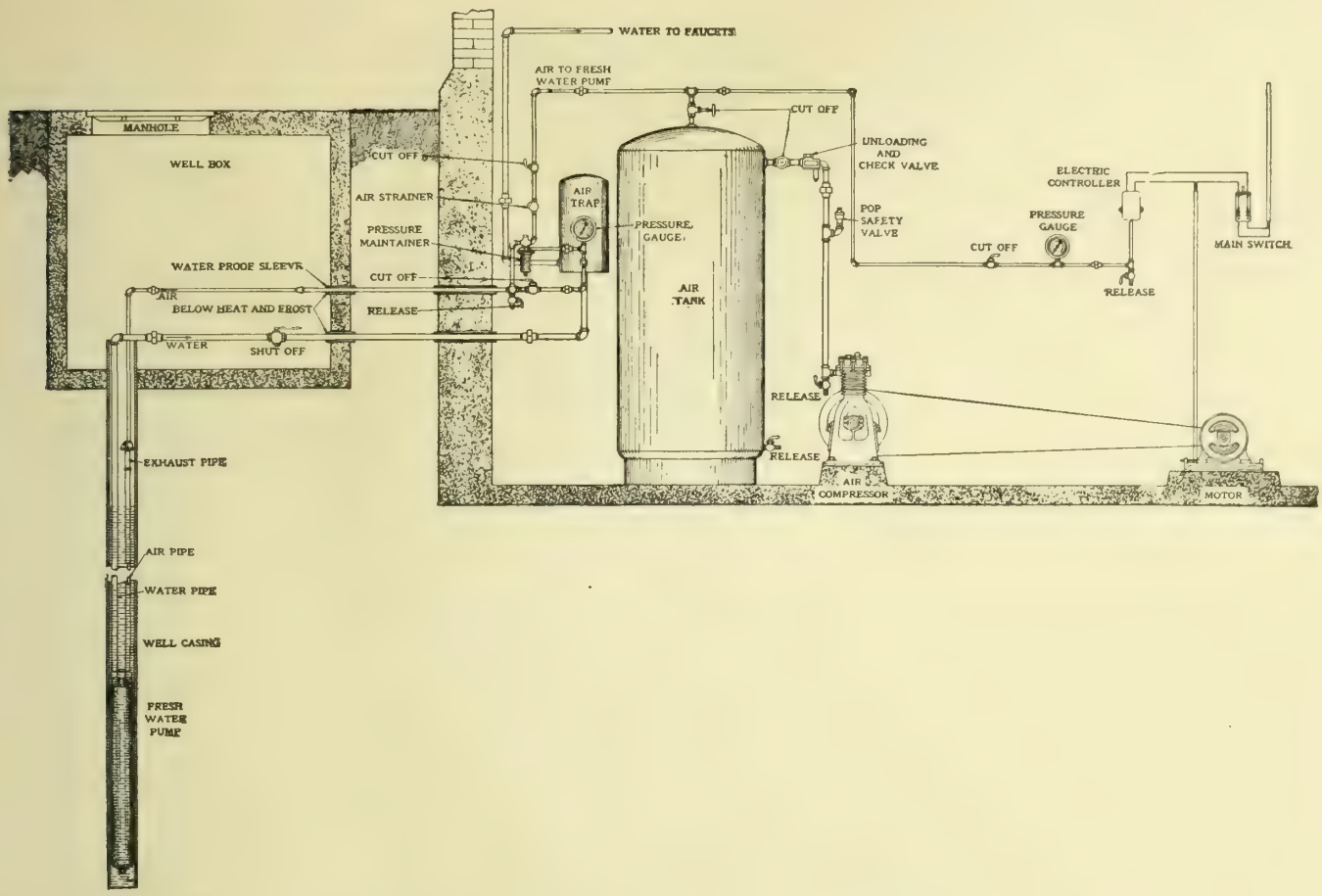


DETAIL OF INSTALLATION OF FRESH WATER SYSTEM, OPERATED BY AN ELECTRIC MOTOR
A gasoline engine may be used where electricity is not available

measurements of distances and elevations requested, and if necessary make a test upon the well in order to determine if it has the capacity that will be required of it. An ample supply of water is the first requirement and it is the first factor to be definitely ascertained.

(1) State source of water supply [well, cistern, spring or lake]?

(2) If a well, what is its smallest inside diameter?

(3) What is depth of water in well?

(4) Total depth of well?

(5) Pumping a given number of gallons per minute, how many feet does water in well fall in a given number of minutes? (Exactitude in this test is important as upon it depends the question of the well's capacity to yield the required supply of water.)

(6) How high is the water to be delivered, measuring from the ground level at the well to the highest fixture?

(7) Daily consumption in gallons?
How many persons supplied?
How many head of stock?
How many bathtubs?
How many showerbaths?
How many sinks?
How many laundry tubs?
How many faucets in barn?
How many lavatories?
How many closets?
How many lawn faucets?
How many stock tanks?
How many other connections?

NOTE—For each person using the system allow 30 to 50 gallons per day; for every horse to be watered, 9 to 14 gallons per day; for every head of stock, 10 to 15 gallons per day; for every head of sheep, 4 to 6 gallons per day; for every hog, 4 to 6 gallons per day.

(8) How many square feet of lawn and garden to be watered?

(9) Do you wish to use gasoline engine or electric motor?

(10) If electric motor, state voltage [.....] and whether the current is direct or alternating [.....]. If alternating, state whether 1, 2 or 3 phase [.....] and number of cycles [.....]. Is the electric service continuous?

(11) If you wish power for any purpose other than supplying water, give particulars.

(12) Do you want water both from rain-water cistern and well?

NOTE—The addition of an extra soft water pump to the Fresh Water System is all that is required to supply cistern water to the soft water fixtures.

(13) If you desire tank located in basement give size of opening through which tank can be admitted.

NOTE—With a Fresh Water System the tank contains air only. It is frost-proof, and can be located anywhere.

After having obtained the above information send it to your most reliable plumbing jobber and he will specify the fresh water equipment most suitable for the conditions. If the conditions are unusual the services of our engineers, who are experts in fitting water supply systems for suburban residences, are at your disposal free of charge.

THE STANDARD PUMP & ENGINE CO.

Pumping Units for Water Supply

AKRON, OHIO

Products.

STANDARD PUMPING UNITS FOR WATER SUPPLY; HAND-PUMP, AUTOMATIC-ELECTRIC and ENGINE-DRIVEN WATER SYSTEM, including SUCTION LIFT and DEEP WATER TYPES; COMBINED WATER AND LIGHTING PLANTS.

TRADE-MARK

Adaptability and Efficiency.

Standard Pumping Units are almost universally adapted to water supply requirements. During the past fifteen years they have been placed in service for country estates, residences, summer and winter resorts, hospitals, infirmaries, sanatoriums, industrial plants, etc.

Because of their simplicity of design they require little attention and care and can be operated by those not skilled in the use of machinery. Being self-contained, they are economical, as there is no loss of power due to extra shafts, belts and pulleys; being compact, they require little space and are easily installed.

Designs.

We have designed our machines with care, keeping in view the fact that they must be simple, durable and reliable, so that they will operate satisfactorily under adverse conditions. Every machine is carefully tested and guaranteed.

It is our aim to maintain our standard designs and interchangeability of parts, so that purchasers will in later years be able to obtain repair parts required without delay or difficulty.

Automatic-Electric Water Systems.

When electricity is available and the cost of operation is not prohibitive this type of water supply system is preferred to the engine-driven type, where there are no employees to start and look after the engine, which, necessarily, requires a little more attention. Under this system the pressure of the air and water in the tank is controlled by an automatic switch which starts the motor at low pressure and allows it to operate until the predetermined high pressure is reached, when the switch automatically stops the motor. These systems are made from ½ to 7½ horse-power size, with capacities from 200 to 4000 gallons per hour to 100 pounds' pressure. Both Suction Lift and Deep Well Types.

Gas Engine-Driven Water Systems.

The application of engine-driven pumping units to the pneumatic pressure type of water supply systems is similar to that in which electric motor pumping units are used. The engine-driven units are made in 1, 2, 4 and 6 horse-power sizes, with capacities from 400 to 4000 gallons per hour to 100 pounds' pressure. In both Suction Lift and Deep Well Types.

Air Compressors.

Air pump attachments are built into the pump frame and furnished when desired.

Tanks.

Tanks are supplied in vertical or horizontal types in any desired size. Either welded or riveted.

Facilities.

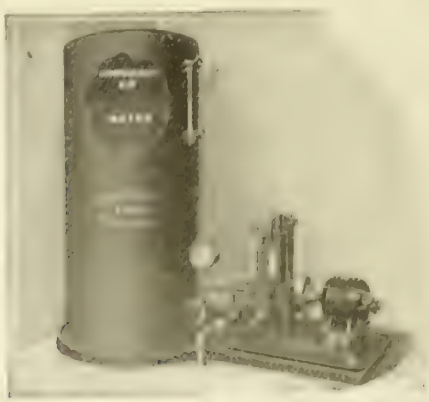
There is no other organization in this line of manufacture that has better facilities for handling its work in an economical way. We have our own iron, steel and brass foundries, with a large machine department equipped with the most modern machinery.

Co-operative Engineering Service.

Our engineering department is managed by men whose long experience in this line of work enables them to select the best possible combination of units for any given condition. The assistance that this department can render architects, engineers and contractors is often of great value and is a part of the service that we offer to our customers.

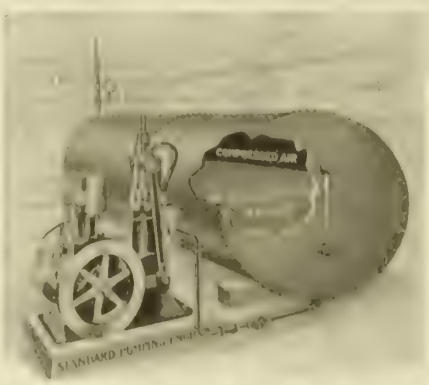
Catalogue.

Our Catalogue, with most complete illustrations, comprehensive descriptive matter, foundation diagrams and table of information, sets forth in full and clear detail the facts that purchasers need in selecting equipment for their requirements. This Catalogue, with prices, sent promptly, on request.



STANDARD SELF-CONTAINED ELECTRIC WATER SYSTEM

This outfit is neat and compact, is well designed and substantially built, requires very little attention, and where electricity is available it makes a perfect water system for a small home, as it is completely automatic, having automatic stopping and starting switch, and air pump for supplying air.



STANDARD GAS OR GASOLINE ENGINE WATER SYSTEM

The outfit consists of a suction lift pumping engine in connection with horizontal pressure tank, including pressure and water gauges, pipe, valves, and fittings. This system is supplied in 1, 2, 4 and 6 horse-power sizes.

YEOMANS BROTHERS COMPANY

Manufacturers of Electric Pumping Machinery

MAIN OFFICE AND FACTORY

231 Institute Place

CHICAGO, ILL.

GENERAL AGENTS FOR SHONE CO.

AGENCIES

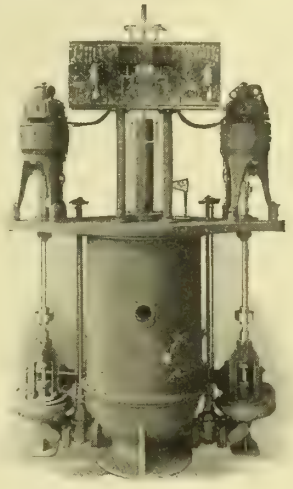
NEW ENGLAND: BOSTON, Power Equipment Co., 131 State Street
NEW YORK and VICINITY, E. A. Julie, 307 Vanderbilt Avenue Building; 51 East 42nd Street
PHILADELPHIA, BALTIMORE and WASHINGTON, DeWitt W. Smith, 1001 Commercial Trust Building, Philadelphia, Pa.
PITTSBURGH, N. C. Davison Gas Burner & Welding Co., 3145 Penn Avenue
CLEVELAND, Cleveland Pump & Supply Co., 416 Citizens Building
MINNEAPOLIS and ST. PAUL, Healy-Ruff Co., Plymouth Building, Minneapolis, Minn.
SAN ANTONIO, TEX., Alamo Iron Works
PORTLAND, ORE., Edw. G. Gordon, 222 Pine Street
SEATTLE and TACOMA, WASH., A. H. Cox & Co., 309 First Avenue, Seattle, Wash.
VANCOUVER, B. C., Pumps & Power, Ltd., 224 Abbott Street
SAN FRANCISCO, California Hydraulic and Engineering Supply Co., 70 Fremont Street.
LOS ANGELES, F. C. Millard, Marsh-Strong Building
DENVER, Hendrie & Bolthoff Mfg. & Supply Co., 1621 17th Street
RICHMOND, VA., V. Bacigalupo, 418 American National Bank Building
BIRMINGHAM, ALA., General Machinery Co., Brown-Marx Building
SALT LAKE CITY, Thos. A. Williams, Scott Building
MONTREAL, WINNIPEG, TORONTO, CALGARY, CAN., Darling Brothers, Ltd., Montreal, Can.

Products.

Yeomans Duplex Electric Sewage Ejector; Yeomans Electric Bilge Pump; Yeomans Electric House Pump; Yeomans Hot-Water Return Pump.

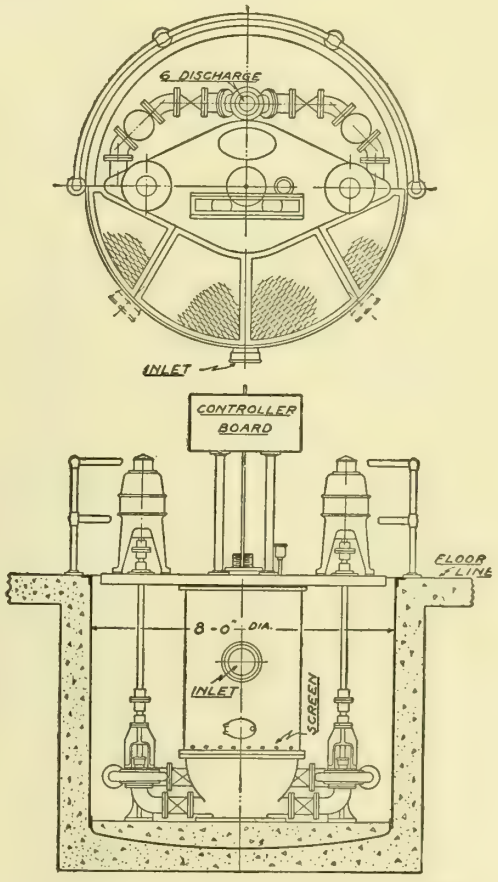
Description of Products.

Yeomans Type "A" Duplex Electric Sewage Ejector—An automatic centrifugal ejector for use where it is necessary to lift sewage or drainage to a higher level. Any desired number of gallons per minute can be discharged against any desired head. The ejector is composed of two units, each of which is capable of doing the required work, except under emergency conditions when the second unit automatically adds its capacity to the first until normal conditions are restored. The ejector requires a circular floor space of about ninety-six inches diameter; is absolutely odorless, noiseless and automatic. Capacities shown on attached table.



TYPE "A" EJECTOR

Yeomans Electric Bilge Pump—An automatic self-contained, heavily built pump, of capacities as shown on attached table (made complete with cast-iron basin where desired), for handling waste water under any conditions where electric power is available. These pumps can be used with closet fixtures up to a number of one to five, in sizes not smaller than No. 4. Where larger numbers of closets are used, the pump should be used in duplicate for the sake of safety; and when the number is more than ten, the Type "A" ejector should be used.



TYPE "A" DUPLEX ELECTRIC EJECTOR
Showing Location in Pit

DATA, STANDARD TYPE "A" EJECTORS

Ejector No.	Gals. per min., each unit	Gals. per min., total	Max. head above bot. pit, ft.	Diam. of pit, ft.	Diam. of Receiver, ft.	Depth of pit below inlet, ft.	Size discharge each unit, ins.	Size discharge riser, ins.	H.P. each motor	Shipping Weight, lbs.
3	100–125	200– 250	30	8	3	4	4	4	3	9,500
4	150–200	300– 400	30	8	3	4	4	6	[illegible]	10,000
5	250–350	500– 700	30	8	4	4	4	6	[illegible]	11,000
6	400–500	800–1000	30	10	5	5	5	8	10	15,000

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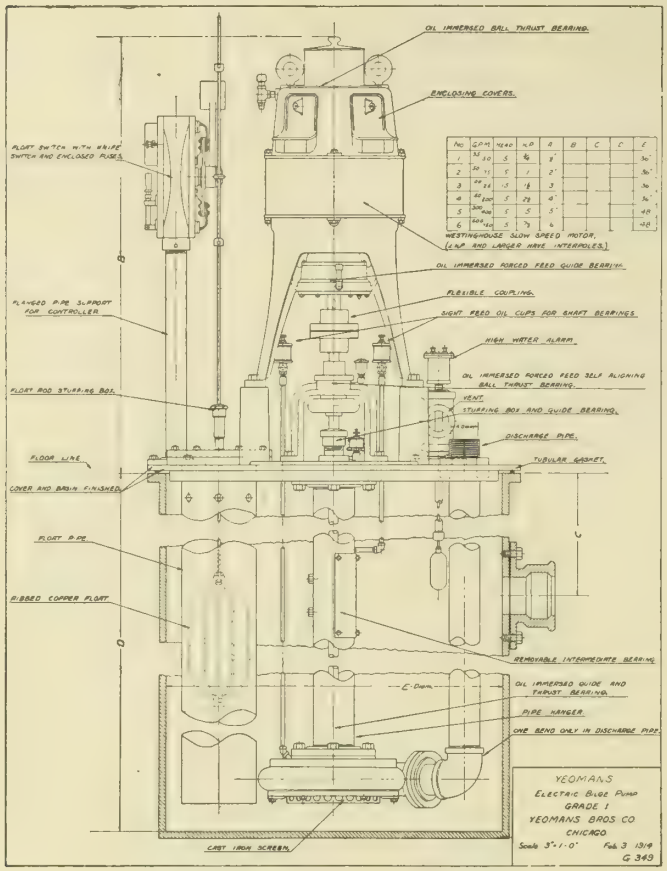
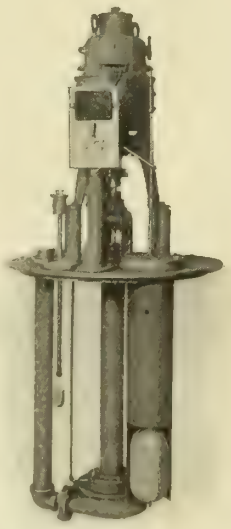


DETAILS OF GRADE 1 BILGE PUMP

Pump No.	Gals. per min.	Head, ft.	Horse-power	Discharge pipe, ins.	E, ins.
½	15 to 25	15 to 30	½ to 1	1¼	24
1	35 to 50	15 to 30	¾ to 1½	1½	36
2	50 to 75	15 to 30	1 to 2	2	36
3	100 to 125	15 to 30	1½ to 3	3	36
4	150 to 200	15 to 30	2½ to 5	4	36
5	300 to 400	15 to 30	5 to 7½	5	48
6	500 to 750	15 to 30	7½ to 10	6	48



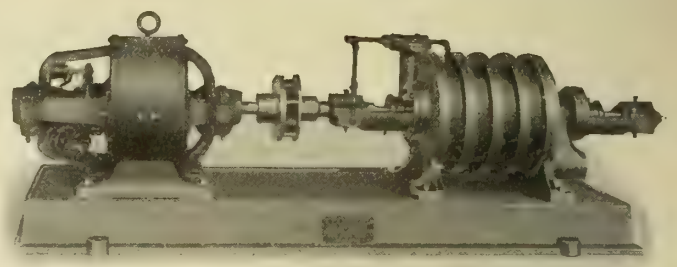
GRADE 1 BILGE PUMP

Yeomans Centrifugal House Pumps—The latest centrifugal type with ring oiled, water cooled, outboard bearings and bronze impellers, perfectly balanced.

Yeomans Hot-Water Return Pumps—Complete with receivers and automatic control; designed to take care of condensation in low pressure heating systems and return it to the boilers automatically.

Adaptability.

Our pumps are adapted to all classes of buildings, under all conditions where electric current is provided.



HOUSE SERVICE PUMP, 5-STAGE
Capacities as desired from 10 to 200 gallons per minute

Capacities.

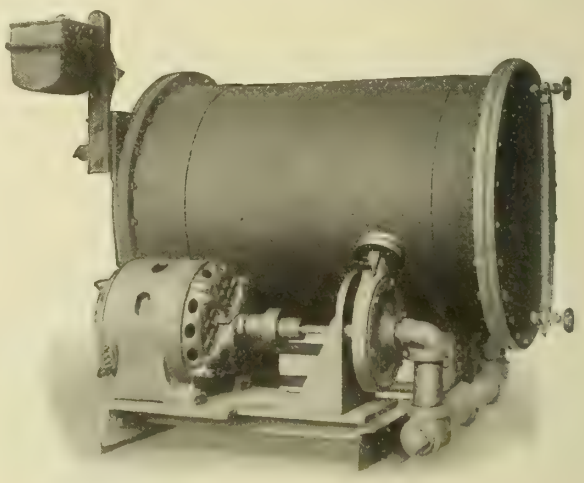
The capacities are shown in the tables applying to each type of pump.

Installation.

Pumps can be installed by any mechanic in accordance with instructions which we will furnish.

Prices.

Prices can be furnished only upon receipt of necessary data, and description of requirements as comprised in specification forms following.



TYPE "H" CONDENSATION PUMP

Pump No.	Maximum square feet direct radiation	Gallons per min.	Horse-power of Motor
1	1,000	5	½
2	3,000	10	½
3	6,000	15	¾
4	10,000	20	¾
5	15,000	30	1
6	30,000	60	2
7	50,000	100	3

Specification Forms.

Covering Form A, Duplex Ejector Installation—There shall be furnished and installed, in location indicated in building plans, a Yeomans Form A Duplex Electric Sewage Ejector having a total capacity of ..... gallons per minute against a total discharge head of ..... feet, measuring from floor level at ejector location. Ejector to have a 36-inch [48-inch] diameter cast-iron sewage receptacle with 36-inch cast-iron screen accessible by hand without removing or interrupting service. This ejector shall be driven by slow speed motors 550 [850, 1150] R.P.M. suitable for the current supplied (if direct current, the motors shall have commutating poles), and of ample capacity to operate the ejector without undue heating, vibration or other signs of distress.

The armature and pump shafts shall be connected by flexible couplings. Pump shafts bronze covered and supported at pump and also at floor level by ball thrust bearings force feed lubricated. The automatic controlling devices shall be so

(Continued on next page)

arranged that should the flow of sewage to the ejector exceed the capacity of one pump the other machine will start automatically and the two pumps operate simultaneously until normal conditions are restored, when the second pump will cease to operate. Check and gate valves shall be provided on the discharge of each unit. The ejector shall be so constructed that either pump and motor may be disconnected and removed without interrupting operation of the other and that the motors and controllers may be used interchangeably. The float shall be of heavy reinforced copper, and shall run in metal casing. The switchboard shall be mounted above and between the motors, and shall consist of two panels with main line switches, fuses and self-starters of the vertical butt contact type for each motor. If power service is polyphase alternating current, there shall be supplied for each motor a Yeomans Protective Relay.

A high water alarm shall be furnished with ejector. Also, necessary valves and connections for removing water from ejector pit. This contractor shall furnish a steel ejector pit ¼-inch shell, ⅜-inch dished bottom with 3-inch angle riveted around top, 8 feet in diameter and 4 feet deeper than center of lowest drain entering the ejector, with necessary inlet openings on same as required. Excavation for this pit shall be made by another contractor, but when excavation is ready, this contractor shall put 12 inches of concrete on bottom of same, and after setting the shell, shall place 8 inches of concrete around it, well tamped, the top of the ejector pit to be left flush with finished floor.

A pipe rail shall be furnished around the ejector pit.

Provision must be made for taking care of all drainage during construction of building by a temporary pump, as this ejector is not to be completed and operated until the owner's engineer is in charge.

Electric wires will be brought to the switchboard of the ejector by another contractor, but the ejector contractor shall make final connections and leave ejector in operating condition.

Inlet and outlet connections shall be made by another contractor, but the ejector contractor shall leave openings as required.

A guarantee for one year must be furnished by the manufacturer.

Covering Yeomans Electric Bilge Pump Equipment—There shall be furnished and installed in location indicated on building plans a No. ..... Yeomans Electric Bilge Pump Grade 1 [Grade 2] complete with motor suitable for the current supplied. Capacity ..... gallons per minute ..... feet head.

Motor shall be vertical slow speed, of ample capacity to perform the above duty without heating, vibration, sparking or any indication of overload. Motor shall be enclosed type, dust and splash-proof. (If direct current 2 horse-power or greater, the motor shall have commutating poles.) Bearings self-lubricating and commutator thoroughly protected from oil.

Coupling shall be flexible.

Thrust bearing shall be lined with genuine babbitt, self-lubricating, and support entire weight of pump shaft and runner.

Cover shall be suitable for basin..... inches in diameter and shall be cast iron with 11 x 14 manhole and faced rim. Basin will be of cast iron [cement, brick], and will be ..... feet deep or three feet deeper than lowest drain entering same. It will be furnished by this [another] contractor. Automatic control shall be mounted upon cover and shall consist of standard float-operated motor starter, knife switch and fuses encased in iron box, and be actuated by a copper float with brass rod connection running in a guide pipe of suitable length.

In case current is polyphase alternating, there shall be furnished with controller a Yeomans Protective Relay.

An automatic high water alarm shall be supplied, so adjusted as to ring a bell continuously in case pump should fail to start after water reaches a predetermined level.

The entire apparatus must be guaranteed for one year.

Provision must be made for taking care of all drainage during construction of building by a temporary pump, as this bilge pump is not to be installed until the owner's engineer is in charge. Electric wires will be brought to pump location by another contractor, but the pump contractor shall complete connections to his switchboard and motor.

Covering Gravity House Supply System (Storage Tank on Roof)—There shall be furnished and installed a Yeomans Electric House Pump with bronze impeller and external ring oiled, self-contained bearings, to be located where shown on building plans, complete with direct-connected motor suitable for the electric current supplied to the building, concrete foundation, cast-iron sub-base and automatic controlling apparatus. The pump shall have a capacity of ..... gallons per minute against a total head of ..... feet, with city pressure of ..... pounds on suction, and motor shall be of ample capacity to drive the pump under these conditions without undue heating, vibration or sparking at the brushes. (If direct current, the motor shall have commutating poles). Motor and pump shall be connected by flexible coupling. Controlling apparatus shall consist of a single pole float switch, installed at the roof tank and actuated by float in tank with chain, pulleys and counterweight, this float switch to be connected by a single No. 14 twin wire run in conduit to a solenoid self-starter at pump location. The starter shall be of the butt contact type. A double pole, single throw fused knife switch shall also be supplied at pump location. If electric current is polyphase alternating, there shall be supplied a Yeomans Protective Relay in connection with the controller.

Wires will be brought by another contractor to an outlet within 10 feet of pump location, and this contractor shall make all electrical connections from this outlet to motor and controller, and shall take out and pay for all city wiring permits.

Covering Automatic Compression Water System (No Roof Tank)—Furnish and install in location indicated on building plans a Yeomans Automatic Electric Compression Water System complete with Yeomans motor-driven direct-connected pump having a capacity of ..... gallons per minute against a pressure of ..... pounds per square inch at pump discharge with city pressure of ..... pounds on pump suction (or, with suction lift of ..... feet). Also, a steel compression tank with a total capacity of ..... gallons, installed on proper supports and supplied with all necessary openings, pressure gauge and water glass. This tank shall be tested under ..... pounds per square inch air pressure before delivery. Furnish also a Yeomans Automatic Pressure Regulator, Butt Contact self-starter, knife switch and fuses. If current is polyphase alternating, furnish also a Yeomans Protective Relay. Motor shall be suitable for the power service supplied to the building and shall be of ample capacity to operate the pump without sparking, overheating, vibration or other signs of distress. If direct current, the motor shall have commutating poles. Pressure regulator shall be so adjusted as to maintain the above stated pressure with a variation of not over 15 per cent. Furnish also a motor-driven air compressor of proper capacity for maintaining at all times necessary air cushion in compression tank. This compressor shall be supplied with hand starter, knife switch and fuses.

Wires will be brought by another contractor to an outlet within ten feet of pump location, and this contractor shall make all electrical connections from this outlet to motor and regulator and shall take out and pay for all city wiring permits.

References.

Yeomans ejectors, bilge pumps or house pumps are installed in the following well known buildings where *quality* was a first consideration. And in hundreds of others, these being merely typical.

BOSTON: Touraine Hotel, Filene Store, Merchants National Bank, Boston Elevated Railway Station, State Mounted Armory, etc.

NEW YORK: Bellevue Hospital, McCreery Store, Post Graduate Hospital, Samaritan Hospital, Palace Theater, Bamberger Store, Newark, etc.

PHILADELPHIA: Wanamaker's Store, Ritz-Carlton Hotel, etc.

WASHINGTON: Union Depot.

BIRMINGHAM: Tutwiler Hotel.

NASHVILLE: Hermitage Hotel.

ST. LOUIS: Grand Leader Store, Railway Exchange Building, etc.

PITTSBURGH: Frick Building, Oliver Estate Building.

ST. PAUL: Hill Building.

INDIANAPOLIS: Severin Hotel, Merchants National Bank, etc.

DAYTON: Miami Hotel.

KANSAS CITY: Union Depot.

OMAHA: Union Electric Light & Power Co.

SALT LAKE CITY: Utah Hotel.

NEW ORLEANS: Hibernian Bank, Terminal Station.

SAN FRANCISCO: Alaska Commerce Building, U. S. Custom House, Pacific Union Club, San Quentin Prison, Spreckles Theater, Municipal Auditorium, Los Angeles Bible Institute, Citizens' National Bank, South Pacific Railway, Depot, etc.

CHICAGO: LaSalle Hotel, Sherman House, Lake Shore Depot, Tribune Building, Sears-Roebuck Building, University Club, Monroe Building, University of Chicago, Chicago Telephone Co., Commonwealth Edison Co., County Building, City Hall, County Hospital, Presbyterian Hospital, etc.

VANCOUVER, B. C.: Parliament Building, Canadian Pacific Railway Hotel, etc.

Refer to Graham, Burnham & Co., Holabird & Roche, Jarvis Hunt, Howard Shaw, or any other well known architect or engineer in any large city.

THE KENNICOTT COMPANY

Equipment for the Purification, Softening, Measurement and Storage of Water

CHICAGO HEIGHTS, ILL.

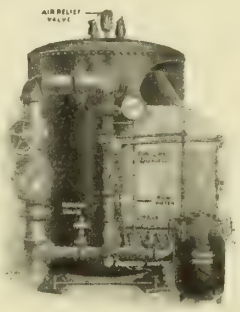
SALES OFFICE: CHICAGO, ILL., CORN EXCHANGE BANK BUILDING
FACTORY AND LABORATORIES: CHICAGO HEIGHTS, ILL.

Products.

KENNICOTT WATER FILTERS and WATER SOFTENERS, CYCLOID WEIR METERS, WATER WEIGHERS, WATER STILLS, CONDENSATION METERS, STANDPIPES, ELEVATED TANKS, PRESSURE TANKS, STEEL PLATE CONSTRUCTION.

Filtration.

Kennicott Filters have been standard for the last twenty years. For factories, office buildings, hotels, swimming-pools, hospitals, laundries, etc. Rate of filtration averages three gallons per square foot per minute, ranging from one and one half gallons for turbid water to five gallons for swimming-pool refiltration.



KENNICOTT VERTICAL FILTER, TYPE "B"

KENNICOTT STANDARD HORIZONTAL FILTER, TYPE "H"

SIZES AND CAPACITIES TYPE "B" VERTICAL PRESSURE FILTERS

Code No.	Size	Area	Inlet and Outlet	Washout	Capacity per hour at 3 gallon sq. ft.
5-B	30"	4.9	1½"	2"	884
6-B	36"	7.1	1½"	2½"	1273
7-B	42"	9.6	2"	3"	1732
8-B	48"	12.6	2"	4"	2263
9-B	54"	15.9	2½"	5"	2863
10-B	60"	19.6	2½"	5"	3533
11-B	66"	23.8	3"	6"	4279
12-B	72"	28.3	3"	6"	5089
13-B	78"	33.2	4"	7"	5972
14-B	84"	38.5	4"	7"	6926
15-B	90"	44.5	4"	8"	7952
16-B	96"	50.3	4"	8"	9049

These sizes can be furnished in multiple units.

SIZE AND CAPACITIES TYPE "H" HORIZONTAL PRESSURE FILTERS

Code No.	Size	Area	Inlet and Outlet	Washout	Capacity per hour at 3 gallon sq. ft.
19-H	8' x 12'	94	6"	6"	16,920
20-H	8' x 14'	109	7"	7"	19,620
21-H	8' x 17' 9"	137	8"	8"	24,660
22-H	8' x 20'	154	8"	8"	27,720
23-H	8' x 24'	183	8"	8"	32,940
24-H	8' x 28'	213	10"	10"	38,340
25-H	8' x 32'	243	12"	12"	43,740
26-H	8' x 36'	272	12"	12"	48,960
27-H	8' x 40'	302	12"	12"	54,360

These sizes can be furnished in multiple units.

Specifications, Vertical Filters, Type "B."

Filters shall be Kennicott or equal, having a capacity of ——— gallons per hour, based on a rate of filtration of ——— gallons per square foot per minute.

Filter shell shall be constructed of open-hearth tank steel of approximately 60,000 pounds tensile strength. Shell shall stand a working pressure of ——— pounds per square inch, factor of safety 4½ to 5.

Filter shall be provided with all immediate valves, fittings, etc., ready for purchasers' connections. All piping shall be galvanized; fittings, cast iron; valves, standard gate or angle pattern, brass trimmed; all fittings above 4 inches to be flanged.

Filter bed shall be white machine crushed quartz, 30 inches in depth, overlaying a layer of gravel ⅛ inch to ½ inch effective size, 15 inches to 20 inches in depth.

Filter shall be provided with a cast-iron pressure coagulant tank equipped with automatic regulating feeding device. Coagulant piping shall be of brass with brass fittings.

Filter shall be provided with duplex pressure gauge for indicating pressure on inlet and outlet, and also proper pressure of applied wash water.

Filter shall be furnished with sampling cocks for raw, filtered and wash water.

Filter shall be provided with an automatic air relief valve to remove accumulated air in top of filter shell.

Filter piping shall be provided with sight glass in wash water line.

Filter shall receive one coat of graphite paint on all outside surfaces.

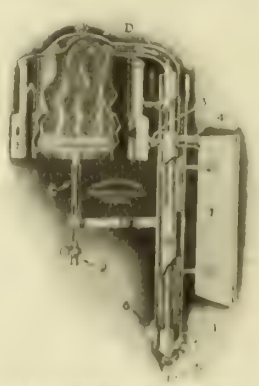
Foundations shall be furnished by purchaser, manufacturer to furnish specifications for same.

Filter shall be guaranteed to deliver a bright water, practically free from all sediment, color and other impurities, due to matter in suspension. The filter shall be guaranteed to reduce the bacteria in the raw water to 97 per cent when the number of bacteria exceed 3000 per C. C., and when number of bacteria is less than 3000 per C. C. the number of bacteria in filtered water shall not exceed 100 per C. C.

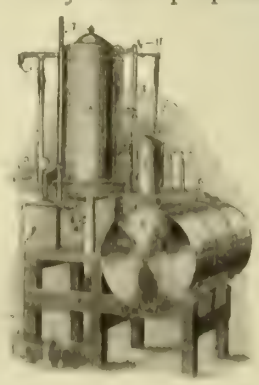
Specifications for Horizontal Pressure Filters furnished upon request.

Distillation.

Kennicott-Polar Water Stills produce distilled water for the manufacture of bottled goods, ice for surgical and hospital use, and many other purposes.



GAS LABORATORY STILL



KENNICOTT POLAR STEAM STILL

Continued on next page

Where purity and cleanliness are essential use a Kennicott-Polar Still. Kennicott-Polar Stills are operated by steam, gas or electricity.

STEAM STILLS, CAPACITIES

Size	Capacity gallons per hour	Floor Space with 500 gallon storage tank	Height with 500 gallon storage tank	Boiler H. P. required
0	5	6′ 9″ x 8′ 3″	9′ 0″	2½
1	10	6′ 9″ x 8′ 3″	9′ 0″	5
2	20	7′ 3″ x 8′ 3″	9′ 3″	8
3	40	7′ 3″ x 8′ 3″	11′ 0″	15
4	60	7′ 6″ x 8′ 3″	11′ 6″	20
5	80	7′ 6″ x 8′ 3″	12′ 0″	25
6	100	9′ 3″ x 8′ 3″	13′ 0″	30

GAS LABORATORY STILLS, CAPACITIES

Size	Capacity gallons per hour	Cubic feet gas per hour
100	½	10
101	1	20
102	1½	30
103	2	50
104	2½	70

Also made for steam.

Specifications, Kennicott-Polar Stills.

Still shall be Kennicott-Polar or equal, having a capacity of ——— gallons per hour; steam, gas or electricity operated. (If electric, state voltage.)

Still shall be made of heavy polished copper and brass throughout, except supporting legs and aerator, which shall be made of cast iron. All piping except overflows shall be of brass.

Still shall be provided with inlet water control, cooler, gauges, and all necessary operating valves. All parts of still coming in contact with distilled water shall be coated with pure block tin.

Still shall be provided with a non-return steam trap of approved design for return of condensing water to boilers.

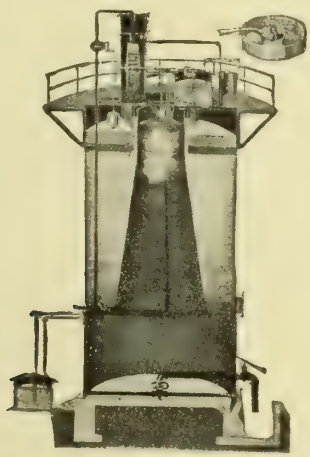
Still shall be equipped with an auxiliary storage tank of ——— gallons for distilled water. (If both hot and cold distilled water are required, state capacity of each tank.)

Still equipment shall be suitably mounted on a wooden supporting platform.

Still shall be guaranteed to deliver distilled water, free from minerals or organic matter, either in suspension or solution.

Softening.

Kennicott Softeners have found universal use in all industries where pure, soft water is an essential to efficient operation. The Kennicott Laboratories and co-operation are at your service.



TYPE "K" KENNICOTT WATER SOFTENER
Interior View, Quartz Filter

CAPACITIES TYPE "K" SOFTENERS, QUARTZ FILTERS

Capacity per hour	Diameter	Height	Inlet	Outlet
500	6′	11′ 9″	1½″	3″ Type BQ
750	6′	14′ 6″	1½″	3″ " "
1,000	8′	11′ 9″	1½″	3″ " "
1,500	8′	17′ 6″	1½″	3″ " "
2,000	8′	23′ 3″	2″	4″
2,500	8′	26′	2″	4″
3,000	9′	26′	2½″	4″
4,000	10′	29′	2½″	4″
5,000	10′	34′ 9″	3″	4″
6,000	12′	29′	4″	6″
7,000	13′ 6″	26′	4″	6″
8,000	13′ 6″	29′	4″	6″
10,000	15′	31′ 9″	4″	6″
12,500	16′	34′ 9″	6″	8″
15,000	18′	31′ 9″	6″	8″
20,000	20′	34′ 9″	6″	8″
25,000	24′	29′	6″	8″
30,000	24′	34′ 9″	8″	10″
40,000	27′	37′ 6″	8″	10″
50,000	30′	37′ 6″	8″	12″
60,000	33′	37′ 6″	8″	12″
80,000	36′	43′ 3″	10″	15″
100,000	40′	43′ 3″	10″	15″

CAPACITIES TYPE "K" SOFTENERS, WOOD FIBRE FILTERS

Capacity per hour	Diameter	Height	Inlet	Outlet
2,000	8′	23′ 3″	2″	2½″
2,500	9′	20′ 3″	2″	3″
3,000	10′	20′ 3″	2½″	3″
4,000	10′	29′	2½″	3″
5,000	12′	20′ 3″	3″	4″
6,000	13′ 6″	23′ 3″	4″	6″
7,000	15′	23′ 3″	4″	6″
8,000	16′	23′ 3″	4″	6″
10,000	16′	26′	4″	6″
12,500	28′	26′	6″	8″
15,000	20′	26′	6″	8″
20,000	20′	23′ 3″	6″	8″
25,000	24′	29′	6″	8″
30,000	27′	29′	8″	10″
40,000	30′	31′ 9″	8″	10″
50,000	33′	31′ 9″	8″	12″
60,000	36′	31′ 9″	8″	12″
80,000	40′	34′ 9″	10″	15″
100,000	45′	34′ 9″	10″	15″

Specifications, Kennicott Softeners.

Softener shall have a capacity of ——— gallons per hour, Kennicott or equal.

Sedimentation tank shall have a capacity of not less than four times the rated hourly capacity of softeners.

The shell of sedimentation tank shall have a minimum thickness of ¼ inch and shall not be less than thickness determined by the following formula:

$$\text{Thickness} = \frac{D \times P \times 5}{60{,}000} \times \tfrac{1}{2} \div E$$

In which D = Diameter of sedimentation tank in inches.
P = Pressure in pounds of water at depth under consideration.
E = Efficiency of the riveted joint at that point.
5 = Factor of safety.
60,000 = Tensile strength of plate in pounds.

The riveting shall conform to the requirements of the Hartford Steam Boiler Insurance Co.

The downtake shall be conical, large end at bottom, material not less than No. 10 B. & S. gauge. Riveting, ⅜-inch rivets, 2-inch pitch, seams well laid up.

The apportioning apparatus shall be designed to handle at least a 12-hour supply, delivering in correct proportions determined by analysis of water.

Softeners up to 10 feet diameter shall have conical bottom with sludge valve; above 10 feet diameter softener shall be provided with revolving sludge remover.

Softener shall be provided with automatic alarm for chemical supply. A chemical testing outfit, with solutions and chemicals for testing, enclosed in a steel cabinet, shall be provided.

Softener shall be provided with a filter, with automatic control, for clarifying the treated water.

Continued on next page

Softener shall receive one coat of graphite paint in shop and one coat in field after erection.

Softener to be erected at premises of ———— at ————, suitable foundations and sufficient working room to be provided by purchaser.

Softened water shall be guaranteed to be softened to not more than ——— grains hardness at a cost per ——— gallon of ——— with soda ash at ——— per hundred pounds and lime at ——— per hundred pounds.

Measurements.

Kennicott measuring devices consist of weighers for water, oil, naptha, etc., cycloid weir meters and venturi meters. These measuring devices are essential when accuracy, dependability and reliability are necessary for power plants, measuring of condensation and other purposes.

The Kennicott Cycloid Weir Meter is used for accurately measuring large quantities of water. It is the most accurate weir meter made.

KENNICOTT WATER WEIGHER

SIZE AND CAPACITIES KENNICOTT WATER WEIGHERS

No.	Maximum rate of weighing		Size of Valve Inlet and Outlet
	Gallons per minute	Pounds per minute	
	1000	8333	10″
	600	5000	8″
	400	3333	6″
	300	2500	6″
11	200	1667	6″
13	150	1250	4″
15	100	833	4″
17	60	500	3″
19	40	333	2½″
23	20	167	2″
25	10	83	1½″

Specifications, Kennicott Water Weigher.

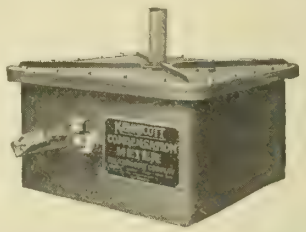
One Kennicott, or equal, automatic atmospheric water weigher having a maximum rate of weighing of ——— pounds of water per minute, and built of not less than ——— gauge steel.

The weigher proper shall contain two stationary measuring or weighing compartments with a stationary siphon in each compartment for delivering the unit charges therefrom. It is to have no valves, dash pots, rubber seats, springs, weights or revolving parts. The weigher is to be provided with a mechanically operated counter which shall register the charges delivered from the weigher.

The weigher is to be provided with a storage tank of not less than ——— to hold at least four charges. A balanced pressure valve with float control to regulate the delivery of water to the storage tank, and pipe and elbow connection between valve and weigher is also to be furnished with the weigher.

The weigher is to be set up and tested under full operating conditions before shipment. The unit charge is to be accurately weighed on certified platform scales throughout the range of temperature at which the weigher is to be used, and a certificate of guaranteed accuracy and capacity is to accompany the shipment of the weigher. The weigher is to be guaranteed by the maker to weigh within one half of one per cent of absolute accuracy at any rate of flow from the minimum requirements of the plant to the maximum rate of weighing specified.

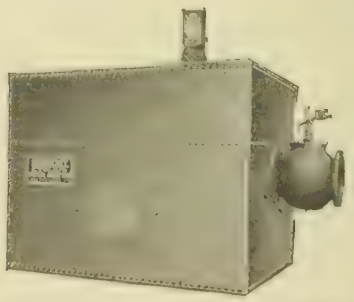
The weigher is to be provided with a water-gauge glass in connection with each measuring chamber and the storage tank will have a water-gauge glass.



KENNICOTT CONDENSATION METER

SIZES AND CAPACITIES, KENNICOTT CONDENSATION METERS

No.	Capacity		Size Inlet	Size Outlet
	Gallons per Minute	Pounds per Minute		
24	12	100	2″	2″
26	8	67	1½″	2″
29	4	33	1″	1½″
31	2	17	1″	1½″



KENNICOTT CYCLOID WEIR METER

SIZES AND CAPACITIES KENNICOTT CYCLOID WEIR METERS

Size	Rate Measuring		Size Inlet and Outlet	Width	Height	Length
	Gallons per Minute	Pounds per Minute				
2	1500	12500	12″	84″	72″	96″
3	1200	10000	10″	72″	72″	96″
4	900	75000	8″	60″	66″	96″
5	600	5000	8″	54″	60″	84″
7	400	3333	6″	48″	60″	84″
9	300	2500	6″	42″	60″	84″
11	200	1667	6″	42″	54″	72″
12	100	833	4″	36″	48″	72″

Recorder adds additional height of 25 inches.

General Steel Plate Construction.

Tanks, rectangular, cylindrical or special; stacks; ore bins; refineries; by-product plants. Built to customer's design and specification. Send us your inquiries.

THE PERMUTIT COMPANY

Permutit Water Softening Apparatus

TELEPHONE, MURRAY HILL 4698

30 East Forty-Second Street
NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL. CINCINNATI, OHIO DETROIT, MICH. INDIANAPOLIS, IND. ST. LOUIS, MO.
MINNEAPOLIS, MINN. JACKSONVILLE, FLA. LOS ANGELES, CAL.

Products.

"PERMUTIT" WATER SOFTENING FILTERS. Also, APPARATUS for the General Rectification of Water, including CLARIFYING FILTERS, IRON REMOVAL APPARATUS, etc.

Patents.

"Permutit" Filters were patented in the United States Mar. 9, 1909; Dec. 14, 1909; Mar. 8, 1910; June 7, 1910; Dec. 23, 1913, Feb. 17, 1914; Feb. 24, 1914; Aug. 11, 1914; Nov. 3, 1914; Dec. 15, 1914; Mar. 9, 1915; May 18, 1915: Patents in Canada and all other countries. Gold Medal, International Exposition, Ghent, 1913, San Francisco, 1915.

Description.

The mechanical part of the "Permutit" System is similar in almost every respect to a pressure sand filter. The filtering medium, however, instead of being natural sand, is an artificial zeolite under the registered trademark name of "Permutit." This "Permutit" has the remarkable property of absorbing every trace of calcium and magnesium (hardening elements) from the water as it passes through the filter. The effluent of a "Permutit" Filter, besides being entirely soft, is absolutely non-caustic.

"Permutit" is manufactured in the United States. It is obtained by fusing feldspar, kaolin, soda-ash and pearlash together in the proper proportion.

Installation.

"Permutit" Filters are very easily installed by the local plumber. A complete set of concise directions is sent with each outfit.

The Filter is usually placed in the basement on a by-pass of the main supply line, and if its per minute capacity is sufficiently large, softens water as it is being used in the house; or, if not, softens water which flows at a uniform rate into either an erected or a pneumatic storage tank. The pressure drop through the filter averages about five pounds per square inch. The maximum drop is ten pounds.

Operation.

When the filter has delivered its guaranteed quantity of perfectly softened water, it is not necessary to replace the filtering material, as it is easily and cheaply regenerated and restored to its original efficiency by introducing a ten per cent solution of sodium chloride (common salt). This salt solution remains in contact with the "Permutit" over night. In the morning it is run directly into the sewer, as it is a perfectly clear liquid. Even if the filter be neglected, no danger to health can result.

Advantages.

"Permutit" Filters furnish a continuous supply of water as soft as rain-water, but just as sparkling and live as the original supply, for every department of the home. No chemicals are added to the water.

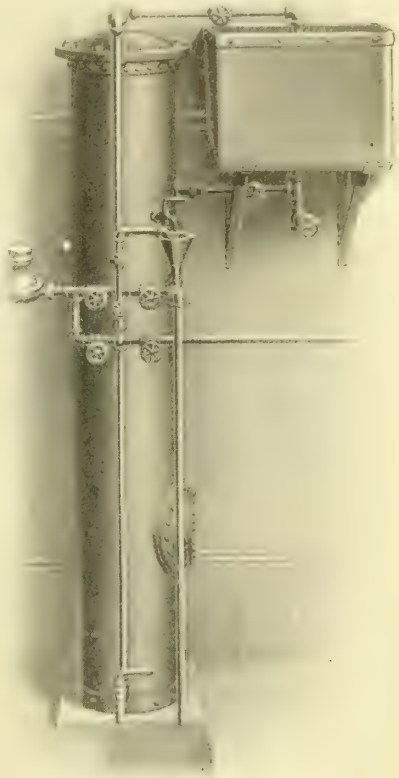
"Permutit" removes the minerals which injure the skin. It makes the bath more healthful and luxurious. It improves the complexion and brings out the maximum natural lustre of the hair.

"Permutit" reduces the amount of soap and labor required in the laundry and makes the linens cleaner, softer and whiter. Its use greatly increases the life of linens.

"Permutit" absolutely eliminates boiler scale and the clogging up of the hot-water pipes and heating coils.

The only cost of operation and upkeep is the cost of the common salt.

"Permutit" Filters are made in all sizes—for the smallest home to the largest club, or hotel.



"PERMUTIT" SOFTENING FILTER
For Domestic Use

SPECIFICATIONS FOR DOMESTIC FILTERS

Serial No.	A3	A4	A5	A6	A7
Diameter	9″	12″	18″	21″	24″
Overall height	5′0″	5′9″	7′0″	8′0″	8′0″
Minimum installation height	6′0″	6′9″	8′0″	9′0″	9′0″
Piping	½″	¾″	1″	1¼″	1½″
Pounds of salt	5½	12½	28	38	50
SHIPPING WEIGHTS					
Shell, crated	250	486	1340	1210	2100
Salt Tank, crated	...	...	...	215	...
"Permutit," barrel	69	140	303	418	543
Gravel and marble, bags.	42	84	240	401	530
Total	361	710	1883	2244	3173
Total weight in operation	500	1000	2000	2800	4300
MINIMUM FLOOR SPACE, INCLUDING SALT TANK					
Width	2′6″	3′2″	4′7″	5′0″	5′5″
Depth	2′2″	2′1″	4′6″	4′3″	4′8″

NOTE—Size of Filter required depends upon hardness of water and quantity of water to be softened between regenerations.

Specifications are for Standard Filters carried in stock and designed for a working pressure of 100 pounds per square inch, constructed on order for any pressure up to 200 pounds.

A FEW REPRESENTATIVE USERS.

M. E. Alexander, Piedmont, Cal.; Julius Fleischman, Cincinnati, Ohio; E. M. Goodall, Miami, Fla.; W. G. Henry, Birmingham, Mich.; Otto H. Kahn, Morristown, N. J.; James H. Moore, Santa Barbara, Cal.; Charles S. Pillsbury, Minneapolis, Minn.; William Rockefeller, Tarrytown, N. Y.; Mortimer L. Schiff, New York, N. Y.; Grant B. Schley, Far Hills, N. J.; E. D. Speck, Grosse Point, Mich.; Mrs. W. G. Warden, St. Augustine, Fla.

AMERICAN WATER SOFTENER CO.

Mechanical Filtration and Water Softening Plants

GENERAL OFFICES

PHILADELPHIA, PA.

Products.

GRAVITY and PRESSURE FILTERS, FILTER EQUIPMENT and WATER SOFTENING PLANTS, designed for Hotels, Clubs, Apartment Houses, Office and Public Buildings, Laundries, Institutions, etc.

Also, FILTRATION and WATER SOFTENING PLANTS, to any capacity, for City, Town and Railroad use; for Textile and Paper Mills, Breweries, Factories, etc.

PLANTS for removing iron from well and other waters, for neutralizing acidity, eliminating tastes and odors, and removing organic matters and discolorations; WATER STERILIZING PLANTS, using Calcium Hypochlorite and liquid Chlorine; SUBSIDENCE BASINS and APPARATUS for applying coagulants or reagents to waters to be clarified, purified or softened where filtration plants cannot be afforded; FILTER EQUIPMENT and APPURTENANCES for new or old plants.

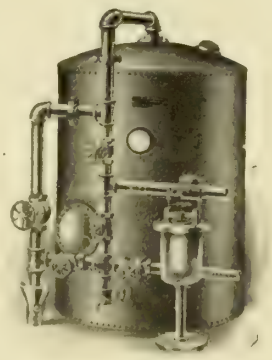
TRADE-MARK

Description.

The Filtration Systems of this Company are designed to provide water—whether surface or spring—free from dirt, color, iron, odors, and bacteria, the systems working by gravity, pressure, aeration, straining, or chemical treatment, or by any or all of these in combination.

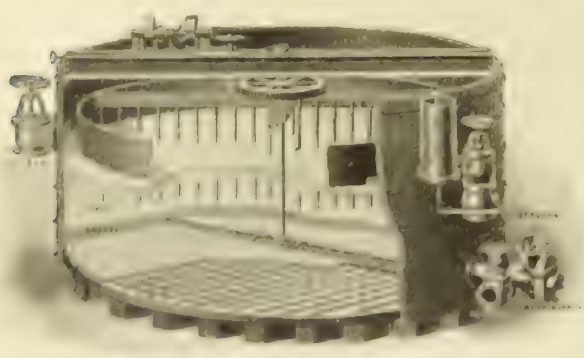
Pressure Filters.

In two forms, the vertical for comparatively small plants and the horizontal for municipal works and large industrial plants. Both equipped for simple reverse current wash, for sectional washing, or for mechanical or air agitation. Will sustain any desired test or working pressure. Water may be supplied to this type of filter by gravity, or pumped directly through them into piping systems, tanks, reservoirs or standpipes.



VERTICAL TYPE STEEL TANK PRESSURE FILTER

The washing or cleansing of a filter, regardless of its size, may be accomplished in from five to ten minutes. Any number of pressure filters may be connected together in battery form. The filtering sand will last for from five to seven years without changing.



OPEN GRAVITY FILTER

Open Gravity Filters and Plants.

Open circular tank gravity filters of wood, steel or concrete, with or without mechanical agitators, or air-wash. Rectangular open gravity filters of reinforced concrete construction of any convenient dimensions and arrangement designed to be washed with or without air agitation.

Open gravity filters of all types are adapted to the filtration of any water supply, and are installed extensively for water-works, paper and textile mills, public or private institutions, etc.

Strainer Systems.

HODKINSON STRAINER OR SAND VALVE

Filter efficiency and economy in the use of wash-water are almost wholly dependent upon its strainer or outlet system apparatus. The Hodkinson Strainer shown here has been employed extensively and most successfully for more than ten years and is used in all sizes and styles of our pressure and gravity filters. In large plants of reinforced concrete filters, however, we sometimes construct the strainer system of a combination of concrete and metal parts.

Air Systems.

In filters equipped with air-wash, the air and water are supplied through separate and distinct piping systems, air and water being used at the same time, as this is the only way maximum efficiency and economy in wash-water consumption can be attained with the air-wash process.

Our air manifold systems are designed so as to insure an equal supply of air to all orifices and its uniform distribution over the entire bottom of the filter.

Capacity of Rapid Filters.

Our recommendation is for an apparatus with ample capacity to deliver the quantity of water needed based on two gallons per minute per square foot of effective filtering surface. If the highest grade of filtered water is not desired, this rate may be exceeded.

Co-operative Service.

This Company will co-operate with architects or builders for the installation of Filtration Plants suitable for Hotels, Clubs, Residences and Apartment Houses and with water engineers and others for Municipal and larger plants.

The Company will be pleased to locate the cause of, and suggest a remedy for, any troublesome water supply, for purification or softening of water, etc. Also, will investigate and report upon the treatment and disposal of waste waters from Mills, Factories, etc.

INTERNATIONAL FILTER CO.

GENERAL OFFICES
First National Bank Building
CHICAGO, ILL.

NEW YORK OFFICE
Woolworth Building

Products.

FILTERS and WATER SOFTENERS for Residences, Buildings, Mills and Municipal Plants.

International Disk Filters.

The International Filter is in general use for supplying drinking water, because of its efficient and sanitary features which are found in no other make. The filtration is upward through cotton fiber disks, which are discarded when clogged and replaced with fresh ones, the results being always the same as if a new filter is in use. No growth of bacteria can occur in the filter medium as occurs in filters using a porous filter material, which is only washed or scraped and used continuously. These filters are in general use in refrigerated drinking water systems for refiltering the water coming from sand, quartz or charcoal filters. Can be operated under any pressure, from 1 to 50 pounds, and can be furnished special for working pressures up to 125 pounds. Ask for Catalogue "I."

INTERNATIONAL DISK FILTER

SIZES AND CAPACITIES

Sizes	Outside Diameter, Inches	Total Height, Inches	Approximate Weights, Pounds		Connections can be Furnished any size up to		Capacity, Gallons per hour
			Shipping	Net	Inlet, Inches	Outlet, Inches	
0	15	23	90	55	¾	¾	75
1	18	31	180	135	1	¾	150
3	24	36	325	265	1½	1½	500
5	33	28	650	500	2	2	1000

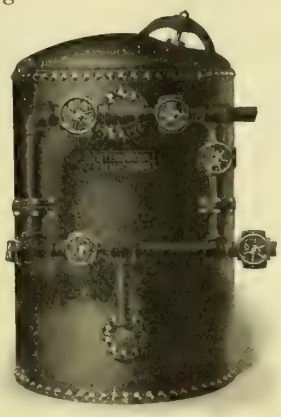
NOTE—Capacities are figured with comparatively clear water under fifteen pounds pressure.

International Sand Filters.

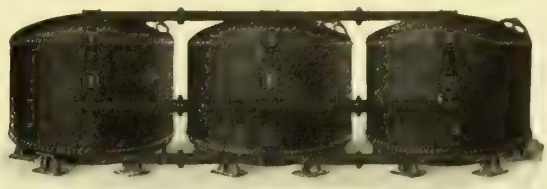
In these filters filtration is downward through a bed of specially selected filter sand, which is superimposed upon layers of graded gravel. These filters are all supplied with automatic coagulant feed. The filter is washed by reverse flow of water. Will filter the muddiest water *bright and clear.* International Sand Filters of the pressure type are made both in the vertical and horizontal styles. Sizes and capacities of the vertical type are given in the foregoing table, the capacities being figured at the rate of three gallons per minute per square foot of filter area. Both vertical and horizontal filters may be connected in batteries to secure any capacity. Full information on other sizes, and on batteries as well as on horizontal filters, furnished on application. Ask for Catalogue "S."

SIZES AND CAPACITIES

	Size Diameter, Inches	Height, Inches	Inlet and Outlet Connections, Inches	Capacity per Hour, Gallons
Style C	12	50	1	140
	15	51	1	220
	18	52	1½	330
	24	53	1½	600
Style I	30	61	2	900
	36	62	2	1260
	42	63	2½	1740
	48	64	2½	2280
	54	65	3	2880
	60	66	3	3600
Style L	66	72	3½	4320
	72	74	3½	5100
	78	76	4	6000
	84	78	4	6900
	96	81	5	9000



STYLE I SAND FILTER



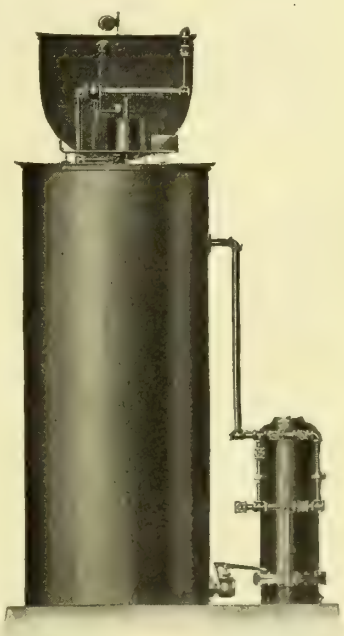
BATTERY, STYLE L FILTERS

International Water Softener.

Made in both continuous and intermittent types. The International Junior is furnished in capacities up to 750 gallons per hour; the International Simplex up to 2500 gallons per hour; the International Standard from 2500 gallons per hour up to any desired capacity.

Complete data sent upon receipt of the following information:

(1) Quantity of water to be handled per hour; (2) source of water supply; (3) whether water will be delivered to apparatus from city main, tank or pump, and under what pressure; (4) nature of difficulties experienced in using water; (5) copy of analysis of water if possible; (6) where water from apparatus is to be delivered and at what elevation; (7) location of apparatus and space available. Give both headroom and floor space.



INTERNATIONAL SIMPLEX WATER SOFTENER

Specification Essentials.

To insure satisfactory filter installations for general supply, the architect should specify:

Filter to be INTERNATIONAL FILTER CO.'s, or approved equal, and of such size that rate of filtration shall not exceed three gallons per minute per square foot of effective filter area.

For drinking water supplies, specify:

International Disk Filter with one hundred filter disks; capacity to correspond with maximum flow required per minute.

ESTABLISHED 1880 36TH ANNIVERSARY

LOOMIS-MANNING FILTER DISTRIBUTING CO.

Loomis-Manning Filters
Baltimore, Manhattan, and Federal Filters

1431 South 37th Street
PHILADELPHIA, PA.

CABLE ADDRESS, "LOOMISMAN," W. U. T. CODE

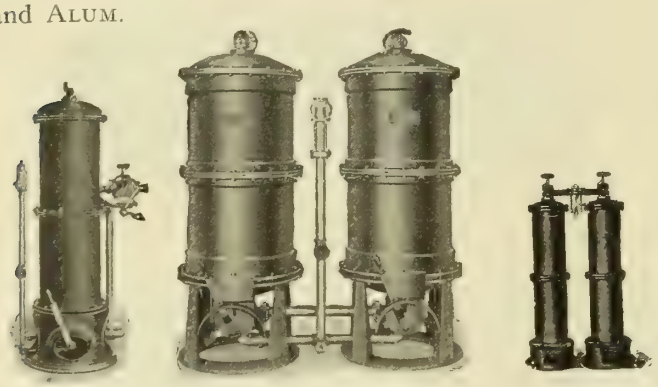
BRANCH OFFICES AND SALESROOMS

NEW YORK, 6027 Metropolitan Life Tower
BOSTON, 440 Exchange Building
CHICAGO, 1038 Marquette Building
BALTIMORE, 501 Calvert Building
BUFFALO, 708 Ellicott Square Building
WASHINGTON, 306 Colorado Building

Products.

WATER FILTERS and FILTRATION SYSTEMS for the Cleansing and Purification of Water Supplies for all purposes; STERILIZERS. Water made bright, clean, free from all matters in suspension, free from odor, taste or iron stain, and safe for all purposes.

Also, FILTER PARTS, QUARTZ, SAND, BONECHAR and ALUM.



TYPES OF LOOMIS-MANNING FILTERS, SINGLE AND DOUBLE STYLES

Outside shell, cast iron, made in parts to facilitate delivery and erection. Manning Single Controlling Valve, solid bronze throughout. Fitted with Loomis Confining Plate to prevent entrance of large particles and loss of filter-bed when washing; Loomis Cutting Plate; and sand-tight Screens to support filter-bed. All plates and screens, perforated tinned copper strongly supported. Galvanized iron pipe and fittings. Filtering materials, the finest selected grades. Workmanship, expert and accurate. All filters tested under 100 lbs. pressure. Special construction for higher pressures if required. Also cylinders can be porcelain lined and filters fitted with brass pipe if desired.

Loomis-Manning Filters.

These filters have been designed and constructed with the single idea to produce a filter which shall give satisfactory results day-in and day-out without the need of expert attention and annoyance caused by filter being out of service on account of faulty construction.

Manifestly these results are entirely dependent on these three fundamental requirements:

(1) Filter must be able to cleanse itself thoroughly, driving out at each washing all foreign matters that have been collected in filter-bed during filtration.

(2) Cleansing must be brought about easily, accurately, and in such a way that mistakes are impossible. This is especially true when the filter is installed in residences or other places where people without mechanical skill often take care of it.

(3) It must be constructed of the most durable materials by careful workmanship.

Efficiency—This in a filter means keeping the filter bed clean. Our Loomis cutting plate, through which the bed passes under the action of the washing current, keeps the bed free from lumps and accumulations and in splendid condition for *continuously effective* service.

The filtration and washing are uniform over and throughout every part of the filter bed because our special screen systems which support and retain the bed extend over the entire area of the filter chamber. This is extremely important, and is unique with the Loomis-Manning Filter.

Only a uniform grade of filtering material is used.

The washing process is shown by a glass working model which demonstrates clearly the simplicity of operation and the thorough cleansing of the bed.

Operation—The Manning Single Controlling Valve reduces the attention necessary to be given to the filter to the movement of one lever. All mistakes avoided. Control accurate and sure. Amount of water used in washing is economized. Filter is practical for installation anywhere, because no expert attention is required.

Durability—The substantial construction is indicated by the brief specifications under the cuts. The use of such high-grade materials and careful workmanship means long life and freedom from frequent repairs.

Sizes—These filters range in capacities from one half gallon to 150 gallons per minute, both single and double styles.

Baltimore Filters.

Cast-iron shell made in sections. Operated by a brass single controlling valve. Equipped with heavy brass *sand-tight* sand valves screwed into a cast-iron diaphragm. Retaining screen over the inlet. Chain breaker to assist in the washing process. Good grades of filtering material. Galvanized iron pipe. All carefully put together and tested to stand 100 pounds pressure. Higher pressure if desired.

The use of a single controlling valve makes this filter free from complications and easy to care for, requiring no expert attention.

The washing process is thorough, since the chain breaker prevents the formation of lumps in the bed and brings about thorough agitation. The filter-bed is practically uniform, and agitates thoroughly when washing.

Sizes—One half gallon to 150 gallons per minute for one unit.

Manhattan Filters and Federal Filters.

The Manhattan Filter is a vertical type. The Federal Filter is a horizontal type. Construction of both types similar.

Steel shell, riveted, calked tight, to stand any desired pressure. Manholes provided in shell. Steel diaphragm supports filter-bed in vertical type, also in horizontal type, except certain sizes, in which manifold system is used. Heavy brass *sand-tight* sand valves, retaining screen, chain breaker, and filtering material, all similar to those of Baltimore Filter.

Operated by single controlling valve, cast-iron body, brass mounted. Gate valve control on certain sizes of Federal Filters.

Sizes—15 to 500 gallons per minute for one unit.

THE R. U. V. COMPANY, INC.

Manufacturers of Ultra Violet Ray Water Sterilizers

50 Broad Street
NEW YORK, N. Y.

CHICAGO OFFICE: HARRIS TRUST BUILDING

Product.

ULTRA VIOLET RAY WATER STERILIZERS, for purification of water for drinking and commercial purposes, and for swimming-pools.

Principle.

Ultra Violet Rays kill bacteria, as has been proved by many experiments with sunlight and electrically produced rays. In R. U. V. Sterilizers there are burners producing Ultra Violet Rays in concentrated form. Hence, we have in the R. U. V. Sterilizing System merely a duplication on a commercial scale of nature's own purification process.

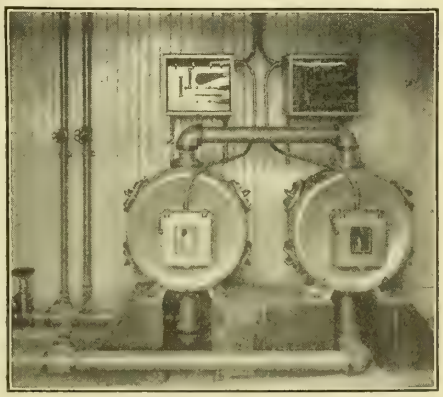
Operation.

Ultra Violet Rays are produced by electric mercury arc burners. In the sterilizers the flow of water is so directed around the burner that there is sufficient exposure to kill the disease-producing bacteria. The water is all subjected to at least two close contacts with the burner. The operation requires only the turning of a switch to start the burner.

Application.

The sterilizers guarantee a safe water, and as only light rays are used to sterilize, there, obviously, will be no change in temperature or taste. This makes them especially applicable where tasty, pure drinking water is desired. They are used in drinking-water systems in hotels, clubs, private residences, factories, hospitals, etc. Further recommendations for their use in such places are economical action, simplicity of control, and the fact that only electric current is required for operation.

Used also in swimming-pool recirculating systems, to eliminate dangers of infection to bathers, they afford a simple and attractive means of keeping a pool in a sanitary condition. Bottling plants, breweries, dairies, importing houses, etc., use them to obtain a pure water for washing and rinsing.



TYPE E-2 STERILIZERS, BENNETT SCHOOL, MILLBROOK, N. Y.

Advantages.

(1) Comparatively small, attractive apparatus, operating on electric power.

(2) Either gravity or pressure apparatus available.

(3) Simplicity of control (absolutely automatic if desired).

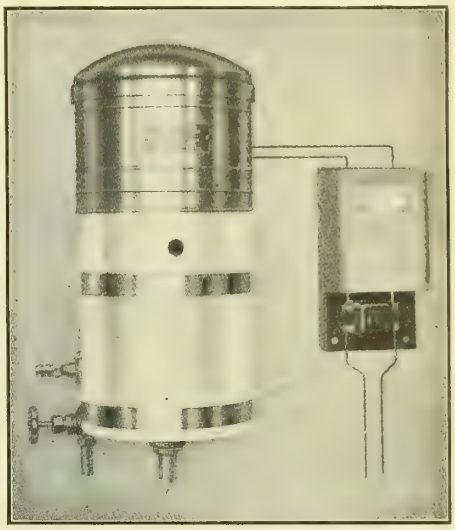
(4) Economy in installation and operation.

(5) Adequate safety factor allowed to meet all emergencies.

(6) All action constantly open to inspection.

(7) No change in temperature of water, therefore no special heating or cooling systems required.

(8) No change in water's natural gases, salts or taste.



ULTRA VIOLET RAY STERILIZER AND SWITCH BOARD—B-2, GRAVITY TYPE

(9) No odor added to water or connected with sterilizer.

(10) No chemicals added to water.

Capacities.

Rates of flow from ten gallons per hour upward are readily cared for with Ultra Violet Ray Sterilizers.

Prices, Specifications, etc.

Prices, specifications, costs of operation, shipping weights, sketches, etc., promptly furnished, on receipt of information in regard to conditions.

Guarantee.

Our guarantee covers materials, workmanship, operation and removal of all pathogenic or disease producing bacteria.

Co-operative Service.

Our Engineering Department stands ready to advise as to proper and economical arrangements of apparatus; also, to furnish sketches, etc., if supplied with the required data.

TYPE B-D-2-T, WATER STERILIZER IN SWIMMING POOL OF THE NEW YORK ATHLETIC CLUB

NATIONAL COMMERCIAL GAS ASSOCIATION

LOUIS STOTZ, Secretary
61 Broadway
NEW YORK, N. Y.

Objects.

The National Commercial Gas Association has for its object the Development and the Promulgation of Methods necessary for the Uses of Gas, and the Encouragement of the Manufacture of Efficient and Suitable Gas Appliances for lighting, heating and power.

Membership.

The Association is composed of three thousand individuals, representing five hundred gas companies and two hundred manufacturers of gas appliances located throughout the United States and Canada.

Co-operation.

This Association, the representative commercial body of the gas industry, will, upon request, correspond with architects and place at their disposal its services. It will co-operate with them in the preparation of plans and specifications for new buildings and for buildings that are being reconstructed. It will, also, upon request made to the Secretary, place upon its complimentary list the names of architects and will furnish them, from time to time, with various publications containing data covering the different applications of gas.

Practically every gas company employs trained specialists, whose services are available to architects at any time and without cost to them. These specialists will co-operate in every way with the architects and assist them in drawing up specifications, or in any way that they may desire.

The modern commercial building should include every facility for the utilization of all agencies in the lighting, fuel and power fields. This is more than ever necessary in view of the permanency of modern buildings, the constant changes which occur in the character of occupancy, the ever increasing number of trades and professions becoming occupants of this class, and the increased rental values obtained where such complete equipment is available. Practice has demonstrated that gas is universally demanded by a wide range of these industries, because in point of economy, service, reliability of quantity and quality of supply, it is preëminent as such an agent.

Gas Uses and Conveniences.

A careful study of present day economic conditions discloses the fact that many buildings, not properly piped originally, have required costly alterations to provide for adequate gas supply. This makes it obligatory, as a protection to the investor, that all buildings should be properly piped for gas at the time of their construction. As there are over one thousand diversified uses for gas, applicable to practically every domestic and manufacturing purpose, the need for furnishing adequate gas service in these fields is all the more apparent.

Piping Schedule.

In order to be of definite assistance to architects, engineers and others, in the proper piping of all buildings for gas, the National Commercial Gas Association advises the use of the following piping schedule, as a conservative and sound basis of practice embodying all standards evolved to date. This schedule is offered by the Association for use in all localities where predetermined conditions do not otherwise obtain. This schedule may be relied upon as fulfilling all requirements of best practice. Gas fitters and contractors will be safe in working under this schedule, which provides equitable conditions for estimating, and insures the owner or occupant an ample supply of gas under safe, economic conditions, whether for illumination, power or heat. It must be understood, however, that the advisory services of the local gas company should be called upon in any territory to go over the schedule with the architect, and it is possible that they may make some suggestions to conform with local regulations or conditions.

SIZE OF PIPE IN INCHES

Required sizes of piping for various lengths and numbers of outlets

No. of ⅜-in. (or 10 cu. ft.) Outlets	⅜	½	¾	1	1¼	1½	2	2½	3	4
	Length of Pipe in Feet									
1	20	30	50	70	100	150	200	300	400	600
2	...	27	50	70	100	150	200	300	400	600
3	...	12	50	70	100	150	200	300	400	600
4	...	...	50	70	100	150	200	300	400	600
5	...	...	33	70	100	150	200	300	400	600
6	...	...	24	70	100	150	200	300	400	600
7	...	...	18	70	100	150	200	300	400	600
8	...	...	13	50	100	150	200	300	400	600
9	...	...	...	44	100	150	200	300	400	600
10	...	...	...	35	100	150	200	300	400	600
11		...	...	30	90	150	200	300	400	600
12		...	...	25	75	150	200	300	400	600
13		...	...	21	60	150	200	300	400	600
14		...	...	18	53	130	300	300	400	600
15		...	...	16	45	115	200	300	400	600
16				14	41	100	200	300	400	600
17				12	36	90	200	300	400	600
18					32	80	200	300	400	600
19					29	73	200	300	400	600
20					27	65	200	300	400	600
21					24	58	200	300	400	600
22					22	53	200	300	400	600
23					20	49	200	300	400	600
24					18	45	190	300	400	600
25					17	42	175	300	400	600
30					12	30	120	300	400	600
35						22	90	270	400	600
40						17	70	210	400	600
45						13	55	165	400	600
50						..	45	135	330	600
65							27	80	200	600
75							20	60	150	600
100								33	80	360
125								22	80	230
150								15	55	190
175									28	120
200									21	90
250									11	59
300										35
350										29
400										22
500										14

If any outlet is larger than ⅜ inch, it must be counted as more than one in accordance with the schedule below.

Size of outlet in inches	½	¾	1	1¼	1½	2	2½	3	4
Value in ⅜ inch outlets	2	4	7	11	16	28	44	64	112

Continued on next page

Explanation of the Piping Schedule.

This schedule is based on the standard formula for the flow of gas through pipes. The friction, and the pressure necessary to overcome the friction, increase with the quantity of gas flowing through; and as the aim of the table is to have the loss in pressure not to exceed $^1/_{10}$-inch water pressure per thirty feet of length of piping, the size of the pipe increases from an extremity of the system towards the meter, as each section has an increasing number of outlets to supply. The quantity of gas the piping may be called on to deliver is stated in terms of ⅜-inch outlets instead of cubic feet, ⅜-inch outlets being used as a unit instead of burners. The consumption of gas through a ⅜-inch outlet is assumed to be ten cubic feet per hour.

In dwellings, the general practice is to supply gas to the range and water heater by a separate pipe leading from the meter to the kitchen. In case, however, it is desired to supply these or other appliances through the general house piping system, as in apartments or upstairs kitchens, the person planning the piping should apply to the gas company to obtain the value of these appliances in terms of "outlets," for use in determining the proper size of pipe from the schedule.

Directions for Using the Piping Schedule.

In using the schedule observe the following rules:

(a) No piping between the meter and the first branch line should be smaller than ¾ inch.

(b) No piping should be smaller than ⅜ inch.

(c) No independent line, in the cellar or on the first floor, from the meter to a gas range should be smaller than one inch; but when the range is supplied from the house piping, a ¾-inch outlet will suffice. Above the first floor, an independent line from the meter to a gas range on an upper floor should not be smaller than ¾ inch. No pipe laid underground should be smaller than 1¼ inch. No piping extending outside of the main wall of a building should be smaller than ¾ inch.

(d) No ceiling outlet, where the height of ceiling is twenty feet or more, should be smaller than ¾ inch.

(e) In determining the sizes of piping, always start at the extremities of the system and work toward the meter.

(f) The lengths of piping to be used in each case are the lengths measured from one branch or point of junction to another, disregarding elbows or turns. Such lengths will be hereafter spoken of as "sections," and are ordinarily of one size of pipe. There are only two reasons for which a change in size of piping will be allowed in a section: First, where the length of a section is greater than the length allowed for the outlets being supplied; as for example, if a section supplying two outlets is thirty-three feet long, twenty-seven feet of this could be ½ inch, and the remaining six feet ¾ inch; second, where the required length from the outlets being supplied will cause a violation of clause "i" unless the size is changed.

(g) If the exact number of outlets under consideration cannot be found in the schedule, take the next larger number. For example, if twenty-seven outlets are required, the next larger number in the schedule, which is thirty, should be taken.

(h) For any given number of outlets, do not use a smaller size pipe than the smallest size in the schedule for that number of outlets. Thus, to supply seventeen outlets, no smaller size pipe than one inch may be used, no matter how short the section may be.

(i) In any piping plan, in any continuous run from an extremity to the meter, there should not be used a longer length of any size pipe than shown for that size in the line opposite one outlet, as fifty feet for ¾ inch, seventy feet for one inch, etc. Exceptions to this rule are: First, when larger piping than called for by the schedule is run in following "j"; second, when fitter voluntarily runs a larger size than is necessary; as, for example, if three outlets are to be supplied by sixty feet of piping, instead of fifty feet of ¾ inch and ten feet of ½ inch being required, the entire sixty feet may be of ¾-inch piping. When two or more successive sections work out to the same size of piping, and their total length or sum exceeds the longest length shown for that size piping, the change in size to a larger pipe should be made as soon as the limiting length has been reached. For example, if five outlets are to be supplied through thirty feet of piping, and then these five and one more, making six in all through twenty-four feet of piping, it would be found by the schedule that five outlets through thirty feet require ¾-inch piping, and that six outlets through twenty-four feet require ¾-inch piping; but as the sum of the two sections (thirty plus twenty-four equaling fifty-four feet) is four feet longer than the amount of ¾-inch piping that may be used in any continuous run, the twenty-four-foot section must be changed from ¾-inch to 1-inch, four feet from the end nearest the meter.

(j) Never supply gas from a smaller size pipe to a larger one. If twenty-five outlets are to be supplied through three hundred feet of piping and these twenty-five and five more, making thirty in all, through one hundred feet of piping, it would be found by the schedule that twenty-five outlets through three hundred feet require 2½-inch pipe, and thirty outlets through one hundred feet require 2-inch pipe; but, as under this condition, a 2-inch pipe would be supplying a 2½-inch, the 100-foot section should be made 2½ inches. This does not apply to the case of a small pipe inside of a building supplying one outside of a building, which has been made large as per "c," because it is exposed to outdoor temperatures.

Gas Lighting.

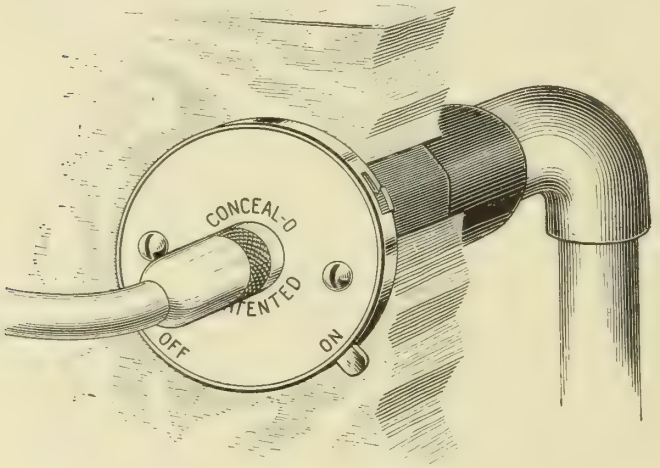
Occupants of houses that are fully piped for gas have, at their disposal, a wide variety of burners, artistic fixtures, reading lamps, domes, direct and semi-indirect lighting units. These fixtures are readily and conveniently lighted or extinguished by the pushing of a button or the pulling of a chain.

Continued on next page

Baseboard Outlets.

As the use of miscellaneous gas appliances both in the home and in professional offices is becoming more general, baseboard outlets should be provided at convenient locations in every room, to give mobility to the fixtures and furnishings.

These outlets are set practically flush with the face of the baseboard, and have a gas connection concealed behind a metal plate.



THE CONCEAL-O PLATE BASEBOARD OUTLET

Gas Appliance Installations.

For convenience, the following list will show some of the gas appliances in general use:

Residence—

LIVING ROOM OR LIBRARY

Gas Lighting Fixtures	Gas Heating Stoves
Gas Reading Lamps	Gas Grates or Logs
Conceal-O Plates	

DINING ROOM

Gas Lighting Fixtures	Open Fire Grates or Logs
Gas Chafing Dishes	Tea Samovars
Portable Table Lamps	Coffee Percolators
Gas Heaters	Art Glass Domes and Showers
Gas Steam Radiators	Conceal-O Plates

KITCHEN

Gas Lighting Fixtures	Warming Ovens
Gas Ranges	Plate Warmers
Circulating Water Heaters	Water Stills
Automatic Water Heaters	Gas Steam Radiators
Incinerators	Conceal-O Plates

LAUNDRY

Clothes Dryers	Gas Heating Stoves
Gas Lighting Fixtures	Automatic Water Heaters
Gas Mangles	Circulating Water Heaters
Gas Irons	Conceal-O Plates

BEDROOMS

Gas Lighting Fixtures	Gas Grates
Gas Heaters	Gas Sick Room Lights
Conceal-O Plates	

BATHROOM

Gas Lighting Fixtures	Gas Wall Heaters
Night Lamps	Water Sterilizers
Conceal-O Plates	

NURSERY PANTRY

Gas Lighting Fixtures	Water Sterilizers
Gas Ranges	Plate Warmers
Night Lamps	Nursery Burners
Conceal-O Plates	

GARAGE

Garage Heaters	Volumizing Burner

Apartment Houses.

Practically all the uses, shown under the heading of "Residences," apply to each suite of apartments; and in nearly every case "all-gas kitchens" are installed. Incinerators are especially valuable in solving the garbage problem, and should be used.

Office Buildings.

Office buildings are no longer exclusively confined to commercial use, but are being occupied more and more by dentists, oculists, barbers, manufacturing jewelers, chemists, etc., who require and demand a service in their professions which can only be supplied by gas.

Manufacturing Buildings.

Buildings used for manufacturing purposes require piping of adequate size to supply the many appliances used in processes requiring heat, such as tailor's irons, singeing appliances, brazing, welding, melting, heating, etc. It is also particularly necessary to completely pipe these buildings for light, for the reason that gaslight is required where color matching is carried on, and in textile trades where the quality of goods must be determined.

School Buildings.

Domestic Science Equipment
Gas Lighting
Gas water heating for showers in gymnasiums and baths
Manual training room
Laboratories
Restaurant facilities for pupils
Entertainment facilities for home and school associations

Other Uses.

There are numerous uses for gas in

Hotels	Cafeterias	Hospitals
Restaurants	Clubs	Stores
Cafés	Churches	Banks

which should all be considered and provided for in plans and specifications.

An interesting publication, issued by the Association, is entitled "The Gas Equipment of the Home," which tells in an interesting way of the use of gas in its relation to additional comforts in the home, and how, with artistic fixtures, it enhances the beauty of the interior and insures proper lighting.

Flue Connections.

Local rules or regulations enter so largely into the matter of flue connections that no general practice may be stated in this respect. The architect should, in each case, communicate with the local gas company in regard to the different sizes and necessities of flues.

Continued on next page

Kitchen Heating.

The "all-gas kitchen" necessitates the proper heating of the kitchen. This can be done in several ways.

(1) Extension of regular house heating system to the kitchen.

(2) By placing a coil in the fire-box of the furnace and connecting to a hot-water radiator in the kitchen.

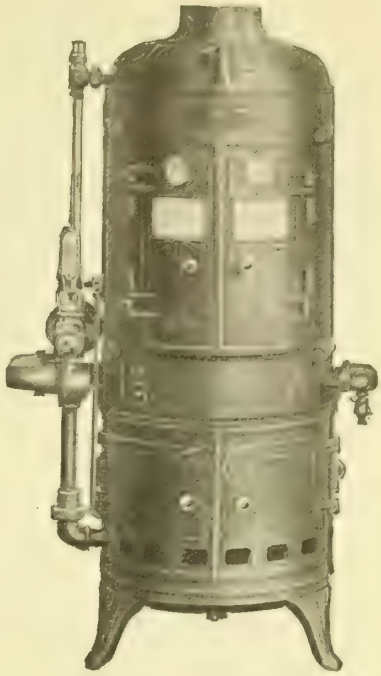
(3) Coal-burning kitchen heater placed at the side of a gas range or constructed as a part of the range.

(4) Various appliances using gas as a fuel, such as reflector stoves, steam and hot-water radiators.

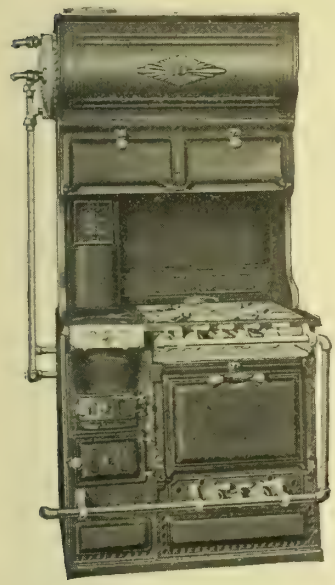
Space Requirements.

Adequate space should be allowed for the installation of all gas equipments. The space requirements, noted under each illustration herewith, will be helpful as a standard which has little, if any, variation.

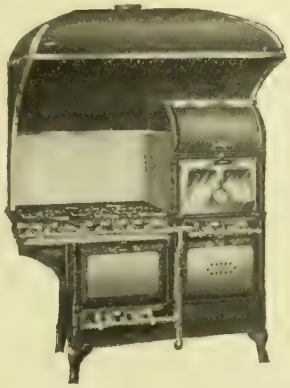
CIRCULATING WATER HEATER
Floor space, 31 by 22 inches; height, 86 inches.
The above dimensions include vertical kitchen boiler



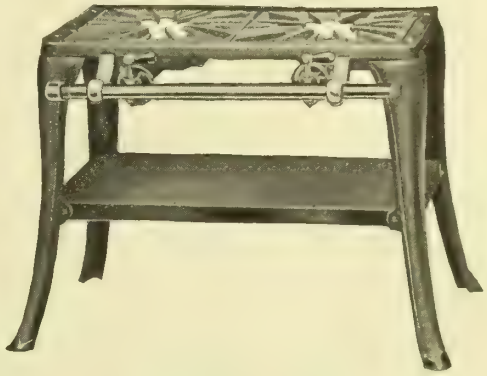
AUTOMATIC WATER HEATER
Floor space, 35 by 21 inches; height, 56 inches



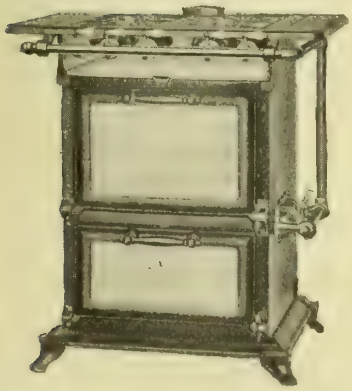
COMBINATION GAS AND COAL RANGE
Floor space, 60 by 30 inches; height, 71 inches



CABINET GAS RANGE
Floor space, 70 by 28 inches; total height, 81 inches

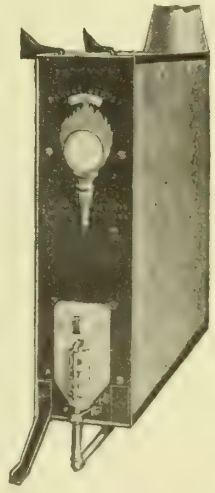


LAUNDRY STOVE
Floor space, 19 by 29 inches; height, 18 inches



DOUBLE OVEN RANGE
Floor space, 43 by 30 inches; height, 36½ inches

INCINERATOR
Floor space, 19 by 22 inches; height, 46 inches



GARAGE HEATER
Floor space, 9¾ to 19½ inches wide by 45 to 57 inches long; height, 40 inches

STERILIZER
Floor space, 20¾ by 25 inches; height, 70 inches

ECONOMY HEATER COMPANY

Manufacturers of " Economy " Combination Boilers and Gas Water Heaters

108 South La Salle Street
CHICAGO, ILL.

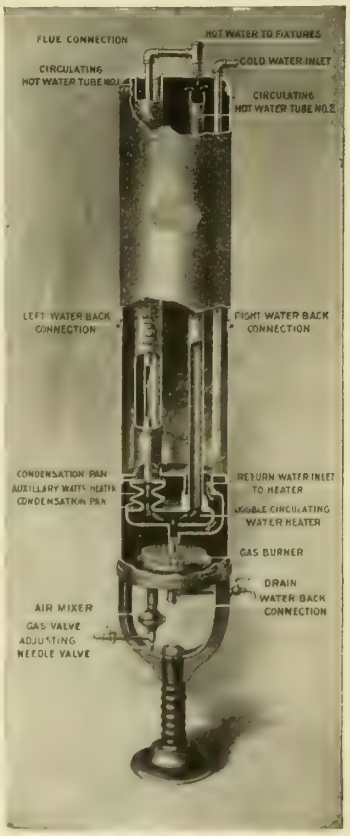
TELEPHONE: Franklin, 4668

Products.

" Economy " Combination Boiler and Gas Water Heaters, in Automatic and Regular Types.

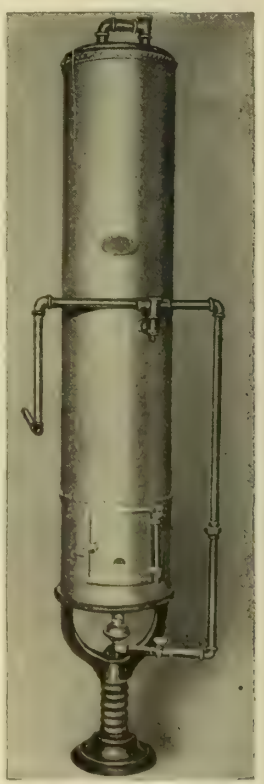
" Economy " Automatic Combination Boiler and Gas Water Heater.

Description—The " Economy " Automatic requires no special gas service pipe or meter. The regular service pipe, even if only ⅜ inch, is ample. An " Economy " Automatic of suitable size will operate at an average gas consumption of less than five feet per hour, night and day, 365 days in the year, without any attention whatever from owner, tenant or janitor—a fact which proves that no other device can equal this low fuel cost figure. It will do this while giving maximum service, which means instant and abundant hot water night and day. It can be connected up with the furnace coils of regular heating system, and if such system is competent to heat water during the cold season of the year it will not be necessary to operate the " Economy " Boiler with its gas burning equipment—simply let it serve during such periods as a plain boiler. Its usefulness is so adaptable to every condition which arises that no other piece of equipment in the home is more appreciated than the " Economy" Automatic Boiler. Independent of everything else it is completely efficient in itself. If for six months in the year it is desired to have it be merely the hot water service boiler in connection with the house heating plant, it fulfills that need. The " Economy " Automatic is always safe and dependable—there are no city safety regulations directed against its installation or operation, for none are necessary. Any plumber can install it. The wholesale and retail plumbing trade are its distributors.



" ECONOMY " COMBINATION BOILER AND GAS WATER HEATER
Showing Internal Construction

To all who would have a most comfortable, safe, sure and economical hot water service, an investigation is strongly urged of what the " Economy " Automatic will do, as against any other type of hot water equipment. Gas side heaters of the most expensive type, in conjunction with plain boilers, even if equipped with a thermo-valve control, cannot equal the " Economy " Automatic in service and low cost of operation. Plain boilers with coal-burning side-heating stoves are not to be considered. Instantaneous type heaters are at a disadvantage from so many practical angles: first cost; cost to install; cost to operate; special large gas service; pipe brought in from the main; special large meter; possibility of accident; no storage of hot water and consequent draining of pipe of cold water before hot water reaches the faucet (this is the case even where the plumbing provides circulating hot water service pipes to each faucet); no possibility to use such equipment during the winter months in connection with the regular heating plant, to provide the hot water without expense; and a piece of complicated machinery with the consequent liability to get out of repair after a year or two of service. All of these are practical considerations and should receive the attention of any one planning what is best to go in his own home; also, what he should provide for the comfort, convenience and safety of a tenant.



" ECONOMY " AUTOMATIC COMBINATION BOILER AND GAS WATER HEATER
Showing Thermo-Valve Control

Advantages—The " Economy " Automatic Combination Boiler and Gas Water Heater offers advantages over any other method or device for providing hot water for domestic use. It is simple in construction and plain in design, but its efficiency for comfortable, dependable service is not equaled by any other hot water equipment, regardless of price. In respect to economy of fuel for hot water results obtained, it will save its entire first cost in one year, as compared with the instantaneous type heaters.

The " Economy " Automatic provides a constant and large storage supply of hot water. Without a storage of hot water, absolutely satisfactory hot water service is not possible.

The " Economy " Automatic is entirely within one piece of equipment, and no side-heating device with a plain tank can possibly give results equal to it.

The " Economy " Automatic interior construction is covered by the Quinn patent No. 1035636, and represents advanced ideas of water heating with gas as the fuel.

The " Economy " Automatic Thermo-Valve Control is positive and will continue so for the life of the equipment. Our guarantee covers the thermo control and every other part of the " Economy " Automatic.

Continued on next page

Guarantee.

"Economy" Combination Boilers and Gas Water Heaters are guaranteed to give absolutely satisfactory service in use and against any defect in material or manufacture. This Company will co-operate with the architect who specifies "Economy" Heaters, Regular or Automatic, whenever notice is sent that an "Economy" has been specified, by following each boiler through to installation and actual operation, to the satisfaction of the owner or his representative.

"Economy" Regular Combination Boiler and Gas Water Heater.

The "Economy" Regular Combination Boiler and Gas Water Heater is made under the Quinn patent No. 1035636, and its interior construction represents advanced ideas of rapid water heating with gas as the fuel.

The "Economy" Regular is identical in construction and material with the "Economy" Automatic, except that it is not provided with the Economy Thermo-Control, and is sold most largely in the No. 30 size (nominal 30 gallon capacity), although a great many No. 18, No. 24 and No. 40 are sold, and some of the larger sizes also.

The "Economy" Regular is what is commonly known to the plumbing trade and by architects as a gas heating range boiler. The No. 30 size is the one usually specified for kitchen and bathroom installation. It can be connected up with the kitchen range and used separately or in conjunction with the range water-back, to produce the required amount of hot water.

The "Economy" Regular has become the standard gas heating boiler of the country for lower priced flats and small houses where convenience of tenants is a consideration with owners. Some single jobs in Chicago have taken more than three hundred No. 30 "Economy" Regular Boilers the past building season. Builders are rapidly changing over from plain boilers to "Economy" Regular Gas Heating Boilers. Their installation gives an added renting and selling inducement. Be careful to have specifications read "Economy" Regular Combination Boiler, and not simply a gas heating range boiler, if you wish to be sure that the "Economy" goes in on the job. The wholesale and retail plumbing trade are distributors of "Economy" Combination Boilers.

LIST PRICES, "ECONOMY" COMBINATION BOILERS AND GAS WATER HEATERS

No.	Actual Capacity, Gallons	Size		Automatic With Thermo-Valve Control	Regular Without Thermo-Valve Control
		Height, Feet	Diam., Inches		
18	13	3	12	$40.00	$24.00
24	17	4	12	40.00	24.00
30	21	5	12	40.00	24.00
40	30	5	14	44.00	28.00
52	40	5	16	60.00	44.00
66	51	5	18	72.00	56.00
82	64	5	20	80.00	64.00
100	78	5	22	98.00	82.00
120	94	5	24	116.00	90.00

Stands extra. Subject to substantial trade discount.

We recommend that oversized boilers be installed, because the larger the stored-up supply of hot water the less number of times each week will the hot water be drawn off in such quantity as to bring the cold water into the boiler and up to a level to operate the thermo-valve to supply additional gas to the burner. With suitable size boiler selected, the gas consumption will practically stand at the minimum of four feet per hour, week after week.

Nos. 18 and 24—Suitable for office hot water requirements and wherever a small but immediate need exists for hot water.

No. 30—The standard size for kitchen and bathroom installation. Also, very generally selected for basement installation in houses and bungalows to provide for one bathroom with lavatory, kitchen sink and laundry tubs. But we recommend No. 40 or preferably No. 52 for moderate sized houses and bungalows.

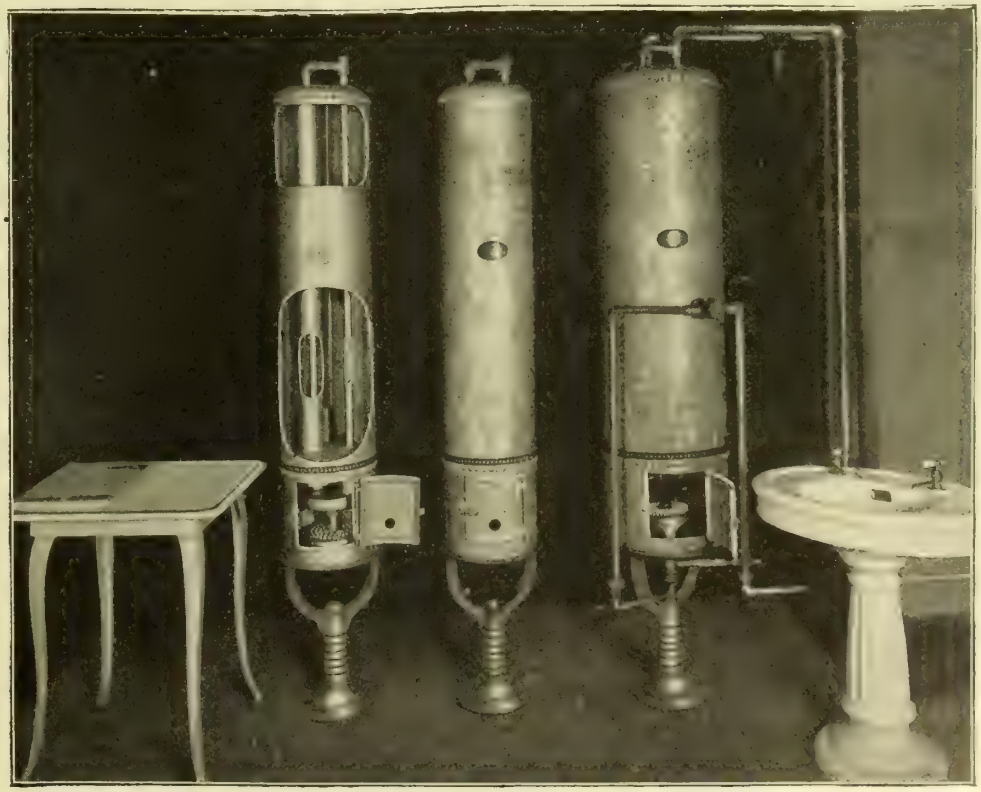
Nos. 40 and 52—For basement installation in houses and bungalows to provide for one bathroom with lavatory, kitchen sink and laundry tubs.

Nos. 66 and 82—For basement installation in residences and bungalows with two bathrooms, extra lavatories, etc.

No. 100—For basement installation. Ample for two-flat buildings and large homes.

No. 120—For basement installation. Ample for three apartments and largest residences.

"ECONOMY" REGULAR COMBINATION BOILER AND GAS WATER HEATER



"ECONOMY" COMBINATION BOILERS AND GAS WATER HEATERS

Photographed on display in Building Material Exhibit, Chicago, Ill.

No. 30 size "Economy" Sectional Boiler showing interior construction

No. 30 size "Economy" Regular Boiler ready for connection with gas and water

No. 52 size "Economy" Automatic Boiler connected with gas and water and automatically in operation on low flame taking four feet of gas per hour

W. E. BEILMAN

The "Beilman-Seamans" Automatic Tank Water-Heaters

448-450 Niagara Street

BUFFALO, N. Y.

Products.

THE "BEILMAN-SEAMANS" IMPROVED AUTOMATIC TANK WATER-HEATERS for Gas; "SEAMANS" AUTOMATIC TANK WATER-HEATERS for Coal, with THERMOSTAT.

Also, "BEILMAN-SEAMANS" IMPROVED AUTOMATIC SPECIAL WATER-HEATER for Gas; SPECIAL FLOAT CHECK VALVES; AUTOMATIC SAFETY GAS CUT-OFF VALVES.

"Beilman-Seamans" Improved Automatic Heaters.

These improved tank water-heaters (see Styles X and XX), with automatic pilot control in connection with main burners (patented July 5, 1910), are equally suited for natural or artificial gas, only modifications being in burners. Supply any quantity of water (temperature as desired) at an average consumption of 1,000 feet of gas to 1,000 gallons.

In artificial gas installations, heaters can be economically connected to water section in house furnace or range, so gas can be cut off entirely when furnace or range is in operation; or a coal fuel heater (see Type Y) can be supplementarily installed.

SIZES AND PRICES, "BEILMAN-SEAMANS" WATER-HEATERS

WITH GALVANIZED AND WROUGHT IRON BOILERS

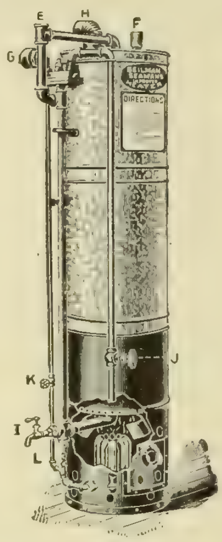
Number	Capacity in Gals.	Diam. and Height, Ins.	With 1/4-in. Wrought Iron Boiler 3/8-in. Heads; $3.00 extra for Hand-Holes Galv. Iron Pipe Circulation 3/8-in. Shell on sizes above 390 gals.	Heater with 5-year Guaranteed Galvanized Boiler and Iron Pipe Circulation	Heater with 8-year Guaranteed Galvanized Boiler and Iron Pipe Circulation
1	30	12 x 60	$74.00	$62.00	$65.00
2	40	14 x 60	83.00	68.00	72.00
3	52	16 x 60	93.00	74.00	78.00
4	66	18 x 60	104.00	88.00	92.00
5	82	20 x 60	116.00	98.00	103.00
6	100	22 x 60	128.00	116.00	121.00
7	120	24 x 60	140.00	130.00	134.00
8	150	30 x 48	155.00	155.00	165.00
9	165	30 x 54	166.00	170.00	183.00
10	185	30 x 60	178.00	185.00	192.00
11	210	36 x 48	190.00	....	....
12	225	30 x 72	200.00	....	....
13	265	36 x 60	214.00	....	....
14	290	36 x 66	230.00	....	....
15	315	36 x 72	245.00	....	....
16	350	38 x 72	265.00	....	....
17	390	40 x 72	290.00	....	....
18	430	42 x 72	315.00	....	....
19	470	48 x 60	345.00	....	....
20	515	46 x 72	375.00	....	....
21	570	48 x 72	420.00	....	....

WITH COPPER BOILERS

Number	Capacity in Gals.	Diam. and Height, Ins.	Heater with Brown & Bros. Seamless Special Copper Boiler; 200-lb. Test Galv. Iron Pipe Circulation	Heater with Copper Boiler and 1-in. Brass Pipe Circulation.	Heater with Copper Boiler and 1¼-in. Brass Pipe Circulation	Heater with Copper Boiler and 1½-in. Brass Pipe Circulation
1	20	12 x 60	$86.50	$94.00	$96.50	$93.00
2	40	14 x 60	102.50	110.50	113.00	115.00
[illegible]	[illegible]	16 x 60	11[illegible].00	126.50	129.50	131.00
4	[illegible]	[illegible]	[illegible]	143.50	146.50	148.00
4	[illegible]	[illegible]	17[illegible].00	184.50	187.50	190.00
[illegible]	[illegible]	20 x 59	205.00	218.00	221.00	224.00
[illegible]	100	20 x 76	231.00	241.50	244.50	247.00
6	[illegible]	24 x 60	261.00	272.00	275.00	[illegible]
7	[illegible]	[illegible]	271.00	282.50	286.00	289.00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	300.00
[illegible]	[illegible]	24 x 78½	307.00	320.00	[illegible]	327.00

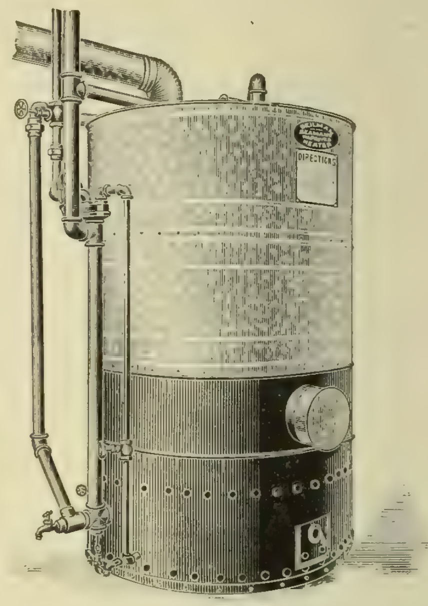
[illegible] size heater up to 120 gallons can be run with ¾-inch [illegible] inch and 1 inch pipe being required for larger [illegible]. Number of heater in price list corresponds to number [illegible] heater up to No. 15 will supply at one time [illegible] No. 16 will supply 20 baths, No. 17, 24 baths, No. 18, 28 baths, [illegible] No. 21, 40 baths, besides laundry and other fixtures. All heaters with 5-foot boilers (Styles X and XX) [illegible]. Larger size heaters than [illegible] can be supplied if required.

[illegible]



Style X

E—Cold-water supply
F—Hot-water supply
G—Gas supply
H—Pipe to chimney
I—For sediment cock
J—Main gas valve
K—Pilot gas valve
L—Automatic pilot valve



Style XX

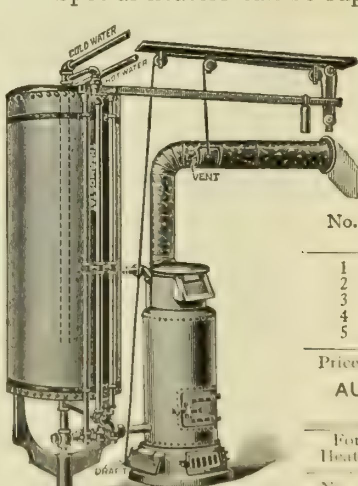
Reproduced from photograph of heater installed in General Electric Building, Buffalo's skyscraper. Capacity, 470 gals. Supplies 98 fixtures

Similar type 570 gal. heater installed in new Hutchinson High School, Buffalo, N. Y.

"BEILMAN-SEAMANS" IMPROVED AUTOMATIC WATER HEATERS

Special Heaters.

Special heaters can be supplied to connect to tanks of any capacity, either upright or horizontal (coal or gas), when Styles X and XX are not convenient.



TYPE "Y" "SEAMANS" AUTOMATIC TANK WATER HEATER FOR COAL

With Thermostat and Fittings

TYPE "Y" HEATER

No.	Will Supply Boiler	Price Without Boiler
1	52 to 100 gals.	$95.00
2	120 to 185 gals.	115.00
3	210 to 315 gals.	145.00
4	350 to 430 gals.	185.00
5	470 to 570 gals.	235.00

Prices with boilers given on application.

AUTOMATIC SAFETY GAS CUT-OFF VALVES

For Heater	Price	For Heater	Price
No. 1	$10.00	No. 12	$21.00
No. 2	11.00	No. 13	22.00
No. 3	12.00	No. 14	23.00
No. 4	13.00	No. 15	24.00
No. 5	14.00	No. 16	25.00
No. 6	15.00	No. 17	26.00
No. 7	16.00	No. 18	27.00
No. 8	17.00	No. 19	28.00
No. 9	18.00	No. 20	29.00
No. 10	19.00	No. 21	30.00
No. 11	20.00		

Fitted to Heater on order.

Check Valves.

Special Float Check Valves for return pipe circulation.

DATA, SPECIAL FLOAT CHECK VALVES.

Size, inches	½	¾	1	1¼	1½	2
Price, each	$4.50	$5.00	$6.00	$7.00	$8.00	$10.00

RAPID HEATER COMPANY

Manufacturers of Water Heaters

GENERAL OFFICES AND FACTORY
101-103 Campau Avenue N. W.
GRAND RAPIDS, MICH.

SOUTHWESTERN OFFICE
Scott & Cochran
AUSTIN, TEX.

Products.

"Rapid" Automatic Instantaneous Gas Water Heaters;
"Rapid" Instantaneous Bath Water Heaters;
"Rapid" Circulating Copper Coil Tank Heaters.

Rapid HEATERS
TRADE-MARK

"Rapid" Automatic Instantaneous Gas Water Heater

White enameled jacket. Capacity two gallons of water per minute raised sixty-three degrees from initial temperature. Sufficient for one bath, lavatory, kitchen and laundry tray.

Combination floor stand or wall bracket supplied with each heater.

"RAPID" AUTOMATIC INSTANTANEOUS WATER HEATER

Jacket — Pure white enameled jacket. Special process enamel fused with the iron at 1800 degrees Fahr. Non-conductor of heat; rust-proof; beautiful; easily cleaned; sanitary. The best material known to science for the construction of a water heater.

Coil—Sixty feet of ½-inch No. 20 gauge, seamless copper tubing; wound so as to absorb all possible heat units from the burner.

Burner—Eight burners in one casting, with central gas distributor which carries the gas with greater pressure and more air to combustion chamber. Position is rigid and unchangeable in the heater. Condensation from coil can not get into the combustion chamber.

Water Valve—Butterfly type. Butterfly held rigidly at top and bottom; swings like a gate on a hinge; cannot change from its original position, and therefore will not stick or bind.

Gas Valve—Operated with a lever from the butterfly of water valve. Spring in the gas chamber keeps gas valve closed when no pressure is on the butterfly. Pilot is independent of main gas valve. Has lava tip, protected from condensation off coils.

DATA AUTOMATIC HEATER

Price	Gas Supply, Inches	Water Supply	Water to Fixture	Vent	Height	Diameter of Jacket
$50.00	¾	½"	½"	3½"	30"	12"

Model D "Rapid" Heater.

Of heavy sheet copper throughout. Heavily nickeled and highly polished. White porcelain enameled shelf ring. The acknowledged leader of all bath heaters. Handsome, compact, efficient. Easily installed.

Burner — Very powerful. No screens. Adjustable gas and air mixer.

Valves — Extra heavy and durable. Gas Valve has safety pilot valve. Main gas valve can not be opened without first turning pilot valve on. Water can not be shut off without first closing gas valve. Gas can not be turned on without turning on water. Gas valve adjustable to any pressure.

Sprayer — Self-cleaning, atomizing. Never clogs.

MODEL D "RAPID" HEATER

Model C "Rapid" Heater.

Of heavy copper throughout. Heavily nickeled and highly polished. White porcelain enameled shelf. Requires no drip connection. Is the largest capacity non-vent heater on the market. The burner is so constructed that no vent is required. Tests at the University of Michigan have failed to show at any time the generation of injurious gases by this heater.

For use on artificial coal or water gas. Can be fitted for natural gas on order.

MODEL C "RAPID" HEATER
Has Safety Water Valve and Safety Adjustable Gas Valve. Visible Pilot Light

Guarantee.

"Rapid" Heaters are guaranteed to do all claimed for them, when installed and operated according to our printed instructions accompanying each heater when shipped. All parts are guaranteed free from flaws and defects in material and workmanship.

DATA "RAPID" INSTANTANEOUS GAS HEATERS

Style	Gas Supply from Meter, Ins.	Gas Supply at Heater	Size of Meter	Height	Diam. of Jacket	Vent	Capac.	Price
Model D.	¾	½"	10 light	28"	10½"	3½"	2 gal	$25.00
Model C.	¾	½"	10 light	31"	10½"	None	2½ gal	

* Capacity given in gallons per minute raised 50° from initial temperature. Figures based on manufactured gas, testing 650 B. T. U.'s.

ESTABLISHED 1886

HUMPHREY COMPANY

DIV. OF RUUD MFG. CO.

Manufacturers of Instantaneous Automatic Water Heaters

FACTORY AND MAIN OFFICE

KALAMAZOO, MICH.

BRANCHES IN ALL LARGE CITIES

Products.

HUMPHREY COPPER COIL GAS WATER HEATER, for every purpose. HUMPHREY-RUUD AUTOMATIC GAS WATER HEATERS, HUMPHREY COTTAGE AUTOMATIC WATER HEATERS, HUMPHREY INSTANTANEOUS BATHROOM WATER HEATERS, HUMPHREY TANK WATER HEATERS.

Facilities.

Humphrey gas water heaters are constructed in an up-to-date, well equipped factory, by thoroughly experienced workmen under the direct supervision of the inventor of these heating appliances.

The organization is backed by ample resources, and so situated geographically as to be able to reach all parts of the country through connections with all railroad and freight lines.

Humphrey-Ruud Automatic, Type "A" Water Heaters (with Thermal Control).

Humphrey-Ruud automatic water heaters are designed to furnish hot water to all parts of the building. They are placed in the basement, or wherever desired, and connected to gas and water supply. Hot water is obtained by opening a faucet, which operation lights the burners by the aid of a tiny pilot light.

These have both water pressure and thermostatic control of gas. The thermal action is made positive by placing thermostat directly over burner. Automatic valve location at top of heater reduces connection costs and facilitates adjustments. The Humphrey two-piece piston in water valve, pilot and burner construction, add greatly to this most advanced, effective, and durable construction.

Patented spout flame burner produces one hundred per cent heat from gas burned. Positively does not "flash back" or corrode and clog up.

Guarantee—This Company guarantees every Automatic Heater against defects, in both workmanship and material, for one year.

TYPES AND SIZES

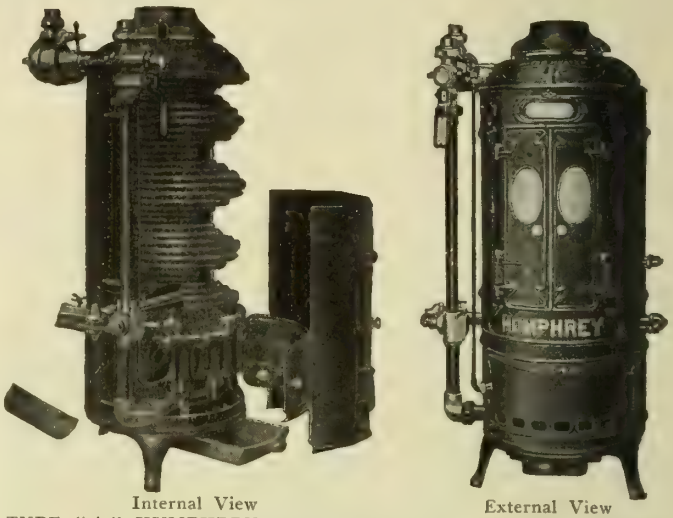
No. 2A—Capacity, 2 gallons hot water per minute. Suitable for places of very light demand, with one or two faucets to be supplied (city water pressure only).. $70.00

No. 3A—Capacity, 3 gallons hot water per minute. Suitable for small dwellings, having only bathroom and kitchen connections for hot water.....$100.00

No. 4A—Capacity, 4 gallons hot water per minute. The standard size, and is heater recommended for the modern home, having bathroom, kitchen and laundry...$115.00

No. 6A—Capacity, 6 gallons hot water per minute. Adapted for dwellings having two or three bathrooms, butler's pantry, and one or more hall or bedroom lavatories.....$150.00

No. 8A—Capacity, 8 gallons hot water per minute. Suitable for large dwellings having three to six bath rooms, butler's pantry, several hall or bedroom lavatories, etc. Also well adapted for small hotels, restaurants, small apartment houses.....$185.00



Internal View External View

TYPE "A," HUMPHREY-RUUD AUTOMATIC WATER HEATER, THERMAL CONTROL

Heater No.	Capacity per Min., Gals., 63° Raise	Height, Ins.	Diam. Shell, Ins.	Diam. Shell, Including Valve, Ins.	Diam. Copper Coils, Ins.	Length Copper Coils, Ft.	Size Flue Pipe, Ins.	Number of Burners	Gas Supply from Meter, Ins.	Size Gas Meter, Lights	Gas Consumed per Min., Cu. Ft.	Number of Faucets Supplied	Net Weight, Lbs.	Shipping Weight, Lbs.
2A	2	39	15	16	$\frac{5}{8}$	60	4	9	$\frac{3}{4}$	10	2	2	139	175
3A	3	43	19	25½	$\frac{3}{4}$	74	5	12	1	20	3	3	220	295
4A	4	46	20	28½	$\frac{3}{4}$	100	6	16	1	30	4	8	266	350
6A	6	52	22	30½	1	124	6½	24	1½	45	6	14	394	490
8A	8	56	26½	35½	1	156	8	32	2	60	8	22	452	580

Humphrey Automatic Pressure Valve Type Heaters (without Thermal Control).

Possess all quality features of Type A, except thermostatic control.

Protection against excessive water temperature, due to valve sticking or to extremely small water flow, is afforded by the Humphrey patented two-piece piston and adjustable by-pass in the water valve.

Humphrey pressure valve type are the only non-thermostatic automatic water heaters reasonably safe under all conditions and use.

HUMPHREY AUTOMATIC WATER HEATER, PRESSURE VALVE TYPE

DATA, AUTOMATIC WATER HEATER PRESSURE VALVE TYPE

No. of Heater	Water Heated per Min., Gals.	Gas Consumed per Min. Cu. Ft.	Gas Supply from Meter, Ins.	Size Gas Meter, Lights	Height, Ins.	Diam., Ins.	Net Weight, Lbs.	Shipping Weight, Lbs.	Price Fast
20	$\frac{2}{3}$	2½	$\frac{3}{4}$	10	38	20	138	168	$50.00
30	$\frac{2}{3}$	3	1	20	40	21	167	205	65.00

Continued on next page

Multicoil Automatic Storage Heater.

Designed to supply hot water when needed in large quantities where several faucets are opened at one time.

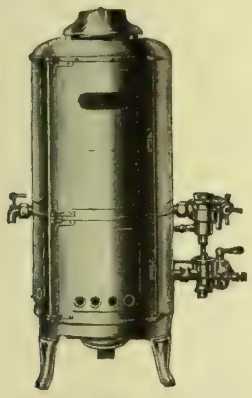
When connected and in operation, gas burns until tank of water is heated to its predetermined temperature; then gas is automatically shut off. When temperature of water in tank falls twenty degrees, the gas is again turned on and burns until water is brought up to temperature again.

Specially adapted to tank or other low water pressure conditions. Splendid auxiliary to steam plant in apartment houses.

MULTICOIL AUTOMATIC STORAGE HEATER

DATA, MULTICOIL AUTOMATIC STORAGE HEATERS

Heater No.	Height, Ins.	Diam., Ins.	Circulators Between Boiler and Heater, Ins.	Size Gas Supply Pipe, Ins.	Size, Gas Meter, Lights	Size Flue Pipe, Ins.	Size Cold Water Inlet, Ins.	Use with Tanks, Gals.	Capacity per Hr., Gals.
2C	39	15	1½	¾	10	4	1	60 to 150	100
3C	43	19	2	1	20	5	1	100 to 300	200
4C	46	20	2	1	30	6	1¼	200 to 365	300
6C	52	22	2½	1½	45	6½	1½	300 to 575	400
8C	56	26½	2½	2	60	7½	2	425 to 800	500



NO. 50. NEW HUMPHREY WATER HEATER

Made of aluminum, for dentists' or doctors' offices for constant hot-water supply

No. 50 size	$50.00
Diam., Ins.	10½
Height, Ins.	28
No. 55 size	$55.00
Diam., Ins.	11½
Height, Ins.	31
No. 60 size	$60.00

HUMPHREY SHOWER BATH WATER HEATER

Will instantly supply hot water to bath or to shower on lighting the gas. Cold shower obtained by turning on water without ignition of gas. Made entirely of copper and brass nickel-plated and highly polished. Price, $35.00

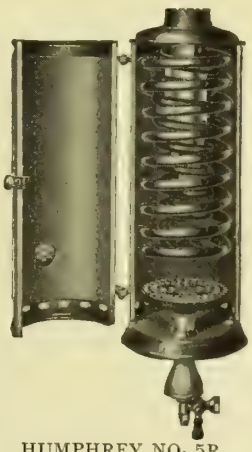
Height, heater only, Ins.	27
Height, with shower, Ins.	31
Width, Ins.	14¾
Thickness	13½
Heat, gals. per minute, 50° raise,	2 gallons

No. 5R Copper Coil Tank Water Heater with Enameled Jacket.

This gas burning heater is attached directly to the kitchen boiler.

The copper coils, twenty five feet long, are enclosed in a sanitary porcelain enameled jacket of pressed steel. Coils are accurately designed to absorb the most heat from the fifty to sixty foot-capacity spout flame Bunsen burner, which is equipped with flat screen flame check and develops intense heat.

The efficiency of the heater is kept high by a heat-resisting lining which prevents radiation into the room.



HUMPHREY NO. 5R TANK WATER HEATER

DATA, NO. 5R TANK WATER HEATER

Height, Ins.	Diam., Ins.	Size Flue, Ins.	Net Weight, Lbs.	Shipping Wt., Lbs.	Length of Coil, Ft.
25	8¼	3	32	46	25

Nos. 5-5-I-50 Copper Coil Tank Water Heaters with Cast-Iron Jacket.

For attachment to kitchen boiler to heat water in boiler by circulation. Equipped with reverse grade copper heating coils and cast-iron jacket that has a baked black japan finish. Heater is easy to install, and is of durable construction.

NO. 51. HUMPHREY TANK WATER HEATER

DATA, NO. 5-5-I-50 TANK WATER HEATER

Size of Heater	Height, Ins.	Width, Ins.	Diam. of Coil, Ins.	Length of Coil, Ins.
No. 5	22 7/8	7	¾	20
No. 5-I	22 7/8	7	¾	25
No. 50	30	10	¾	35

Size of Heater	Adapted for Tanks, Gals. Cap.	Net Weight, Lbs.	Shipping Weight, Lbs.	Burner Cap. Per Hr. Cu. Ft
No. 5	24 to 30	33	43	50
No. 5-I	30 to 40	35	45	50–60
No. 50	60 to 80	73	96	75–80

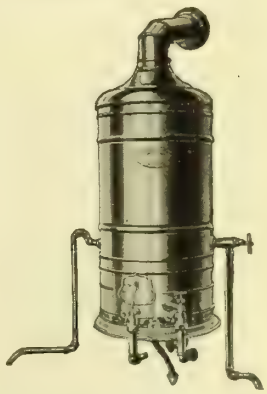
Humphrey Instantaneous Water Heaters.

These are not pressure water heaters, so can be used to supply hot water only to fixtures in the same room.

Nos. 6 and 8 are contact heaters. The water is divided into minute particles and forced into direct contact with heated gases, thus utilizing practically every heat unit of the gas.

The No. 2 is entirely non-contact. The products of combustion of the gas do not come in contact with the water.

This has tinned water surfaces, so that besides being the ideal heater for bathing, the hot water can be used for hot drinks and every domestic purpose, which cannot be done with Nos. 6 and 8.



NO. 6 AND 8 INSTANTANEOUS WATER HEATER

Made of sheet copper, thoroughly nickel-plated and polished. Valves are of brass; burners of cast iron and shelf of steel, white porcelain enameled

DATA, HUMPHREY INSTANTANEOUS WATER HEATER

No. Heater	Gas Supply from Meter, Ins.	Heats Gals. Per Min. 50° Rise in Temperature	Height, Ins.	Diam., Ins.	Shipping Weight, Lbs.	Price
Non-contact 2 ...	¾	2½	34⅜	12	75	$40.00
Contact 6.....	¾	3	29½	12	65	29.00
Contact 8.....	1	2¼	28½	10¼	54	23.50

Catalogue.

A very complete catalogue covering all different types and sizes with detailed descriptions, diagrams of parts and installations, will be supplied on request to main office at Kalamazoo.

THE HOFFMAN HEATER COMPANY

Manufacturers of the Hoffman Water Heaters and Thermostatic Valves

FACTORY AND EXECUTIVE OFFICES

Washington Street and N. Y. C. and St. L. R. R.

LORAIN, OHIO

Products.

HOFFMAN COPPER COIL GAS WATER HEATERS, including AUTOMATIC INSTANTANEOUS WATER HEATERS, MULTICOIL STORAGE HEATERS, DOUBLE COIL TANK HEATERS, and MULTICOIL HOUSE HEATERS, for Heating with Hot Water or Steam.

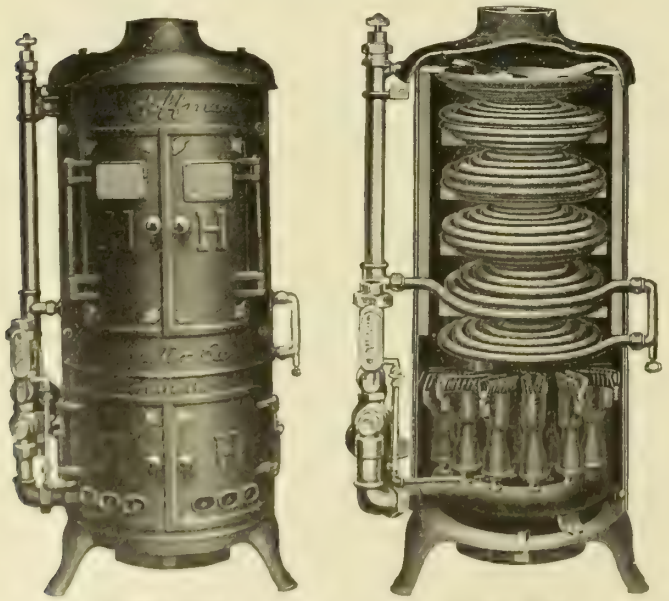
Also, SINGLE COPPER COIL TANK HEATERS, CAST IRON COIL HEATERS, DOUBLE COPPER COIL TANK HEATERS, and THERMOSTATIC VALVES.

Installation of Hoffman Heaters.

Any plumber can install these heaters from drawings and instructions supplied with each outfit.

Hoffman Instantaneous Automatic Water Heaters.

The Hoffman Instantaneous Automatic Heater (Fig. 1) is essentially an economical apparatus, conserving the full power of the gas flame in its direct application to the water. With its patented burner and thermostatic valve, it is a markedly fool-proof, efficient and superior heater. It requires practically no attention, and provides, within 15 seconds, at the mere turn of the hot-water faucet, an abundant supply of *hot* water for laundry, kitchen, lavatory, bath and other purposes.



Exterior View Interior View

FIG. 1 VIEWS OF HOFFMAN INSTANTANEOUS AUTOMATIC GAS WATER HEATERS

DIMENSIONS, WEIGHTS, PRICES, ETC.

		Diam., Inches		Size of Pipe from Meter to Heater	Size of Connections	Flue Connection	Weight, Lbs.	
1½-D	7	10	11	¾"	1½"	4"	100	$
2-D	7	11	13	1"	1"		200	70
3-D	3	15	41	1"	1"	6"	60	
4-D	4	15	43	1¼"	1"	6"	90	110
6-F	6	17	49	1½"	1½"	7"	1 520	140

The apparatus is connected with the gas and water supply pipes, and burns gas (excepting in the case of the very small pilot light) only when the water of the hot-water faucet is running, automatically shutting off the gas when the faucet is closed.

Advantages of Hoffman Instantaneous Heating—The hot-water service is ready at any time and under all conditions, winter or summer, from the earliest hour in the morning to the latest hour in the night.

The Hoffman Heater provides, when manufactured gas (at $1.00 per 1,000) is used, hot water at the rate of approximately 10 gallons for one cent, or a bath for about one cent. With a range boiler a bath costs about five times as much, and besides is dependent upon the convenience of the kitchen service. When natural gas is used, a hot bath will cost on an average half a cent.

No more water is heated than is actually required.

The hot water is fresh and clean, as the water is not stored to become stale and rusty, but is heated "instantly" as it passes through the copper coils.

Adaptability of Types and Capacities.

No. 2½-D—Suitable for bungalow, cottage or small residence.

No. 3-D—Suitable for small dwellings, usually having only bathroom and kitchen connections for hot water.

No. 4-D—This is the standard size, and is the heater we recommend for the modern home having bathroom, kitchen and laundry. This size will supply the average household with all the hot water needed.

No. 6-F—This size is adapted for dwellings having two or more bathrooms, butler's pantry, and other hot-water fixtures.

Superior Construction.

Jacket—The jacket of the Heater consists of a double cast-iron Shell with ⅞-inch dead-air space between. The double doors, above and below, are self-closing; and Nos. 4-D and 6-F (see "Adaptability of Types and Capacities," above) are also equipped with double doors in the rear to give ready access to the rear of the coils. The top rests on lugs, leaving a space of one inch between the shell and the top. There is a deflector at the top of the coils, which catches the down-draft, throwing it out through this opening, thus preventing the down-draft from blowing out the pilot light, and doing away with the unsightly hood or the need of a damper.

Coils—The coils are of the highest grade 18 gauge seamless drawn copper tubing, and are wound in a manner to produce the greatest efficiency. The lower section, which lies in the fire zone, is detachable and removable. The No. 2½-D contains 75 feet of ⅝-inch tubing; the No. 3-D, 75 feet of ¾ inch tubing; the No. 4-D, 100 feet of ¾-inch tubing; and the No. 6-F, 125 feet of ⅞-inch tubing—all tested to 300 pounds

Continued on next page

pressure. Water and gas valves are of red brass castings specially ground and fitted.

New Improved Patent Hoffman Burner—As may be seen in Fig. 2, the gas is introduced through a minute hole in the nipple and rushes to the top of the burner, carrying with it an increased volume of air, which it siphons through the openings that surround the nipple at the bottom of the burner. The air and gas strike against the solid iron at the top of the burner, from which they rebound and are thoroughly mixed, taking the natural rotary motion of gas and escaping through the cylindrical gauze to the tip of the burner, where ignition takes place. The large proportion of air that the gas naturally takes up in this arrangement makes for a flame of highest efficiency and economy.

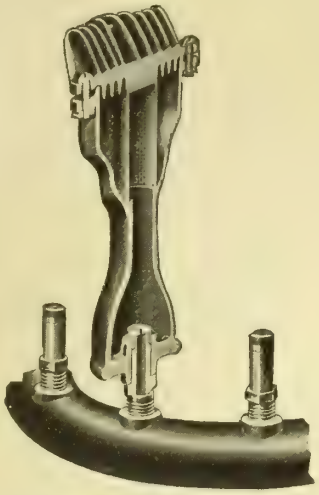


FIG. 2. CROSS-SECTION HOFFMAN BURNER

The top of the burner is so constructed that the flame is thrown in two directions and is thoroughly protected from condensation.

Patent Thermostat Valve, etc.—These Heaters are equipped with our new and improved type of Thermostat. It is very simple in construction and positive in action, because it acts on the Water Valve instead of on the Gas Valve. In operating, it reverses the action of the Water Valve, by opening a port. This throws the water pressure on the opposite side of the plunger, driving it back to place, and releasing the pressure from the Gas Valve, which is forced shut by this reversed action of the Water Valve.

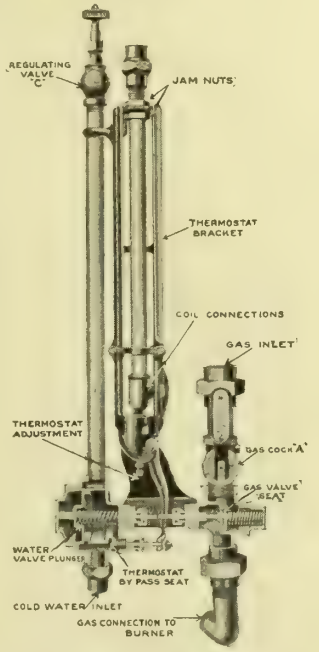


FIG. 3. HOFFMAN THERMOSTATIC VALVE

Guarantee.

We guarantee the Hoffman against defect in workmanship or material for one year from date of installation.

We further guarantee, that with artificial gas testing 650 B. T. U., one cubic foot of gas will raise the temperature of one gallon of water 63 degrees.

We further guarantee, that if the Hoffman Heater has been properly installed as per instructions accompanying each Heater, it will do the work which that particular Heater is specified for.

It is further guaranteed to the purchaser, that should the Heater, after being properly installed as per instructions accompanying each Heater, not perform the work as specified, the Heater may be returned at any time within a period of 30 days, and all money paid to us for that Heater will be refunded.

Indorsements.

The buildings in the Panama-Pacific Exposition were supplied with hot water through Hoffman heaters. The Hoffman received the "Medal of Honor," the highest award granted to any Water Heater in the country. These and other authoritative and scientific indorsements have won for the Hoffman, recognition from many of the leading architects and gas men.

Instantaneous Heaters as Auxiliaries to Range Boilers.

By connecting the Hoffman Instantaneous Automatic Heater, as indicated in Fig. 4, the water from the range boiler is made to pass through the heater before it reaches the water fixtures. If this water is not of a predetermined temperature (according to thermostatic adjustment), sufficient additional heat is added to it by an automatic lighting of the burner. If sufficiently hot, the water will pass through the heater without igniting the gas. The economy and convenience of this application is obvious.

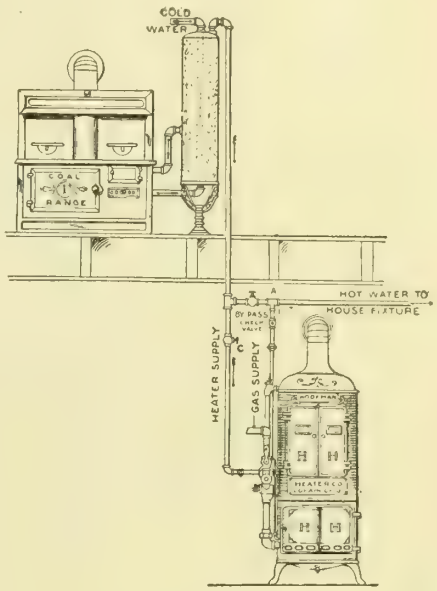


FIG. 4. ELEVATION, SHOWING INSTANTANEOUS HEATER INSTALLED AS AUXILIARY TO RANGE BOILER

Double Copper-Coil Tank Heater.

These heaters (lighted and extinguished by hand) are built to meet the most exacting requirements. They heat rapidly and economically, and are used to heat range boilers of 30 to 60 gallons capacity.

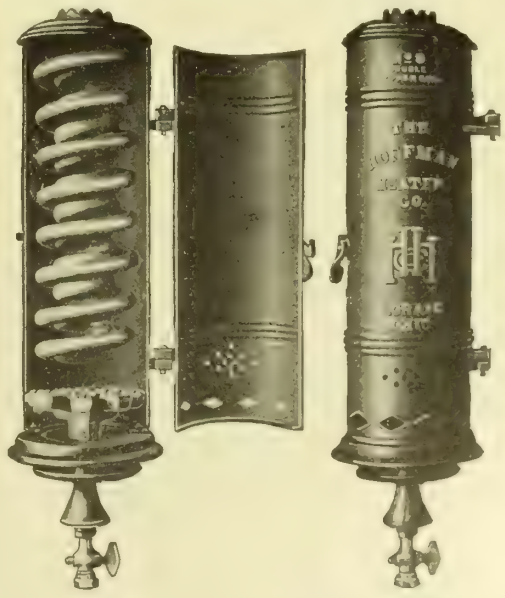


FIG. 5. VIEW OF HOFFMAN DOUBLE COPPER-COIL TANK HEATER, NO. 9

Continued on next page

Hoffman Automatic Hot Water Storage System.

This system is designed to furnish a continuous supply of domestic hot water at the rate of 100 to 500 gallons per hour. It is especially adaptable to large residences, apartments, store and office, hospital, school and factory buildings.

Operation—Automatically provides instant hot water at a turn of the faucet, and maintains uniformly the predetermined degree of temperature, usually 150 degrees. Requires no attention after pilot light is once lighted. Hot water drawn from tank is instantly replaced by cold. This immediately acts upon the thermostat which automatically turns on the gas. Water circulates through heater and tank temperature is rapidly restored, causing thermostat to shut off gas. When all faucets are closed tank temperature is automatically maintained by gravity circulation.

The system as sold complete, consists of a Hoffman storage heater, storage tank, 85 per cent magnesia tank covering, tank supports, Hoffman thermostatic gas valve and boiler thermometer.

Size of System Required.

No. 110—For large residences with two or three baths and shower, and apartment houses with three to six apartments.

No. 200—Large residences having three to six baths, showers, kitchen and laundry service. Apartment buildings with six or eight suites and laundry service. Small hotels with not over five baths, ten lavatories, kitchen and laundry.

No. 300—Large residences, six to fifteen baths, showers, etc. Apartment buildings with eight to twenty suites and usual laundry service. Hotels with not over ten baths, fifty lavatories, large laundry, etc., and gymnasiums having not over fifteen or eighteen hot water outlets.

No. 500—Adaptable to large hotels, apartment buildings, factories, bathhouses, gymnasiums, public buildings, etc., where hot water demands are greater than in cases previously mentioned.

Details of System.

Hoffman Multicoil Storage Heater—Combines simplicity, compactness and a high degree of efficiency, with economy in gas consumption. The coil and burner construction has been designed to transfer a maximum number of heat units from gas to water at the lowest possible cost for gas, radiation and flue losses being reduced to a minimum.

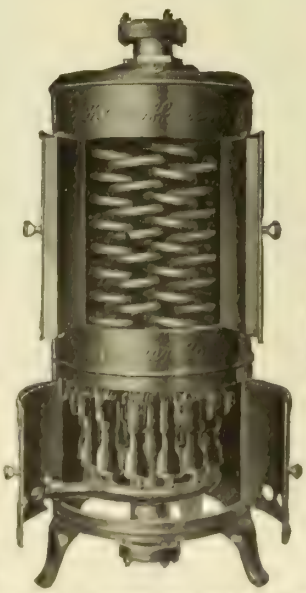


FIG. 6. VIEW OF HOFFMAN BOILER HEATER AND STORAGE HEATER, SHOWING INTERIOR ARRANGEMENT

Hoffman Sectional Multicoil Construction—Ten separate sections of copper coil are connected, independently of each other, with unions, to brass manifolds at top and bottom. Highest grade 18 gauge copper tubing is used; 100 feet of ¾ inch in No. 200, 125 feet of ¾ inch in No. 300, and 175 feet of ⅞ inch in No. 500 heater.

No. 110 heater has only four coils made of 50 feet of 18-gauge copper tubing: two outer coils of ⅞-inch and two inner ones of ¾-inch tubing.

Manifolds and all connections are contained in heater shell. By-pass increases circulation of water, and pitch of coils at the bottom manifold prevents accumulation of sediment, etc. A series of baffle-plates interspersed among coil sections increases efficiency.

Hoffman Cast Iron Shell—Perfect insulation provided by double shell inter-packed with an inch of asbestos. Entire shell comes off by removing four bolts. Upper and lower doors equipped with springs, making them self-closing.

Hoffman Improved Burner—Equipped with burner as described on preceding page, except for top which is so constructed as to throw flame directly against coils.

Hoffman Thermostatic Gas Valve—Compact, simple and efficient, automatically maintaining desired degree of temperature in storage tank.

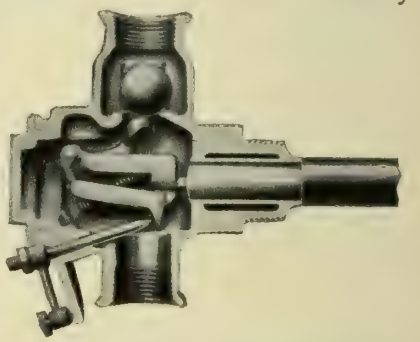


FIG. 7. HOFFMAN THERMOSTATIC GAS VALVE
Showing details and operation

Heating of water expands copper tube causing porcelain rod which is fastened to its extreme end to move out also. This relieves the pressure on lever A, which, through a series of levers, causes the ball valve to seat, closing gas inlet. As hot water is drawn off from tank reverse action takes place, opening valve and admitting gas.

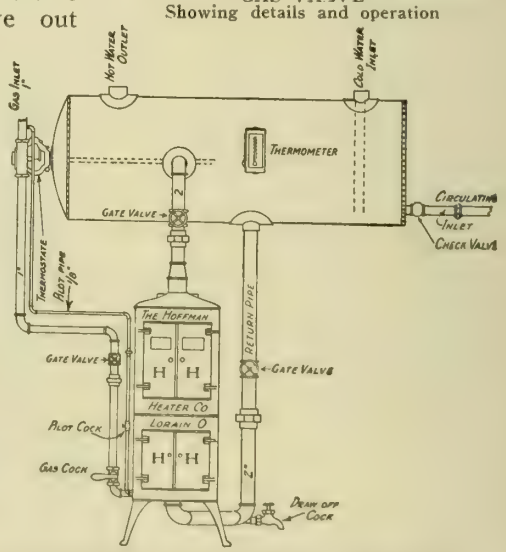


FIG. 8. SHOWING METHOD OF INSTALLING IMPROVED HOFFMAN STORAGE HEATER

SIZES, CAPACITIES AND PRICES

Capacity Heater, Gals.	Capacity Tank, Gals.	A	B	C	D	E	F	G	H	K	Size Circulator	Gas Supply	Hot Outlet	Cold Inlet	Complete Systems: Charcoal Iron Boiler	Complete Systems: Galv. Boiler
110	80	28"	42"	46"	64"	50"	35"	4"	10½"	9½"	1¼"	¾"	1"	1"	$128 00	$134 00
110	100	28	48	46	64	50	35	4	10½	9½	1¼	¾	1	1	134 00	140 00
110	120	28	60	46	64	50	35	4	10½	9½	1¼	¾	1	1	142 50	149 75
110	150	34	48	52	67	50	35	4	10½	9½	1½	¾	1	1	154 75	165 50
110	220	40	48	58	70	50	35	4	10½	9½	1½	¾	1	1	165 50	181 50
200	150	34	48	50	72	55	44	6	18	15	2	1	1¼	1¼	182 50	192 75
200	200	28	96	50	69	55	44	6	18	15	2	1	1½	1½	198 75	219 25
200	250	34	84	50	72	55	44	6	18	15	2	1	1½	1½	214 25	245 00
200	300	34	96	50	72	55	44	6	18	15	2	1	1½	1½	226 75	269 75
300	250	34	84	53	75	58	47	7	21	18	2½	1¼	1½	1½	237 50	268 50
300	300	34	96	53	75	58	47	7	21	18	2½	1¼	2	2	250 25	293 25
300	375	34	120	53	75	58	47	7	21	18	2½	1¼	2	2	266 00	
500	425	40	96	59	78	58	47	7	21	18	2½	1¼	2	2	310 00	
500	425	40	96	61	80	60	55	8	23	20	2½	1½	2	2	374 00	
500	500	46	84	67	83	60	55	8	23	20	2½	1½	2	2	392 75	
500	720	46	120	67	83	60	55	8	23	20	2½	1½	2	2	420 75	
500	860	46	144	67	83	60	55	8	23	20	2½	1½	2	2	435 00	

NOTE—Over all dimensions include two inch asbestos boiler covering.

THE JOHN E. MANNEN CO.

Manufacturers of "Age-Gar" Garage Heater

2241-2255 St. Clair Avenue
CLEVELAND, OHIO

Products.

The "AGE-GAR" GARAGE HEATER, for use with natural or artificial gas; "MANEST" TRIANGULAR FLOUR BOX, and the "MANEST" ECONOMIC FLOUR BOX, for Residences and Apartment Houses.

"Age-Gar" Garage Heater.

A practical and efficient heater, using natural or artificial gas, designed and made by pioneers in the natural gas field of Ohio. A powerful heater; is practically gas-tight, and has a galvanized pan that gives double fire protection. Will provide supply of hot water when desired, by placing hot-water coil in heater.

Will insure summer conditions in the garage during the cold months of winter, with absolute safety.

Size—Width, 12 inches; height, 42 inches; depth, 19 inches

Prices—"Age-Gar" Garage Heater, $12.00 net; $12.50 crated f. o. b. Cleveland. Hot-Water Coil, $7.00.

"AGE-GAR" HIGH EFFICIENCY GARAGE HEATER

"Manest" Triangular Flour Box.

The "Manest" Triangular Flour Box is a most convenient and sanitary receptacle for apartment house use. Made in two sizes and finished and decorated in japanned metal, as shown. Not affected by mould, damp or dust. Easy of access and takes up space that could not otherwise be occupied, fitting snugly into any corner.

"MANEST" TRIANGULAR FLOUR BOX

DATA, "MANEST" TRIANGULAR FLOUR BOXES

No.	High	Wide	Deep	Capacity	Price
25	10 ins.	10 ins.	19½ ins.	⅛ bbl. or 25 lbs.	$1.75
50	12 ins.	12 ins.	22 ins.	¼ bbl. or 50 lbs.	2.50

"Manest" Economic Flour Box.

Boxes made of tinned metal. Finished in glossy black and decorated as shown. Proof against vermin and mice. Not affected by mould, damp or dust.

Fasten against inside of cupboard door—out of the way when not wanted; easy of access when wanted. Cost less and take up less space than wood flour bins.

For residences and apartment houses.

"MANEST" ECONOMIC FLOUR BOX

DATA, "MANEST" ECONOMIC FLOUR BOXES

No.	High	Wide	Deep	Capacity	Price
25	16 ins.	12 ins.	8 ins.	⅛ bbl. or 25 lbs.	$1.75
50	20 ins.	14 ins.	11 ins.	¼ bbl. or 50 lbs.	2.50
100	25 ins.	18 ins.	14 ins.	½ bbl. or 100 lbs.	5.00

WILLIAM M. CRANE COMPANY

Manufacturers of "Vulcan" Gas Appliances

TELEPHONE
MADISON SQUARE 1058

16-20 W. 32nd Street
NEW YORK, N. Y.

CABLE ADDRESS
"VULCAN, NEW YORK"

Products.

"VULCAN" GAS RANGES for Hotels, Apartments, Institutions and Private Residences.

Also, "VULCAN" WATER HEATERS, HOTEL GAS APPLIANCES, BROILERS, TOASTERS, WARMING CLOSETS, PLATE WARMERS, LAUNDRY APPLIANCES, GAS IRONS (INDUSTRIAL and DOMESTIC), BURNERS (INDUSTRIAL, ILLUMINATING and ACETYLENE), HEATERS, FIREPLACE HEATERS, GAS LOGS, BAKE OVENS, HOT PLATES, BRASS FITTINGS, TUBING, etc.

Installing Gas Ranges.

All cities have ordinances governing the installation of gas ranges, and practically no two agree, but if the following suggestions are followed, all conditions, with perhaps a few exceptions, will be satisfactorily fulfilled.

In planning the kitchen and selecting the type of range to be specified, the first consideration should be: "What will be the possible cooking requirements of the apartment or house?" There are many styles and sizes of gas ranges, and care should be exercised to makes their selection proper, to meet these requirements.

A flue opening of at least twenty-four square inches in area should be provided. A direct flue connection should never be made; that is, the flue pipe from the range should not lead directly into the flue opening. Such connections are undesirable, for in the event of a strong back draught the oven burner might be extinguished.

The best method of connection is to furnish a separate hood to be set over the range, the hood to be connected directly to the flue opening as shown in the illustration on this page. This provides an indirect flue connection for the range, which is positive in action.

The importance of these suggestions will be readily understood when we state that at times gas companies and contractors when called upon to install the kitchen equipment, especially in apartment houses, have found it impossible to install a gas range of the proper size to fulfill the requirements because the proper space was not provided for the range, or the hood, nor had arrangements been made for flue connection.

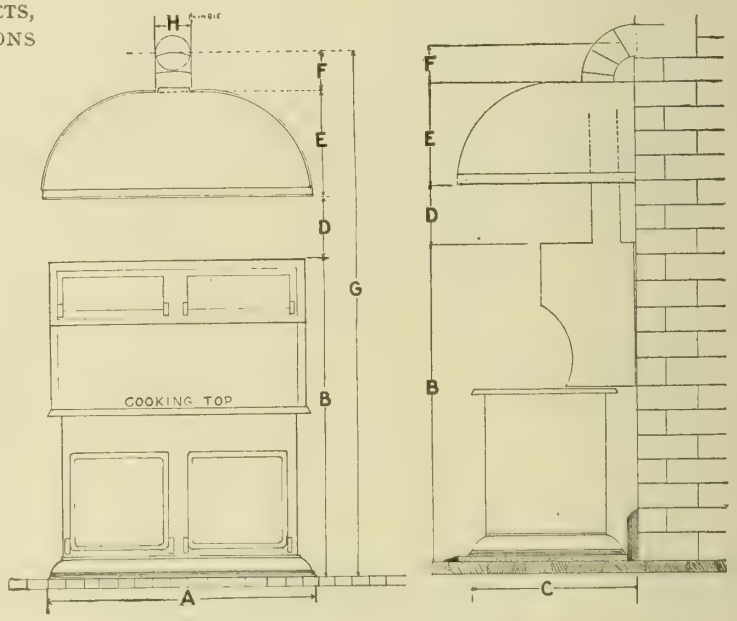
Certain types of "Vulcan" Ranges have the hood attached to the range, which type of construction is preferred by many. Cabinet Ranges are generally provided with a combination hood and shelf fitting over the top cooking burners, and connected with the oven flue, so as to form an acceptable type of indirect flue connection.

In details, such as the above and any others that might arise, we will be glad to co-operate with architects, and will furnish specifications to meet requirements, if tentative sketches are submitted to us.

We have had thirty years' experience in this line.

Catalogue.

Catalogue No. 1, for architects, showing a complete line of Gas appliances, will be forwarded upon request.



Front Elevation Side Elevation

DIMENSION DIAGRAMS OF "VULCAN" GAS RANGES
Large range with separate hood attached to wall. When attached hood is used there is a slight difference in dimensions

No.	2–184	150–663	889	842	803–B
A	55"	55"	44¼"	38½"	40"
B	62"	61¾"	65¼"	59½"	49½"
C	27"	35"	27½"	25"	25"
D	10½"	11"	7"		7"
E	20"	20"	16¾"		4"
F	6"	6"	6"	6"	6"
G	99"	99"	90"	66"	66"
H	6½"	6½"	6½"	6½"	6½"

Representative Types.

Below are described a few representative types of "Vulcan" Gas Ranges.

No. 2-184 "Vulcan" Double Range, with Elevated Broiler and Warming Closet.

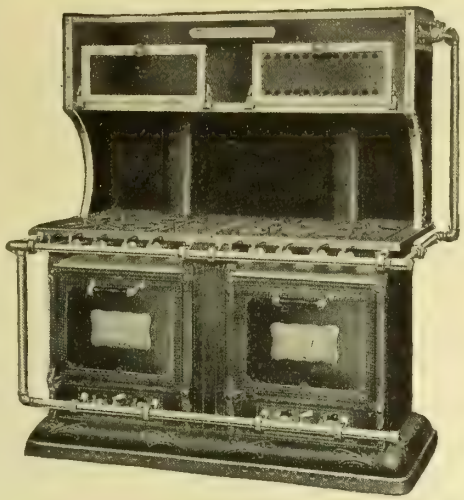
A popular Gas Range for large apartments or wherever cooking requirements are heavy. It is handsomely finished, substantially constructed, and offers unusual cooking capacity.

Each oven is heated by two pipe burners lighted by pilot from outside.

Continued on next page

Broiler is set high on a line with eyes and is heated by two pipe burners, lighted by pilot from outside. Large capacity, warming closet on level with broiler.

Cooking top has two giant, six regular, and two simmering burners. All burners, top, oven and broiler are removable.

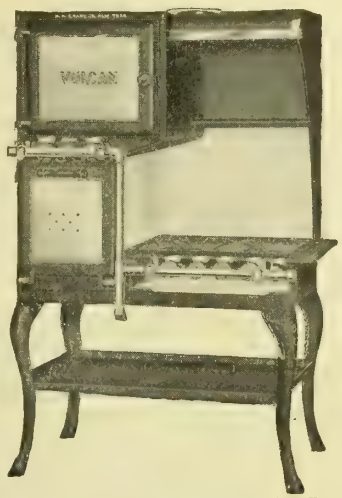


NO. 2—184-664 "VULCAN" RANGE
Ovens, 18" wide, 18" deep, 14" high
Broiler, 18¾" wide, 15" deep, 9" high
Warming closet, 27" wide, 15" deep, 12½" high
For other dimensions see diagram on opposite page

No. 842 "Vulcan" Short Cabinet Gas Range.

No. 842 fills a long-felt want of builders, because of its small size and large cooking capacity. It can be set in a space 36 inches wide, and has a cooking capacity that will fulfill most requirements. Cooking top fitted with three regular, one giant and one simmering burners. Furnished with white enameled panels, broiler and dust pans. White enameled splasher can be supplied, if desired.

Can be supplied without 2½-inch shelf.



NO. 842 "VULCAN" RANGE
Oven, 16" wide, 18" deep, 14" high
Broiler, 12½" wide, 18" deep, 14" high
Cooking top, 22" wide, 21" deep
For other dimensions see diagram on opposite page

No. 808-B Range.

Only 40 inches wide, but with cooking capacity that will fulfill most requirements. Canopy hood. Can be supplied with white enameled door panels, splasher around top burners, and white enameled broiler and dust pans.

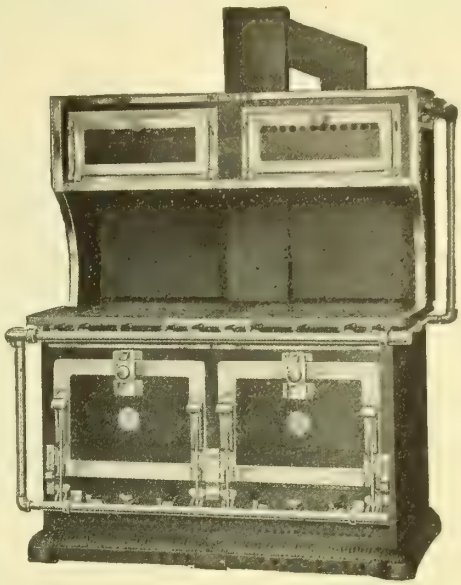
Oven, 14" wide, 18" deep, 14" high
Broiler, 14" wide, 18" deep, 9" high
Cooking Top, 22" wide, 21" deep
For other dimensions see diagram on opposite page

NO. 808-B "VULCAN" RANGE

No. 150-663 "Vulcan" Range, with Elevated Broiler and Warming Closet.

Designed for requirements of small hotels, restaurants and larger apartments. Made of extra heavy material. Handsomely finished and trimmed throughout. Top grids and bridges are extra heavy and flush with top, giving a smooth surface. Oven doors and frames made strong and substantial to prevent breakage.

Range has eight top burners (six regular, two giant) and simmering burner. Ovens will take the largest size joints.



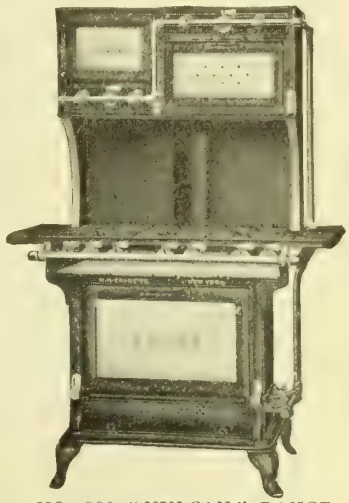
NO. 150-663 "VULCAN" RANGE
Ovens, 18¾" wide, 23" deep, 14" high
Broiler, 18½" wide, 15" deep, 8" high
Warming closet, 25" wide, 18" deep, 11" high
For other dimensions see diagram on opposite page

No. 889 Range.

A combination that serves a variety of requirements.

Fitted with large lower oven, large cooking top, elevated broiler and breakfast oven. Cooking top fitted with two giant, four regular, and one simmering burners. White enameled panels, broiler and dust pans.

Can be supplied with canopy hood and without side shelves.



NO. 889 "VULCAN" RANGE
Lower oven, 22" wide, 18" deep, 14" high
Breakfast oven, 12" wide, 15" deep, 9" high
Broiler, 16" wide, 14" deep, 9" high
Cooking top, 33" wide, 21" deep
For other dimensions see diagram on opposite page

Right or Left Ovens.

All "Vulcan" Cabinet Gas Ranges can be supplied with either right or left ovens, as desired.

White Enameled Splashers.

All "Vulcan" Gas Ranges can be supplied with white enameled splashers around top burner.

Automatic Lighters.

Automatic lighters for top burners can be attached to all "Vulcan" Ranges.

Gas Logs.

"Vulcan" Gas Logs are made in twelve sizes and four styles. They are natural in appearance, whether burning or extinguished, and will give good service under variations of pressure and quality of gas.

Catalogue.

Catalogue No. 1, for architects, showing a complete line of Gas appliances, will be forwarded upon request.

ROBERTS & MANDER STOVE CO.

Manufacturers of "Quality" Gas Ranges

S. E. Corner 11th Street and Washington Avenue

PHILADELPHIA, PA.

Products.

"Quality" Gas Ranges, and "Quality" Gas Ranges with Kitchen Heater (Combination Ranges) for Domestic Use, burning Natural or Manufactured Gas.

Description.

"Quality" Gas Ranges are constructed in accordance with the specifications of the National Commercial Gas Association and the American Gas Institute. Nothing less than No. 24-gauge steel sheets, and in many instances No. 18-gauge steel sheets, are used in their construction. The castings are dipped in japan and thoroughly baked, giving them a uniform appearance and making them easy to clean. Star-shaped top burners and pipe oven burners have drilled portholes, showing the greatest efficiency, with interlocking adjustable air shutters. White enamel drip and broiler pans, white enamel door panels, white enamel splash backs and oven sides as specified. Ovens on the right or left side of burner top.

NO. 344. "QUALITY" GAS RANGE
Plate Shelf "E," Top Splash and White Enamel Door Panels, Drip and Broiler Pans. Ovens on Right or Left Side

Dimensions and Weight

Baking Oven—18 x 18 x 12 ins. Broiling Oven—18 x 18 x 9 ins.
Length, less end shelf, 44 ins.; with end shelf, 48 ins. Height, 50 ins. Shipping weight, 340 lbs.

NO. 344. "QUALITY" GAS RANGE
With Canopy, Shelf, Glass Oven Door, Oven Thermometer, White Enamel Door Panels, White Enamel Drip and Broiler Pans

Dimensions and Weight

Baking Ovens (two)—18 x 18 x 12 ins. Broiling Oven—18 x 18 x 12 ins.
Length, 54½ ins. Height, 59 ins. Shipping weight, 460 lbs.
No. 342 "Quality" Gas Range, same as above, but with extra large Baker Baking Oven (22 x 18 x 14 ins.)

Other Equipment — Glass door, thermometer, warming closet above baking oven, canopy shelves, ventilating canopies, enamel splash back and oven side.

Combination Ranges.

"Quality" Gas Ranges with Kitchen Heater (Combination Ranges) are constructed to give the greatest amount of kitchen comfort and convenience, consequently gas is the principal fuel, coal being used as an auxiliary during the winter months to heat the room and water.

These ranges have the usual top and oven burners, with broiling burner in baking oven with interlocking safety device, large "L" shaped cast-iron or cast-brass waterback. Brass pipe coil or special brass pipe coil, if specified. Drop center or duplex grates.

NO. 836. "QUALITY" COMBINATION RANGE
With Warming Closet "C"

Dimensions and Weight

Baking Oven—18 x 18 x 12 ins.
Top, 37 x 25 ins. Total height, 63½ ins.; Cooking top height, 31½ ins.; Space required, 38½ x 28½ ins. Shipping weight, 550 lbs.

No. 736, with closed base instead of leg base.

NO. 564. "QUALITY" COMBINATION RANGE
Right or Left Ovens

Dimensions and Weight

Baking Ovens (two)—18 x 18 x 12 ins. Broiling Oven—18 x 18 x 12 ins.
Length, 57 ins. Height, 59 ins. Shipping weight, 670 lbs.

Catalogues.

Two separate catalogues are issued, one showing our complete line of straight gas ranges and the other showing our line of "Quality" Gas Ranges with Kitchen Heater (Combination Ranges), both of which will be forwarded on request.

ESTABLISHED 1865

THOMAS, ROBERTS, STEVENSON CO.

"Fortune" Ranges for Manufactured Gas

GENERAL OFFICE, FOUNDRY AND WAREHOUSE
American and Dauphin Streets
PHILADELPHIA, PA.

Products.

Manufacturers of "Fortune" Single Oven, Double Oven, Short Cabinet, Box Cabinet, Standard Cabinet and Special Cabinet Gas Ranges.

"Fortune" Gas Ranges.

"Fortune" gas ranges are perfect in construction, original in design and economical in operation.

All "Fortune" ranges are constructed according to the specifications of the National Commercial Gas Association, and are sold through gas companies. They can be obtained anywhere in the United States.

Shipping Facilities.

Philadelphia as the largest manufacturing city is admirably situated as a distributing point for manufactured goods. Its shipping facilities, both by rail and water, make it possible for us to guarantee prompt delivery of "Fortune" gas ranges north, south, east and west, at rates which permit competition with shipments from any other point in the United States.

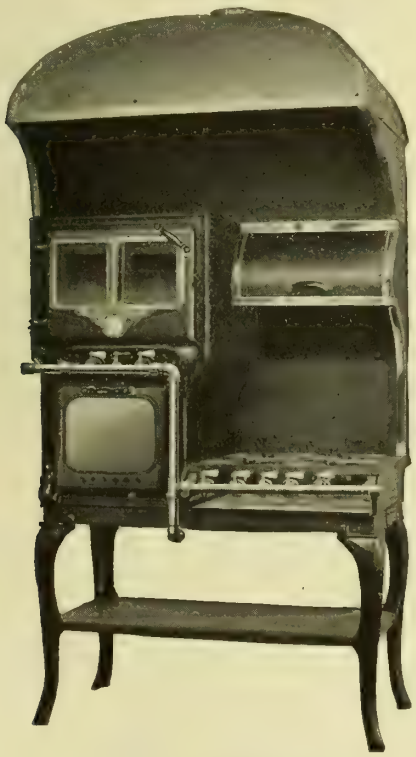
BOX CABINET

1844 Left-hand ovens 1845 Right-hand ovens
With high shelf, enameled panels in broiling and baking oven doors

Dimensions in Inches

Baking oven	18 x 18 x 12	Floor space, less end shelf	45
Broiling oven	18 x 18 x 9	Cooking top, with end shelf	27½ x 19½
Height from floor to burner top	33	Cooking top, less end shelf	22 x 19½
Floor space, with end shelf	50		

Shipping weight.....265 lbs.



SHORT CABINET

4218-F Left-hand oven, swing door 4318-F Right-hand oven, swing door
With canopy "C" and warming closet, with glass door and thermometer, with white enameled broiler door panel. Canopy and warming closet made of cold-rolled steel, nickel-trimmed

Dimensions in Inches

Baking oven	18 x 18 x 13	Width over all	40
Broiling oven	14 x 18 x 14	Height, floor to burner	31

Shipping weight, 400 lbs.

SPECIAL CABINET—SIX BURNERS

3016 Left-hand oven 3116 Right-hand oven
With high shelf, glass door, thermometer, enamel panels in broiling and lower baking oven doors, and enamel splash plates

Dimensions in Inches

Upper baking oven	18 x 16 x 14	Height, floor to bottom of top baking oven	40
Lower baking oven	18 x 20 x 12	Height, floor to burner	35
Broiling oven	18 x 16 x 14	Floor space	62
Top, with end shelf	40½ x 22		
Top, less end shelf	34½ x 22		

Shipping weight.....495 lbs.

THE GARWOOD GAS LAMP & HEATER COMPANY

MANUFACTURERS OF

Gas-Heated Steam Radiators and Gas-Steam Fireplace Heaters

CANTON, OHIO

Products.

GARWOOD GAS-HEATED STEAM RADIATORS, with and without Flue Connection.

Description.

An automatic, unitary system, steam-heated radiator using gas for fuel and having no water connection. Each radiator is made with standard, plain design radiator sections, cast sufficiently long to completely encase a Bunsen type gas burner; and these sections are connected with a thermostat valve, which automatically regulates the flow of gas, providing a uniform temperature at all times, and effecting a great economy in heating cost.

New Circulating Principle.

The circulating feature of the Garwood gas steam radiator is considered by expert heating engineers to be the greatest improvement in heating appliances of the present day. Note that gas burner does not extend the full length of radiator, hence the end or overhanging sections of radiator are not directly affected by its heat.

When steam is generated in radiator, this steam rises, and is forced outward into the overhanging sections which, being free from heat of burner, are cooler than the middle sections, resulting in condensation, the condensed steam running down to bottom of these sections and finding its level, through return opening, back over burner. This compels an active circulation of live steam at all times.

Table for Figuring Garwood Radiation.

In figuring amount of Garwood radiation necessary to heat a room, use following table:

Allow one square foot of radiation for each 200 cubic feet of contents.

Allow one square foot of radiation for each 20 square feet of exposed wall.

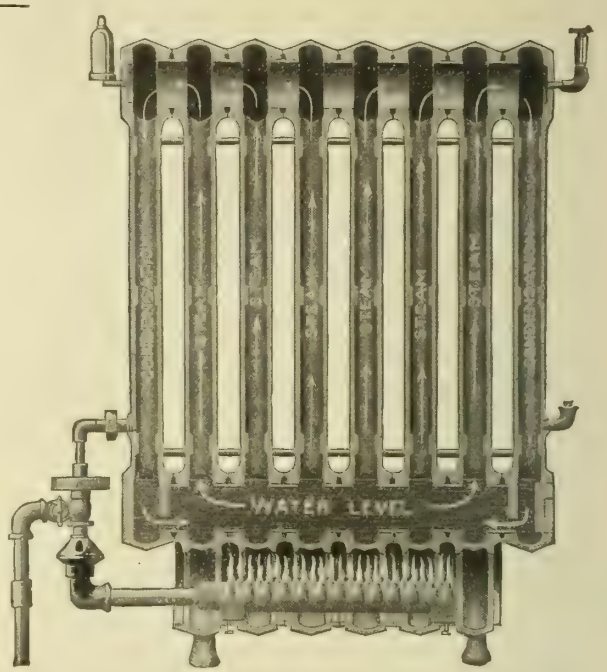
Allow one square foot of radiation for each 2 square feet of glass.

SIZES AND WEIGHTS

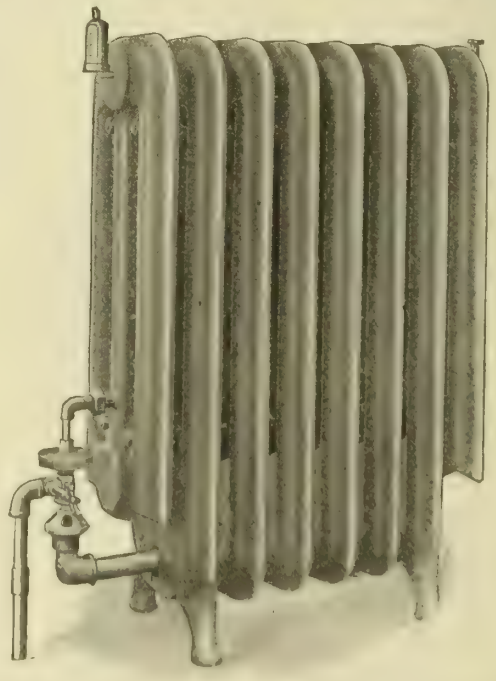
These Radiators Made With and Without Flue Connection

Radiator No.	No. of Column	Height Column, Ins.	No. of Sections	Sq. Ft. Radiation	Shipping Weight, Lbs.
1		23	6	18	150
2		23	8	26	200
3	3	23	10	34	250
4		23	12	42	300
5		29	6	28	180
6		29	8	38	240
7		29	10	48	300
8		29	12	58	360
9		41	6	34	240
10		41	8	46	320
11		41	10	58	400
12		41	12	70	480
13		41	14	80	560

For information regarding Garwood Radiators made with flue connection, write to us, giving number and size of rooms, number and size of windows, number and sizes of exposed walls, and all necessary information regarding possible arrangement of flues.



SECTIONAL VIEW GAS-HEATED STEAM RADIATOR



EXTERIOR VIEW GAS-HEATED STEAM RADIATOR

Cost of Operation.

The average size Garwood radiator when used with natural gas of 1000 B.T.U. consumes but eight feet of gas per hour. Of course, this consumption varies with the value of the gas used.

Catalogue.

A handsome descriptive catalogue of Garwood Radiators will be sent upon request.

STANDARD HEATING & RADIATOR CO.

MANUFACTURERS OF

The "Standard" Gas-Saving Burners for Natural Gas

220 Penn Avenue

BELL TELEPHONE, Court 4312

PITTSBURGH, PA.

Products.

The "Standard" Gas-Saving Burners, using Natural Gas for fuel in steam and hot-water heating boilers and hot-air furnaces.

Description.

The "Standard" Gas-Saving Burners are applied to any make of heating boiler or furnace used for the warming of buildings, and are always made in sizes to conform to each special size and shape of firebox in which the burner is to be used.

The "Standard" Burners are made up of numbers of specially constructed small individual gas burners, each burner having its own mixer. The burners are attached to base castings placed low inside the firebox. They are constructed for the use of one or more valves to control the various numbers of sectional rows or parts of burners, and are made in parts to pass through the fire-door. No broken brick or covering of any kind is used. These burners work perfectly in connection with automatic temperature-control devices.

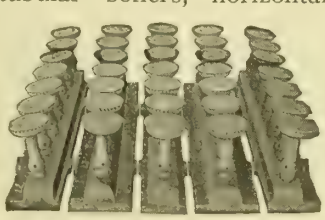
Economy and Guarantee.

The "Standard" Gas-Saving Burners for natural gas fuel are the most economical, and are guaranteed to produce heat, at the usual gas pressure and flow, equal to the capacity of the boiler or furnace when using coal.

"STANDARD" HORIZONTAL ROUND BURNER
For Any Make of Round Hot-Air Furnace

Application.

The "Standard" Gas-Saving Burners are used successfully when installed in: Rectangular cast-iron sectional boilers, round cast-iron boilers, all shapes of hot-air furnaces, vertical tubular boilers, horizontal tubular boilers, down-draft boilers, and many industrial purposes. Adapted for heating of residences, school buildings, churches, post office buildings, public buildings, store buildings, apartment buildings, etc.



"STANDARD" UPRIGHT RECTANGULAR BURNER

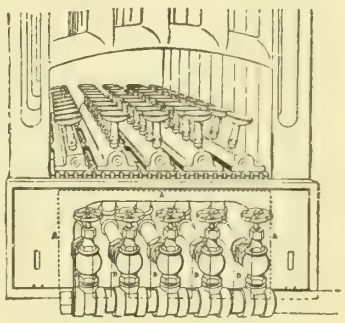
"Standard" Burners for High Pressure Steam.

"Standard" Gas-Saving Burners are often applied to upright round tubular boilers for generating steam for various industrial purposes.

Prices.

"Standard" Burner prices are dependent upon the size and make of the boiler or furnace where they are to be installed.

Prices will be quoted immediately on receipt of data concerning size and make of boiler or furnace, and whether hot water or steam is to be used.



SHOWING INSTALLATION "STANDARD" RECTANGULAR BURNER

"STANDARD" UPRIGHT ROUND BURNER

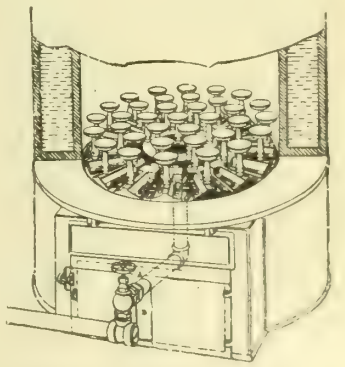
Specification.

Specify: The "Standard" Gas-Saving Burner manufactured by the Standard Heating & Radiator Co., Pittsburgh, Pa.

Co-operative Service.

Explicit installing instructions are furnished the heating contractor for the correct installation of these burners, and in special cases blueprints with instructions are furnished.

This Company will advise on proper shape and size of burners required for any installation on receipt of data concerning the equipment contemplated.



SHOWING INSTALLATION OF "STANDARD" UPRIGHT ROUND BURNER

Users.

Twelve years have elapsed since the first manufacturing of the "Standard" Gas-Saving Burner, which has given unvaryingly successful results. It is used by the first-class steam and hot-water heating contractors in all the natural gas territory.

THE SCIENTIFIC HEATER CO.

Manufacturers of Gas Heating Appliances

CLEVELAND, OHIO

Products.

"Scientific" Safety Garage Heaters, for Artificial and Natural Gas; Clothes Dryers.

Also, Gas Warm-air House Heating Furnaces and Boilers, Water Heaters, Gas Radiators, etc.

"Scientific" Safety Garage Heater (Gas).

This is the only heater especially designed for garage heating. It is the result of expert study of over two hundred leading United States heating, gas appliance and fire prevention authorities, and is thoroughly endorsed by insurance companies. It is, without question, the most economical garage heating system devised. Can be furnished with automatic regulator.

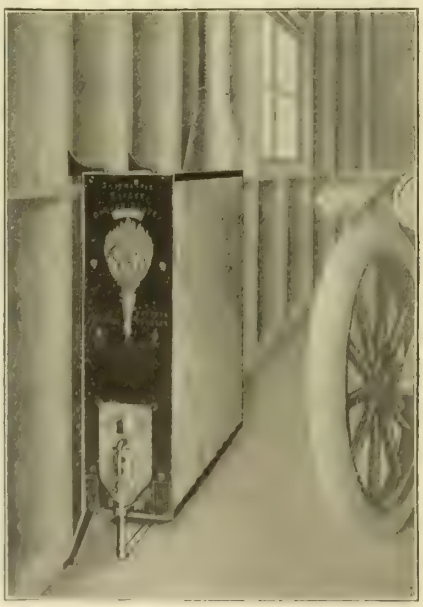
Scope of Uses.

"Scientific" heaters are built primarily (because of their safety feature) for garage service, but are also distinctly advantageous for use in sun porches, offices, storerooms, etc. Made in three standard sizes, they can be scientifically applied, in any number of units, to any size garage or room.

Description.

This heater is built on same plan as miner's lamp, which gives it its safety feature, even in presence of gasoline fumes or leaking oil. It heats by the principle of air circulation. Air in the garage circulates through heater, up one side of garage, down the other and again through heater. Cold air entering at bottom issues as warm, pure, dry air at top of heater.

Made throughout of best and most durable materials obtainable. Front and back castings and bottom reinforcing bars at sides are enameled black. Sides are of extra quality galvanized steel. All parts exposed to gas fumes are of special acidproof iron. All parts readily accessible for cleaning.



"SCIENTIFIC" SAFETY GARAGE HEATER NO. 750 INSTALLED

Heater equipped, when desired, with hot water coil, insuring supply of hot water. Every heater is carefully inspected and tested before shipment.

Operation.

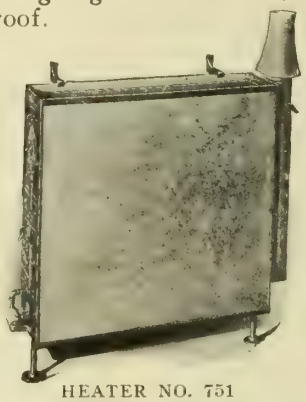
The heater embodies its own self lighting mechanism, so that the necessity of striking a match in the garage is entirely eliminated. A quick, sharp twist of a knurled steel rod, rotates a notched steel wheel on the inside, against which a cartridge of pyrophoric metal is held by the compression of a spring. The shower of sparks which results, ignites the pilot light from which the main burner is ignited.

Operating cost has been found to be surprisingly reasonable. Data on request.

Installation.

The heater should be mounted against side wall of garage and on north or west side, on brackets furnished with the heater. The cost of installing is not greater than that of a gas stove. Full directions accompany each shipment.

If there is no chimney, vent pipe can be extended through roof or through side of garage and then above roof.



HEATER NO. 751

DOUBLE HEATER NO. 752

Why the "Scientific" Should Be Specified.

(1) It assures absolute safety.

(2) Approved by over one hundred experts throughout the United States, who have made practical as well as laboratory tests of the severest kind.

(3) Most rapid and economical heating system devised; *evenly distributes the heat.*

(4) Simple to operate, and fool-proof.

(5) Occupies less space than any other heating appliance. Can be crowded in anywhere. No heat given off at the sides. Cannot damage the auto.

(6) Strong construction; will outlast auto.

(7) Manufactured under rigid inspection, by skilled workmen. Interchangeable parts. *Guaranteed to operate perfectly.*

PRICES, ETC., "SCIENTIFIC" HEATERS

Size of Garage*	18x20 ft.	22x26 ft.	26x36 ft.
Heater required	No. 750	No. 751	No. 752
Net price	$25.00	$32.50	$45.00
Width of Heater	9¾"	9¾"	19½"
Extr. Distance from wall, when mounted	13½"	13½"	23¼"
Length Over-all	45"	57"	45"
Height, when mounted	40"	40"	40"
Bottom Above Floor	6"	6"	6"
Length of Burner	12"	15"	2@12"
Gas Connection	½"	½"	¾"
Smallest Size Pipe, House to Garage	¾"	¾"	¾"
Size of Vent Pipe	4"	4"	5"

With Hot Water Coil Attachment, $2.50 extra.

* Recommendation of sizes based on: fairly tight wood or brick construction; ceilings 10 to 12 ft. high.

Continued on next page

References.

We have on file hundreds of letters from prominent men all over the country, whose garages are heated with the "Scientific" Heater. About five thousand heaters are in successful operation.

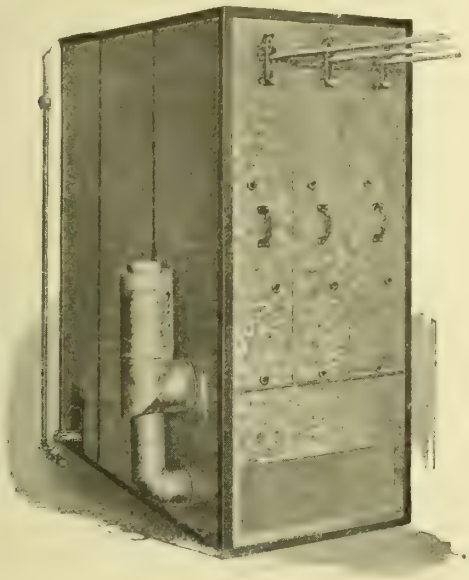
List of local installations sent on request.

Booklet.

Send for booklet, "Scientific Garage Heating."

"Scientific" Clothes Dryer.

The "Scientific" Clothes Dryer is the result of the application of established laws of the science of heating and ventilating to the problem of drying clothes quickly, evenly, and without odor or yellow appearance. Either artificial or natural gas may be used for fuel.

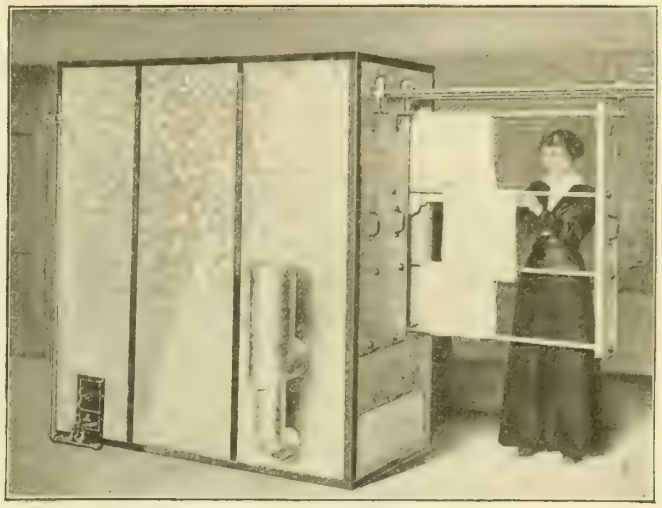


"SCIENTIFIC" CLOTHES DRYER, CLOSED

Uses—The "Scientific" Dryer is indispensable to the equipment of apartment houses, hospitals, hotels, and for the private residence. It saves valuable time and labor in drying any fabric from dish-cloths to the finest and most delicate of garments.

Construction—The construction of the "Scientific" Dryer is of such a character as enables it to give lasting satisfaction during a long period of years. Heavy galvanized sheet steel, reinforced by special interlocking rib construction, is used in the main body of the dryer, while acidproof iron is utilized for the heating drum. Separating the drying chamber from the heating drum is a sheet metal "floor" to prevent any danger of scorching a delicate garment which might fall from the rack.

Operation—In drying clothes, proper ventilation is of prime importance. By creating a rapid circulation of warm air through the drying chamber, the "Scientific" Dryer ventilates as well as dries the clothes. Air enters the lower compartment containing the heating unit at the front and back of the dryer, is warmed by coming in contact with the surface of the heating drum, and enters the drying chamber at the rear, rising to the top at this point. From this point the warm air is drawn forward and down through the clothes by the chimney draft, which is increased by the added discharge of the hot exhaust gases from the heating drum below. The passage of the air down through the clothes is the natural way, since the air tends to become heavier as it takes moisture from the clothes.



"SCIENTIFIC" CLOTHES DRYER, OPEN
Showing Method of Hanging up Clothes

Circulation—Only by keeping the warm air in rapid motion through the clothes can they be kept white and free from odor. This circulation is assured in the "Scientific" Dryer by using the hot exhaust gases as an ejector to draw out the moist air from the drying chamber.

Protection—It is impossible to burn the most delicate of fabrics in the "Scientific" Dryer. Even should a garment fall from the rack, it cannot come in contact with a surface hot enough to scorch it.

Economy—The operating cost of a dryer is so small as to be almost negligible. The valuable time and labor saved by its use make it a profitable investment for the home or public institution.

SIZES AND DIMENSIONS

Size of Family	Size of Dryer	No. of Racks	Width, Inches	Price
2	1502	2	23	$ 90.00
3–4	1503	3	33	130.00
5–7	1504	4	43	170.00
8–10	1505	5	53	210.00
10–15	1506	6	63	250.00

Ask for discount.

Each standard rack is 10 inches wide by 5 feet 6 inches long, and has three rods for hanging clothes.

Standard height is 6 feet 6 inches.

Other sizes to order.

Special dryers of any size or dimension made to specification.

J. B. COLT COMPANY

Acetylene Lighting and Cooking Plants

90 West Broadway

NEW YORK, N. Y.

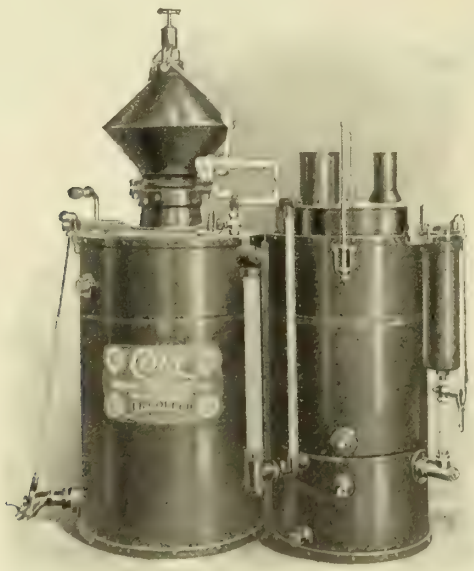
Products and Services.

COLT STANDARD ACETYLENE GENERATORS, STANDARD ACETYLENE COOKING and HEATING APPLIANCES, ACETYLENE FIXTURES, ACETYLENE BURNERS, IGNITERS and SUPPLIES.

Estimates furnished without charge on complete Acetylene Lighting and Cooking Plants. Lighting Specifications and installation details freely supplied.

Description.

Colt Acetylene Lighting and Cooking Plants are simple in design and the few parts are strong and well made. They are moderate in cost, readily installed and operated. There are no fast moving parts to wear out or require adjustment. All parts are standardized and interchangeable.



COLT STANDARD ACETYLENE GENERATOR

Approval by the National Board of Fire Underwriters.

Colt Standard Acetylene Generators are on the permitted list of devices of this character issued by the National Board of Fire Underwriters.

Advantages.

For the lighting of residences, stores, churches, hotels, etc., where lighting service is either unobtainable or inefficient, a Colt Lighting and Cooking Plant gives a superior quality of light, low in cost, and service which is reliable and lasting.

Cooking with acetylene is made practicable and satisfactory by the Standard burners. The Standard line includes ranges and hot plates for use in either kitchens or laundries.

The operating of the generator is simple and easy. It can be properly done by any employee.

The residuum from the Colt Standard Acetylene Generator is slaked lime. It is valuable in many ways. It can be used in liquid form for whitewashing, or dry as a fertilizer or disinfectant.

CAPACITIES, DIMENSIONS AND PIPE CONNECTIONS

Generator No. and Carbide Capacity, Pounds	Space required for Installation Floor	Hgt.	Width of Door Generator will go through	Net Weight, Pounds	Gross Weight, Pounds	Service Pipe, Inches	Blow-off Pipe, Inches
50	23x56	72	24	260	434	1	1
100	31x66	87	31	339	664	1½	1
200	38x107	87	31	676	1020	1½-two	1½
300	36x109	93	36	967	1487	1½-two	1½

In estimating size of generator needed allow one pound of carbide to each 24 candle-power burner on the system. Capacity above requirements provides longer operation on each charge of carbide without loss of any gas.

Generators listed above require Quarter Carbide (1¼-inch x1/12-inch).

Generators Nos. 200 to 300 inclusive are of the Duplex Type, consisting of two generating units and one regulating gasometer.

Information regarding generators of larger capacity than 300 pounds will be given upon request.

The gas service pipe should be reduced or increased in accordance with the length of the mains. The city gas schedule of pipe sizes is used for acetylene.

References.

No stronger proof can be given of the mechanical excellence and unfailing reliability of the Colt Standard Generator than their use by the United States Lighthouse Service. One hundred and six of our generators have been installed in this service and are meeting every requirement demanded with entire satisfaction. References to architects and users will be gladly supplied.

Literature.

Any of the booklets listed below may be obtained on request: "Colt Standard Acetylene Generators." "Fixture and Supply" Catalogue, illustrating a complete line of specially designed acetylene fixtures, globes, burners, etc. "Standard Acetylene Stoves," and "Acetylene Installation Instructions."

STANDARD ACETYLENE HOT PLATE

The Standard line includes Ranges and Hot Plates for use in either kitchens or laundries

ELECTRICAL INFORMATION AND DATA

FURNISHED BY

The Society for Electrical Development, Inc.

29 West 39th Street
NEW YORK, N. Y.

Purpose of the Following Pages.

It is believed the following pages will emphasize to both architects and owners, the advisability of planning better and more complete electrical equipment for proposed buildings, than has heretofore been the general custom.

Such improvements, when included in the original plan, do not add materially to the expense, while the alterations necessary to secure such results later may be very costly and sometimes prohibitive.

Form of Current to Be Used.

In designing an electrical installation it is essential to determine in advance whether Central Station current will be used or a complete power plant is to be installed. When Central Station current is available, it is generally conceded to be more economical, except in special cases, to use such power than to install a generating plant. In the latter case it is recommended that the current generated shall correspond to the class of current obtainable from the public service company, for in case of a break down of generating plant, Central Station power will be suitable, and there will be no occasion for interruption of service.

In any case, it is wise to consult with the Central Station management, as they are always familiar with the latest regulations affecting the industry, both those of the local city administration and of the insurance interests.

Generator units may be obtained with generator direct-connected to water or steam turbine, steam engine or gas engine. Where mechanical power is available belt-driven generators may be employed.

As a rule, alternating current is used when transmission is over one quarter mile, and where constant speed and quite constant service, without frequent stopping and starting, are required, and whenever lighting systems are the principal load. In buildings where stopping and starting of various machines will be frequent, and where adjustable speed motors are desired, or battery charging or electro-plating is required, direct current is best adapted.

If the available current is alternating, and direct current desired, the alternating can be converted into direct by employing a rectifier or motor-generator set.

Electricity in Modern Building.

Electricity has become so necessary a factor in modern life that no building can be considered modern unless adequately wired for its varied applications.

Not only should provision be made for apparatus already on the market, but so planned as to be able to readily utilize the improvements of the future.

Estimating Cost of Electrical Installations.

It has been common practice in building estimates to allow a bare one and one-half per cent of the cost of the completed structure to cover the electrical installation. Is this important part of the equipment not entitled to more liberal consideration? Even three or four per cent would be a low rate to charge up to greater safety, comfort and efficiency.

National Electrical Code.

The National Board of Fire Underwriters require as a prerequisite of securing reasonable rates of insurance, that the rules contained in the National Electrical Code be lived up to. These National Electrical Code rules are the result of many years of experience and study of the National Fire Protection Association, an organization which has had the active co-operation in matters electrical of the

American Electric Railway Association
American Institute of Electrical Engineers
Associated Factory Mutual Fire Insurance Companies
National Association of Electrical Inspectors
National Board of Fire Underwriters
National Electric Light Association
National Electrical Contractors Association

A new set of rules issued in December, 1915, supersedes those dated 1913.

Do not lose sight of the fact in consulting the Code that it merely prescribes the *minimum requirements* allowable, and that it is wise to provide a wider margin.

The Code rules permit only the approved fittings and material.

The Underwriters' Laboratories.

The Underwriters' Laboratories is an organization whose object is to bring to the user the best obtainable opinion on the merits of appliances, devices, machines and materials in respect to the life and fire hazards and accident prevention.

List of Approved Electrical Fittings.

The Underwriters' Laboratories have prepared complete standards for electrical fittings, and all fittings which have been examined and found to comply with these standards are published by this organization in a book, called "List of Approved Electrical Fittings."

Standardization of Electrical Construction.

The work of developing the proposed national electric safety code, which has been undertaken by the United States Bureau of Standards, has attracted much attention among electrical companies, State commissions, city officials, and many others interested in electrical construction and operation throughout the United States. Practically all these interests have given their cordial co-operation in the project, which aims at a standardization of these branches of electrical work.

Electrical Units.

Volt—Unit of Electro-Motive Force: The force required to send one ampere of current through one ohm of resistance.

Ohm—Unit of Resistance: The resistance offered to the passage of one ampere when impelled by one volt.

Continued on next page

Ampere—Unit of Current: The current which one volt can send through a resistance of one ohm.

Watt—Unit of Power: The power to do work when one ampere passes through one ohm under pressure of one volt (746 watts equal one horse-power).

Mil—Unit of Measure for Expressing Size of Wire. Mil is equal to one one thousandth of an inch.

Electrical Formulae (Direct Current).

Ohm's law is a method of expressing the relationship existing between the electro-motive force, current and resistance, and is practically the basis of most electrical computations.

I = Current (Amperes)
R = Resistance (Ohms)
H.P. = Horse-power
E = Electro-motive Force (Volts)
W = Electric Power (Watts)
K = Efficiency of Machine

$$I = \frac{E}{R} \qquad R = \frac{E}{I} \qquad E = RI \qquad W = IE$$

$$W = \frac{E^2}{R} \qquad W = I^2R \qquad W = 746 \times HP \qquad HP = \frac{W}{746}$$

$$E = \frac{746 \times HP}{I \times K} \qquad I = \frac{746 \times HP}{E \times K}$$

Wiring Formulae.

The diameter being given in mils, the area is obtained by the well-known rule, "the area of a circle, in circular units, is equal to the square of its diameter"; hence the square of the diameter of a wire expressed in mils equals the area of its cross-section.

CM = Circular Mils
D = Length of wire, in feet, on one side of circuit only
I = Current (Amperes)
R = Resistance (Ohms)
e = Volts lost in line
n = Number of lamps in multiple
c = Current in amperes per lamp

10.8 Ohms Resistance of one foot of commercial copper wire having a diameter of one mil and a temperature of 75 degrees Fahr.

For multiple lighting circuits only I = (c × n)

$$CM = \frac{2D \times I \times 10.8}{e} \qquad n = \frac{CM \times e}{10.8 \times 2D \times c}$$

$$e = \frac{2D \times I \times 10.8}{CM} \qquad R = \frac{e}{n \times c \times 2D}$$

$$c = \frac{CM \times e}{10.8 \times 2D \times n} \qquad 2D = \frac{e}{n \times c \times R}$$

The size of solid wires shall be stated by their diameter in mils. Sizes of stranded conductors shall be stated by their cross-sectional area in sectional mils.

CARRYING CAPACITY, SIZE AND WEIGHT OF INSULATED COPPER WIRES AND CABLES FOR INTERIOR CONDUCTORS, ALL VOLTAGES

		National Electric Code						
		Single Conductor Rubber Insulated for 600 Volts					Triple Braid Weatherproof	
			Braided		Leaded			
Size B & S	Circular Mils	Allowable Current Carrying Capacities	Weight per 1000 ft.	Overall Diameter	Weight per 1000 ft.	Overall Diameter	Weight per 1000 ft.	Allowable Current Carrying Capacities
18	1,624	3	17	.19				
16	2,583	6	20	.20	210	.29	19	10
14	4,107	15	35	.21	228	.31	25	20
12	6,530	20	46	.23	253	.33	35	25
10	10,380	25	63	.26	288	.35	53	30
8	16,510	35	86	.29	335	.38	75	50
6	26,250	50	130	.37	512	.47	110	70
5	33,100	55	165	.40	565	.49	137	80
4	41,740	70	197	.42	618	.51	164	90
3	52,630	80	246	.45	694	.54	209	100
2	66,360	90	289	.51	770	.57	255	125
1	83,690	100	381	.59	935	.65	310	150
0	105,500	125	464	.63	1055	.69	400	200
00	133,100	150	562	.67	1202	.73	490	225
000	167,800	175	681	.72	1377	.78	625	275
0000	211,600	225	861	.78	1583	.84	765	325
[illegible]	250,000	238	[illegible]	.87	1760	.98	937	350
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2303	1.00	1130	400
[illegible]	400,000	325	1548	1.03	[illegible]	1.10	1445	500
[illegible]	500,000	400	[illegible]	1.12	[illegible]	1.22	1781	600
[illegible]	[illegible]	1,000	[illegible]	1.22	[illegible]	1.38	[illegible]	680
[illegible]	700,000	[illegible]	[illegible]	1.30	[illegible]	1.41	2445	760
[illegible]	800,000	550	[illegible]	1.36	[illegible]	1.44	2778	840
[illegible]	[illegible]	[illegible]	[illegible]	1.43	[illegible]	1.53	[illegible]	[illegible]
[illegible]	1,000,000	650	3624	1.48	[illegible]	1.59	[illegible]	1000
[illegible]	[illegible]	750	4496	1.65	[illegible]	1.79		
[illegible]	1,500,000	850	[illegible]	1.77	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9155	[illegible]		
[illegible]	[illegible]	1050	[illegible]	1.99	[illegible]	2.13		

[illegible] [illegible]

Conversion Factors.

1 Horse-power	746 watts 33,000 foot pounds per minute
1 Watt	.001 Kilowatt .00134 horse-power .736 foot pounds per second 44.26 foot pounds per minute
1 Kilowatt	1000 watts 1.34 horse-power 2,655,400 foot pounds
1 Kilowatt Hour	1000 watt hours 1.34 horse-power hours 2,655,400 foot pounds per hour

Wire Terminology.

Wire—A slender rod or filament of drawn metal; while primarily the term "wire" refers to the metal, nevertheless when the contents show that the wire is insulated the term "wire" will be understood to include the insulation.

Conductor—A wire, or combination of wires, not insulated from one another, suitable for carrying a single electric current.

Cable—A stranded conductor, or a combination of conductors insulated from one another. The term "cable" is applied by some manufacturers to a solid wire heavily insulated and lead covered. The usage arises from the manner of the insulation, but such a conductor is not included under the definition of "cable." The term "cable" is a general one, and, in practice, it is usually applied to the larger sizes. A small cable is called a "stranded wire," or a "cord." Cables may be bare or insulated, and the latter may be armored with lead or steel wires or bands.

Strand—One of the wires or groups of wires of any stranded conductor.

Stranded Wire—A group of small wires, used as a single wire.

Cord—A small cable, very flexible, and substantially insulated to withstand wear.

Duplex Cable—Two insulated single conductor cables, twisted together. They may or may not have a common insulating covering.

Twin Cable — Two insulated single conductor cables, laid parallel, having a common covering.

Wiring Notes.

In the wiring of new buildings, it is always advisable, whenever lamps, heating or cooking apparatus and motors are to be used, to install a separate system of wires for the lighting circuits, and one for the power and heat consuming devices.

This will permit of connection to a separate meter, and many Central Stations make a lower rate for current used for heating and power apparatus than for lighting circuits, as these devices are principally used at the off peak periods at the Central Station.

The following are important factors in planning the wiring of any building:

First—Liberal size of wires.

Second—Ample number of lighting outlets.

Third—Good switch control.

Fourth—Sufficient appliance outlets (for heating, cooking, power).

In planning various circuits, one should endeavor to locate distribution centers in easily accessible places, so that cut outs and switches controlling circuits can be grouped for convenience and safety of operation. The load should be divided as evenly as possible among the different circuits, and all complicated and unnecessary wiring should be avoided.

(Continued on next page)

When installing wires, ample outlets should be provided in all rooms for future use, to take care of the rapidly increasing use of electric devices of various sorts.

No one lighting circuit of 300 volts or less shall be used to carry more than 600 watts. Wire for inside work must not be of smaller size than No. 14 B & S gauge, except as allowed for fixture work and pendent cord, and this is not desirable.

All power receptacles should be designed to take the same plug, and these should be made to fit only the power outlets, so as to prevent their attachment to the lighting circuits, which are not designed to carry the relatively heavy currents required by the power consuming devices.

Before laying out wiring plans for any building, the rules of National Electric Code should be carefully noted, as well as State laws and City ordinances.

Wires for conduit must be rubber covered and have a double braid over the rubber.

Insulation of Wires.

Various grades of rubber covered wire are manufactured. The principal differences lie in the quantity of pure rubber and gum used in the insulating compound. The wire must, in all ways, meet the requirements of the National Electric Code Standard, that is, have the approval of the Underwriters' Laboratories.

Conduits.

The same conduit must not contain more than four two-wire or three three-wire circuits of the same system, except by special permission of the Inspection Department, and must never contain circuits of different systems.

No conduit tube having an internal diameter of less than five eighths of an inch shall be used. All elbows or bends must be so made that the conduit, or lining of same will not be injured. The radius of curve of the inner edge of any elbow not to be less than three and one half inches. Must have not more than the equivalent of four quarter bends from outlet to outlet, the bends of the outlet not being counted.

In tall buildings special provision must be made to support the conductors in the vertical conduits, to remove their weight from their connections, and the spacing of supports in such cases is prescribed as follows:

Size of Wire	Distance of Support
14 to 0	100 feet
0 to 0000	80 feet
0000 to 35000 cm.	60 feet
35000 to 500000 cm.	50 feet
500000 to 750000 cm.	40 feet
750000	35 feet

In laying out a conduit job, first ascertain the size and number of wires required, then take the size of conduit from the preceding table.

SIZE OF CONDUITS FOR THE INSTALLATION OF WIRES AND CABLES

	Number of Conductors in System			
	One Conductor in a Conduit Size Conduit, Ins.	Two Conductors in a Conduit Size Conduit, Ins.	Three Conductors in a Conduit Size Conduit, Ins.	Four Conductors in a Conduit Size Conduit, Ins.
Size B & S	Electrical Trade Size	Electrical Trade Size	Electrical Trade Size	Electrical Trade Size
14	½	½	¾	¾
12	½	¾	¾	¾
10	½	¾	¾	
8	½	1	1	1
6	½	1	1¼	1¼
5	¾	1¼	1¼	1¼
4	¾	1¼	1¼	1½
3	¾	1¼	1¼	1½
2	¾	1¼	1½	1½
1	¾	1½	1½	2
00	1	1½	2	2
00	1	2	2	2½
000	1	2	2	2½
0000	1¼	2	2½	2½
CM				
200000	1¼	2	2½	2½
250000	1¼	2½	2½	3
300000	1¼	2½	2½	3
400000	1¼	3	3	3½
500000	1½	3	3	3½
600000	1½	3	3½	
700000	2	3½	3½	
800000	2	3½	4	
900000	2	3½	4	
1000000	2	4	4	
1250000	2½	4½	4½	
1500000	2½	4½	5	
1750000	3	5	5	
2000000	3	5	6	

Test of Completed Installation.

The wiring in any building must comply with the following requirements:

The complete installation must have a resistance between conductors, and between all conductors and the ground (not including attachments, sockets, receptacles, etc.), not less than that given in this table:

Up to	5	amperes	4,000,000 ohms.
Up to	10	"	2,000,000 ohms.
Up to	25	"	800,000 ohms.
Up to	50	"	400,000 ohms.
Up to	100	"	200,000 ohms.
Up to	200	"	100,000 ohms.
Up to	400	"	50,000 ohms.
Up to	800	"	25,000 ohms.
Up to	1,600	"	12,500 ohms.

The test must be made with all cut-outs and safety devices in place. If the lamp sockets, receptacles, electroliers, etc., are also connected, only one half of the resistances specified in the table will be required.

Comparative Costs of Wiring.

Owing to varied costs of material and labor, as well as different restrictions placed by State and City ordinances, the following table gives only approximate figures for comparing the various systems of wiring per outlet.

Knob and Tube	$1.50 to $2.50
Flexible Steel and Armored Conductors	2.00 to 5.00
Flexible Steel Conduit	3.50 to 5.50
Rigid Metallic Conduit	4.00 to 7.00

Switchboards.

Before designing a switchboard, it is advisable to get in touch with switchboard manufacturers, as they usually have a line of standard panels, to which your various circuits might be adapted. Standard panels are less expensive than special boards. In locating switchboard, the following requirements of the National Board of Fire Underwriters should be borne in mind:

(*a*) Must be so placed as to reduce to a minimum the danger of communicating fire to adjacent combustible material.

Switchboards must not be built up to the ceiling, a space of three feet being left, if possible, between the ceiling and the board. The space back of the board must be kept clear of rubbish and not used for storage purposes.

(*b*) Must be made of non-combustible material.

(*c*) Must be accessible from all sides when the connections are on the back, but may be placed against a brick or stone wall when the wiring is entirely on the face.

Continued on next page

If the wiring is on the back, there must be a clear space of at least eighteen inches between the wall and the apparatus on the board, and even if the wiring is entirely on the face, it is much better to have the board set out from the wall.

(*d*) Must be kept free from moisture.

(*e*) Wires with inflammable outer braiding, when brought close together, as in the rear of switchboards, must, when required, be each surrounded with a tight, non-combustible outer cover.

Flame-proofing must be stripped back on all cables a sufficient amount to give the necessary insulation distances for the voltage of the circuit on which the cable is used.

Motors.

The selection of a motor best adapted to perform a certain specific duty is a very important matter, and should be determined by an electrical engineer or by a responsible manufacturer. Conditions of current, load on motor, class of service and starting conditions must all be taken into consideration. The following points will prove of some assistance in the determining of type of motor:

(1) Direct or alternating current.
(2) Voltage (frequency and phase, if alternating).
(3) Rating of machine or machines motor is to drive.
(4) Belted, geared, chain or direct-connected.
(5) Service to be continuous or intermittent.
(6) Frequent starting and torque conditions at starting.
(7) Speed required, constant, variable or adjustable.
(8) Location of motor, dust, acid, fumes, dampness, high temperature, etc.

Illumination.

This is a subject which is often neglected. The introduction of many types of diffusing and directing media, has drawn the attention of the architect to the great possibilities for effects which may be secured with the aid of artificial lighting. Direction and amount of light plays an important part in the design of an interior, and the information given below may be of some help in determining the intensity of light, size of units, number of units and the spacing of same.

Types of Lighting.

Direct Lighting—Commonly applied to a type of lighting unit in which it is apparent that a majority of the light received in useful directions, comes directly from the light source without being first deflected by the ceiling or other large surface. For example, clear or frosted incandescent lamp; lamp enclosed in diffusing globe; lamp equipped with ordinary glass or metal reflector.

Indirect Lighting—Applied to a lighting unit in which all the light is reflected to the ceiling or other large surface by an opaque reflector, for redistribution in useful directions. For example, cove lighting or lamps concealed by inverted, opaque reflectors.

Local Lighting—The method of lighting where attention is paid only to illumination over small spaces without reference to any intermediate points, as for example, where a small lamp is used over a lathe. Local lighting is sometimes used to supplement the general illumination where a high illumination is required at particular points or times. (See General Illumination).

Semi-Indirect—Applied to lighting units in which the majority of the light is reflected by means of translucent reflectors on to large surfaces, for distribution throughout the room, some light however being transmitted through the reflector.

General Illumination—The method of lighting an interior in which an attempt is made to give an equal intensity of light throughout the entire room. It is usually applied to lighting with large units, and represents the extreme of practice opposed to local lighting.

Localized General Illumination or Group Lighting—This is applied to the practice intermediate between general illumination and local lighting, lamps being spaced with reference to machinery or processes, so as to give proper direction of light and maximum intensity at important points.

Common Terms Used in Illumination.

Diffusion—That quality of light produced by the presence of irregular cross rays, as distinguished from parallel rays, or those radiating from a point. It is usually secured by interposition of opal or frosted globes, or by the use of dull-surfaced reflectors so as to increase the apparent dimensions of the light source. While diffusion is usually accomplished by some sacrifice in light intensity, it is also accompanied by reduced brilliancy and glare, so that reasonable diffusion improves the seeing value of light.

Glare—A condition of lighting which, on account of an excessive contrast or high brilliancy, produces ocular discomfort or interferes with vision. The most common example is where a brilliant source is seen against a dark background.

Intensity—The luminous power of a beam of light emitted by a source (See Candle-power) or falling on a surface (See Foot-Candle).

Efficiency—The efficiency of an electric lamp is usually expressed by the ratio between the light output and watts input. For example, lumens per watt, mean spherical candle-power per watt, watts per mean horizontal candle-power. Watts per candle-power (mean horizontal) has been used extensively in connection with the incandescent lamp, but since it does not properly represent efficiencies of different types of lamps, and also gives a lower value for lamps of higher efficiency, there is now a tendency to abandon the expression in favor of lumens per watt or mean spherical candle-power per watt.

Mazda—A trade-mark name used by certain American manufacturers of incandescent lamps to designate the quality of lamps established by the leading research laboratory. Mazda B has been used to designate tungsten filament, vacuum types of lamps. Mazda C has been used to designate tungsten filament gas-filled lamps.

Measurement of Lighting.

Inverse Square Law—Since with light radiating from a point, the area illuminated by any particular beam is in proportion to the square of the distance from the light source, it follows that the intensity of illumination varies inversely with the square of this distance. This law applies accurately to lighting units only for distances which are large as compared to dimensions of the source.

Candle power or Candle—The unit of luminous intensity of a light source based on horizontal intensity from a certain specified candle. The unit of candle-power is now most accurately recorded in incandescent

Continued on next page

lamps. The International candle, adopted in 1910, is now standard in the United States, Great Britain and France. The candle-power of a lamp may differ for all different angles. With most modern sources candle-power is approximately equal for all angles about the vertical axis. It varies widely for different angles of elevation. (See also Mean Spherical C.P., Mean Hemispherical C.P., and Mean Horizontal C.P.)

Candle-power Per Watt—(See Efficiency).

Foot-Candle—The unit of intensity of illumination received on a surface. If light from a point source of known candle-power falls perpendicularly on a surface, the foot-candles can be determined by dividing the candle-power by the square of the distance in feet.

Lumen—The unit of light flux either (a) emitted by a source or (b) falling on a surface. It is equal to intensity times area. For example.

(a) Lumens equal means spherical c.p. times area in square feet of an imaginary sphere of one foot radius concentric with the source. Total lumens from a lamp equal mean spherical c.p. times 12.57 (total area of such sphere).

(b) The lumens falling on a surface equal average foot-candles times area of surface in square feet.

Mean Hemispherical Candle-power—The mean of the candle-powers of all angles either above or below the horizontal. Unless upper hemispherical candle-power is specified the lower hemispherical candle-power, that is that below the horizontal, is understood.

Mean Horizontal Candle-power—The mean of the candle-powers for all angles in a horizontal plane through the center of the light source. It has been customary to designate the light value of incandescent lamps in this unit, but the present tendency is toward the use of mean spherical candle-power which more properly represents the light output.

Mean Spherical Candle-power—The mean of the candle-powers in all directions from the light source. It can be calculated from values indicated on a polar photometric curve by weighting the candle-power for each angle of elevation (say, each 10 degrees) by the cosine of the angle with the vertical, to account for the corresponding zone areas.

Watts Per Candle-power—(See Efficiency).

Watts Per Square Foot—(Of floor area). Has often been used to indicate the relative power consumption of lighting installations. Where similar equipments of equal efficiency are used the watts per square foot is the measure of the relative lighting value. Owing to its simplicity this has often been used.

Lighting Practice.

In planning a lighting installation the established practice is the safest guide in determining the quantity element—that is to say, the intensities to be recommended. This should be interpreted or modified to suit the demands of various local conditions, as for example, room finish, personality of owner, illumination of surroundings, etc. The following table is a record of the average practice in this regard as compiled by a leading lamp manufacturer. The watts per square foot (floor area) as given in the third column are based on incandescent lamps giving approximately one candle-power per watt. For lamps of different efficiencies the values can be corrected proportionately, provided a similar type of equipment is used.

RECOMMENDATIONS FOR VARIOUS CLASSES OF SERVICE

Room	Foot-Candle Intensity	Watts per Square Foot	Type of Reflector	Size of Lamp, Watts
Armory or Drill Hall	2.0	.50	Dome Steel or Bowl Glass	200–1000
Armory (Cavalry):				
Tan-bark Floor	3.0	.75	Dome Steel	200–1000
Ballroom	2.0– 3.0	.....	Special Lighting	
Barroom	2.0– 5.0	.50–1.25	Bowl Glass or Decorative	25–300
Bath (Public):				
Dressing Rooms	1.0– 1.5	.25– .40	Bowl Glass	25–100
Swimming Pool	1.5– 2.0	.40– .50	Bowl Glass or Dome Steel	60–200
Café (General Illumination only)	2.0– 4.0	.....	Ornamental	25–500
Café (Supplemented by Lights on Tables)	1.0– 2.0	.....	Ornamental	25–200
Card Room	2.0– 3.0	.50– .75	Bowl Glass	25–200
Court Room	2.0– 4.0	.50–1.00	Bowl Glass or Ornamental	25–500
Dance Hall	2.0– 4.0	.50–1.00	Bowl Glass	100–300
Fire Stations:				
Alarm turned in	3.0	.75	Bowl Glass or Steel	25–200
At other Times	1.0	.25	Bowl Glass or Steel	25–200
Garage	1.0– 3.0	.25– .75	Bowl or Dome Steel	60–200
Gymnasium	2.0– 4.0	.50–1.00	Bowl Glass or Dome Steel	25–500
Handball Court	7.0–10.0	.....	Angle Steel	60–300
Hotel:				
Lobby	2.0– 4.0	.50–1.00	Bowl Glass	25–400
Dining Room	(See Café)			
Writing Room	2.0– 3.0	.50– .75	Bowl Glass	25–200
Corridors	.6	.20	Bowl or Enclosing Glass	25– 60
Bedroom	1.5– 2.0	.30– .50	Bowl Glass	25–100
Lavatory	1.5– 2.0	.30– .50	Bowl Glass	25–100
Laundry	2.0– 3.0	.50– .75	Bowl Glass or Steel	25–100
Lunch Room	2.0– 4.0	.50–1.00	Bowl Glass	60–200
Market	3.0– 5.0	.75–1.25	Bowl or Dome Enameled Steel	40–500
Moving Picture Theater	Approximately 0.2-foot-candles at front of house and 1.0-foot-candles near entrance		Totally Indirect	100–500
Museum	2.0– 6.0	.50–1.50	Bowl Glass	25–500
Reading (Ordinary Print)	2.0– 4.0	.....	.....	....
Reading (Fine Print)	3.0– 5.0	.....	.....	....
Restaurant (See Cafés)				
Rink (Skating)	1.0– 3.0	.25– .75	Bowl or Dome Steel or Glass	60–500
Sewing—Hand				
(Light Goods)	3.0– 5.0	General Illumination		
(Dark Goods)	4.0– 8.0	Localized General Illumination		
Sewing — Machine				
(Light Goods)	4.0– 6.0	Localized General Illumination		
Squash Court	7.0–10.0	.....	Angle and Bowl Steel	60–200
Stable	.8– 1.0	.20– .30	Bowl or Dome Steel	25–200
Stock Room	.5– 1.5	.....	Bowl Steel or Glass	25–100
Stores:				
Book	3.0–5.0	.75–1.25	Bowl Glass	100–500
Baker	2.0–4.0	.50–1.00	Bowl Glass	60–200
Cigar	4.0–6.0	1.00–1.50	Bowl Glass	60–200
Clothing	4.0–7.0	1.00–1.75	Bowl Glass	100–500
Confectionery	3.0–5.0	.75–1.25	Bowl Glass	60–200
Drug	2.0–4.0	.50–1.00	Bowl Glass	60–200
Dry Goods	4.0–7.0	1.00–1.75	Bowl Glass	100–500
Furniture	2.0–4.0	.50–1.00	Bowl Glass	100–200
Grocery	2.0–4.0	.50–1.00	Bowl Glass	60–200
Haberdasher	5.0–7.0	1.25–1.75	Bowl Glass	100–200
Jewelry	4.0–6.0	1.00–1.50	Bowl Glass	60–200
Millinery	4.0–6.0	1.00–1.50	Bowl Glass	60–200
Shoe	2.0–4.0	.50–1.00	Bowl Glass	60–200
Stationery	2.0–4.0	.50–1.00	Bowl Glass	60–200
Telephone Exchange:				
Operators	2.0– 3.0	.50– .75	Bowl Glass	25–200
Theater:				
Lobby	2.5– 5.0	.....	Ornamental	25–500
Auditorium	1.0– 2.5	.....	Ornamental	25–500
Warehouse	.5– 1.5	.10– .40	Bowl or Dome Steel	60–300
Wharf	.5– 1.5	.10– .40	Bowl or Dome Steel	60–300

MISCELLANEOUS INDUSTRIES

Note—It is impossible to cover the different industries in the space available, so only a few typical illustrations are incorporated.

Factory (General)				
General Illumination	3.0–6.0	.75–1.50	Bowl or Dome Steel	40–500
General Illumination (Supplemented by Localized Light)	1.0–2.0	.25– .50	Bowl or Dome Steel	40–200
Shipping	1.5–2.5	.40– .60	Dome and Bowl Glass or Steel	40–200
Stock Room	.8–2.0	L–G	Bowl and Dome Glass or Steel	25–100
Warehouse	.5–1.5	.10– .40	Dome Steel	40–200
Forge and Blacksmithing				
Smithing (Ordinary Anvil Work)	2.0–4.0	.50–1.00	Dome or Bowl Steel	60–200
Machine Forging	2.0–3.0	.50– .75	Dome or Bowl Steel	60–200
Tool Forging	3.0–5.0	.75–1.25	Dome or Bowl Steel	60–200
Paint Shop				
Fine Work, Finishing	4.0–8.0	1.00–2.00	Dome or Bowl Steel or Glass	60–400
Coarse Work, First Coats, etc.	2.0–4.0	.50–1.00	Dome or Bowl Steel or Glass	[illegible]
Pattern Shop				
Metal	4.0–6.0	1.00–1.50	Dome or Bowl Steel	[illegible]
Power-House				
Engine Room	2.0–3.0	.50–1.25	Dome or Bowl Steel	25–500
Boiler Room	.8–1.5	.20– .40	Dome Steel	25–500
Supplemented by Individual Gauge Lights				25–000

Continued on next page

Method of Determining Quantity of Light.

(1) Effective lumens required equals the floor area (in square feet) multiplied by the desired intensity of the room, which is formed under foot-candle intensity of the following table.

(2) Effective lumens per watt equals foot-candle intensity divided by watts per square foot. Both of these latter can be found from table opposite room desired.

(3) Number of watts required equals the effective lumens required divided by the effective lumens per watt.

Determination of the Number of Lamps—For uniform general illumination, the area to be lighted should be divided as nearly as possible into equal squares, and the light unit placed at the center of each square. The size of the square depends upon the use to which the room will be put, and in some cases upon the extent to which shadows will be objectionable; for, in general, the smaller the size of the square, the less intense will be the shadows. For instance, in lighting large offices where individual desk lamps are not employed, the square should be comparatively small, in order to have the light on any one desk coming from many units.

The ceiling height will, of course, determine the hanging height of the lamp; and, in general, the higher the ceiling, the greater the allowable spacing. As a rough rule for ordinary conditions met in commercial lighting, as stores, public halls, hotels, etc., the distance apart of units should approximate the ceiling height. Of course, local conditions, such as obstructions, piping, etc., will affect this; and special requirements, such as in a factory, mill and the like, can not be thus generally treated.

Character of Distribution Desirable—The actual choice of the type of reflector, whether bowl steel, opalescent glass, prismatic, etc., will depend upon the class of service. Detailed information on the various classes of interiors will assist in the selection.

Regardless of what type is chosen for any given hanging height and spacing, the reflector must give a certain characteristic distribution if even illumination is desired. When we consider that symmetrical (i. e., not angle types) reflectors send forth a sort of cone of light, it is obvious that by overlapping cones of light of the proper contour, we can get even illumination for almost any hanging height and spacing. Experience has shown that the ratio of hanging height to distance between units is most likely to assume the following values: 1 : 2, 4 : 5, 4 : 3 and 2 : 1. Reflectors have, therefore, been designed to give even illumination at these ratios, and the vertical distribution curves of these, as determined with the photometer, have been designed as follows:

Ratio of Height to Distance	Type of Curve
1 : 2	Extensive
1 : 3	Intensive
1 : 3	Focusing
2 : 1	Concentrating

Another distribution is obtained with the type which is known as widely distributing. This, while it will not give even illumination, giving 1 to 2 ratio of the extensive type, has more light flux near the horizontal, and can be used on wider spacings and lower hanging heights than the extensive type, without having serious dark spots between units.

Ventilation.

Electric blowers, fans and exhaust fans play a very important part in building ventilation. They are not only used to supply fresh air to rooms, but are used to extract foul air, dampness, odors, steam, fumes, etc., from the same.

Designing Information—Air per person delivered by electric fan and blowers:

	Cubic Feet per Min. per Person
General Hospitals	35-40
Contagious Hospitals	80
Workshops	25
Living Rooms	50
Prisons	30
Kitchens	60
Theaters	20-30
Assembly Halls	20
Schools	30-40
Offices	40

Example—An office having 30 occupants requires approximately $30 \times 40 = 1200$ cubic feet of air per minute. Select a fan giving approximately this air delivery, and suited for the customer's circuit.

Note—If air in room is completely changed in five minutes or less, a draught is liable to be created, depending upon the location of exhaust fan and occupation of persons in the room.

Air replacing the exhausted air should be pure—from a pure source—or little is gained.

Fans should blow outward instead of inward, as the latter produces draughts.

Cooking Equipment.

As a suggestion to architects in laying out kitchens in residences, apartment houses, hotels and restaurants, to investigate the electric ranges, broilers, ovens, toasters, etc., as are placed on the market by the larger electric companies. The cost of operation of the same compares very favorably with the gas and coal appliances.

Heating Equipment.

Portable and permanent electric heaters of various sizes and designs are now available. There are a number of ways of utilizing electricity for this purpose, the hot air system, hot-water or steam circulation. An individual heater or radiator may be installed in each room.

An electric water heater can be obtained which is adaptable for any hot-water tank, or receptacle. It is easily installed and quickly and readily heats all necessary water.

Wiring Diagrams.

In designing the wiring of any building, one must always provide for future needs. The most economical time to wire a house or public building is during its construction; therefore, be liberal in the use of switches, outlets for portable lamps, fans, cooking apparatus, etc., and power outlets in all rooms for electric vacuum cleaners, in bathroom and bedrooms, for electric heaters, and in kitchen for electric ranges, dishwashers, etc., and in the basements for motors for electric washing machines, electric ice cream freezers, electric iron, etc.

The standard wiring symbols as adopted by the American Institute of Architects and the National Electrical Contractors Association are given, and their use in the plans may offer suggestions in the wiring of various rooms of a residence. The same scheme of designating outlets, etc., is used in other plans, such as offices, public buildings, apartment houses, hotels, restaurants, etc.

Electrical Handbooks.

The foregoing tables and formulae may be of service, but the following handbooks containing complete data are recommended.

Cushing's Standard Wiring, 1916 (based on the latest 1915 National Electrical Code Rules), which has special section devoted to house wiring.

American Electrician's Handbook, by Terrell Croft.

American Handbook for Electrical Engineers, by Harold Pender.

Standard Handbook for Electrical Engineers.

Continued on next page

STANDARD SYMBOLS FOR WIRING PLANS

Ceiling Outlet; Electric only. Numeral in center indicates number of Standard 16 C. P. Incandescent Lamps.

Ceiling Outlet; Combination. $\frac{4}{2}$ indicates 4-16 C. P. Standard Incandescent Lamps and 2 Gas Burners. If gas only.

Bracket Outlet; Electric only. Numeral in center indicates number of Standard 16 C. P. Incandescent Lamps.

Bracket Outlet; Combination. $\frac{4}{2}$ indicates 4-16 C. P. Standard Incandescent Lamps and 2 Gas Burners. If gas only.

Wall or Baseboard Receptacle Outlet. Numeral in center indicates number of Standard 16 C. P. Incandescent Lamps.

Floor Outlet. Numeral in center indicates number of Standard 16 C. P. Incandescent Lamps.

Outlet for Outdoor Standard or Pedestal; Electric only. Numeral indicates number of Stand. 16 C. P. Lamps.

Outlet for Outdoor Standard or Pedestal; Combination. $\frac{6}{6}$ Indicates 6-16 C. P. Stand. Incan. Lamps; 6 Gas Burners.

Drop Cord Outlet.

One Light Outlet, for Lamp Receptacle.

Arc Lamp Outlet.

Special Outlet, for Lighting, Heating and Power Current, as described in Specifications.

Ceiling Fan Outlet.

S¹ S. P. Switch Outlet.

S² D. P. Switch Outlet.

S³ 3-Way Switch Outlet.

S⁴ 4-Way Switch Outlet.

Sᴰ Automatic Door Switch Outlet.

Sᴱ Electrolier Switch Outlet.

Show as many Symbols as there are Switches. Or in case of a very large group of Switches, indicate number of Switches by a Roman numeral, thus: S¹ XII, meaning 12 Single Pole Switches. Describe Type of Switch in Specifications, that is, Flush or Surface, Push Button or Snap.

Meter Outlet.

Distribution Panel.

Junction or Pull Box.

Motor Outlet. Numeral in center indicates Horsepower.

Motor Control Outlet.

Transformer.

Main or Feeder run concealed under Floor.

Main or Feeder run concealed under Floor above.

Main or Feeder run exposed.

Branch Circuit run concealed under Floor.

Brand Circuit run concealed under Floor above.

Brand Circuit run exposed.

Pole Line.

Riser.

Telephone Outlet; Private Service.

Telephone Outlet; Public Service.

Bell Outlet.

Buzzer Outlet.

Push Button Outlet. Numeral indicates number of Pushes.

Annunciator. Numeral indicates number of Points.

Speaking Tube.

Watchman Clock Outlet.

Watchman Station Outlet.

Master Time Clock Outlet.

Secondary Time Clock Outlet.

Door Opener.

Special Outlet; for Signal Systems, as described in Specifications.

Battery Outlet.

Circuit for Clock, Telephone, Bell or other Service, run under Floor, concealed. Kind of Service wanted ascertained by Symbol to which line connects.

Circuit for Clock, Telephone, Bell or other Service, run under Floor above, concealed. Kind of Service wanted ascertained by Symbol to which line connects.

Note—If other than Standard 16 C. P. Incandescent Lamps are desired, Specifications should describe capacity of Lamp to be used.

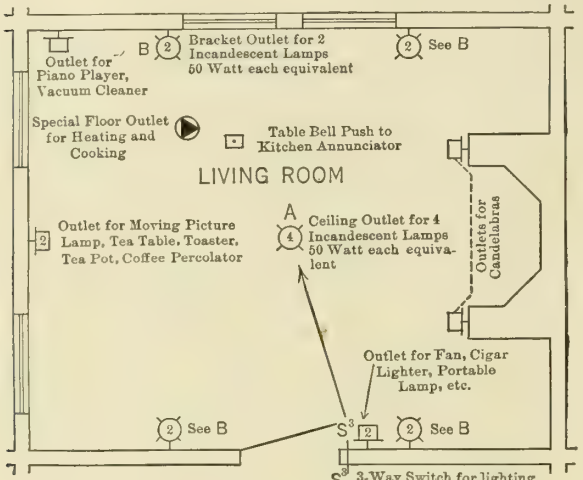
Continued on next page

Suggestions In Connection With Standard Symbols.

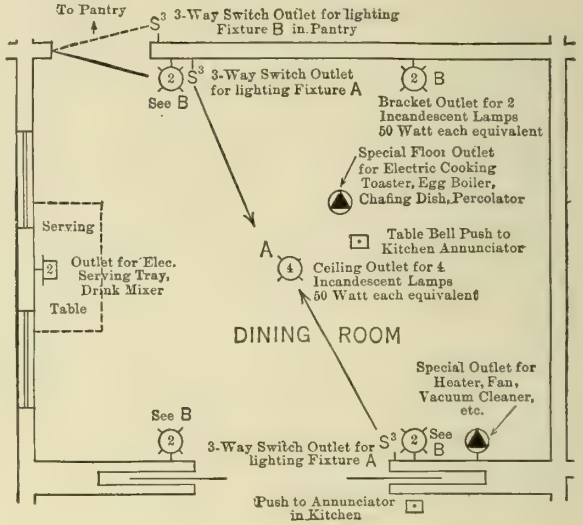
It is important that ample space be allowed for the installation of mains, feeders, branches and distribution panels. It is desirable that a key to the symbols used accompany all plans. If mains, feeders, branches and distribution panels are shown on the plans, it is desirable that they be designated by letters or numbers.

Heights of center of wall outlets (unless otherwise specified):

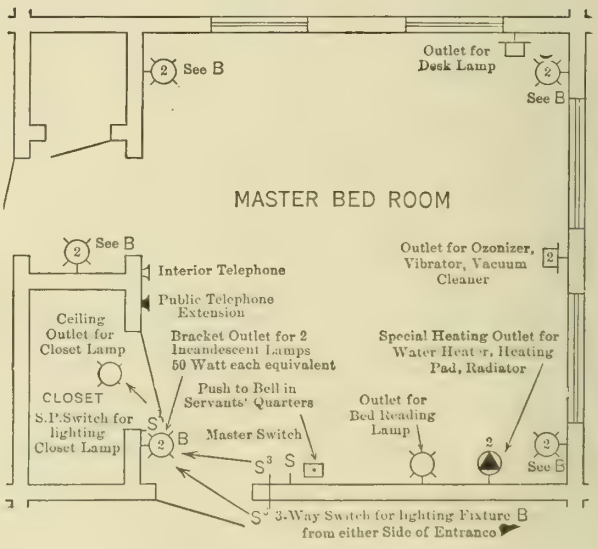
Living Rooms	5 feet 6 inches
Chambers	5 feet
Offices	6 feet
Corridors	6 feet 3 inches
Height of Switches (unless otherwise specified)	4 feet



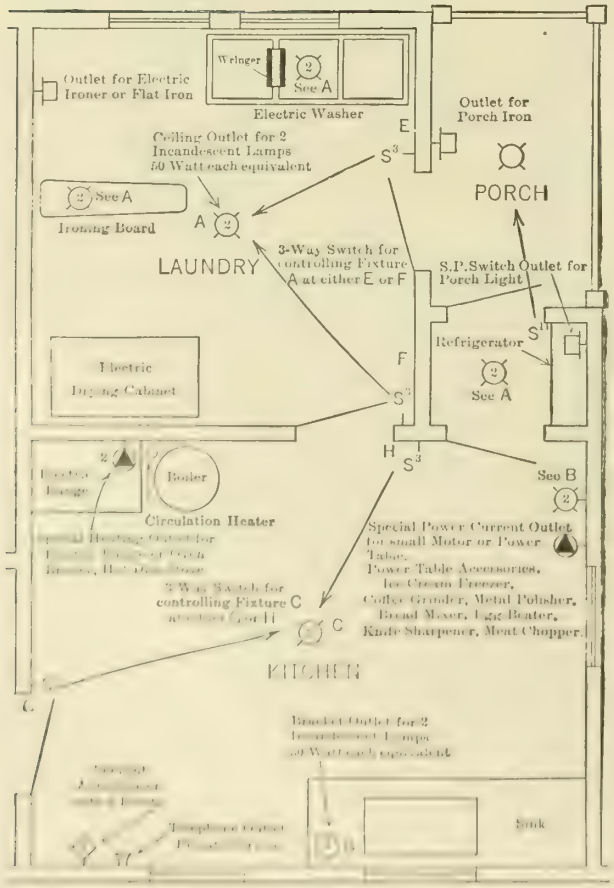
In Living Room



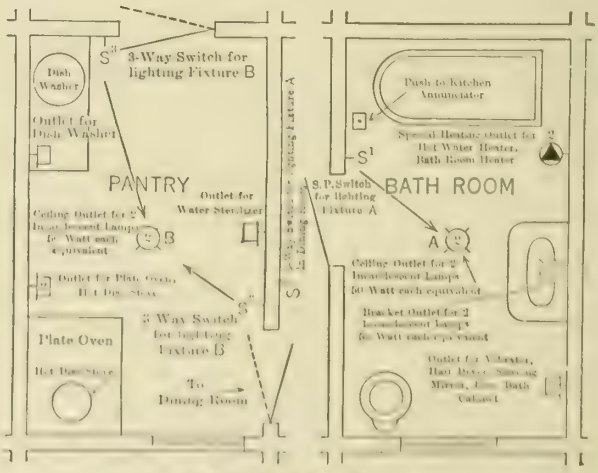
In Dining Room



In Master Bedroom



In Laundry, Locker and on Porch



In Pantry and Bathroom

METHOD OF USING STANDARD SYMBOLS ON PLANS, WITH THEIR NECESSARY EXPLANATORY MATTER

GENERAL ELECTRIC COMPANY

SCHENECTADY, N. Y.

DISTRICT OFFICES

ATLANTA, GA. CHICAGO., ILL. DENVER, COLO. PHILADELPHIA, PA.
BOSTON, MASS. CINCINNATI, OHIO NEW YORK, N. Y. SAN FRANCISCO, CAL.

Complete List of Offices on Page 1335

Products.

The products of the GENERAL ELECTRIC COMPANY comprise practically every kind of APPARATUS and MACHINERY used in the GENERATION, TRANSMISSION, DISTRIBUTION and USE of ELECTRICAL ENERGY. Its thousands of products, in use in all parts of the world, have established the G-E Trade-Mark as the Guarantee of Excellence on Goods Electrical.

TRADE-MARK
Guarantee of Excellence on Goods Electrical

Purpose of these Pages.

It is a well recognized fact that a knowledge of the many functions which electricity performs in modern building practice is necessary to every architect. In these pages, the methods of obtaining electric power, controlling it, and applying it to various uses are illustrated with concrete suggestions which will aid in preparation of electrical specifications for building construction.

Unified Responsibility.

It is entirely practical, therefore, for the architect to standardize with G-E equipment throughout. By this procedure all parts inter-relate and much time can be saved. The added advantage of having all electrical equipment built by one company, ready for immediate installation and operation is obvious.

Co-operative Service.

The factory, engineering and laboratory equipment at the command of the GENERAL ELECTRIC COMPANY is ample for all requirements of its business.

The engineering and sales departments are prepared to co-operate with architects, contractors and engineers in the planning and selection of the apparatus and material best suited for electrical requirements.

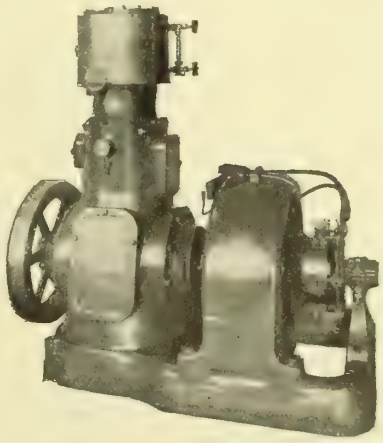
As a further assistance, catalogues, special bulletins and prices are readily obtained from our nearest offices, listed on page 1335. In requesting bulletins, a prompt reply will be facilitated by referring to bulletin numbers given in description of apparatus on the following pages. A complete index to these bulletins will be found on page 1334.

Source of Electric Power.

Where Central Station Power Is Available—When power is purchased from lighting or power company it is possible to connect incoming wires direct to switchboard. Suitable switchboard panels with main switch and meters for measuring current should be specified when ordering switchboard. When incoming current is not suitable for requirements, it will be necessary to change form of current to meet these conditions by using motor-generator sets, rotary-converters, transformers or mercury arc rectifiers. Whenever such conditions are encountered, it is advisable to get in touch with our nearest office which will gladly give detailed information.

Where Steam Power is Available—When central station service is not available for small isolated plants requiring 100 kilowatts or less, the steam engine generating set is used. These sets were designed originally to meet the severe conditions of marine work, which demand light, compact and durable sets of close regulation and quiet operation. These sets have been used extensively for both power and lighting service.

When it is desired to provide for taking power from an outside source in case of emergency, double throw switches may be added to main panel of the switchboard equipment. Further information is given in Bulletin A4189.



SINGLE CYLINDER, FORCED LUBRICATION ENGINE, WITH DIRECT CURRENT GENERATOR

DATA FOR STEAM GENERATING SET TYPE MP

CLASSIFICATION		DIRECT CURRENT			
Kw.	Speed	Volts Full Load	Amperes Full Load	Floor Space, Ins.	Height, Ins.
2½	700	110	23	40 x 24	32
4	600	110	36	49 x 28	40
7	550	110	64	55 x 32	51
10	475	110	91	58 x 32	57
15	425	110	136	66 x 37	68
20	400	125	160	68 x 39	75
30	315	125	240	79 x 49½	82½
50	280	125	400	88 x 52	97

The above ratings are based on 80 pounds steam pressure, non-condensing, and may be operated on any pressure up to 125 pounds, condensing or non-condensing. All sizes can be used with higher steam pressure by installing a reducing valve.

All the above and many intermediate sizes are carried in stock; intermediate size can be furnished on short notice.

Sets wound for 220 or 250 volts can be furnished on short notice.

NOTE—The GENERAL ELECTRIC COMPANY also offers a line of generating sets having similar engines with larger cylinders for low pressure steam; designed for working pressures from 35 to 60 pounds. These are made on special order only in sizes from 7 to 60 kilowatts, and occupy the same floor space as the sets tabulated above.

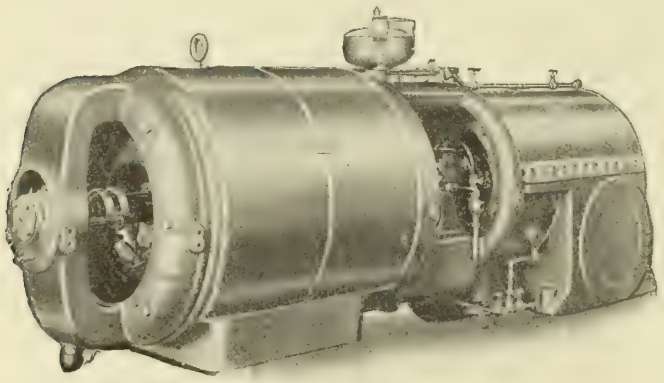
The engines described can be furnished with generator wound for three-wire service, if required.

NOTE—Further information and data on the above, and also on direct-connected generating sets with cross-compound and tandem-compound engines will be furnished upon application to the company. These sets can be furnished with either alternating or direct current generators.

Continued

For power stations supplying electric light and power to office buildings, machine shops, mills, etc., the Curtis Steam Turbines are admirably adapted for this class of work. Their operation is characterized by a minimum of vibration and noise. They are very compact, requiring minimum floor space, head room and attendance. The exhaust steam is free from oil and may be used for heating.

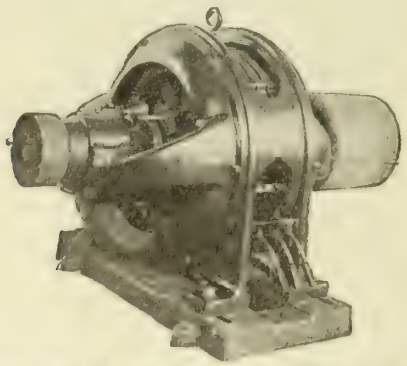
Turbine sets are available in sizes ranging from 100 kilowatts to 50,000 kilowatts alternating current and from 5 kilowatts to 1,000 kilowatts direct current.



300 KW. 60 CYCLE CONDENSING CURTIS STEAM TURBINE

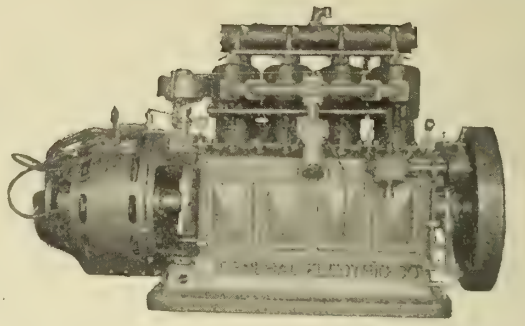
Full details and particulars contained in Bulletins 42201, 42206, 42210 and 4705A.

Where Mechanical Power is Available—For the production of electrical energy from mechanical sources of power, belt driven generators are used. Such units are available in sizes up to 300 kilowatts for direct current and up to 550 kilowatts for alternating current. Bulletin 40400.



AIB 150 KW., 900 R.P.M., 2300 VOLT, FORM PB, 60 CYCLE, BELT DRIVEN ALTERNATING CURRENT GENERATOR

Where No Power is Available—For rural residences, hotels, farms, country estates, rural railroad stations, camps, etc., electrical power and light is obtained from the G-E Internal Combustion Engine-Driven Generator Sets, designed and built in units of 10 and 25 kilowatts capacity. These engines are designed to use commercial motor gasolene as fuel, and they can be operated on natural gas of 1000 B. T. U. These units consist of an efficient electric generator direct connected to a high grade gasolene engine; both designed and built by this Company for operation together, thereby giving complete units, necessarily superior to the usual type of belted or assembled combinations. These types of generators are also designed, and are available, for direct connection to gas engines of other manufacturers.



25 KW. GAS ENGINE GENERATING SET

Full information, covering this type of generating set in detail, will gladly be sent upon request.

Information on switchboards for use with sets of this character will be found in Bulletin A-4037.

CAPACITIES AND DIMENSIONS

Kilowatts, Sizes	Output, Horsepower	Candle Power, Mazda Lamps	Floor Space, inches, Base Plate	Floor Space, inches, Over-all	Height, inches	Weight, pounds
10	13.4	8,000	30⅜ x 76	31 x 78⅞	51	4,070
25	33.5	20,000	26 x 58⅞	34 x 95⅜	64	5,040

Control of Electric Power.

For the control and distribution of current, the General Electric Company offers a complete line of switchboards for all systems of electric distribution. These boards are equipped with latest improved instruments and controlling devices. Expert engineering ability and modern manufacturing facilities are at the customers' service.

All devices mounted on these boards are made by a single company, thus centralizing responsibility for the behavior of the entire switchboard.

For the convenience or assistance of architects and consulting engineers, switchboard specialists are stationed in the principal branch offices of the Company. Architects and consulting engineers are invited to confer with these engineers in planning a switchboard to meet any unusual requirement or space condition. Sketches, detailed drawings, and specifications of any such special boards, or the adaptation of standard panels, will be furnished promptly on request.

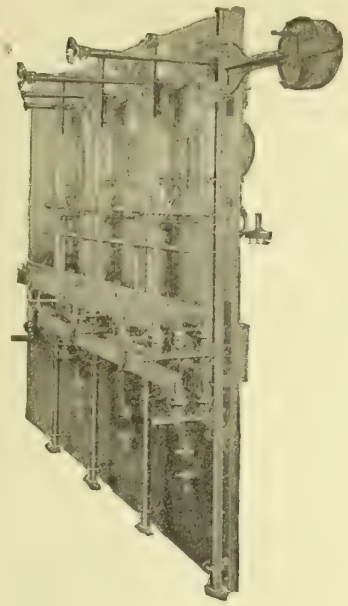
"Standard Unit" Switchboards—The General Electric Company has developed very complete lines of standard panels, for both direct and alternating current, complete with all switches, instruments and other equipment necessary. Each panel is listed as a separate unit, and has its own catalogue number. There are thousands of these "standard units," and they are listed in twenty-two separate lines for different classes of service.

These panels are so designed that they can be assembled in different combinations, to form a complete switchboard having a neat, uniform appearance, both front and back, all parts on the back being easily accessible. Such switchboards can be constructed to fit any usual condition. They are less expensive than special boards, and quick deliveries can be made of these standard panels complete ready for erection.

Continued on next page

This is the most advanced system of switchboard manufacture, and obviates the time and expense necessary when original detail specifications are drawn up for each individual job by the architect, contractor or consulting engineer.

A booklet, "Standard Units," gives a short description of each class of panels. This booklet will be found of interest to any one contemplating the use of switchboard panels developed with particular reference to utility and simplicity. It will be furnished on request.



Rear View
"STANDARD UNIT" SWITCHBOARD FOR 125/250 VOLT, THREE-WIRE CIRCUIT

Material of Standard Panels—All panels are of slate; the isolated or small plant panels of dull black marine finished slate, and the central station boards of natural black slate, 1½ inches thick with ⅜-inch bevel, and vary in width from 12 to 32 inches. Height of panel varies from 20 to 90 inches. Size of instruments and controlling devices determine size of panels. Panels of marble, or different dimensions, can be substituted at prices which may be obtained from any office of the General Electric Company.

Front View
"STANDARD UNIT" SWITCHBOARD FOR 125/250 VOLT THREE-WIRE CIRCUIT

Frame work—A complete supporting framework of 1¼-inch pipe, with necessary fittings, is included for each panel. Total height of switchboard above floor never exceeds 90 inches, Bulletin 47750 covers details of framework.

Switches—For controlling various circuits switches are employed, and are furnished with each panel. Their size and type is determined by amount of current carried. Their number depends upon number of circuits controlled.

Fuses—These are a protective device, used in connection with switching apparatus. When overloads occur, the fuse opens the circuit, thus protecting the electrical apparatus.

Connections—Each panel is furnished complete, unless otherwise specified, with small wiring on back of panel and with copper connections between the appliances which comprise the equipment of the panel.

The connections from generator to panel and from panel to all distribution points are invariably made by the electrical contractor and are not furnished by the manufacturers.

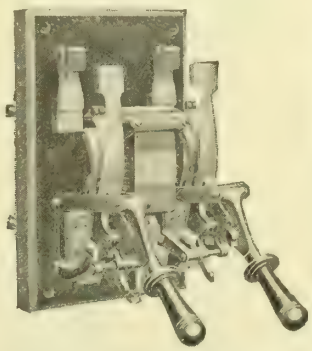
Card Holder—For designating different circuits, card holders are used and must be specified. Use one for each switch.

Circuit Breakers.

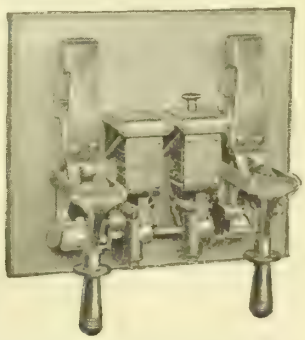
The circuit breaker affords the best insurance against costly interruption of service. The operation of the circuit breaker is positive and invariable, and it can be adjusted to trip between wide limits of calibration.

Circuit breakers may be motor, float, solenoid or hand-operated; only the type last mentioned is listed, because of its relatively great popularity. When used in conjunction with suitable auxiliary devices, additional protection is afforded in the event of low voltage, high voltage, excessive speed, reversal of current or phase, etc.

By the use of the low-voltage release attachment, circuit breakers may be arranged to operate on a drop in or cessation of voltage; two or more circuit breakers may be electrically interlocked, and by the use of a switch to short circuit the low-voltage release, circuit breakers may be tripped from one or more remote points. This device is also made use of when it is desired to open the breaker, by the operation of a speed limiting device or reverse current relay.



DOUBLE-POLE CIRCUIT BREAKER, WITH SINGLE TRIP COIL TO TRIP OUT BOTH POLES



DOUBLE-POLE CIRCUIT BREAKER, WITH SEPARATE COILS FOR TRIPPING OUT THE TWO POLES

The General Electric Company has been manufacturing many types of circuit breakers for over twenty years. The satisfactory operation given in all kinds of railway, industrial and building service is an indication of the quality and excellent design of the G-E circuit breaker.

The advantage of purchasing G-E circuit breakers, which will come to you mounted on switchboard ready for immediate operation, is obvious.

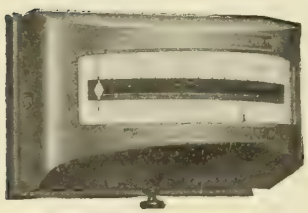
All General Electric Company circuit breakers are approved and listed by the Underwriters' Laboratories, and will carry rated loads continuously at 30° C. temperature rise.

G-E circuit breakers are made in all types for both alternating and direct current. Complete information can be obtained by requesting Bulletins 4837 to 4841.

Measuring Electric Power.

In addition to controlling devices, the switchboard includes an equipment of electrical measuring instruments. These are necessary in order to give the operator of the plant an exact knowledge of the electrical conditions at all times.

The choice of electrical measuring instruments depends upon the class of service as well as the character of the equipment; that is, with direct current equipments, ammeters and voltmeters with watthour meters are sufficient; with alternating current equipment, in addition to ammeters, voltmeters and watthour meters, there should be included wattmeters, power factor, frequency and synchronism indicators. A permanent record of the operation of different circuits is often necessary, in such cases curve drawing ammeters, voltmeters, wattmeters, power factor and frequency indicators should be furnished.



Type H Instrument

Type D Instrument

MEASURING INSTRUMENTS

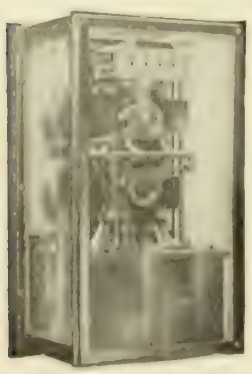
Voltmeters, ammeters and wattmeters are made in several forms. Two types are illustrated, and can be furnished for either alternating current or direct current circuits. The type H form is preferable from the standpoint of highest accuracy, and also where space economy is an important factor.

The watthour meter is a desirable adjunct to a switchboard for the purpose of measuring the output of the generating apparatus, or for determining the amount of energy delivered to the various circuits in the building, or to any or all current consuming devices. By the use of watthour meters the proper charge to various tenants for electric power, light or heat may be determined.

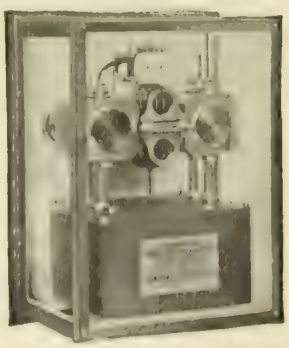
It is often desirable, in addition to the above, to use a ground detector, which will indicate line troubles.

For further information see Bulletin 46013, covering all types of instruments.

TYPE CR SWITCHBOARD VOLTMETER



TYPE C3 DIRECT CURRENT WATTHOUR METER



TYPE C2 DIRECT CURRENT WATTHOUR METER

Sheet's Catalogue

Transmitting Power.

It is a well known fact that electricity is the simplest and easiest form of power to transmit. An old building is readily provided with a system of concealed wiring. A new building should be designed to accommodate the future as well as the present uses of electricity. One of the most important movements in this regard is the increasing use of electrical devices, which consume more power than allowed on lighting circuits and, therefore, require heavier wiring. In any event, these devices can usually be operated at a lower cost if a separate wiring system on a power circuit meter is installed.

Most electric companies give a lower rate when current is consumed on a special circuit in this manner, because such use represents a service furnished during the day when their equipment is not required to furnish current for the lighting service.

Wires and Cables.

Wires and Cables are manufactured by the GENERAL ELECTRIC COMPANY in varieties suitable for all uses of the architect. This product includes cable with weatherproof, flame-proof, rubber (National Electric Code and better grades to meet severer requirements), paper, varnished cambric, or asbestos insulation, and with all special finishes.

Rubber Insulation—Three types of Rubber Insulation have been standardized: Red Core, Tricoat and 30 Per Cent Para (Black or White Core). In addition, we are prepared to manufacture special types and grades of rubber-insulated conductors to meet unusual conditions.

"Red Core" is a high-class insulation used primarily on wires for house wiring, and superior to the requirements of the National Board of Fire Underwriters.

"Tricoat" Insulation was designed for those desiring a very high-grade wire, somewhat better than Red Core, but less expensive than the 30 Per Cent grade.

"30 Per Cent Para" Insulation meets the 1907 Specifications of the Rubber Covered Wire Engineers' Association and is the best rubber compound for absolutely high-grade work. The core may be white or black, as desired.

Braided Wire—All wires and cables No. 8 B. & S. and smaller carry a single braid, while No. 6 B. & S. and larger are regularly made with either two braids or a tape and one braid; which in accordance with Underwriters' requirements is equal to double braid and suitable for conduit work. If tape and two braids are required, orders must so specify, and extra charge for extra braid will be made.

N. E. Code, Red Core, braided, twin wire is finished with talc, which assures ease in pulling wire into conduits; no extra charge made for this feature. All our braided, rubber-covered wires may be finished in this way, if desired, without additional cost.

Our rubber-covered braided wires and cables are distinguished by one red and one black thread woven parallel in braid.

Weatherproof and Underwriters' Cable—Standard weatherproof wires and cables are manufactured strictly in accordance with the requirements of the National Board of Fire Underwriters, with three braids placed directly over the copper core, thoroughly impregnated with a black, weatherproofing compound, and

Continued on next page

then polished to remove all superfluous compound and give a smooth exterior finish. Double braid weatherproof wire furnished on order.

When the number of braids is not specified, wire with three braids, commonly called triple braid, is always furnished; if double braid is required, requisitions or requests for quotations should so state. A stock of triple braid wire is carried.

Ordering—In ordering or making inquiries regarding wires or cables, the following information should be given:

(1) Size and number of conductors, or current to be carried;
(2) Working voltage;
(3) Test voltage;
(4) Type of insulation (Varnished Cambric, Rubber, Paper, etc.);
(5) Insulation Resistance per mile required;
(6) Finish (Braid, Lead, Armored, etc.);
(7) Class of service and type of generating apparatus;
(8) Exact length and shipping lengths of each item.

If there are formal specifications covering the proposition, they should always be forwarded with the inquiry.

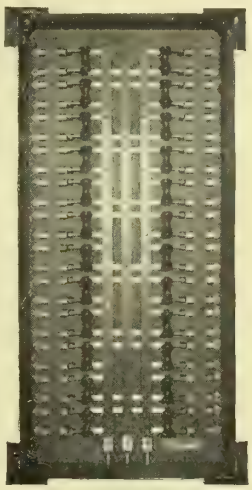
Information as to local conditions is always of value in making recommendations.

Cable Connecting Devices.

A standard line of Cable Connecting Devices of great reliability and convenience is also manufactured. It includes Copper Cable Connectors, End Bells, Cast-Iron Coupling Boxes, Junction Boxes and Fuse Boxes.

Panel Boards.

General Electric panel boards are compact and well finished; possess high grade features throughout, and represent the latest and most satisfactory devices on the market. We can furnish a complete line of standard panels, and are prepared to promptly furnish panels to meet the most exacting specifications.



STANDARD CEO PANEL BOARD
24 circuit. Lugs in mains

Switches—Individual circuits with the following arrangements can be supplied:

Fused terminals. Knife switches, punched clip or sweated and pinned. Rotary snap switches, moulded covers. Push-button switches, moulded covers. Safety type rotary snap switches. Safety type push-button switches.

Any of the above types may be fused between buses and switches, or outside of switches, with NEC enclosed, Edison plug or open link fuses.

Mains and Branches—Highest grade copper, having 98 per cent conductivity, is used for the mains and branches. The main terminals, bus bars, switches, and fuses are designed for a capacity of 6 amperes per circuit on 2 to 2 wire and 3 to 3 wire 125 volt panels, and 3 amperes per circuit on 3 to 2 wire 125 volt and 2 to 2 wire 250 volt panels. Mains can be arranged for lugs only, NEC enclosed or open link fuses, or with fused or unfused main switch.

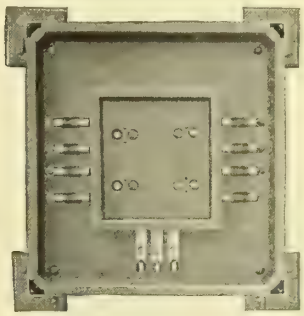
Frames—By the use of a slate frame, or set of barriers around the panel, a more finished appearance is given, as it separates the wiring in the cabinet from the active part of the panel. This frame consists of four pieces of slate mounted on the face of the panel and fastened to the back of the cabinet by adjustable corner irons. The slot in the frame opposite each terminal, through which the wire passes, permits the complete wiring of the panel before the slate frame is placed in position, and simplifies the work of connecting the circuit wires.

Finishes—Any finish desired or called for in specifications can be furnished; but the General Electric Company strongly recommends its No. 1, or dull black slate, with satin finished bus bar, and branch connections. This is a very durable finish and renders the appearance of the panel very attractive.

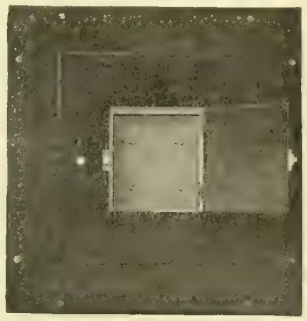
Safety Type Panels.

This type of panel has been developed to meet an increasing demand for a strictly high grade *safety* type of panel. It is so arranged that the switch compartment is covered by a door, fastened with a spring catch; while the fuse compartment is covered by a larger door, supplied with a lock. By this construction only authorized persons may have access to that part of the panel which is alive.

These panels are arranged for either push-button or rotary snap switches, and NEC enclosed, open link or Edison plug fuses in the branches.



Without cabinet or trim, showing arrangement of switches, bus bars and fuses



Door over switch compartment open

SAFETY TYPE PANELS

Salient Features—

Switches operated without opening door exposing current carrying parts.

All live metal parts covered by locked door, eliminating possibility of shock to operator.

Unit switch construction.

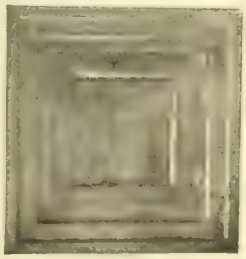
Plates may be engraved with name or number of circuit controlled.

Recommended for use in all public places, department stores, private residences, factories, or any place where the switches are likely to be operated by persons unfamiliar with the damage, or possibility of personal injury, caused by short circuit, or accidental contact with live conductors.

Panel Board Cabinets.

These cabinets are made of wood or steel, and can be finished in any color desired.

In addition to our standard construction, special cabinets can be supplied to meet any requirement.



STEEL CABINET

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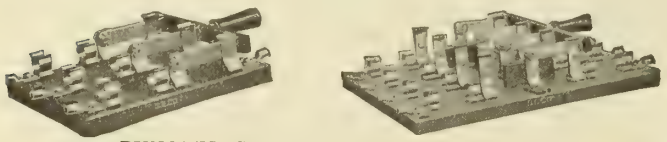
Lever Switches.

G-E Lever Switches are constructed to withstand severe and constant usage, and they will carry their rated capacity indefinitely without overheating. Moreover, they embody certain other minor details of construction which, though not essential, add considerably to their efficiency.

Punched Clip Type—These switches will meet

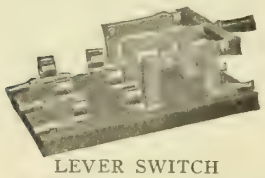


PUNCHED CLIP TYPE LEVER SWITCHES

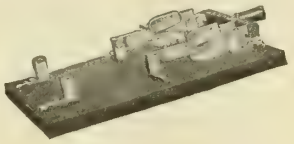
every requirement where efficient and low-priced switches are required.

Type L—Type L, Form D-12, lever switches were designed to meet the demand for a high-grade lever switch of simple but strong construction.

Type Q, Form C-2—These are similar to the Type L, Form D-12, with the addition of a quick break feature.



LEVER SWITCH
Type L, Form D-12



QUICK BREAK LEVER SWITCH
Type Q, Form C-2

Snap Switches.

The General Electric Company manufactures a line of mechanically and electrically efficient snap switches in all standard rating. The types and sizes are too numerous to be listed here, but a few representative switches are shown.

88987
Porcelain, for Moulding Work

GE248
Ceiling Type

68141
Miniature, Full Metal Cover

GE241
"Pony" Type
Cover removed

60954
Three-Way Switch
Cover removed

GE563
Pendent Switch

GE [illegible]
For [illegible]

Lock Attachment for [illegible]

GE [illegible]
For Conduit [illegible]

Sockets and Receptacles.

The standard and special Lamp Sockets made by this company cover all possible requirements in electric installation.

G-E Quick Make and Break Socket, 660 watts, 250 volts, fills a long-felt need for a key or pull socket which can be used interchangeably with keyless socket and switch control where electric heating devices and other small portables are used on lighting circuits.

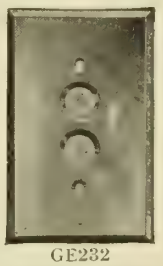
G-E Locking Sockets and Receptacles afford a positive protection to lamps and also prevent the theft of current. When the key is removed, the screw shell of the socket swivels freely, preventing injury to either the lamp base or the socket if an attempt is made to remove the lamp without the key.

GE459
GE LOCKING SOCKET

Flush Switches.

G-E Flush Switches, both push-button and rotary types, are known for their absolute reliability. They are furnished with adjusting nuts, which feature insures accurate alignment. The locking type is recommended for use in public buildings, to prevent the switch from being operated by unauthorized persons. Flush Switch plates can be furnished in any finish required. White enameled plates should be used with delicately tinted walls and woodwork.

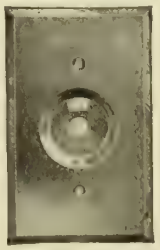
68247
FLUSH PUSH-BUTTON SWITCH



GE232
PLATE FOR FLUSH PUSH-BUTTON SWITCH

GE688
FLUSH PUSH-BUTTON SWITCH, LOCKING TYPE

60473
FLUSH ROTARY SWITCH

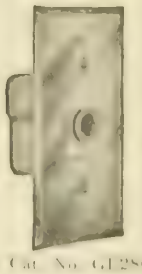


61044
PLATE FOR INDICATING FLUSH ROTARY SWITCH

60468
FLUSH ROTARY SWITCH, INDICATING

Double Door Flush Receptacle.

When installed in the wall or base-board, only the small porcelain flange of the plug is visible. Two perfectly fitting doors in the plate open to allow the insertion of the plug.



Cat. No. GE286

Receptacle

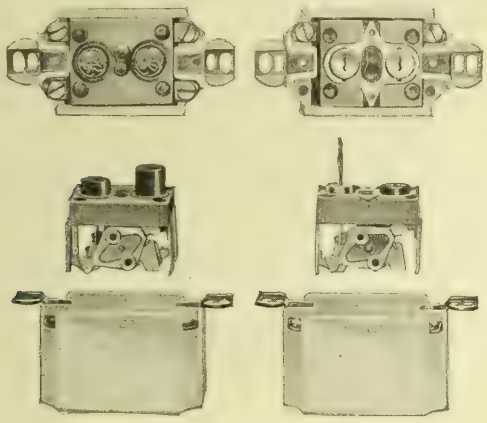
Plug

DOUBLE DOOR FLUSH RECEPTACLE

Continued on next page

Removable Mechanism, Flush Push-Button Switch.

Constructed especially to comply with the restriction of the Underwriters in regard to having loose wires in buildings during erection. With this type of switch, only the porcelain box, with a temporary fiber cover, is installed with the wiring during plastering and other rough building operations. The removable mechanism, separately packed, is retained, ready for insertion as soon as there is no longer any danger of injury to it.

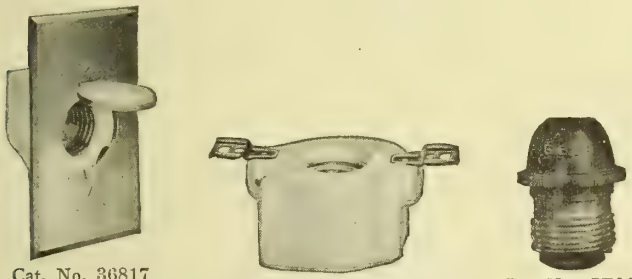


GE733 GE686

REMOVABLE MECHANISM SWITCHES

Flush Receptacles for Electric Portables.

This flush receptacle will take any medium screw base attaching plug. Cat. No. G-E002 is a miniature swivel plug, and is particularly well adapted to use with small electric portables in connection with receptacle, Cat. No. 36817. The swiveling feature prevents the cord from twisting when the plug is screwed into the receptacle.

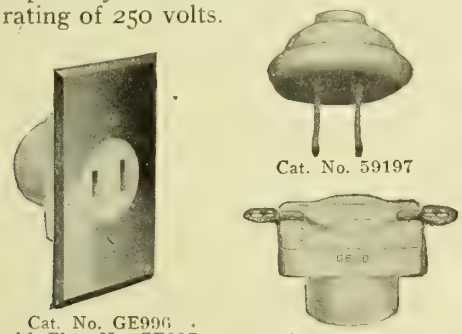


Cat. No. 36817 and Plate No. 36818 Cat. No. 36817 Cat. No. GE002

FLUSH RECEPTACLES FOR ELECTRIC PORTABLES

25 Ampere Flush Receptacle.

Plugs for this receptacle can be furnished in both porcelain and moulded material. The design is such that the polarity cannot be reversed. It has an approved rating of 250 volts.



Cat. No. 59197

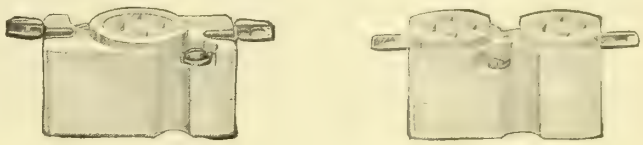
Cat. No. GE996 with Plate No. GE997 Cat. No. GE996

25 AMPERE FLUSH RECEPTACLE

Flush Receptacles.

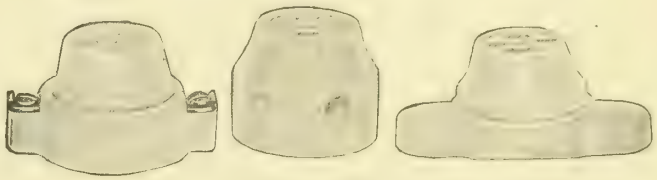
The very complete line of wiring devices manufactured by this Company includes a variety of flush receptacles for use as outlets for various electric portables.

Cat. Nos. GE658 and 49491 Cat. Nos. GE694 and 695



Cat. No. GE658 Cat. No. GE694

G-E "STANDARD" FLUSH RECEPTACLES



Cat. No. GE544 Cat. No. GE665 Cat. No. GE546

Cat. No. GE545 Cat. No. GE547 Cat. No. GE543

G-E "STANDARD" SURFACE TYPE RECEPTACLES

Cat. No. GE625 Moulded material

Cat. No. GE662 Metal covered moulded Material

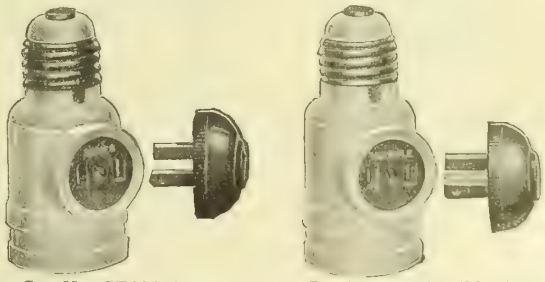
Cat. No. GE663 Polarity Moulded Material

Cat. No. GE703 Porcelain

Cat. No. GE704 Moulded Material

Cat. No. GE706 Metal covered moulded Material

CAPS FOR DEVICES LISTED ABOVE



Cat. No. GE696 (Series) Cat. No. GE697 (Multiple)

G-E "STANDARD" COMBINED SOCKETS AND ATTACHING PLUGS

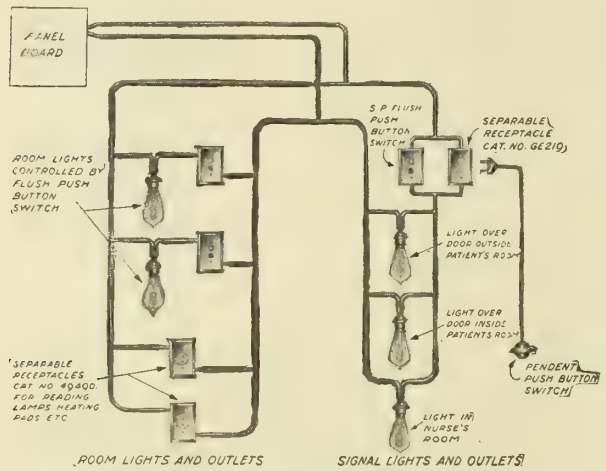
Cat. No. GE702 Cat. No. GE682 Cat. No. GE624

G-E "STANDARD" SEPARABLE ATTACHING PLUGS

Continued on next page

General Electric Hospital Signal Lights.

Herewith is shown a diagram of a simple hospital signal light system. This system utilizes the standard circuits and is installed so that a positive indicating signal can be readily given by the patient. A green light is placed over the door inside the patient's room; over the door outside the room there is a red light. Inside the nurses' room is located a red light for each



HOSPITAL SIGNAL LIGHTING SYSTEM

patient's room and a pendent switch is placed in a convenient location and within easy reach of the patient. This switch is connected in series with the line through a flush receptacle of the separable type.

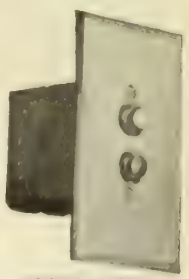
When desiring to call a nurse, the patient pushes the switch button which lights the lamps inside and outside of the patient's door and the lamp in the nurses' room. These lamps will burn until the nurse visits the patient and turns them off at the pendent switch. In addition to the pendent switch control, the system may also be operated by a push-button switch installed in the side wall.

If desired, a single button lock type push-button switch can be furnished. This switch when operated by the patient is locked in the "on" position and it is necessary for the nurse to use a key to turn off the lights.

TRIPLE-POLE, SINGLE-THROW, REMOTE CONTROL SWITCH

Remote Control Switch.

The Type R, Form C-2, electrically operated Remote Control Switch can often be used to advantage to connect and disconnect lighting circuits, motors not subject to heavy overloads, or other electrical devices located at a distance. It is especially adapted for use in large buildings, libraries, theaters, halls, stores, etc., where control from a central point is desired.


SPECIAL PUSH BUTTON SWITCH

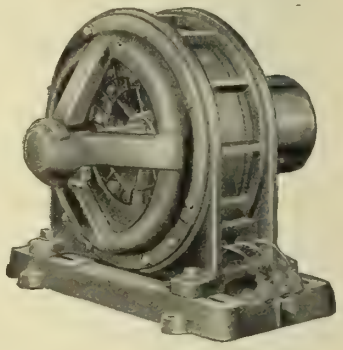
This switch is a self-contained unit, and is operated by a special, single pole, double throw, push button switch, which is normally in the open position and remains closed only when held by the operator.

The standard finish of all live parts is polished copper, and of the mechanism, marine (dead black). Bulletin A-4070.

Power Applications.

The General Electric Company's motors cover a wide range of applications of electric power to mechanical service. Constant and variable speed motors, for both alternating and direct current service, are built. Complete lines of alternating- and direct-current motors are manufactured, varying in size from $^1/_{10}$ horse-power up to any size desired.

The smaller motors are applicable to sewing machines, buffers, ice-cream freezers, washing-machines, and similar household devices; and the larger ones to all manufacturing and power service.


STANDARD FORM K INDUCTION MOTOR

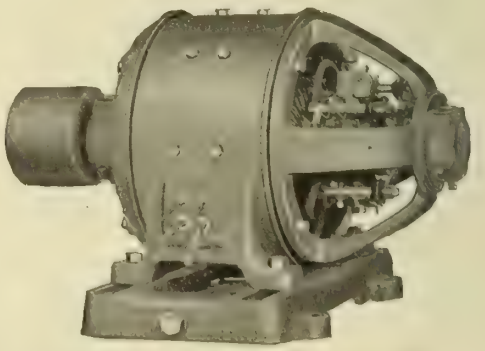
In selecting motors, it should be remembered that for the same horse-power rating the cost will vary inversely as the speed at which the machine is designed to run.

Approximate Space Required for Standard Constant Speed Induction Motors

H-P.	Speed, R.P.M.	Length, inches	Width, inches	Height, inches
1	1800	14	13	11
10	1200	33	28	23
25	1200	42	32	28
50	900	49	43	35

Induction Motors—Multi-speed Induction Motors, Form K, are standard in small sizes. In general, four speeds, 1800, 1200, 900, 600 R.P.M., may be obtained from a 60-cycle motor of this design, the horse-power being the same for all four speeds.

Variable Speed Induction Motors can be furnished for any ordinary horse-power rating. The variation in speed is obtained by the use of a controller; but as the speed is reduced, the power of the motor is also reduced proportionally. Bulletin 41302.


CONSTANT SPEED DIRECT-CURRENT MOTOR, TYPE RC

Approximate Space Required for Constant Speed Direct-Current Motors

H.-P.	Speed, R.P.M.	Length, inches	Width, inches	Height, inches
1	1700	18	14	11½
10	1150	32	28	22
25	775	51	36	33
50	650	62	46	40

Direct-Current Motors—The type RC Constant Speed Motors of moderate speed meet a majority of the ordinary requirements of motor applications. These motors have commutating poles as well as other mechanical and electrical refinements. Bulletin 41013.

Type RLC Adjustable Speed Motors are standard; and can be furnished where practically full horse power rating is required, with a speed variation from normal

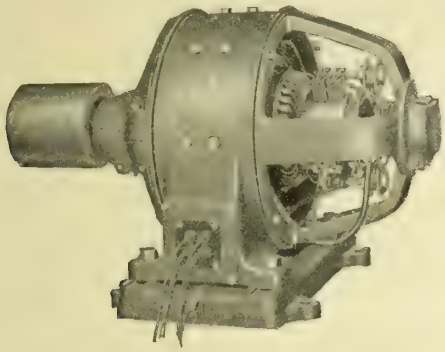
Continued on next page

to about one-fourth normal. The speed variation is obtained by field control. Bulletin A-4130.

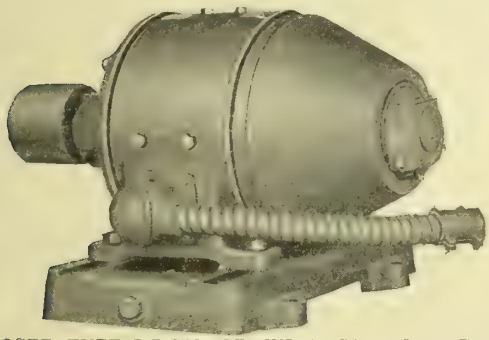
Type CO-1800 Variable Speed Motors are specially adapted for crane and hoist service.

For special conditions where dust, fumes or moisture are present, it is advisable to specify the enclosed type of motor illustrated herewith.

Motors suitable for mounting on the wall or ceiling can be furnished for installations where it is desirable to economize space. Bulletin 48100.



TYPE RC MOTOR, 20 HORSE-POWER



ENCLOSED TYPE RC MOTOR, WITH CONDUIT TERMINAL
Special fixtures for conduit connections, as illustrated, may be supplied at a slight extra cost

Information Required.

For specific information on motors kindly answer the following questions:

CONSTANT SPEED SERVICE

Item 1—Alternating or direct current available?
Item 2—Voltage and frequency (if alternating current)?
Item 3—What is the motor to drive?
(If an individual machine—the manufacture and size.)
Item 4—Belted or direct connected?
(Pulley dimensions if not standard.)
Item 5—Gear or chain drive?
Outward bearing and shaft extension.
Subbase and by whom to be furnished.
Item 6—Load { Continuous. / Intermittent (details).
If the load is intermittent, give cycle of duty, i.e. maximum horse-power; length of time load is on; time off and friction load.
Item 7—Frequent starting and stopping { Yes. (Number of times per hour.) / No.
Item 8—Give details as to starting conditions. Is time of acceleration long? Must motor accelerate long line shafting, flywheels, etc.?
Item 9—Conditions of location—dust, acid fumes, high temperatures, etc.?
Item 10—If special mechanical features are required send sketch if possible.

VARYING SPEED SERVICE

In addition to the information specified for constant speed motors, please advise regarding the following:
Item 11—Speed range required.
Item 12—At reduced speeds is horse-power output reduced in proportion to speed (i.e., constant torque); if not, state proportion.

NOTE—If more than 50 per cent reduction from normal speed is required, reduced ventilation may require increasing the size frame. Give complete details of service.

Cooking and Heating.

A wide range of domestic appliances is now practical for the modern building. These devices are of vital interest to the architect in two ways. First, because the value of the complete structure as a working unit can be vastly increased by their use; and, secondly, because special wiring is invariably required and should be provided for in the original plans of the building. By installing separate meter, the charges for current consumption will be much lower than for lighting circuits.

Since the limit established by the Underwriters is 660 watts from a lighting circuit wire, the architect can readily determine the advisability of a separate circuit by noting the wattage of the various devices which will probably be used. Kitchen ranges, three- and four-unit radiators, circulation water heaters and air heaters for instance, are above the 660 watt limit, and must, therefore, be connected to the special power circuit wire.

The GENERAL ELECTRIC COMPANY offers a complete line of electric heating and cooking appliances for domestic, hotel and restaurant installations and industrial applications.

Electric Ranges—Are easy to operate, the heat is quickly available and is readily regulated. They are clean, safe and labor-saving, and their use promotes comfort and cleanliness. There is no fire requiring constant attention; no excess heat, smoke or fumes to vitiate the atmosphere. There is no longer need of continued scouring and scrubbing to keep cooking utensils clean and free from soot. Dust and dirt, together with the bother and burden of handling and storing coal and ashes, are entirely eliminated. The superiority of electric cooking devices over gas-heated appliances is self-evident. The same current will always produce the same temperature; therefore, other things being equal, uniform results are obtained.

The Type R-1 electric range performs all kinds of cooking and baking. Ordinary cooking utensils are used with them. The broiler is combined with the oven, the meat being broiled by radiant heat from above. The cooking top comprises three hot plates and two vegetable compartments. Type R-2 has an elevated oven; Type R-3 is a cabinet design.

TYPE R-1 ELECTRIC RANGE

2 hot plates	Three-heat	250-500-1000	watts each
1 oven	Two-heat	500-1000	watts
1 broiler	One-heat	1000	watts
3 cookers	One-heat	200	watts each

The oven door opens downward and has a drop latch with ebonized wooden handle.

Height, 52 in.; length, 33 in.; depth, 26 in. Net weight, 195 lb.; shipping weight, 335 lb.

TYPE R-2 ELECTRIC RANGE

The Type R-2 has the same equipment as the Type R-1. The oven is located above the cooking top so that it is not necessary to stoop or bend over when using same.

Height, 65⅝ in.; length, 33 in.; depth, 36 in. Net weight, 283 lb.; shipping weight, 500 lb.

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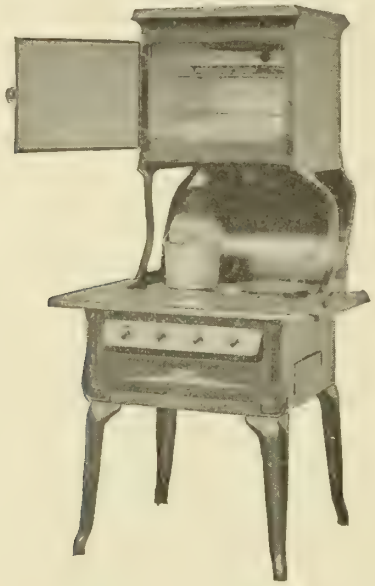


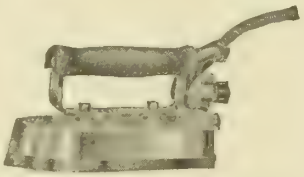
ELECTRIC RANGE, SHOWING STEAMING COMPARTMENT

Flatirons—Three-, six- and eight-pound sizes. With separate or attached stand. Full nickeled or with barffed base.

TAILORS' IRONS

Pounds	Watts
12	250-750
15	250-750
18	300-900
24	300-900

With two regulating heats.



TAILORS' ELECTRIC IRON

Broiler—To broil, invert and place on meat in platter. Retains all the juices.

Stoves—Portable disks for many purposes. Four-inch, single heat. Six-inch, three heats.

ELECTRIC FLAT IRON TILTED ON HEEL STAND

Cat. No. 171574
BROILER

Cat. No. 153473
DISK STOVE

TYPE R-2 ELECTRIC RANGE

This is a cabinet type of range with the elevated unit in the right of the cooking top. It also has the added convenience of warming closet and a 200-watt unit above the oven. The shelf underneath provides a convenient rest for cooking utensils.

Height, 61 in.; width, 24 in.; depth, 26 in. Net weight, 350 lbs.; shipping weight, 670 lbs.

Water Heaters—Useful for heating all kinds of liquids. One half pint size will heat water for shaving in two to three minutes. Pint and quart sizes popular as milk warmers. Costs less than three quarters of a cent to boil one pint of water.

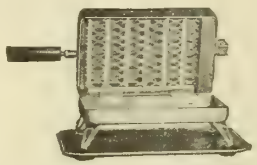
WATER HEATER
Used as Milk Warmer

Cat. No. 177397
TOASTER

Cat. No. 153464
WATER HEATER

Toaster—Convenient and ornamental for use on the dining room table. Makes fresh toast, as needed. Ten slices cost but one cent.

Grill—A combination device which will grill, fry, toast, boil and bake. Hinged unit frame permits cooking to be done both above and below heating coils.



Cat. No. 153488
RADIANT GRILL
Open to show lower pan

RADIANT GRILL
Closed to show top plate

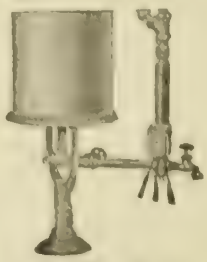
Air Heaters—Particularly adapted for the heating of rooms in buildings or residences where the heat is to be used continuously. The heating units are so constructed as to allow a free passage of air over the heating element, the heat being rapidly conducted away to the surrounding air. Heating units easily renewable. Snap-switch heat control.

Glower Radiators—Adapted for intermittent service, particularly in removing the chill before or after the heating system is in use. Ideal for nurseries and bathrooms. Consists of a handsomely finished ornamental metal frame, with a highly polished reflector, and two, three or four luminous heating units. Safety from danger of fire or fumes.

AIR HEATER
Air Heaters—Sizes, 1200 to 5000 watts

THREE-GLOWER RADIATOR
750 or 1500 watts

Circulating Water Heater
This circulating water heater may be readily connected with the ordinary kitchen hot water tank. It is designed for low wattage continuous heating, but the larger wattages adapt it for intermittent use. No tank, piping or switches furnished.



CIRCULATING WATER HEATER

Continued on next page

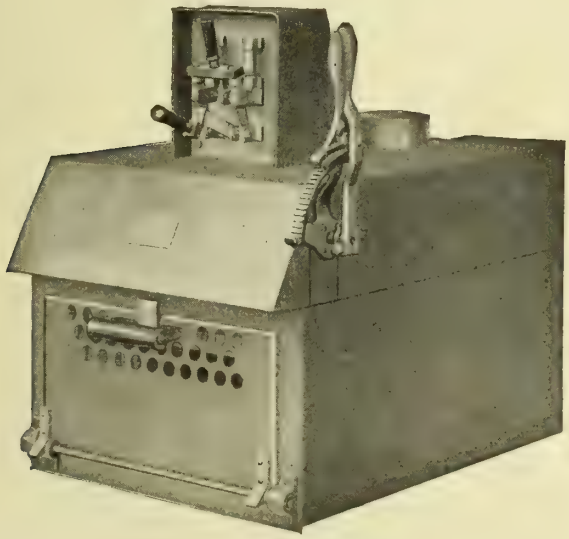
Hotel Equipment.

Ranges—The range has a capacity for one hundred or more persons. It comprises two roasting ovens and a cooking top, divided into eight rectangular hot plates.

HOTEL ELECTRIC RANGE

The front hot plates operate at high temperature for rapid work, while those at the rear have less heat for continuous boiling.

Broilers—The gridiron, on which the meat rests, is supported below the radiant heating unit on a movable frame raised or lowered by a lever. An auxiliary unit keeps the device hot between broiling operations. The effective area of the hotel broiler is sufficient for broiling about twelve pounds of steak or chops, each 1½ inches thick. It has about 280 square inches of broiling surface, with a capacity of about 70 pounds of meat per hour. The G-E Broiler saves floor space.



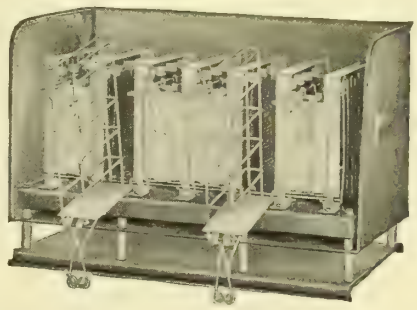
HOTEL ELECTRIC BROILER

Bake Ovens—The initial cost of a G-E electric oven is far less than that of a brick oven and about the same as that of a gas oven of a similar capacity. The upkeep is a very small item, and so satisfactory is the G-E Bake Oven, mechanically and electrically, that with reasonable care it should last a lifetime. Brick ovens have to be relined frequently—an expensive and time-consuming job.

ELECTRIC BAKE OVEN

G-E bake ovens of the type shown above are made in three sizes, ranging in capacity from 40 to 100 loaves an hour.

Hotel Toasters—The G-E hotel toaster promptly provides quantities of fresh toast. The slices to be toasted are placed in hinged wire racks, which are tipped into the toasting position between the heating coils. The coils instantly glow red when the current is turned on. Two, three or six slices can be toasted simultaneously.



ELECTRIC TOASTER

Lighting.

The General Electric Company manufactures a complete line of units for both interior and exterior lighting and will gladly co-operate with the architect in making every installation the last word in the art of illumination.

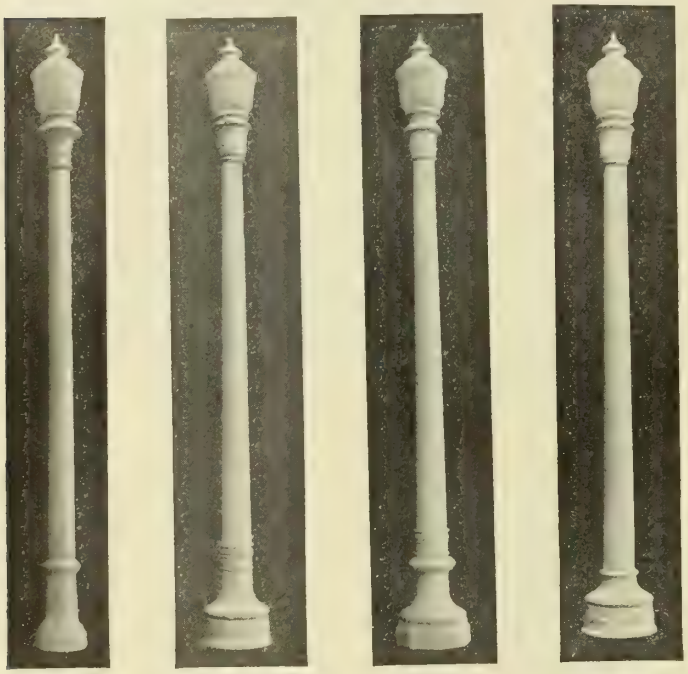
Novalux Ornamental Units—The Novalux Ornamental Units manufactured by the General Electric Company are highly ornate and are built to accommodate the Mazda C lamp.

Continued on next page

In addition to lighting the streets and sidewalks, these units are designed to throw considerable light upward to illuminate the building fronts.

By combining illuminating efficiency with a dignified and distinctive appearance, they beautify their surroundings and are an asset by day as well as night.

The Novalux Ornamental Units are made for all standard lighting circuits and for all candlepowers.

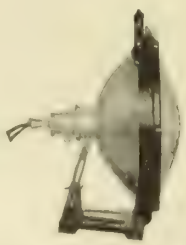


NOVALUX ORNAMENTAL UNITS

Flood Lighting Projectors—Flood lighting the exteriors of buildings has achieved considerable prominence because of its extensive use at the Panama Pacific International Exposition. Its popularity is due to the fact that the building, not the lighting, is presented to the eye; the means of illumination is concealed and does not distract the attention and the building appears natural and real, exactly the impression the architect wishes to give. The Flood Lighting Projector manufactured by the GENERAL ELECTRIC COMPANY is designed expressly for this class of lighting and by its use, buildings, statues, monuments and other objects of public pride and interest are not lost to view at night time but are made more conspicuous than in the day time.

These Flood Lighting Projectors are made to accommodate either the 250 or 500 watt Mazda C lamps, which are made expressly for this class of work. Bulletin 42850.

FORM L1 FLOOD LIGHT 150 PROJECTOR



FORM L1 FLOOD LIGHTING PROJECTOR, SIDE VIEW

Battery Charging Outfits.

The rapidly increasing use of electrically propelled vehicles makes thoroughly reliable charging equipment of high commercial efficiency very necessary. The GENERAL ELECTRIC COMPANY is prepared to furnish battery charging equipments of all kinds; that is, the individual charging sets with control panels, also large equipments for charging vehicle batteries in large garages.

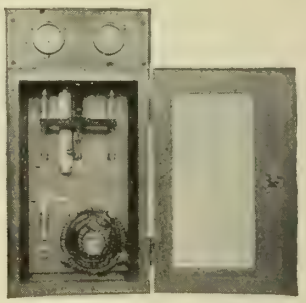
Individual Vehicle Charging Sets.

The individual vehicle charging sets, herewith illustrated, can be furnished for the charging of either Lead or Edison vehicle batteries. They can be furnished for service on various frequencies, either single-phase or polyphase circuits of the standard voltages, and in suitable capacities for charging Lead batteries of 44 cells and under or Edison batteries of 60 cells and under.

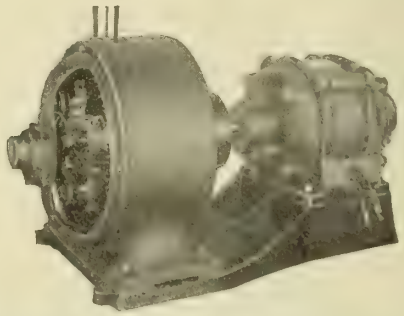
The selection of the proper set for any particular charging work depends upon the make of battery and type of cell, as well as the frequency, voltage and number of phases of the alternating current supply.

No series resistances are required with these sets. The sets can be mounted on the floor, wall or ceiling.

The wall cabinets illustrated, it will be noted, contain the switch, fuses and generator field rheostat. Direct current ammeter and voltmeter can be furnished as extras where they are desired. The individual charging sets are simple to operate.



STEEL WALL CABINET CONTROLLING VEHICLE CHARGING SET



MOTOR-GENERATOR OF INDIVIDUAL VEHICLE CHARGING OUTFIT

Motor-Generator Sets for Small Battery Charging.

The Fort Wayne Types MIC Form D and MCC Form D motor-generator sets consist of a fractional horse-power motor, driving a small direct current generator; and is furnished for service on 110 and 220 volt, 60 cycle, alternating current circuits, and 110 and 220 volt direct current, respectively.

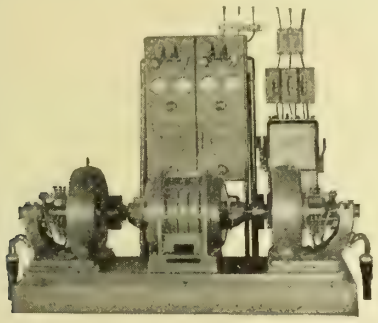
Both types of these sets are furnished for 175 and 250 watts outfit, and for 6, 12, 18 and 24 volts. These sets are especially adapted to the charging of automobile and ignition batteries. All sets, excepting the 6 volt, can be supplied with a switchboard panel, mounted upon them as shown in the illustration.

MOTOR GENERATOR SET FOR BATTERY CHARGING

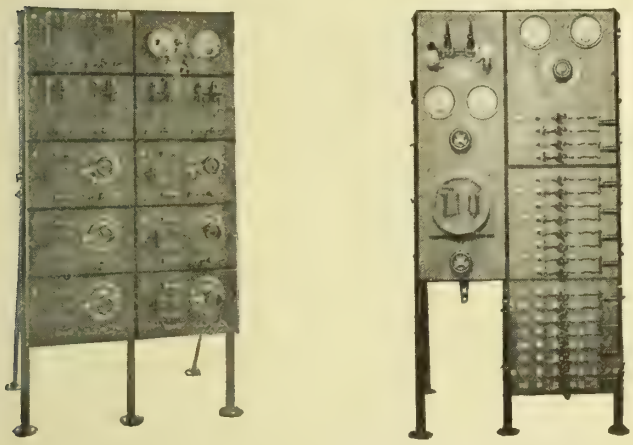
Continued on next page

Battery Charging Outfits for Large Garages.

The problems for selecting battery charging outfits for large garages present conditions so diversified in character that it is best to take each case up individually with the engineers of the GENERAL ELECTRIC COMPANY. The following pictures of equipments for battery charging only serve to illustrate some of the problems that have been successfully solved by this company.



MOTOR-GENERATOR SETS FOR BATTERY CHARGING



SWITCHBOARD PANELS FOR BATTERY CHARGING

Fort Wayne Compensarc.

For the reduction of voltage incident to operating moving picture machines, Fort Wayne Compensarcs are available for reducing direct current or transforming alternating to a usable direct current voltage. For illustration of apparatus, for changing alternating current to direct, see illustration under Individual Vehicle Charging Set. These machines are built especially for this class of work, and are much more efficient, reliable and satisfactory in operation than the ordinary motor-generator sets that have heretofore been offered for this service. The only energy taken from the line being that required by the arc lamp and the small losses incidental to the running of the machine. It is simple to install, as no sub-base or special foundations are required, and there are absolutely no difficulties to be encountered in connecting it into the circuit.

DIRECT-CURRENT COMPENSARC

ALTERNATING-CURRENT COMPENSARC

Special Transformers.

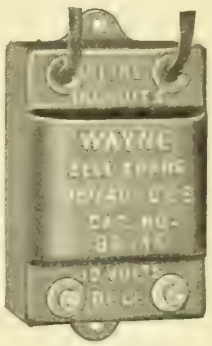
For small devices, such as bells, toys, small lamps, etc., the use of batteries has been replaced by small transformers, which give the required low voltages at a small cost and without attention. Transformers can be used only on alternating current systems.

For Night Light—A miniature transformer (the All-Nite Lite) is screwed to the lamp socket in place of the ordinary lamp, and transforms the supply voltage to operate a six volt two-candle power bayonet base Mazda lamp (the same as used for automobile rear and speedometer lighting). Bulletin B-3341.

For Bell Ringing Systems—The Wayne bell ringing transformer serves every ringing requirement. The one illustrated, Cat. No. 190546, is adapted for operating household type electric bells, annunciators, door-openers, thermostats, etc. It has sufficient capacity to operate three 3-inch bells simultaneously. It has been approved by Fire Underwriters.

A bell ringing transformer should be included in all wiring specifications. Described in Flyer B-3350.

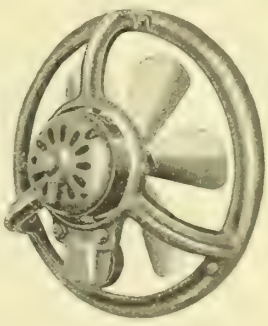
TRANSFORMER FOR NIGHT LAMP



TRANSFORMER FOR BELL RINGING SYSTEMS

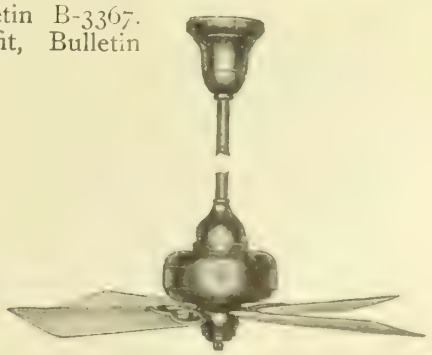
Fans.

Fans for residences and offices are made in three sizes, 8, 12 and 16 inches in diameter, and with three-speed control. Can be furnished for desk or wall mounting, either oscillating or stationary with adjustable or swivel-trunion. These fans are quiet in running, light in weight, very efficient and durable. Made for different voltages for both alternating or direct current. Desk Fan, Bulletin B-3367. Ventilating Outfit, Bulletin B-3259.



G-E VENTILATING OUTFIT

DESK FAN



32-INCH ALTERNATING-CURRENT CEILING FAN

Continued on next page

Suggestions for Electric Specification.

(Numbers refer to General Electric Catalogue)

Conduit System—Install a complete system of Genuine Hot-Galvanized, Wiped Interior Conduit, for all wires, as shown on plans. All conduit shall be "Greenfield Duct," of sufficient size to take all wires of each circuit.

Outlet Boxes—Install a Galvanized Steel Outlet Box at each electric outlet. Provide all outlets with ⅜-inch fixture stems. All wall and ceiling outlet boxes shall be Sprague No. 6200.

Wiring—All wiring shall be done with "Tricoat" Wire of No. 14 B. & S. gauge, or of the size shown on plans.

Panel Boards—Furnish two G-E Marbleized-Slate Panel Boards of the 220-110 volt type, with a polished copper knife switch and NEC enclosed fuses for each circuit. Panel boards shall be set in recessed type steel boxes with steel doors and trims, set and connected complete at the points shown.

Switches—Install at points indicated a G-E Removable Mechanism Push Switch. They shall be of the single-pole (GE731), double-pole (GE732), three-way (GE733) and four-way (68250) pattern as shown. Each switch shall be fitted with solid brass plate finished to match hardware. Where switches occur in pairs or in threes, gang plates shall be used. A No. 60478 Electrolier Switch with 61044 Plate shall be installed in the dining room for turning on fan or light, singly or together.

Base Receptacles—Install at points shown a Removable Flush Wall Receptacle consisting of a GE No. 694 receptacle, and a GE No. 695 Plate. Receptacles shall be fitted with solid brass plates finished to match hardware.

Burglar Lights—The Lights marked "B" shall be so wired and switched with the GE 732 and 733 removable two-pole and three-way switch mechanisms, specified above, that any light may be turned on by its respective three-way switch, and so that all lights may be turned on by the two-pole control switches in bedrooms.

Pull-Chain and Drop-Cord Receptacle—Install at points shown in closets No. 88963 Pull-Chain Receptacles. In basement at all outlets marked "D" install Reinforced Drop Cords with GE No. 099 porcelain Key Sockets. The one-light receptacles under range hood shall be Keyless Receptacles, GE No. 411.

Fans—Install at points shown in Den and Reception Room No. 60561 16-inch D-C Oscillating Bracket Fans; in Dining Room a No. 59433 110-volt Ceiling Fan with a one-light 100-watt fixture; in Pantry a No. 34011 16-inch Ventilating Fan with a No. 34036 Speed Controller.

Electric Heating Outlet Heating Devices, etc.—For electric ranges, install at points shown Pilot Light Boards GE No. 947, consisting of a plug, fuse cutout, double pole snap switch, pilot light and receptacle. Where special heating outlets are shown for large heaters, GE No. 112 Lamp Board shall be used.

Also install at points shown in Kitchen a No. 153464 Water-Heater, a Flatiron, and Universal Ozonator; in Pantry a No. 153473 Hot Plate; in Dining Room a No. 153479 Samovar, a No. 153483 Coffee Percolator, a No. 153485 Chafing Dish, a No. 153477 Toaster, and a No. 76871 Luminous Radiator with 250 watt bulbs; in Sitting Room a No. 139320 Mantel Type Luminous Radiator with three 250 watt bulbs; in each Bathroom a No. 76215 Hot-Water Heater and a No. 165825 Air Heater; in Shop a No. 153498 Glue Pot and a No. 153509 Soldering Iron Heater.

Motor—Install a GE996 Receptacle, with 997 Plate and a 59197 Plug, and connect in the shop a 2-H.-P., 230-volt, CVC No. 111 GE Compound Wound Motor with a CR No. 107 Starting Box.

Special Transformers—For ringing all bells install a No. 190546 Bell Ringing Transformer. For small lights at night for porches, halls, bathrooms, install an All-Nite-Lite.

Bulletins.

The following list and corresponding bulletin numbers are referred to in foregoing pages.

Source of Electric Power:
- Hydro Electric Stations 4966A
- Steam Turbines 42206, 42201
- Steam Driven Generator 40500, A-4189
- Belt Driven Generator 40400
- Gas Driven Generator ..... *

Control of Electric Power:
- Switchboards ..... "Standard Units," B-3303
- Circuit Breakers 4837, 8, 9, 40, 41

Measuring Electric Power:
- Electrical Instruments 46013
- Electrical Meters 4662-13

Transmitting Electric Power:
- Wires and Cables ..... *

Distribution:
- Panelboard ..... *
- Cabinets ..... *

Wiring Devices:
- Switches ..... Supply Catalogue
- Wiring Devices ..... Supply Catalogue
- Remote Control Switches A-4070

Power Appliances, Motors:
- Induction Motors 41302
- Direct Current Motors (Constant Speed) 41013
- Direct Current Motors (Variable Speed) A4130
- Direct Current Motors (Crane and Hoist) 48100

Lighting:
- Novalux Ornamental Units ..... *
- Flood Lighting Projectors 42850

Cooking Equipment:
- Ranges, Domestic B-3353
- Broilers, Domestic Y-744
- Disk Stoves, Domestic B-3344
- Water Heaters, Domestic Table Y-744
- Radiant Grill, Domestic Table Y-744
- Ranges, Hotel Y-744
- Broiler, Hotel B-3278
- Ovens, Hotel Y-744
- Toaster, Hotel Y-744

Heating Equipment:
- Air Heaters, Domestic Y-744
- Water Heaters, Domestic Y-744
- Luminous Radiator Y-744
- Irons, Flat, Domestic B-3318
- Irons, Flat, Tailors B-3318

Miscellaneous Service:
- Battery Charging Outfits Y-744
- Motor Generator Sets 42552
- Controlling Cabinet ..... *
- Switchboards ..... *
- Compensares ..... *

Transformers—
- Night Lamp B-3341
- Bell Ringing Systems B-3350

Fans—
- Desk B-3367
- G-E Ventilating Outfits B-3259

Information regarding those marked with an asterisk (*) will be furnished on application to our nearest office.

Continued on next page

GENERAL ELECTRIC COMPANY

PRINCIPAL WORKS

Schenectady, N. Y.	Lynn, Mass.	Newark, N. J.	Watsessing, N. J.
Pittsfield, Mass.	Harrison, N. J.	Cleveland, Ohio	Erie, Pa.
		Fort Wayne, Ind.	

SALES OFFICES

ATLANTA, GA.....Third National Bank Building
BALTIMORE, MD.....Munsey Building
BIRMINGHAM, ALA.....Brown-Marx Building
BOSTON, MASS.....84 State Street
BUFFALO, N. Y.....Electric Building
BUTTE, MONT.....Electric Building
CHARLESTON, W. VA.....Charleston Nat'l Bank Building
CHARLOTTE, N. C.....Commercial Nat'l Bank Building
CHATTANOOGA, TENN.....James Building
CHICAGO, ILL.....Monadnock Building
CINCINNATI, OHIO.....Provident Bank Building
CLEVELAND, OHIO.....Illuminating Building
COLUMBUS, OHIO.....Columbus Savings & Trust Building
DAYTON, OHIO.....Schwind Building
DENVER, COLO.....First National Bank Building
DES MOINES, IOWA.....Hippee Building
DULUTH, MINN.....Fidelity Building
ELMIRA, N. Y.....Hulett Building
ERIE, PA.....Marine National Bank Building
FORT WAYNE, IND.....Fort Wayne Electric Works
INDIANAPOLIS, IND.....Traction Terminal Building
JACKSONVILLE, FLA.....Heard National Bank Building
JOPLIN, MO.....Miner's Bank Building
KANSAS CITY, MO.....Dwight Building
KNOXVILLE, TENN.....Bank & Trust Building
LOS ANGELES, CAL.....124 West Fourth Street
LOUISVILLE, KY.....Starks Building
MEMPHIS, TENN.....Randolph Building
MILWAUKEE, WIS.....Public Service Building
MINNEAPOLIS, MINN.....410 Third Ave., North
NASHVILLE, TENN.....Stahlman Building
NEW HAVEN, CONN.....Second National Bank Building
NEW ORLEANS, LA.....Maison-Blanche Building
NEW YORK, N. Y.....30 Church Street
NIAGARA FALLS, N. Y.....Gluck Building
OMAHA, NEB.....Union Pacific Building
PHILADELPHIA, PA.....Witherspoon Building
PITTSBURG, PA.....Oliver Building
PORTLAND, ORE.....Electric Building
PROVIDENCE, R. I.....Turks Head Building
RICHMOND, VA.....Virginia Railway & Power Building
ROCHESTER, N. Y.....Granite Building
ST. LOUIS, MO.....Pierce Building
SALT LAKE CITY, UTAH.....Newhouse Building
SAN FRANCISCO, CAL.....Rialto Building
SEATTLE, WASH.....Colman Building
SPOKANE, WASH.....Paulsen Building
SPRINGFIELD, MASS.....Massachusetts Mutual Building
SYRACUSE, N. Y.....Onondaga Co. Savings Bank Building
TOLEDO, OHIO.....Spitzer Building
WASHINGTON, D. C.....Evans Building
YOUNGSTOWN, OHIO.....Wick Building

For Texas, Oklahoma and Arizona business—

SOUTHWEST GENERAL ELECTRIC CO. (formerly Hobson Electric Co.)

DALLAS, TEX.....1701 N. Market Street
EL PASO, TEX.....500 San Francisco Street
HOUSTON, TEX.....Third and Washington Streets
OKLAHOMA CITY, OKLA.....Insurance Building

For Michigan business—

GENERAL ELECTRIC COMPANY OF MICHIGAN

DETROIT, MICH.....Dime Savings Bank Building

PARTIAL LIST OF FOREIGN SALES OFFICES

General Electric Co., Foreign Dept.....Schenectady, N. Y.
General Electric Co., Foreign Dept.....30 Church Street, New York, N. Y.
General Electric Co., of New York.....83 Cannon Street, London, E. C., England
Australian General Electric Co.....Melbourne and Sydney
Companhia General Electric do Brazil.....Rio de Janeiro
Cia. General Electric Sudamericana.....Buenos Aires
Mexican General Electric Co.....City of Mexico
South African General Electric Co.....Johannesburg and Cape Town

For all Canadian business—

CANADIAN GENERAL ELECTRIC CO., LTD.

TORONTO, ONT.....King and Sineo Streets

AGENCIES

Representatives and Agents in all Countries—
Motor Agencies in all large cities and towns

SCHENECTADY WORKS AND GENERAL OFFICES

SPRAGUE ELECTRIC WORKS

OF GENERAL ELECTRIC COMPANY
527-531 West Thirty-Fourth Street
TELEPHONE, Greeley 2000
NEW YORK, N. Y.
BRANCH OFFICES

CHICAGO, ILL., Fisher Building
PHILADELPHIA, PA., Witherspoon Building
BOSTON, MASS., 201 Devonshire Street
BALTIMORE, MD., American Building
PITTSBURGH, PA., Oliver Building
CLEVELAND, OHIO, Illuminating Building
CINCINNATI, OHIO, Provident Bank Building
ATLANTA, GA., Third National Bank Building
ST. LOUIS, MO., Chemical Building
MILWAUKEE, WIS., Public Service Building
SAN FRANCISCO, CAL., Rialto Building
LOS ANGELES, CAL., Corporation Building
PORTLAND, ORE., Electric Building
SEATTLE, WASH., Colman Building

Products.

Flexible Steel Armored Cable, Flexible Steel Conduit, Flexible Armored Cord, Greenfielduct, Spragueduct, Outlet Boxes, Theatrical Devices, Electric Fans, Exhaust Fans and Outfits, Switchboards, Generators, Motors, Controllers, Dynamometers, Hoists, Monorail Cranes, Winches and Winding Drums, Electric Storage Battery Trucks, Ozonators, Armored Hose.

Flexible Steel Armored Cable.

Known to the trade as BX, a name originated and copyrighted by the Sprague Electric Works. Adapted to new building construction and particularly favorable on account of the ease with which it can be installed in finished buildings without defacing the walls. It is made with single, double and triple conductors.

BXL has a sheathing of lead between the steel armor and the insulation, and is used in damp places, in concrete and in underground construction.

BM is for marine work.

Flexible Steel Conduit.

Single Strip Type is designed especially for fireproof construction, but is equally adaptable to non-fireproof work, or for the wiring of finished buildings.

Double Strip Type is strongly recommended for use in existing buildings on account of its extreme flexibility. A gasket is provided between the inner and the outer strips of steel, rendering the conduit moisture-proof.

Flexible Armored Cord.

Type E, for lamp pendants, show windows, theaters, factories, etc.

Type EM, reinforced, for portables and all current-consuming devices.

Greenfielduct.

A rigid conduit, hot galvanized on both the exterior and the interior surfaces.

Spragueduct.

A black enameled rigid conduit.

Outlet Boxes.

A full line of outlet, junction and switch boxes, together with fittings and tools, is manufactured, to make the wiring systems complete.

Theatrical Devices.

Complete electrical equipment of theaters, auditoriums, moving picture houses, etc., will be furnished to meet the individual requirements of architects and engineers.

Electric Fans.

A complete line of fans for the desk, wall or ceiling.

The desk and the wall fans may be either oscillating or non-oscillating.

Exhaust Fans and Outfits.

Motor-driven Exhaust Fans of all sizes, with direct current or alternating current motors attached. Standard equipments carried in stock.

Switchboards.

Switchboards, Panelboards and Metering Panels of standard or special types built to meet the most exacting specifications.

Generators.

Direct-current Generators for isolated plants. Built in sizes up to 1000 kilowatts.

Motors.

Direct current and alternating current, all types. Special attention to applications of motors to printing presses, pumps and ventilating fans of all kinds.

Controllers.

Printing Press and Blower Motor Controllers for all applications, hand operated, semiautomatic and full automatic. Sizes from ¼ horse-power to 125 horse-power.

Dynamometers.

For testing gasoline engines and the measurement of power, generated or absorbed.

Hoists.

Electric Hoists for general lifting and conveying purposes. Sizes from ¼ ton to 6 tons.

Monorail Cranes.

For the economical transportation of heavy material about the plant. A number of cranes may be used on the same track system, provided the necessary switches and turnouts are supplied.

Winches and Winding Drums.

For pulling freight cars and heavy trucks into and out of shops, for warping vessels through drawbridges and along docks, for use in lumber yards, shipyards, etc.

Electric Storage Battery Trucks.

Rapid and economical means of handling miscellaneous loads on docks, piers, railroad terminals, and in industrial plants.

Ozonators.

A successful device for removing objectionable odors in department stores, restaurants, markets, cold storage warehouses, offices, etc. The use of ozone as an adjunct to ventilation is rapidly becoming recognized.

Armored Hose.

Rubber Hose encased in a flexible steel armor to protect it from external injury and prolong its service. Made for steam, air and water. Used in engineering projects, excavating operations, power plants, etc.

WESTINGHOUSE ELECTRIC & MFG. CO.

Manufacturers of Apparatus for the Generation, Application and Control of Electric Power

EAST PITTSBURGH, PA.

FOR DISTRICT SALES OFFICES, SERVICE DEPARTMENT REPAIR SHOPS, AND WESTINGHOUSE AGENT-JOBBERS, SEE PAGE 1344

Products. PAGE

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- BELT DRIVEN GENERATORS....1337-38
- STEAM OR GAS ENGINE DRIVEN GENERATORS....1338

SWITCHBOARD....1338
SWITCHBOARD METERS....1339
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- FOR FANS AND BLOWERS....1339
- FOR OPERATING ELEVATORS....1339
- FOR DRIVING PUMPS....1340
- FOR DRIVING VACUUM CLEANER SYSTEMS....1340
- FOR DRIVING LAUNDRY EQUIPMENT....1340
- FOR DRIVING ICE AND REFRIGERATING MACHINES....1340

FLAME CARBON LAMPS:
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ALSO, AUTOMOBILE EQUIPMENTS: ELECTRIC STARTING, LIGHTING AND IGNITION; INSULATING MATERIAL; ROTARY CONVERTERS; TRANSFORMERS; VULCANIZERS; WELDING OUTFITS, ELECTRIC ARC; WATER-WHEEL GENERATORS.

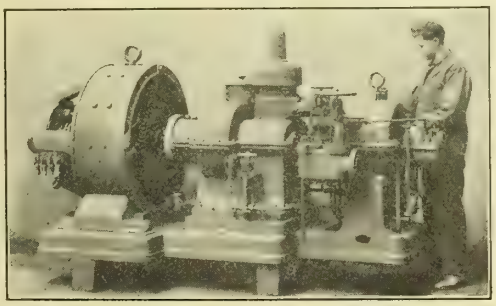
Co-operative Service.

Architects and engineers are invited to use the facilities of our Engineering and Sales Departments in the planning and selection of material and electrical equipment to solve special problems.

TRADE-MARK

Steam Turbine Generating Sets.

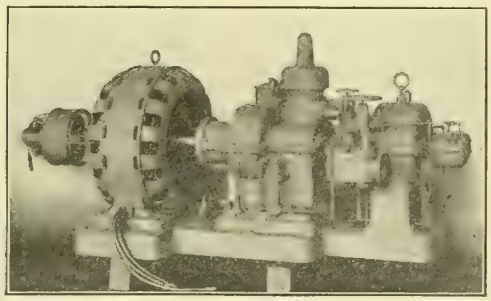
Direct-Current Engine-Type Generators, Type Q—Cool operation, ability to withstand heavy loads, and sparkless commutation from no load to heavy overloads with a fixed brush position, are identifying features of Type Q generators. Each armature is arranged for mounting on a prime mover shaft, which, together with the bearings, is furnished by the builder of the engine. The field structure is designed for mounting on the prime mover bed-plate or sole-plates set in masonry foundation.



STEAM TURBINE GENERATOR—DIRECT CURRENT

Alternating - Current Engine-Type Generators, Type E—The many years of practical experience of the Westinghouse Company in the design and construction of various types of alternators of all capacities and speeds have been embodied in Type E generators, which constitute a standard line of 60-cycle alternators.

These generators are applicable to all prime movers, being suitable for direct connection to steam, gas or oil engines, or slow-speed horizontal water-wheels.



STEAM TURBINE GENERATOR—ALTERNATING CURRENT

Belt-Driven Alternators, Type G—Small central stations and industrial plants requiring belt-driven alternators will find the Type G line of 60-cycle generators especially well adapted to this service. More than a thousand of these machines are in successful operation.

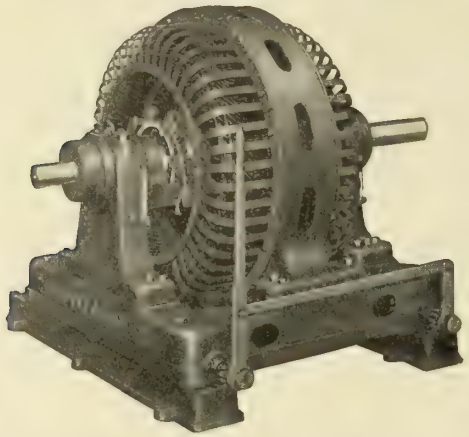
They are highly efficient at all loads, well ventilated, simple in electrical and mechanical construction, made of high-grade materials throughout and very rugged; also economical to operate and maintain.

DATA ON STEAM TURBINE GENERATING SETS

Capacity, Kw.	Over-all Dimensions: Length, Ft.	Ins.	Width, Ft.	Ins.	Height, Ft.	Ins.	Size of Pipe, Inches: Steam	Exhaust	Number 40-Watt Lamps, 125 Volts
	DIRECT CURRENT								
1		35		13		18	1/2		1
15	5	35 5/8		34 3/8		30 7/8	3 3/8		5
25	5	41 1/4	3	0		32 1/2	3 3/8		5
50	6	10	3	7 5/16	3	1 1/8	3 3/8		5
75	9	4 1/4	3	10	4	8	3		8
100	9	2 1/2	3	10	4	8	3		8
	ALTERNATING CURRENT								
30	7	2 1/2	3	5		34 3/8	2		5
75	10	1	3	11 3/4	4	5	3		8
100	10	6 5/8	4	2 3/4	4	8	3		8
150	10	10 7/8	4	8 1/2	4	8	3		8
200	12	7 1/2	5	6 1/2	5	1 1/2	5		12

Larger sizes upon application.

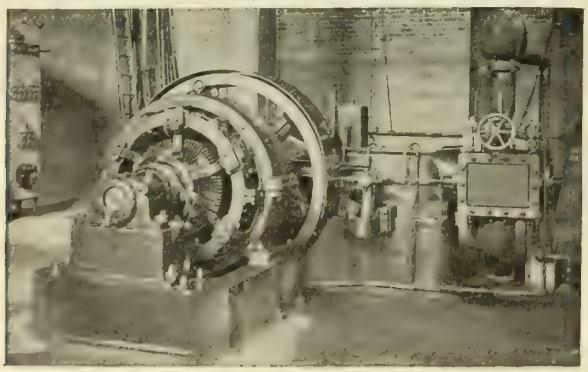
Continued on next page



BELT-DRIVEN GENERATOR, TYPE G

DATA

Capacity, Kw.	Over-all Dimensions, Inches			Speed, R. P. M.	No.40-Watt Lamps, 125 Volts
	Length	Width	Height		
Direct Current					
1½	29 11/16	15	18 15/16	1390	38
5	37 1/16	17 5/8	22 3/4	1120	125
9	37 9/16	18 1/2	23 9/16	1700	225
12½	41 3/4	22 5/8	27 11/16	1350	363
25	50	27 7/8	34 1/16	1150	625
30	53 7/16	29 1/2	37 11/16	1090	750
50	64 1/2	36	45 7/16	835	1250
75	69 3/4	36 3/8	46 3/8	900	1875
100	75 5/16	39 3/8	49 3/8	900	2500
Alternating Current					
25	39	31	26	1800	625
50	45	39	37	1200	1250
62.5	47	42	39	1200	1563
100	47	42	39	1200	2500
125	55	48	48	900	3125
187	70	57	48	900	4700
250	88	74	67	600	6250



GENERATOR DIRECT-CONNECTED TO STEAM ENGINE

DATA

Capacity, Kw.	Over-all Dimensions, Inches			Speed R. P. M.	No.40-Watt Lamps, 125 Volts
	Length	Width	Height		
Steam Engine—Direct Current					
25	38 1/2	24 1/2	44 3/8	295-325	625
50	43	32	43 1/2	275-300	1250
100	53	45 1/2	52 1/4	250-275	2500
Steam Engine—Alternating Current					
62.5	55	53	49	300	1563
75	58	59	56	277	1875
100	58	59	56	300	2500
Gas Engine—Direct Current					
50	47 3/4	41 1/2	48 1/4	200-220	1200
100	59	47 1/2	52 1/4	250-275	2500
Gas Engine—Alternating Current					
62.5	55	53	49	300	1563
100	82	72	77	140	2500
225	121	83	105	120	5625

Switchboards.

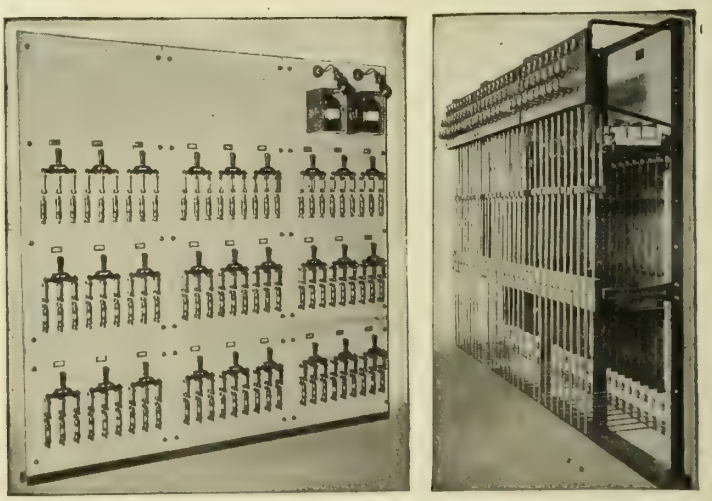
General—Switchboards are built by the Westinghouse Electric & Mfg. Co. to cover all requirements from the smallest plant to the largest. They are built to conform to the specifications of the architect or engineer where necessary; but in order to save the time of the designer, a complete assortment of switchboard panels has been standardized.

To make up a switchboard for any desired installation, all that is necessary is to select the panels for the required purposes. All panels bearing the same type designation match up in appearance and in the alignment of apparatus, and can be combined to form a complete switchboard.

Special care is taken with the arrangement of apparatus on both the front and the rear of panels. Apparatus on the front is arranged with special reference to the convenience of operation, and apparatus on the rear, to provide access to all connections. The rear of a Westinghouse switchboard is arranged as neatly as the front.

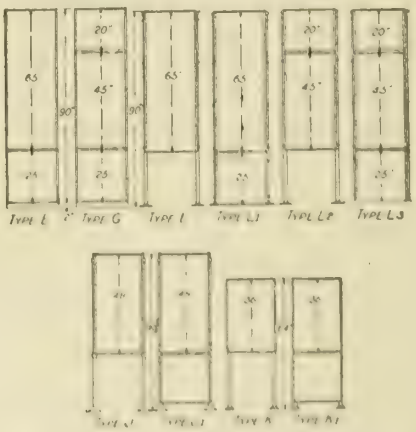
Finish—Standard finish is a dull velvety black. Any special finish can be had on order. Current-carrying parts on front of panel are polished copper.

Delivery—On any standard panel listed in the Westinghouse Catalogue delivery can be made within fifteen days of receipt of order. Special features require longer time for delivery.



Front View Rear View

SWITCHBOARD OF FIDELITY SAVINGS AND TRUST COMPANY, BALTIMORE, MD.



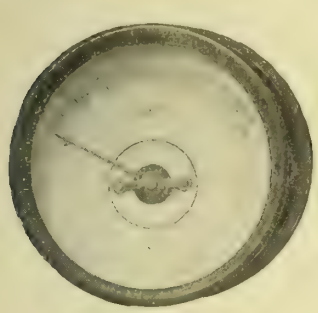
OVER-ALL DIMENSIONS OF SWITCHBOARD FRAMES

Note—The type does not cover width, thickness or material of slabs

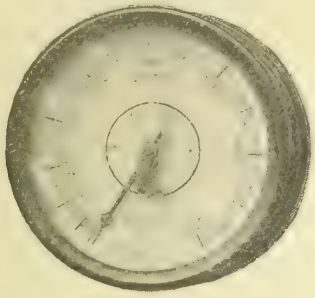
Continued on next page

Meters.

A distinct advance was made in switchboard meter practice when the Westinghouse 7-inch round pattern meters were placed on the market. These meters can be enclosed in a rectangle of fifty-five square inches, and have scales fourteen and one half inches long. These scales are as long as the largest types of meters of other manufacturers and yet occupy no more switch-



TYPE SL 7-INCH DIRECT-CURRENT VOLTMETER



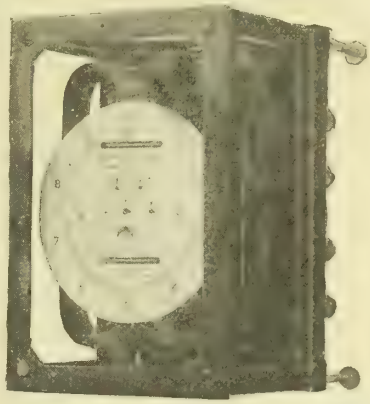
TYPE SM 7-INCH ALTERNATING-CURRENT AMMETER

board space than the smallest types of edgewise meters, which have scales only six inches long. The scales of these 7-inch meters are twice as long as the scales of 9½-inch meters of other makes.

The 7-inch meter permits of great saving in switchboard area and floor space, as it is possible to mount two meters in a horizontal line, on a 16-inch panel, or three on a 24-inch panel. This is impossible with any other practical type of meter.

TYPE CW-6 DIRECT-CURRENT WATT-HOUR METER

The WESTINGHOUSE ELECTRIC & MFG. Co. is the only manufacturer able to offer a complete line of 7-inch meters for both alternating and direct current. These meters are of uniform size, thus permitting mounting side by side, which result in a most pleasing design with no irregularities and incongruities. They have a high degree of accuracy and permanence of calibration. In addition to the long scales, facility in reading is enhanced by the flat glass front. This makes illumination of the dial possible without the troublesome reflections found in the curved covers of meters of edgewise types, and makes the whole pointer visible, rendering it possible to take accurate readings from a distance and from any angle.



TYPE C, POLYPHASE SWITCHBOARD METER, GLASS COVER

The Company manufactures also a complete line of portable meters, watt-hour meters and graphic meters. Full details obtained from the regular catalogues.

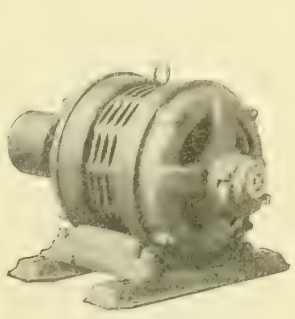
TYPE U, PORTABLE GRAPHIC METER

Westinghouse Motors.

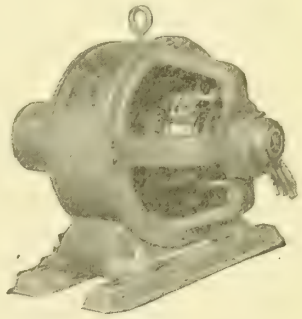
Westinghouse motors and control are supplied for practically all machines within the architect's field of activity. Special motors have been developed for certain specialized service. Others, for more general service where no special characteristics are required, can be applied to a wide variety of machines. They can be mounted directly on the machine or on the floor, wall or ceiling, and may be belted, geared or direct-connected to the driven machine. For special cases above one and one half horse-power vertical motors may be supplied.

If the architect states in his specification the exact service under which the motor is to be operated, a Westinghouse motor and controller which perfectly fit the conditions will be furnished.

Engineering Co-operation and Data Sheets—Assistance will be gladly given in selecting the proper motor and controller for any application. The experience of Westinghouse engineers, gained through designing in many different motor applications is at the architect's disposal. Prices supplied on request.



Alternating Current



Direct Current

WESTINGHOUSE MOTORS

Motors for Driving Fans and Blowers—A line of Westinghouse motors has been specially designed for ventilating fans and blowers of any type and size. Some of their features are quiet operation, cleanliness, economy in the use of current and reliability. For small ventilating outfits see pages 1340-41.

VENTILATING FAN DRIVEN BY WESTINGHOUSE MOTOR

For Operating Elevators—Westinghouse elevator motors and controllers have been specially designed and built for elevators of all types, high- and moderate-speed passenger and low-speed freight elevators. They are quiet in operation, start the car quickly but smoothly, and permit exact stops without jolts. They give reliable operation with very little attention, not only when new but after years of service.

Direct-current motors commutate sparklessly. They are furnished in several classes in order to suit the different kinds of service; squirrel-cage alternating-current motors are supplied in sizes up to twenty horse-power, and slip-ring alternating-current motors in all capacities required for the service.

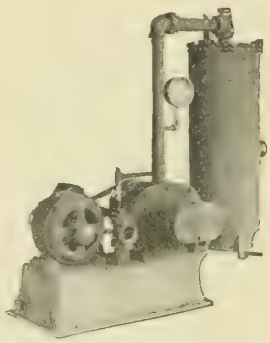
ELEVATOR MACHINERY DRIVEN BY WESTINGHOUSE MOTOR

For Operating Pumps—Westinghouse motors and control are supplied for all types of pumps and all classes of pumping service, including centrifugal, triplex, duplex, single-acting, deep-well and fire pumps. Special protection from moisture may be given where

HOUSE PUMP DRIVEN BY WESTINGHOUSE MOTOR

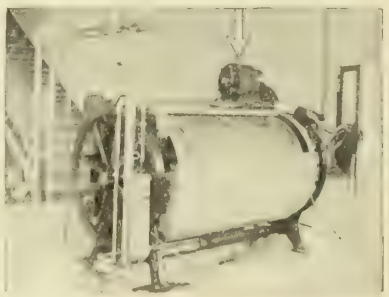
conditions require it. Automatic control permits operation to be controlled from a distance or, if desired, entirely automatically. A full line of motors is available for small house pumps.

For Driving Vacuum Cleaner Systems — Westinghouse motors for driving vacuum cleaners can be operated successfully by unskilled operators. This service has been carefully studied by the WESTINGHOUSE ELECTRIC & MFG. CO. Most manufacturers of vacuum cleaners supply their machines complete with motors attached.



VACUUM CLEANER EQUIPMENT DRIVEN BY WESTINGHOUSE MOTOR

For Driving Laundry Equipments—The moist atmosphere of the laundry, the presence of dripping water, and the want of technical knowledge on the part of the operators make laundry service especially severe for electric motors. Westinghouse laundry machine motors are adapted in every respect for their purpose, as is proved by the fact that the leading laundry machine manufacturers have standardized their use.



LAUNDRY EQUIPMENT DRIVEN BY WESTINGHOUSE MOTOR

75 H.P. WESTINGHOUSE DIRECT CURRENT MOTOR DRIVING 100 TON REFRIGERATING MACHINE

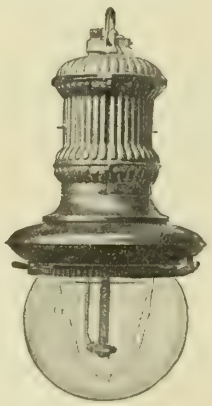
For Driving Ice and Refrigerating Machines—Westinghouse motors can be supplied for driving all types and sizes of ice and refrigerating machines from any power circuit. These motors are characterized by high efficiency and great reliability.

Flame-Carbon Arc Lamps.

Flame-carbon arc lamps are well known for their intense and efficient illumination. The Westinghouse lamps have these desirable characteristics, and in addition give uniform distribution and burning life of carbons of somewhat over 100 hours, thus securing low maintenance cost.

The carbons are arranged vertically, and thus produce maximum candle-power close to the horizontal plane. The distribution is modified, however, in such a mannner that it gives a remarkably uniform, shadowless illumination. All magnetic fields are well compensated, and a very steady arc with even burning is obtained.

Color of Light — Either white- or yellow-light carbons can be used. For street lighting white-light carbons give an intense illumination that closely approximates daylight.

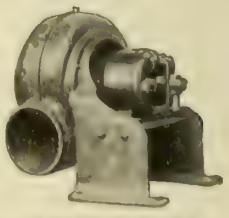


FLAME-CARBON ARC LIGHT

PILLAR FLAME-CARBON ARC LAMP MOUNTED ON POST

Westinghouse-Sirocco Blowers.

Westinghouse-Sirocco blowers are especially adapted for use in connection with a system of piping, or where there is some resistance to the passage of the air. They should be used where the exhausted air contains smoke, fumes, dust, etc., as the air does not pass through the motor windings.



WESTINGHOUSE-SIROCCO BLOWER

DATA ON WESTINGHOUSE-SIROCCO BLOWER

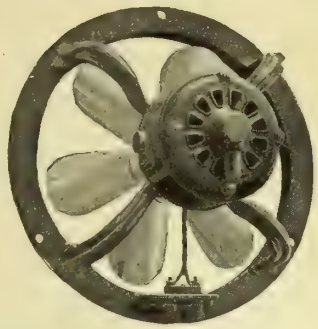
Horse-power	Over-all Dimensions				Cu. Ft. Air per Min.	Size of Pipe		Price
	Length, Ins.		Width, Ins.	Height, Ins.		Intake, Ins.	Outlet, Ins.	
	A.C.	D.C.						
1/20	10 3/4	11 3/4	8 1/2	9 1/2	175	4 5/8	3 5/8	$20 00
1/16	11 5/8	12 3/4	11 5/8	12 5/8	275	6 1/2	4 5/8	88 00
1/10	13 1/4	14 3/4	13 3/8	15 1/4	400	7 5/8	6	78 00
1/8	13 1/4	14 3/4	13 3/8	15 1/4	525	7 5/8	6	78 00
1/8	15 1/2	17 1/8	17 1/8	18 1/2	700	9 1/2	7 5/8	110 00

Voltage either 110 or 220.

Continued on next page

Westinghouse 12-and 16-inch Exhaust Fans.

These fans are for ventilation rather than cooling. They should exhaust freely, not into flues or pipes. Where there is back pressure, or where the exhausted air contains smoke, fumes, dust, etc., blowers should be used instead.



12-INCH EXHAUST FAN

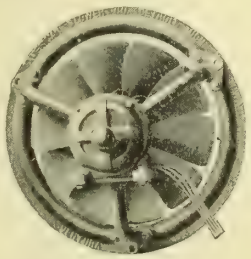
DATA ON WESTINGHOUSE EXHAUST FANS

Cycles	Blades	Over-all Dimensions, Inches. Diam.	Depth	Watts	Cu. Ft. Air per Min.	Weight, Lbs.
12-Inch Fans						
60	6	15¼	9¼	36	1000	25½
50	6	15¼	9¼	36	865	25½
40	6	15¼	9¼	31	1025	25½
25–30	4	15¼	9¼	50	670	24½
D.C.	6	15¼	9¼	24	1000	25
16-Inch Fans						
60	6	19¼	9¾	90	1820	30½
50	6	19¼	9¾	85	1570	30½
40	6	19¼	9¾	80	1820	30½
25–30	4	19¼	9¾	80	1420	29½
D.C.	6	19¼	9¾	62	1820	30

Diameter for bolt holes—12-inch fan: 13⅜ inches; 16-inch fan: 17⅛ inches.
Made for 110 and 220 volts.

Westinghouse-Ventura Exhaust Fans.

Westinghouse - Ventura fans are used for the same purpose as the exhaust fans listed above, but are made in larger sizes. The fan has ten blades so designed that it is very quiet and highly efficient, allowing no back-flow through the center of the fan. Totally enclosed motors are used.



WESTINGHOUSE-VENTURA EXHAUST FAN

DATA ON WESTINGHOUSE-VENTURA EXHAUST FANS

Size	Diam., Ins.	Depth, Ins. A.C.	D.C.	Diam. for Bolts, Ins.	Cu. ft. Air per Min.	Horse-power
3½	25⅜	11 $^{8}/_{16}$	12 $^{5}/_{8}$	23 $^{13}/_{16}$	1860	.085
4	28	12	14 $^{1}/_{32}$	26 $^{5}/_{8}$	2770	.110
5	34¼	13 $^{5}/_{16}$	15 $^{13}/_{32}$	32 $^{7}/_{8}$	4420	.170
6	40⅛	15 $^{5}/_{16}$	17 $^{13}/_{32}$	38½	6530	.260

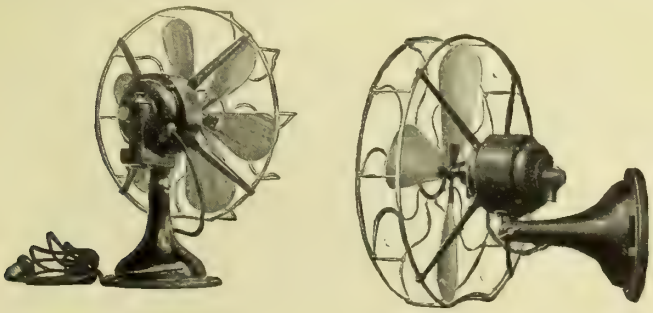
Voltages 110 to 230.

Desk, Bracket and Ceiling Fans.

Stationary Fans—The stationary fans can be tilted forward fifteen degrees, backward ninety degrees (for bracket mounting), and rotated three hundred and forty degrees. A wing nut clamps all adjustments.

Oscillating Fans—The oscillating mechanism is geared through a ball clutch which lets the oscillation stop when the fan strikes an obstruction. Cannot drop oil. Oscillates over forty-five or ninety degrees, as desired. Fan can be tilted twenty degrees forward when arranged either for upright or for bracket mounting. Oscillation can be stopped or started with the fan running.

"Silent-Six" Fans—Six-blade fans are quieter than four-blade fans because they run at lower speed; but they deliver the same volume of breeze.



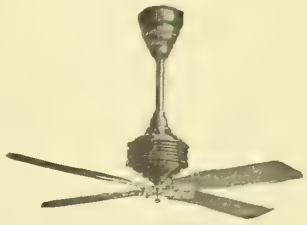
DESK AND BRACKET FANS

DATA ON DESK AND BRACKET FANS

Diam., Ins.	Stationary Blades	Watts	Weight, Lbs.	Approx. Price	Oscillating Watts	Weight, Lbs.	Approx. Price
60-cycle Alternating-Current Fans							
8	4	23	6	$9.50	..	..	..
12	4	42	15	14.10	44	17	$18.20
12	6	42	15½	14.80	44	17½	18.70
16	4	75	19	17.10	77	21	21.70
16	6	75	19½	18.20	77	21½	22.70
Direct-Current Fans							
8	4	24	4½	8.80	..	..	..
12	4	25	13	12.70	27	15	16.60
12	6	30	13½	13.30	32	15½	17.10
16	4	63	16	14.80	65	18	19.90
16	6	63	16½	16.00	65	18½	20.90

Made also for 50-, 40-, and 25- to 30-cycle alternating current.
Made for 100 to 115, and for 200 to 230 volts.
Prices given are for 100 to 115 volts.

Ceiling Fans—32-inch ceiling fans are for use in hallways, vestibules and small rooms; 56-inch and 58-inch for stores and other large interiors. Where ceiling fans cannot be used, 56-inch column fans of similar type are available, for both counter and floor mounting.



CEILING FAN

Gyrating Fans—These have been called the "Scientific Breeze Makers." They keep all the air stirring, not just a draft. Moving part rests on a ball bearing, and is revolved by mechanical drive, not by air reaction; cannot run too fast. Made in ceiling, counter-column and floor-column types. Special bearing arrangement prevents the escape of oil.

CEILING TYPE GYRATING FAN

DATA ON CEILING FANS

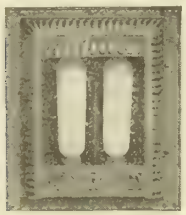
Diam., Ins.	Finish	Watts	Speeds	Approx. Price
60-cycle A.C. 4-Blade Type				
32	M	65	2	$24.70
32	W	65	1	24.70
32	B	65	1	22.20
56	M	150	3	30.75
56	B	150	2	27.70
D.C. 4-blade Type				
32	W	50	1	18.40
32	B	50	1	18.00
56	M	110	3	25.60
56	B	110	3	23.80
58	B	140	1	20.00
60-cycle A.C. Gyrating Type				
2 x 12	D	88	3	36.00
D.C. Gyrating Type				
2 x 12	D	64	1	31.50

Finishes: M—Mottled copper; W—White enamel; B—Black enamel; D—Dull black.
Made also for 50-, 40- and 25- to 30-cycle alternating current.
Made for 110 and 220 volts.
Prices are for 110 volts.

FLOOR COLUMN TYPE GYRATING FAN WITH TOP LIGHT

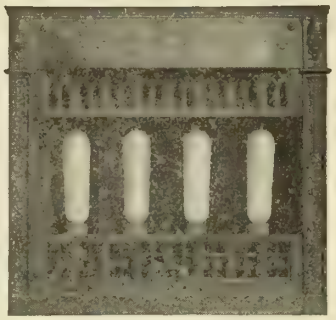
Continued on next page

Heating Devices.



SMALL LUMINOUS RADIATOR

For use in fireplaces or mounted flush in walls. Adapted for intermittent or occasional service



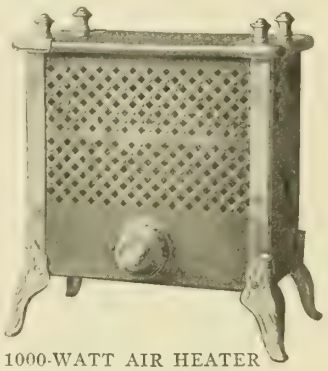
LUMINOUS RADIATOR

DATA

No. of Units	Dimensions, Ins.	Tiles	Styles Available
2	15½ x 18½	..	1
3	24 x 26	..	1
3	24 x 30	16	5
4	30 x 30	17	5

Heater units made for 250 or 500 watts each.
Voltage 100 to 125 and 200 to 250.

Air Heaters—Useful for furnishing auxiliary heat for bathrooms and halls. Also used extensively for garages, barns, scale houses, watchmen's booths, etc. They are absolutely safe, giving off no fumes and requiring no outlet.



1000-WATT AIR HEATER

DATA ON AIR HEATERS

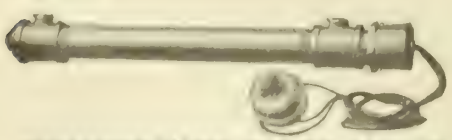
Size	Length, Ins.	Width, Ins.	Height, Ins.	Watts	Weight, Lbs.	Approx. Price
1	11¾	7¼	13⅝	1000- 500-250	7	$10 00
2	18¾	7¼	13⅝	2000-1000-500	10½	12.00
3	26¼	7¼	13⅝	3000-1500-750	14	14.00

Voltages 100 to 125 and 200 to 250.

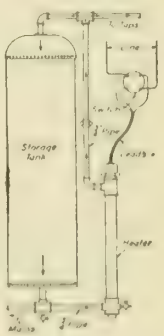
Water Heaters—The bayonet or circulation heater is adapted for hot-water storage systems, various forms of sterilizers, steam generators, and other uses of this nature.

The complete heater is provided with a pipe casing and tees arranged for ¾-inch connections by means of which it may be attached to a water system. The connections are made in the same manner as those of gas or circulation type of heater.

Supplied with six-foot flexible cord and control switch.



WESTINGHOUSE WATER HEATER, BAYONET TYPE COMPLETE



APPLICATION OF HEATER

DATA

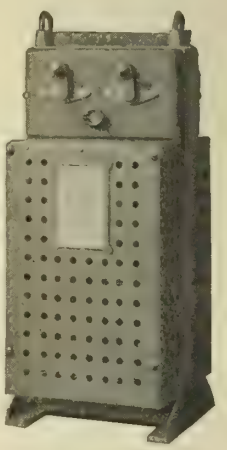
Starting	Running	Not Covered	Length, Inches
[illegible]	[illegible]	15	[illegible]
[illegible]	[illegible]	20	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2625	120	[illegible]

Select Carbon

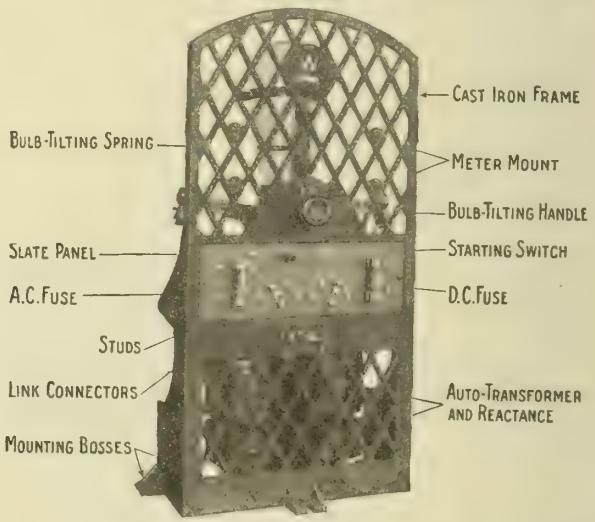
Battery Charging Outfits (Westinghouse-Cooper-Hewitt Rectifier).

These outfits are used for the purpose of changing alternating current to direct current where only alternating current is available to furnish direct current for charging storage-batteries or for any purpose.

These rectifiers are easy to install and require little space, and their first cost is low compared with that of other devices used for changing alternating current to direct current. They are very simple to operate, and have no moving parts. The regulation of current is effected by means of an auto-transformer, so that power is not wasted; the efficiency of operation is therefore high.



TYPE AA BATTERY CHARGING OUTFIT



TYPE W 30-AMPERE OUTFIT

Type AA—For charging automobile storage-batteries, automatic starting.

Type AE—For charging Edison storage-batteries, automatic starting.

Type AN—For charging automobile storage-batteries, non-automatic.

Type W—For charging battery in a private garage where the same battery will always be charged.

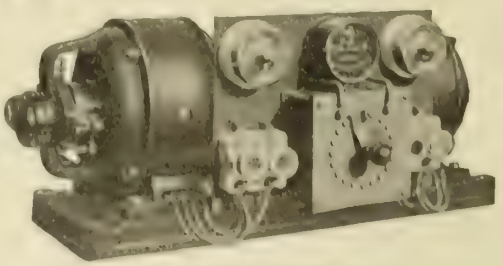
DATA ON BATTERY CHARGING OUTFITS

Type	Height, Ins.	Width, Ins.	Depth, Ins.	Number of Cells	B. C. Volts	D. C. Amperes
AA	44 7/16	18¾	18⅛	{14-32 / 20-44}	{28-85 / 40-120}	30
AE	56	21⅛	21¾	{14-32 / 20-44}	{28-85 / 40-120}	{40 / 50}
AN	44 7/16	18¾	18⅛	{14-32 / 20-44}	{28-85 / 40-120}	30
W	34½	19⅞	8¼	38-46	76-120	{15 / 30}

A. C. Voltage, 110 or 220.

Battery Charging Motor Generator Sets.

Small motor generator sets for charging batteries used for starting, lighting and ignition on gasoline



SMALL MOTOR GENERATOR

Continued on next page

cars are supplied complete, with control panel mounted directly on the frame where it occupies the minimum of space and provides the most convenient means of controlling the set. Several sizes are furnished.

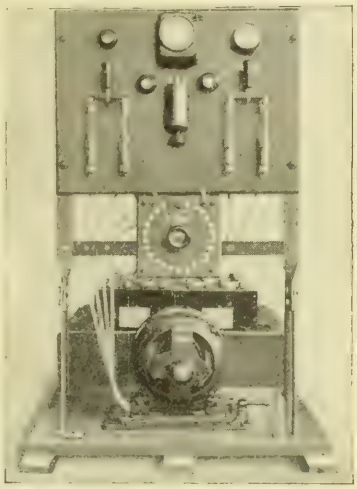
DATA ON BATTERY CHARGING MOTOR GENERATOR SETS

Set No.	Generator Full Load			Current Range with Series Rheostat Amperes	Suitable for Lead Batteries	Dimensions, Inches			Retail Price with Panel as shown
	Watts	Volts	Amperes			Height	Width	Length	
1	100	12.6–6.3	8	....	One or two 6-volt One 12-volt	7 3/8	7 1/8	15 9/16	$72.00
2	176	12.6–6.3	14	....	.....	8 5/8	7 3/4	24 11/32	84.00
3	252	31.5–18.9	8	8–3	Three, four or five 6-volt Two 12-volt and one 6-volt	10 7/16	8 5/8	25	121.00
4	441	31.5–18.9	14	14–5	One 18-volt and one 12-volt	10 7/16	8 5/8	25 5/8	137.00
5	403	50.4–37.8	8	8–3	Six, seven or eight 6-volt Three or four 12-volt	10 7/16	8 5/8	25	137.00
6	705	50.4–37.8	14	14–5	Two 18-volt and one 12-volt	11 5/16	10 1/16	30 11/16	167.00

Westinghouse Low Voltage Storage-Battery Lighting Plant.

These low voltage storage-battery plants are designed especially for lighting country residences, farms and small manufacturing plants, and may also be used for driving motors up to their capacity. Any available source of power may be used to drive them.

These sets are supplied wired complete, ready for operation when unboxed.



LOW VOLTAGE STORAGE-BATTERY LIGHTING PLANT

DATA ON LOW VOLTAGE STORAGE-BATTERY LIGHTING PLANTS

Plant No.	Battery Capacity at 8-hour Discharge Rate, Ampere Hours.	Generator		Full Load R. P. M. of Generator	H. P. of Engine Required to Operate Generator	Number of 15-Watt Lamps Operated		
		Amperes	Volts			Battery Alone Hours		Generator Alone
						5	8	
1	44	20	32–42	1700	2	18	12	42
2	78	20	32–42	1700	2	30	20	42
3	78	30	32–42	1700	3	30	20	64
4	117	30	32–42	1700	3	45	30	64

Bell Ringer.

The bell ringer connected to a 110-volt, 60-cycle lighting circuit, produces a voltage suitable for operating door bells, buzzers, annunciators, miniature incandescent lamps, or for any similar purpose for which one to fifteen dry- or wet-cell batteries are used. The transformer replaces the batteries and precludes the trouble of keeping them in condition, the expense of replacing them when worn out, and, finally, the annoyance of having the bell out of order.

BELL RINGER

Adaptability — Adapted for residences, hotels, restaurants, apartment houses, amusement halls and buildings of similar character.

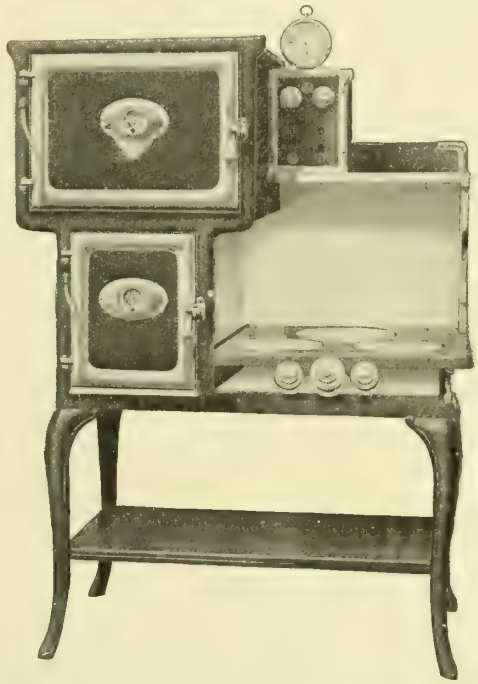
TYPE 2-19 NON-AUTOMATIC RANGE

Electric Ranges.

Electric ranges furnish the ideal means for cooking because of their absolute cleanliness and wonderful convenience.

The Westinghouse ranges are furnished with or without automatic features. In the automatic ranges the current can be turned on at a predetermined time, by proper setting of the clock, and turned off when the proper temperature has been reached, by proper setting of the thermostats on the oven doors.

All the ranges (except type 406) operate on the fireless cooker principle; that is, they require electric current only for raising the temperature to the proper cooking point, after which no further current is required, the heat insulation of the oven retaining and utilizing the stored heat for hours. This feature results in wonderful economy, and makes the electric range really practical. The stove top heaters are conveniently arranged with heat control switches, which further economize in the use of electricity.



TYPE 3-19 AUTOMATIC RANGE, NICKEL FINISH

Combination gas and electric ranges—electric ovens with gas stove tops—are also furnished for localities where the cost of electricity is high. For oven cooking, owing to the fireless cooker principle and the automatic features, electricity is as cheap as gas.

DATA ON ELECTRIC RANGES

Type	Total Watts	Length, Ins.	Height, Ins.	Depth Ins.
2-19 Automatic	6000	32	[illegible]	[illegible]
2-19 Non-automatic	6000	32	[illegible]	[illegible]
2-19 Combination	2000	32	[illegible]	[illegible]
3-19 Automatic	6800	43	[illegible]	[illegible]
3-19 Non-automatic	[illegible]	43	[illegible]	[illegible]
3-19 Combination	[illegible]	43	[illegible]	25
4-06 Non-automatic	3660	24 [illegible]	31 [illegible]	[illegible]

Continued on next page

WESTINGHOUSE ELECTRIC & MFG. CO.

EAST PITTSBURGH, PA.

DISTRICT SALES OFFICES

ATLANTA, GA.	Chandler Building
BALTIMORE, MD.	121 East Baltimore Street
BIRMINGHAM, ALA.	Brown-Marx Building
BLUEFIELD, W. VA.	Kelley-Moyer Building
BOSTON, MASS.	201 Devonshire Street
BUFFALO, N. Y.	Ellicott Square
BUTTE, MONT.	50-52 East Broadway
CHARLESTON, W. VA.	Alderson-Stephenson Building
CHARLOTTE, N. C.	American Building
CHICAGO, ILL.	111 West Washington Street
CINCINNATI, OHIO	Traction Building
CLEVELAND, OHIO	Swetland Building
COLUMBUS, OHIO	Interurban-Terminal
* DALLAS, TEX.	Cotton Exchange
DAYTON, OHIO	Reibold Building
DENVER, COLO.	Gas & Electric Building
DETROIT, MICH.	Dime Savings Bank
* EL PASO, TEX.	Mills Building
* HOUSTON, TEX.	Tel-Electric Building
INDIANAPOLIS, IND.	Traction Terminal Building
JOPLIN, MO.	Ba Som Building
KANSAS CITY, MO.	1012 Baltimore Avenue
LOS ANGELES, CAL.	I. N. Van Nuys Building
LOUISVILLE, KY.	Paul Jones Building
MEMPHIS, TENN.	Exchange Building
MILWAUKEE, WIS.	Merchants & Manufacturers Bank Building
MINNEAPOLIS, MINN.	Metropolitan Life Insurance Building
NEW ORLEANS, LA.	Maison Blanche Building
NEW YORK, N. Y. (Export)	165 Broadway
NEW YORK, N. Y. (Sales)	165 Broadway
OMAHA, NEB	1208 Harney Street
PHILADELPHIA, PA.	Widener Building
PITTSBURGH PA.	Union Bank Building
PORTLAND, ORE	Northwestern Bank Building
ROCHESTER, N. Y	Chamber of Commerce Building
ST. LOUIS, MO.	300 North Broadway
SALT LAKE CITY, UTAH	Walker Bank Building
SAN FRANCISCO, CAL.	165 Second Street
SEATTLE, WASH.	Alaska Building
SYRACUSE, N. Y.	University Building
TOLEDO, OHIO	Ohio Building
WASHINGTON, D. C.	Hibbs Building

* Westinghouse Electric & Mfg. Co. of Texas

SERVICE DEPARTMENT REPAIR SHOPS

ATLANTA, GA.	Mangum and Markham Streets
BOSTON, MASS.	37 Wormwood Street
BUFFALO, N. Y.	6-8 Lock Street
CHICAGO, ILL.	32 South Peoria Street
LOS ANGELES, CAL.	2026 Bay Street
NEW YORK, N. Y.	528 West 25th Street
PHILADELPHIA, PA.	214-220 North 22nd Street
PITTSBURGH, PA.	Amberson Avenue and Pennsylvania Railroad
SAN FRANCISCO, CAL.	1400 Fourth Street
SEATTLE, WASH.	560 First Avenue, South

WESTINGHOUSE AGENT-JOBBERS

Julius Andrae & Sons Co.	Milwaukee, Wis.
The Avery-Loeb Elec. Co.	Columbus, Ohio
Carroll Electric Co.	Washington, D. C.
Columbian Electrical Co.	St. Joseph, Mo.
Elec. R. R. & Mfgs. Supply Co.	San Francisco, Cal.
Fobes Supply Co.	Portland, Ore.
Fobes Supply Co.	Seattle, Wash.
Illinois Electric Co.	Chicago, Ill.
Illinois Electric Co.	Los Angeles, Cal.
Intermountain Elec. Co.	Salt Lake City, Utah
Lee Electric Co.	Baltimore, Md.
The McGraw Co.	Omaha, Nebr.
The McGraw Co.	Sioux City, Iowa
The Montana Electric Co.	Butte, Mont.
Northwestern Elec. Equip. Co.	New York, N. Y.
Peerless Electrical Co.	Minneapolis, Minn.
Penn Electrical Eng. Co.	Scranton, Pa.
W. M. Reay & Co.	Norfolk, Va.
H. C. Roberts Elec. Supply Co.	Philadelphia, Pa.
H. C. Roberts Elec. Supply Co.	Syracuse, N. Y.
Satterlee Electric Co.	Kansas City, Mo.
Stuart-Howland Co.	Boston, Mass.
Superior Supply Co.	Bluefield, West Va.
H. C. Tofel Elec. Co., Inc.	Louisville, Ky.
Tel-Electric Co.	Houston, Tex.
Tower-Binford Elec. & Mfg. Co.	Richmond, Va.
United Electric Co.	Wichita, Kan.
The Varney Elec. Supply Co.	Indianapolis, Minn.
The Varney Elec. Supply Co.	Evansville, Ind.
The Washington Elec. Supply Co.	Spokane, Wash.
Wooley-James Elec. Co., Inc.	Buffalo, N. Y.

U. S. LIGHT & HEAT CORPORATION

GENERAL OFFICES AND FACTORY
NIAGARA FALLS, N. Y.

BRANCH OFFICES AND SERVICE STATIONS

BOSTON	NEW YORK	WASHINGTON	BUFFALO	CLEVELAND
DETROIT	CHICAGO	ST. LOUIS	KANSAS CITY	SAN FRANCISCO

Products.

U-S-L Electric Home-Lighting Plants, equipped with Planté Batteries in Lead-lined Tanks. Pasted Plate Batteries at a lower price are optional.

Facilities.

The U-S-L factory at Niagara Falls, N. Y., is thoroughly modern and complete. The superior quality of U-S-L products is *guaranteed* by an exceptional laboratory, up-to-date manufacturing facilities, advanced methods and high standards of workmanship.

TRADE-MARK

Description.

Each plant is a storage battery, a dynamo and a switchboard, all on one base, ready for service.

The battery comes charged. All internal wiring is completely connected.

The dynamo is made by the Triumph Electric Company.

The Switchboard—The switchboard includes the best of instruments, switches and units, and is assembled by the U. S. Light & Heat Corporation.

The Battery—The battery is the main thing. For securing long service in a home-lighting plant, much dependence must be placed on the efficiency and reliability of that very important part of the plant. Forcible reasons why U-S-L Planté batteries are superior to all other types for home-lighting purposes are given on this and succeeding page.

Installation—All that is required to install a U-S-L plant:

(1) To remove top of shipping crate.

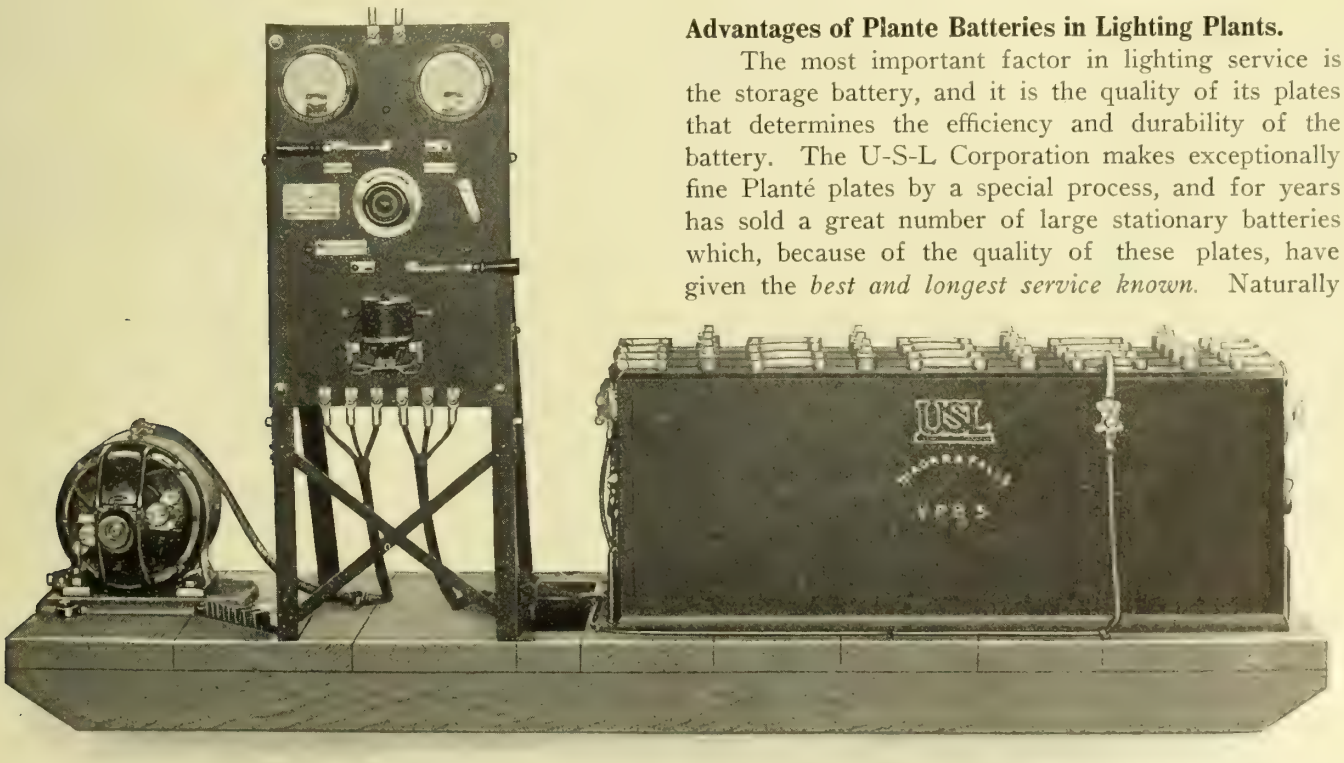
(2) To slide plant into position (skids of the base being for that purpose).

(3) To connect two wires from the lighting circuit to terminals plainly marked on the switchboard.

(4) To throw belt from a gasoline engine over the dynamo pulley.

Advantages of Plante Batteries in Lighting Plants.

The most important factor in lighting service is the storage battery, and it is the quality of its plates that determines the efficiency and durability of the battery. The U-S-L Corporation makes exceptionally fine Planté plates by a special process, and for years has sold a great number of large stationary batteries which, because of the quality of these plates, have given the *best and longest service known.* Naturally



A COMPLETE HOME-LIGHTING PLANT ON ONE BASE

Continued on next page

many battery-wise people installed sections of such batteries for small lighting service. For the assurance of the service that they knew only U-S-L Planté batteries could give, they gladly paid not only the price of the battery, but also the extra expense caused by the fact that these batteries were assembled in glass jars, and hence had to be shipped knocked-down, which involved many packing crates, considerable freight charges, and finally the expenses and wages of an expert for several days to install the plant. Those who knew were willing to pay extra for U-S-L service.

Now for the first time the U-S-L Corporation offers you a unit plant with a Planté battery in unbreakable, lead-lined tanks; a new battery which not only retains the quality plates of the large U-S-L stationary batteries, but also is assembled at the factory, and is proof against rough handling, so that the plant as a complete unit can be shipped in one crate and, above all, be installed by the customer, easily, quickly, and without expense. Assembling the Planté plates in substantial wood tanks with lead linings as permanent containers, at the factory, secures the most rugged, durable battery that can be made. Three-inch space below plates makes washing unnecessary for several years.

The rubber jars sometimes used in home-lighting batteries are fragile, apt to be broken in shipment and handling, involve renewal expense, and are only a half-way solution of the customer's problem.

U-S-L home-lighting batteries with U-S-L Planté plates will last three times as long as any pasted plate battery. Working side by side in the same service with a U-S-L Planté battery, an ordinary pasted plate battery will have to be renewed three times during the life of the U-S-L. The U-S-L is the only unit plant home-lighting battery with Planté plates on the market. Furthermore, in any service no other Planté plates compare with the U-S-L Planté plates for durability.

Note that we have supplemented our list of Planté battery plants with two plants having pasted plate batteries. These pasted plate batteries employ exactly the same size tanks that two of the Planté batteries do. Because they are thinner, more pasted plates can be assembled in a tank of given size than Planté plates, and therefore offer greater capacity in a given tank, although shorter life. A pasted plate battery is cheaper than a Planté battery of equal capacity. We thus offer the public two plants with U-S-L pasted plates, which will give the best service procurable from any pasted plates made, in competition as to price with the ordinary plants offered by other makers. The U-S-L batteries, of course offer the unique advantage of lead-lined tanks. When considering price, remember that in regard to quality, long life, and real economy there is no competition with U-S-L Planté batteries.

No Complicated Devices—The switchboard and dynamo embody quality and utility and will do their work thoroughly well without the cost of fancy trimmings, or the troubles due to complicated automatic devices.

The wiring between battery, switchboard and dynamo is completed, the battery is charged, and the plant, self-contained on its permanent base, leaves the U-S-L factory ready for business.

Electric Cranking of Engine.

Electric cranking of engine is a feature of U-S-L plants. Close starting switch, and dynamo will spin engine. When engine begins to operate, open switch. There is a limit to the size of engine which dynamo will thus start. Each of the dynamos shown below will easily spin a good make of gasoline engine on horsepower shown opposite. When customer desires an engine of no greater power than enough to operate the lighting plant, we recommend that he procure engine of size here indicated to drive the corresponding dynamo.

¾ H. P. Engine for ⅜ K. W. Dynamo of 1400 R. P. M. operative speed
1½ H. P. Engine for ¾ K. W. Dynamo of 1700 R. P. M. operative speed
3 H. P. Engine for 1½ K. W. Dynamo of 1650 R. P. M. operative speed

Engine Speed and Pulley.

The dynamo must be run at least as fast as a certain speed to enable it to give its rated output. Therefore it is essential to take into consideration the speed of the engine and to see to it that the diameter of engine pulley is such that the engine will drive dynamo at proper speed.

See "Speeds of Dynamos" in revolutions per minute and "Diameters of Dynamo Pulleys" in inches in table on following page.

To find required diameter of engine pulley.

Let P_E = diam. of Engine Pulley in inches.
Let P_D = diam. of Dynamo Pulley in inches.
Let R_E = Revolutions per minute of Engine.
Let R_D = Revolutions per minute of Dynamo.

Then $P_E = \frac{P_D \times R_D}{R_E}$

EXAMPLE

Given diam. of Dynamo Pulley = 3"
Given revs. per min. of Engine = 5000
Given revs. per min. of Dynamo = 170

Ans. $P_E = \frac{3 \times 1700}{500} = 10.1\ 5''$

It will hardly be possible to secure a pulley of such a size. Therefore take the next larger standard size procurable. In all cases where an engine pulley figures out to an odd size, take a larger standard size. Better run dynamo a little above speed than below. Belt slippage may cause some loss of speed. Sometimes customer already has an engine, so that it would be cheaper to arrange for a special dynamo pulley in case engine pulley is not such as to give dynamo the proper speed.

Then Required Diameter in inches of Dynamo Pulley = $P_D = \frac{P_E \times R_E}{R_D}$

In case of dynamo pulley, take next size smaller, when diameter figures out to an odd size.

Be sure to run dynamo fast enough to give sufficient voltage.

Continued on next Page

Selection of a U-S-L Plant.

The table opposite is based on the number of lamps to be turned on at any one time, and the number of hours such a group of lamps would be operated on one battery charge. For example, plant C will operate twenty-four twenty watt lamps for eight hours. This service might be distributed to run six lamps for four hours per night for at least eight nights on one charge. Often only two or three lamps will be operated at one time. The essential thing is to select a plant large enough to meet the maximum demand. U-S-L home-lighting plants permit charging battery and operating several lamps at same time.

Wiring.

Where distance between switchboard and lamps does not exceed one hundred feet use No. 8 wire with plants A and B, and No. 6 wire with plants C, D and E. This will insure proper voltage at lamps, and brilliant lighting.

Batteries in Glass Jars.

This Company manufactures batteries in every variety and size. For large installations, batteries in glass jars are generally used. See Bulletin No. 110. Certain sizes of cells can be supplied, charged and sealed ready for service.

Packing Charges.

$5.00 on plant A; $7.50 on plants B, C, D and E.

Syringe Hydrometer.

Furnished complete in case, list price, $6.00, extra.

Prices.

F. o. b. U-S-L factory, Niagara Falls, N. Y.

CAPACITIES OF U-S-L HOME LIGHTING PLANTS*

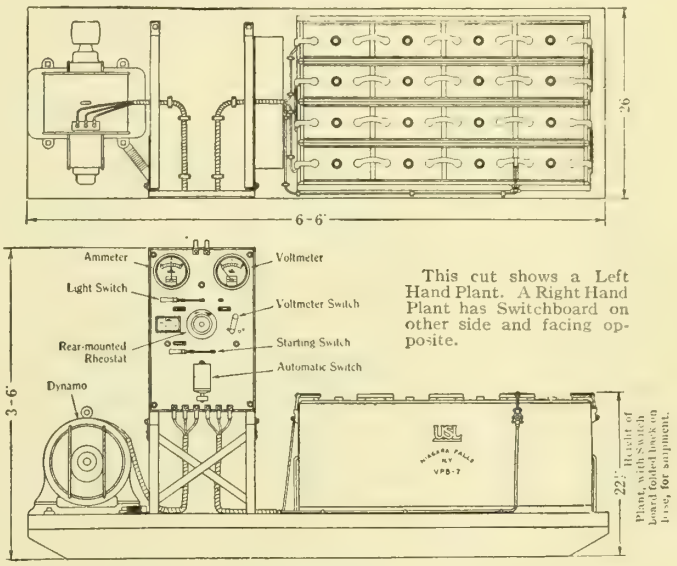
On One Charge of 16-Cell Batteries

Type of Plant	Size of Battery	Ampere-hour Capacity at 8 hour Rate	Capacities in Amperes for				Numbers of 12 C. P. 15 Watt Tungsten Lamps — Plant will carry for			Numbers of 16 C. P. 20 Watt Tungsten Lamps — Plant will carry for			†List Prices 4-Cell Tanks of Batteries
			3 hrs.	5 hrs.	8 hrs.	16 hrs.	3 hrs.	5 hrs.	8 hrs.	3 hrs.	5 hrs.	8 hrs.	
A	U P B—7	60	15	10	7.5	4 3/8	31	22	16	24	16	12	$53.00
B	V P B—5	80	20	14	10	5 3/4	42	30	21	32	22	16	50.00
C	V P B—7	120	30	21	15	8 3/4	64	44	32	48	33	24	60.00
D	C L P B—7	120	40	21	15	8 3/4	64	44	32	48	33	24	52.50
E	C L P B—9	160	40	28	20	11 1/2	84	60	42	64	44	32	60.00

Normal charging rates same as 8 hour discharge rate.

*In terms of 12 candle-power, 15 watt, 30-volt Tungsten lamps and 16 candle-power, 20 watt, 30-volt Tungsten lamps.

†Note that each of the prices as shown in table above is for a 4-cell tank. Four of such tanks are required for a 16-cell battery as used on one of these 30-volt plants. Packing charges on these separate batteries will be billed at cost.



A TYPICAL INSTALLATION OF A U-S-L HOME-LIGHTING PLANT

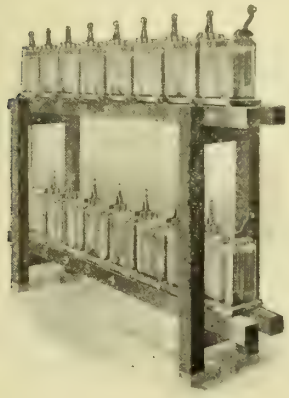
Side elevation and top view

LIST PRICES OF PLANTS AND DATA ON EQUIPMENT

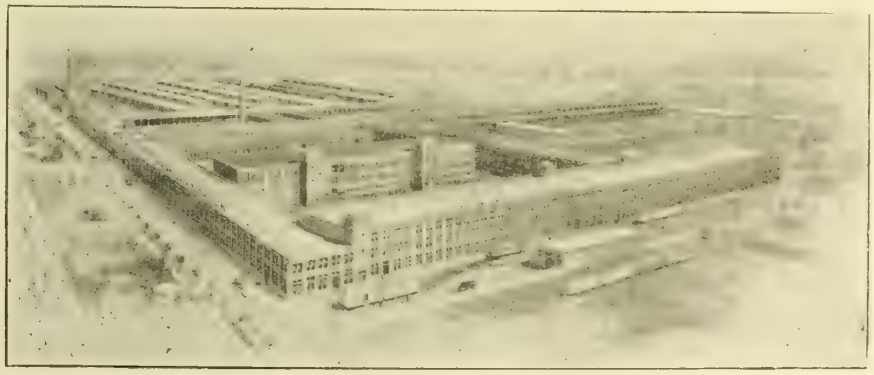
All Switchboards are of 30 Ampere Capacity. All Wood Bases are 26 in. by 6 ft. 6 in.

Type Nos. of Plants	Sizes of Batteries	42 Volt Dynamos regularly included as shown — Capacities in K. W.	Capacities — Numbers 20 Watt Mazda Lamps	Operating Speeds, R.P.M.	Sizes Pulleys, Inches — Diam.	Face	†List Prices of Dynamos Purchased Separate	List Prices of Plants — †Less Dynamos	Complete	Shipping Weights of Complete Plants, Lbs.
A	UPB–7	3/8	14	1400	3	2 1/2	$82.50	$355	$425	1220
B	VPB–5	3/4	28	1700	3	2 1/2	120.00	345	450	1485
C	VPB–7	3/4	28	1700	3	2 1/2	120.00	385	490	1670
*D	*CLPB–7	3/4	28	1700	3	2 1/2	120.00	355	460	1540
*E	*CLPB–9	1 1/2	56	1650	4	3 1/2	150.00	385	520	1660

*Plants D and F have Pasted Plate Batteries. †Listed thus so purchaser can substitute a dynamo of different capacity for one regularly assembled with plant—this will change list price of complete plant by amount equal to difference between list prices of the two dynamos.



TYPE V-7. BATTERY OF SIXTEEN CELLS



U-S-L PLANT AT NIAGARA FALLS, N. Y.
Greatest Storage Battery Factory in the World

AMERICAN STEEL & WIRE CO.

MANUFACTURERS OF

Electrical Wires and Cables

CHICAGO NEW YORK PITTSBURGH CLEVELAND DENVER

EXPORT REPRESENTATIVES, United States Steel Products Company, New York

PACIFIC COAST REPRESENTATIVES, United States Steel Products Company, San Francisco, Los Angeles, Portland, Seattle

Products.

We manufacture Bare Copper Wires and Cables for Telegraph, Telephone, Street-Railway and Long-Distance Power Transmission purposes; also, Insulated Wire of all kinds, such as Weatherproof Wires and Cables for Arc Lighting and Street-Railway Feeders, Slow-Burning Wires for Mill Construction; Magnet, Office and Annunciator Wires, Lamp Cord, Submarine Cables, Car Wires, together with all kinds of Rubber Wires for the interior wiring of offices and buildings; Ignition Wire for autos and motor boats; Signal Wire for railway service.

We are also manufacturers of Lead-Incased Cables for underground service, the same being insulated with either rubber or paper or varnished cambric for electric lighting or power.

SOLID CONDUCTOR "AMERICORE" RUBBER-COVERED BRAIDED WIRE

Fulfilling National Code Specifications, with varying thicknesses of rubber, according to required working voltage

STRANDED "AMERICORE" RUBBER-COVERED DOUBLE-BRAIDED WHITE FIREPROOF-FINISHED CABLE

For station wiring, car wiring, and other places where a wire impervious to flame is required

Description of Electrical Wires and Cables.

The cuts shown herewith illustrate a few of the many varieties of Electrical Wires and Cables made by the American Steel & Wire Company.

TELEPHONE WIRE

"Amerite" Rubber-Covered and Signal Wires.

We present this new wire as the result of many years of exhaustive research and test under service conditions assuring the greatest efficiency over the longest period of usage.

The specifications of this wire are adequate for the most extreme requirements of indoor use in high-class structures, as well as for the most exacting outdoor exposure.

FLEXIBLE CONDUCTOR TWIN "AMERICORE" RUBBER-COVERED MINING MACHINE CABLE

Made to National Code Specifications, and also insulated for special requirements

"Americore" Rubber-Covered Wire.

The quality of "Americore" Wire is such as to make it an absolute standard for interior wiring, and to give the best possible fire protection.

Every foot is carefully inspected by us in the various stages of manufacture, and, when completed, is finally examined and labeled under the direction of the Underwriters' Laboratories.

We are prepared to furnish this wire in all sizes of conductors, both solid and flexible, from warehouses conveniently located for quick delivery to all parts of the country.

Send for Booklets, fully describing

SOLID CONDUCTOR TRIPLE-BRAIDED RELIANCE WEATHER-PROOF WIRE

For general power-house equipment and street-railway use

STRANDED TRIPLE-BRAIDED RELIANCE WEATHER-PROOF CABLE

For street-railway and general power-line equipment

Continued on next page

SOLID CONDUCTOR "AMERICORE" RUBBER-COVERED TAPED AND LEAD-INCASED WIRE

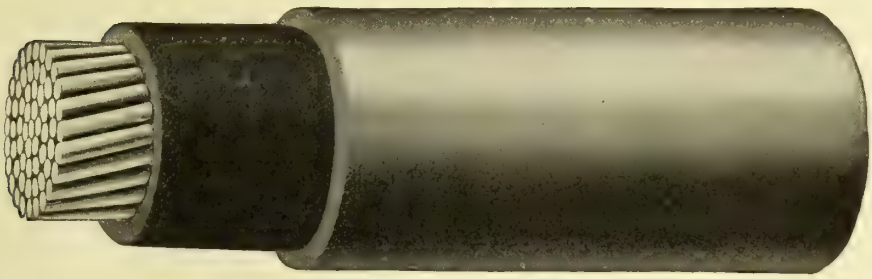
For underground use. Thickness of rubber and lead varying with requirements

THREE-CONDUCTOR PAPER-INSULATED, LEAD-INCASED CABLE

For underground use. Always made to specifications

SOLID CONDUCTOR TWIN "AMERICORE" RUBBER-LEAD-INCASED CABLE

Varying thicknesses of rubber and lead, as required

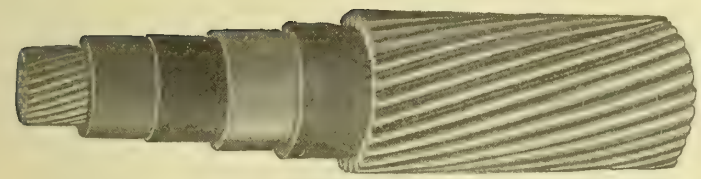


STRANDED CONDUCTOR "AMERICORE" RUBBER-COVERED TAPED AND LEAD-INCASED CABLE

National Code thickness of rubber as well as heavier thicknesses for special voltages, both ordinary black finish and fireproof finish, for station wiring and general use

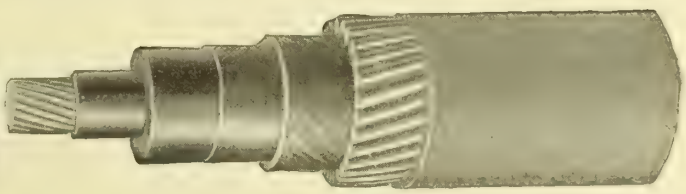
STRANDED CONDUCTOR VARNISHED CAMBRIC LEAD-INCASED CABLE

For underground use. Varying thicknesses of cambric according to working voltage



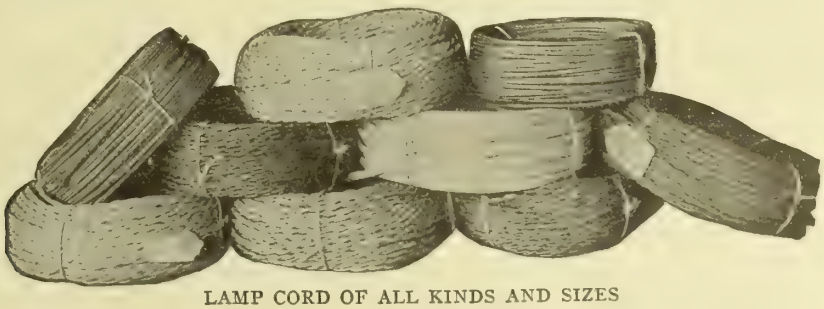
STANDARD CONDUCTOR "AMERICORE" RUBBER-COVERED TAPED, LEAD-INCASED, JUTED AND ARMORED SUBMARINE CABLE

Made to specifications as to thickness of rubber, lead and size of armoring



SPECIALLY CONSTRUCTED SUBMARINE CABLE

Lead sheath being omitted, and a heavy serving of jute protecting the braid as well as the armoring wires



LAMP CORD OF ALL KINDS AND SIZES

THE ELECTRIC CABLE COMPANY

Insulated Wire and Cable

10 East 43rd Street
NEW YORK, N. Y.

FACTORY: BRIDGEPORT, CONN.

BRANCH OFFICES
CHICAGO PHILADELPHIA BOSTON CLEVELAND SAN FRANCISCO

Products.

House Wire
Fixture Wire
Drop Wire
Lamp Cord
Elevator Cable
Heater Cord
Slow-burning Wire
Brewery Cord
Theater Cable
Insulating Varnishes
Insulating Compounds
Insulating Tapes
Voltax

Also

Automobile Wire
Bridle Wire
Car Wire
Deck Cable
Dredger Cable
Mining-Machine Cable
Motor Boat Wire
Packing House Cord
Pot-Head Wire
Signal Wire
Switchboard Cable
Lighting Cable
Power Cable
Telephone Cable
Submarine Cable

ECCO
Insulated Wire
TRADE-MARK

Purpose of the Electric Cable Co.

First—To produce rubber-insulated wire of superior quality and absolute security.

Second—By unusual efficiency in manufacturing, to sell quality wire at no higher price than inferior wire.

Third—To retain our customers' confidence by fair, courteous and honest business relations.

"Ecco" Wire is the expression of this purpose.

Tests Required on "Ecco" Wire.

All "Ecco" Wire must pass eight different tests before it leaves our factory:

Test 1—Analysis of all raw materials.
Test 2—Copper wire uniformity.
Test 3—Electrical test of insulation during manufacture.
Test 4—Tensile strength of insulation.
Test 5—Stretch of insulation.
Test 6—Continuity.
Test 7—Insulation resistance.
Test 8—Voltage.

Certified Copy of Tests on Each Coil.

"Ecco" is made to perform its duty without the possibility of doubt.

The responsibility rests upon us, but that is not enough. You also should be able to know what kind of wire you are getting. That is why we furnish on request, a certified copy of the actual tests made on each coil of "Ecco" Wire. A record is kept of every foot we make.

Identification Mark.

"Ecco" is marked every three feet on the surface of the braid.

SECTION OF MARKED WIRE, "ECCO" ON BRAID EVERY THREE FEET

Each grade and gauge is likewise indicated. You can be sure of getting the wire you specify.

Heretofore there has been no readily recognized means of identifying wire. "Ecco" Marking provides the means—both before and after the wire has been put in.

Grades.

Three grades of low voltage wire are made.

"Ecco Security"—30% Pure Beni Para.

The highest grade of low voltage wire made. Every year more architects are specifying this 30% wire on their finer work.

We are strongly in favor of using 30% wire in all cases. The difference in cost is insignificant in comparison with the absolute security from leaking current and consequent fire.

Furthermore, the longer life means no labor or material cost for renewal for years. This gives 30% a real dollars-and-cents superiority over cheaper grades.

Specification—This grade should be specified by its trade name: "Ecco Security"—30% Pure Beni Para.

"Each coil to meet N. E. C. test requirements. Manufacturers to furnish certified copy of test on each coil, on request. The name, grade and gauge shall be

Continued on next page

stamped visibly on the outer surface of the braid, at points not more than three feet apart."

"Ecco Engineers" Wire.

Made in two grades of "intermediate" specifications. This wire is usually selected by architects and engineers for intermediate purposes instead of special specifications, where 30% is not required. It fills a purpose between 30% and code wire.

Specification—"Ecco Engineers" should be specified as to grades "A" or "B." "A" is slightly higher testing than "B."

"Each coil to meet N. E. C. test requirements. Manufacturer to furnish certified copy of test on each coil, on request. The name, grade and gauge shall be stamped visibly on the outer surface of the braid, at points not more than three feet apart."

"Ecco Invincible" Wire.

Made to specifications higher than the Underwriters' Code. Few architects, engineers or owners are satisfied with house wire that barely passes code requirements. There should be a wider margin of safety, and that is why we make "Ecco" better than code in these important characteristics:

(1) Ecco is tested to 2500 Volts. (Underwriters require 1500.)

(2) Resistance tested to 1800 megohms per thousand feet. (Underwriters require 1500.)

(3) Two-inch strip of "insulation" under braid stretches seven and one-half inches. (Underwriters require six inches.)

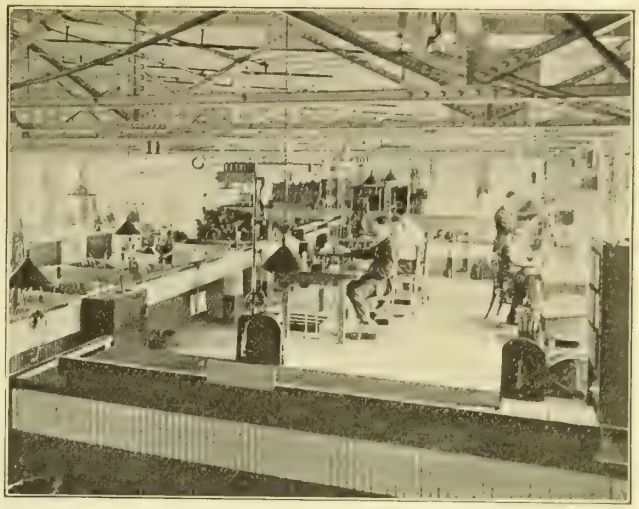
Specification—This grade should be specified as follows: "Ecco Invincible."

"Each coil to meet N. E. C. test requirements. Manufacturers to furnish certified copy of test on each coil, on request. The name, grade and gauge shall be stamped visibly on the outer surface of the braid, at points not more than three feet apart."

Further Information.

We will gladly send more detailed information concerning house wire or any of our other products.

We make "Ecco" wire for every purpose where rubber covered wire is used.



ELECTRICAL TESTING LABORATORY OF THE ELECTRIC CABLE COMPANY
Entrance to Research and Analytical Laboratories shows in the background

Our booklet "Facts" deals with wire and wiring; also contains valuable tables. Will be sent on request.

Buildings in Which Electric Cable Company's Wire Has Been Installed.

"Ecco" Insulated Wire has been used in notable buildings all over the country. A few are listed below for reference:

New York, N. Y.
42nd Street Building
N. Y. Edison Buildings
Bonwit-Teller Building
Hearst Building
7th Regiment Armory
N. Y. Edison Sub-Stations
Consolidated Gas Building

Brooklyn, N. Y.
Bush Terminal Buildings
Schraders Sons Factory

Long Island City, N. Y.
Long Island State Hospital
Ford Motor Car Works

Newark, N. J.
Auditorium
Banister Shoe Factory

Baltimore, Md.
Coca-Cola Building

Detroit, Mich.
Wayne County Bank

Cleveland, Ohio
Peerless Motor Car Co.

Milwaukee, Wis.
Plankington Building

Cincinnati, Ohio
Pogue Addition

San Francisco, Cal.
Harrison Building

Bridgeport, Conn.
Remington Arms Building
Bridgeport Bank Building

New Haven, Conn.
New Haven Theater

Hartford, Conn.
Bond Hotel

Wilmington, Del.
Wilmington Municipal Building

Allentown, Pa.
Allentown Court House

Atlanta, Ga.
Connolly Building

HABIRSHAW ELECTRIC CABLE COMPANY, INC.

MANUFACTURERS OF
Rubber Covered Wire and Cables
10 East 43rd Street
NEW YORK, N. Y.
WORKS: YONKERS, N. Y.

Products.

All forms of Insulated Wires and Cables, including House Wire, Fixture Wire, Elevator Cable, Brewery Cord, Theater and Stage Cable. Also,

Telephone Wire
Telegraph Wire
Signal Wire
Packing House Cord
Mining Machinery Cables
Car Wire
Deck Cable
Dredger Cable
Tree Wire
Park and Suburban Cables
Automobile Wire
Motor Boat Wire
Aerial Cables
Underground Cables
Armored Submarine Cables
Mine and Torpedo Cables
High Tension Wire and Cables
Lead Encased Cables for all Voltages

HABIRSHAW RUBBER COVERED WIRES CABLES AND CORES.
TRADE-MARK

Habirshaw "Red Core," Intermediate.

This grade is well known as meeting the needs of installations requiring better quality than code, and yet not quite so high quality as "30%." Habirshaw "Red Core," Intermediate grade, has to pass tests much higher than N. E. C. requirements before leaving our factory.

Specification for Habirshaw "Red Core"—This grade should be specified: "Habirshaw 'Red Core'—certified copy of tests on each coil to be furnished by the manufacturers on request."

Note—This Company is the sole manufacturer of Habirshaw "Red Core" Wires and Cables. Unless made by us, it is not genuine "Red Core." The Habirshaw identification is three blue threads parallel in the braid. These can be seen by scraping off the black weather-proof finish.

Habirshaw "Black Core."

Conforms to New Code requirements in every respect, and exceeds them in all essentials. Habirshaw "Black Core" stands out among code wires. Its reputation and the name behind it are well considered by architects, as is shown by its almost universal specification.

Specification for Habirshaw "Black Core"—"Habirshaw 'Black Core'—certified copy of tests on each coil to be furnished by manufacturers on request."

Special Wire made to Specifications.

Many architects, electrical contractors and engineers prefer their own specifications for insulated wires. We are glad to meet any special conditions that may arise.

BUFFALO GENERAL ELECTRIC BUILDING, BUFFALO, N. Y.
Watson Flagg Eng. Co., Electrical Contractors
Habirshaw Wire Installation

Experience and Reputation.

The Habirshaw Electric Cable Company, Inc., is one of the pioneers in the rubber-insulated wire industry. For more than a quarter of a century it has had an unparalleled record. It has supplied wires and cables that have operated successfully for twenty-five years and are operating successfully to-day, with every indication that they will continue to do so well into the future. With such a record, Habirshaw wire has become recognized as the "Standard of wire quality," and is used the world over in installations where the best is demanded.

Tests.

All our house wires are on the approved list of the National Board of Fire Underwriters, and are inspected and tested by the Wire Inspection Bureau. A test stamp will be found on the tag of every coil.

Identification.

Habirshaw House Wires are identified by three blue threads woven into the braid.

Grades of Low Voltage Wire—Habirshaw "30%."

It has been found that Habirshaw "30%" pays decidedly in the long run. It costs more, though not very much more. But the longer life of this superior quality wire more than makes up for its slightly higher cost. The tendency towards Habirshaw "30%" is shown by the increasing number of architects and electrical engineers who specify it.

Specification for Habirshaw "30%"—Complete specifications for Habirshaw "30%" will be sent to any architect desiring them.

Continued on next page

Prices and Information.

Catalogues and further information concerning any grade of Habirshaw wire will be sent on application. Our engineers will gladly be of service on any question that may arise regarding rubber insulation.

Guarantee.

The best guarantee of quality to come is quality produced in the past. The record of Habirshaw is, in itself, a guarantee. And, of course, we stand back of Habirshaw Wire to the limit of excellence.

Architects and engineers are invited and urged to visit our plant, where every facility and opportunity will be afforded to inspect the wire specified.

Installations.

We are proud of the long list of important buildings in which Habirshaw has been used, in the last twenty-five years, including over 25,000 buildings, and comprising some of the most prominent Federal, State, municipal, hotel, commercial and business buildings in the United States.

For your convenience in seeking information as to Habirshaw quality, we will send, on request, a list of the important installations in your city.

A FEW PROMINENT BUILDINGS IN WHICH HABIRSHAW WIRE PRODUCTS WERE INSTALLED

BUILDING	ARCHITECT	ENGINEER	ELECTRICAL CONTRACTOR
Biltmore Hotel, New York, N. Y.	Warren & Wetmore	C. R. Place	J. Livingston & Co.
Vanderbilt Hotel, New York, N. Y.	Warren & Wetmore	C. E. Knox	J. Livingston & Co.
Municipal Building, New York, N. Y.	McKim, Mead & White	C. E. Knox	Lord Electric Co.
Taft Hotel, New Haven, Conn.	F. Andrews	Newton L. Schloss	Watson Flagg Engineering Co.
Ritz Carlton, New York, N. Y.	Warren & Wetmore	Clark, McMullen & Reilly	Western Elec. Co.
Buffalo General Electric Building, Buffalo, N. Y.		Watson Flagg Engineering Co.	Watson Flagg Engineering Co.
Hotel Astor, New York, N. Y.	Clinton & Russell	A. E. Wells	Western Elec. Co.
J. P. Morgan Building, New York, N. Y.	Trowbridge & Livingston	H. C. Meyer	J. Livingston & Co.
Bankers' Trust Building, New York, N. Y.	Trowbridge & Livingston	H. C. Meyer	Lord Electric Co.

MUNICIPAL BUILDING, NEW YORK, N. Y.
McKim, Mead & White, Architects
C. E. Knox, Electrical Engineer
Lord Electric Co., Electrical Contractors
Habirshaw Wire Installation

BILTMORE HOTEL, NEW YORK, N. Y.
Warren & Wetmore, Architects
C. R. Place, Electrical Engineer
J. Livingstone & Co., Electrical Contractors
Habirshaw Wire Installation

THE WESTERN CONDUIT CO.

SUBSIDIARY TO THE YOUNGSTOWN SHEET & TUBE CO.

MANUFACTURERS OF

"Buckeye" Rigid Conduits and "Realflex" Armored Conductors

GENERAL OFFICES AND WORKS

YOUNGSTOWN, OHIO

BRANCH OFFICES OF THE YOUNGSTOWN SHEET & TUBE CO.:

THE WESTERN CONDUIT COMPANY

NEW YORK, 30 Church Street
PHILADELPHIA, Widener Building
BOSTON, 120 Franklin Street
PITTSBURGH, 1625 Oliver Building
CHICAGO, 1563 McCormick Building
DENVER, 725 First National Bank Building
DALLAS, 915 Busch Building
SAN FRANCISCO, 604 Mission Street
SEATTLE, 535 Central Building
ATLANTA, GA., 1514 Healey Building
ST. LOUIS, 902 Third National Bank Building

REPRESENTED BY

NEW YORK, The W. A. Bonnell Co., 132 Church Street
SAN FRANCISCO, The Electric Agencies Co., 247 Minna Street
LOS ANGELES, CAL., The Electric Agencies Co., Central Building
BOSTON, E. R. Bryant, 110 Pearl Street
PHILADELPHIA, PA., Walker Bros. & Haviland, 1532 Sansom Street
DETROIT, MICH., J. W. McNair Electric Co., 29 Woodward Avenue

Products.

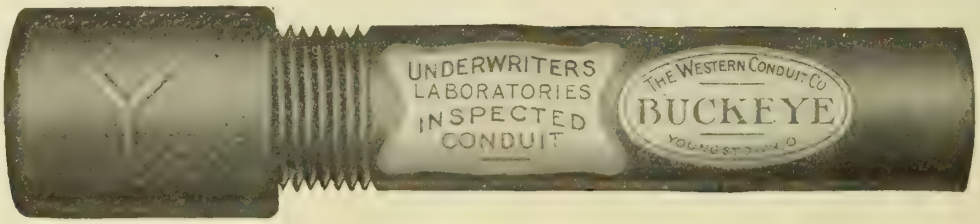
"Buckeye" Rigid Black Enameled and Galvanized Conduit and "Realflex" Armored Conductors.

Official Approval.

Our "Buckeye" Conduits and "Realflex" Armored Conductors are regularly examined and labeled under the supervision of the Underwriters' Laboratories, Inc.

"Buckeye" Conduit, Enameled.

This conduit is made from soft steel pipe of our own manufacture, of special analysis. The enamel used is the best procurable, and the finished conduit meets the requirements of the Underwriters' Laboratories, the United States Government, and the foremost architects of the country.



"BUCKEYE" RIGID ENAMELED CONDUIT

"Buckeye" Conduit, Galvanized.

Made of the same kind of pipe as the enameled conduit, the outer surface being heavily electro-galvanized, the interior enameled. This conduit also meets the requirements of the Underwriters' Laboratories, Inc., the United States Government, and the leading architects.

"Realflex" Flexible Armored Conductor.

This new armored conductor is radically different from any other now on the market. The armor being composed of steel wire, rather than flat strips, gives a combination of maximum strength with maximum flexibility. It is inspected by the Underwriters' Laboratories, Inc.

Real Reasons for Using "Realflex."

(1) "Realflex" is as flexible as ordinary rubber hose, yet as strong as steel wire can make it.

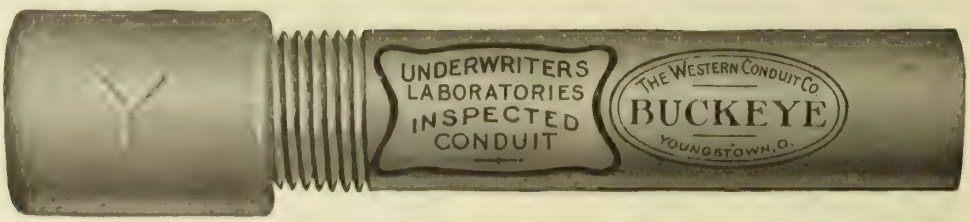
(2) It is rust- and rat-proof.

(3) Clean, even ends when severed.

(4) Armor firmly hugs the rubber-covered interior wires, yet without injury.

(5) The core of one copper wire is different in color from the other, thereby saving time and trouble in testing out.

(6) "Unbreakable." Can not be broken with the hands like the outer armor of almost any other flexible armored conductor on the market, but is easily and cleanly cut with ordinary hack saw.



"BUCKEYE" RIGID GALVANIZED CONDUIT

Continued on next page

(7) It is no longer necessary to run the risk of fire from poor and insufficient insulating material.

"Realflex," with its staunch, thick outside walls, gives the utmost protection to the interior rubber-covered wires.

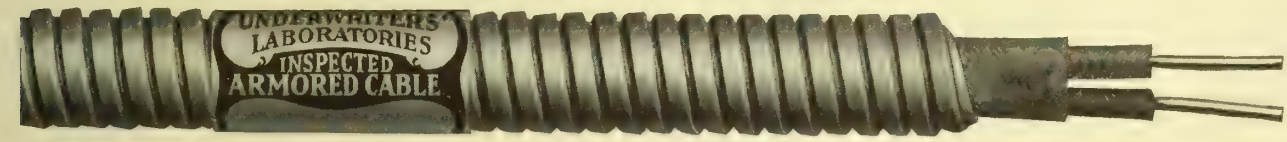
Service Offered by this Company.

Quality—The Western Conduit Co. is subsidiary to The Youngstown Sheet & Tube Co., one of the largest manufacturers of steel, wire and pipe in this country. It has therefore the unique advantage of controlling the quality of its materials from ore to finished conduit. The excellence of its products is attested by the fact that the capacity of its works has been trebled during the past year.

Delivery—The advantages of its raw material connections and its modern factory with large capacity, enable The Western Conduit Co. to make prompt deliveries at all times. A large and well assorted stock is always maintained, and it is very rare when shipment can not be made the day the order is received.

Transportation—Our factory is located on five great railway systems, and adequate railway service is assured even at times of traffic congestion. We maintain a traffic department having in it six to eight experts, whose services are always at the disposal of our customers to facilitate prompt deliveries.

Realflex
The Approved Flexible Armored Conductor
TRADE-MARK



"REALFLEX" ARMORED CONDUCTOR

Special Requirements—The Western Conduit Co. has laid a broad foundation for a permanent establishment in this line of business. It is amply financed with millions of dollars of assets behind it, and is therefore naturally anxious to maintain at all times the highest quality of product. It maintains not only large chemical laboratories, but metallurgical laboratories as well, with an adequate staff of expert chemists and metallurgists. The services of this specialized organization are always at the disposal of architects or engineers to carry out their ideas with reference to any special form or kind of conduit; and the company will be glad at any time to receive suggestions for improving its product, and to work with architects and engineers in designing material to meet particular or special service conditions.

Specifications.

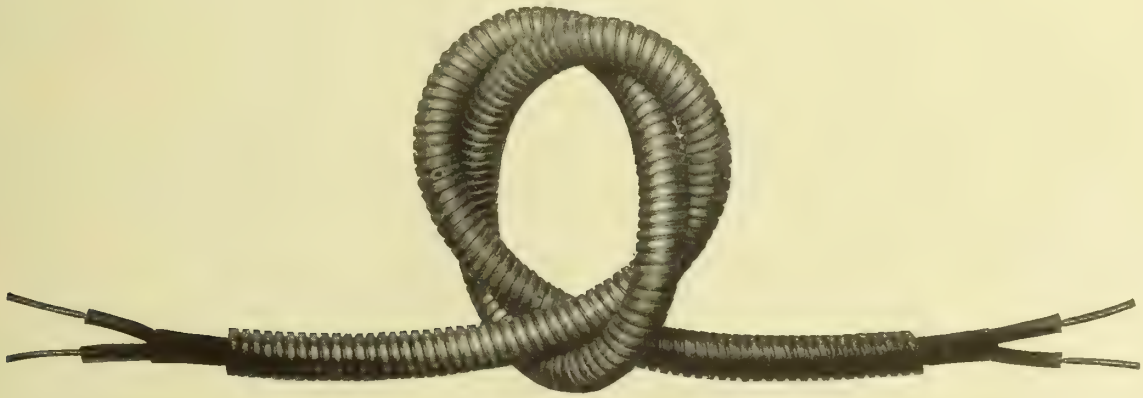
For the use of architects and engineers, we submit herewith specifications for rigid conduit, which are in conformity with the detailed requirements of the National Electric Code.

"All wires shall be run in conduits, which shall be of mild steel tube, enameled or galvanized, especially selected with reference to uniformity of thickness and freedom from defects. Conduits shall be delivered at the building in not less than ten-foot lengths.

"Joints shall be made tight with standard enameled or galvanized couplings and corners turned with elbows or long radius bend in the pipe.

"Ends of all conduits or elbows shall be cut square and reamed. All conduits shall be put up first and made water-tight, and wire pulled through after plaster is on.

"All conduits and fittings shall be carefully examined before being installed, and all blistered and defective pieces shall be rejected.



"REALFLEX" FLEXIBLE ARMORED CONDUCTOR
Double Knot

"All conduits shall be concealed unless specified to the contrary, or otherwise shown on drawings.

"All conduits installed underground, or in floors under which there is no excavation, shall be put together with joints made up with white lead and tested as directed by the architects, to show that they are air-tight.

"Special care must be taken to run conduits from switchboard to ceiling along plumb lines.

"Conduit shall be Western Conduit Co.'s 'Buckeye.'"

STEEL CITY ELECTRIC CO.

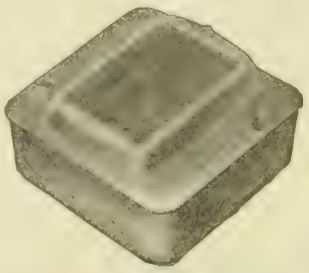
1207-1209 Columbus Avenue
PITTSBURGH, PA.

Products.

"Steel City" Drawn-Steel Outlet Boxes and Covers; "Star" Conduit Bushings and Locknuts; "Fullman" Floor Outlets; "Universal" Insulator Supports.

"Steel City" Drawn-Steel Outlet Boxes and Covers.

Line is complete, and designs embody all practical labor-saving features, particularly the knockout plug, which is clean cut from box, except at the connecting neck or tie. This plug is securely held in place, but is easily removed and leaves a clean opening for the conduit. Gang boxes and covers are made in all sizes, of drawn steel instead of cast iron, making a stronger and neater equipment.

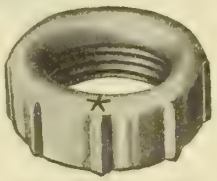


OUTLET BOX AND SWITCH COVER

Finish—Galvanizing is done *right* by the *Sherardizing Process,* insuring perfect protection against rust. Enameled finish also furnished.

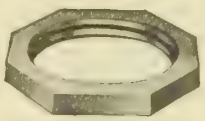
"Star" Conduit Bushings and Locknuts.

"Star" bushings are of original "rib" design for easy turning and tightening on conduit; made of malleable iron for strength, and will not break. Rounded edge protects insulation on wires. Extra thread gives secure hold on conduit.



½-INCH BUSHING

Locknuts—⅜-inch to 1-inch sizes made of special composition steel. Larger sizes made of malleable iron with "ribs."



½-INCH LOCKNUT

Finish—All sizes of bushings and locknuts are galvanized *right* by the *Sherardizing Process,* insuring perfect protection against rust.

"Fullman" Water-Tight Floor Outlets.

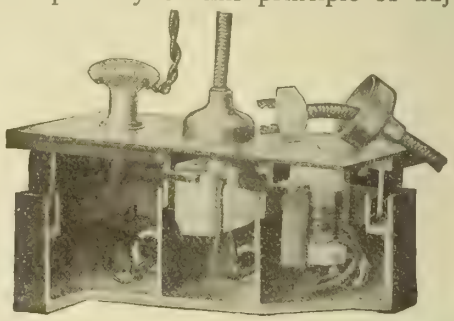
Adjustable Types—The main feature of adjustable types is method of adjusting cover quickly and accurately, so that it aligns with finished floor. The "box body" is frequently disturbed or set out of level; but this condition is taken care of automatically, as the "adjusting ring" simply dips deeper in groove in upper side of "box body," as shown in illustrations.

Cat. Nos. 400, 413, 465.

Cat. Nos. 401, 466

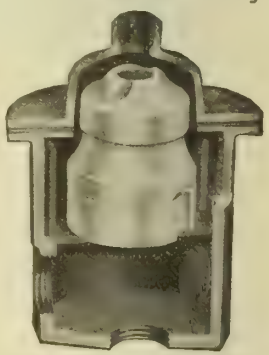
SECTIONAL VIEWS OF "FULLMAN" WATER TIGHT OUTLETS

Another important feature is the universal application and adaptability of this principle of adjustment.



SECTIONAL VIEW OF THREE-GANG OUTLET
Showing Drip and Bell Nozzles in use, and 2-inch flush plug in one cover

Rectangular Gang Outlets—These outlets are also designed to meet the necessity of furnishing several varieties of service from one source or outlet. They are furnished in two to six sections and with several styles of cover equipment. See illustration above.



SECTIONAL VIEW OF NON-ADJUSTABLE TYPE OF FLOOR OUTLET
Catalogue No. 477

Non-Adjustable Type—The No. 477 outlet successfully meets an urgent demand for a small outlet for residence and office requirements, especially where wood floors are laid. Can also be used in cement or similar floors.

Finish—The iron and steel parts of all styles of floor outlets are galvanized *right* by the *Sherardizing Process,* insuring perfect protection against rust. All brass cover parts are polished.

"Universal" Insulator Supports.

These fittings are strong, rugged, malleable iron clamps, made in four sizes, for securing porcelain and glass insulators to steel framework in wiring mills, foundries, factories, shops, bridges, piers, elevated railways, subways, train sheds and similar structures.

Finish—Standard finish is black enamel. Can also be furnished with *Sherardized Finish.*

1-inch Support with two No. 5½ Split Insulators. Support is tapped special for No. 10—24 thread machine screw

2-inch Support with attachment for Type A No. 2 B. & D. Cleat. Support is tapped standard for No. 24—16 thread machine screw

"UNIVERSAL" INSULATOR SUPPORTS

Catalogue.

Write for complete catalogue.

ATLANTIC INSULATED WIRE & CABLE CO.

TELEPHONE, Rector 2093

120 Liberty Street
NEW YORK, N. Y.

FACTORY
STAMFORD, CONN.

CHICAGO, 557 West Monroe Street
BOSTON, 156 Purchase Street
BALTIMORE, 2 East German Street
PITTSBURGH, Jenkins Arcade

LOUISVILLE, Keller Building
ST. LOUIS, 1502 Chestnut Street
ST. PAUL, 906 Merchants' Bank Building
LOS ANGELES, 757 South Los Angeles Street

Products.

Insulated Wires and Cables—Interior, Aerial, Underground, Lead-Encased and Submarine, in the following brands: "Neptune," "Triton," "Dolphin," and "Beacon." All sizes and for every service.

Trade-Names.

The trade-names under which our wires and cables are sold indicate definite grades of quality, which are absolutely maintained by us. These brands of wire have established standards for high class rubber insulation for the purposes for which they are intended, and should not be classed with wire sold under named brands whose specifications are not definitely fixed. The following extracts cover essential points of complete specifications for these brands, which we will be pleased to forward on request.

"Neptune."

"Neptune," extra high-grade insulation, is our best commercial product. Compounded of 30 per cent Para rubber and ingredients selected after years of tests and trial which our experience, and not a technical specification, dictates.

BRAND

We recommend "Neptune" Insulation as most enduring and economical for every condition and service, guaranteeing every foot of wire manufactured under this brand to meet the following tests:

Test—A sample of vulcanized compound, four inches in length, shall be cut from the wire and marks placed on it two inches apart; stretched until the marks are six inches apart, and immediately released; one minute after such release the marks shall be not more than two and one quarter inches apart; then stretched until the marks are twelve inches apart, before breaking.

Tensile strength 1,200 pounds per square inch.

Insulation resistance at 60° Fahr., 2,000 megohms per mile for No. 14 B & S. Other sizes in proportion.

"Triton."

"Triton," a high-grade insulation, to meet the requirements of engineers, architects and contractors, for a high-grade, long-service insulation of moderate cost.

"Triton" Insulation contains 25 per cent of Para rubber, and it is guaranteed that every foot of this wire is of uniform quality that measures, under rigid tests, to established standards, as follows:

BRAND

Test—A sample of vulcanized compound, four inches in length, shall be cut from the wire and marks placed on it two inches apart; stretched until the marks are six inches apart, and then immediately released; one minute after such release the marks shall be not more than two and one quarter inches apart; then stretched until the marks are ten inches apart, before breaking.

Tensile strength 900 pounds per square inch.

Insulation resistance at 60° Fahr., 1,500 megohms per mile for No. 14 B & S. Other sizes in proportion.

"Dolphin."

"Dolphin," a dependable high-grade commercial code wire meeting the new rules of the National Board of Fire Underwriters and passing all requirements by a wide margin. Contains 25 per cent of India rubber.

We guarantee the same care in its manufacture as in our higher grade products.

Test—A sample of vulcanized compound, four inches in length, shall be cut from the wire and marks placed on it two inches apart; then stretched until the marks are five inches apart, and immediately released; one minute after such release the marks shall be not more than two and three eighths inches apart; then stretched until the marks are eight inches apart, before breaking.

BRAND

Tensile strength 600 pounds per square inch.

Insulation resistance at 60° Fahr., 800 megohms per mile for No. 14 B & S. Other sizes in proportion.

"Beacon."

"Beacon," 30 per cent Para. We claim that this is the best and longest-lived 30 per cent Para and dry mineral matter insulation made. It meets the most exacting requirements of engineers, specialists and theorists known to us.

"Beacon" Insulation is necessarily expensive, but we recommend it highly wherever it may be required through necessity or demand.

Test—A sample of vulcanized compound, four inches in length, shall be cut from the wire and marks placed on it two inches apart; stretched until the marks are six inches apart, and then immediately released; one minute after such release the marks shall be not more than two and three eighths inches apart; then stretched until the marks are ten inches apart, before breaking.

BRAND

Tensile strength 1,200 pounds per square inch.

Insulation resistance at 60° Fahr., 3,000 megohms per mile for No. 14 B & S. Other sizes in proportion.

Underwriters' Stamps.

All Atlantic Insulated Wire is approved by the Underwriters and carries Underwriters' test stamps.

THE TRUMBULL ELECTRIC MFG. CO.

Panel Boards, Cabinets and Switchboards

PLAINVILLE, CONN.

SALES OFFICES

BOSTON, MASS., 76-78 Pearl Street
NEW YORK, N. Y., 114 Liberty Street
TELEPHONE, RECTOR 5321

PHILADELPHIA, PA., 138 North 10th Street
SAN FRANCISCO, CAL., 595 Mission Street
CHICAGO, ILL., 15 South Desplaines Street

Products.

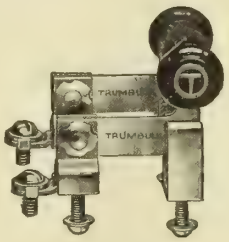
Manufacturers of TRUMBULL PANEL BOARDS, BOXES and CABINETS, and other ELECTRICAL SUPPLIES.

TRADE-MARK

Trumbull Panel Boards.

Special Features—(1) All switches and branch bars are 30-ampere capacity.

(2) Switch blades are moulded into the handle, and are secured to hinges by a copper rivet spun over; cannot come loose.



PANEL SWITCH
Showing Return Bend Clips

(3) Panels are equipped with self-adjusting, return bend, double U contact clips. By the nature of their construction the resiliency in the copper tends to hold a close contact with the switch blade, and, furthermore, if they ever get jammed or bent they can be adjusted with a blow of the hammer without expert assistance.

(4) Panel boards are regularly made with copper parts, polished, mounted on hand-finished natural black slate, one inch thick.

(5) Main bus bars are designed to carry 660 watts per circuit. Two-wire panels regularly designed for 125 volts, 3-2 wire for 125-250 volts.

(6) Panels are all on 1-inch slate, not on ¾-inch as some.

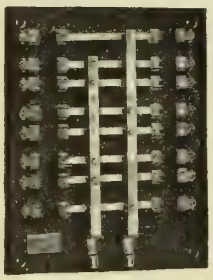
(7) 3-2 wire panels are of same width as 2-2 wire. Thus they take a narrower box and the ultimate cost of box and trim is materially reduced. Our panels will average from one and one half to three and one half inches narrower and from one to five inches shorter than other well-known panels on the market.

Official Approval—All Trumbull panel boards are examined and labeled under the direction of the Underwriters' Laboratories.

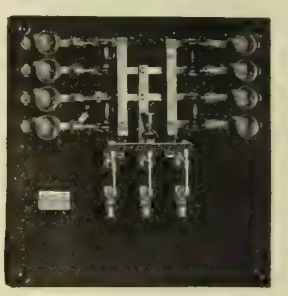
UNDERWRITERS' LABEL

Facilities—We carry in stock, wrapped for immediate shipment, a full assortment of panels most in demand, and all orders for panels on the Stock Panel List are automatically shipped within a day after order is received. For special work and for panels not entirely assembled we have all necessary parts and a full assortment of slate in large and small sizes.

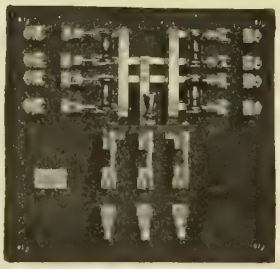
Types—We manufacture eight standard types of panel boards, and will also design and manufacture, at short notice, any special panel called for in specifications. All switches to be of our latest improved type.



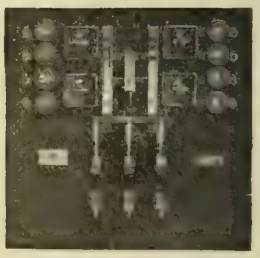
Type "E" with Main Lugs (Double Branch), for N. E. C. Fuses Only



Type "PS" Main Switch (Double Branch), Plug Fusible Knife Switches



Type "ES" Fusible Main Switch (Double Branch), N. E. C. Fusible Knife Switches

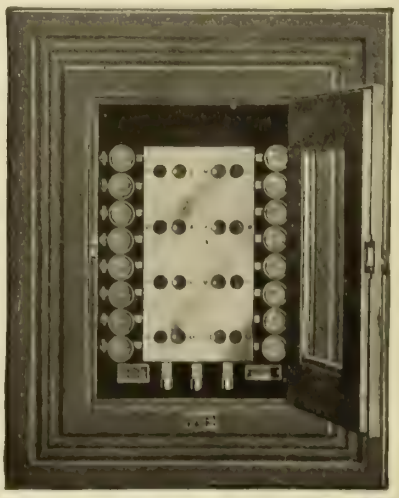


Type "T" Snap Switch (Double Branch), Plug Fusible Snap Switches

TYPES OF TRUMBULL PANEL BOARDS

Push Switch Panel with Cabinet (Safety First).

This style of push switch panel is particularly adapted for high-grade work, or where the switches are to be operated by persons unfamiliar with the dangers of electricity.



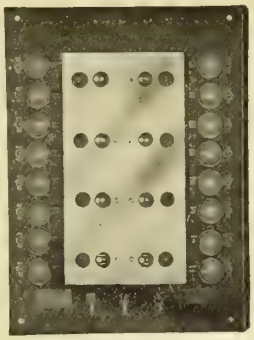
PUSH SWITCH PANEL WITH CABINET DOOR OPEN

SEE ALSO CATALOGUE

Continued on next page

This panel is fool- and panic-proof and is ideal for residence or department store installations.

When the door is closed and locked the switch plate and switch buttons only are exposed. There is no necessity for opening the door except for the renewal of fuses. If it is desired to limit the operation of the panel to certain persons, lock switches may be used at an additional price.

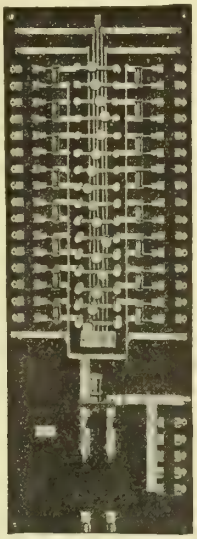


TYPE "PB" PUSH PANEL (DOUBLE BRANCH), PLUG FUSIBLE PUSH SWITCHES

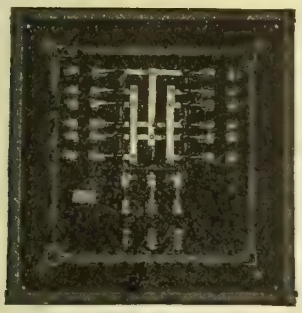
Metering Panels.

The Trumbull metering panels meet the most exacting of requirements. They are made in all types, both two- and three-wire, with as many meter bars as may be required. All changes of meter control can be made by unskilled help without the use of any tool whatever. This is accomplished by unscrewing the insulated knob corresponding to the circuit number to be changed, and moving it along the circuit bar to the proper meter bar, where it should be tightened.

These panels are manufactured under the McWilliams and other patents.



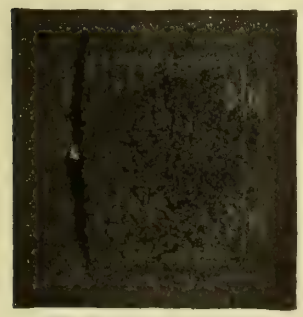
METERING PANEL



PANEL IN BOX

Cabinet Boxes and Trim.

Cabinets are wood or steel. Steel cabinets are bent up of one sheet.

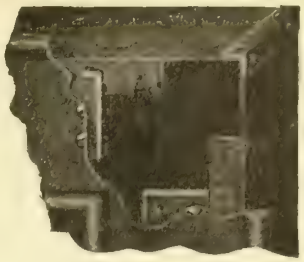


NEW STEEL CABINET

WOOD TRIM

Swing Clamp.

The adjustable feature of our trim by means of a swing clamp in place of screws is noteworthy. This permits interchange of trims of same size and allows for adjusting a reasonable amount of deviation from perpendicular in installing box.



SWING CLAMP

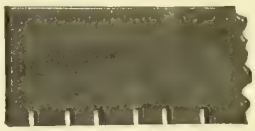
Adjustable Corner Iron.

Panel and slate frame are fastened together as a unit, and the slot in the foot of the corner iron allows the panel and frame to be adjusted to trim irrespective of box.

ADJUSTABLE CORNER IRON

Slotted Frame.

The slate frames instead of being drilled are slotted on the bottom, so that wires can be connected and the frame then set down over the wires, saving a great deal of time, as frames are not in position and interfering with terminals while connections are being made.



SLOTTED FRAME

Patented Conduit Hole Closer.

The drilling of holes larger than one half inch on the job is a tedious proposition; so we regularly equip all boxes for standard panels with one conduit hole closer as in illustration. By loosening two screws and placing the proper half circles together, the box may be arranged for ¾-in., 1-in., 1¼-in., or 1½-in. steel conduit, or the hole may be closed entirely by placing blank ends together.

PATENTED CONDUIT HOLE CLOSER

Knockouts.

One end of each box is provided with a conduit hole closer (as explained above) and from four to eight knockouts for ½-in. steel conduit. The other end is equipped with as many knockouts as the greatest number of circuits on a panel that box will hold; i. e., a box that will hold a 10-circuit panel has ten knockouts, etc. Extra knockouts furnished if desired.

KNOCKOUTS

Switchboards.

We are thoroughly equipped to design, build and erect any kind of switchboards desired, for either direct or alternating current. The knife switches used are our regular type "A," and any make of indicating instruments, circuit breakers and oil switches can be supplied. We guarantee prompt service and expert workmanship.

CROUSE-HINDS COMPANY

Manufacturers of Electrical Appliances

SYRACUSE, N. Y.

BRANCH OFFICES

NEW YORK, 30 Church Street
BOSTON, 201 Devonshire Street
CHICAGO, 417 South Dearborn Street
CINCINNATI, 1-7 Fourth Street, W.

Products.

We manufacture PANEL BOARDS, DISTRIBUTING BOARDS, PANEL BOARD CABINETS (steel and wood), KNIFE SWITCHES (fused and fuseless, front and back connection); VOLTMETER, AMMETER and END-CELL BATTERY SWITCHES; CONDUIT OUTLETS (known as "CONDULETS"); CONDULET COVERS and FITTINGS, including RECEPTACLES (plug and lamp), PLUGS, ROSETTES and FUSED SWITCH CUT-OUTS, also RECEPTACLES for Conduit Box, Molding, Cleat and Temporary Installations.

Panel Boards.

Our standard line of Panel Boards includes types with cartridge or plug fuses only in branches, and also either style of fuse in connection with knife, flush rotary or double push-button switches.

We make a specialty of designing panels to meet uncommon conditions, and offer this service without extra charge to our customers.

We pride ourselves on meeting customers' requirements in both style of Panel Board and time of delivery. In regard to quality of material and workmanship, no better Panel Boards can be made.

Panel Board Cabinets.

Our Boxes and Trims are equally as high-class as our Panel Boards. Steel boxes are formed from one-piece No. 10 gauge sheet steel, although lighter gauge metal is allowed. Our standard line includes Cabinets with side gutters, with back gutters and without gutters.

Switches.

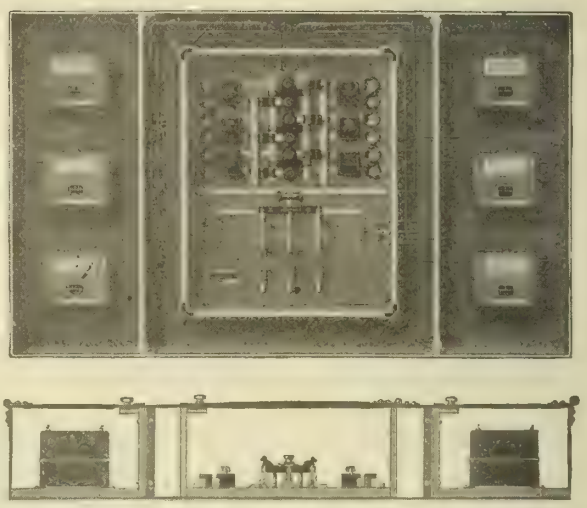
Our Switches' current-carrying parts are of highest grade hard drawn copper of 98 per cent conductivity, with a current density rating of 1,000 amperes per square inch of sectional area. Sliding contacts are rated at 75 amperes per square inch. Blades are ground in contact, and parts do not work loose under hard treatment.

Condulets.

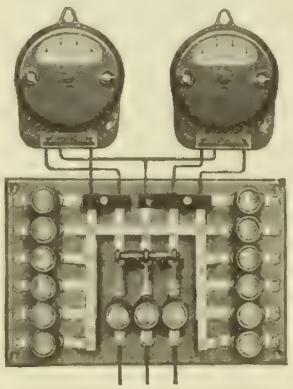
Condulets are made in hundreds of types and sizes, from single branch pull boxes for ⅜-inch conduit to the massive, fused service entrance fitting (type FF) for 4-inch conduit. Between these two extremes are types of Condulets that meet every conduit outlet requirement. They are cast iron; therefore, strong as conduit. They have threaded hubs to receive conduit; therefore, are easy to install. They have well-drawn lines and are no larger than their purpose demands; therefore, make an attractive installation.

Catalogues.

Complete descriptions, illustrations and listings given in catalogues. Copies will be mailed to any address free, upon application.

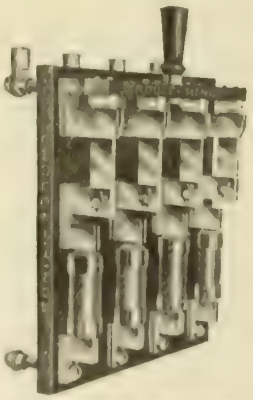


MULTIMETER PANEL (TYPE H CONSTRUCTION)
Permits instant change of circuit from one meter to another without use of tools



RESIDENCE PANEL
Arranged for two services. Regular equipment includes steel cabinet

TYPE P PANEL
Made in two- and three-wire, single and double branch forms



TYPE B SWITCH

TYPE BN CABINET

THE BRYANT ELECTRIC COMPANY
THE PERKINS ELECTRIC SWITCH MFG. CO.

BRIDGEPORT, CONN.

NEW YORK, 51 East 42nd St. SAN FRANCISCO, 149 New Montgomery St. CHICAGO, 323 West Jackson Blvd.

Products.

ELECTRIC LAMP SOCKETS and RECEPTACLES; ATTACHMENT or EXTENSION PLUGS; BASEBOARD and FLOOR RECEPTACLES and PLUGS; BULL'S-EYE INDICATING SWITCHES; INDICATING UNITS for Controlling Electric Heating Devices; SWITCH ROSETTES; FLUSH SURFACE, SNAP, PENDENT, ENTRANCE, PANEL, and CEILING and WALL SWITCHES; ROSETTES: The BRYANT SILENT ELECTRIC SIGNALLING SYSTEM.

Also, ELECTRIC SHADE HOLDERS; FITTINGS for ELECTRIC LIGHTING FIXTURES; DOOR SWITCHES; "STRAIGHT THROUGH" SWITCHES; KNIFE BLADE SWITCHES; PLUG and CARTRIDGE ENCLOSED FUSES, and CUTOUTS for same; ELECTRIC OUTLET BOX COVERS.

General.

The illustrations here shown represent only a part of our most comprehensive line of electrical wiring devices. As the largest manufacturers in the country of this class of apparatus, we are in a position to supply any legitimate demand for standard and approved devices of all kinds.

Due to the constant changes made to meet varying requirements and the improvements which are being made from day to day, it is impractical for us to provide here complete data on our full line.

The 1916 Catalogue, describing our complete line, gladly sent on request.

Following is a brief explanation of the various subjects illustrated.

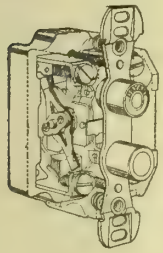


FIG. 1

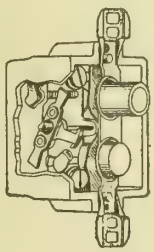


FIG. 2

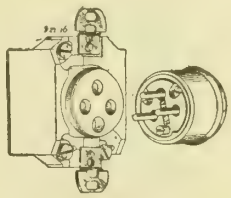


FIG. 3

Fig. 1. Bryant Push-Button Switch. The original and only switch with shallow base and deep cover, made entirely of molded insulation. Dirt-proof during and after installation. Ground-proof and practically unbreakable

Fig. 2. Perkins Two-Button Flush Switch; single-pole, double-pole, 3-point and 4-point types. Buttons never protrude more than ⅜ inch beyond flush plate. Also furnished with metal escutcheons in place of buttons to permit of locking as desired

Fig. 3. Bryant 3-Wire Flush Receptacle and three-prong, polarized plug for small polyphase motors; telephones; heating appliances, etc.

FIG. 4

FIG. 5

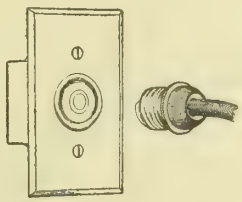


FIG. 6

Fig. 4. Combination of Receptacle, Plug and D. P. Type "O" Indicating Switch. One of various novel and convenient combinations in our "Junior" line

Fig. 5. Tell-tale used to indicate whether a fan, remote light or electric range, etc., is using current

Fig. 6. Won-Dor Receptacle. Any make of plug can be safely and quickly connected into circuit by means of this wonderful little device

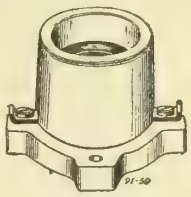


FIG. 7

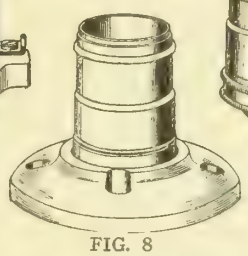


FIG. 8

FIG. 9

FIG. 10

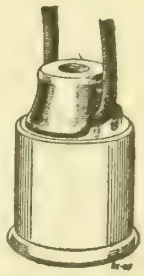


FIG. 11

Figs. 7-11. Bryant Mogul Sockets and Receptacles for the new high candle-power lamps — all porcelain with sealed-in connections; two parts as shown in Figs. 10 and 11; lugged, Fig. 7; or with brass shell as in Figs. 8 and 9

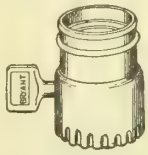


FIG. 12

FIG. 13

FIG. 14

Figs. 12 and 13. Representative of the very complete line of "New Wrinkle" Sockets, Key and Turn types, with interchangeable caps to meet conditions

Fig. 14. Bryant weather-proof porcelain and composition sockets

FIG. 15

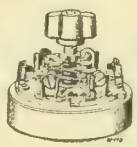


FIG. 16

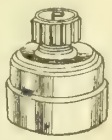


FIG. 17

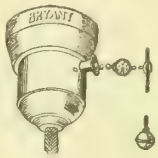


FIG. 18

FIG. 19

Fig. 15. Perkins "Type O" Pendent Switch

Figs. 16 and 17. Perkins Snap Switches to meet every variety of lighting, small power and heating service

Fig. 18. "New Wrinkle" Switch Rosette with side guide

Fig. 19. Ceiling Receptacle with bottom guide. Particularly adapted for the modern forms of indirect and semi-indirect lighting

FIG. 20

FIG. 21

FIG. 22

Fig. 20. Perkins Dead Front Distributing Panel. No danger of shock in operation or replacing of fuses. Switches indicate clearly, and are readily removed when necessary. Cost less than $1.00 per circuit

Figs. 21 and 22. Exceedingly compact ceiling Receptacle, "Bryant No. 4100." Projects only 1¼ inches from ceiling

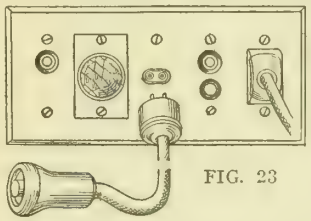


FIG. 23

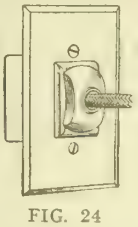


FIG. 24

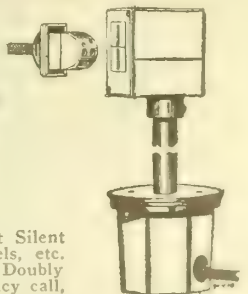


FIG. 25

Fig. 23. A calling station of the Bryant Silent Call System for Hospitals, Institutions, Hotels, etc. Operates on 100-120 volts lighting circuit. Doubly fused to insure safety. Provides for emergency call, for heating pad and other connections. Over 2500 stations already installed in leading hospitals

Fig. 24. Bryant Disappearing Door Receptacles. Doors are flush when plug is out

Fig. 25. Bryant Floor Outlet Extension, water- and trouble-proof at all times. Connecting block in floor box. Receptacle and plug of Bryant Disappearing Door type. Excellent for Offices, Showrooms, etc.

ESTABLISHED 1891

THE HART & HEGEMAN MFG. CO.

ORIGINAL MANUFACTURERS OF

"Hart" and "H & H" Electric Switches and Accessories

342 Capitol Avenue

HARTFORD, CONN.

Products.

SWITCHES: PUSH-BUTTON, STANDARD and ELECTROLIER, ROTARY, FLUSH and SURFACE, BATTERY, AUTOMATIC DOOR, PENDENT, MOMENTARY CONTACT, FLUSH PLUG RECEPTACLES, PILOT-LAMP RECEPTACLES; WALL CASES.

H&H TRADE-MARK

General Selling Agents for "PAISTE" SOCKETS, RECEPTACLES, ROSETTES, CUT-OUTS, PANEL BOARDS, PANEL BOXES, FITTINGS for Iron Conduit and for Metal and Wooden Moulding.

"H & H" Push-Button Switches.

Push-button switches are now made in types to secure all kinds of control. The "H & H" Electrolier Switches, which are used to light two or three circuits separately or at the same time, look exactly like standard switches, so that uniformity is secured on an installation. "H & H" plates for flush switches are solid with planed bevel, or pressed out of .040 brass sheets. Specifications should state which are to be used.

"H & H" and "Hart" Snap Switches.

These snap switches have a heavy brass sleeve enclosing and protecting the spring and strengthening the entire mechanism. Very large metal plates on bottom and top of the base are used for supporting the spindle. This gives a wide bearing which takes from the porcelain the strain of the yanking and twisting received by the spindle.

It is best to use switches with porcelain covers and handles where excessive moisture will tarnish the metal covers. They also eliminate any danger of the user receiving shocks.

Where Used.

"H & H" Push Switches have been installed in a large proportion of the celebrated office buildings, hotels, clubs, residences, and other edifices that have been erected since push switches were first used. They are regarded as a standard by most of the leading architects and engineers.

The Equitable Building is the latest of the world-cele-

EQUITABLE BUILDING
GRAHAM, BURNHAM & Co., Architects

brated buildings in which "H & H" Push Switches are used.

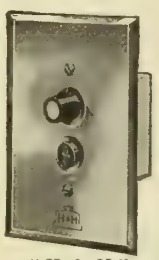
"H & H" Door Switches.

Door switches turn on the lights in dark closets as soon as the doors are opened, and turn them off when the door is closed. This gives the light when it is needed, and prevents wasted current from failure to turn off the lights. "H & H" Door switches have a wheel in the tip of the plunger which prevents friction.

Warning Light, "H & H" Plug Receptacles.

The bull's-eye glows red when the current is on. This warning light should be installed where heating devices are connected, also on a circuit where lights might be unnoticed for hours, as in attics or cellars.

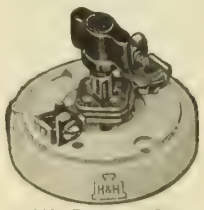
Shutters close the openings of "H & H" Plug Receptacles when the plug is out, preventing curious little children from injuring themselves. They also prevent dust, water, and other foreign matter from coating the contacts.



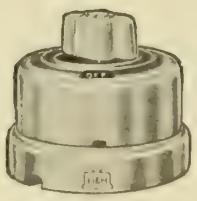
"H & H" STANDARD AND ELECTROLIER PUSH SWITCHES LOOK EXACTLY ALIKE

"H & H" PUSH LOCK SWITCH

"H & H" INDICATING ROTARY FLUSH SWITCH

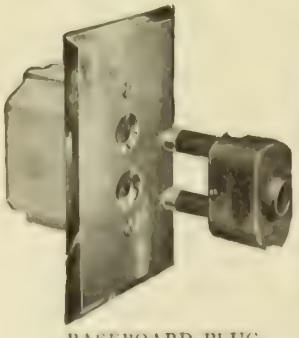


SNAP SWITCH
Showing Reinforced Center



PORCELAIN SWITCH
For damp places

DOOR SWITCH



BASEBOARD PLUG RECEPTACLE
With child proof openings

SWITCH, WARNING LIGHT AND ATTACHMENT PLUG

Continued on next page

"Paiste Multipo" Sockets.

All shells of "Paiste Multipo" Sockets fit all caps and bases. For places where lamps are exposed to theft, use locking sockets. For places where heating devices may be attached to key sockets, specify 660-watt sockets. Regular "Paiste" pull sockets have a wide break and may safely be used for 500 or 600 watts.

To specify any sockets, combine the letter of cap or base with number of shell, as "A-50" for key socket with ⅛-inch cap. Only a few types are shown here. Write for complete catalogue.

KEY SHELL PART 50

KEYLESS PART 51

PULL PART 52

LOCKING PART 54

LOCKING PART 55

⅛" CAP PART A

¼" CAP PART J

⅜" CAP PART K

PENDENT CAP PART M

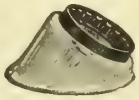
⅛" CAP 90° ANGLE PART E

⅛" CAP 45° ANGLE PART B

SMALL COVERED BASE PART P

INSULATED BASE PART R

CLEAT BASE PART W


ANGLE BASE PART H

Porcelain Sockets for Damp Places.

Use "Paiste" porcelain sockets in bathrooms, cellars and other places where dampness may cause the user to receive shocks from metal sockets.

"Paiste" caps and bases are fastened to the shell by interior screws, making the neatest type of socket. All shells fit all caps and bases.

KEY TOP PART 40

⅛" CAP PART PA

⅜" CAP PART PK

¾", 90° ANGLE CAP PART PG

KEYLESS TOP PART 41

SMALL BASE PART PN

LARGE BASE PART PP

ANGLE BASE PART PH

PULL TOP PART 42

WOOD MOULDING AND PIPE TAPLET BASE, PART PS

BASE FOR 4" OUTLET BOX, PART PO

Standardizing of Attachment Plugs.

A number of manufacturers have lately standardized their separable attachment plugs, so that all makes of these plugs will fit all receptacles. The standard plugs have been adopted by many manufacturers of lamps, fans, heating and other devices using cord connections.

Specify "Paiste" or some uniform make of receptacles to fit the standard plug, in order to make them most useful.

Receptacles for separable attachment plugs are by far the most convenient because it is so much easier to "push" the plug in than to "screw" it in.

"Paiste" plugs have the fiber washer covering the interior of the cap, hiding wiring ends and making a neat looking cap.

CURRENT TAP

CHANDELIER PLUG

PLUG COMPLETE

BASE

CAP

ROUND FLUSH RECEPTACLE Two sizes. Plates 2¼" and 3¼" in diameter

RECTANGULAR FLUSH RECEPTACLES

FOR OPEN CLEAT WIRING

FOR WOODEN MOULDING WORK

FOR CONCEALED WORK

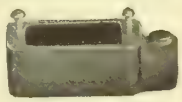
FOR MOULDING OR PIPE TAPLETS

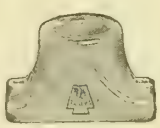
CONDUIT RECEPTACLE

CANOPY RECEPTACLE When wired to fixture, the canopy covers porcelain part and wires

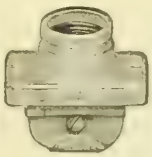
"Paiste" Pipe Taplets.

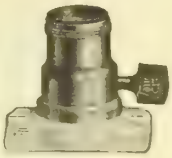
One feature of the "Paiste" Pipe Taplets is the set screws in the hubs which insure an even, neat installation and good ground connection. Another feature is the number of different devices which can be used on the same types of pipe taplets. A few of them are shown below.

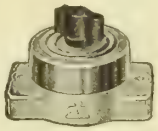

RECTANGULAR OPENING PIPE TAPLETS


EASILY WIRED RECEPTACLE

ANGLE TYPE RECEPTACLE

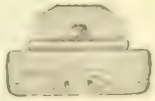

WEATHER-PROOF RECEPTACLE


SOCKETS OF ALL STYLES


SWITCHES OF MANY STYLES

EASILY WIRED ROSETTE

ROSETTE WITH NIPPLE


PLUG RECEPTACLE

THE HART MANUFACTURING CO.

Manufacturers of "Diamond H" Switches, Receptacles and Appliances

HARTFORD, CONN.

BRANCH OFFICES

NEW YORK, N. Y., 30 Church Street
BOSTON, MASS., 170 Summer Street
CHICAGO, ILL., 411 South Jefferson Street
DETROIT, MICH., 1519 Dime Bank Building
DENVER, COLO., 2910 Huron Street
SAN FRANCISCO, CAL., 143 Second Street
SEATTLE, WASH., 617 Fourth Avenue
TORONTO, ONT., 331 King Street, West
LONDON, ENG., 77 Rochester Row, Westminster, S. W.

Products.

"Diamond H" Push-Button Switches, Rotary Flush Switches, Surface Switches, Automatic Door Switches, Automatic Flush Receptacles, Remote Control Switches, Solenoid Door Switches.

TRADE-MARK

In General.

"Diamond H" specialties are the original creations of Gerald W. Hart, the founder of The Hart Manufacturing Co., whose inventions and manufactures have for the past twenty-five years received general recognition as standards of efficiency and construction.

The "H," the name, being an abbreviation of Hart, it is only necessary to call for "Diamond H" specialties in order to secure the very highest type of results in the art of making electrical appliances.

PUSH BUTTON SWITCH WITH PLATE

Push-Button Switches.

"Diamond H" push-button switches are radically different in construction from all other switches of this type, as the porcelain base entirely encloses the mechanism and is proof against dust and dirt. This construction is found only on "Diamond H" switches, and obviates the necessity of using temporary plates when the switch is installed before the walls are plastered. Binding screws are machined and of extra length, and are easily accessible. Sheet mica is used exclusively to insulate the mechanism from the current carrying parts.

All parts subject to wear are made of carbonized steel drawn in oil. Contacts are made of spring temper phosphor bronze, and are of sufficient size to carry safely any reasonable overload. The make and break is accomplished with unusual rapidity.

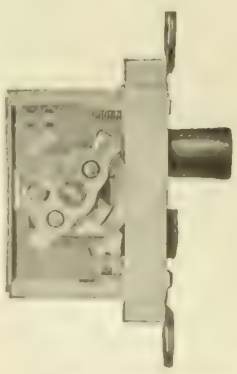
An exclusive feature is the straight line movement of the push-buttons, obviating the swinging motion common to other switches of this type. This is accomplished by a simple addition to the mechanism, which occupies no extra space but gives extra strength to the union of the buttons with the lever which throws the switch.

Rotary Flush Switches.

"Diamond" rotary flush switches combine the flexibility of standard switches with the durability, strength, and generally compact appearance of push-button switches. For practical results they are superior to anything heretofore produced.

They are made throughout of the best materials obtainable, wearing parts of oil treated steel, phosphor bronze contacts, brass binding posts and switch plates, and extra length binding screws to facilitate wiring. Perfect insulation of the mechanism from the current carrying parts is accomplished with sheet mica, the best insulating material for this purpose.

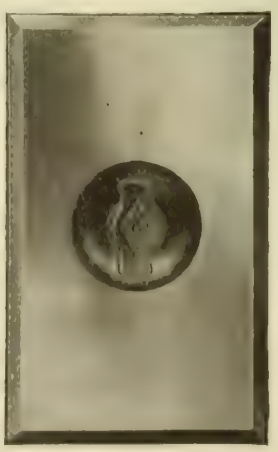
Front View, Mechanism Removed



Side View, showing enclosed Mechanism

PUSH BUTTON SWITCH

Switch Mechanism



Front View, with Plate

ROTARY FLUSH SWITCH

Safety Cabinets

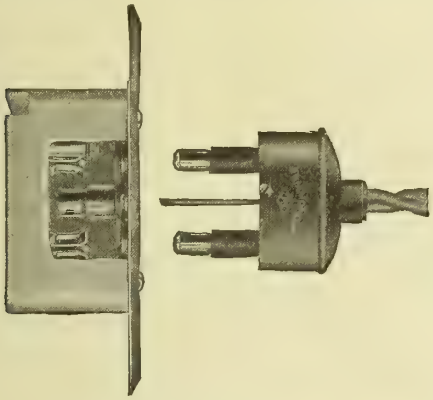
Continued on next page

"Diamond H" Receptacles.

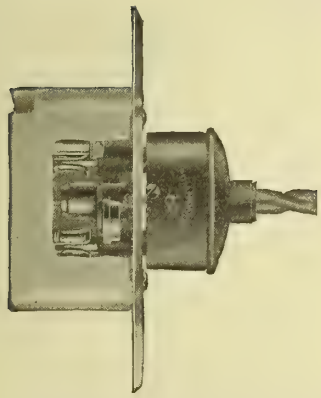
Safety is an important consideration in the use of "Diamond H" receptacles, as it is impossible to ground or short-circuit them with the plug. They can be operated without danger by a child or other person unfamiliar with their use.

The "Diamond H" receptacle is the only one that can be opened or closed automatically except by the respective insertion or withdrawal of the plug. It is particularly adapted for use in residence work, hotels, apartment houses, etc., where children, servants, and others are likely to get a short circuit by inserting some article, such as a hairpin or other metallic substance, in the receptacle.

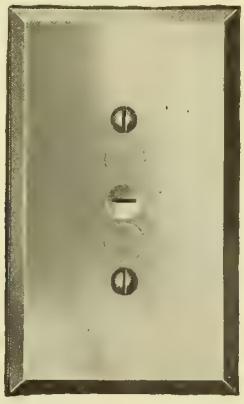
This automatic feature entirely obviates the necessity of prying open lids or shutters when it is desired to insert the plug. It is only necessary to enter the pilot pin in the small slot in the face plate, and push; the desired connection is instantly established. To break the connection, simply withdraw the plug, and the holes in the plate automatically close, effectually excluding dust, dirt and foreign substances which will invariably find their way into the ordinary flush receptacle. These shutters are opened by the action of a pilot pin, which pushes them inward and causes them to rotate to one side, away from the prongs of the plug.



RECEPTACLE WITH PLUG READY TO INSERT



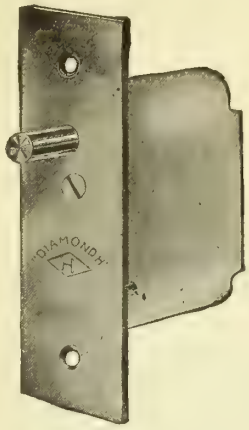
RECEPTACLE WITH PLUG INSERTED



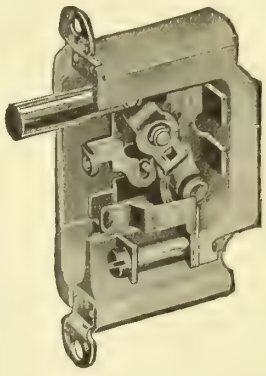
RECEPTACLE PLATE WITH PLUG WITHDRAWN

Automatic Door Switches.

"Diamond H" door switches are made on the principle of the push-button switch, and will give satisfactory results under hard and continuous service. The mechanism is strong and durable, and is insulated by sheet mica from the current carrying parts. A heavy porcelain base, one inch wide, with rounded ends, gives the necessary strength to prevent accidental breakage and allows the switch to be installed with minimum labor and expense. It is made in two types, No. 601 Light "On" with door open, and No. 602 Light "Off" with door open.



No. 602 With Face Plate



No. 602 Showing Mechanism

AUTOMATIC DOOR SWITCHES

Combination Plates.

Plates can be furnished in any combination style desired. The illustration shows plate mostly used where heating units are installed. The bull's-eye indicates by its light when current is entering the iron or other appliance attached.

Push-Button Switch | Indicating Bull's-Eye | Automatic Receptacle

COMBINATION PLATE

Finishes.

The stock or standard finishes are brushed brass, polished brass, nickel polished bronze and oxidized copper. Any special finishes of switch and receptacle plates can be furnished on short notice.

"Diamond H" Remote Control Switches.

This type of remote control switch is suited for all classes of service where it is expedient to install magnetically operated switches. The locking mechanism and magnets are entirely enclosed in an iron housing, and its positive action, rigid construction, and compactness of design mark a very decided improvement in the manufacture of this class of apparatus.

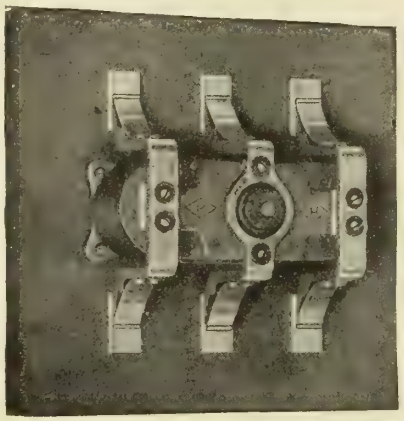
The remote control switch is located where the circuit is to be opened and closed. The push-button may be located wherever convenient, at any distance from the switch; or, if desired, several push-buttons may be used to operate the same switch from different locations.

Continued on next page

The remote control switch is useful for controlling small motors, vacuum cleaner motors, or groups of sign lamps, as well as for the service mentioned above, and is a saver of time and trouble wherever used.

The solenoids operating the switch are located at each end of the switch housing directly under the brush yokes, and give a straight pull without rocking or cramping. The releasing solenoid is in the center of the housing, and operates on the locking mechanism direct. As all working parts are entirely enclosed, they cannot become damaged through rough usage. All wearing parts are of case-hardened and tempered steel.

In many cases, the cost of the remote control switch is more than offset in the saving in copper wire, where it is not desirable to control the service by hand-operated switches located at the natural centers of distribution; and the convenience and safety of being able to control various types of services from a number of different points by means of three No. 14 wires and a flush push-button switch is frequently an important consideration.

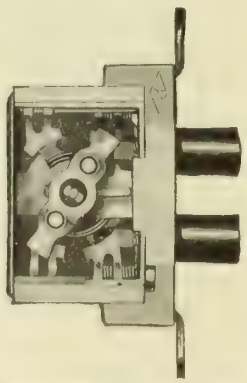


"DIAMOND H" REMOTE CONTROL SWITCH

These switches can be furnished for direct or alternating current in two-pole, three-pole, four-pole; in sizes from 5 to 300 amperes, 250 V.D.C. or 440 volt A.C. All switches are made with laminated brushes, enclosed mechanism, manual releasing attachment, and have a straight line movement.

Momentary Contact Switch.

This is a special push-button switch for use in connection with remote control switches. The mechanism is similar to that of the regular "Diamond H" push-button switch, and is so arranged that a snap contact is made by pressing either of the buttons, and a quick break is obtained when the button is released. Both buttons cannot be pressed at the same time. This switch fits all standard conduit boxes, and uses a regular "Diamond H" push-button plate. It can be fitted with lock attachment, if desired.



MECHANISM OF MOMENTARY CONTACT SWITCH

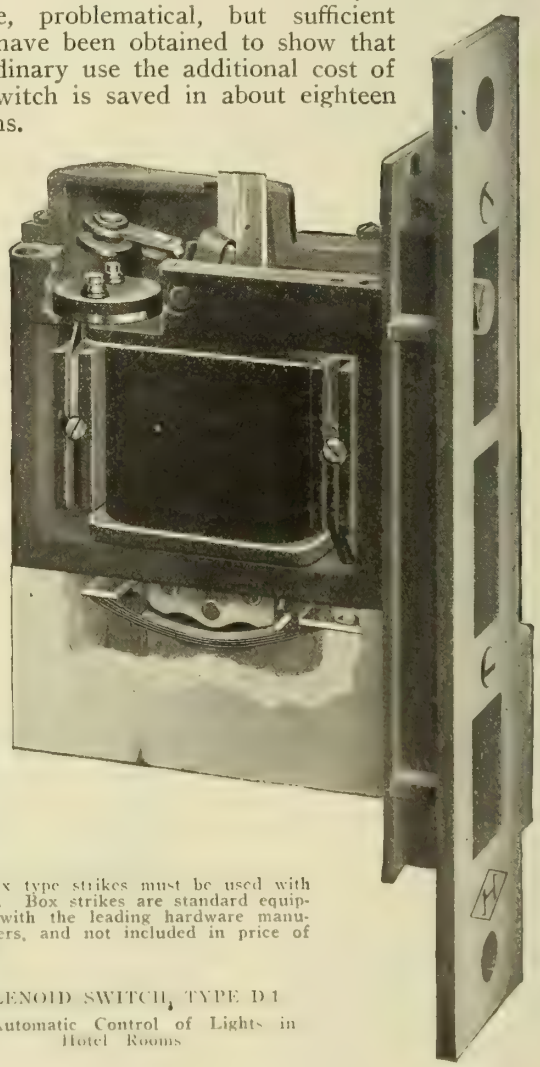
Solenoid Switches, Type D-1.

Hotel guests, when leaving their rooms, frequently leave burning all or part of the lights in the rooms. To stop this waste of current the "Diamond H" hotel door switch has been designed, and its use adopted by many leading hotels throughout the country.

It is installed in a special conduit box in the jamb of the corridor door back of the lock strike, and is wired in series with a push-button switch in the room. The jamb switch is operated by the bolt in the door lock which is used when locking the door from the corridor side; but the door being locked from the room side does not operate the switch, as a separate bolt is used.

When the door is locked from the corridor side, the switch opens and all lights are extinguished, but unlocking the door immediately relights them. The lights are always under control of the occupant of the room when the door is not locked from the corridor side.

The amount of current saved is, of course, problematical, but sufficient data have been obtained to show that in ordinary use the additional cost of the switch is saved in about eighteen months.



Box type strikes must be used with switch. Box strikes are standard equipment with the leading hardware manufacturers, and not included in price of switch

SOLENOID SWITCH, TYPE D-1
For Automatic Control of Lights in Hotel Rooms

Installations.

A few representative installations of Solenoid Switches, Type D-1, are as follows:

New Morrison, Chicago, Ill.
Blackstone, Chicago, Ill.
St. Paul, St. Paul, Minn.
Hotel Statler, Detroit, Mich.
Hotel Statler, Cleveland, Ohio
Endicott, New York, N. Y.

HARVEY HUBBELL, INC.

Manufacturers of Electrical Specialties

MAIN OFFICE AND FACTORY

BRIDGEPORT, CONN.

BRANCH OFFICES

NEW YORK, N. Y., 30 East 42nd Street
CHICAGO, ILL., 318 W. Washington Street
SAN FRANCISCO, CAL., 612 Howard Street
LOS ANGELES, CAL., 524 Union Oil Building
SEATTLE, WASH., 1002 First Avenue, South
PORTLAND, ORE., 401 Lumbermen's Building
DENVER, COLO., 231 Fifteenth Street
MONTREAL, CAN., R. E. T. Pringle, 216 Bishop Street
TORONTO, CAN., 95 King Street, East

Products.

High-class and Approved Wiring Devices, for Residences, Hotels, Hospitals, Libraries, Railroad Stations, Manufacturing Plants, etc., including Interchangeable T-Slot Plug Receptacles; Flush Plug Receptacles; Attachment Plugs (Separable), Porcelain Base Receptacles for Open and Concealed Wiring; Porcelain Receptacles for Wood and Metal Moulding Polarity Receptacles and Plugs; Current Taps; Pull, Key and Keyless Sockets; Porcelain and Weatherproof Sockets; Pendent, Wall and Ceiling Pull Switches; Lamp Guards; Tin, Brass, Aluminum and Enameled Steel Reflectors.

TRADE-MARK
Reg. U. S. Pat. Off.

Hubbell Policy.

The working policy of this organization demands a constant, progressive improvement of its products, with the aim toward higher efficiency of its electrical devices and their greater general serviceability. The result is a class of products which is eminently up-to-date at all times, and yet not so improved as to make early Hubbell installations incapable of ready modification to admit of adoption of the later devices, when desired.

The fact that Hubbell products are installed in most of the better class of buildings (see references on second page following) offers irrefutable evidence of their mechanical and electrical excellence.

Hubbell Interchangeable Receptacles and Attachment Plugs.

To adapt Hubbell wall and flush receptacles to both types of Hubbell caps, they are now equipped with what is known as T-slots. Uniting the two forms of slots in one standard base doubles the utility of all Hubbell wall and flush receptacles.

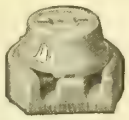
Hubbell receptacles and plugs are the only devices of this character with concealed or protected contacts. Current-carrying parts are sunk in a heavy porcelain base and safely housed against intrusion of fingers or small metal articles.

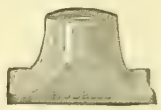
The user of Hubbell receptacles and plugs is insured absolute safety in establishing or breaking connection. A porcelain wall separates the contact posts, making arcing or short-circuiting impossible.

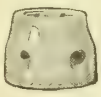
Hubbell receptacles fit all standard outlet boxes and are approved by the Underwriters.

Concealed Base No. 5617

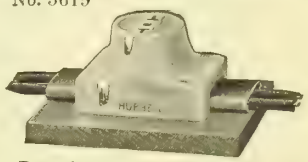
Cleat Base No. 5618


Moulding Base No. 5619

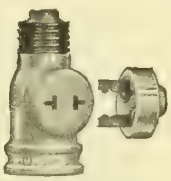



Conduit Box Base No. 5624

Receptacle for Outlet Box Cover No. 6103


Base for National Metal Moulding. One-way, No. 5939. Two-way, No. 6068

Weatherproof Receptacle (Composition) No. 6293


Current Tap, No. 5735 Multiple. No. 5736 Series

Flush Receptacle, Round Plate, No. 6283

PORCELAIN WALL RECEPTACLES
T-Terminal slots fit all sizes Hubbell 10-Ampere Caps

No. 6250 Brass Casing

No. 6251 Without Casing

No. 6252 ½-in. Bushing

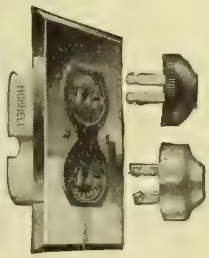
No. 6253 ⅜-in. Bushing

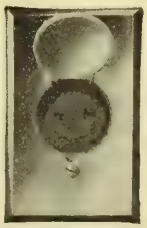
Plug No. 5915

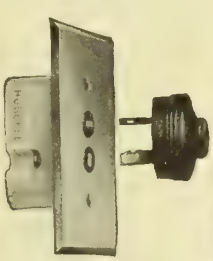
Plug No. 5406

ATTACHMENT PLUGS AND RECEPTACLE BASES

Receptacle No. 5547, Plate No. 5548


Receptacle No. 6257, Plate No. 6258


Receptacle No. 5579, Plate No. 5580


No. 5566, 10-Amp. No. 5568 Plate only

No. 5557, 20-Amp. Concealed Base

No. 5727, 20-Amp. Cleat Base

No. 5623 20-Amp. Moulding Base

No. 5552, 20-Amp. Receptacle No. 5551 Plate only

T-SLOT, 10-AMPERE RECEPTACLES

POLARIZED RECEPTACLES AND BASES

Continued on next page

Hubbell Pull, Key and Keyless Sockets.

The sockets listed and illustrated below represent twenty years of specialization in creating and producing high-grade sockets for fixture, surface and outlet work.

The mechanical and electrical features of Hubbell sockets not only meet all existing needs of architects, contractors and building owners, but anticipate as far as possible their future requirements.

Recognition has been taken of the demand for smaller sockets of greater current capacity, consequently all new Hubbell sockets have been developed along these lines.

The older types have been modified in size, improved in appearance, and given electrical capacity far in excess of the requirements of modern high wattage lamps.

Hubbell pull, key and keyless sockets are assembled in three types of interchangeable shells: "Presturn," "Quick-Catch" and "Lock." The interchangeable feature enables easy and perfect attachment of any type of Hubbell shell to any corresponding class of ceiling, wall or fixture base or pendent cap.

The many possible combinations of Hubbell socket bodies with different styles of bases readily solve every perplexing problem in wiring residences and all classes of public buildings.

No. 3618 Pull

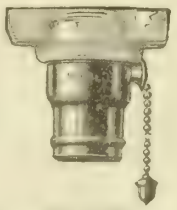
No. 3664 Key

No. 3667 Keyless

HUBBELL "QUICK-CATCH" SOCKETS

No. 3731

No. 3736 Metal Covered Base



No. 3888 Wood Moulding Base

No. 3885 Surface Wiring Base

No. 3740 K. W. Rosette Base

No. 3621 Lock Holder permanently attached to Socket

HUBBELL WALL AND CEILING PULL SOCKETS

No. 3750 Shallow Base for 3- and 3¼-in. Outlet Box

No. 3841 Shallow Base with Economy Attachment

No. 3880 Wide Base for 3-, 3¼-, and 4-inch Outlet Boxes

HUBBELL WALL AND CEILING PULL SOCKETS

No. 5828

No. 5880

HUBBELL ATTACHMENTS FOR PULL SOCKETS

Hubbell Porcelain Sockets.

Hubbell pull, key and keyless porcelain sockets are safe to use in all damp places. Being self-insulated by the heavy porcelain body, it is impossible for the shell to become charged, as is often the case where moisture accumulates on brass shell sockets.

They may be installed near, or in direct contact with, water pipes, metal furnishings, etc., without danger of short-circuiting, causing fire or harming the user.

No. 3330

No. 3337

No. 3382

No. 3375

HUBBELL PORCELAIN SOCKETS

No. 3383

No. 3385

No. 3391

HUBBELL MOGUL SOCKETS

For high Wattage Tungsten and Nitrogen filled lamps, Schedule B, 1500 watts, 600 volts. To withstand excessive heat from nitrogen filled lamps, these sockets are equipped with special heatproof linings. Approved by National Board of Underwriters

No. 50715

No. 9402

No. 4013

No. 28795

HUBBELL PORCELAIN CLEAT RECEPTACLES

No. 3502½ PULL SOCKET WITH PLUG BASE

No. 3851 KEYLESS WALL SOCKET

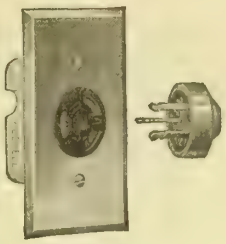
No. 5529 ATTACHMENT FOR OIL LAMPS

Continued on next page

No. 6040
10-Amp.
Plug Cap

No. 6045
10-Amp. Concealed Base
(Porcelain)

No. 6055
20-Amp. Concealed Base,
Brass Cap



No. 6049, 10-Amp.
Flush Receptacle
Porcelain Cap

THREE-WIRE ATTACHMENT PLUG, WALL AND FLUSH RECEPTACLE

No. 5027
Porcelain
Base

No. 5689
Brass Covered
Base

WALL PULL SWITCHES

No. 5999
Surface Wiring
Base

Both equipped with strain relief discs for wires

No. 6035
Condulet Base

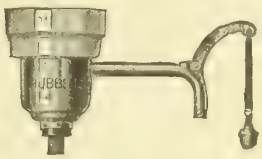
CEILING PULL SWITCH ROSETTES

No. 6012
WALL PULL
SWITCH

No. 6014
CANDLE PULL SWITCHES

No. 6015

No. 6077
CEILING
ELECTROLIER
PULL SWITCH



No. 6001, Porcelain
Base

No. 6023, Metal
Covered Shallow
Ceiling Base

No. 5610
Side Outlet
FIXTURE
PULL
SWITCH

PULL SWITCHES EQUIPPED WITH ECONOMY CHAIN EXTENDERS

INSTALLATIONS

LEWISTON, ME.
Manufacturers National Bank

BOSTON, MASS.
United States Custom House
High School of Commerce
Randall-Faichney
Avery Hotel
Brigham Hospital

CAMBRIDGE, MASS.
Gray & Davis Building
Ford Motor Co.
Carters Ink Co.
Infants Hospital Building
Harvard College

PROVIDENCE, R. I.
Peoples Savings Bank

NEW HAVEN, CONN.
Taft Hotel
Winchester Repeating Arms Co.

NEW YORK, N. Y.
Equitable Building
Grand Central Terminal
Pennsylvania R. R.
Trinity Building
United States Express Building
Knickerbocker Hotel
Belmont Hotel
Vanderbilt Hotel
Mark Cross Building
Police Headquarters
Biltmore Hotel
United States Custom House
Lord & Taylor Department Store
Altman Department Store

ROCHESTER, N. Y.
Rochester Hotel
Seneca Hotel

ATLANTIC CITY, N. J.
Hotel Traymore

PITTSBURGH, PA.
Oliver Building
Rosenbaum Building

COLUMBUS, OHIO
University of Ohio
Columbus Athletic Club
State Buildings
Hartman Theater and Buildings
Majestic Theater

DETROIT, MICH.
Fuller Hotel
Kresge Building
Whitney Building
Dime Savings Bank Building
Cadillac Motor Car Co.
Packard Motor Car Co.
Michigan Central Terminal Building
Ford Motor Co.
Hudson Motor Car Co.
Dodge Bros.
Chalmers Motor Car Co.
Hotel Statler

CHICAGO, ILL.
Advertising Building
Continental & Commercial National Bank Building
Conway Building
Marshall Field Annex
Garland Building
Hearst Building
Lytton Building
Mallers Building
Michigan Boulevard Building
Monroe Building
Otis Building
Mandel Bros.
Rothschild & Co.
Gibbons Building
Stevens Building
Marshall Field Store
Morrison Hotel
Kaiserhof Hotel
Tuberculosis Sanitarium

MINNEAPOLIS, MINN.
University of Minnesota, Various buildings
Hotel Radisson
Minneapolis Athletic Club
Hotel Dyckman

KANSAS CITY, MO.
Hotel St. Regis
Taylor Building

DALLAS, TEX.
Adolphus Hotel
Busch Building
Union Station

SEATTLE, WASH.
Northern Life Building
Frye Hotel
King County Court House
John Davis Apartments
Washington Securities Building
Stuart Building
Metropolitan Office Building

PORTLAND, ORE.
Reed Institute
Benson Hotel
Pittock Block
Meier & Frank Department Store
Northwestern Bank Building
Board of Trade Building
Pacific Tel. & Tel. Building
Ford Motor Factory
Lipman & Wolf Department Store
Olds Wortman & King Department Store
Multnomah County Library
Multnomah County Courthouse

SAN FRANCISCO, CAL.
Adair Hotel
Crocker National Bank Building
California Pacific Building
Emporium
First National Bank Building
Humboldt Bank Building
Knights of Columbus Building
Metropolitan Life Insurance Building
Phelan Building
St. Francis Hotel
Union Trust Building
Warrington Apartments

PALO ALTO, CAL.
Stanford University

LOS ANGELES, CAL.
Bryson Apartments
Rex Arms Apartments
Engstrom Apartments
Rampart Apartments
L. A. Athletic Club

TORONTO, ONT.
Continental Life Building
New Ontario Hydro Commission Building

PASS & SEYMOUR, INC.

Manufacturers of Handy Electrical Wiring Devices

MAIN OFFICE AND WORKS

SOLVAY, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., 6 Church Street
BOSTON, MASS., 158 Purchase Street
CHICAGO, ILL., 700 Jackson Boulevard
SAN FRANCISCO, CAL., Rialto Building

Products.

SHURLOK LOCKING DEVICES; FLUTO KEY, KEYLESS and CHAIN PULL, SINGLE and DOUBLE POLE, INTERCHANGEABLE BRASS SOCKETS; FLUTO WALL and CEILING RECEPTACLES; FLUTOLIER BRASS SOCKETS; OUTLET RECEPTACLES; MOGUL BASE SOCKETS and RECEPTACLES; PORCELAIN SOCKETS and RECEPTACLES; ELECTRIC DECORATIVE and DISPLAY MATERIALS; PENDENT and CHAIN PULL SWITCHES; ELECTRIC ROSETTES; CONSTRUCTION MATERIALS, etc.

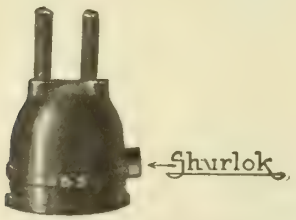
HANDY ELECTRICAL P&S WIRING DEVICES
TRADE-MARK

Catalogues.

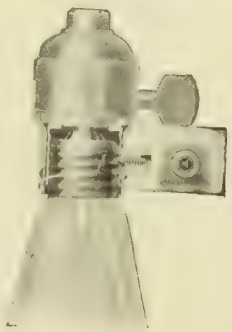
PASS & SEYMOUR, INC., issue a consecutive series of catalogues, and are glad to furnish the very latest issues, as well as bulletins, samples of the devices, and any information, on request.

Shurlok Devices.

Shurlok is a device attached to P & S sockets and receptacles, to prevent theft of lamps. Consists of a small set screw inserted into base of lamp by means of a special key.



P & S 540 CONDENSITE SHURLOK SOCKET

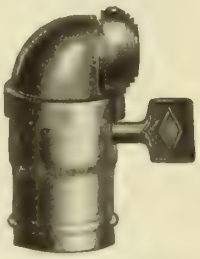

P & S 100421 SHURLOK

Fluto Interchangeable Sockets.

Made in following types: Key, single and double pole, 660 watts; keyless, and chain pull.

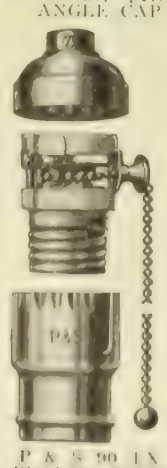
Furnished with male and female caps, N. C. S., as well as following types: Pendent, strain relief, fixture, angle and angle-fixture caps.

Any standard key or pull body will fit any Fluto key shell. Any Fluto shell, key or keyless, will fit any Fluto base or cap.


P & S 827, ¼ INCH ANGLE CAP

P & S 480 SOCKET, ⅛ INCH SHELL FIXTURE CAP

P & S 100421 SOCKET, ⅛ INCH, WITH THREADED READ FOR "480" HOLDERS


P & S 90 EXPLODED VIEW

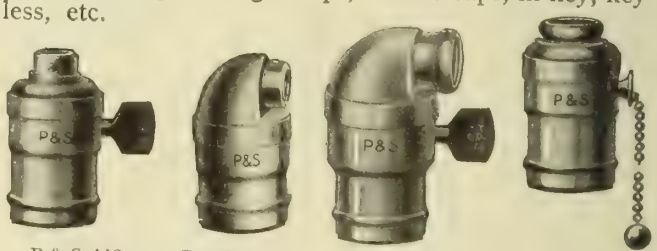
Fluto Interchangeable Receptacles.

Made in following types: Key, single pole and 660 watts; keyless, and chain pull. A specially designed base for wall and ceiling receptacles, allows using also on conduit fittings, outlet boxes, etc. We make a complete line of sizes in all types according to N.C.S.

P & S 149 Pull, P & S 816 Key, P & S 44 Keyless
P & S 66609 Key, P & S 98 Pull, P & S 60387 Keyless
P & S 156 Pull, P & S 812 Key, P & S 60431 Keyless
FLUTO INTERCHANGEABLE RECEPTACLES

Flutolier Interchangeable Sockets.

The Flutolier socket is a smaller diameter pattern of the Fluto socket, for use only on electric lighting fixtures. Made in two sizes. The regular Flutolier, in key, keyless and chain pull; short Flutolier in keyless only. We furnish a complete series of these sockets with angle caps, straight caps, fixture caps, in key, keyless, etc.


P & S 446 P & S 491 P & S 564 P & S 499
FLUTOLIER INTERCHANGEABLE SOCKETS

P & S Outlet Receptacles.

These are designed for beam, low ceiling, mezzanine, entresole, balcony or arch unit lighting systems. Made in fifty-nine different types, including key, keyless and chain pull mechanism, porcelain and brass shell, etc. They are made for use with 3, 3½ and 4 inch outlet boxes, according to N.C.S.

P & S 1010 3 AND 4 INCH OUTLET RECEPTACLE

P & S 428 CHAIN PULL RECEPTACLE

P & S Mogul Sockets and Receptacles.

Designed for use with extra large base, high efficiency lamps using as high as 1500 watts, 600 volts. Fur

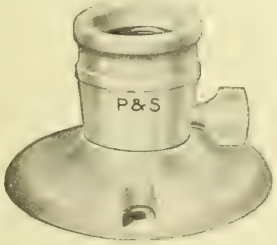
Continued on next page

nished with or without copper shells. Sockets made in brass, porcelain, and weatherproof types with brass cap or iron yoke, and without caps. The copper shell sockets and receptacles can be furnished in nickel, oxidized, or statuary bronze finishes at slightly increased cost.

P & S 517 SOCKET

P & S Porcelain Sockets and Receptacles.

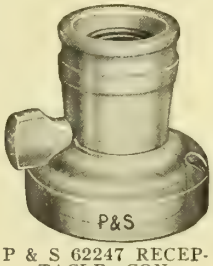
We make a complete line of pendent-drop and fixture interchangeable porcelain sockets, together with a wide range of wall sockets and receptacles in porcelain, many of which may be used on outlet boxes. Sockets made in key or keyless types with brass cap, aluminum cap, or pendent cap. The interchangeable and stationary porcelain receptacles are made in key or keyless types, with concealed, cleat or angle bases for use on conduit fittings, as wall or ceiling receptacles, and on wood moulding. The porcelain sockets and receptacles are especially adapted for installation in hospitals, armories and warehouses; and have proven themselves peculiarly fitted for use in laboratories, experiment rooms, fume closets and refineries, because of the opportunity the glaze surface gives for sanitation and cleanliness. Added to these qualifications they have a rugged construction, and simplicity of current carrying parts which recommend them to clients.



P & S 46 RECEPTACLE
May be used on 3¼-inch outlet box

P & S 61317 PORCELAIN SOCKET, PENDENT CAP

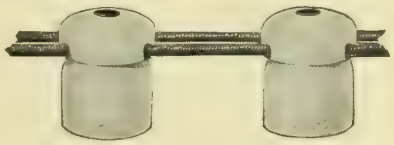
P & S 61227 PORCELAIN SOCKET, BRASS CAP



P & S 62247 RECEPTACLE, CONCEALED BASE

Electric Decorative Materials.

P & S decorative materials are designed to meet all requirements of electric sign and display work. Our ready-wired porcelain receptacles and sockets, as well as mica composition sockets, are designed for use where border or outlining lights are the illuminating factors.

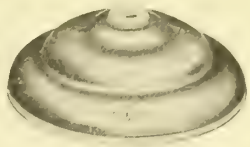

P & S 61420 READY WIRED SOCKETS

P & S Construction Materials.

We manufacture an extensive assortment of construction material for use in installing any electric wiring device or system; all being designed according to the N. C. S. A few of these materials are as follows: Switch bases for concealed, cleat, or moulding work; glazed and unglazed two-wire cleats; conduit clamps, porcelain tubes, strain insulators, attachment plugs, porcelain transformer cut-outs, etc.

P & S Fluto and Porcelain Rosettes.

P & S rosettes have a wide range of use in making handsome and inexpensive fixtures; also in connection with pendent drop-cord work. We make a large assortment in rosettes, differing in finish, intended use and design, and can furnish these for use in drop-cord work, or for ceiling, wall or outlet-box fittings. Made in the fusible and fuseless types.


P & S 200 ROSETTE WITH BRASS COVER

P & S 723 ROSETTE WITH FLUTO SHELL

Fluto rosettes are rated for 3 amperes 125 volts, and 1 ampere 250 volts in the pull switch type. Those without the pull mechanism are not equipped with interiors. Both types are fitted and used with brass covered and concealed bases, as well as thirteen styles of caps.

P & S Pendent and Chain Pull Switches.

Special switches designed for convenience and neatness. Switch with side chain pull and the ceiling pull switch are both made in twenty-seven types according to style of cap or base used, and are designed for 3 amperes 125 volts, or 1 ampere 250 volts. No. 3000, one-circuit pendent switch is designed for as high as 6 amperes 125 volts.

P & S 3000 PENDENT SWITCH

P. & S. 3019 4-INCH BOX BASE

P & S 3003 CEILING PULL SWITCH

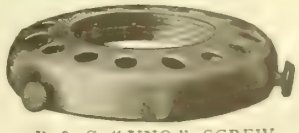
P & S 712 PULL SWITCH ROSETTE

P & S 702 WITH BASE FOR CONDULET

P & S Conveniences.

Attention is called also to many conveniences, such as shade holders for sockets or receptacles, in plain or special finishes; brass and special extension keys; chain guides; insulated chains; unassembled sockets with unlacquered shells for convenience in finishing as desired, etc.; thus broadening the usefulness of the line.

REMOVABLE KEY


P & S "UNO" SCREW SHADE HOLDER

GEORGE CUTTER COMPANY

Electrical Lighting Fixtures and Distributing Apparatus

SOUTH BEND, IND.

Products.

ORNAMENTAL POSTS, NEWELS, BRACKETS and REFLECTORS.

Also, PANEL BOARDS, METERING PANEL BOARDS and SWITCHBOARDS; BOXES and CABINETS.

SOL-LUX
TRADE-MARK

Sol-Lux Gate Post Newels.

These newels are made of highest quality grey iron, of distinctive design and very appropriate for lighting gateways and private grounds, entrances of buildings, etc.

Specifications: Base, 14" diam., 24" high. Column, 5" diam. above base, tapering to 3½" diam. near top. Height from base plane to bottom of side globes, 3' 8"; to bottom of center globe, 4' 6½"; to bottom of globe 1-light newel, 3' 8". Distance center to center of opposite globes, 30". Designed for 6"x9" or 6"x10" side globes, and 6"x12" or 6"x14" top globe.

DATA, SOL-LUX GATE POST NEWELS

No.	Lights	Wt., Lbs.	Price.
21817	1	125	$25.00
21818	2	175	35.00
21819	3	175	35.00
21820	4	215	40.00
21821	5	215	40.00

Prices include medium screw sockets for side lamps and Mogul screw sockets for center lamps, unless otherwise specified. Prices do not include globes, ventilators, lamps, wiring or foundation bolts. Use three ¾" bolts.

SOL-LUX GATE POST NEWELS

SOL-LUX BRIDGE NEWELS

Sol-Lux Bridge Newels.

Similar in design to Sol-lux Gate Post Newel, but higher.

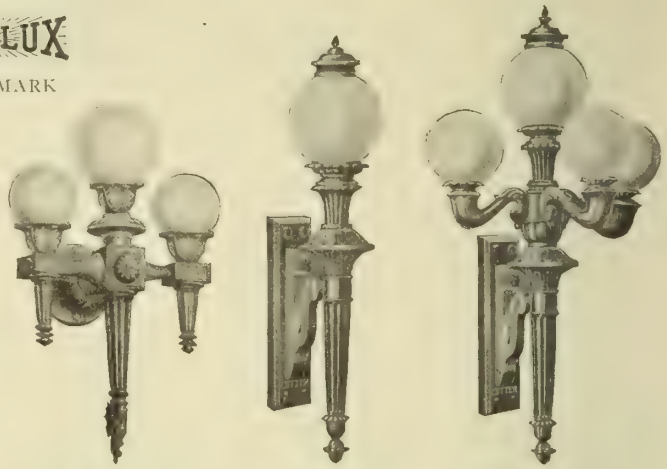
Specifications: Base, 14" diam., 24" high. Column, 5" diam. above base, tapering to 3½" diam. near top. Height from base plane to bottom of side globes, 5' to bottom of center globe, 6' 10½"; to bottom of globe 1-light newel, 6'. Distance center to center of opposite globes, 30". Designed for 6"x9" or 6"x10" side globes, and 6"x12" or 6"x14" center globes.

Arms may be reversed for parlor cluster.

DATA, SOL-LUX BRIDGE NEWELS

No.	Lights	Wt., Lbs.	Price.
21822	1	175	$30.00
21823	2	225	40.00
21824	3	225	40.00
21825	4	265	45.00
21826	5	265	45.00

Prices include medium screw sockets for side lamps and Mogul screw sockets for center lamps, unless otherwise specified. Prices do not include globes, ventilators, lamps, wiring or foundation bolts. Use three ¾" bolts. Top base included.



3-Light Corridor 1-Light Commerce 4-Light Commerce

SOL-LUX BRACKETS

Sol-Lux Brackets.

Midget—A light cast-iron bracket designed for small sizes of lamps which do not require ventilation. Has a threaded stem for attachment to crowfoot or conduit.

Specifications: Diameter wall canopy, 5¼". Distance end of stem to center of globe, 6".

MIDGET BRACKET

DATA, MIDGET BRACKETS

No.				
No. 21835	With 4" x 8" Diffusing Globe	12 lbs.	$4.75	Equipped with 4¼" holder and medium screw socket, but not wired.
No. 21836	Without globe	7 lbs.	3.25	

Corridor—

Specifications: Distance wall to center of globe 1-light bracket, 10". Distance center to center of opposite globes 3-light bracket, 16". Height over all, 40". Globe holders have 6" fitters for 6"x8" side globes and 6"x10" center globes.

DATA, CORRIDOR BRACKETS

No.				
No. 21245	1-light	65 lbs.	$15.00	Includes globe holders and medium screw sockets, but not globes or wiring.
No. 21246	3-light	110 lbs.	21.00	
No. 21247	4-light	135 lbs.	24.00	
No. 21841	6" x 8" Diffusing Ball	5 lbs.	1.50	
No. 21842	6" x 10" Diffusing Ball	7 lbs.	2.00	

Commerce—A massive fixture of distinctly artistic and classical design. Particularly adapted for lighting fronts of fine structures, such as banks and office buildings, clubs, libraries, etc.

Specifications: Wall plate, 9" wide, 20" high. Distance wall to center of top globe, 14". Height to bottom of globe 1-light bracket, 33", to bottom of center globe 3- and 4-light brackets, 41". Distance center to center of opposite globe, 30".

For side lamps use 6"x9" or 6"x10" globes. For center lamps use 6"x12" or 6"x14" globes.

DATA, COMMERCE BRACKETS

No.				
No. 21838	1-light	90 lbs.	$20.00	Not including lamps, globes, ventilators or wiring. Medium screw sockets are furnished for side lamps. Mogul screw socket for center lamps, unless otherwise specified.
No. 21839	3-light	145 lbs.	30.00	
No. 21840	4-light	155 lbs.	32.50	
No. 21830	6" x 9" Diffusing Ball	6 lbs.	1.75	
No. 21842	6" x 10" Diffusing Ball	7 lbs.	2.00	
No. 21843	6" x 12" Diffusing Ball	8 lbs.	2.50	
No. 21832	6" 12" Diffusing Ball (6" top fitter)	8 lbs.	2.50	
No. 21833	6" 14" Diffusing Ball (6" top fitter)	9 lbs.	3.50	
No. 21756	24" Ventilator	9 lbs.	1.00	

EDISON LAMP WORKS

OF GENERAL ELECTRIC COMPANY

GENERAL SALES OFFICE

HARRISON, N. J.

DISTRICT SALES OFFICES

ATLANTA, GA.	CHICAGO, ILL.	DENVER, COLO.	PHILADELPHIA, PA.
BOSTON, MASS.	CINCINNATI, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.

For other Branch Offices see General Electric Company's Branch Offices on Page 1335

Products.

Edison Mazda C (Gas-Filled) Lamp and Edison Mazda B (Vacuum) Lamp.

Lamps of Known Quality.

Into every Edison Mazda lamp is built the cumulative results of thirty-six years' experience in the manufacture of over five hundred million lamps. Each Edison Mazda Lamp is backed by Mazda Service, the world-wide, scientific service to lamp manufacturers maintaining the Mazda standard of quality.

Expert Advice on Your Lighting Problems.

We maintain a corps of lighting experts of broad experience whose business it is to co-operate with you and all our customers, so that you may be sure of getting the most efficient and, at the same time, the most economical illumination fitted to your particular requirements.

If you think your lighting can be improved, then our lighting experts will be glad to co-operate with you in making your lighting the most efficient and satisfactory for your own particular requirements. This service is entirely without charge to present or prospective customers.

Size and Type of Lamps.

For all standard voltages, seven sizes, 10-15-20-25-40-60-100 watts in Mazda B or vacuum lamps, and seven sizes, 100-200-300-400-500-750-1000 watts, in Mazda C or gas-filled lamps. Round or straight side bulbs, clear, bowl frosted or all frosted. Special lamps for flood lighting, color matching, sign lighting, series lighting and other special uses; in fact a lamp for every purpose and a size for every need.

Edison Mazda B (Vacuum) Lamps.

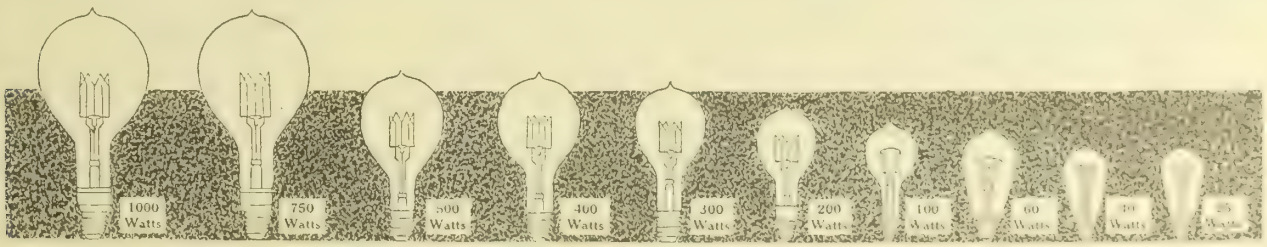
This is the well-known Tungsten filament lamp, standard for all uses requiring small lamps under 100 watts in size. This is the lamp that is replacing the old, 8, 16 and 32 candle-power carbon filament lamps.

Edison Mazda C (Gas-filled) Lamps.

These new lamps represent the very latest advance in the art of incandescent electric lighting. They are from four to six times as efficient as old-style carbon lamps, and the light is whiter and much nearer daylight quality. They are used principally for general illumination, and for lighting large areas, and for this purpose are far more economical and efficient than any other type of incandescent lamp. The range of sizes is complete enough to give you practically any desired intensity of light from a single unit.

Stocks of Lamps at Convenient Points.

In addition to the stocks carried by the eight district sales offices shown above, we carry, for our customers' convenience, additional stocks at our branch offices in Kansas City, Los Angeles, Minneapolis, New Orleans, Pittsburgh, Portland, Ore., Providence, and Salt Lake City. Of course our six factories are additional sources of supply. This widespread distribution enables any of our local agents or distributors to obtain quickly any quantity or type of lamp not carried in his own smaller stock.



<— Mazda C Lamps —> <—Mazda B Coil Lamps—>

EDISON MAZDA LAMPS

IVANHOE-REGENT WORKS

OF GENERAL ELECTRIC COMPANY

Manufacturers of Regent Glassware and Ivanhoe Metal Reflectors

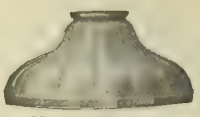
CLEVELAND, OHIO

Products.

Opal Glass Reflectors.
Regent Semi-Indirect Bowls, for Decorative and Commercial Lighting.
Ivanhoe Reflectors.
Trutint Units.
Also, Holophane Prismatic Reflectors and Holophane Reflector Balls, Holophane Realite Units, etc.

TRADE-MARK

No. 3024 Druid
Stonehenge Design



No. 3041 Druid

Opal Glass Reflectors.

Opal Reflectors are especially adaptable for ornamental designs and give good lighting results. They are made in three qualities of glass, known under the trade-names of Veluria, Druid, Sudan.

Veluria—Is a light density opal with velvet surface. When lighted it shows true pink opal fire. It is the highest grade of ornamental opal. It is a blown glass and cannot be pressed.

Druid—Is an opal of somewhat heavier density than Veluria. Has a smooth surface with a slight amber tinge and is furnished either pressed or blown.

Sudan—Is a heavy density opal. It diffuses light transmitted through its surface almost perfectly. It is white, uniform in texture and most satisfactory for true indirect lighting. Pressed bowls regularly furnished, but blown reflectors and bowls can be furnished when specified.

No. 01213 Sudan

No. 01225 Sudan
Panelex Design

No. 3067 Sudan

No. 3043-7 Sudan

Bowl Type—Veluria

OPAL COMMERCIAL REFLECTORS

PACKING DATA

Regent No.	No. in Standard Package	Net Packing Charge for Standard Package	Approx. Shipping Weight, Standard Package	Dimensions in Inches			Recommended "Mazda" Lamp Watts
				Diam.	Height	Holder	
3024- 6" Druid	12	$0.20	18	6	4½	2¼ O	25 or 40
3024- 7" Druid	12	.20	22	7	5	2¼ O	60
3024- 8" Druid	12	.37	47	8	5¾	2¼ H	100
3024-10" Druid	6	.37	58	10	7	3¼ A	150, 200
3024-12" Druid	6	.37	74	12	7½	3¼ A	250
3024-14" Druid	3	.40	52	14	9		300, 400, 500
3041- 7½ Druid	12	.15	28	7½	3½	2¼ O	25 or 40
3041- 9½ Druid	12	.35	36	9½	4⅜	2¼ O	60
3041-11½ Druid	6	.50	28	11½	5⅜	3¼	100, 150, 200
01213- 6" Sudan	12	$0.15	13	6	4½	2¼ O	25 or 40
01213- 7" Sudan	12	.20	15	7	5	2¼ O	60
01213- 8" Sudan	12	.37	22	8	5⅜	2¼ H	100
01213-11" Sudan	6	.52	23	11	7¾	3¼ A	150, 200
01213-12" Sudan	6	.52	28	12	8⅞	3¼ A	250
01213-14" Sudan	3	.40	32	14	10		300, 400, 500
01225- 6" Sudan	12	.15	14	6	4½	2¼ O	25 or 40
01225- 7" Sudan	12	.20	17	7	5¼	2¼ O	60
01225- 8" Sudan	12	.37	23	8	6	2¼ H	100
01225-10" Sudan	12	.75	80	10	7½	3¼	150, 200
3067- 6" Sudan	12	.20	18	6	4⅞	2¼ O	25 or 40
3067- 7" Sudan	12	.20	22	7	5	2¼ O	60
3067- 8" Sudan	12	.37	47	8	6⅛	2¼ H	100
3067-10" Sudan	6	.37	58	10	8	3¼ A	200
3043- 6" Sudan	12	.20	18	6⅜	4⅜	2¼	25 or 40
3043- 7" Sudan	12	.25	22	7	5¼	2¼	60
3043- 8" Sudan	12	.37	47	8½	6⅜	2¼	100
0462- 5" Veluria	12	$0.15	9	5	4½	2¼ O	25
0462- 6" Veluria	12	.15	15	6	4⅞	2¼ O	40
0462- 7" Veluria	12	.20	17	7	5	2¼ O	60
0462- 8" Veluria	12	.37	23	8	5¼	2¼ H	100

No. 01238 Veluria

No. 3030 Druid

No. 01244 Veluria

No. 01245 Veluria

ORNAMENTAL OPAL SHADES

PACKING DATA

Regent No.	No. in Standard Package (Boxed)	Net Packing Charge for Standard Package	Approximate Shipping Weight, Standard Package	Dimensions in Inches			Recommended "Mazda" Lamp Watts
				Diam.	Height	Holder	
01238 Veluria	12	$ .25	25	4	6	2¼	25 or 40
01244 Veluria 74	12	.25	25	5	6	2¼	25 or 40
01245 Veluria 75	12	.25	25	4½	6½	2¼	25 or 40
3030 Druid	36	.54	70	4	6	2¼	25 or 40

Continued on next page

Regent Semi-Indirect Bowls.

For a great deal of lighting work, such as that in schools, drafting rooms and offices, a highly diffused illumination is necessary, for in such rooms the eye is closely applied to detailed work for extended periods. Also, in living and dining-rooms in homes, libraries and assembly halls and similar spaces diffused illumination from fixtures, decorative in effect, is important.

These bowls are supplied in a wide variety of designs ranging from the simple to the highly decorated.

Density of Glass.

The three kinds of opal glass (Veluria, Druid, Sudan) described on the preceding page are used in the Regent Bowls.

Decorations and Coloring.

Bowls are ornamented either by blowing, or pressing, in molds which have decorations cut into them, or by etching the surfaces of glass blown to shape in smooth molds.

Colors are applied in two ways, namely: fired colors, which are applied and then burnt in; unfired colors, which are applied and allowed to harden at ordinary temperature. Fired colors are permanent. Unfired colors are durable, but not guaranteed as to permanency. Colors are light brown, light green, gray, ivory and ivory with orange inside.

Prices.

Complete catalogue and prices sent on application.

3040 DRUID

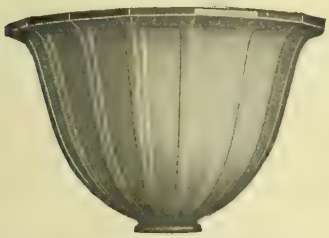
No.	Dimensions—Ins.			Decoration	Color
	Long, Diam.	Short, Diam.	Height		
3040S.	6	2¼	5	Pressed	Natural
3040S.161	6	2¼	5	"	Unf. Lt. Brown
3040S.162	6	2¼	5	"	Unf. Ivory

3034 DRUID

No.	Dimensions—Ins.			Decoration	Color
	Long, Diam.	Short, Diam.	Height		
3034D.	5	2¼	4¾	Pressed	Natural
3034D.161	5	2¼	4¾	"	Unf. Lt. Brown
3034D.162	5	2¼	4¾	"	Unf. Ivory
3034D.163	5	2¼	4¾	"	Unf. Ivy. & Orange

1280 VELURIA, 122

No.	Dimensions—Ins.			Etching	Color
	Long, Diam.	Short, Diam.	Height		
1280V.	4¼	2¼	4½	None	Natural
1280V.122	4¼	2¼	4½	Relief	"



3031 x 11 DRUID OR SUDAN

No.	Dimensions—Ins.			Decoration	Color
	Long, Diam.	Short, Diam.	Height		
3031 x 11D.	11	2¼	7	Pressed	Natural
3031 x 14D.	14	3¼	9	"	Natural
3031 x 11D.161	11	2¼	7	"	Unf. Lt. Br.
3031 x 14D.161	14	3¼	9	"	Unf. Lt. Br.
3031 x 11D.162	11	2¼	7	"	Unf. Ivy.
3031 x 14D.162	14	3¼	9	"	Unf. Ivy.

Same sizes furnished in Sudan Glass.

01206 x 12 VELURIA

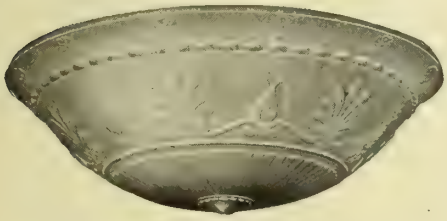
No.	Dimensions—Ins.		
	Long, Diam.	Short, Diam.	Height
01206 x 8V.	8	5	10
01206 x 12V.	11¾	8	15
01206 x 14V.	14¼	10	17¼

Decoration, blown; Color, natural.

1276 x 9 VELURIA, 122

No.	Dimensions—Ins.			Etching	Color
	Long, Diam.	Short, Diam.	Height		
1276x 9V.122	9	9	9½	Relief	Natural
1276x12V.122	12	12	11¾	"	"

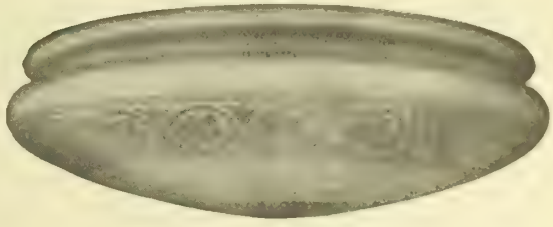
Furnished in Fired Light Brown color and Engraved and Relief Etching.



3037 x 16 DRUID OR SUDAN

No.	Dimensions—Ins.			Decoration	Color
	Long, Diam.	Short, Diam.	Height		
3037 x 16D.	16	16	5	Pressed	Natural
3037 x 18D.	18	18	5¾	"	"
3037 x 20D.	20	20	6¼	"	"

These sizes also furnished in Unfired Light Brown, Unfired Ivory and Ivory outside with Orange inside. Furnished also in Sudan Glass.



1209 x 17 VELURIA, 134

No.	Dimensions—Ins.			Etching	Color
	Long, Diam.	Short, Diam.	Height		
1209 x 13V.	13	12	4	Relief	Natural
1209 x 17V.	17	16	5	"	"
1209 x 21V.	21¼	20	6½	"	"

Furnished in all colors and etchings.

H. W. JOHNS-MANVILLE CO.

Lighting Service and Acoustics

NEW YORK AND EVERY LARGE CITY
SEE BRANCH ADDRESSES IN OUR CATALOGUE IN ROOFING SECTION

SOLE SELLING AGENTS FOR I. P. FRINK CO., MITCHELL VANCE CO., AND GILL BROS. CO.

Products.

SPECIAL REFLECTORS and LIGHTING FIXTURES for Armories, Art Galleries, Banks, Billiard Parlors, Bowling Alleys, Churches, Gymnasiums, Hospitals, Libraries, Offices, Public Buildings, Railway Stations, Restaurants, Schools, Squash Courts, Stores, Theaters, etc.; FRINK'S PATENT WINDOW REFLECTOR and SHOW-CASE REFLECTOR; MIRROR-LINED SHADES; REFLECTORS for Concealed Lighting, Cove Lighting, and Indirect Lighting; CLUSTER REFLECTORS; BORDERS and FOOTLIGHTS; EXIT SIGNS; PORTABLE LAMP GUARDS and SCHOOL LAMP GUARDS; FRINK and J-M CARRIAGE CALLS; J-M LINOLITE LAMPS; MITCHELL VANCE FIXTURES and BRONZES, and GILL BROS. CO. PARIAN GLASSWARE.

For J-M Building Materials see our name in General Index.

Engineering.

Johns-Manville Lighting Service comprises three general departments:

Frink Products: For special illumination, which in many cases are used in conjunction with J-M Linolite systems of illumination.

Mitchell Vance Fixtures and Bronzes: Covering every requirement of artistic or commercial lighting.

Gill Bros. Co. Parian Glassware: For indirect and semi-indirect lighting use.

The maintenance of these three departments in the various J-M branches, under the guidance of local lighting specialists, makes this a complete lighting service that every architect or engineer is invited to avail himself of.

A department on illumination, located centrally in New York, is ready to handle any illumination requirement.

A designing staff is also maintained for the development of lighting fixture designs in all periods.

Frink Reflectors.

These reflectors, fitted with J-M Linolite (tubular) or standard base lamps, insure an even distribution of light without deep shadows and glaring "spots." While the light produced by this system is very powerful, it is soft in quality and is the nearest approach to daylight known. This system not only gives more and better illumination than ordinary systems, but is more economical on account of lower wattage required.

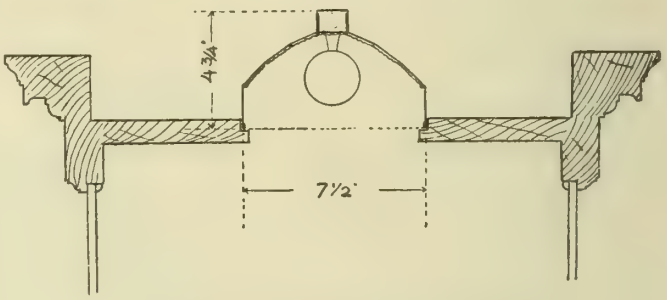
It is particularly effective in concealed source lighting as hereinafter described, and for cove lighting it is unexcelled.

Store Lighting—Window and Show-Case Illumination.

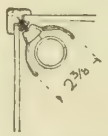
Frink Window and Show-Case Reflectors direct the light on the goods, not on the street outside nor on the aisle floors. The silver-plated, corrugated glass delivers fifty per cent more light on the display with the same current than any all-glass unsilvered reflector on the market. Over 30,000 stores are using Frink and J-M Linolite Systems of lighting to show their merchandise in its finest details and color values, without the detraction of glare.

These reflectors can be finished to match metal work, from the finest bronze to the less expensive metals.

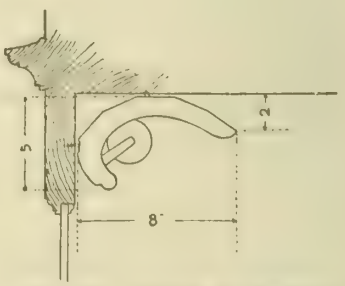
SHOW WINDOW OF LORD & TAYLOR, NEW YORK, N. Y.



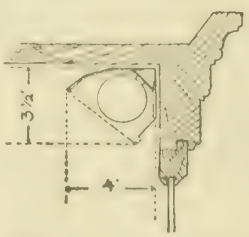
NO. 402. CLEAR STANDING CASE REFLECTOR
Made with or without glass bottom



NO. 401. COUNTER CASE REFLECTOR
Brass frame, glass lined



NO. 100. FRINK STANDARD WINDOW REFLECTOR



NO. 103. WALL CASE REFLECTOR

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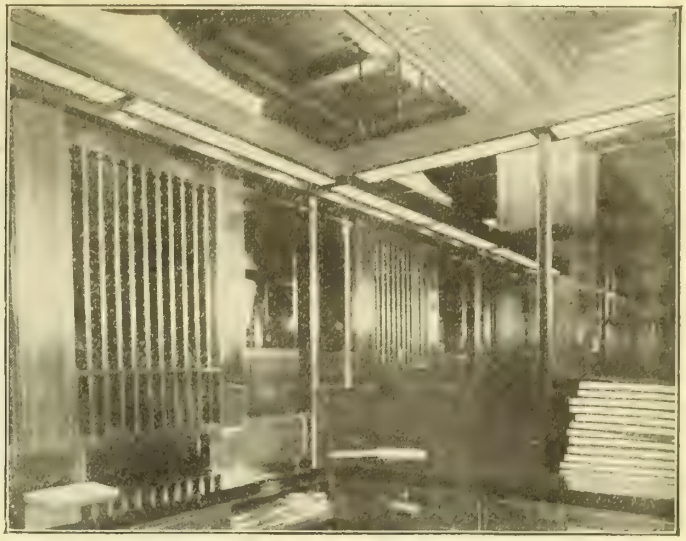
FIRST CONGREGATIONAL CHURCH, SAN FRANCISCO, CAL.
Reid Brothers, Architects, San Francisco
Using J-M Lighting Service



FIRST NATIONAL BANK, DENVER, COLO.
Showing Combination Cornice and Light Diffusing Reflectors for Main and Partition Screens. Send for Typical Plan Main Reflector No. 441, and Partition Screen Reflector No. 441-A

Church Lighting.

The adaptability of Frink reflectors, as well as their perfect diffusing properties, lends them ideally to church illumination, both for general lighting and special illumination about the chancel, glass ceilings, and memorial windows.

Memorial Windows and Glass Ceilings.

The most delicately tinted glass illuminated without spots or shadows. True colors retained. Sunlight and moonlight window effects produced.

Art Gallery Lighting.

We have perfected reflectors especially for the display of pictures and statuary. Many of the finest public and private galleries in the country are "Frink" lighted.

ART GALLERY OF C. H. FRY, SEATTLE, WASH.
Special Reflector back of Skylight

Bank Lighting.

The uniform illumination of the Frink and J-M Linolite Systems gives a perfect diffusion without glare and shadows, and eliminates eye-strain. Systems include reflectors for cornice and screen lighting; for single desks, flat-topped tables, adding machines, etc. Screen reflectors will be made to special design, when desired. Send us preliminary sketches for our suggestions.

Hospital Lighting.

The Frink Operating Table Reflector, now in use by many prominent hospitals, throws a brilliant light on the patient, but protects surgeon's head against heat by means of an ingenious system of ventilating tubes. Specially designed wall and ceiling units are obtainable for ward and room lighting.

FRINK WARD REFLECTORS INSTALLED IN BELLEVUE HOSPITAL, NEW YORK, N. Y.

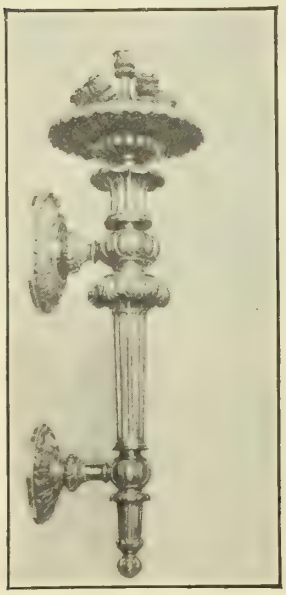
Mitchell Vance Fixtures and Bronzes.

For years the name Mitchell Vance has been synonymous with quality in lighting fixtures and bronzes.

The entire Mitchell Vance equipment is now offered to the architectural profession as a department of Johns-Manville Lighting Service—a department for general lighting of every description.

It follows that, in addition to the I. P. Frink products for special illumination and the glassware of the Gill Bros. Co., you may call on this department for

any lighting unit, whether it be an ordinary commercial fixture or an actual reproduction of a world-famed classic of the metal worker's art.



MITCHELL VANCE FIXTURE

MITCHELL VANCE FIXTURE

Gill Bros. Co. Parian Glassware.

Parian ware is furnished for direct, indirect and semidirect systems of lighting.

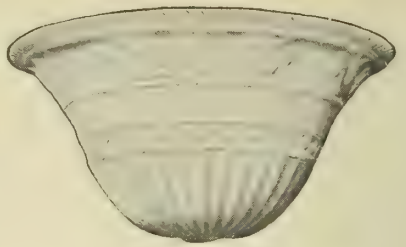
Of these three methods we always suggest the use, where practicable, of semidirect lighting because of its high efficiency when Parian Ware is used.

Parian Ware offers a wide field for the perfect illumination of stores and churches, for auditoriums, for public buildings of every character, and for residences.

It may be furnished in designs of any period, to blend harmoniously with the furnishings.

It includes total enclosing globes, either round or acorn shaped, one- or two-piece spheres, oblong side wall-lights, which can be placed flush with the surface of the wall.

CORRIDOR OF GWYNNE BUILDING, CINCINNATI, OHIO
Using Philippine Seashells as a diffusing Element



GILL BOWL

Our portfolios contain the latest designs for homes, department stores, offices, schools, churches, libraries, clubs, banks, theaters, and many other types of buildings.

J-M Architectural Acoustics.

We are prepared to furnish expert advice and to execute contracts for the correction of defective acoustical conditions in all types of offices and auditoriums, churches, theaters, court houses, schools, hospitals, restaurants, banking-rooms, etc. Such correction can be applied to structures already erected, or can be accurately figured in advance of construction and satisfactory conditions assured in the outcome by proper specifications.

Our acoustical department is in the charge of experts who have devoted themselves to careful research and study of the principles of absorption and design as developed by this new science. We have the best men in the country in this field, and their knowledge is supplemented by our practical experience gained in the technic of construction necessary for correction. A large majority of cases require the use of a certain amount of highly sound-absorptive materials. We have made a specialty of designing materials best suited for this purpose with regard to efficiency, durability and appearance; and have a skilled corps of workmen trained in their application.

ALLEGHENY COUNTY SOLDIERS' MEMORIAL HALL, PITTSBURGH, PA.
Palmer, Hornbostel & Jones, Architects
Treated Acoustically by J M Method

We offer the benefits of our investigations and experience to architects and others without obligation on their part. Whenever an adequate correction will involve the use of materials which we can supply, we will enter into contract to apply these with guarantee of correct results.

LUMINOUS SPECIALTY COMPANY

INDIANAPOLIS, IND.

Products.

Eye-Shield-Diffusers; Reflectors.

Illumination with the Eye-Shield-Diffuser.

The glass of the diffuser proper is very thin and highly translucent, having absorption of about seven and one half per cent. With the recommended reflector, we really secure about twenty-five to thirty-three and one third per cent increase in useful illumination. The reflector, being semi-translucent, throws a soft diffusion of light over the upper area to be illuminated, gradually blending to its greatest volume on the useful plane. This offers to the eye over the entire area to be illuminated no sharply contrasting shadows in the field of vision, thus making this form of illumination very congenial to the eye, relieving eye-strain altogether, and at the same time securing the greatest volume of useful light of low intensity on the plane to be illuminated.

Adaptability.

The Eye-Shield-Diffuser is made for use with all forms of Tungsten and Type " C " lamps, up to and including 200 watt. It can be installed in any fixture now used or in any fixture in which you can place the new Type "C" or gas-filled lamps. No trouble to install. Simply slip the holder over the base of the lamp and snap on the diffuser.

For school work, where consideration is given to conservation of the eye, there is no unit on the market that compares with it.

Relative Advantages.

The high efficiency of modern illuminants, such as the Tungsten lamp, and later the gas-filled lamp, is of great economic value. Therefore, if we should devise some means of shielding the eye from the high intrinsic rays of these modern illuminants, and at the same time preserve the high efficiency and create the proper diffusion or flux of light, we should have an ideal illuminant from both an ocular as well as an economic point of view.

In evolving this new unit, the Luminous Specialty Company's engineers, after careful consideration, made the following classification of the present standard methods of illuminating, together with their objectionable features.

Direct Illumination—In almost all cases this form of lighting unit concentrates the rays of light from the illuminant used and floods the lighting plane with an extremely intense light, very confusing to the eye and the field of vision covering the area illuminated.

Indirect Illumination—This form of illumination is very congenial to the eye, but possesses no points of efficiency whatever, inasmuch as the rays of light radiating from the illuminant used are directed in a field exactly opposite to that of the useful plane. However, this unit can be consistently recommended in the illumination of church auditoriums, art galleries, etc., where artistic effect is desired without consideration as to efficiency or to the expense of current consumption.

Semi-Indirect Illumination—This form of illumination is a sort of compromise between the indirect and direct, and is a decided improvement over both, although the maximum flux of light is direct toward the ceiling instead of toward the useful plane to be illuminated.

Semi-Indirect Units with an Auxiliary Opaque Reflector—This form of unit is possibly less efficient than the semi-indirect without the use of a reflector, inasmuch as it gathers up all light rays radiating in a vertical direction from the illuminant, and redirects them with practically all of their intensity and a spot light effect on the useful lighting plane. This opaque reflector also creates deep shadows, and offers such sharp contrasting lines of intensity over the area illuminated in the field of vision, that it is highly objectionable to the eye.

Note—Practically all the translucent bowls used in every form of semi-indirect illumination now on the market are very thick and absorb an enormous percentage of the light rays radiating from the illuminant used. It therefore seems that the ideal unit would be composed of a highly translucent diffuser immediately under the illuminant, and a semi-translucent reflector placed immediately above the illuminant. This is the theory used in evolving the Eye-Shield-Diffuser.

EYE-SHIELD-DIFFUSER WITH REFLECTOR

Catalogue.

Catalogue, fully descriptive, sent on request.

LUMINOUS UNIT CO.

Brascolite Semi-indirect Lighting Fixtures

ST. LOUIS, MO.

NEW YORK, 253 Broadway BOSTON, 223 Old South Building CHICAGO, 19 S. Fifth Avenue
LOS ANGELES, 1621 S. Grand Avenue PHILADELPHIA, 1020 Land Title Building

Product.

BRASCOLITE, a semi-indirect lighting fixture which does not rely upon the ceiling for reflection. Numerous types are made in more or less ornate design, in metal and composition, both for mounting directly on ceiling and for suspension by one or more chains.

BRASCOLITE
DIFFUSION PLUS REFLECTION
TRADE-MARK

Engineering Service.

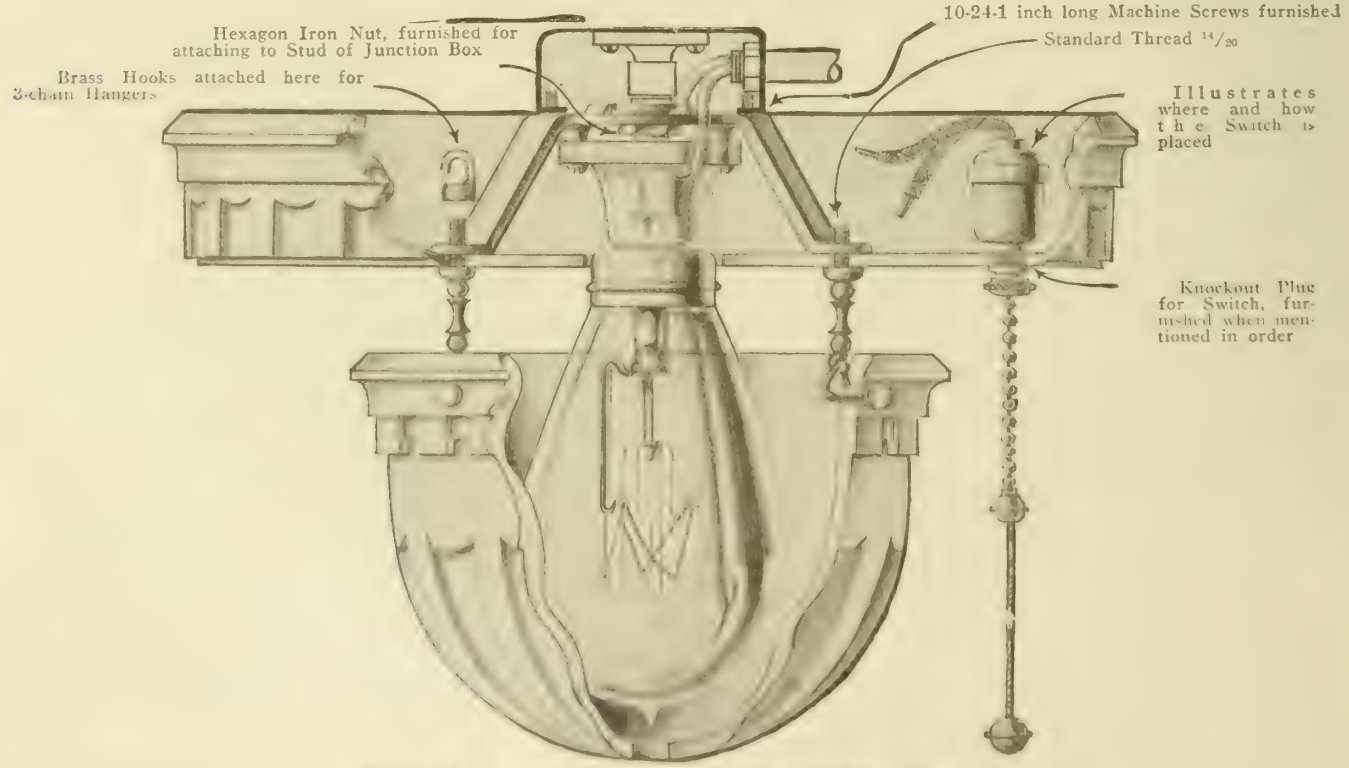
Our Engineering Department will make recommendations as to the proper wattage, location of units, etc., upon receipt of plans from the architect. The large quantity of this work that is handled places us in a position to offer, at no expense to you, the services of experienced engineers who specialize on lighting problems.

Description.

The Brascolite consists of two essential parts, a bowl of white diffusing glass of sufficient density to protect the eyes from the direct rays of the lamp, and yet transmit diffusely a liberal proportion of the light; and a flat reflector, presenting a white depolished surface from which the light is diffusely reflected. The light given is shadowless, white, uniform and soft, and photometric tests show the remarkable efficiency of eighty per cent. The construction and ventilation of the fixture is such that dust does not readily accumulate; but when cleaning becomes necessary, the fixture and lamp may be efficiently cleaned with a dry cloth without detaching any part of the fixture or removing the lamp.

Economy.

With the Brascolite system of illumination it is possible to provide illumination which does not produce eye strain, at the same expenditure for current as with direct lighting, and with thirty-three per cent less current than with ordinary semi-indirect lighting or fifty per cent less than indirect. This economy is effected by eliminating to a large extent the absorption of light by the ceiling of the room to be illuminated. This ceiling at best is a poor reflector, and is not to be compared in efficiency with the specially designed reflector of the Brascolite.



SECTIONAL VIEW, BRASCOLITE SEMI-INDIRECT UNIT

H. G. McFADDIN & COMPANY

Semi-Indirect Electric Units

38 Warren Street

NEW YORK, N. Y.

Products.

MEFCOLITE LIGHTING FIXTURES: SEMI-INDIRECT ELECTRIC, for Hospitals, Public Institutions and Office Buildings; EMERALITE DESK and READING LAMPS.

Mefcolite Lighting Units.

The Mefcolite is a simple, practical, well constructed semi-indirect lighting unit, embodying several new and desirable features (not heretofore combined in a single fixture) which make it particularly suitable for industrial and commercial installations, where first cost and, especially, cost of maintaining the lighting equipment are important considerations.

Cost of Maintenance—Perhaps the most important feature of the Mefcolite is the low cost of maintaining installation because of: (1) Minimum breakage of glassware, as it is not handled after installation. (2) Minimum cost of labor for cleaning. Any lighting system must be kept clean to insure efficiency, therefore installing Mefcolites means efficiency maintained at minimum cost. (3) Minimum cost for alterations on account of adjustable features.

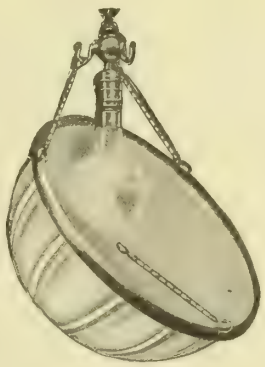
As an approximate basis for calculating distribution and number of units, allow one 200-watt nitrogen unit for each 400 square feet ceiling surface.

Mefcolites are made of best materials throughout, their moderate cost being due to simplicity of design, not to cheap construction. Adapted for type C Mazda or Nitrogen lamps, as they permit ample circulation of air; ceiling shadows are practically eliminated, and the eyes are protected from the glare of these intense lights.

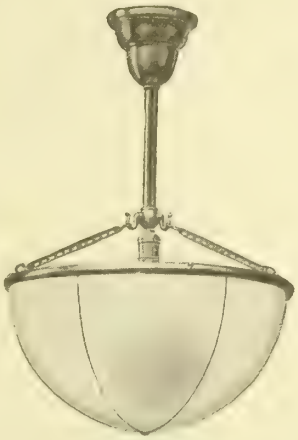
Glass Bowl Support—Bowl is held securely in a strong adjustable ring, locked in position by one of the supporting arms without use of screws, or any clamping devices which require delicate adjustment to avoid breakage due to expansion of heated glass. Should bowl be fractured, being supported on its entire circumference, it cannot fall.

Cleaning—Glass bowl is easily and quickly cleaned by simply unhooking any one supporting arm (see illustration). This avoids handling of glassware after installation.

Supporting Rods — Rods, resembling link chains, are *adjustable in length* by means of positive locking device, casting no shadows on ceiling owing to their thin edge being towards the light.



BOWL DROPPED FOR CLEANING



NO. 0619 MEFCOLITE WITH MARBELITE GLASS BOWL

Type of Lamp—Any type or size of electric lamp can be used in any unit, thus increasing or decreasing light without alteration of fixture.

Types of Glass—Pure white glass, with highest efficiency for diffusion, transmission and reflection of light; smooth inside.

Marbelite, a veined effect similar to white marble; smooth satin finish inside and outside.

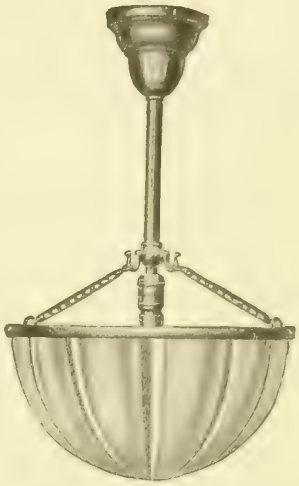
Deflectors — Made of white enameled metal. Suitable where ceiling cannot be used as a reflector.

Complete Fixtures — Fixtures are wired, with keyless socket, insulating joint and glass bowl. Lamp not included.

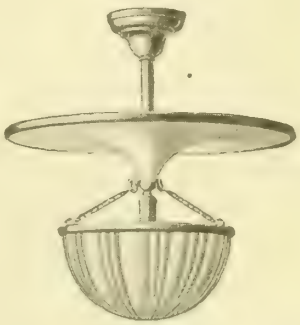
Fixtures regularly furnished with brass stems.

Stock fixtures, 36 inches long to bottom of bowl (special lengths, to order), and with bowl diameters of 10, 12, 14 or 16 inches.

Folder, etc. — Illustrated folder and prices sent on request. Sample fixtures sent on approval.



NO. 0600 MEFCOLITE WITH PRESSED GLASS BOWL



MEFCOLITE WITH DEFLECTOR

STARRETT BUILDING, 5 WEST 30TH STREET, NEW YORK, N. Y.
Mefcolites installed in all offices

EDWARD MILLER & CO.

"Miller" Lighting Fixtures

GENERAL OFFICE AND FACTORIES

MERIDEN, CONN.

SALES ROOMS

NEW YORK, N. Y., 68 and 70 Park Place
PHILADELPHIA, PA., 1727 Chestnut Street
BOSTON, MASS., 201 Congress Street
MERIDEN, CONN., 99 Center Street, at Factory

Products.

"Miller" Lighting Fixtures—Electric, Gas, or Combination Varieties for Homes and Public Buildings, in following styles: Chandeliers, Brackets, Portables, Dining Room Domes, Showers, Semi-Indirect Fixtures, Ceiling Lights, Porch and Out-Door Lamps, Desk and Piano Lamps, Floor Lamps, Bed Lights, Cast Metal Openwork Shades with Art Glass Panels for Portables and Dining Room Domes.

Also Fixtures, Burners and Trimmings for Oil. "Miller" Smokeless Oil Heaters, Brass and Bronze Die and Mould Castings, Incandescent Gas Burners—Inverted and Upright Styles.

Service.

We equip homes and public buildings with lighting fixtures according to specifications and requirements.

Specifications.

Insist on having your architect specify "Miller" Fixtures in your contracts for building or remodeling, and be sure of the best designs and a perfect lighting equipment with the "Miller" reputation.

NO. L 2250—THREE-LIGHT ELECTRIC PORTABLE LOUIS XVI

Height, 24 inches; 16-inch octagon shade of cast metal openwork over art glass panels. Royal gold finish with dark amber glass. Patina brass or royal green finish, with green and amber glass, chain pull sockets, six feet of silk cord and plug. Complete except lamps

NO. E 6244 ELECTRIC CHANDELIER

With four or five lights. Old brass and black finish. Length, 36 inches; spread, 17½ inches; with 6 x 1¼ inch opal candles. Complete price includes silk cord, keyless sockets and No. 1021 silk shades. Takes regular base lamps

NO. E 3237—TWO LIGHT ELECTRIC BRACKET

Old brass and black finish. Projects 4 inches, spread 7 inches, with 4 x 11½ inch opal candles and cast metal base. Complete price includes wire, chain pull switches, candelabra receptacles and No. 1345 silk shades. Takes candelabra base lamps

NO. E 3237—TWO LIGHT ELECTRIC BRACKET

Antique gold finish, blue porcelain medallion. Projects 4½ inches; spread, 6¼ inches, with 5 x 7⅛ inch opal candles. Complete price includes wire, chain pull switches, candelabra receptacles and No. 1345 silk shades. Takes candelabra base lamps

Prices.

Prices with illustrations furnished on application.

MACBETH-EVANS GLASS COMPANY

Lighting Glassware and Fixtures

PITTSBURGH, PA.

BRANCH OFFICES

BOSTON, MASS., 30 Oliver Street
CHICAGO, ILL., 172 West Lake Street
CINCINNATI, OHIO, Pickering Building
DALLAS, TEX., 1812 Live Oak Street
CLEVELAND, OHIO, 1900 Euclid Building
PHILADELPHIA, PA., 1613 Chestnut Street
SAN FRANCISCO, CAL., Rialto Building
ST. LOUIS, MO., Laclede Gas Light Building
TORONTO, ONT., CAN., 160 Bay Street
MEXICO CITY, MEX., Apartado 2692
NEW YORK, N. Y., 143 Madison Avenue

FACTORIES

CHARLEROI, PA.; MARION, IND.; ELWOOD, IND.; TOLEDO, OHIO, AND PITTSBURGH, PA.

Products.

LIGHTING GLASSWARE and FIXTURES for Gas and Electric Illumination:

GLOBES	SHADES	BOWLS
SPHERES	URNS	FIXTURES

Also, PORTABLE LAMPS, PLACQUES, CANDLE SHADES, MIRROR REFLECTORS, etc.

TRADE-MARK

Good Light for the Home.

The principal element of good lighting in the home is restfulness and decorative value, although in some rooms efficiency is more of an element.

In the hall—On entering the home the main thing is the impression to be created; it depends on the surroundings whether soft or brilliant lights are required.

The parlor—Where the parlor is not also the living-room, it should be the most brilliantly illuminated room in the house, but so arranged that it can be either brilliant or subdued, according to the occasion.

The living-room—The living-room calls for several kinds of illumination; gentle illumination for social conversation, clear but gentle light to work or play games by, and portable to read by.

The dining-room—The dining-room should be restful with a slight emphasis upon the table, and with extra light for festive occasions.

In the library—Here efficiency is more important, but the decorative effect of the central fixture should not be lost sight of.

The bedroom—The bedroom should be cheerfully and daintily illuminated, with special lights on each side of the dressing table and a portable at the bedside.

In the bathroom, kitchen and pantry—In these places the light is purely for efficiency.

Beauty—In every place where beauty counts the lighting equipment should be beautiful. It should also take into account the personal element, the things accomplished by different kinds of light. Where costumes are expected to appear brilliant, the light should be brilliant. Jewels do not shine in gentle light.

Colors, especially those bordering on the yellow and pink, are highly favorable to toilettes and complexions, and give a sense of luxury and restfulness.

Good Light in Clubs, Hotels, etc.

The same requirements are offered as for the corresponding rooms in the home—emphasis upon the decorative and gentle color value.

There is no reason why the lighting fixtures should not be in absolute harmony with the architectural and decorative qualities of the rooms.

Good Light in Offices, Stores, etc.

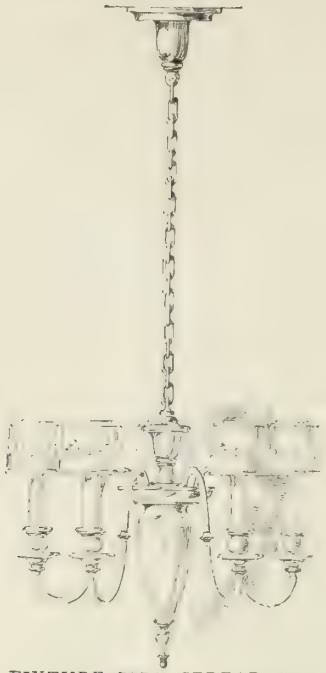
This is divided into two kinds: Lighting for efficiency, and lighting for beauty and efficiency.

In offices or work-rooms—Efficiency lighting is of extreme importance where people are working steadily. It increases the efficiency of employees; as they do more and better work, make fewer mistakes, and there are fewer absences due to illness.

In stores and showrooms—Efficient lighting increases sales, by making seeing easy, and displaying goods and merchandise well.

MACBETH-EVANS (ALBA) LIGHTING EQUIPMENT, [illegible]
13TH AVENUE SCHOOL, NEWARK, N. J.
E. F. GUILBERT, Architect

Continued



FIXTURE 5854, SPREAD 16½",
GLASS 2175 D 202, THEBIAN

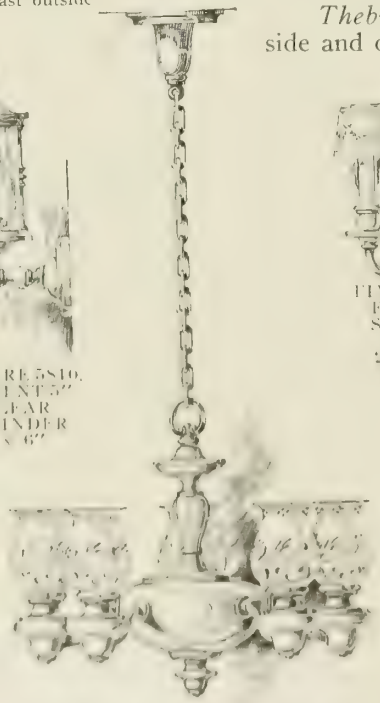
FIXTURE 5869, DIAM. 17",
GLASS 4364 E 130 A, DECORA

FIXTURE 5881, EXTENT 4½"
GLASS 1134 C 411
Sand blast and cut

FIXTURE 57400, DIAM. 22"
GLASS 3762, ALBA
Sand blast outside

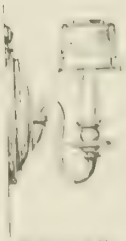
FIXTURE 5824, SPREAD 36"
GLASS 6 30 5340 A 30 5329, ALBA
Sand blast outside

FIXTURE 5810,
EXTENT 5"
CLEAR
CYLINDER
4 x 6"



FIXTURE 5827, SPREAD 18"
GLASS 1134 C 421
Sand blast and cut

FIXTURE 5856,
EXTENT 4"
SPREAD 7"
GLASS
2175 D 202,
THEBIAN



FIXTURE
5855,
EXTENT 5"
GLASS
2175 D 202,
THEBIAN

FIXTURE 89607, DIAM.
11"
GLASS 3675, ALBA
Sand blast outside

Customers are attracted by good light. It does this by its beauty, its cheerfulness, and its efficiency. For most purposes the best kind of light is a soft, gentle light, with as little color as possible in order that goods may appear in true colors. In some stores —for example, jewelry stores—the light should be soft but brilliant, so as to show the jewels to the best advantage.

Efficient lighting is a source of profit to the employer, which is not always appreciated by tenants and landlords. It is one of those " plus " services, of great importance and value.

Macbeth-Evans Lighting Fixtures.

These represent our ideas of the different kinds of lighting fixtures required for these different purposes. The metal part of the fixture is at best a holder, and its place in the scheme is to hold the lighting source where it is wanted, and in so doing to make proper use of its decorative art.

In a room done according to a certain period, the fixtures should be of that period—in a Colonial room, for example, the fixture may be of the Adam design. We have a wide and increasing variety of fixtures covering the different periods.

The kind of light produced depends largely upon the glassware. We make lighting glassware to produce every desirable kind of light.

The principal kinds are:

Alba—A translucent white glass, which gives the softest of light at the least possible cost for current. In most of its forms it is decorative, and of fine marble-like beauty.

Decora—A translucent glass of rather creamy color, lending itself to design and decoration according to various art tendencies, historic periods, or color schemes; and can be treated mauve, buff, brown, gray, pink, etc. This is a very beautiful glass.

Iridile—An iridescent glass, with amber as the prevailing tone, and the iridescence running into all colors. The color effect produced upon the complexion is distinctly favorable.

Thebian—An opal glass, roughed on the outside and decorated in color.

Continued on next page

Lustro—A light topaz iridescent glass.

Cut Glassware—Smooth, frosted glassware, with simple or elaborate cutting, uncolored but decorative.

Leaded Glassware—Clear and frosted glass, with permanent burnt-in decoration to represent leaded glass.

Cuirass—Crystal or colored glass set in art brass.

Simplex Etched—Clear glass design, with frosted background.

Duplex Etched—A two-tone effect (by etching).

Triplex Etched—A three-tone effect (by etching).

Frosted with Crystal Design—The design is clear and pressed into the glass-frosted background.

Opal Glassware—Smooth, frosted, cut or colored.

Crystal, Roughed Inside or Outside—Frosted glassware, plain.

Decorated Glassware—Designs of various sorts.

Co-operation with Architects.

The services of our Lighting Fixture Department are at the disposal of architects in working out actual lighting installations. If an architect will submit plans and data, we will submit suggestions for his consideration.

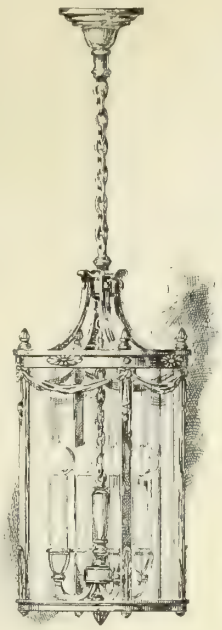
We naturally have practical knowledge of the effect of every kind of glassware in producing light, and are able to give definite information, based upon experience, as to efficient or decorative illumination.

Architects' Portfolios.

We are glad to send to architects, on request, individual portfolios containing our latest equipment for

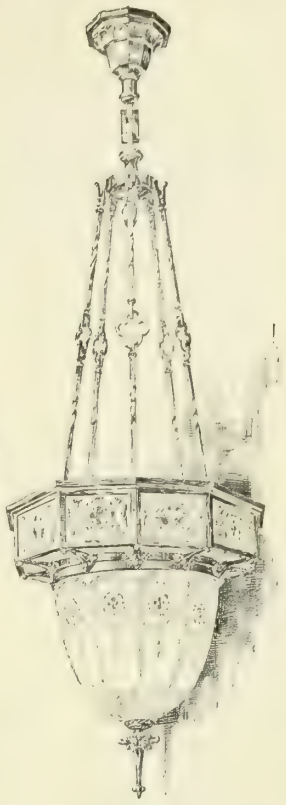
Restaurants	Hotels	Hospitals	Offices
Schools	Banks	Churches	Clubs
Stores	Factories	Libraries	

and other types of buildings.



FIXTURE 44049, CLEAR CYLINDER 10 x 15"

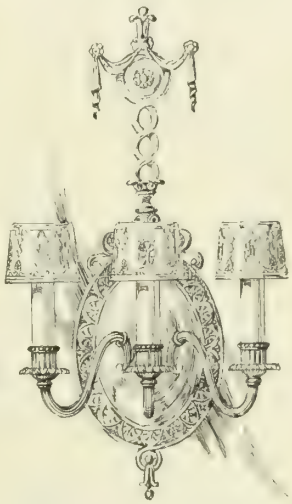
FIXTURE 5880, SPREAD 7" GLASS 1139 C 411, Sand blast and cut



FIXTURE 59920, SPREAD 22" GLASS 1586 E 120, DECORA GLASS AND PLATES

FIXTURE 5841, EXTENT 4" SPREAD 7½" GLASS 1972 E 241 DECORA

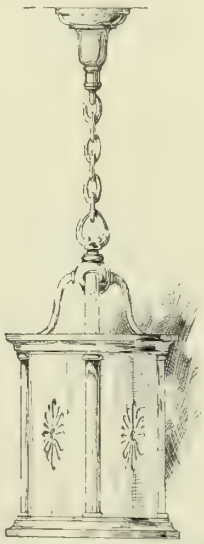
FIXTURE 5840, EXTENT 5" GLASS 1972 E 241, DECORA



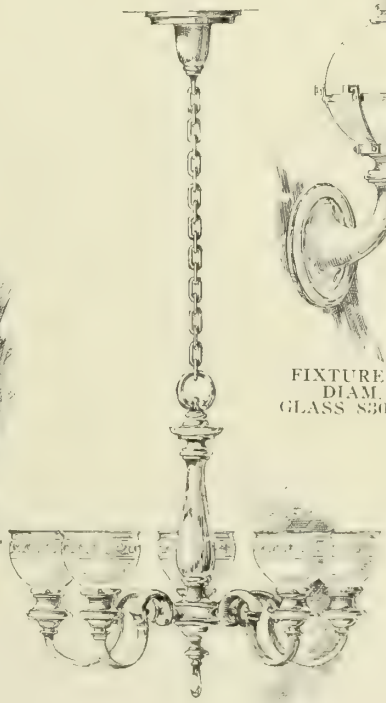
IXTURE 77739, SPREAD 13" GLASS 1574 A E 200, DECORA

FIXTURE 79904, DIAM. 8" GLASS 830, ALBA

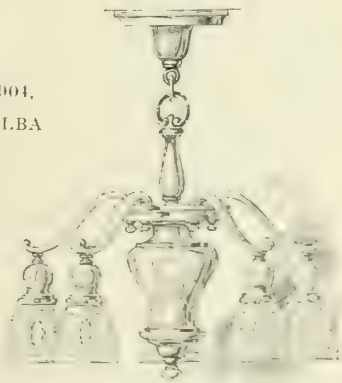
FIXTURE 5824, SPREAD 18" GLASS 1969 E 238, DECORA



FIXTURE 5807, CLEAR CYLINDER 8 x 10" CUTTING 479



FIXTURE 5839, SPREAD 18" GLASS 1972 E 241, DECORA



FIXTURE 5836, SPREAD 17" GLASS 1599 E 167, DECORA

NATIONAL X-RAY REFLECTOR CO.

"Illumination from Concealed Sources"

Illuminating Engineers and Manufacturers of Scientific Lighting Appliances

235 W. Jackson Boulevard
CHICAGO, ILL.
TELEPHONE, Wabash 2982

21 West 46th Street
NEW YORK, N. Y.
TELEPHONE, Bryant 6843

RESIDENT ENGINEERS AND AGENCIES

BALTIMORE, MD., T. H. Bailey, Jr.
BOSTON, MASS., The Pettingell-Andrews Co., 160 Pearl Street
CLEVELAND, OHIO, J. F. Sells
DETROIT, MICH., A. R. Morey, 540 David Whitney Building
KANSAS CITY, MO., H. B. Wheeler, 120 West 11th Street
MILWAUKEE, WIS., L. G. Morgan, 217 Stephenson Building
MINNEAPOLIS, MINN., W. N. Goldschmidt, 529 Security Building
NEW ORLEANS, LA., Interstate Electric Co., Baronne and Perdido Streets
PHILADELPHIA, PA., G. H. Swanfeld, 316 Perry Building
ST. LOUIS, MO., F. E. Lauderbach, 917 Pine Street
SAN FRANCISCO, CAL., The Thomas Day Co., 725 Mission Street
TOLEDO, OHIO, E. R. Gillet
TORONTO, ONT., CAN., G. J. Beattie, 72 Victoria Street

Products and Services.

Our trade-marked products are two: The "Eye Comfort" Lighting System and "X-Ray" Reflectors.

The business of this Company is to perfectly illuminate, from the artistic, hygienic and utilitarian viewpoints, any and every kind of interior using artificial light.

"X-Ray" Reflectors.

Every illuminating need is met by "X-Ray" Reflectors, which are designed for the indirect lighting of buildings of all classes—ecclesiastical, monumental, commercial and residential. The "X-Ray" Reflectors which produce the perfect lighting may be hidden in coves, cornices, pedestals, urns, columns, hanging bowls, art lamps, etc. The variety of unique effects obtainable is limited only by the will and ingenuity of the designer.

Store Window Lighting.

The most attractive shop windows you see are equipped with these powerful and efficient reflectors, the only silvered mirror reflectors which last indefinitely.

Indirect Art Lamps.

These are the most novel lighting fixtures ever devised for the home. The entire room is flooded with actual sunlight, while the lamp shade is lighted with [illegible]

Industrial Plants.

"X-Ray" Reflectors light the whole shop uniformly and brilliantly from concealed sources. No light can get in the workmen's eyes, and accidents are prevented and efficiency is raised remarkably.

Flood Lighting.

The Woolworth Tower, New York City, is lighted from the exterior by "X-Ray" Reflectors. The illumination of buildings is rapidly becoming very popular.

Fine Portfolio Free to Architects.

To give architects concise and usable information, we have published a Portfolio of details and data on interior illumination from concealed sources.

If this beautiful Portfolio is not in your files, send for it. It contains forty sheets of detail drawings, which illustrate the methods of "X-Ray" Reflector installation, for all purposes, in many buildings, by famous architects. As developments in lighting are perfected, new plates are sent you. It also contains a bound book of 52 pages, 12 x 15 inches, which completely covers the planning and specifying of illumination from concealed sources. As a prominent architect said: "It is an encyclopedia of lighting detail." Free to Architects—to others the charge is five dollars.

Co-operative Services.

Let us help you plan your lighting system before the building is started. We have many times saved thousands of dollars in the wiring cost of large buildings, and proportionate sums in smaller ones, and the illumination invariably reflects great credit on the architect. Our corps of twenty illuminating engineers is at your service in the preparation of correct lighting systems. Take advantage of the knowledge of these lighting specialists. Their aid is gratis.

"X-Ray" Reflectors and fixtures are sold by the electrical trade generally. There is an "X-Ray" Reflector for every lighting need. We have lighted buildings similar to yours, and we will gladly tell you about it.

Send for the Portfolio. Its 92 big pages and detail drawings contain complete information.

PLOWMAN, SOLLITT COMPANY, INC.

Reflectors and Lighting Specialties

172 North Franklin Street
CHICAGO, ILL.

Products.

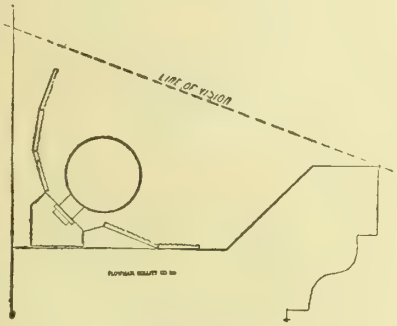
REFLECTORS for Bank Screen, Desk, Cove, Window, Squash Court, Skylight and Exterior Flood Lighting; also, OPERATING TABLE REFLECTORS for Hospitals.

Engineering Service.

Our engineering department will furnish blueprints and sketches of special reflectors to meet special conditions, without charge or obligation to the architect.

Cove Reflector.

The designing of cove reflectors requires careful consideration of all the conditions obtaining in the room to be lighted, and architects should in all cases send blue-prints when asking our engineering department for sketches. The best effects are obtained when the ceiling is arched, and when the cove is placed about one quarter of the width of the room from the ceiling.



COVE REFLECTOR

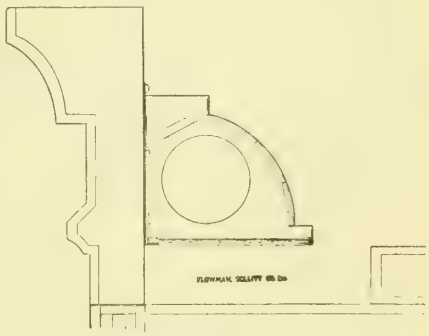
Operating Table Reflector.

The Plowman-Sollitt operating table reflector is undoubtedly the best device of its kind on the market at the present time. Using only 360 watts of current (six 60-watt Mazda lamps), its illumination intensity on the field of operation is 117 foot-candles. The ventilating arrangement of the fixture is such that, notwithstanding this intense light, the rise in temperature on the field of operation after two hours of burning is only seven degrees Fahrenheit. The reflector is built of heavy gauge metal, dust-catching projections are eliminated, the double banks of reflectors are glazed with the finest imported silvered corrugated glass, and the outside of the fixture is finished in hard white enamel. The lower bank of reflectors and the plate glass screen are arranged to swing down for cleaning and relamping.

OPERATING TABLE REFLECTOR

Bank Screen Reflector.

Our system of lighting the working counters in banks eliminates all glare and shadows and, by giving uniform illumination, allows work to be done on any part of the counter without having to move books or papers to get a favorable light, as must be done when brackets and shades are used. We design and manufacture screen reflectors of different shapes and sizes for use where our standard reflector, as shown by line drawing, is not suitable.

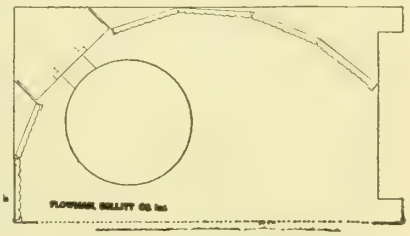


BANK SCREEN REFLECTOR

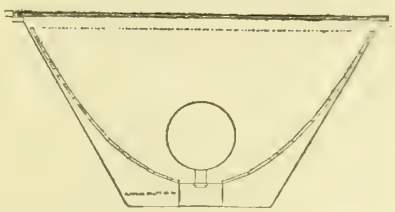
Window Reflector.

Designed expressly to meet existing conditions.

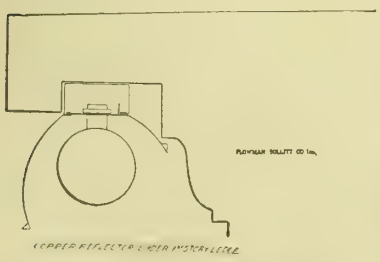
We carry no "stock" reflectors. In most cases trough reflectors are to be preferred to "unit" reflectors, especially so when windows have clear glass or mirror backing. We build reflectors for both Mazda and Nitrogen lamps. Blueprints should accompany requests for sketches or recommendations.



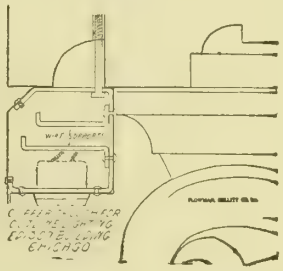
WINDOW REFLECTOR WITH HOUSING

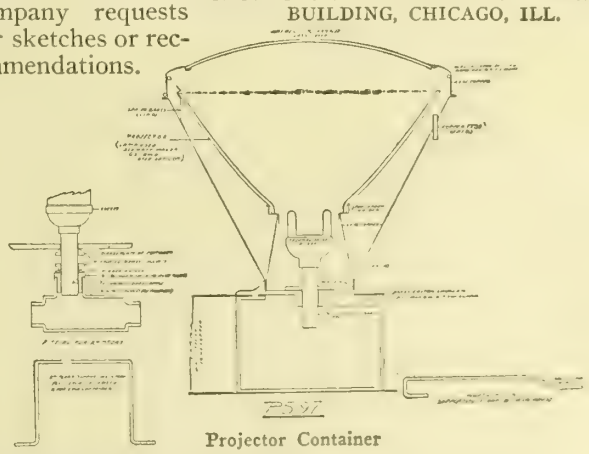


REFLECTOR AT ENTRANCE OF CONWAY BUILDING, CHICAGO, ILL.



Orchestra Hall Building, Chicago, Ill.





Projector Container

Commonwealth Edison Building, Chicago, Ill.
EXTERIOR FLOOD LIGHTING SPECIALTIES

WESTINGHOUSE LAMP COMPANY

Manufacturers of Incandescent Lamps

165 Broadway

NEW YORK, N. Y.

FACTORIES: BLOOMFIELD, N. J.; NEW YORK, N. Y.; MILWAUKEE, WIS.

SALES OFFICES AND WAREHOUSES

ATLANTA, GA., Candler Building
BALTIMORE, MD., 121 East Baltimore Street
BOSTON, MASS., 201 Devonshire Street
BUFFALO, N. Y., Ellicott Square
BUTTE, MONT., 50-52 East Broadway
CHICAGO, ILL., 111 Washington Street
CINCINNATI, OHIO, Traction Building
CLEVELAND, OHIO, Swetland Building
COLUMBUS, OHIO, Traction Building
DALLAS, TEX., Westinghouse Lamp Corp., Cotton Exchange Building
DENVER, COLO., 1621 17th Street
DETROIT, MICH., Dime Savings Bank Building
KANSAS CITY, MO., 1012 Baltimore Avenue
LOS ANGELES, CAL., Van Nuys Building
MILWAUKEE, WIS., 3100 Center Street
NEW ORLEANS, LA., Maison-Blanche Building
NEW YORK, N. Y., 200 Fifth Avenue
PHILADELPHIA, PA., Widener Building
PITTSBURGH, PA., Union National Bank Building
PORTLAND, ORE., 1015 Northwestern Bank Building
ST. LOUIS, MO., Boatmen's Bank Building
SALT LAKE CITY, UTAH, 1604 Walker Bank
SAN FRANCISCO, CAL., 165 Second Street
SEATTLE, WASH., 524½ First Avenue, South
SYRACUSE, N. Y., University Building

EXPORT SALES OFFICE: NEW YORK, N. Y., 165 Broadway

CANADA: Canadian Westinghouse Company, Ltd., Hamilton, Ont.

Products.

Westinghouse Mazda Lamps in every size and style for all lighting requirements.

Description.

Westinghouse Mazda Incandescent Lamps represent the highest attainment in the art of lamp manufacture, and have maintained that reputation for thirty-six years. They can be depended upon for satisfactory service under conditions of all kinds. They are the most efficient lighting units available, furnishing the maximum light at minimum cost for current.

Sizes and Uses.

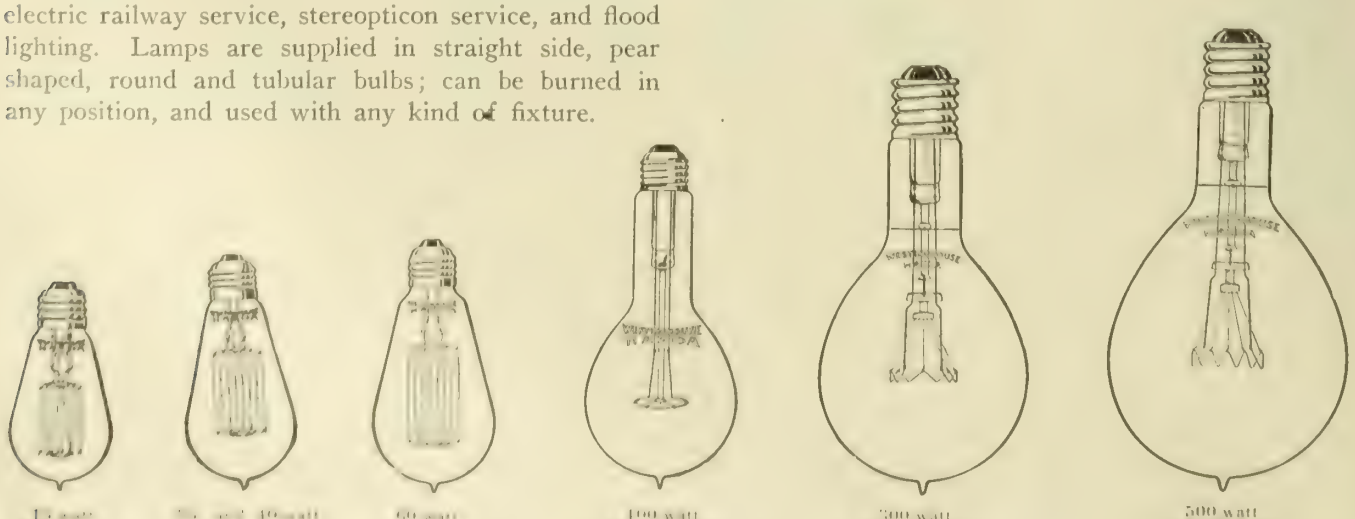
Westinghouse Mazda Lamps are made in all sizes from 2½ to 1000 watts for every standard voltage and ampere range. There are lamps for every conceivable use, including home lighting, store lighting, office lighting, factory and mill lighting, street lighting, steam and electric railway service, stereopticon service, and flood lighting. Lamps are supplied in straight side, pear shaped, round and tubular bulbs; can be burned in any position, and used with any kind of fixture.

Special Lighting Service.

The Illuminating Engineering Department of the Westinghouse Lamp Company has data and information on all kinds of lighting, and the services of this organization are available without charge. Special material covering different phases of lighting and decoration, in convenient form for architects, is prepared and can be supplied on request. The Westinghouse Incandescent Lamp Data Book contains definite information on dimensions of lamps, sizes and styles, with drawings to scale. This book is supplied free on request.

Prices and Discounts.

Complete information as to prices and discounts will be found in the Data Book, and further details may be obtained by application to the nearest sales office or to the general office of the Company.



A FEW POPULAR SIZES OF WESTINGHOUSE MAZDA LAMPS
(One quarter actual size)

AUTOMATIC ELECTRIC COMPANY

Automatic Telephone Equipments

1001 West Van Buren Street

CHICAGO, ILL.

BRANCH OFFICES

NEW YORK, 46 West Broadway
PHILADELPHIA, Bourse Exhibition Department
BOSTON, 445 Tremont Building
ST. LOUIS, 1215 Syndicate Trust Building
PITTSBURGH, 604 First National Bank Building
DETROIT, 525 Ford Building
BUFFALO, Box No. 778
TOLEDO, 813 Second National Bank Building

FOREIGN BRANCHES

WINNIPEG, CANADA, Automatic Telephone Mfg. Co., Ltd.
LIVERPOOL, ENGLAND, Automatic Telephone Mfg. Co., Ltd.
SYDNEY, AUSTRALIA, Automatic Telephones (Australasia), Ltd.
BERLIN, GERMANY, Siemens & Halske
PARIS, FRANCE, Thompson-Houston Co.

Products and Services.

We manufacture and install Automatic Telephone Systems for private and public service.

Also, Push-Button Intercommunicating Systems; Cordless Connecting Telephone Switchboards; Manual Private Exchange Switchboards; Magneto and Common Battery Telephones; Train Despatching Systems; all forms of Telephone Supplies; "Raven" Enameled Wire and "Raven Brand" Telephone Cords.

Automatic Telephone System for Private Exchanges.

This system affords more efficient and economical telephone service by eliminating the human operator and placing the actual connections under the control of the calling party.

The calling party rotates the dial, or calling device (shown in cuts), which sends electrical impulses to the magnets on a switchboard. These magnets, by their operation, establish the desired connection and ring the bell at the called station.

Operation.

To call number 165 the user places his finger in the hole over the figure "1" and pulls the dial downward as far as he can and releases. He performs the same operation for the numbers "6" and "5" and thus establishes a connection with 165. This bell will ring intermittently until the called party answers, or until the calling party breaks the connection by hanging up his receiver.

Should the called line be busy, a busy tone (a distinct buzz) will be heard.

Advantages.

The Automatic stands preëminently as a highest efficiency intercommunicating apparatus. The elimination of the human factor not only quickens but also improves the service. Each part of the mechanical operator or connector in the Automatic System has its own duty to perform and no other. Being mechanical, it makes connections instantly by the simple rotation of the dial.

It will work day or night without additional cost.

It can never listen to private conversations.

The Automatic cannot make a wrong connection through its own carelessness; it cannot give the "busy" signal unless the line is really busy.

Our system, requiring no operators, saves that much in salaries.

We can arrange for any type of special service, such as party lines, conference calling (any number connected at the same time), etc.

The saving in the maintenance and operation of the Automatic System over the same for any other system in four years' time or less will equal the total cost of the automatic equipment.

DESK PHONE

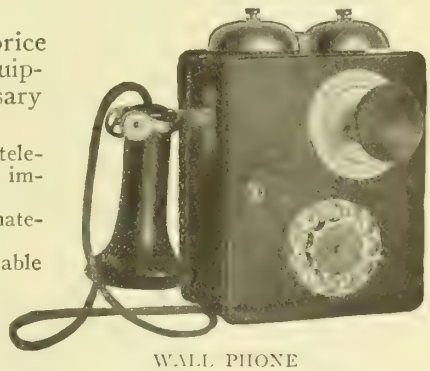
Cost.

To give a price on any sized equipment it is necessary that we know:

(1) Number of telephones to be installed immediately.

(2) Number ultimately required.

(3) Current available for charging storage batteries, i. e., voltage, and whether alternating current or direct current.



WALL PHONE

References.

There are several hundred systems installed in Factories, Hotels, Hospitals, Post Offices, Arsenals, Educational Institutions, Ranches, Offices, Mines, Railroads, Navy Yards, Private Estates, Government Offices, Plantations, etc.

The practicability and advantages of the Automatic System have long been established by installation and subsequent satisfactory operation in over one hundred cities in the United States, and by the adoption and installations made by the Governments of Great Britain, France, Germany, Canada, Australia, Austria, New Zealand, Cuba and the United States for use in Navy Yards, Arsenals, etc.

There are over 600,000 automatic telephones in daily use—all made by us.

THE HOLTZER-CABOT ELECTRIC CO.

Electric Signaling Systems

HOME OFFICE AND FACTORY
115-135 Amory Street
BOSTON, MASS.

BRANCHES
CHICAGO, 6161-6165 South State Street — NEW YORK, 101 Park Avenue — BALTIMORE, 1104 Union Trust Building

Products.

INTERIOR TELEPHONES; ANNUNCIATORS; ELECTRIC BELLS, BUZZERS and PUSH-BUTTONS; SCHOOLS, and HOSPITAL SILENT CALL SYSTEMS; INTERIOR FIRE-ALARM SYSTEMS; ELECTRIC BELLS, BUZZERS and PUSH-BUTTONS; MAGNETO WATCHMAN'S CLOCKS; REACTO FACTORY HORNS; ELECTRIC FIRE-ALARM BELLS for Factories; MOTORS; DYNAMOS; MOTOR GENERATORS for Battery Charging, Bell Ringing, etc.

ESTABLISHED 1875. INCORPORATED 1889. REG. U.S. PAT. OFF.

TRADE-MARK

Specifications.

Specifications or blue-prints with special layouts and wiring circuits will be furnished promptly on request.

Prestige.

Over one hundred and fifty American and Canadian Hospitals are now equipped with the Holtzer-Cabot Signal System. Send for Hospital Bulletin No. 1625.

RECENT INSTALLATIONS

Ohio Valley General Hospital, Wheeling, W. Va., Edward F. Stevens, Architect, Boston, Mass.

Robert B. Brigham Hospital, Boston, Mass., Architects, Shepley, Rutan and Coolidge, Boston, Mass.

St. Elizabeth's Hospital, Boston, Mass., Architect, Edward T. P. Graham, Boston, Mass.

Johns Hopkins Hospital, Baltimore, Md.

Geisinger Memorial Hospital, Danville, Pa., Architect, J. H. Brugler, Danville, Pa.

Specimen Hospital System (see Floor Plan).

The Patient's Call—The patient, pressing the calling button —+, lights the lamp —O— over the door in the corridor, also the private room or ward pilot —OO— as the case may be, and the lamp in the annunciator Ⓢ; this operation also sounding the buzzers ☐✓ momentarily in the duty room and diet kitchen. When a call is made from a ward, a light at the bed of the patient calling —O+ is also lighted.

The Nurse's Response—The nurse, hearing the buzzer or seeing the lamp lighted, locates the station calling by means of the pilot lamp —O— burning over the door of the patient's room. If the call is from a ward, she locates the bed in the room by means of the lamp —O+ burning at its head.

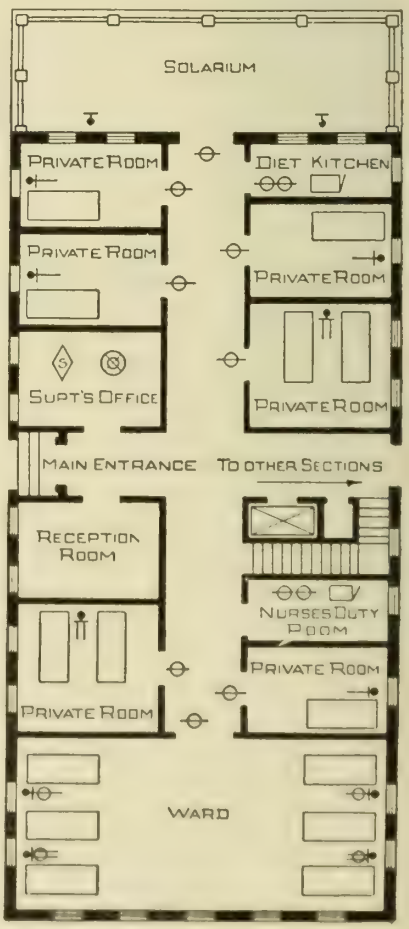
Restoration of Signals—On reaching the bedside she releases the locking button, which extinguishes all signals, unless a call has come in from another patient in the meantime, in which case all signal lights set by the second call will remain lighted and the buzzers will sound momentarily.

52-162
Ⓢ SUPERINTENDENT'S ANNUNCIATOR

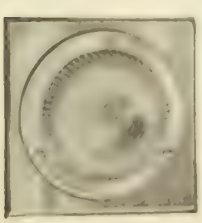
Simplicity and Adaptability—The system is a simple one as here described, and is only one of the many combinations possible with Holtzer-Cabot apparatus. Other pieces of apparatus, such as annunciators for nurses, Ⓝ, or elapsed time recorders, ⊗, may be added. Or any piece can be omitted without impairing the working of the system.

12-162
—+ PRIVATE ROOM STATION

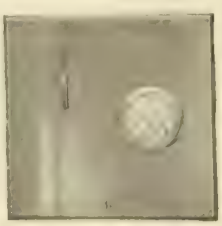
3-162
—O+ WARD STATION WITH PILOT LAMP



FLOOR PLAN SHOWING TYPICAL LAYOUT HOSPITAL SILENT CALL SYSTEM



75-162
—O— CORRIDOR OR PILOT LAMP STATION



37-162
☐✓—O— BUZZER WITH PILOT LAMP

6-162
SOLARIUM CALLING STATION

Continued on next page

Interior Fire-Alarm Systems.

For schools, hospitals, dormitories, factories, etc.

We specialize in the manufacture of various types of fire-alarm stations, bells, horns, motor generator sets and control panels to meet the requirements of State and City authorities and Fire Underwriters.

Complete equipment can be supplied by us for closed or open circuit, plain or code signaling; also for auxiliarized systems.

Telephone and Bell Systems.

For schools, factories, etc.

The telephones and bells illustrated are specially designed for schools, and having such features as dust-proof construction, concealed terminals and durable finish, insure lasting service under exacting conditions.

Holtzer-Cabot bells have long been recognized as standard by leading school architects.

For classroom work, our 48½-151D Type "S" buzzer, mounted on suitable mat is recommended.

As a corridor signal, our 48-151D Type "S" dust-proof bell with proper mat.

For outdoor use, our 100-151D yard gong. This bell is not only weatherproof but absolutely water-tight. It is mounted on a heavy mat, and provided with a heavy wire cage and metal hood to prevent birds from nesting, and as a protection from missiles.

High Grade Annunciators and Telephones.

For residences.

Holtzer-Cabot apparatus is designed for individual requirements.

Holtzer-Cabot annunciators are known for their superior quality of cabinet work, finish, and positive operation.

Furnished for electrical reset, automatic reset, or hand reset.

Where two or more annunciators having like indications are required for various locations, they are wired to operate in unison. This feature is often desirable for residence work.

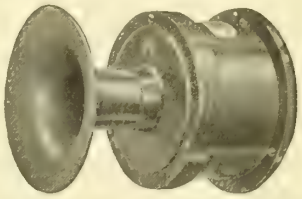
Holtzer-Cabot telephones are made in only one grade, and have long distance transmitters and receivers. Surface and flush mounting types. Finish to match surrounding trim or hardware.

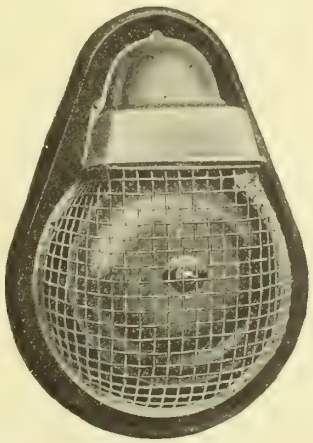
RECENT INSTALLATIONS OF SIGNALING SYSTEMS

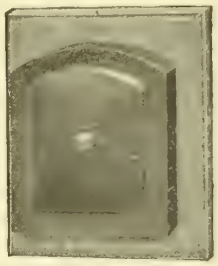
New Bureau of Engraving and Printing, Washington, D. C.
Frick Mansion, New York, N. Y.
Forsyth Dental Infirmary, Boston, Mass.
Children's Hospital, Boston, Mass.
Penn Mutual Life Building, Philadelphia, Pa.
Curtis Publishing Co., Philadelphia, Pa.
Youth's Companion Building, Boston, Mass.
High School of Commerce, Boston, Mass.
Merchants National Bank, Boston, Mass.
Cambridge City Home, Cambridge, Mass.
Harvard University, Cambridge, Mass.
Cambridge Tuberculosis Hospital, Cambridge, Mass.
Gale Hospital, Haverhill, Mass.
City Hall Annex, Boston, Mass.

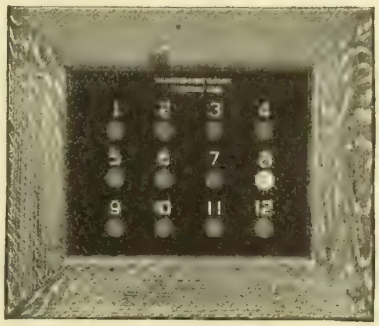
TYPE "NYS" CODE SIGNAL FIRE STATION

92-151D
12-INCH "H-C" ELECTRO-MECHANICAL BELL

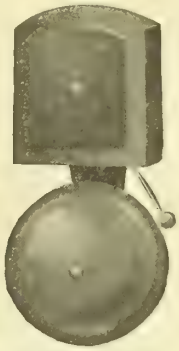

REACTO ELECTRIC HORN


100-151D WATER-TIGHT YARD GONG

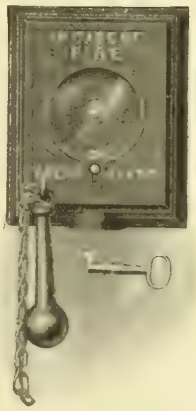

48½—151D BUZZER



6½-150D FLUSH ANNUNCIATOR


48-151D CORRIDOR BELL

1742-148D CLASS ROOM TELEPHONE



NON-CODE SIGNAL STATION

1730-148D FLUSH TELEPHONE

WESTERN ELECTRIC COMPANY

INCORPORATED

Intercommunicating Telephones

NEW YORK	ATLANTA	CHICAGO	KANSAS CITY		SAN FRANCISCO
BUFFALO	RICHMOND	MILWAUKEE	ST. LOUIS		OAKLAND
NEWARK	SAVANNAH	INDIANAPOLIS	DALLAS		LOS ANGELES
PHILADELPHIA	NEW ORLEANS	DETROIT	HOUSTON		SEATTLE
BOSTON	BIRMINGHAM	CLEVELAND	OKLAHOMA CITY		PORTLAND
PITTSBURGH	CINCINNATI	MINNEAPOLIS	ST. PAUL	OMAHA	DENVER	SALT LAKE CITY

Products.

TELEPHONE SWITCHBOARDS and ACCESSORIES, for public and private exchanges; INTERCOMMUNICATING TELEPHONE SETS; CENTRAL BATTERY and MAGNETO TELEPHONES; CABLE; GENERATORS; MOTORS; POWER SWITCHBOARDS.

Also, FANS; SUNBEAM MAZDA LAMPS; WASHING MACHINES, and other HOME ELECTRICAL APPLIANCES; and all classes of TELEPHONE, POWER and LIGHTING APPLIANCES and WIRING MATERIALS.

For Vacuum Cleaners, see our name in General Index.

Western Electric
Inter-phones
TRADE-MARKS

Scope and Output.

The WESTERN ELECTRIC COMPANY are the largest manufacturers of telephones in the world, and are distributors of equipment for every electrical need.

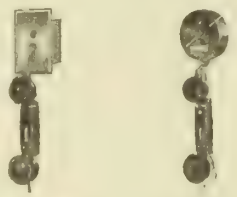
Interphones.

"Inter-phone" is the trade-name adopted by the WESTERN ELECTRIC COMPANY for what is commonly known as intercommunicating telephone apparatus. Inter-phones are intended to provide intercommunication between various points in one or several buildings without necessitating a connection through a telephone switchboard.

Two to twenty-four stations may be used together.

No operator is required, as the signaling and talking circuits can be controlled from any station. This makes it an ideal system for the home, apartment house, hotel, Y. M. C. A. buildings, manufacturing establishments, schools, hospitals, asylums, prisons, and, in fact, wherever there is much intercommunication in or between buildings and no outside calls to an exchange.

Inter-phones are easy to install, easy to use and cost little to maintain.



Flush Type — Non-Flush Type

HAND SET INTER-PHONES

Wooden Set Flush Wall — Desk Set — Metal Flush Wall Set

INTER-PHONE TYPES

Types.

There are three general types of Inter-phones. These are the wall set, desk stand and hand set types—the last the most convenient form, as it has transmitter, receiver and ringing button on one handle. Hand set Inter-phones are of two kinds, flush and non-flush, depending upon the style of apparatus box used. The flush type is for new buildings, and the non-flush for buildings where it is not desirable to cut into walls.

All three types may be used in any one system.

Systems.

Various systems have been developed to cover various service requirements. Price differences are regulated by the advantages possessed by different systems.

Some of the systems are designated as follows:

Code Ringing and Common Talking—In which all bells will ring simultaneously when ringing button on any one Inter-phone is depressed, and in which only one conversation can be carried on at a time.

Central and Outlying Stations—Where one centrally located station can call a number of outlying stations selectively, and vice versa, while the outlying stations can not call each other.

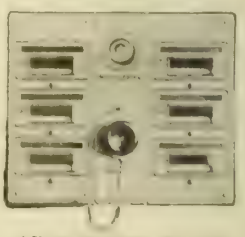
Selective Ringing and Common Talking—Permitting only one conversation at a time, but arranged so that any one station may call any other station selectively.

Selective Ringing and Selective Talking—In which two or more conversations may be held at same time without interference, and in which any one of the stations may be called selectively by any of the other stations.

APARTMENT HOUSE INTER-PHONE
Vestibule Set and Letter Boxes

Apartment House—Arranged for communication between vestibule, janitor and suites.

Code Signaling—Intended for industrial establishments. Provides a mechanical means of signaling by ringing a system of bells by code in order to locate and bring to the telephone an official of the company who may be in a distant part of the factory.



APARTMENT HOUSE INTER-PHONE
Letter Box Units Containing Suite Signaling Buttons

NOTE—Some of the systems designated may be arranged to give service in two or more ways. The central and outlying station system, for example, may be arranged for calling from outlying to central station only with or without an annunciator; for calling from central to outlying station only, or for calling both ways. Apartment house systems also admit of a wide variation in the service that can be given.

Data.

All these systems are fully described in the Inter-phone catalogue, which will be mailed upon request.

WINKLER & REICHMANN

Loud Speaking Telephone Systems for all Purposes

220 South State Street
CHICAGO, ILL.

Products.

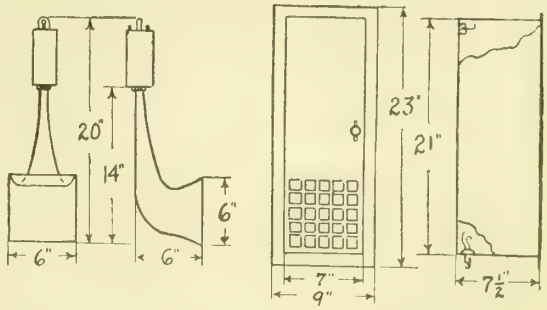
PAGING SYSTEMS, for Business Houses and Railway Stations; "STILL SMALL VOICE" DOCTORS' CALL SYSTEM, for Hospitals; ELECTRICAL PAGE BOY, for Hotels, Clubs, etc.; LOUD-SPEAKING TELEPHONES, for all purposes.

Description.

Systems—System generally installed consists of a talking station located at some central point—such as the telephone switchboard—and reproducer horns located throughout building, all repeating simultaneously what is spoken at talking station. The system is very *flexible,* and any selective switching of reproducer horn circuits is very simple to arrange. Simplicity of equipment and circuits, perfect articulation, and any desired volume, from a very loud maximum down to a whisper, are features of the system.

All equipment of this kind in use is manufactured by us. We handle installations of any size.

Styles—WINKLER & REICHMANN Systems are designed to use either concealed or exposed reproducer horns. The concealed type is in a cabinet with grille door, and set in, flush with the wall.



No. H-401 No. B-501
CONCEALED TYPE REPRODUCER HORN

No. H-401. Special horn for concealing in walls of new buildings. This size suitable for hospitals.
No. B-501. Special Flush Type, containing cabinet to hold Special Horn H-401. A steel cabinet with a grilled door on hinges

The "Electrical Page Boy" for Hotels, Etc.

Operated from the telephone switchboard, locates any guest almost instantly, by enunciating his name distinctly and simultaneously in every gathering point in the building—main corridor, buffet, grill room, barber shop, etc.

R-130A. REPRODUCER HORN, EXPOSED TYPE

"Still Small Voice" Doctor's Call System for Hospitals.

Installed in hospitals built or in process of erection. A perfect paging system, instantly locating any doctor, interne, or nurse who is in the hospital, whether there be one building or a dozen. Call lasts from three to five seconds and is arranged to be just audible.

Full information and data on request.

Specifications.

Mounting Reproducer Horns—The reproducer horns should be located at the most advantageous points. They should be so placed that they will be as nearly on a line with persons' ears as is practicable; this is usually about eight feet above the floor level.

Wiring to Reproducer Horns—The wiring to reproducer horns should be done with rubber-covered twisted pair telephone wire, either No. 16 or No. 19 B. & S. gauge. Where the wiring is in conduit, as on new buildings, use No. 16 wire. Where the wiring is exposed, use the No. 19 interior telephone wire.

Circuits—Reproducer horns are connected in multiple from five to ten on a circuit, depending upon conditions.

Talking Station Equipment—The apparatus at the talking station (that used by the operator) varies according to the size of the installation and the conditions surrounding the installation.

Current for Energizing System—If 110 volts *direct current* is available, provide an outlet of same near the talking station location (generally near the telephone switchboard). If this current is not available, let us advise you on this.

Full Information—We will send you complete and specific information on your problem on request.

Guarantee.

We guarantee our apparatus to be electrically and mechanically perfect when shipped. We will cheerfully replace any defective part within one year from date of purchase. We further absolutely guarantee that every reproducer horn will give any volume up to the same volume as a loud talking voice, with perfect articulation, when same is properly installed and properly used.

REFERENCES

Lord & Thomas, Advertising Agency, Chicago, Ill.
Carson, Pirie, Scott & Co., Wholesale Dry Goods, Chicago, Ill.
D. B. Fisk & Co., Wholesale Millinery, Chicago, Ill.
Chicago Mercantile Co., Wholesale Millinery, Chicago, Ill.
Gage Bros., Wholesale Millinery, Chicago, Ill.
Albert Pick & Co., Wholesale Hotel Furnishings, Chicago, Ill.
Orr & Locket, Wholesale and Retail Hardware, Chicago, Ill.
John M. Smyth & Co., House Furnishings, Chicago, Ill.
Bunte Bros., Wholesale Candies, Chicago, Ill.
Pennsylvania Railway
Union Pacific Railway
Chicago Athletic Club, Chicago, Ill.
Hamilton Club, Chicago, Ill.
Johns Hopkins Hospital, Baltimore, Md.
Massachusetts General Hospital, Boston, Mass.
Presbyterian Hospital, Chicago, Ill.
Presbyterian Hospital, New York, N. Y.
Mercy Hospital, Chicago, Ill.
Royal Victoria Hospital, Montreal, Can.
Wesley Hospital, Chicago, Ill.
Washington Park Hospital, Chicago, Ill.
German Hospital, Chicago, Ill.
Elizabeth Steele McGee Hospital, Pittsburgh, Pa.
St. Louis Childrens' Hospital, St. Louis, Mo.
Presbyterian Hospital, Pittsburgh, Pa.
New Morrison Hotel, Chicago, Ill.
Windermere Hotel, Chicago, Ill.
Lee Huckins Hotel, Oklahoma City, Okla.
B. F. Keith's Theatre, Jersey City, N. J.
Harlem Opera House, New York, N. Y.
Royal Theatre, New York, N. Y.

THE KENT VACUUM CLEANER CO., INC.

ROME, N. Y.

Products and Service.

KENT CLEANERS for Installation in All Classes of Buildings. (Patents granted and pending.)

KENT GROOMERS for Grooming Live Stock. (Patents granted and pending.) Special attention given to installations on model dairy and prize stock farms.

HOSE; TOOLS; all kinds of PIPE and PIPE FITTINGS.

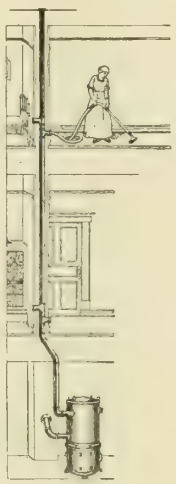
This Company offers the gratuitous service of its engineers in assisting architects and others in planning the installation of Stationary Cleaning Systems and Grooming Plants and will be pleased to have plans submitted for advice and quotation.

Construction.

The operating parts of the Kent Cleaner are limited to a motor and a fan. The motor is placed in the base of the machine, where it is given rigid support, assuring maximum efficiency and minimum vibration and noise.

The fan is constructed of sheet aluminum, scientifically designed to move the maximum amount of air, and is mounted directly on upward extending shaft of motor. The motor shaft, carrying the only moving parts, rotates in two self-aligning ball bearings, submerged in oil supplied through pipes extending to the exterior of machine.

The machine is constructed in sections, so that the motor and the fan are easily removable. A door is placed on front of machine to permit inspection of motor. The machine has an attractive appearance, is cylindrical in form, stands erect, is compact, and can be taken apart very readily.



SECTIONAL DETAIL
Showing method of installing Kent Cleaner System

Special Carpet Tool.

The Kent Carpet Tool is equipped with a pivoted shoe, on which it rests and rocks as it is passed over the carpet. Thus, the nap of the carpet is thoroughly swept in its natural position and renovated, without scaling of the tool with the surface, and so avoids consequent injury to the fabric.

KENT PATENTED CARPET TOOL
Showing sweeping effect of air

Power.

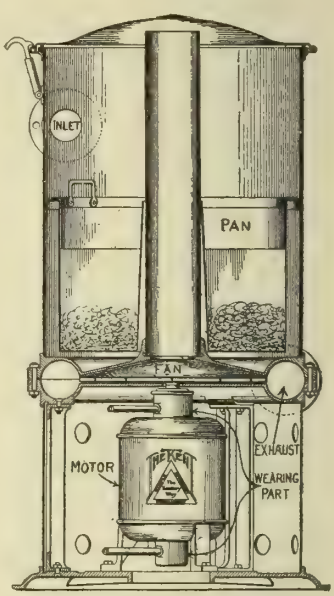
Power other than electric, as described above, may be used with the Kent system, if desired.

Sizes.

The Kent Cleaners are made in sizes from one half horse-power single sweeper, single-stage up; and one horse-power single sweeper, multi-stage up.

Special Advantages.

(a) A cleaner in every sense. (b) Simplest and most compact. (c) Greatest amount of cleaning with lowest cost for electricity. (d) Tools operated with greatest ease. (e) Fewer wearing parts. (f) Less frictional losses. (g) Makes least noise. (h) Works most rapidly. (i) Cleans where others fail. (j) Actual cost less than that of any other cleaner.



SECTIONAL DETAIL KENT CLEANER
Showing all operating parts inside machine

Brief Specification Data.

The following information is furnished to enable architects to embody proper data in specifications:

General Description—Furnish and install a Kent Cleaner [single- or multi-stage type, of desired capacity] for removal of dust, dirt and disease germs from all parts and furnishings in building. Diameter of hose permits articles as large as a half dollar to be picked up.

Machine—Cleaner is to be of cylindrical form, with motor mounted directly on base, and fan and separating chamber supported above motor on legs wholly independent of motor. Separating chamber to be provided with an easily removable dirt pan of large capacity, and to have removable cover secured by "automobile type" spring fasteners. Fan is to be made from suitable gauge sheet aluminum, to have a bronze hub, and to be accurately adjusted to a running balance. Motor is to be direct-connected to fan [size of motor to be specified], and to have a full load speed of 3500 r.p.m. Motor to have self-aligning ball bearings arranged to run in oil; pipes for supplying oil to extend to exterior of cleaner and to be provided with filling and drawing plugs.

Dirt Separator—The dirt is to be *separated* from the air in the cleaner *by centrifugal force and gravity*, and *without the use of bags, screens or other obstructing devices.*

Pipe Lines—The risers and horizontal pipe lines shall be of suitable size for building, but in no instance less than 2½ *inches in diameter.* (Piping of smaller diameter is easily clogged by toothpicks, matches, etc., and produces excessive frictional losses, besides not providing a suction having sufficient volume to do the cleaning efficiently and economically.) Special or smooth bore "drainage" pipe fittings shall be used, and ends of pipe shall be screwed against shoulders of fittings, to provide a smooth surface throughout system.

Hose Inlets—Suitable number of hose inlets, with plugs, are to be provided to permit cleaning to be done with a twenty-five or forty foot length of hose per operator.

Tools—Suitable tools, provided with Kent patented swivel joint, to be furnished, and to include Carpet and Rug Tool, Hardwood Floor Tool, Cement Floor Brush, Wall Brush, Clothes and Upholstery Brush, Tuft Tool, Radiator Tool, Elbow and Tube.

Tools for special work also manufactured.

Specification Sheet—Blank specification sheets will be furnished upon application.

THE SPENCER TURBINE CLEANER COMPANY

CABLE ADDRESS: "SPENTURB"

Manufacturers of Vacuum Cleaners

HARTFORD, CONN.

BRANCH OFFICES IN CHICAGO AND NEW YORK AGENTS IN ALL LARGE CITIES

Products and Services.

SPENCER TURBINE VACUUM CLEANERS.

The Engineering Department will assist engineers or architects in laying out piping systems, drawing specifications, or in any vacuum cleaner problems.

Description.

The machine consists of correctly designed multi-stage impellers, mounted in a correctly designed cast-iron housing on a single shaft, touching nothing but the self-oiling bearings on which they rotate. The motor is direct-connected.

Turbine is designed especially for vacuum cleaning with extremely wide clearances throughout. It is the only high vacuum turbine system.

No cloth bags or screen used or recommended. Excessively large piping and hose not necessary or recommended.

Superiority of cleaning tools and accessories universally acknowledged. This Company is the original patentee of the controllable swivel tool, which reaches the dirt easily; the ball-bearing elbow joint, which makes 1½-inch hose as easy to handle as 1-inch hose would otherwise be; and the rubber clincher hose coupling, which prevents marring floors and furniture.

The Spencer System has been installed in more large buildings within the last few years than all other systems put together.

Standard Specifications.

Vacuum Producer—Shall be of a self-governing type, capable of operating simultaneously ..... sweepers as hereinafter specified, and shall be constructed with clearances of not less than ⅛ inch throughout to avoid injurious wear from dust or dirt. Power required shall not exceed ..... K. W., and beyond the frictional load shall be in direct proportion to number of sweepers in use, using less power as less sweepers are used. To avoid excessive vacuum at outlets near machine, or when less than full number of sweepers are in use, vacuum at machine must at no time exceed 7 inches of mercury.

No auxiliary governing devices of any kind permitted. Bearings shall be of self-oiling type and operate under maximum load and speed without undue heating.

Motor—Shall be mounted on or by vacuum producer and direct-connected thereto; and, if direct current, shall be of commutating pole type with slotted commutator [General Electric, Westinghouse, or equal]. Motor shall be of ample size, and capable of running at full load for two hours without a rise in temperature of over 45 degrees centigrade, and shall run without undue noise or vibration.

Separators—Shall be of the dry type and constructed of steel; provided on pipe lines in basement at or near vacuum producer, and shall be capable of separating 90 per cent of dust. No cloth bags or other appliances liable to rupture by air currents permitted in separators, and construction shall be such that no part of same will receive direct impact of dust.

Piping System—Pipe sizes shall be such as to operate ..... sweepers simultaneously, not over ..... on any one riser. Piping shall be of black mild steel or wrought iron; all fittings shall be of long turn recessed type, except where impossible to get them into available space, in which case, short turn recessed fittings shall be used. Steam, gas or water fittings will not be permitted.

Inlet Valves—There shall be provided 1½-inch inlet valves, so located in building that any point can be reached with 50 feet of hose. These valves shall be spring-closing type, with concealed springs of best quality and of such strength as to insure closing of valves in any position. Valves shall not project more than ¾ inch from wall or baseboard.

Hose—There shall be furnished for each sweeper that plant is designed to operate 50 feet of 1½-inch steel reinforced suction hose, to weigh not over 14 ounces per foot, and that will not be injured by being stepped on. Hose shall be equipped with clincher type rubber couplings, with no metal exposed on either end to mar floors or furniture.

Cleaning Tools—All standard floor tools shall be of best material and workmanship, with renewable wearing surfaces and with slots not less than ⅝ inch wide, and of the swivel type, controllable by operator by a turning movement of handle.

All floor and wall handles shall be of steel tubing nickel-plated, and not less than 1⅛ inch inside diameter. All cleaning tools shall be nickel-plated except those made of aluminum, which shall be polished. All tools shall be positively attached to handles; ordinary friction taper connections not permitted.

The following set of cleaning tools shall be furnished for each sweeper that plant is designed to operate:

One floor handle, with inside diameter not less than 1⅛ inch, equipped with elbow joint and shut-off valve.

One wall handle, in two sections not less than 1⅛ inch inside diameter.

One 5-inch hand tool for upholstery.

One 12-inch carpet renovator, with not less than 7½ square inches area of slot.

One 15-inch open and bare floor tool, with replaceable rubber composition, or felt sides, with not less than 8 square inches slot area.

One 8-inch hand brush and library tool.

One 4-inch round brush.

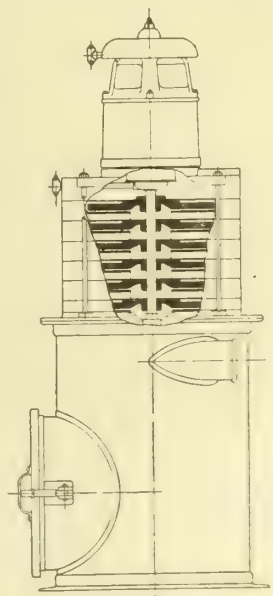
One 15-inch wall brush.

*Capacity Test**—This system shall be subject to what is known as the orifice test. Vacuum Producer shall maintain a substantially constant vacuum under all working conditions, and be capable of maintaining for each sweeper, at the end of 50 feet of hose not over 1½ inch in diameter, attached to any inlet valve in building, a vacuum of not less than 2 inches of mercury while a round sharp-edged orifice ⅞ inch in diameter is wide open, and a vacuum of not less than 3 inches of mercury while a round sharp-edged orifice ⅝ inch in diameter is wide open.

To determine if apparatus meets above specifications, one outlet for each sweeper that apparatus is to operate simultaneously shall be selected by engineer making the test, to each of which shall be attached 50 feet of hose of size used with system.

In all of these hose, except one, shall be placed a plate, ⅛-inch thick with a ⅞-inch round sharp-edged orifice through it. In end of hose where test is to be made shall be placed a hollow metal globe, substantially 4 inches in diameter, to top of which shall be attached a vacuum gauge and inside of which shall be a ⅞-inch round sharp-edged orifice. Vacuum gauge under these conditions should show not less than 2 inches of mercury. A similar test shall be made, using ⅝-inch orifices instead of ⅞-inch, under which condition the vacuum gauge must show not less than 3 inches of mercury.

*NOTE—*Above specifications for heavy duty equipment. If medium duty outfits are desired, change capacity test requirements to a minimum of 1½ inches of mercury with ⅞-inch orifice, and 2½ inches with ⅝-inch orifices. If low duty outfits are desired, substitute 1 inch of mercury for ⅞-inch orifice, and 1½-inches with ⅝-inch orifices.*



SPENCER TURBINE VACUUM CLEANER

Above illustration shows the simplicity and direct action of the Spencer Cleaner. Made in sizes from ½ to 40 H.P. inclusive

RICHMOND RADIATOR COMPANY

INCORPORATED

Manufacturers of " Richmond " Vacuum Cleaners

1480 Broadway

NEW YORK, N. Y.

"RICHMOND"

TRADE-MARK

Product.

" Richmond " Stationary Vacuum Cleaning Machines, including Light, Medium and Standard Service Electric, Standard Service Steam Aspirator, and Heavy Service Electric and Steam Plants.

For Steam and Hot-Water Heating Boilers and Radiators, see our name in General Index.

Facilities.

The Richmond Radiator Company has taken over the factories and equipment of the three pioneer Vacuum Cleaner manufacturing companies, viz., The American Air Cleaning Company of Milwaukee, The Vacuum Cleaner Company of New York, and The Sanitary Devices Manufacturing Company of San Francisco. The " Richmond " line, therefore, comprises all that has proved best since the first commercial application of Vacuum Cleaning apparatus, and includes all approved types of machines, each type having its advantages in its particular field of usefulness.

Patents.

We either control or are licensed under all of the important Vacuum Cleaner Patents, including the Kenney and Matchette patents. Our systems can, therefore, be installed without liability for infringement or damage suits therefrom.

Standard Sizes.

The table below gives general data regarding standard " Richmond " machines up to and including units of ten-sweeper capacity. Larger units are manufactured when required. Correspondence is solicited regarding standard machines or in reference to the many special applications of these systems, concerning which our Engineering Department has collected very complete data.

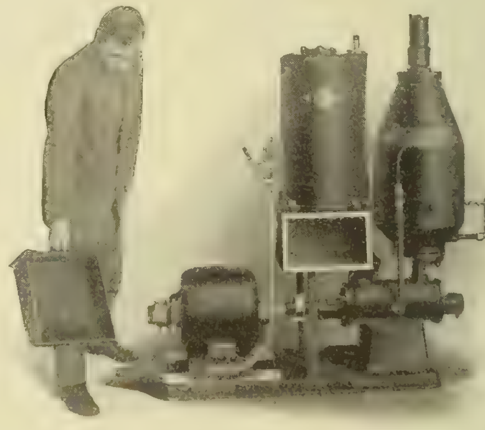


Fig. 1. " RICHMOND " RENOVAK NO. 11-B
One H.P. electrically operated. For residences.
Direct-connected; simple; silent; efficient

DATA OF STOCK SIZES, OF RICHMOND VACUUM CLEANING MACHINES

Data on Larger Sizes and Machines of Special Design on Application

	Number	Horse-Power	Sweeper Capacity	Type of Vacuum Producer	Style of Drive	Type of Dust Separator Tanks	Amt. Hose Supplied	Cleaning Tools	Approx. Shipping W'g't. Lbs.	Air Inlet	Air Exhaust	Extreme Length	Extreme Width	φ Extreme Height
Light Service Electric	51	½	1	Rotary	Belt	1 Dry	24′	1 Set F	500	1½″	1½″	38″	16″	53″
Medium Service	11B	1	1	Rotary	Direct Con.	1 Dry	50′	1 Set B	700	φ 1½″	2″	51″	18″	45″
Electric	21B	2	1	Rotary	Direct Con.	1 Dry	50′	1 Set B	1000	φ 1½″	2″	56″	20″	56″
	1	3	1	Rotary	Chain Drive	2 Dry	75′	1 Set D	1675	2″	2″	41″π	30″	78″
Standard	32	5	2	Rotary	Chain Drive	2 Dry	150′	2 Sets D	2100	2½″	3″	48″π	35″	89″
[illegible]	33	7½	3	Rotary	Chain Drive	2 Dry	225′	3 Sets D	3250	3″	3″	54″π	40″	92″
Electric	34	10	4	Rotary	Chain Drive	2 Dry	300′	4 Sets D	3500	3″	3″	54″π	40″	92″
	35	12½	5	Rotary	Chain Drive	2 Dry	375′	5 Sets D	4500	4″	4″	57″π	46″	107″
	36	15	6	Rotary	Chain Drive	2 Dry	450′	6 Sets D	5000	4″	4″	57″π	46″	107″
	A-1	....	1	Aspirator	....	1 DryΔ	75′	1 Set D	400	2″	2½″	20″	20″	94″
Standard	A-2	....	2	Aspirator	....	1 DryΔ	150′	2 Sets D	560	2½″	3″	24″	24″	94″
[illegible]	A-3	....	3	Aspirator	....	1 DryΔ	225′	3 Sets D	650	3″	3″	24″	24″	94″
[illegible]	[illegible]	....	4	Aspirator	....	1 DryΔ	300′	4 Sets D	960	3″	4″	26″	26″	105″
Aspirator	[illegible]	....	5	Aspirator	....	1 DryΔ	375′	5 Sets D	1000	4″	4″	26″	26″	105″
	[illegible]	....	6	Aspirator	....	1 DryΔ	450′	6 Sets D	1150	4″	4″	26″	26″	105″
	[illegible]	[illegible]	1	§Piston	*Belt	1 Wet; 1 Dry†	75′	1 Set D	1800	2″	[illegible]	80″	28″	60″
	[illegible]	[illegible]	[illegible]	§Piston	*Belt	1 Wet; 1 Dry‡	150′	2 Sets D	5100	2½″	3″	81″π	32″	74″
	[illegible]	10	[illegible]	§Piston	*Belt	1 Wet; 1 Dry‡	225′	3 Sets D	6000	3″	3″	82″π	33″	79″
Heavy	[illegible]	[illegible]	[illegible]	§Piston	*Belt	1 Wet; 1 Dry‡	300′	4 Sets D	8000	3″	4″	91″π	41″	91″
Service	135	[illegible]	[illegible]	§Piston	*Belt	1 Wet; 1 Dry‡	375′	5 Sets D	8800	4″	4″	95″π	41″	91″
Electric and	[illegible]	20	[illegible]	§Piston	*Belt	1 Wet; 1 Dry‡	450′	6 Sets D	9000	4″	4″	98″π	41″	102″
Steam	[illegible]	20	[illegible]	‖Piston	*Chain Drive	1 Wet; 1 Dry‡	525′	7 Sets D	12400	5″	5″	133″π	39″	103″
	[illegible]	25	[illegible]	‖Piston	*Chain Drive	1 Wet; 1 Dry‡	600′	8 Sets D	12600	5″	5″	133″π	39″	103″
	[illegible]	25	[illegible]	‖Piston	*Chain Drive	1 Wet; 1 Dry‡	675′	9 Sets D	12800	5″	6″	133″π	39″	93″
	[illegible]	[illegible]	10	‖Piston	*Chain Drive	1 Wet; 1 Dry‡	750′	10 Sets D	18000	5″	6″	180″π	47″	105″

[illegible] only. * Steam driven piston pumps are direct connected, i. e., mounted "in tandem" [illegible]

[illegible] † Pedestal type tanks

[illegible] ‡ Flat bottom tanks

§ [illegible] ‖ Horizontal piston pumps.

[illegible]

φ Can be furnished with 2″ air inlet. Orders should so specify if to be connected to 2″ piping.

[illegible]

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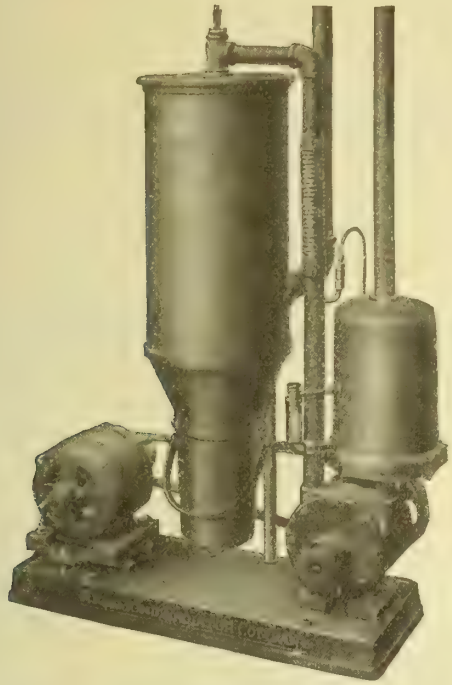


FIG. 2. "RICHMOND" RENOVAK NO. 51
½ H.P. Electrically operated. For small residences. Silent operation

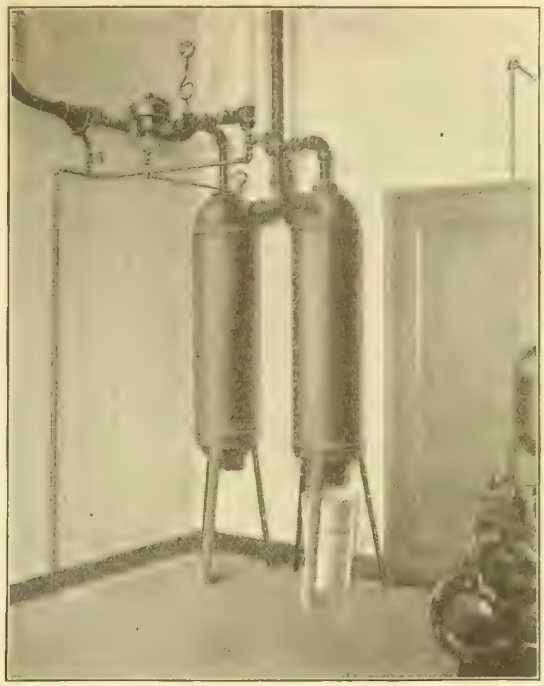


FIG. 3. A TYPICAL ONE-UNIT STEAM ASPIRATOR INSTALLATION

Recommended where high pressure steam, 65 lbs. or more, is available. First cost low and cost of operation and maintenance reduced to minimum by means of automatic steam cut-off device. No machinery; no moving parts; efficient; reliable. Installed in many prominent buildings throughout the United States

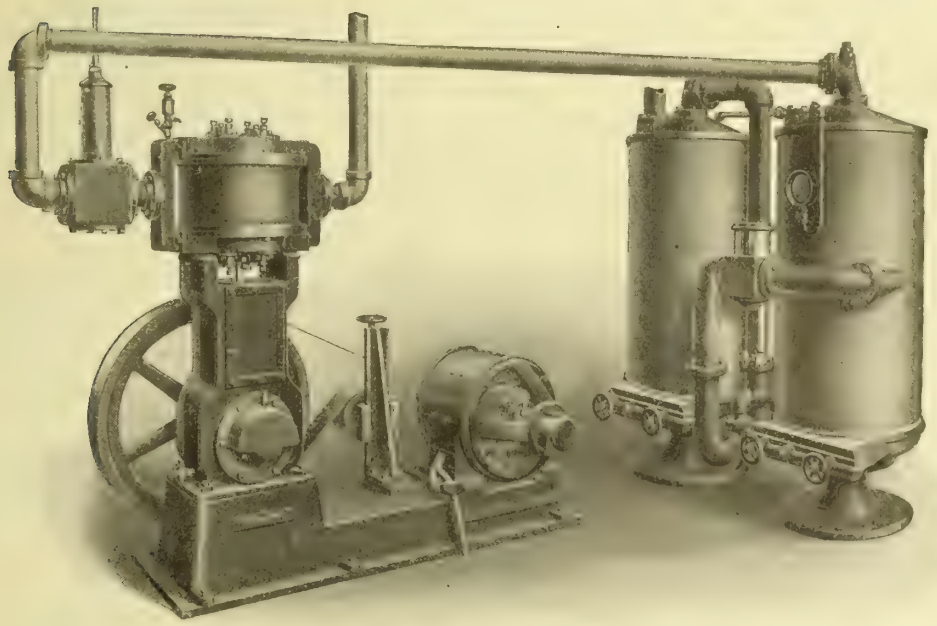


FIG. 4. "RICHMOND" NO. 133, POSITIVE DISPLACEMENT, RECIPROCATING PISTON TYPE MACHINE, WITH WET AND DRY DUST SEPARATORS

Adapted for heavy, continuous service in large buildings of all kinds. In large units, pumps are horizontal (see Data of Stock Sizes)

THE UNITED ELECTRIC COMPANY

Stationary Vacuum Cleaning Systems

FACTORIES AND GENERAL OFFICES

CANTON, OHIO TORONTO, CAN.

CABLE ADDRESS, "TUEC, CANTON"

EXPORT REPRESENTATIVES

NEW YORK, N. Y., BERGER MANUFACTURING CO., 11th Avenue and 22d Street

SALES OFFICES IN ALL LARGE CITIES

Products.

TUEC STATIONARY VACUUM CLEANERS and EQUIPMENT for every type of building.

Patents.

Manufactured under patents owned by us and licensed under the basic Kenny patent.

Record.

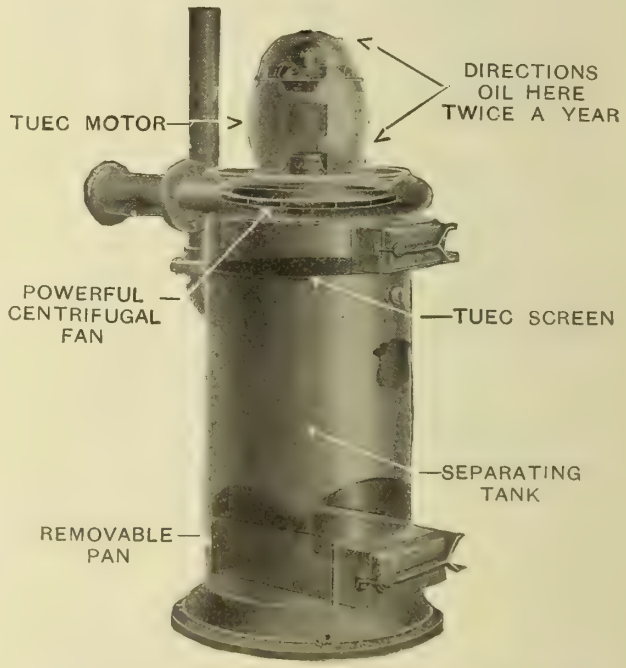
The Tuec has won first place in all open National competitive engineering tests.

The Tuec was awarded the "Grand Prize"—"The Highest Award"—at the Panama-Pacific International Exposition in San Francisco, 1915.

Various Uses.

Tuecs are designed for use in residences, apartments, offices, schools, churches, hotels, theaters, stores, clubs, banks, railway stations and terminals, car barns, stables, dairy barns, garages, flour mills, silk mills, rubber factories, telephone exchanges, laundries, carpet-cleaning establishments, other factory work, and for many other special uses, including special equipment for cleaning swimming pools.

There are more than nine thousand installations in buildings as classified above.



SECTIONAL VIEW OF STANDARD TUEC MACHINE

Design.

Simplicity is paramount in the design of the Tuec machine. The only moving parts are the motor shaft and the fan directly attached to it. The fan revolves without metallic contact in its snail or housing. The only two wearing surfaces are the two S. K. F. self-aligning, annular ball bearings, which run in a constant oil bath in dustproof cavities. No cloth bags, baffle plates or screens that rupture air currents are used. The motor is designed for only one purpose, is as simple as can be made, and runs at all times underloaded. No automatic relief valves or vacuum breakers are necessary. There is no necessity for vacuum control. The vacuum is constant under all conditions. The large air displacement permits of the use of tools of liberal sizes. Our tools are larger than others and can therefore do cleaning with less strokes and in a shorter time.

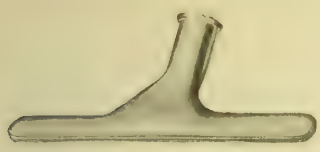
Types and Sizes.

The Tuec is manufactured in fifteen sizes and 265 styles.

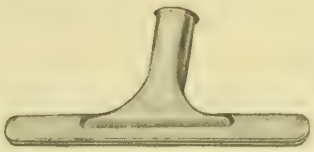
Types in electrically driven apparatus in sizes from one half to ten horse-power with capacities from one to six sweepers, are standard and carried in stock. Larger machines are made specially.

Independent power machines, to be driven from engines or other power, are listed in capacities from one to six sweepers. Larger machines made specially.

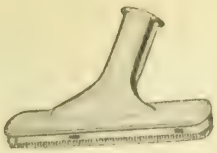
Continued on next page



No. 1. Carpet Renovator

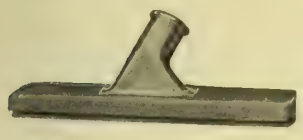


No. 2. Hardwood Floor Cleaner



No. 3. Wall Brush

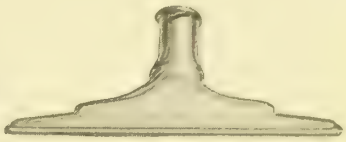
No. 32. Swivel Bare Floor Tool



No. 15. Oriental Rug Brush

No. 30. Cement or Bare Floor Tool

No. 7. Radiator Tool



No. 33. Swivel Carpet Renovator

No. 4. Upholstery Cleaner

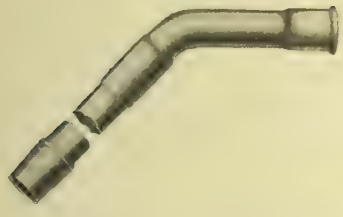
No. 14. Library Brush

No. 6. Tuft Cleaner

No. 8. Clothes Brush

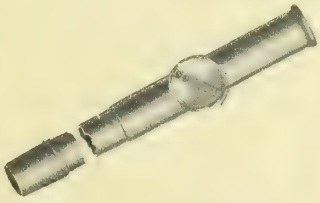
No. 9. Pistol Grip Handle

No. 5. Duster



No. 50. Curved Handle

No. 10. Straight Handle



No. 51. Handle with Shut off Valve

No. 18 Bristle Horse Brush

No. 17 Steel Tooth Currycomb

Hose

No. 1. Light weight, canvas covered
No. 2. Army duck, canvas covered
No. 3. Light weight, rubber covered
No. 4. Heavy rubber covered

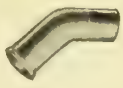
No. 13. Hose Terminal

No. 12. Hose Conductor

No. 21. 45° Swivel Ell

No. 39. 90° Ell

No. 20. Swivel Hose Terminal



No. 19. 45° Handle Ell

4½ inches

3½ inches

Inlet Valves, any finish desired

Inlet Shanks in lengths from 1 to 4 inches
Choice of lengths does away with the use of nipples

TUEC TOOLS AND ACCESSORIES

SPECIAL RUBBER TOOLS FOR TELEPHONE, STREET CAR AND OTHER ELECTRICAL WORK

Other Special Tools Made to Order

Specification.

General Description—The work included in this specification shall be the furnishing and installing of a complete vacuum cleaning system for the removal of dust, dirt and other litter from carpets, rugs, floors, walls, stairs, draperies, furniture, shelves, and other furnishings and fixtures throughout the building, and for conveying said dirt, dust, etc., to a suitable receptacle located in an approved part of building.

The complete system shall include all necessary piping and wiring, cleaning tools, hose, separator, exhauster, motor and all other appurtenances required to make a complete working system.

Machine—The vacuum producer shall be capable of operating simultaneously ..... sweepers, and shall operate without overload under full-load conditions.

The machine, in all of its details, shall be made of the best materials suitable for the purpose, shall be of approved design and construction, and shall be so proportioned and constructed as to handle the volume of air required at the least possible loss, as hereinafter specified.

It shall be the centrifugal fan type, with single impeller fan, direct-connected to motor.

The entire machine to have no more than two bearings, both of which shall be self-aligning ball bearings running in a constant oil bath, in dustproof oil cavities, and shall be self-oiling.

The power required shall not exceed ..... kilowatts when operating under full-load conditions. The power, when all inlets of the system are closed, shall not exceed sixty per cent of that of full load.

No auxiliary governing devices of any kind whatsoever will be permitted. The vacuum maintained shall be constant under all conditions.

Motor—Motor to comply with the standard requirements of the American Institute of Electrical Engineers, and the National Electrical Code.

Motor to be of such size that when operating under test conditions, it will not be under less than three fourths, nor more than full-load conditions.

It shall operate continuously without undue heating.

The maximum rise in temperature shall not exceed forty degrees centigrade above the room temperature, under full-load conditions.

Separator—There shall be but one dry separator, made of steel, rigidly supported. No cloth bags to be used. Screen, if used, to be so placed that nothing but the lightest dust can lodge thereon. Gravity to be the means of separation.

Separator to have clean-out doors and hand-holes placed so as to allow for the easy removal of the accumulated dirt, etc., to give access to the interior of the separators.

Inlet Valves—The inlet valves shall be so located in the building that any point can be reached with fifty feet of hose.

These valves to be furnished in any type desired, but for public building work, lock-type valves are preferable.

Valves to be finished to correspond with the hardware finish in the building.

Piping—All pipe shall be standard black mild steel or wrought iron.

All fittings to be preferably "Tuec Special Fittings." If unavailable, fittings should be long turn recessed "Durham" fittings.

All pipe lines to conform to the actual conditions found in the building, such as offsets to clear structural steel, etc.

All lines shall be installed in a neat and workmanlike manner.

The pipe and fittings shall be free from stains and tool marks if exposed. When exposed pipes pass through any wall, floor or ceiling, they shall be fitted with nickel-plated escutcheons, securely fastened to the pipes or the building.

The "burs" formed by cutting the pipe shall be reamed out to full inside diameter, leaving the interior of the pipe smooth.

All pipes shall be screwed "home" in the fittings, and all joints in pipe lines shall be made by butting the ends of the pipe in the couplings, to insure a perfectly smooth and uniform interior surface, free from all places for the lodgment of foreign substances passing through the pipe during the sweeping of the building.

Easily accessible horizontal clean-out plugs shall be placed at the bottom of all risers and at every turn of the pipe where possible, and should be placed so that the flow of air is never directly into them.

All pipe lines shall be supported on, or stayed by, iron strap hangers, securely anchored to the building, and spaced not over ten feet apart.

No pipe shall be less than two and one half inches inside diameter, to insure the safe passage of such articles as matches, toothpicks, etc.

Pipe to be designed to avoid excessive friction losses, and be capable of attaining a velocity of not less than forty feet per second.

Cleaning Tools—All sweeping tools shall be as light as possible, consistent with long life, and shall be made of phosphor bronze or aluminum. If of phosphor bronze, they shall be heavily nickel-plated.

All handles shall be made of seamless brass tubing, heavily nickel-plated.

Bare-floor tool and carpet renovator to be of swivel type, controllable by the operator by a turning movement of the handle, if desired.

The following tools shall be furnished for each sweeper that the plant is designed to operate:

One Floor Handle, No. 10, No. 50 or No. 51.

One Wall Handle, No. 10½.

One 15-inch Carpet Renovator (swivel if desired), No. 1 or No. 32.

Continued on next page

One 15-inch Bare Floor Tool (swivel if desired), No. 2 or No. 33.
One Upholstery Cleaner, No. 4.
One 10-inch Wall Brush, No. 3.
One Duster, No. 5.
Additional standard tools furnished if desired:
One 15-inch Cement Floor Tool, No. 30.
One Carpet Brush Tool, any length from 10 to 24 inches, No. 15.
One Library Brush, No. 14.
One Clothes Brush, No. 8.
One Radiator Cleaner, No. 7.
One Tuft Cleaner, No. 6.

Hose—The hose furnished shall be one and three quarter inches inside diameter.

All hose shall be the best quality rubber hose, reinforced in an approved manner, and sufficiently strong to prevent the collapse of the hose under the highest vacuum obtainable with the vacuum producer installed, and to prevent collapse or distortion if stepped on.

Couplings of the hose of smooth bore, of the same inside diameter as the hose. They shall be of the smallest possible outside diameter, well rounded, to prevent the injury of furniture and building trim.

Hose to be of weight suitable to the nature of the work to be performed.

Tests—The system shall be tested under what is known as the orifice test.

The vacuum producer must maintain practically the same vacuum under all working conditions, and be capable of maintaining one-inch Hg. (mercury), with a displacement of eighty cubic feet of free air per minute for each sweeper, at the end of the longest length of hose required in actual operation, which is to be the standard hose used by the system.

The test shall be made as follows:

With the standard handle for system attached to the standard hose, of longest length required, the cleaning tools shall be removed from the handles, the open end of same to be provided with adjustable orifice, and to be adjusted to give one-inch Hg. (mercury) directly back of said orifice. The air displacement shall then be measured through said orifice by means of a standard anemometer or Pitot tube.

Facilities.

Our factories are the largest in the world devoted exclusively to the manufacture of stationary cleaners. Every part of the machine and motor is manufactured in our factories. A large stock of machines is always carried to insure prompt delivery.

Co-operative Service.

We gladly offer the services of our engineering department to aid in your cleaning problems.

SOME PROMINENT TUEC INSTALLATIONS

APARTMENTS
Esplanade, Baltimore, Md.
Garden Court, Detroit, Mich.

OFFICES
Conway Memorial Building, Chicago, Ill.
L. C. Smith 42 Story Building, Seattle, Wash.

SCHOOLS
Washington Irving High School, New York, N. Y.
North East High School, Kansas City, Mo.

CHURCHES
St. Margaret's Church, Boston, Mass.
Grace M. E. Church, New York, N. Y.

HOTELS
Belvidere, Baltimore, Md.
Onondaga, Syracuse, N. Y.

THEATERS
B. F. Keith's, Lowell, Mass.
American Motion Picture Co., Utica, N. Y.

STORES
The Bedell Company, New York, N. Y.
J. W. Robinson, Los Angeles, Cal.

FRATERNAL INSTITUTIONS
Scottish Rite Cathedral, Dallas, Tex.
Elks Temple, Columbus, Ohio

CLUBS
Detroit Athletic Club, Detroit, Mich.
The Peninsular Club, Grand Rapids, Mich.

ASSOCIATIONS
Y. M. C. A., Brockton, Mass.
Y. W. C. A., Denver, Colo.

BANKS
Merchants Bank Bldg., Indianapolis, Ind.
Fifth-Third National Bank, Cincinnati, Ohio

RAILWAY STATIONS
Pennsylvania Station, Ft. Wayne, Ind.
New York Central Station, Rochester, N. Y.

HOSPITALS
Sibley Hospital, Washington, D. C.
St. Mary's Hospital, Niagara Falls, N. Y.

MISCELLANEOUS
Geneva Car Barn, San Francisco, Cal.
Northern Ohio Traction Car Barn, Canton, Ohio
O. C. Barber, Cow Barn, Barberton, Ohio
E. W. Field, Cow Barn, Montello, Mass.
E. Richard Meinig Silk Mill, Reading, Pa.
Knight Tire & Rubber Co., Canton, Ohio
Meade's Bakery, Baltimore, Md.
General Electric Research Laboratory, Schenectady, N. Y.
Bell System, Court Exchange, Pittsburgh, Pa.
Automatic System, Rochester Telephone Co., Rochester, N. Y.
American Steel & Wire Co., Cleveland, Ohio
Quaker Oats Co., Akron, Ohio

RESIDENCES
Tuec machines are installed in thousands of residences, ranging in price from $4,000.00 up, and include such homes as are owned by Henry Ford and Howard E. Coffin of Detroit, Mich., R. B. Mellon of Pittsburgh, Pa., and John Wilkinson (chief engineer, Franklin Motor Car Co.), Syracuse, N. Y.

WESTERN ELECTRIC COMPANY

INCORPORATED

Stationary Vacuum Cleaners

NEW YORK	ATLANTA	CHICAGO	KANSAS CITY	SAN FRANCISCO
BUFFALO	RICHMOND	MILWAUKEE	ST. LOUIS	OAKLAND
NEWARK	SAVANNAH	INDIANAPOLIS	DALLAS	LOS ANGELES
PHILADELPHIA	NEW ORLEANS	DETROIT	HOUSTON	SEATTLE
BOSTON	BIRMINGHAM	CLEVELAND	OKLAHOMA CITY	PORTLAND
PITTSBURGH	CINCINNATI	MINNEAPOLIS ST. PAUL	OMAHA DENVER	SALT LAKE CITY

Products.

WESTERN ELECTRIC - STURTEVANT STATIONARY VACUUM CLEANERS.

Western Electric TRADE-MARK

For Electrical Equipment for every need, see our pages in General Index.

Stationary Vacuum Cleaners.

The Western Electric-Sturtevant Vacuum Cleaner has behind it the fifty years' experience of the largest manufacturer in the world of air moving machinery; and the reputation of the builder of the motor insures the very highest grade apparatus possible for the electrical part of the equipment.

Scope of Use—Western Electric-Sturtevant Stationary Vacuum Cleaners are built in a range of sizes suitable for installation in buildings ranging from a small residence to the largest theater, hotel or office building.

Co-operative Service.

We are prepared to give architects the advice and suggestions of our corps of engineers trained in the details of the installation of vacuum cleaner systems for all classes of service.

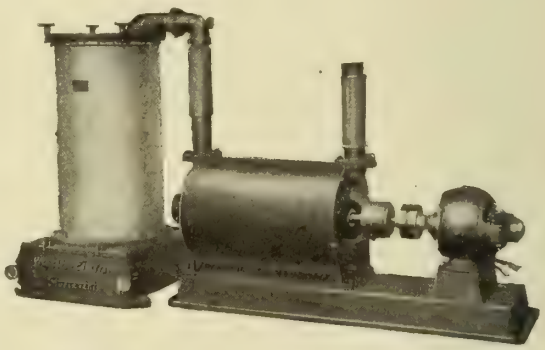
Design and Type.

Western Electric stationary cleaners are of the multi-stage centrifugal fan type, which is generally conceded to furnish the simplest, most flexible, most efficient, and in all respects the most satisfactory system for vacuum cleaning.

No belts, gears, water seals, suction regulators, or auxiliary devices are required. There is just one moving part—the fan directly mounted on the motor shaft; and the sole points of contact of the moving part are in the automatically lubricated ball bearings of the fan and motor shaft. It is this extreme simplicity which appeals particularly to the prospective builder. Semi-annual oiling and occasional emptying of the dustpan are all the attention the cleaner should require over a long term of years.

Separation of dirt is complete before the air passes through the fan into the exhaust. This is accomplished by a closely woven inverted bag which, by reason of its mounting, is practically self-cleaning.

It is unquestionably the most efficient and satisfactory separator on the market. Since absolutely no dirt passes through the fan, closer clearances between the fan and fan casing are possible than where only partial separation is obtained. This insures higher efficiency, and more than offsets the slight resistance in the bag. Another most important advantage is that there is no possibility of clogging the clearance between the fan and the fan casing, or of dirt getting on the fan and throwing it out of balance.



HORIZONTAL STATIONARY VACUUM CLEANER

DATA FOR VACUUM CLEANERS

Tools Working at one time	List No.	Current D.C.	Current A.C.	Current Phase	Over-All Dimensions Length, Ins.	Width, Ins.	Height, Ins.	Weight, Lbs.	Tool Equipment No. of Sets	Tool Equipment Set No.
HORIZONTAL TYPE										
1	C	D.C.	A.C.	1-2-3	86	25	52	1250	1	38
1	D	D.C.	A.C.	1-2-3	94	25	52	1500	1	39
2	C_2	D.C.	A.C.	1-2-3	86	26	52	1425	2	38
2	D_2	D.C.	A.C.	1-2-3	90	26	52	1600	2	38
2	E	D.C.	A.C.	1-2-3	91	26	52	2500	2	39
3	F	D.C.	A.C.	1-2-3	93	30	96	3000	3	39
4	G	D.C.	A.C.	2-3	93	30	96	3400	4	39
VERTICAL TYPE										
1	A	D.C.	A.C.	1-2-3	26	24	54	490	1	38
1	B	D.C.			26	24	64	630	1	38
1	B		A.C.	1-2-3	26	24	64	630	1	38
2	B_2	D.C.			26	24	64	580	2	38
2	B_2		A.C.	1-2-3	26	24	64	580	2	38

Voltage—110, 220 and 550. Price includes tool equipment.

TOOL LIST NO. 38

Comprises the following: Upholstery tool, 12-inch hardwood floor tool, 10-inch wall brush, 12-inch carpet tool, 1¼-inch curved floor handle, and 25 feet of 1½-inch hose.

TOOL LIST NO. 39

Comprises the following: Hardwood floor handle, 1½-inch curved floor handle, upholstery tool, 12-inch floor tool, 15-inch wall brush, 1½-inch taper coupling, and 50 feet of 1½-inch hose.

METHOD OF REMOVING CAPACITY DUST PAN

VERTICAL STATIONARY VACUUM CLEANER

Data.

We have published a 52-page book on vacuum cleaning, comprising technical installation data, complete specifications for cleaners and piping, with a bulletin describing in detail the construction of vacuum cleaning plants.

BOSTON LIGHTNING ROD COMPANY

BOSTON, MASS.

BRANCH OFFICES

WORCESTER, MASS., 31 Foster Street
PROVIDENCE, R. I., 585 Plainfield Street
FALL RIVER, MASS., 89 Bank Street
NEWPORT, R. I., 47 Spring Street

Products.

Manufacturers of and contractors for the installation of Modern LIGHTNING CONDUCTORS on Buildings of all Classes.

Description.

Conductors are made in the forms illustrated, of ⅜-inch diameter round, solid, pure copper, soft drawn, of high conductivity; and of ¾ Star pattern, galvanized iron, specially formed and coated.

Both types of rods are of ample weight, surface, and conductivity to afford protection under all conditions.

Connections.

Threaded joints and copper couplings are employed throughout, and all points are of copper, gilded or platinum plated. Conductors are attached by clips of same metal used, being fastened to wood with brass screws and to metal work with solder. Metal finials, ridges, skylights, eaves troughs, etc., are connected to the lightning conductors, and all ground conductors terminate with sheets of heavy copper bedded in charcoal, sunk to an electrically tested level, or to water service pipes, or running water. Conspicuousness is avoided in all our work, and is made second only to dependability.

Efficiency.

The principle on which lightning conductors are based is strictly scientific, and is accepted by electrical engineers and men of science generally.

These equipments possess the special merits of exceptional durability, of being very inconspicuous, and having ample weight, surface, and conductivity. During thirty-five years' experience in the equipment of many thousands of buildings, we have not had a building or its contents damaged by lightning.

Estimates.

Plans figured and estimates submitted upon receipt of complete information. Installations made in any part of the United States.

Guarantee.

Equipments are installed to conform with architectural requirements; are electrically tested throughout, and fully guaranteed.

Approvals.

Our equipment is approved by the Underwriters' Laboratories, Inc.

SOLID COPPER ROD

Booklet.

Send for descriptive, illustrated booklet.

References.

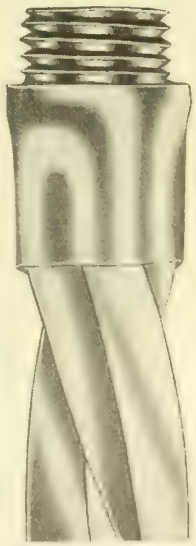
We have installed conductors for those mentioned below, and gladly refer to them.

ARCHITECTS AND CONTRACTORS

Edison Electric Illuminating Co., Boston, Mass.
B. F. Smith Construction Co., Pawtucket, R. I.
Andrews, Jacques & Rantoul, Boston, Mass.
Preston Moore Electric Co., Holyoke, Mass.
Derby, Robinson & Shepard, Boston, Mass.
Shepley, Rutan & Coolidge, Boston, Mass.
Norcross Brothers Co., Worcester, Mass.
Frank Chouteau Brown, Boston, Mass.
Elliot C. Brown Co., New York, N. Y.
Bigelow & Wadsworth, Boston, Mass.
Ewing & Chappelle, New York, N. Y.
Arthur F. Gray, M. E., Boston, Mass.
Charles K. Cummings, Boston, Mass.
Hewitt & Brown, Minneapolis, Minn.
Roberts & Hoare, Manchester, Mass.
William Williams, Providence, R. I.
Geo. Hunt Ingraham, Boston, Mass.
Casper Ranger Co., Holyoke, Mass.
Edwin J. Lewis, Jr., Boston, Mass.
Griggs & Hunt, Waterbury, Conn.
French & Hubbard, Boston, Mass.
George F. Newton, Boston, Mass.
John Cowan, Inc., Baltimore, Md.
F. Joseph Untersee, Boston, Mass.
Maginnis & Walsh, Boston, Mass.
Cram & Ferguson, Boston, Mass.
Lord Electric Co., Boston, Mass.
Matthew Sullivan, Boston, Mass.
Charles E. Patch, Boston, Mass.
Charles T. Main, Boston, Mass.
Little & Brown, Boston, Mass.
Ira G. Hersey, Boston, Mass.
James Purdon, Boston, Mass.
J. T. Wilson, Nahant, Mass.

PRIVATE OWNERS

Rt. Rev. Mgr. James E. Cassidy, Fall River, Mass.
Judge W. H. Moore, Prides Crossing, Mass.
Herbert Dumaresque, Center Harbor, N. H.
James E. Whitin, North Uxbridge, Mass.
R. F. Haffenreffer, Jr., Fall River, Mass.
Charles F. Choate, Jr., Southboro, Mass.
R. Livingston Beeckman, Newport, R. I.
F. Lothrop Ames, North Easton, Mass.
Harris Whittemore, Naugatuck, Conn.
Alfred G. Vanderbilt, Newport, R. I.
Charles A. Kidder, Southboro, Mass.
Joseph O. Hobbs, Portsmouth, N. H.
Norman B. Ream, Thompson, Conn.
Samuel Winslow, Worcester, Mass.
Henry L. Higginson, Boston, Mass.
Franklin MacVeagh, Dublin, N. H.
Bradford Norman, Newport, R. I.
Prof. A. V. Phelps, Westerly, R. I.
Park Painter, Watch Hill, R. I.
Clarence Dolan, Newport, R. I.
Jas. J. Storrow, Boston, Mass.
Robert Winsor, Boston, Mass.
R. T. Crane, Jr., Chicago, Ill.
Russell Robb, Boston, Mass.
H. A. Pevear, Lynn, Mass.



GALVANIZED STEEL ROD

STANLEY & PATTERSON, INC.

Battery Sets, Electrical Signal Apparatus, Interior Fire-Alarm Systems and Floor-Outlet Boxes

23 Murray Street and 141-145 West 36th Street
NEW YORK, N. Y.
TELEPHONE, Barclay 5200

Products.

Patterson Battery Sets, Faraday Enclosed-Type Signal Bells, Faraday Fire-Alarm Systems, Faraday Electro-Mechanical Gongs and Patterson Floor-Outlet Boxes.

Battery Sets and Their Usefulness.

Patterson Battery Sets are designed for the operation of Electric Signal Apparatus, Bells, Annunciators, Telephones, Elevator Signals, Door Openers, Fire-Alarms, Time Stamps, Program Clocks, Secondary Dial Clocks controlled by a Master Clock, etc., in every class of building work.

For the above service, a Patterson Battery Set, of proper size, will (without attention or maintenance expense) furnish a never-failing supply of electric current for a period of from two to three years.

In all Patterson Battery Sets the renewal of cells is as easy as the renewal of an incandescent lamp; and, though done quickly by the most inexperienced person without tools or technical knowledge of any sort, can be done only in one way and that the right way.

General Types and Adaptability.

Patterson Battery Sets are made in all voltages and all ampere-capacities; the four general type outfits are here noted:

"Series" Sets—Models "BB" and "BSC," shown in Figs. 1 and 2, are best adapted for use where current requirements are light and infrequent, i.e. fairly intermittent.

Fig. 1. Model "BB-4" Patterson Battery Set
Series Box Type
6 Volts—25 Amperes

Fig. 2. Model "BSC-6" Patterson Battery Set
Series Cabinet-Type. Flush Steel Cabinet
6 Volts—25 Amperes

"Multiple-Service" Cabinets— Model "BMC," shown in Fig. 3, are the best outfits for use where current requirements are heavy and the electrical equipment is frequently used. In "Multiple-Service" Cabinets, the current drain is distributed over the *entire bank of cells in the cabinet,* and the greatest economy is obtained by using battery cabinets of the "BMC" type. If, through any accidental cause, one of the series of cells in a "BMC" Cabinet should fail, all other rows or series of cells in the cabinet will *automatically continue working without the manual operation of a "throw-over" switch or similar device.*

Fig. 3. Model "BMC-36" Patterson Battery Set
"Multiple-Service." Surface Steel Cabinet
6 Volts—75 Amperes

"2-Circuit-Reserve" Cabinets—Model "BDC," shown in Fig. 4, is recommended where a complete reserve battery is considered necessary, but particular attention is called to the fact that the "BDC" Cabinet requires the *manual* operation of throwing the switch,

Continued on next page

as against the *automatic* continuanec of service in a "Multiple-Service 'BMC'" Outfit.

FIG. 4. MODEL "BDC-26" PATTERSON BATTERY SET
"2-Circuit-Reserve." Surface Steel Cabinet
6 Volts—25 Amperes

"4-Circuit-Reserve" Cabinets—Model "BUC," shown in Fig. 5, is more advantageous than the "2-Circuit-Reserve 'BDC'" Cabinets, because it permits the use of the battery in *multiple* which will always be found most desirable and economical; in addition to the advantage of being able to use a "BUC" Outfit in multiple, the *series* connection is at times extremely desirable, for when the cells are almost run down, with the Series connection apparatus may be operated for a considerable period without signal failure, while a new set of cells is being procured.

FIG. 5. MODEL "BUC-26" PATTERSON BATTERY SET
"4-Circuit-Reserve." Surface Oak Cabinet
6 Volts—50 Amperes

Heavy-Service Battery Cabinets.

"Multiple-Service 'BMC,'" "2-Circuit-Reserve 'BDC,'" and "4-Circuit-Reserve 'BUC'" Cabinets (shown in Figs. 3, 4 and 5) will always save much more than they cost; these heavy-service cabinets provide a battery power plant that will do the most severe work, *even that which has heretofore been thought to require a motor-generator or storage battery, and do it with absolute satisfaction at a cost of approximately one-tenth the expense of motor-generator operation.*

A 50-ampere Patterson Battery Cabinet will do the same work four times as long; 75-ampere Patterson Battery Set, eight times as long; 100-ampere Patterson Battery Set, ten times as long; 150-ampere Patterson Battery Set, sixteen times as long as the old-style battery installation; *never, of course, exceeding limit-life of a Patterson-Columbia Cartridge-Cell—two to three years.*

Protection Circuit-Fuses.

"Series Cabinets 'BSC,'" "Multiple-Service Cabinets 'BMC,'" "2-Circuit-Reserve Cabinets 'BDC,'" and "4-Circuit-Reserve Cabinets 'BUC'" all have individual circuit fuses, automatically protecting Battery Set, in case of accidental short-circuit, without disturbing operation of apparatus other than on the circuit in trouble. Ample space is provided at top of cabinet for distribution of circuit-wires and a sufficient number of terminal-screws is provided, so that never more than one wire need be put under a single screw; each terminal is plainly numbered, so easy reference to various circuit-connections can be made by consulting Circuit-Directory Frame on inside of cabinet door.

Long Service-Life of Patterson Battery Sets.

The extreme long service-life of a Patterson Battery Set suited to work in hand will, in a few years, save its entire cost. This is due to the following:

(1) Absolute "full-carrying" capacity of the contacts, which completely does away with loss of battery power always present in "old-style wired-up" battery set. (2) Housing of the "wax-sealed" end of cell in practically an air-tight cup, away from the effect of temperature change, etc. (3) Complete elimination of leakage due to dampness on bottom of cell or on cartons. (4) Positive prevention of accidental "getting-together" of zinc terminals, as has always been most troublesome in the "old-style wired-up" battery set.

Motor Generator Type Cabinets.

75-, 100- and 150-ampere "Multiple-Service" Cabinets will accomplish results in the heavy-service work where Motor-Generator and Storage Battery were at one time thought necessary.

Durability and Dependability.

A Patterson Battery Holder will last a lifetime, as every part is made of the best material and designed to give the user an outfit which will be a constant source of satisfaction, year-in and year-out.

Screw-cups are renewable if necessity ever demands. Heavy contact springs of genuine phosphor-bronze make absolute, positive contact with the brass-capped carbon electrode of the cell; the contacts automatically clean themselves every time a battery is screwed in or out of the Set, and the heavy pressure of the phosphor-bronze center contact-spring acts as a locking-device on the cell, making it impossible for the same to back-turn.

Once Connected, Never Has to Be Disconnected, or Re-connected.

In a Patterson Battery Set, whether it be the "Series," or the heavy-duty "Multiple-Service" Wall-Cabinet Type, *circuit-wires, once connected to the battery, never have to be disconnected or re-connected;* of course, any predetermined change of circuit-connections may be made to take care of specific connections.

Continued on next page

Flush and Surface Cabinets.

Wall-Cabinet models ("Series" types Model "BSC," "Multiple-Service" types Model "BMC," "2-Circuit-Reserve" Model "BDC" and "4-Circuit-Reserve" Model "BUC") are listed and regularly carried in stock in Enameled Steel and Polished Quartered Oak for both surface and flush installations. Cabinets will be furnished to order, in Mahogany and other woods, or if metal cases of special design or finish are required, estimates will be promptly submitted upon receipt of blue-prints, sketches, etc.

Centralized Battery Sets.

The great advantage of centralizing batteries in a building in one cabinet, instead of allowing them to be installed in divided sets all over a building, should not be overlooked. Every electrical device in a building, of course, can be easily wound to *proper resistance to work at one uniform voltage;* but, if desired, Voltage-Reducer Plugs are furnished, so that any number of voltages *lower than the maximum voltage of the Set* are available from a centralized cabinet.

Patterson Battery Sets of proper ampere-capacity guarantee uninterrupted service for two to three years.

Ground-Detectors.

Ground-Detectors will be furnished in "Multiple-Service" Cabinets when *specially ordered,* guaranteeing instant notification by trouble-lamp or trouble-bell if a ground shows up on either side of circuit.

2-Circuit-Reserve "BDC" Cabinets.

Cabinets shown in Fig. 4 are designed to meet the demands for a low-priced "Reserve or Throw-over" type of battery set. "BDC" Outfits are not, however, as desirable as the Multiple-Service "BMC" Models where the entire bank of cells is in service whenever the circuit is closed; but there is a certain demand for a "Reserve" type outfit with throw-over switch, and to meet this demand the "BDC" line has been developed.

"BDC" Reserve Sets have two separate sets of cells with a first-class "Throw-over" switch, so that in an emergency the Reserve Battery (one half the total number of cells in the case) may be thrown into circuit; either upper half or lower half of the battery being available by throwing switch to right or left.

It should not be forgotten that these "BDC" Outfits do *not* permit the battery being used in "Multiple," which is, of course, the modern method of using battery; neither, in a "BDC" Reserve Outfit, can all cells in the cabinet be thrown into Straight-Series, which in a "BUC" 4-Circuit Reserve Outfit (see Fig. 5) is a very desirable emergency provision.

4-Circuit Multiple-Service-Reserve "BUC" Cabinets.

Cabinets shown in Fig. 5 have a complete Reserve Battery, which may be thrown into circuit in any emergency; the Reserve Battery will operate all apparatus in a building which is connected to the battery outfit. Discriminating architects and engineers nowadays almost universally specify "4-Circuit Reserve" Battery Sets, so that, by the turn of a switch, an entirely independent set of batteries may be available.

"4-Circuit Multiple-Service-Reserve" Cabinets have not only the above advantage of a complete reserve, available in case of necessity, but have, in addition, two other "set-ups" which may in an instant, by anybody without technical knowledge, be called into service, viz.: "Multiple-Series"; and "All-Series"—the latter for *emergency* work.

These two "set-ups" are in addition to the reserve feature; the complete range of battery "set-up" is as follows: "Upper-half in circuit—lower-half in reserve"; "Lower-half in circuit—upper-half in reserve"; "Multiple-Series"; "All-Series."

Fire-Alarm Battery Sets.

Practically every State has already put into effect, or is preparing legislation making compulsory, private fire-alarms in factories, hotels, schools, apartment houses, stores, etc. Patterson Battery Sets for *both open- and closed-circuit* Fire-alarm Systems of this character are approved and recommended by various State Departments and Boards, because a Patterson Battery Set, once installed, requires *no technical knowledge to keep it in working condition, and because there is never a necessity of disconnecting or re-connecting a single wire.* Every fire-alarm requirement is taken care of in ideal fashion, and supervision and maintenance are reduced to a minimum; so much so, that a Patterson Battery Set for fire-alarm work will, in all cases, save its entire cost over any competitive type of battery, within a few years after installation.

Battery Sets for Program Clocks and School-Building Signal Work.

Specially designed Patterson Battery Sets for schoolhouse installation, in connection with Program Clocks, Secondary Dials operating from Master Clock, etc., are now in use in many up-to-date school-buildings. Two types are furnished, both with or without Ground-Detectors as specified, viz.:

(a) For systems where *3 or 4 different* voltages are required;

(b) For systems where operation is at *one uniform* voltage.

These Patterson Battery Sets for school-building work are in the form of *one* single steel cabinet (flush or surface, as desired), and possess the following very desirable, but hitherto impossible, advantages:

(a) *Not a wire to be disconnected or re-connected after the set has been installed;*

(b) Cell-renewal like that of an incandescent lamp, guaranteeing that, no matter how non-technical the school-building employees are, in five minutes at the outside, once a year before term begins, the Battery Set can be made ready for the next year's work. *All Patterson Battery Sets for school work are guaranteed to require attention but once a year,* and that for only five minutes, if the circuits are clear and the proper type outfit is installed.

Continued on next page

No architect who has done school-building work and met with the eternal annoyance and expense of old-style battery systems can fail to appreciate the absolute perfection to which the Patterson Battery Set has been developed for this class of work.

Average cost of year's run and complete renewal of cartridges is *under $8.00 per annum.*

Don't allow Storage Batteries or Rectifier Sets in your specifications for program clocks and secondary dials—they always require technical care, whereas a Patterson Battery Set is "fool proof."

Telephone Battery Sets.

Intercommunicating telephone installations require a "split-circuit" battery set, usually with 2, 3, 4, or 5 cells for "talking," and 4, 5, and 6 or more cells for "ringing." While this is a reasonably simple arrangement of circuits, still, in the old way of setting up batteries, a mistake was easily made.

In a Patterson Battery Set for telephone work, the renewal of the entire battery can be done by anybody, yet can be done in only one way, and that the right way, all without the slightest technical knowledge, and without tools.

The most generally used outfits are the models having three cells for "talking" and five cells for "ringing." For long lines, outfits with more cells for both "ringing" and "talking" are desirable; and for telephone installations, where the use of system is frequent and severe, "Multiple-Service," "2-Circuit-Reserve" or "4-Circuit-Reserve" Outfits are most economical.

No installation of telephones of any kind whatsoever is complete today without a Patterson Battery Set.

Closed-Circuit Work.

Patterson Battery Sets are ideal for closed-circuit work where apparatus is wound to *high resistance.* Tell us your problems and we will give careful advice—advice that will save many a dollar for your client.

How to Specify Patterson Battery Sets.

"The Battery shall be a centralized Patterson Battery Cabinet [here insert "Multiple-Service," "2-Circuit-Reserve," or "4-Circuit-Reserve," with or without Ground-Detectors, flush or surface, steel or oak, as desired] of proper voltage to satisfactorily operate all signal apparatus in the building and of sufficient ampere-capacity to give two (2) years' uninterrupted service; the Cabinet shall be furnished with one complete equipment of Patterson-Columbia Cells."

Special Outfits.

Larger sizes and special cabinets with any combination of circuits required, both as to voltage and amperage, will be promptly made to order upon specification as to details.

We particularly solicit correspondence with architects, engineers, contractors, and others as to the best types of outfits for specific installations; full detail blue-prints of any type cabinet, whether regular or special, will be gladly furnished upon application.

Co-operative Service.

Our Engineering Department will gladly figure out and recommend the best size and type outfits to suit specific requirements, if details of same are sent us.

Faraday Enclosed-Type Signal Bells, National Code Standard.

Faraday Enclosed-Type Signal Bells are recommended for use wherever an electric signal gong is required that must be absolutely reliable and dependable. All Faraday Enclosed-Type Gongs have been inspected and approved by Underwriters' Laboratories, and are "National Code Standard."

General Types—Faraday Bells are made in the following types:

NOTE—*The operation of signal gongs from AC circuits either through transformers or direct on the AC light or power lines is fundamentally wrong. While we make a full line of Faraday Gongs for AC circuit operation, we strongly urge the use of low-voltage DC battery type gongs.*

(1) Standard type Single-Gong vibrating for operation on battery (all voltages), and all DC electric light and power-circuits from 60 to 600 volts.

(2) Transformer type Single-Gong vibrating for operation through AC Transformers (12 to 24 volts) connected to 25- to 60-cycle, 100- to 440-volt electric lighting and power circuits; also direct on AC light and power circuits of all voltages 100 to 440.

(3) Double-Gong vibrating type designed primarily for operation on AC 100- to 440-volt electric light and power circuits of 25- to 60-cycle frequency; also furnished for operation on AC Transformers (not less than 18 volts secondary) and on all DC electric light and power circuits from 60 to 600 volts; also battery circuits.

(4) Electro-Mechanical type, Single-stroke or Continuous-ringing, designed for use where a more powerful blow is required than can be obtained from the regular electric signal-gong; in the Electro-Mechanical type, the gong is struck by heavy ball on the end of a lever, *released by the electric current,* but operated by a powerful clock-spring which after approximately 700 blows must be wound up. Operative from all AC, DC and battery circuits.

(5) "Single-Stroke" type for operation on battery and all DC electric light and power circuits from 60 to 600 volts (cannot be operated on AC circuits). "Single-Stroke" Gongs are generally used for code-signaling.

Standard Single-Gong Faraday Bells, Enclosed-Vibrating Types.

(1) For use where wires are not run in conduit, i.e., without conduit box backs. Operative from any

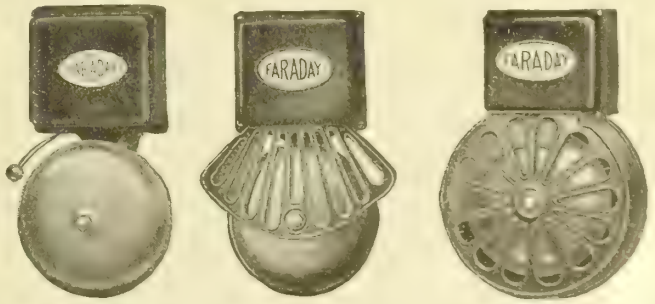


FIG. 6. Model "A" Non-Guarded Gong, 13¼ to 18" FIG. 7. Model "B" Half-Guarded Gong, 4 to 14" FIG. 8. Model "C" Full-Guarded Gong, [illegible]

STANDARD SINGLE-GONG ENCLOSED-TYPE FARADAY VIBRATING BELLS
Where wires are not run in conduits

Continued on next page

battery or DC electric light or power circuit. Not for use on AC.

Standard Single-Gong Enclosed-Type Faraday Vibrating Bells, shown in Figs. 6, 7 and 8, are the most generally used of any types made in the United States; they are furnished with three styles of housings, as shown in illustrations; these three styles of housings are each furnished in various submodels for specific building conditions.

(2) For use where wires are to be run in conduit on surface of walls. Operative from any Battery or DC electric light or power circuit. Not for use on AC.

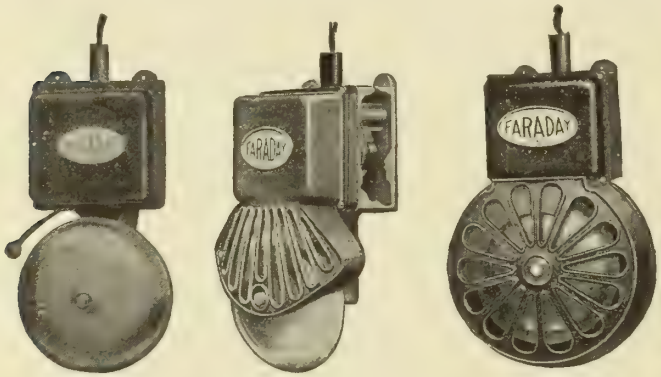


Fig. 9 Model "AEC" Model "AFC" Gongs, 3½ to 18"

Fig. 10 Model "BEC" (For Exposed Conduit) Model "BFC" (For Concealed Conduit) Gongs, 3½ to 14"

Fig. 11 Model "CEC" Model "CFC" Gongs, 5 to 12"

STANDARD SINGLE-GONG ENCLOSED-TYPE FARADAY VIBRATING BELLS
Where wires are run in conduits

Models "AEC" (non-guarded gongs), "BEC" (half-guarded gongs) and "CEC" (full-guarded gongs) are for surface conduit installations, i.e., installations where wiring is to be done in conduit run on the *outside of the walls;* exposed conduit models are a great improvement over the ordinary type of gong which have no outlet-box provision for making conduit connections to bring the circuit-wires from the conduit into the bell itself.

Models "AFC" non-guarded gongs, "BFC" half-guarded gongs and "CFC" full-guarded gongs are practically the same as shown in Figs. 9, 10 and 11, except that the outlet-box back is designed to set *flush in wall* and to connect with conduit run inside the walls.

Transformer-Type Single-Gong, Enclosed-Vibrating Bells.

Operative on 25- to 60-cycle Transformer circuits (12 to 24 volts); also direct on 25- to 60-cycle AC light and power circuits of all AC voltages 100 to 440.

Transformer-Type Single-Gong Bells Vibrating pattern, shown in Figs. 12, 13 and 14, are designed primarily for operation through AC Transformers 6 to 18 volts or direct-connected to 25- to 60-cycle 100- to 440-volt light and power circuits; they are *not* as desirable as the standard low-voltage gongs described before, and actually cost more to operate from a Transformer circuit than the standard Single-Gong Faraday Bell from a Patterson Battery Set of proper size and capacity; there is, however, a demand for gongs to be operated from Transformer circuits, although the expense is greater, and like other Faraday products, the Transformer Faraday Bell is the *best on the market,* because of its fine electrical and mechanical detail, adjustments, etc.

Fig. 12 Model "AT" Model "AET" Model "AFT" Gongs, 3½ to 12"

Fig. 13 Model "BT" (For places where conduit is not used) Model "BET" (For Exposed Conduit) Model "BFT" (For Concealed Conduit) Gongs, 3½ to 12"

Fig. 14 Model "CT" Model "CET" Model "CFT" Gongs, 5 to 12"

TRANSFORMER TYPE SINGLE-GONG BELLS

Double-Gong Faraday Bells.

Double-Gong Bells for operation from AC 25- to 60-cycle Transformers, and direct from AC lighting and power circuits 100- to 440-volts, 25- to 60-cycles; made also for use on Battery and DC lighting and power circuits.

Double-Gong Faraday Bells, shown in Fig. 15, are entirely different from any AC Bells on the market, because of the new patented quick-break pole-reversing commutator device, which completely overcomes the "dead-center" of other double-gong bells.

Fig. 15. DOUBLE-GONG BELL
Model "DG" for places where conduit is not used
Model "DGEC" for Exposed Conduit
Model "DGFC" for Concealed Conduit
Gongs, 3 to 18"

All Faraday Double-Gong Bells, Models "DG," "DGEC" and "DGFC," are made for operation as follows:

(1) AC electric light and power circuits of all voltages from 100 to 440 volts, 25 to 60 cycles.

(2) AC 18-volt Transformer circuits, 25 to 60 cycles.

(3) DC electric light and power circuits of all voltages from 60 to 600.

(4) Battery circuits of any voltage.

For Double Gong Bell installations, the voltage should always be plainly specified and, if AC, the frequency also.

Continued on next page

Electro-Mechanical Faraday Gongs.

Operative from all AC, DC, and Battery circuits.

Electro-Mechanical Faraday Gongs, shown in Fig. 16, are made for use where certain requirements demand a heavier and more powerful blow than is possible to obtain from an electric signal-gong of regular design.

In an Electro-Mechanical Faraday Gong, the blow is struck by a heavy ball on the end of a lever *released by the electric current,* but operated by a powerful clock spring.

Fig. 16. Model "EM"
ELECTRO-MECHANICAL FARADAY GONG
Model "EM" for places where conduit is not used
Model "EMEC" for places where exposed conduit is used
Model "EMFC" for places where conduit is run concealed
Vibrating or Single Stroke Gongs, 6 to 18"

Cases are of cast iron, finely japanned; heavy soft-rubber gaskets guard against dampness getting into the case; for conduit installations, cases are regularly drilled for ½- or ¾-inch rigid iron conduit as specified, but entrances are plugged and provision made for wires entering from "open-work" type of wiring; when specially ordered, boxes will be drilled for any size conduit desired.

"Tell-tale" attachment furnished when specified at $5.00 per bell extra; with "Tell-tale" attachment, notification is insured whenever spring of the movement needs re-winding.

Electro-Mechanical Faraday Gongs will give approximately 700 blows to each winding. The following types of mechanisms are made, and type desired must, of course, be specified:

(a) *Single-stroke, for open-circuit work*
(b) *Single-stroke, for closed-circuit work*
(c) *Continuous-ringing, for open-circuit work (rings as long as circuit is closed)*
(d) *Continuous-ringing, for closed-circuit work (rings as long as circuit is open)*
(e) *To ring continuously until run down, for open-circuit work*
(f) *To ring continuously till run down, for closed-circuit work*

"Single-Stroke" Enclosed-Type Gongs.

Operative from Battery and all DC electric light and power circuits (cannot be operated on AC circuits).

"Single-Stroke" Enclosed-Type Faraday Gongs, shown in Figs. 17, 18 and 19, are the most powerful and longest movement Single-Stroke Gongs made; having no clockwork mechanism these gongs, of course, require no winding, as does the electro-mechanical type.

The long, slow, powerful movement in this mechanism is obtained by means of the Faraday multiple-gear between armature and hammer-rod, a feature that with a ⅜-inch movement of armature permits, for example, in a 10-inch size gong, a 3-inch movement of the hammer-ball.

Semi-flexible recoil-type hammer-rod guarantees a clear, unmuffled blow on the gong—a most valuable advantage over the usual hammer rod construction of other makes.

Fig. 17 Model "AS" Model "ASEC" Model "ASFC" Gongs, 4 to 18"

Fig. 18 Model "BS" (For places where conduit is not used) Model "BSEC" (For Exposed Conduit) Model "BSFC" (For Concealed Conduit) Gongs, 4 to 14"

Fig. 19 Model "CS" Model "CSEC" Model "CSFC" Gongs, 5 to 12"

"SINGLE-STROKE" ENCLOSED-TYPE GONGS

Faraday Interior Fire-Alarm Systems.

Stanley & Patterson, Inc., manufacture the largest line of interior fire-alarm apparatus made in the United States; their engineers are always prepared to furnish fire-alarm engineering advice of absolutely unquestioned reliability; and this service is made without charge to all architects and engineers specifying Faraday Fire-Alarm Systems.

With the rapidly crystallizing public sentiment that every building of any size should have a fire-alarm system to protect life and property, and the rapidly spreading legislation making installation of fire-alarm systems mandatory, architects and engineers will do well to include a Faraday Fire-Alarm System in all their more important specifications at time of construction; because installation of these interior fire-alarm systems can be very much more economically made during construction of the building than after the building is up and the walls closed in.

Faraday Interior Fire-Alarm systems are simple, serviceable and absolutely reliable for all building requirements. Broadly speaking, there are two types of systems:

(a) Closed-circuit electrically-supervised (see systems "DSS," "SEM" and "PEM").

(b) Open-circuit non-supervised (see system No. 1).

Faraday Fire-Alarm Systems are briefly described in following paragraphs; full and complete fire-alarm data will be found in Catalogue No. 35, which will be promptly forwarded upon application.

"DSS" Faraday Fire-Alarm System.

For DC light or power circuit connection. "DSS" System is an electrically supervised closed-circuit system operated from a DC electric light or power circuit *without battery.* ("DSS" cannot be operated on AC circuits.) "DSS" system employs selective-code-ring-

Continued on next page

ing Faraday Fire-Alarm Boxes indicating by tap signals on Single-Stroke Faraday Gongs location of box from which signal originates.

Advantages—The advantages of the "DSS" Faraday Fire-Alarm System are as follows:

(a) Control apparatus on slate-panel, in compact pressed-steel cabinet-unit under lock and key.

(b) Gongs require no winding or attention of any sort.

(c) Operative closed-circuit source of energy DC electric light or power mains—no large closed-circuit battery to maintain.

(d) Lowest installation cost of any first-class, closed-circuit, electrically supervised system.

(e) Remarkably low current consumption; maintenance expense as low as $1.00 per month.

(f) Extreme simplicity of wiring.

(g) Main-circuits, box-circuits and gong-circuits constantly under electrical test; trouble of any nature, on any part of system, or failure of operative current, automatically indicated by ringing of Trouble-Bell.

"DSS" System is simplicity itself. It consists of a Faraday Control-Cabinet, Model "DSS"; a Faraday Trouble-Bell, Model "2502"; a certain number of Single-Stroke Faraday Gongs, Model "2120," and a certain number of Faraday Selective Boxes, Model "F-2022" (or "2020," if "Break-Glass" type Box is desired).

Specifications—"DSS" Faraday Fire-Alarm System of closed-circuit electrically supervised type shall be installed with necessary number of Faraday Single-Stroke Gongs, Model "2120," and Faraday Selective-type Fire-Alarm Boxes, Model "F-2022," controlled and operated by Faraday Control-Cabinet "DSS" of proper size to control the total number of gongs in the building; there shall be one or more boxes on each floor of the building, located in the natural path of escape from fire; a Faraday Trouble-Bell, Model "2502," shall be connected to the proper terminals of the "DSS" Control-Cabinet; all wiring shall be done in rigid iron black enameled or galvanized conduit, not smaller than ½ inch, and wire shall be rubber-covered National Code double-braid, not smaller than No. 14 B. & S. gauge.

"SEM" Faraday System.

For places where absolutely dependable DC light or power circuit is not available. "SEM" System is a closed-circuit electrically supervised selective-code-ringing-system with Electro-Mechanical Gongs (in place of Single-Stroke Gongs).

It is operated from a storage battery charged from the DC circuit mains or, where AC only is available, from a small motor-generator transforming AC to DC for charging the battery.

"SEM" System is an electrically supervised system and automatically gives an indication, not only when box is pulled, but when the slightest trouble or derangement of circuits or apparatus occurs.

"SEM" System employs selective-code-ringing Faraday Fire-Alarm Boxes, indicating by single-stroke signal on Electro-Mechanical Faraday Gongs, Model "2620," location of box from which signal originates.

Specifications—"SEM" Faraday Fire-Alarm System of closed-circuit electrically supervised type shall be installed with necessary number of Electro-Mechanical Faraday Gongs, Model "2620," and Faraday Selective-type Fire-Alarm Boxes, Model "F-2022," controlled and operated by Faraday Control-Cabinet, Model "SEM," of proper size and type. A sufficient number of cells of Storage Battery of proper ampere-capacity to operate the system shall be furnished and installed in *duplicate* and (where DC current from light power current is not available) a motor-generator of proper size and capacity to charge above storage battery together with necessary control-board shall also be installed; there shall be one or more boxes on each floor of the building, located in the natural path of escape from fire; Faraday Trouble-Bell, Model "2502," shall be connected to the proper terminals of the "SEM" Cabinet; all wiring shall be done in rigid iron black enameled or galvanized conduit, not smaller than ½ inch, and wire shall be rubber-covered National Code single-braid, not smaller than No. 14 B. & S. gauge.

"PEM" Faraday Fire-Alarm System.

For places where DC light or power circuit is not available. "PEM" System is also a closed-circuit electrically supervised selective-code-ringing system with Electro-Mechanical Faraday Gongs. It differs from "SEM" Faraday system in that it employs simple cabinet type Patterson Battery Set, which may be maintained by anyone without technical knowledge. Full details of this system will be furnished upon application. This is the *ideal* System for schoolhouse work.

No. 1 Faraday Fire-Alarm System.

No. 1 System is a simple *open-circuit* system, employing Vibrating Enclosed-Type Fire-Alarm Gongs, Model "2500" (with special outlet-back box), operated by Faraday Break-Glass Non-Selective Boxes, Model "2040" (Flush "2041"). No. 1 System is operated from an open-circuit battery, preferably (demanded in many states by statute) a Patterson Battery Set of the "BMCF" type.

Gongs and Boxes in No. 1 System are connected in multiple; breaking the glass in any box automatically rings all gongs; gongs are vibrating type, and, after glass is once broken, will continue ringing until the glass is replaced in box.

No. 1 System is non-supervised, non-selective type, i. e., it does *not* automatically give notification of a broken wire or accidental derangement of circuits and it does *not* indicate location of the box from which the signal originates.

Specifications—No. 1 Faraday Fire-Alarm System of open-circuit non-supervised type shall be installed with Faraday Vibrating Enclosed-Type Fire-Alarm Gongs, Model "2500," of not less than 10 inches diameter, operated by Break-Glass Faraday Fire-Alarm Boxes, Model "2040" [Flush Model "2041"]. As source of current, a Patterson Battery Set, Model "BMCF," of proper capacity to operate this system shall be installed; this outfit shall be complete with one set of Patterson-Columbia Cartridges; there shall be one or more Faraday Fire-Alarm Boxes, Model "2040" [Flush Model "2041"], on each floor of the building, located in the natural path of escape from fire; all wiring shall be done in rigid iron black enameled or galvanized conduit, not smaller than ½ inch, and wire shall be rubber-covered National Code single-braid, not smaller than No. 14 B. & S. gauge.

Patterson Floor-Outlet Boxes, National Code Standard.

(Licensed under Fountain Patents).

Desirability of Floor-Box Installations—A specification for a liberal number of floor-outlet boxes will, in modern, up-to-date building construction, save much more than the installation costs; after a building is closed in and floors laid, a single floor-outlet, required, often entails many dollars expense, to say nothing of

Continued on next page

damage to floors and walls—all of which can be saved by liberal specifications for floor-outlet boxes to be installed *during construction*.

Uses—Floor-Outlet Boxes are necessary to properly install desk-lighting, office call systems, telephones, fan motors, portable lamps, etc.

General Types—Adjustable, for cement, tile and granolithic floors, Nos. "4000," "4003," "4000B," "4000BN" and "4003BN."

Non-adjustable, for wood floors and installations where finished level of floor will not vary to any appreciable extent, Nos. "3000," "3000A," "3000B," "3000AB," "3000BN" and "3000ABN."

Both the adjustable and non-adjustable types are made in two classes: (a) Boxes *with* Receptacles and Detachable Plugs, Nos. "3000," "3000A," "4000," "4000BN," "4003."

(b) Boxes *without* Receptacles and Detachable Plugs, Nos. "3000B," "3000AB," "3000BN" and "3000ABN."

Standard Construction of Patterson Floor Boxes—Patterson Floor Boxes (both adjustable and non-adjustable) are thoroughly waterproof, double-gasketed throughout; every part except box itself is cast bronze; the floor box is galvanized iron.

Receptacles may be removed from boxes for easy wiring by simply loosening two screws.

Rubber gasket fits into "under-cut" of bronze plate so that the gaskets do not fall out.

Hard-rubber bushings in dome caps are sunk flush, overcoming entirely the annoyance of breakage so universally experienced in other floor boxes.

Both Adjustable and Non-adjustable Type of Patterson Floor Boxes may be installed in much shorter time than competitive boxes.

Adjustable Patterson Floor Boxes.

These Boxes afford, without additional machine-work, connections to lighting circuit as follows:

(a) By portable cord through rubber-bushed dome cap; (b) by ⅝-inch brass tubing into dome cap when bushing is removed; (c) by ½-inch conduit into flush disc when removable plug is taken out.

Universal template permits mounting of any make Receptacle without additional machining. Floor-plate can be taken off *without disturbing cemented edge of plate*.

In Adjustable Patterson Floor Boxes, the vertical up-and-down adjustment of one inch is ample for any variation of floor height, and side or off-level adjustment of ⅝ inch is ample to give full adjustment for variation in floor level.

Fig. 20. NO. "4000" ADJUSTABLE FLOOR-OUTLET BOX
No. "4000" with 2-wire, 10-ampere Receptacle and Plug
No. "4003," with 3-wire, 10-ampere Receptacle and Plug

Adjustable Floor Boxes are regularly tapped for four ½-inch conduit entrances in sides and one in bottom.

Fig. 21. NO. "4000B" ADJUSTABLE FLOOR-OUTLET BOX
With Blank Bronze Plate
Receptacle and Plug not regularly furnished, but can be mounted in "4000B" box

Fig. 22. NO. "4000BN" ADJUSTABLE FLOOR-OUTLET BOX
With Double-Outlet Nozzle
No. "4000BN" with 2-wire, 10-ampere Receptacle and Plug
No. "4003BN" with 3-wire, 10-ampere Receptacle and Plug

Non-Adjustable Patterson Floor Boxes.

Non-adjustable Patterson Floor Boxes, Nos. "3000" and "3000A," have 10-ampere Receptacles and Detachable Plugs; in Nos. "3000," "3000AB," "3000BN" and "3000ABN," Receptacles and Plugs cannot be used.

Non-adjustable Type Boxes are regularly drilled and tapped for four ½-inch conduit entrances, two inside and two in bottom, adapting them to flexible or rigid conduit work without extra drilling and tapping.

Cardboard shims are furnished with each box, and with these shims bronze plate can be easily brought flush with floor. The setting of a Patterson Floor Box is thus made quicker and easier than any floor box on the market.

Fig. 23. NOS. "3000" and "3000A" NON-ADJUSTABLE OUTLET BOX
With 2-wire, 10-ampere Receptacle and Plug

Non-adjustable Boxes with letter "A" in model number are superior to those without, in that size of the plate is larger and box sets more satisfactorily.

NOTE—Both Adjustable and Non-Adjustable boxes will be furnished, when specially ordered, with any arrangement of conduit entrances. With all boxes removable plugs are furnished, closing all but one outlet.

Fig. 24. NOS. "3000B" and "3000AB" NON-ADJUSTABLE OUTLET BOX
With Blank Bronze Plate
Receptacle and Plug cannot be used in "3000B" and "3000AB"

Fig. 25. NOS. "3000BN" and "3000ABN" NON-ADJUSTABLE OUTLET BOX
With Double-Outlet Nozzle. Receptacle and Plug cannot be used

Catalogues.

Complete catalogues containing valuable data concerning all Stanley & Patterson Electrical Apparatus will be furnished to architects on request.

INCORPORATED, 1866

THE PENRHYN SLATE COMPANY

HYDEVILLE, RUTLAND COUNTY, VT.

DIRECTORS AND OFFICERS

BLAIR S. WILLIAMS, President
Member N. Y. Stock Exchange

STEPHEN G. WILLIAMS, Treasurer
Worcester, Williams & Saxe, New York, N. Y.

RICHARD GRIFFITH, Vice-President and Manager, Fair Haven, Vt.

SAMUEL F. BARRY, Secretary, New York, N. Y.

W. M. MOORE, President John Jones Slate Co.

MARSHALL L. WARRIN, New York, N. Y.

CHARLES A. MORAN, Attorney, New York, N. Y.

MILLS AND QUARRIES

MIDDLE GRANVILLE, N. Y. WEST CASTLETON, VT. FAIR HAVEN, VT. HYDEVILLE, VT.

Products.

Electrolytic and Chemical Tanks; Electrical Switchboard Bases, etc.

Penrhyn Purple Slabs for:

Shower, Urinal and Toilet Stalls; Stair Treads and Platforms; Laboratory Table Tops, Sinks and Shelving; Laundry Tubs; Rough Garden Flagging; Garden Seats; Dairy Shelves; Pastry Boards; Kitchen Table Tops; Pantry Shelves and Linings; Greenhouse Shelves; Book Shelves; Baseboards; Mouldings; Mausoleum Slabs, etc.

Penrhyn Slate.

Penrhyn is a uniformly strong, fine-grained purple product, adaptable to all structural purposes to which slate may be applied. It weighs 14 pounds per square foot (12 inches by 12 inches by 1 inch).

The quality of the Penrhyn Slate makes it unusually valuable for use with electrical appliances, as is proved by its use by such well-known electrical concerns as we mention under head of references.

Organization.

Inquiries are promptly answered. Orders are shipped on the dates named.

Facilities.

Our equipment is of the best, and our finished product is not surpassed by that of any firm and seldom equaled.

Co-operative Service.

This organization will gladly co-operate with architects and others interested in slate for structural purposes, in working up the details for its proper application. This service is gratis.

Estimates.

Complete quotations will be made promptly on receipt of necessary details.

Samples.

Samples of slate will be furnished on request of prospective users.

References.

As evidence of the excellent quality of Penrhyn Slate we submit here a partial list of the regular users of our product.

General Electric Company
Westinghouse Electric Mfg. Co.
Northern Electric Co.
Speakman Supply and Pipe Co.
J. B. & J. M. Anderson Co.
Brunswick-Balke-Collender Co.

UNIVERSAL ELECTRIC STAGE LIGHTING CO.

KLIEGL BROS., PROPRIETORS
TELEPHONE, Circle 2016
240 West Fiftieth Street
NEW YORK, N. Y.

Products.

We are manufacturers of Electric Stage Lighting Apparatus, including Foot, Border, Proscenium, Bunch and Strip Lights; Receptacles, Stage Pockets and Plugs, Waterproof Pockets, Balcony Panel Pockets, Plugging Boxes; Arc Lamps, Spot and Flood Lights, Sciopticons, Stereopticons, Reflectors, Music Stands, Switchboards, Exit Signs, Monogram Signs, Act Announcers, Electric Carriage Calls, Fireplaces and Wood Logs, Connectors, Cleaners' Stands, etc.

Act Announcers.

Are used without program, and the various announcements are painted on glass slides and lit up when in use.

Fig. 5
SPOT-LIGHT

Arc Lamps.

Take 25 amperes, 125 volts. Can be used on alternating or direct current.

Klieglight Arc Lamps.

For motion picture photography.

Border Lights.

Made in any length desired, of No. 20 galvanized iron, with the receptacles and wiring inclosed, provided with cable splicing box at end; furnished with 1¼-inch piping for hanging; lamps spaced four 16-candle-power or three 32-candle-power to the foot.

Carriage Call.

Fig. 777 constructed entirely of metal, 29 inches high by 72 inches wide, each number distinctly outlined by incandescent lamps.

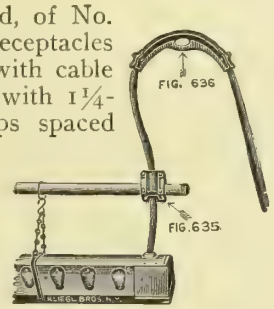


Fig. 600. BORDER LIGHT WITH CABLE SUPPORT AND CRADLE

Stage Pockets and Receptacles.

We make all kinds of Stage Pockets and Charging Receptacles, flush floor, flush wall, waterproof, wall receptacles, in iron and brass, with or without lock and key.

2-Wire 50 amperes, 250 volt
2-Wire 50 amperes, 500 volt
2-Wire 100 amperes, 125 volt
2-Wire 200 amperes, 125 volt
3-Wire 50 amperes, 125-250 volt
3-Wire 100 amperes, 125-250 volt
4-Wire 50 amperes, 250 volt

Made in one, two, three or four sections

Fig. 350

Fig. 301
STAGE POCKET AND FIBER PLUG

Kliegl Stage Pockets (Fig. 350) meet all conditions. They are National Electrical Code Standard, absolutely fireproof, dustproof and foolproof; made of cast iron, with all current carrying parts inclosed. Each pocket is furnished with Universal Fiber Plug (Fig. 301).

Plugging Boxes or Spider Pockets.

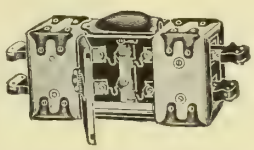


Fig. 391. 4-SECTION PLUGGING BOX

Arranged for two, four, six, or eight receptacles of 50-ampere capacity each. Receptacle is fused and furnished with Universal Plug (Fig. 301).

Exit Signs.

Of all designs and descriptions. We carry "Exit" signs in stock with 3-inch, 5-inch, and 8-inch letters.

685
EXIT SIGN

Bunch Lights.

Furnished with adjustable hood for twelve 40-watt lamps or for one 1000-watt nitrogen lamp, adjustable stand and 25-foot cable complete.

Fig. 641
BUNCH LIGHTS

Footlights.

Footlights are made of No. 20 galvanized iron, furnished with trough, the hood of which extends 3 inches above the stage level. The footlight strip with receptacles and wire inclosed is removable. Fig. 829, Disappearing Footlight, curved or straight, is flush with the floor, and its sections can be raised at will.

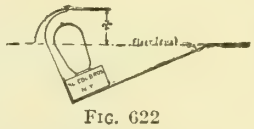


Fig. 622

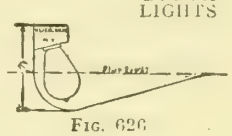


Fig. 626

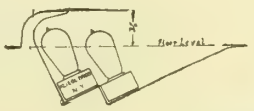


Fig. 624

Fig. 829
FOOTLIGHTS

Proscenium Lights.

Made entirely of metal and furnished any length desired.

Fig. 955

Connectors.

Kliegl Connectors are made in 5, 15, 30, 60, 100, and 200 amperes, 2-wire, and 5, 15, 30, and 60 amperes, 3-wire, and are provided with cable clamps to hold the cable firmly by its outer insulation.

Fig. 965
CONNECTORS

Monogram Signs.

Announce the program, and show letters from A to O, with X; and are operated by a switch in the wings.

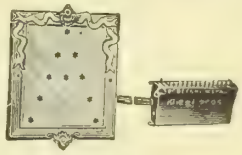


Fig. 700
MONOGRAM SIGN

Panel Pockets.

Fig 372, for use in balcony and picture booths; made in two to eight sections of 50-ampere outlets each.

Fig. 372
PANEL POCKET

Music Stands.

Furnished with adjustable stand, iron base, wood or iron top, together with light fixture and 8-foot cable.

Automobile Pockets.

For mounting against the wall, with outlet for 1-inch conduit, top or bottom.

Fig. 305
AUTOMOBILE POCKET

Strip Lights.

Stock sizes, 5 feet, 6 lights; 8 feet, 10 lights. Other sizes made to order.

Catalogue.

Send for illustrated catalogue.

A. B. SEE ELECTRIC ELEVATOR COMPANY

220 Broadway
NEW YORK, N. Y.

OFFICES

PHILADELPHIA, PA. BOSTON, MASS. WASHINGTON, D. C. CLEVELAND, OHIO MONTREAL, QUE.
NEW YORK, N. Y. BALTIMORE, MD. HARTFORD, CONN. JERSEY CITY, N. J. TORONTO, ONT.

Products.

Manufacturer of DIRECT-CONNECTED ELECTRIC PASSENGER, FREIGHT and SIDEWALK ELEVATORS.

Also, ELECTRIC PUSH-BUTTON TYPE ELEVATORS and DUMB-WAITERS.

Traction Type Elevators.

The traction type elevator became a necessity with the increase in the height of buildings, and received its name because of the tractive force exerted on the car cables by passing them over the driving sheave without being fastened to it.

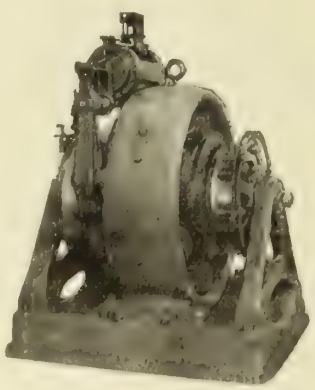
The cables, usually six in number, pass from their anchorage in the car over the drive sheave, then down under an idler, back up over the top of the drive sheave, and from there down to the counterweight where the fastening is made. As the size of the drive sheave bears no direct relation to the height of car travel, it makes the traction elevator ideal for high buildings.

Gearless Traction Machines.

Because of simplicity of design, low depreciation and high efficiency, gearless traction machines are being installed in hotels, office buildings, and other buildings where high speed passenger service is desired.

In this type, the drive sheave is built integral with the armature of a slow speed shunt wound motor, operating on direct current power circuits only. Ideal self-aligning bearing conditions are obtained, as both drive sheave and armature are mounted on a common spider and revolve on roller bearings mounted on a non-rotating shaft. Thus each revolution of the armature carries the drive sheave at the same speed without the introduction of any gearing.

A magnetic brake is provided, and so designed that the admission of power to the motor immediately releases the brake shoes from off a large brake drum. These shoes set again as soon as the power is released, and bring the car to smooth stop without any jar.



A. B. SEE GEARLESS TRACTION MACHINE

One-to-One Gearless Traction.

Where high speeds, such as 500 to 600 F.P.M. are desired, the lifting cables are attached directly to the car and counterweight. Because of the roping, their construction is known as the One to One gearless traction.

Two-to-One Gearless Traction.

In department stores and building requiring speeds of 300 to 500 F.P.M., the One to One gearless traction machine is impracticable because of the armature speed.

To supply the demand for gearless traction machines with the reduction in car speed, it has been found necessary to devise a system of rope gearing or reduction called Two-to-One roping.

By reducing the sheave diameter slightly and passing the lifting cables in loops under sheaves in the top of the car and counterweight, with the cable ends fastened at the top of the hatch, a rope gearing is obtained that reduces the car speed to that required.

Geared Traction for both Direct and Alternating Current Circuits.

This type, while not quite as efficient as the gearless traction, but still possessing many of its advantages, can be used for practically any type of building where moderate speeds are desired.

In this form of traction equipment, the drive sheave is combined with a phosphor-bronze worm-gear, which meshes with a screw shaft driven by a moderate speed shunt wound motor. A magnetic brake operating on the screw shaft, similar to the gearless machine brake, is provided. An equipment known as the tandem worm-gear traction, and consisting of a geared machine with a right- and left-hand worm screw meshing with both of two intermeshing spur gears, thereby eliminating end thrust, is also built by us.

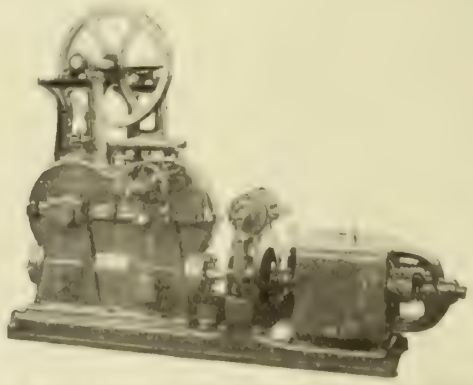
As the gear ratios of both types are variable, speeds from 150 to 450 F.P.M. are obtainable.

Drum Machines for Direct and Alternating Current.

Drum machines are built in a number of different types for passenger and freight service. These may be of single or tandem worm-gear drive and with internal spur-gear reduction for extra heavy capacities.

Passenger speeds of from 100 to 400 F.P.M., with freight speeds of 25 to 150 F.P.M. and capacities up to 20,000 pounds, are included in the drum equipment.

Automatic push-button drum type elevators, with a complete non-interference device, for residences, hospitals, apartment houses, public buildings, etc., are built also.



A. B. SEE TANDEM WORM GEAR DRUM MACHINE

Drawings.

Preliminary drawings for any proposed installation will be provided on notifying the nearest office.

THE COHOES IRON FOUNDRY & MACHINE CO.

Elevator Equipments

COHOES, N. Y.

Products.

ELECTRIC PASSENGER and FREIGHT ELEVATORS; ELECTRIC and HAND-POWER GARAGE ELEVATORS; HOUSE ELEVATORS; DUMB-WAITERS and BELT-DRIVEN ELEVATORS.

HAND-POWER FREIGHT ELEVATORS, SIDEWALK LIFTS, AUTOMATIC GATES and HATCH DOORS for Hoistways.

Efficiency, Facilities, Shipment and Materials.

During thirty years of scientific study of Engineering problems in all kinds of elevator work, our products have been developed to highest efficiency.

We maintain a competent force of Engineers and are prepared to make complete layout of plans or to act in advisory capacity.

We can quote on jobs installed complete or made up according to specifications and shipped f. o. b. our siding, for installation by your own experts.

Materials used by us are of highest grade only and can be depended upon for absolute reliability.

Information Required for Estimate.

For All Types—Capacity, speed, number and height of floors, size of car, or size of hatchway, location of winding engine, steel or wood for guides and sheave beams, style of car, value of cage, method of control, gates or hatchway doors if required, grating under sheaves.

For Electric-Driven Types—State whether current is direct or alternating and give voltage; if alternating, give phase and cycles. State type of winding engine, whether direct-connected, chain-driven, or single belt-driven.

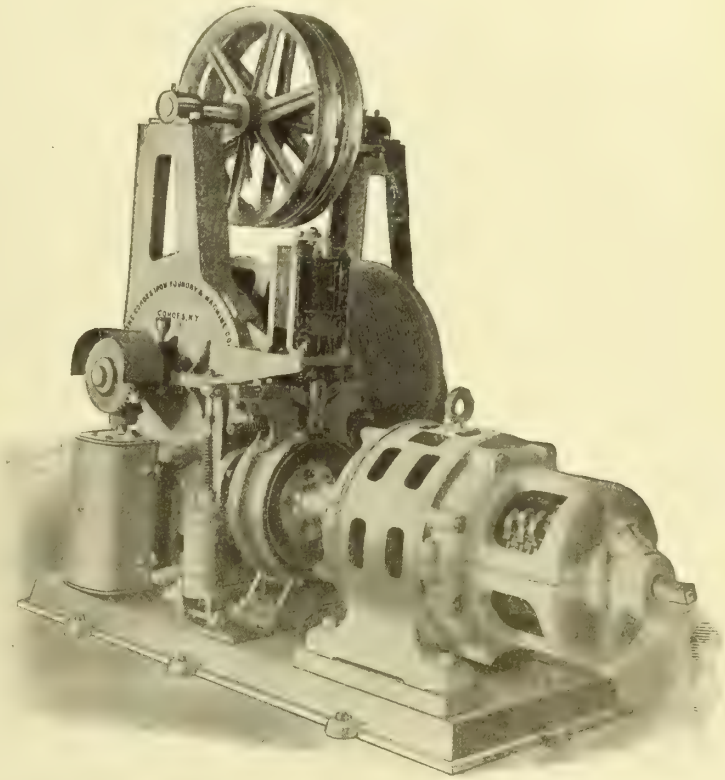
For Belt-Driven Types—State whether winding engine is to be driven from line shaft, countershaft, or other source of power. Give location of power with reference to hatchway.

If possible, send a sketch or blue-print, showing hatchway, its location in building, entrances to car, and location or space prepared for the winding engine.

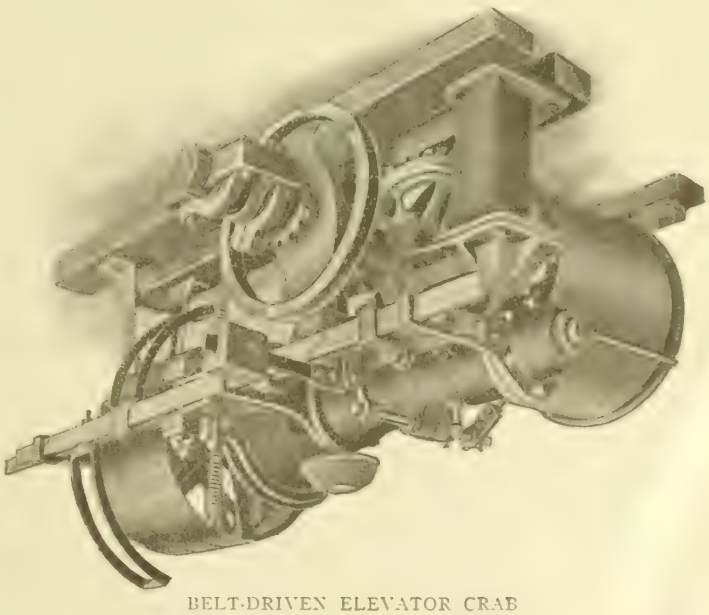
On request, we will be glad to send our Application Sheet, which gives a complete list of the information required for an accurate estimate.

Estimates.

Estimates are gladly furnished, and specifications submitted on any equipment.



DIRECT CONNECTED ELECTRIC CONTROL PASSENGER CRAI



BELT-DRIVEN ELEVATOR CRAB

PAID UP CAPITAL $250,000.00

AMERICAN ELEVATOR & MACHINE COMPANY

INCORPORATED

Passenger and Freight Elevators

LOUISVILLE, KY.

REPRESENTATIVES

FOR SOUTHWEST—J. Peyton Hunter, Dallas, Tex.
FOR WEST—C. L. Colby, Hall Building, Kansas City, Mo.
FOR CUBA—C. H. Thrall Electrical Contracting Co., Havana, Cuba
KANSAS CITY, MO., King Supply & Equipment Co., Scarritt Building
NEW ORLEANS, LA., American Elevator & Electric Co.
NASHVILLE, TENN., J. Bouchard & Sons Co.
PEORIA, ILL., H. F. Kircher & Co.

Products.

We build a complete line of Elevators: Electric Elevators, for Direct or Alternating Current, in Single or Tandem Drum, or Traction Types; Hydraulic, Belt and Hand-Power Elevators.

We also make a specialty of Automobile Elevators and of Push-Button Dumb-Waiters and Passenger Elevators.

Passenger Elevators.

The push-button control, and other types of passenger elevators, for alternating current, are quiet in operation; the controllers, electric brakes and other parts are immersed in oil to eliminate noise and pounding of switches, so noticeable with alternating current equipment.

Important Data for Architects.

For Freight Elevators a pit should be provided at bottom of elevator shaft not less than 36 inches, and for Drum Type Passenger Elevators not less than 48 inches.

Traction Type Elevators require a pit at least six feet deep to allow space for oil buffers under car. The openings in floors or hatchways should be plumb over each other, and about 12 inches wider than car the guide-post way and 12 inches the other way.

When Elevator Engine is placed in basement or on one of the floors, provide about 18 feet clearance from top landing to under side of penthouse roof. Should the engine be placed directly over hatchway, about 24 feet of clearance should be provided. This can be reduced about two feet for freight elevators.

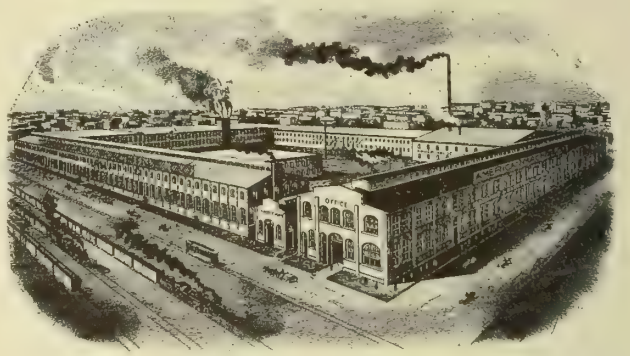
About 12 feet above top landing make provision for supporting overhead beams or machinery.

If penthouse is required, same should be about one foot larger than hatch on three sides.

If walls surrounding hatch are of brick or concrete, provision should be made for placing fastenings for posts in walls as the building is erected.

Information Required for Estimates.

In writing for estimates, give the following information:



OFFICE AND WORKS
AMERICAN ELEVATOR & MACHINE COMPANY
Ground Space, 92,500 square feet

For Either Style—State capacity desired, speed, number and height of floors; also, whether building has basement, and whether wood or steel guides are desired. If Passenger, give value of car, state whether annunciator is desired, and if so, which style. If Freight, state whether car shall be wainscoted.

For Electric—State whether current is direct or alternating, and give voltage, phase and cycles. State whether to be operated magnetically, by switch in car, or mechanically; if the latter, state whether by pilot-wheel in car or hand-rope. State on which floor engine should be set, or whether above hatch.

For Hydraulic—State whether vertical or horizontal cylinder, or direct plunger type is desired. Give pressure, and state whether to be operated by street main, gravity or compression tank.

For Belt—State whether to be driven by gas engine, electric motor, or line shaft; if latter, send sketch showing location. State from which floor engine can be suspended.

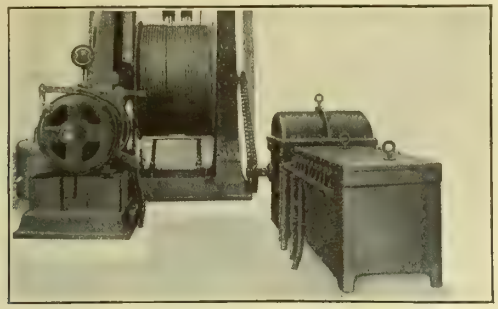
Facilities.

We have one of the largest independent elevator plants in the United States, completely equipped for building elevators, elevator motors, controllers and other parts, thereby enabling us to execute orders promptly.

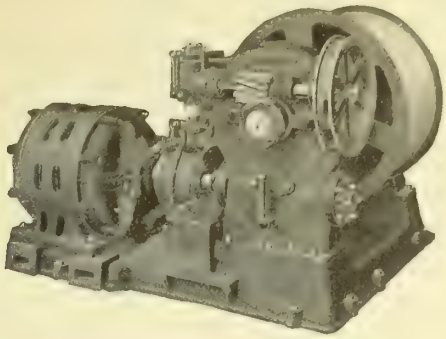
Independent.

We are not in the Trust.

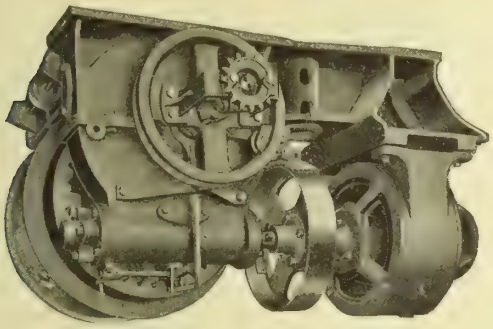
Continued on next page



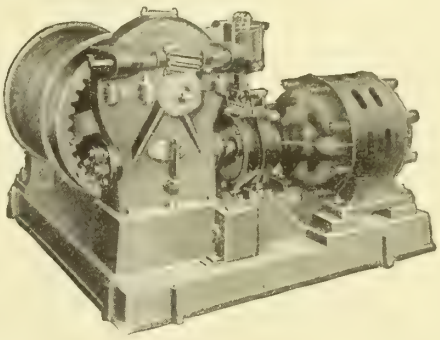
AUTOMATIC PUSH-BUTTON TYPE, DIRECT OR ALTERNATING CURRENT
Showing alternating current type with brake controller immersed in oil for quiet operation



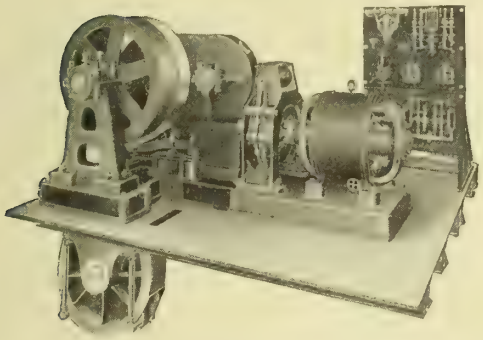
DRUM TYPE, SINGLE GEAR
For Passenger or Freight; built in several sizes



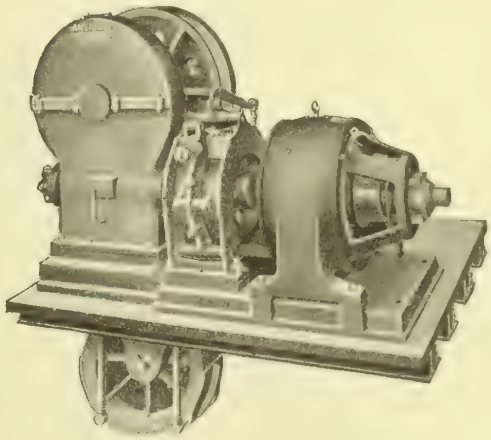
DRUM TYPE, SINGLE GEAR
Freight Service, for ceiling suspension



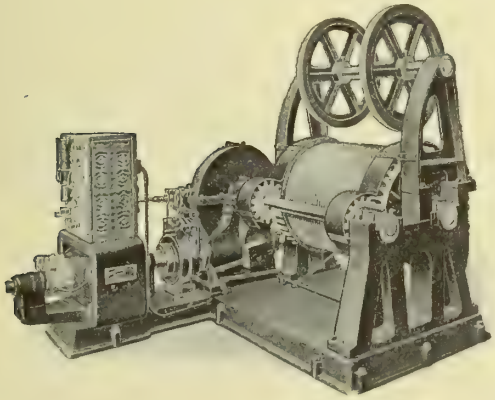
DRUM TYPE, INTERNAL GEAR
Freight Service; slow speed



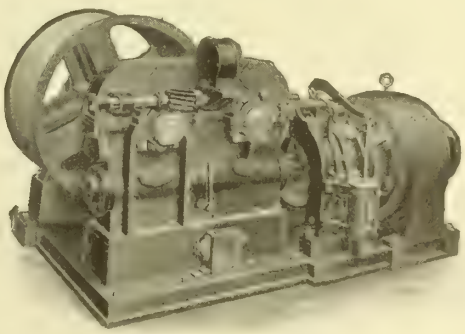
TRACTION TYPE, TANDEM GEAR
For high speed Service, operated by switch in car



TRACTION TYPE, SINGLE GEAR
For high speed Service, operated by switch in car



HEAVY DUTY TYPE, COMPOUND GEAR
Freight Service; slow speed



HEAVY DUTY TYPE, TANDEM DRUM
For Passenger or Freight; high and moderate speeds

BURDETT-ROWNTREE MFG. CO.

Electric Dumbwaiters

515 Laflin Street CHICAGO | 119 W. 40th Street NEW YORK | 525 Market Street SAN FRANCISCO | 931 Security Building LOS ANGELES

Products and Services.

Manufacturers and Contractors of ELECTRIC DUMBWAITERS for all purposes.

Types of Electric Dumbwaiter Service.

Five classes of hoisting machines and eleven standard types of control are made. These are suited to almost every conceivable condition and requirement. Modifications in systems of control can, however, be made when special service requirements necessitate.

The following are a few fields for which service systems have been specially developed:

Hotels, Clubs and Restaurants
Hospitals and Infirmaries
Newspaper and Printing Offices
Factories and Garages
Apartment Houses
Residences
Public Buildings
Libraries and Banks
Retail Stores
Wholesale Houses
Warehouses

Standard Types of Electric Dumbwaiter Control.

The eleven standard types of control consist of two Central Station Types, five Selective Multiple Types, and four Non-selective Multiple Types. The Central Station Controls are complete with all necessary signals. The Multiple systems are controlled directly from the controlling push-buttons on the different floors.

CENTRAL STATION CONTROLS

No. 1. One Point with Signals—Car controlled from only one point, with complete signalling system for rapid service between all floors. Particularly valuable where two or more dumbwaiters are used.

No. 2. One Point Direct Service—Car controlled from one point, automatically returning to dispatching floor after each trip, upon closing of door. Used largely by hotels and clubs.

SELECTIVE MULTIPLE CONTROLS

No. 3. Half Automatic—A full set of control buttons at

TYPES, LOADS, SPEEDS, ETC., OF BURDETT-ROWNTREE ELECTRIC DUMBWAITERS

Class	Types	Load, Lbs.	Car Speed, F.P.M.	H.P.* Wiring	Weight on Overhead Supports†	Brief Specifications of Hoisting Machine
		DIRECT-CURRENT UP TO 750 VOLTS				
A	AO	150 200 250	130 100 75	2.5	2100	CLASS A (Fig. 1) Class A hoisting machines have phosphor bronze worm, cast solid on an open-hearth steel shaft, and a cut cast-iron gear. Motor frame and lower half of gear case all one casting. Armature shaft and worm shaft are joined by a grip coupling. Ball thrust bearings at each end of the worm to reduce friction. Hatchway limits are used to prevent overrunning. Maximum travel 100 feet. Maximum number stops 10. Floors must be at least 8 feet apart for any control except non-selective. Not equipped with slow-down device.
A	AA	300 350	130 100	4	2500	
A	AB	400 500	100 75	4	3000	
B	B	100 150	150 100	2	2000	
B	BO	100 150 200 250	225 200 150 100	4	2300	
B	BA	200 250 400 450	200 150 100 75	4	3000	CLASS B (Fig. 2) Class B machines have same worm and gear construction as Class A. All parts of machine are mounted on cast-iron bed plate. Armature shaft and worm shaft joined with flexible coupling, which is also the brake wheel. Automatic limit stops are mounted on controller instead of in hatch. All machines with car speed of 150 F. P. M. or more are equipped with slow-down device. There is no limit to speed, number of stops or travel.
B	BB	250 300	200 150	4	2600	
B	BC	100 200 300 400 500	500 300 200 150 100	5.5	3200	
B	BD	200 300 400 500	500 400 300 200	9.5	3400	
		ALTERNATING-CURRENT UP TO 600 VOLTS				
C	C	[illegible]	[illegible]	[illegible]	2000	CLASS C (Fig. 2) Class C machines are of same general type of construction as Class B, with necessary changes to operate on alternating current. Are not equipped with slow-down device. No limit as to travel or number of stops.
C	CO	[illegible]	150 125 [illegible]	4	2300	
C	CA	[illegible]	[illegible]	4	3000	
C	CB	[illegible]	[illegible]	4	2600	
C	CC	[illegible]	[illegible]	4	3000	
		[illegible]				CLASS D (Fig. 1) Class D machines are of same type of construction as Class A, with necessary changes to operate on 60-cycle polyphase current. Same limitation as Class A in regard to travel, stops and distance between floors.
D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
D	[illegible]	[illegible]	100	4	2500	
D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
		[illegible]				CLASS E (Fig. 3) Class E machines are designed to be installed over hatch. Needs very little attention and [illegible] service without [illegible] of Classes A, B, C or D. Speed reduction through silent chain and gear and pinion. Limited to 75 feet travel and hand rope control.
E	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

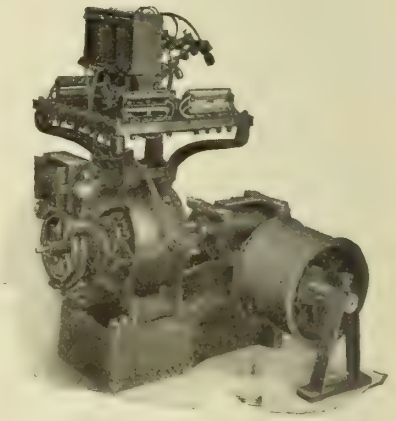


FIG. 1. HOISTING MACHINE, CLASSES A AND D
Class A equipped for Direct-Current; Class D equipped for Alternating Current

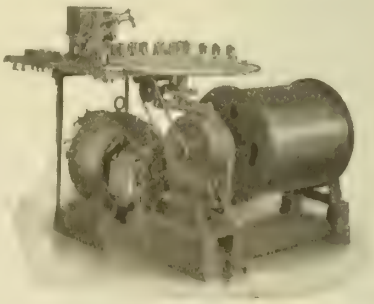


FIG. 2. HOISTING MACHINE, CLASSES B AND C
Class B equipped for Direct-Current; Class C equipped for Alternating Current

FIG. 3. CLASS E HOISTING MACHINE
Direct or Alternating Current. Located at Top of Shaft

* [illegible] should be [illegible] delivering, [illegible] and all [illegible] of starting and stop[illegible]

† [illegible]

Continued on next page

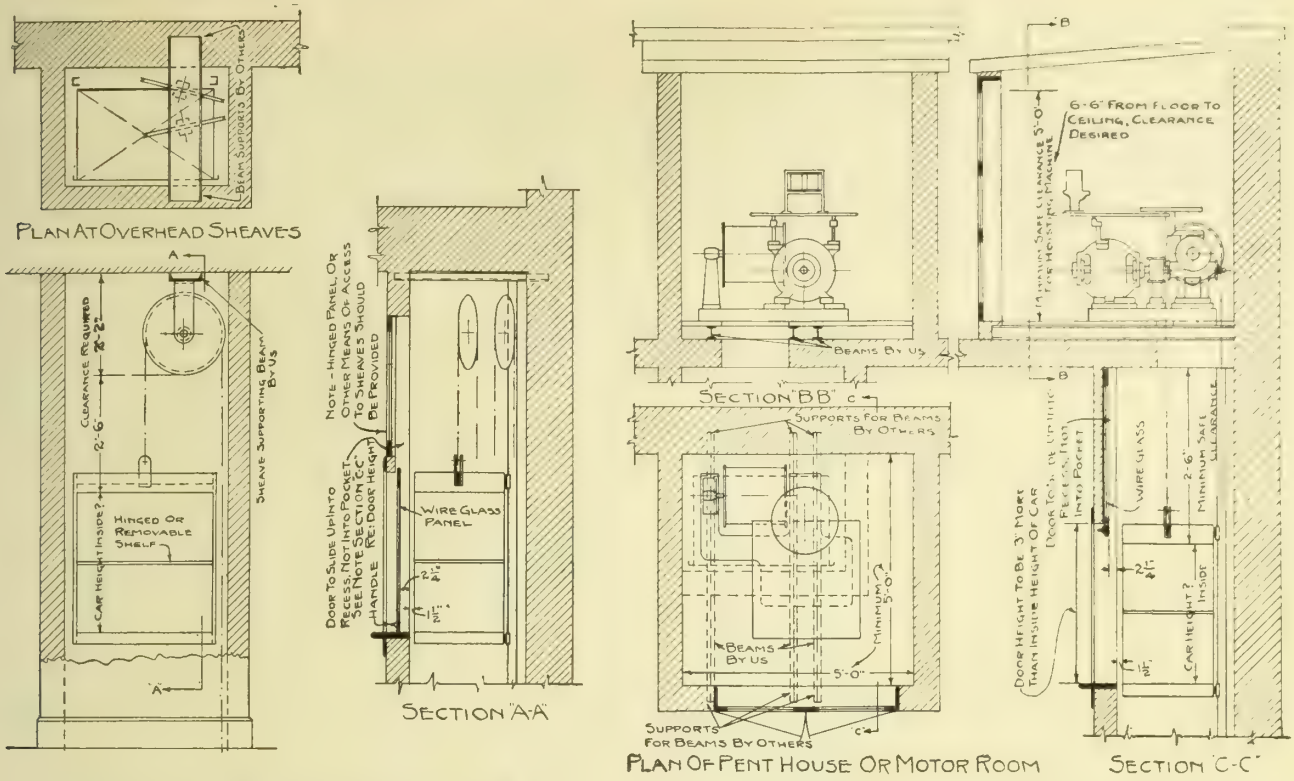


FIG. 5. SPACE REQUIRED WHEN HOISTING MACHINE IS OVERHEAD

If travel is over 100 feet, consult us regarding space required

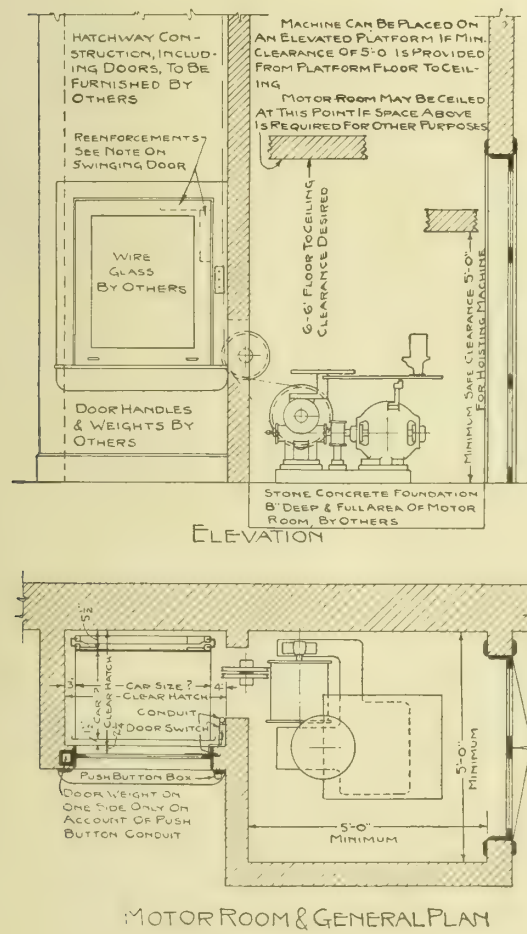


FIG. 4. SPACE REQUIRED WHEN HOISTING MACHINE IS ALONGSIDE OF HATCH

Hoisting machine may be located on basement floor, on an elevated platform in basement, or at some higher position in building (depending on travel of car). If travel is over 100 feet, consult us regarding space required.

Installation shows sliding doors; swinging doors as shown in adjoining detail, can be used if necessary. For note on sizes of doors, see Specification Note 3c, next page

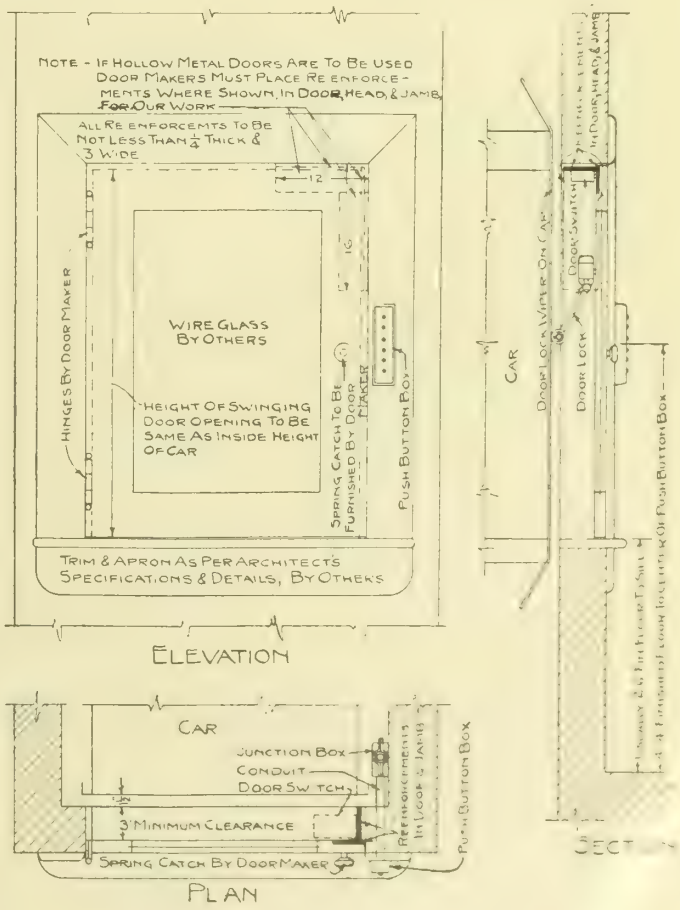


FIG. 6. SHOWING CONSTRUCTION OF SWINGING DOOR FOR ELECTRIC DUMBWAITER

It is of advantage to have all doors hinged on same side. For note on sizes of doors, see Specification Note 3c, next page

Continued on next page

the dispatching floor, with a return button at all other floors for returning the car to the dispatching floor.

No. 4. Call and Send—A full set of control buttons at the dispatching floor, with calling and returning buttons at all other floors.

No. 5. Car and Call—A full set of control buttons in the car for dispatching, and a calling button on every floor.

No. 6. Car Only—A full set of control buttons in the car for dispatching. This is the only type of push-button control that it is safe to use without safety door switches.

No. 7. Full Automatic—A full set of control buttons on every floor. An operator on any floor can call the car to his floor or send the car to any other floor.

NON-SELECTIVE MULTIPLE CONTROLS

No. 8. One Button—A sending button only at each of the terminal landings.

No. 9. Two Button—A calling and sending button at each of the terminal landings.

No. 10. Three Button—Sometimes called "Up, Down and Stop." Three buttons are placed on every floor and the car travels "Up" or "Down" to the limit of its travel unless stopped at an intermediate floor by the use of the "Stop" button.

No. 11. Hand Rope—This control is furnished only with our Class E machine, and consists of a hand rope either inside or outside of the hatchway.

Installation Data.

Dumbwaiter Cars—For use in hospitals and residences where extreme quietness is important, wood cars with hardwood guide shoes should be specified.

For restaurants and hotels where food is often spilled, and in commercial and industrial buildings, steel cars with steel guide shoes should be specified.

Slack cable switch on car and lamp in car should be specified for Class A, B, C, or D machines; these are not furnished with Class E machines.

Shelves can be placed in car where desired, and can be stationary, removable, or hinged.

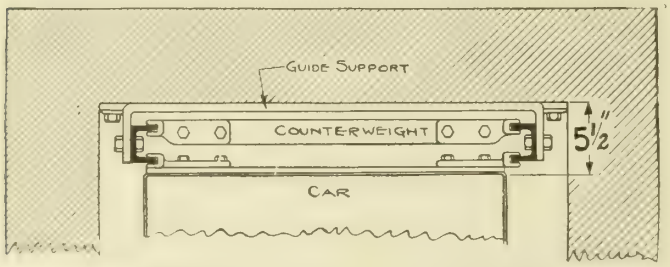


FIG. 7. COMBINATION CAR AND COUNTERWEIGHT GUIDES

Steel Guides—Guides for both car and counterweight, which are fully described in the specifications, consist of cold-rolled steel channels, specially designed for this class of work, and are used as combination car and counterweight guides. They are installed at the back or side of the hatch, as best suited to the conditions.

Corner post or opposite side post construction of guides is not used, as these require more space, decrease size of car and are more expensive.

Door Openings—Door openings can be placed on one, two or three sides of the hatch, by properly arranging the location of the hoisting machine so as to keep the hoisting ropes away from in front of the door openings (Fig. 8).

Hoisting Machine—Hoisting machines for hospitals and residences should always be located in basement.

Automatic Slow Down—Class B machines for direct-current, having a car speed of 150 F.P.M. or more, are equipped with an automatic electrical slow down for decreasing the speed of the car before applying the brake.

Safety Door Switches—All of our dumbwaiters, except controls No. 6 (Car Only) and No. 11 (Hand Rope), have Safety Switches at the hatchway doors, which prevent the starting of the car unless all the doors are closed. This is a valuable safety feature.

Specification Notes.

The following work is to be done by other Contractors, and the various items are herein mentioned in order that they may be provided for in the Architect's drawings and included in the specifications, in the proper sections.

(1a) Framing for hatchway and its complete construction, including plastering or lining of interior, if not to be left rough.

(2b) Furnishing, installing and painting or finishing of frames, sills and doors; doors to have wire glass, hardware, and be hung as shown on details.

(3c) Height of sliding door openings to be three inches more than inside height of car. Height of swinging door openings to be same as inside height of car. One door opening in each hatchway, preferably the bottom one, is to be three inches wider and ten inches higher than inside dimensions of car, to permit car to be installed without removing door trim and buck.

(4d) Door weight for sliding doors to be placed uniformly on only one side of door opening, as weights on both sides of a door interfere with push-button conduit. If only one dumbwaiter is to be installed, place the door weight at left-hand side of doors, unless guides are at right-hand side of shaft. (No. 2, Fig. 8.)

If dumbwaiter guides are located at side of hatch, door weight shall be on same side of door opening, as it is necessary to place push-buttons and conduit on side of door opening opposite to guides.

(5e) Hoisting machine shall be in a fireproof enclosure having an entrance door. This is required by the Underwriters in some localities. Allow at least five feet square by five feet high for each hoisting machine, so that machine can be properly oiled and cleaned. Additional space required if travel of car is over 100 feet.

(6f) A pit at bottom of shaft is not required if car is to stop level with sill, usually two feet six inches from floor. If car is to stop level with floor on bottom landing, a pit one foot six inches deep is required.

(7g) If hoisting machine is located on basement floor, a stone concrete foundation eight inches in depth and full area of motor room shall be provided.

(8h) If hoisting machine is located on basement floor or alongside of shaft on upper floors, necessary means shall be provided for supporting beams for the sheaves at top of shaft.

(9i) If hoisting machine is located overhead or on platform alongside of shaft, necessary means shall be provided for supporting beams for machine platform.

(10j) Necessary means shall be provided at each floor for attaching the guide supports which shall be installed by dumbwaiter contractor.

(11k) Feed wires shall be provided within five feet of hoisting machine, of ample size as shown on table under "H.P. Wiring," terminating with controlling switch ready for connections which shall be made by the dumbwaiter contractor.

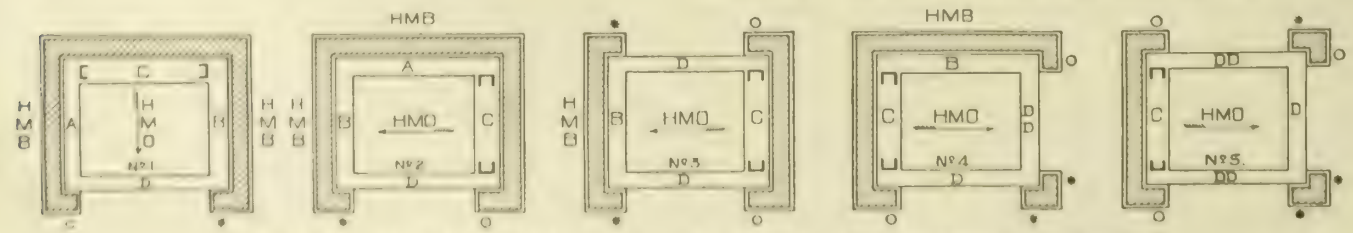


FIG. 8. TYPICAL ARRANGEMENT OF DOOR OPENINGS AND HOISTING MACHINES

A—1" B—4" C—4" D—1" DD—1" HMB—Hoisting Machine Below HMO—Hoisting Machine Overhead ● Push Button ○ Door Weight

Continued on next page

How to Specify.

The BURDETT-ROWNTREE MFG. CO. has evolved the following standards in the manufacture and installation of electric dumbwaiters, which are herewith offered as a basis in securing the highest type of efficiency and service. It is suggested that architects, engineers and others, desiring the best results, may obtain them by inserting the following clause and table in their general specifications:

Furnish and completely install where and as shown on drawings.....electric dumbwaiters, the same to comply in every respect with the specifications and details of the BURDETT-ROWNTREE MFG. CO., as set forth on pages.....of SWEET'S ARCHITECTURAL CATALOGUE, 1916 Edition. The type of installation, load, service, etc., to be in accordance with the following table:

TYPES, NUMBER, DUTIES, ETC., OF DUMBWAITERS

Location of Shaft	Car Operates between: Floor	Car Operates between: Floor	Type of Machine	Car Travel, Ft.	No. of Stops	No. Door Openings in Shaft (Fig. 8)	Capacity, Lbs., of Dumbwaiter	Speed of Car, Ft. per Minute	Control	Car: Metal or Wood	Car: Depth, Ins.	Car: Width, Ins.	Car: Height, Ins.	No. of Shelves (Stationary or Hinged)	Openings in Dumbwaiter Car (Fig. 8)	Location of Hoisting Machine	Currents: Volts (A. C. or D. C.)	Currents: Phase (A. C.)	Currents: Cycles (A. C.)

Detailed Specifications for Classes A, B, C and D Dumbwaiters.

Hoisting Machinery—Each hoisting machine to consist of a reversible motor direct-connected to hoisting apparatus by means of a steel shaft, fitted with a phosphor bronze worm, operating in a cut cast-iron gear, both worm and gear to operate in a dustproof chamber designed to receive continuous and ample lubrication. Keyed to shaft, which carries worm gear, is to be a cast-iron hoisting drum, turned true, scored for cables and of proper diameter to secure the required speed and travel of the car. Each hoisting machine to be so constructed that it will use current only when car is in motion. All shafts to be of steel, and all bearings to be provided with necessary means for ample lubrication. Entire hoisting machine to be constructed and erected in best possible workmanlike manner. (See Specification Note 5e.)

Cars—Each car to be as large as practicable, irrespective of dimensions given, to run in hatchway provided, and to be capable of sustaining a much larger load than machine is designed to lift. Each car to be provided with (one) (two) (removable) (stationary) (hinged) shelves.

Each car to be constructed of (hardwood) (formed sheet steel members with rounding edges and riveted together rigidly with no rivet heads inside car except for shelf supports; sides and back of car to be No. 18-Birmingham gauge sheet steel, .049" thick and bottom to be No. 16-Birmingham gauge sheet steel .065" thick). Each car to be left completely finished by the manufacturer.

Counterweights—Each machine to be provided with a back drum counterweight, counterweight frame to be constructed of channels and bolts, rigidly held together, and to contain slugs, held securely in place, so as to properly retain their position.

Guides—All guides for both car and counterweight to consist of cold-rolled steel channels, specially designed for this class of work, weighing not less than six pounds per foot and measuring 2⅜" x 1 11/16" x 9/32", erected straight. Steel channels to be used as combination car and counterweight guides, and to be installed at back or side of hatch, as best suited to conditions.

Guide sections to be fastened together by use of dowel pins and fish plates, and to be fastened rigidly to building construction at each floor by use of guide supports.

One guide intermediate must be used between various guide supports when distance between supports is more than eight feet and not more than sixteen feet, and two must be used where distance between supports is more than sixteen feet.

Means to be provided at each floor by another contractor for proper attachment of guide supports. (See Specification Note 10j.)

Hatchways—Hatchways to be provided and hatchway enclosure complete with all necessary doors, properly hung at various openings under another contract. One door in each hatchway, preferably bottom one, to be left large enough for admission of car without removing door frame. (See Specification Notes 1a, 2b, 3c, 4d.)

Safety Appliances—Each dumbwaiter to be provided with limitation stops, so arranged that car cannot travel beyond terminal stops in either direction.

Brakes—Each dumbwaiter to be provided with safety brake, which will be automatically applied and will hold car securely at that point of its travel, whenever circuit is broken.

Slack Cable—Each car to be equipped with a slack cable switch, so arranged that, if car is obstructed in its downward travel and cable slackens, machine will automatically stop, thus obviating danger of damaging cable.

Foundation—For machines located overhead: Hoisting machines to be located overhead on steel supporting beams, and platform to be provided by this contractor; supports for same by another contractor. (See Specification Note 9i.)

For machines located in basement alongside hatch: Hoisting machines to be located in basement on foundation of concrete, eight inches in depth, to be provided by another contractor. (See Specification Notes 7g, 8h.)

For machines located alongside hatch on upper floors: Hoisting machines to be located alongside of hatch on ..... floor. Another contractor to be responsible for floor being of sufficient strength to carry weight of machine and for its being constructed so that machine can be securely fastened in place. (See Specification Note 8h.)

NOTE—For details consult us.

For machines located on elevated platform: Hoisting machine to be located on steel supporting beams, and platform to be furnished by this contractor and supported [from ceiling on ..... floor] [on ..... floor]; supports for same by another contractor. (See Specification Note 9i.)

Sheave Beams and Sheaves—Beams to which overhead sheaves are attached to be provided by this contractor, but supports for same to be furnished under another contract. (See Specification Note 8h.)

Sheaves for supporting car and counterweight to be turned true for cables, and to have ample provision for lubrication.

Cables—This contractor is to furnish and install all the necessary hoisting cables.

Electrical Connections—Feed wires for furnishing current to each dumbwaiter machine to be furnished, installed and connected to wall switch at hoisting machine under another contract; but this contractor is to furnish all necessary operating wiring in hatchways and make connections from same to hoisting machinery. (See Specification Note 11k.)

Signal Lamps—A signal lamp to be provided in each dumbwaiter car, so arranged that it will be lighted when car is at rest in front of any doorway.

A glass panel to be placed in each enclosure door by another contractor, so that signal light in car can be seen when car has arrived at destination. (See Specification Note 2b.)

Safety Fuses—This contractor is to provide safety fuses to properly protect various circuits that operate machine and controlling apparatus.

Control—(See descriptions of controls on preceding pages.)

Door Switches—Door switch to be provided by this contractor at each enclosure door, so connected that all doors must be closed in a hatchway before machine can be operated. (Not furnished with control No. 6.)

Door Locks (if required)—To be provided by this contractor on each enclosure door, so arranged that an enclosure door cannot be opened unless car is opposite.

Guarantee—Work done under this contract to be guaranteed as to workmanship and material; this contractor will be required to replace, at his expense, all parts that prove defective within one year from date of completion of his work.

NOTE—See Specification Notes for other contractors' work.

Specification for Class E Dumbwaiters.

Hoisting Machinery—Each hoisting machine to consist of reversible motor connected to hoisting drum by means of silent chain drive with gears and pinions.

Each hoisting machine to be so constructed that it will use current only when car is in motion. All shafts to be of steel, and all bearings to be provided with necessary means for ample lubrication.

The entire hoisting machine to be constructed and erected in the best possible workmanlike manner.

Other Features—Specifications for following features are the same (except as noted) as in case of specification for classes A, B, C and D:

Cars; Counterweights; Guides; Hatchways; Safety Appliances; Brakes; Slack Cable—Not furnished; *Foundation*—Machine only located overhead; *Sheave Beams and Sheaves*—Not required; *Cables; Electrical Connections; Signal Lamps*—Not furnished; *Safety Fuses; Control*—No. 11; *Door Switches*—Not furnished; *Door Locks*—Not furnished; *Guarantee.*

NOTE—See Specification Notes, on preceding page, for other contractors' work, etc.

Additional Information Furnished.

Typical details and data book free.

CHELSEA ELEVATOR COMPANY

TELEPHONE, CHELSEA 5448

332 West Twenty-Sixth Street
NEW YORK, N. Y.

BUSINESS ESTABLISHED 1876
INCORPORATED 1912

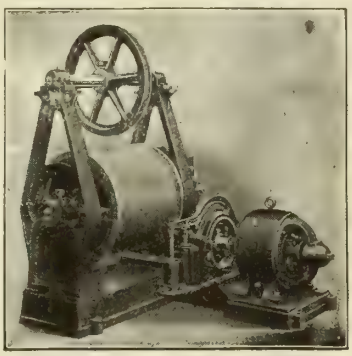
Products.

Manufacturers of HOISTING MACHINERY, including: ELECTRIC and HAND-POWER PASSENGER and FREIGHT ELEVATORS; HAND-POWER INVALID, SIDEWALK and AUTOMOBILE ELEVATORS; and all Types of HAND-POWER and ELECTRIC DUMB-WAITERS.

Also, HOSPITAL ELEVATORS, TRUNK LIFTS, ASH HOISTS, FORM LIFTS, HOIST WHEELS, AUTOMATIC and SEMI-AUTOMATIC GATES, etc.

Electric Direct-Connected Elevators.

A line of Elevator Machinery covering the whole range of elevator requirements, from the slow-speed sidewalk lift to the massive freight and high-speed passenger elevators.

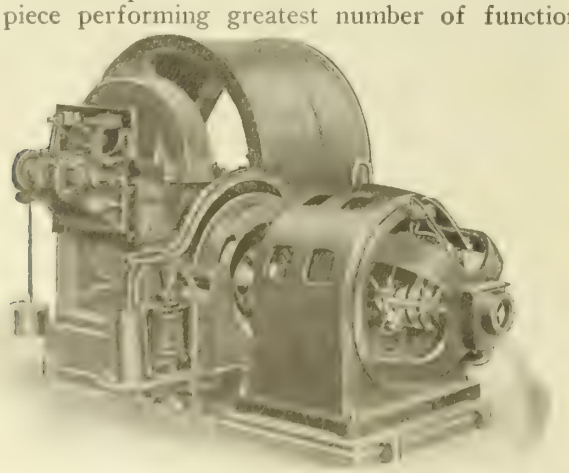


DIRECT-CONNECTED ELECTRIC PASSENGER AND FREIGHT DRUM MACHINE
Direct Current

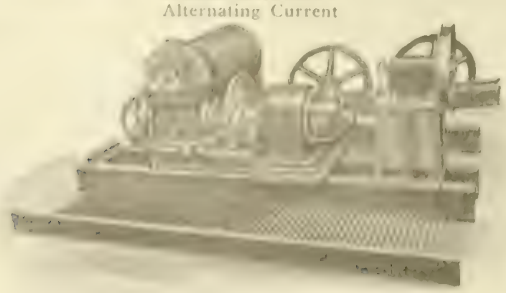
Electric Elevator Machines.

Machines for these elevators are designed on principles of simplicity, durability and safety. Only best materials are used, and construction is based on a factor of safety far exceeding that used in ordinary practice.

Number of parts have been reduced to a minimum, each piece performing greatest number of functions consistent with sound mechanical principles. All parts are readily accessible.



DIRECT-CONNECTED ELECTRIC FREIGHT AND PASSENGER DRUM MACHINE
Alternating Current



DIRECT-CONNECTED ELECTRIC FREIGHT DRUM MACHINE OVERHEAD TYPE

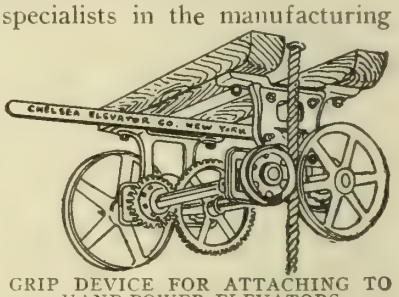
Estimating for Electric Elevators.

Data required:

Service	Guides, wood or steel
Car travel	Car value
Light in car	Type of control
Annunciator	Size and location of well
Indicators	Side or corner-post
Maximum load, pounds	Machine foundation by
Number of landings	Sheave beam supports by
Shaft construction	Pit by
Speed, feet per minute	Counterweight screen by
Current and voltage	Service for current by
Location of machine	Grating by

Hand-Operated Elevators.

For many years specialists in the manufacturing of hand-power elevators, every modern improvement of merit is incorporated, insuring elimination of friction and noise, ease of operation, simplicity, safety, durability and reliability.



GRIP DEVICE FOR ATTACHING TO HAND-POWER ELEVATORS

Features—Shafts of steel of large diameter; self-lubricating bearings; drums spirally grooved; strong gears and fly-wheels keyed to shafts; ropes and cables first quality; cars and platforms either hardwood or steel; material and workmanship best obtainable.

NO. 13. FOUR CABLE PRIVATE STABLE ELEVATOR
1,000 to 6,000 lbs. capacity

NO. 14. COMBINED HAND AND POWER CENTER LIFT ELEVATOR
2,500 lbs. capacity

NO. 15. NEW IRON DRUM HOIST WITH FL
1,000 to 5,000 lbs. capacity

Hand-Operated Dumb-Waiters.

Every type of hand dumb-waiter manufactured, including most modern designs obtainable:

Traction, sheave type, band brake and automatic brake, geared automatic, patent iron frame geared, brass tube, compensating, under counter, disappearing and form-lift dumb-waiters.

Traction Dumb-Waiters are highly recommended for high speed and quick service; Patent Iron-Frame Machines for heavier duty. In these machines counterweight rope passes over one wheel from center of car to center of counterweight. No leading sheaves are used. Wheels are, therefore, of full diameters, thus reducing friction and wear.

Special attention is given to any dumb-waiter installation that presents a problem. Material and workmanship best obtainable.

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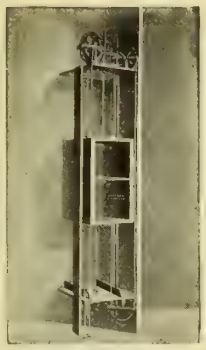
NO. 1. ONE-TO-ONE TRACTION DUMB-WAITER
1 to 50 lbs. capacity



NO. 2. TWO-TO-ONE TRACTION DUMB-WAITER
50 to 100 lbs. capacity

NO. 3. PLAIN SHEAVE DUMB-WAITER
50 to 150 lbs. capacity

NO. 4. BAND BRAKE DUMB-WAITER
50 to 150 lbs. capacity

NO. 5. AUTOMATIC BRAKE DUMB-WAITER
75 to 200 lbs. capacity

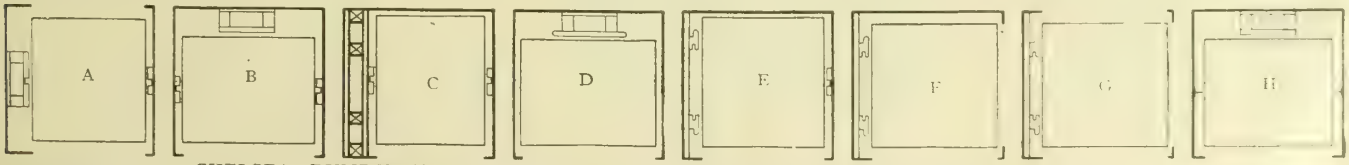
NO. 6. PATENT FRAME DUMB-WAITER
100 to 500 lbs. capacity

DATA AND PRICES OF SOME OF THE CHELSEA HAND-OPERATED DUMB-WAITERS

Number	Type	Car-Size, in inches	Hatchway Size, Single Face	Hatchway Size, Double Face	Capacity in Lbs.	Complete Shipping Weight, Approx.	Price Machine Only	Price Complete Outfit, Height 20 ft. or less	Price Machine Extra Double Face	Add each extra ft., Single Face	Add each extra ft., Double Face	Price, Machine without Brake	Service best adapted for	Outline Specifications
1-A	One-to-One Traction Brake	22x18	26x21	26x22	50	400	$25.00	$50.00	$12.00	$0.25	$0.38	$18.00	High-class residence work. Pantry service. Quick service. Small packages. Almost noiseless in operation. Ropes very lasting, on account of full diameter wheels.	*Machine*—Iron wheels set in iron frames, with oil holes, rope guards, etc. All wheels full diameters between centers; weight wheel fitted with band and leather-cushioned band brake. *Car*—Ash, dovetailed, varnished, shelved as directed, fitted with eyes for ropes and guides for runs; Russian hemp hand and check ropes; Manila weight rope; heavy double groove hardwood runs; cast-iron counterweight fitted with eye and guides; platform at bottom fitted with rubber bumpers; check weights, bull's-eyes, pulleys, etc.
1-B	One-to-One Traction Brake	26x22	30x25	30x26	50	450	27.50	55.50	14.00	0.25	0.38	20.00		
2-A	Two-to-One Traction Brake	22x18	26x21	.....	100	450	25.75	59.00	....	0.28	...	18.75	High-class residence work where heavier duty is required than one-to-one. Almost noiseless in operation. Ropes very lasting, on account of full diameter wheels.	*Machine*—Same as above with eye at top of shaft for hand rope fastening. *Car*—Ash, dovetailed, varnished, shelved as directed, fitted with eyes for ropes and guides for runs and casting pieces with lignum vitae sheaves; Russian hemp hand and check ropes; Manila weight rope; heavy double groove hardwood runs; cast-iron counterweight fitted with eye and guides; platform at bottom fitted with rubber bumpers and fastening for adjustment to hand rope; check weights, bull's-eyes, pulleys, etc.
2-B	Two-to-One Traction Brake	26x22	30x25	.....	100	475	28.00	66.25	....	0.28	...	20.75		
3-A	Plain Sheave Rig	22x18	26x21	26x22	75	240	10.00	24.00	6.00	0.25	0.33	Has No Brake	For general requirements where a moderate price good quality Dumbwaiter is desired.	*Machine*—Steel shaft, fitted with proper diameter fly-wheel and weight wheel securely fastened; also, leading sheaves and boxes for shaft. *Car*—Ash, dovetailed, varnished, shelved as directed, fitted with eyes and guides; Russian hemp hand rope; Manila weight rope; hardwood guide runs; cast-iron counterweight, eyes and guides; cross-pieces at bottom fitted with rubber bumpers; bull's-eyes, fair leaders, etc.
3-B	Plain Sheave Rig	26x22	30x25	30x26	100	300	12.00	30.00	6.50	0.27	0.35	Has No Brake		
4-A	Brake Sheave Rig	22x18	26x21	26x22	75	290	18.00	40.00	6.00	0.26	0.35	See Plain Rig	A serviceable Dumbwaiter where it is desirable to lower loads, controlling speed with the brake rope.	*Machine*—Steel shaft fitted with proper diameter fly-wheel and weight wheel and boxes for shaft; fly-wheel fitted with band and band brake. Necessary leading sheaves. *Car*—Ash, dovetailed, varnished, shelved as directed, fitted with eyes and guides; Russian hemp hand and check ropes; Manila weight rope; hardwood guide runs; cast-iron counterweight, eyes and guides; cross-pieces at bottom fitted with rubber bumpers; bull's-eyes, fair leaders, check weights, etc.
4-B	Brake Sheave Rig	26x22	30x25	30x26	100	365	19.50	47.50	6.50	0.2[illegible]	0.3	See Plain Rig		
5-A	Automatic Brake	22x18	26x21	26x22	75	275	18.00	36.00	6.00	0.25	0.33	See Plain Rig	Residence and apartment house work, where a number of different people have the use of car. No check line required, as automatic brake holds loads within the capacity of machine.	*Machine*—Steel shaft fitted with proper diameter fly-wheel and weight wheel, and boxes for shaft. To back timber, there is fastened an automatic brake of first-class construction, so designed as to eliminate as much lost motion, noise and friction as possible; lock to automatically hold car at any point without the use of check lines or fastenings; car to remain stationary with load within capacity of machine until released by a pull on hand rope. *Car*—Same as for 3-A and 3-B, above.
5-B	Automatic Brake	26x22	30x25	30x26	100	350	22.00	43.50	6.50	0.27	0.35	See Plain Rig		
5-C	Automatic Brake	30x24	35½x27	35½x28	150	450	25.00	52.00	8.00	0.28	0.40	See Plain Rig		
5-D	Automatic Brake	34x28	39½x31	39½x32	200	635	30.00	61.00	8.00	0.32	0.45	See Plain Rig		
6-A	Patent Frame Geared Brake	34x28	40x32	40x33	250	975	50.00	90.00	10.00	0.49	0.58	Not Made Without Brake	Strong and substantial; store service. Heavy packages, etc. Good for lowering.	*Machine*—Shafts of steel; wheels of full diameters; gears of size to suit hatch and capacity of machine; fly-wheel proper diameter; band and leather-cushioned band brake; heavy babbitted boxes; necessary pulleys for check; lever for brake. *Car*—As for 3-A and 3-B, above.

Notes—Enclosed weight box, add 32 cents each foot of height. Steel guide rails for car, add 75 cents per foot of height. Brass guides for steel rails, $5 a set. Automatic Catch serviceable for a two-story dumbwaiter where brake and automatic lock are omitted, $3.50. Rope clamps to fasten hand ropes, 50 cents each.

Steel cars are made special and prices are quoted on request. All prices given are f.o.b. New York City. A detailed plan and instructions are sent with each equipment. No extra charge if size varies slightly from these given. Ropes spliced before shipment, if requested.

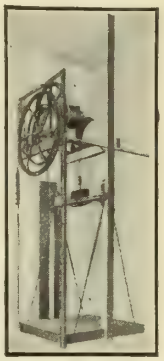


CHELSEA DUMB-WAITER HATCHWAY ARRANGEMENTS FOR VARYING CONDITIONS

In ordering, state preferable arrangement, and give clear inside measurements and total height of hatchway; also, door size in height and width

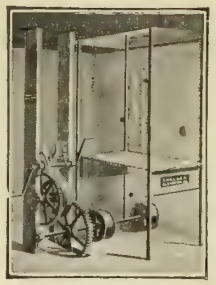
Continued on next page

NO. 7. PATENT FRAME PASSENGER ELEVATOR
500 to 1,000 lbs. capacity

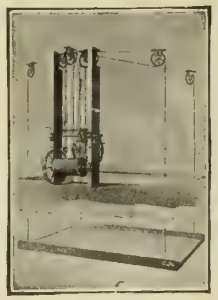


NO. 8. PATENT FRAME SIDE-POST STORE ELEVATOR
1,000 to 3,000 lbs. capacity

NO. 9. PATENT FRAME CORNER-POST STORE ELEVATOR
1,000 to 3,000 lbs. cap.



NO. 10. HAND-POWER SIDEWALK ELEVATOR
1,000 to 6,000 lbs. capacity



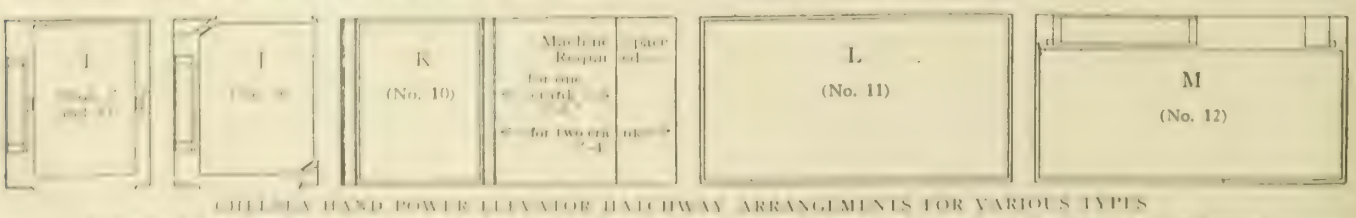
NO. 11. FOUR-CABLE WINDLASS ELEVATOR
2,000 to 6,000 lbs. capacity

NO. 12. FOUR-CABLE HAND-ROPE CARRIAGE ELEVATOR
2,000 to 6,000 lbs. capacity

DATA AND PRICES, OF SOME OF THE CHELSEA HAND-OPERATED ELEVATORS

Number	Type	Platform Size, Outside	Hatchway Size, Single Face	Hatchway Size, Double Face	Cap. in Lbs.	Complete Ship. Wgt., Approx.	Price Machine Only	Price complete except Wt. Box. 20 ft.	Price Machine, Ex. Double Face	Add each extra ft., Single Face	Add each extra ft., Double Face	Price allowed for Safety Attachment	Service best adapted for	Outline Specifications
7-A	Patent Frame Passenger Elevator	3'x3'	4'x3'-4"	4'x3'-6"	600	1800	$165	$425	$24	$1.00	$1.30	$32.00	General passenger service, invalids, hospitals, sanitariums, schools, public buildings, private residences, trunk lifts, etc.	*Machine*—Patent iron frames; steel shafts; drums, wheels and gears keyed to shafts. Steel keys; drums spirally grooved for cables; roller bearings; babbitted boxes; lubricating candles; finished brake; steel brake band, leather cushioned; wrought iron lever; iron pulleys and pulley supports. *Car*—Ash or other hardwood, dovetailed, filled, varnished and rubbed, iron braced. Safety attachment; guide shoes; cushioned counterweight; car and counterweight cables Swedish iron; drop forged sockets; Russian hemp hand and check ropes; fair leaders; check weights; maple guide runs.
7-B	Patent Frame Passenger Elevator	4'-6" x4'	5'-6"x 4'-4"	5'-6" x4'-6"	1000	1950	185	475	27	1.25	1.50	34.00		
8-A	Patent Frame Store Elevator, Side Post	4'-6" x4'	5'-6"x 4'-4"	5'x 4'-6"	1500	2000	190	360	30	1.25	1.50	34.00	Stores, lofts, factories, banks, bakeries, laundries, etc., wherever used from one side or opposite sides.	*Machine*—Same as 7A and 7B above, except brake is not turned and brake band not leather cushioned. *Platform*—Side post type. Shoes, post and crosshead, ash or other hardwood; flooring strongly lagged to shoes; crosshead and shoes tenoned and bolted to posts; posts braced with iron straps and rods and reinforced with iron brackets; safety attachment; guide shoes; cushioned counterweight; platform and counterweight cables Swedish iron; drop forged sockets; Manila hand and check ropes; check weights; fair leaders; maple guide runs.
8-B	Patent Frame Store Elevator, Side Post	5'-6" x5'	6'-6"x 5'-4"	6'-6" x5'-6"	2000	2500	250	450	36	1.60	1.80	36.00		
9-A	Patent Frame Store Elevator, Corner Post	4'-6" x4'	4'-8"x 4'-4"	4'-8" x4'-6"	1500	2200	190	390	30	1.25	1.50	36.00	Stores, lofts, factories, banks, bakeries, laundries, etc., wherever used from right angles or three sides.	*Machine*—Same as 8A and 8B above. *Platform*—Corner post type. Floor framing, post and crosshead of ash or other hardwood; frame for floor of platform tenoned and bolted securely fastened to posts; crosshead tenoned and bolted to posts; flooring N. C. pine; posts braced with iron brackets; iron straps and rods secure floor frame to crosshead; safety attachment, etc., as for 8A and 8B above.
9-B	Patent Frame Store Elevator, Corner Post	5'x5' -4"	5'-8"x 5'-8"	5'-8" x5'-10"	2000	2800	250	480	36	1.60	1.80	38.00		
10-A	Sidewalk Elevator or Ash Lift	3'x3'	3'-10" x 3'-2"	See Hatchway, Plan K for Machine Room	1000	1600	95	174	..	12-ft. rise or less	..	Have no safety attachments	Stores, lofts, etc., basement service, ashes, boxes, etc. Operated from one floor only.	*Machine*—Frames; cast iron, I beams or hardwood; steel shafts; iron drums, gears, pulleys keyed to shafts; steel keys; brake and steel brake band; wrought iron lever; pinion can be put out of mesh and loads lowered with brake lever; lip to hold pinion in mesh; pawl to hold loads; iron trough. *Platform*—Hardwood, iron braced; iron guides; solid iron posts or T iron guideways; proof chain to four corners of platform and to drums; iron overhead sheaves grooved for chains; wrought iron frames for sheaves; iron boxes; one or two cranks with maple handles.
10-B	Sidewalk Elevator or Ash Lift	4'x4'	4'-10"x 4'-2"		2000	1800	115	204	..		..			
11	Carriage or Auto Elevator, Windlass Type	7'-6" x16'	7'-8"x 16'-2"	C. W. T. Box outside of Hatch about 6'x30"	2500	3800	270	460	..		..		Garage, stables, etc., for short rise. No part shows below ceiling.	*Machine*—Same as for 10A and 10B above, except drum has back drum counterbalance and is grooved for cables. *Platform*—Hardwood shoes; flooring lagged to shoes; hung from four corners with Swedish iron cables; leaded in steel sockets. Counterweight hung similar cable; overhead sheaves on steel shafts set in iron brackets; additional wrought iron safety straps; cushioned counterweight.
12-A	Carriage or Auto Elevator, Hand Rope Type	7'-6" x16'	8'-4"x 16'-2"	Counterweight Box in Hatch	2500	4500	275	490	..	Each extra story, $20.00	..		Garage, stables, etc. Operated by hand rope and controlled by brake rope from any floor.	*Machine*—Frames hardwood; steel shafts; iron wheels, drum, gears keyed to shafts; steel keys; drums spirally grooved for cables; roller bearings; babbitted boxes; brake and steel brake band; wrought iron lever; pulleys and pulley supports; back drum counterbalance; babbitted wall box or bearing. *Platform*—Same as 11 above, except fitted with iron guides; maple guide runs.
12-B	Carriage or Auto Elevator, Hand Rope Type	8'x16'	8'-11"x 16'-2"		3000	6000	440	725	..	Each extra story, $32.00	..			12B same as 12A, except double geared for increased capacity.

Note—In the above stock sizes and capacities are given. No extra charge if size varies slightly. Prices quoted on request for outfits of any capacity; also on steel platforms and decks, etc. Estimates quoted for erection anywhere. Above prices are for complete machines, including machine lumber and bolts. Weight boxes, blocking and supporting timbers not included. Detail plan and instructions sent with each outfit. Prices f.o.b. New York City.



CHELSEA HAND POWER ELEVATOR HATCHWAY ARRANGEMENTS FOR VARIOUS TYPES

In ordering send sketch showing location of hatchway in building, show entrance to platform, give size of hatchway, and total height

CHARLES K. ERNST

Manufacturer of Iron Specialties

998-1006 East Ferry Street
BUFFALO, N. Y

Products.

Self-Raising Platform Lifts; Basement Operated Telescopic Hoists, Sidewalk Operated Telescopic Disappearing Hoists, Hand- and Motor-Driven; Automatic Safety Guarded Sidewalk Doors; Perfection Elevator; Labor-Save Cellar Elevator; Ash Conveyor; Automobile Turntables; Ash Can Trucks; Light Sidewalk Elevator.

Ernst Self-Raising Platform Lift.

A platform lift of unusual merit that can be used through a cellar window, or sidewalk door, for the handling of material, ashes and waste matter to and from the basement, and requiring the least amount of labor to operate. Lowers load of from 300 to 1,000 pounds by gravity, controlled by powerful band brake. Platform, when empty, automatically rises from cellar to sidewalk. Where goods are chiefly lowered into basement and platform goes up empty, this lift is ideal, as no cranking is necessary. The only time cranking is necessary is when a load is taken up from the basement to sidewalk. Turning the hand-wheel ten times elevates the platform one foot.

Special Features—An endless chain drive fitted into special pocket wheels, and cranking mechanism attached to upright, eliminate expense due to rust and stretching and wearing out of cable, as no working part is in a pit. The platform is counterbalanced. This and the endless chain drive make the lift operate always the same.

Operation—Lift can be used with or without a pit, as desired, as the platform height is but 19¼ inches. All lifts, having platforms up to four feet long, are self-supported, and are easy to erect. Inclined only 2½ feet.

Window Type—This same lift can be used through a cellar window (Fig. 4) where the first story is three or more feet above grade level. So used, it eliminates the expense of building an outside area way and cellar door, and consequent danger from an open hatch. Also, lift is sheltered from weather and dampness.

Price—For platform up to 4x4 ft., $125.00 f. o. b. Buffalo. Can be made full width of opening, but of lengths not over 4½ feet for heights of basement to ten feet. Each additional foot, $2.00 extra. Where platform of lift would occupy full opening, leaving no space for operator to crank side of machine, a special inside cranking mechanism can be furnished for $10.00 extra.

Use Ernst safety guarded sidewalk door with this lift, to safeguard sidewalk door opening.

Note—Architects when specifying kindly allow one foot and eight inches on side where cranking mechanism is to be placed, so as to give ample room for operator.

Can be furnished with direct attached one horse-power electric motor, taking up no extra room. Price for this quoted on application.

Fig. 1. Lift with platform level with floor

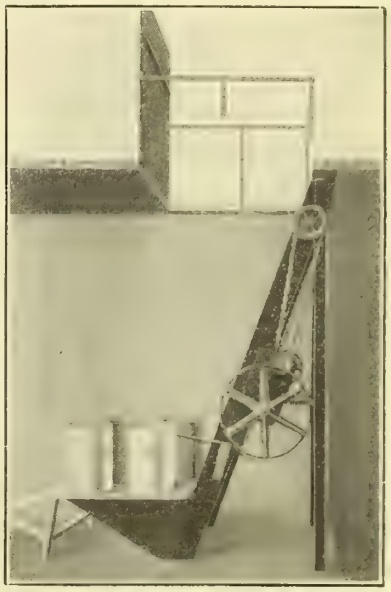


Fig. 2. Platform without pit. Can be set up in any old or new building

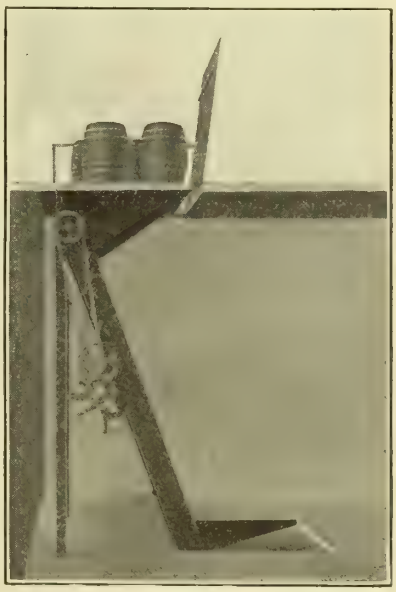


Fig. 3. Platform level with sidewalk. Shown with sloping pit

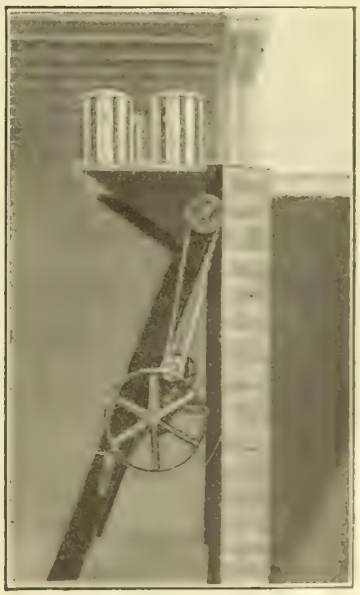


Fig. 4. Lift used through cellar window or door; requires no area way or cellar door

ERNST SELF-RAISING PLATFORM LIFT

Continued on next page

Ernst Sidewalk Operated Telescopic Hoist.

The Ernst Sidewalk Operated Telescopic Hoist is in principle and construction similar to our basement operated telescopic hoist, with the added feature of being operated from sidewalk level, where desired. This lift occupies less space and is invisible when not in use. The 5-inch channel upright is rigid on this lift, and the cranking mechanism is pivoted on two supports, allowing load to be swung and lowered on sidewalk with the utmost ease. The complete cranking mechanism, being instantaneously detachable, can easily be stored when not in use, to prevent rusting.

Hoist has compound gear box, safety catches, powerful band brake, automatic clutch, cable grooved drum, and ⅜-inch non-twisting cable. Enclosed drum box shelters cable and drum from rain or dampness.

Operation—Cranking the hoisting handle elevates arm above sidewalk, where it is held in position by an automatic clutch. By using hook ash cans, as shown in illustration, one man unaided can grapple cans with hook, hoist, swing and remove them, and then lower the empty ones to cellar, all from sidewalk. Full ash cans weighing 200 pounds can be hoisted at speeds of twenty-five to thirty feet per minute.

Position of operator on sidewalk safeguards the open hatchway while hoisting.

Price—Complete for heights to ten feet, $65.00 f. o. b. Buffalo. Each additional foot, $1.25 extra. When ordering, give height from basement floor to sidewalk level. Use with Ernst Safety Guarded Sidewalk Door.

Note—Hoist is compact, very easy to ship and erect. Setting plan furnished with each lift. Every lift is given a thorough working test before shipping. Capacity 400 pounds.

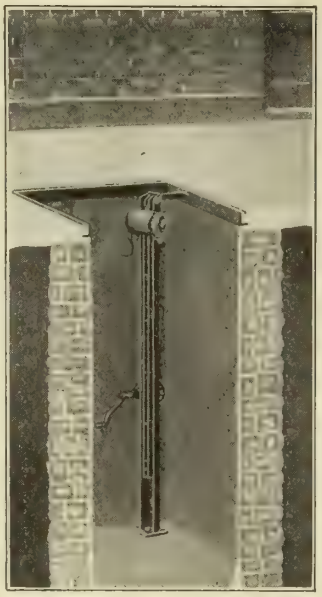


Fig. 5. Hoist lowered into cellar

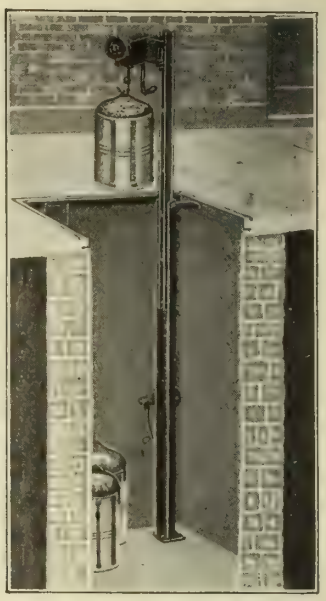


Fig. 6. Hoist in operation at sidewalk level

ERNST SIDEWALK OPERATED TELESCOPIC HOIST

Ernst Basement Operated Telescopic Hoist.

The Ernst Basement Operated Telescopic Disappearing Hoist is a one-man operating hoist, made to operate entirely from the cellar floor from a stand three feet high. The entire operation of raising telescopic arm in position, raising, swinging and lowering of load on sidewalk, and returning the hoist to cellar, is accomplished without the operator's leaving the machine or putting himself in danger by being obliged to move under the load. Hoist is invisible when not in use.

Operation and Installation—Raises a full can of ashes of 200 pounds weight at a speed of 25 to 30 feet per minute; maximum capacity 400 pounds. Has compound gears, automatic clutch to hold arm in position for hoisting, safety ratchets and strong band brakes that permit the lowering of telescoping arm and load into cellar without cranking cable grooved drums. Can be installed within two hours; setting plan and all necessary anchor bolts furnished with each lift. Handles all sizes of ash cans of standard makes.

Construction—Constructed all of metal of best materials obtainable. The upright is made of a 5-inch channel, into which hoist proper slides and which is made of 2½ by 2-inch angles riveted and stiffened together, while bottom is a 5-inch floor channel five feet long, which can be furnished any desired length to fit opening.

Price—Complete, $65.00 to 10 foot heights. Each additional foot $1.25 extra. Furnished with wagon height extension arm, $5.00 extra. Furnished with direct attached motor, one horse-power, operated from hoist stand.

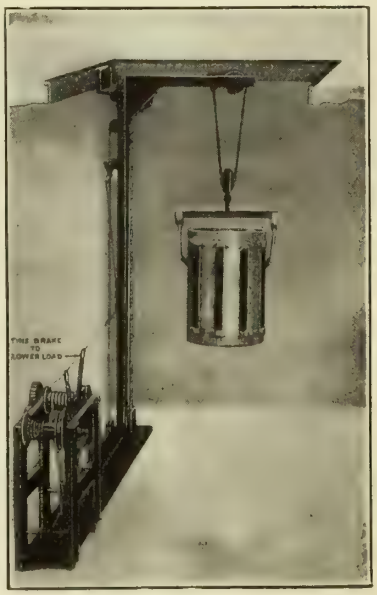


Fig. 7. Hoist lowered into cellar

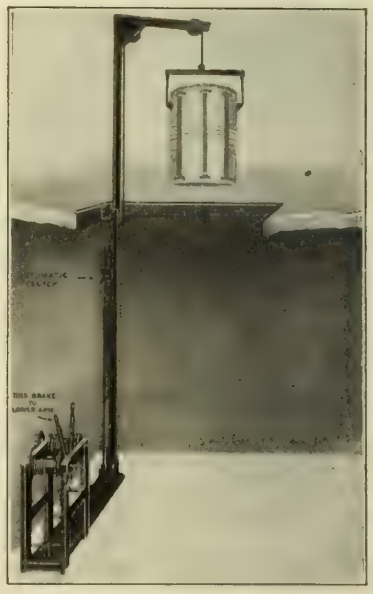


Fig. 8. Hoist in operation from basement

ERNST BASEMENT OPERATED TELESCOPIC HOIST

Ernst Perfection Elevator.

A simple, safe, strong, practical elevator, used through a cellar window for raising ashes or produce to window height and swinging load out over sidewalk. All metal, consisting of a 2½-inch pipe upright, securely fastened to cellar floor and ceiling, six inches from cellar wall, on which rides a platform 21 inches in diameter, operated by a 2⅜-inch iron cable moving on windlass attached directly to upright. Speed 15 to 25 feet per minute, capacity 300 pounds. Platform handles all sizes of ash cans of standard makes.

Installation—Size of window governs size of can or package that can be hoisted through window. Size of window recommended, twenty six inches wide by twenty eight inches high. Installed within an hour.

Continued on next page

No changes to window are needed as cellar windows are usually provided in buildings. No pit required. Platform lowers to 1½ inches from floor.

Gear—Has cable grooved drum, compound gears, window height regulator, band brake to lower platform to floor, safety-ratchet, and lock. Takes up very little room.

Price—Complete without ash can, $24.75 for heights up to eight feet. Each additional foot 75c. extra. When ordering, give height from cellar floor to ceiling.

NOTE—A handy ash can truck that handles cans from surface to platform of ash lift, eliminating pulling cans around, furnished for $2.50 extra.

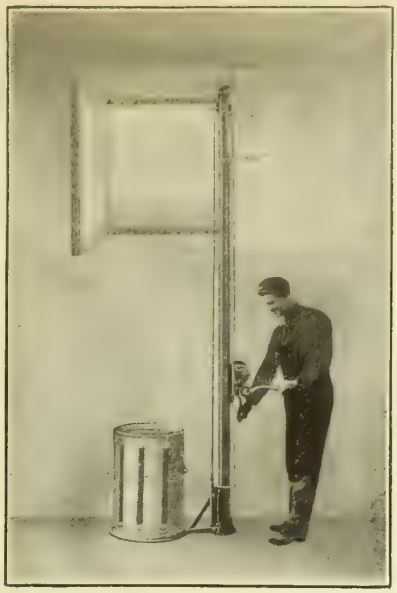


Fig. 9. Shows platform loaded ready for hoisting

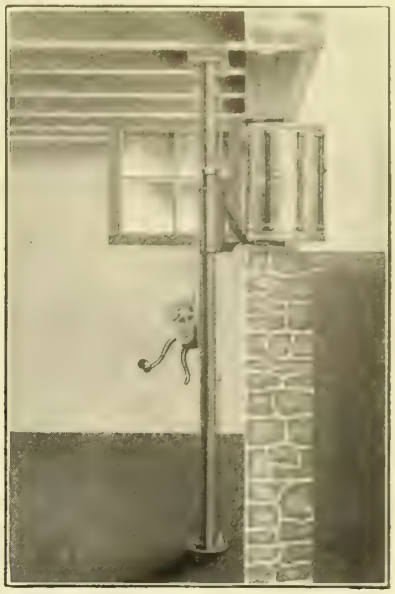


Fig. 10. Platform hoisted and swung out of a window

ERNST PERFECTION ELEVATOR

Ernst One-Piece Safety-Guarded Sidewalk Door.

Practically no single article in the construction of a modern building causes more annoyance than the sidewalk doors now in use, due to their imperfections.

Description—The Ernst door is the only door made automatically counterbalanced and safety guarded, to offer the best protection to pedestrians. The guards rise and close automatically when moved. Constructed of a one-piece 3x3¼-inch angle and one-piece checkered top, non-slippery plate ¼ inch thick, flush with sidewalk; no visible hinges or frame; strongly reinforced by stiffener angles and hinges to withstand a load of 300 pounds per square foot. Heavy counterweights permit opening and closing of door easily, giving long life. Has no middle seam to bend down or leak. Has an iron stop on four sides, that acts as a gutter and prevents concrete from breaking around door.

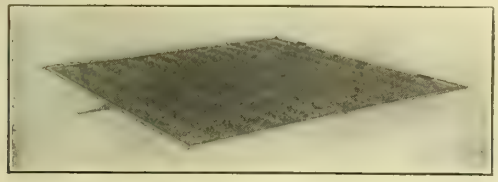


FIG. 11. Neat appearance of closed door

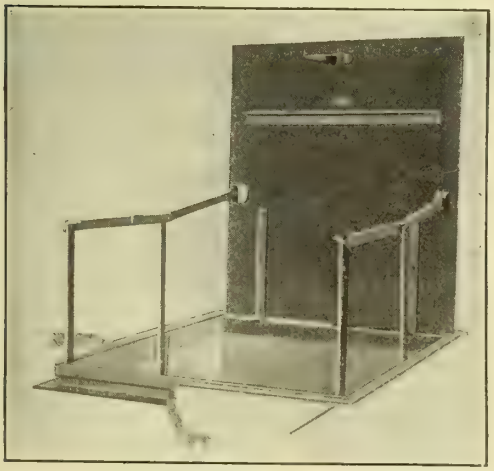


FIG. 12. Door opened showing complete rail guard, concealed frame and iron stop

AUTOMATIC SAFETY GUARDED SIDEWALK DOOR

Price—Made in all sizes. Stock sizes from 3 feet by 3 feet 6 inches to 5 feet by 6 feet, and ranging in price from $33.00 to $50.00.

NOTE—When ordering, state on which side door is to be hinged. Double doors having same flush frame and construction, but lacking automatic guards and weights, also made.

Light Sidewalk Elevator.

Has a capacity of 400 pounds; rises flush with sidewalk; can be used with or without a pit; takes up but little room; and is easily installed. Size of platform made up to 2 feet 6 inches square.

Price $70.00.

Ash Conveyor.

Made similar to our Perfection Elevator, but has two uprights, and a flexible platform that can be extended through a cellar window in a thick wall to sidewalk.

Price—$66.00 furnished with a 2 ft. 10 in. high by 2 ft. 5 in. wide special metal cellar window frame.

Catalogue.

Our latest Catalogue sent on request. We shall be only too pleased to afford you any further information desired regarding any or all of our machines, and will appreciate the opportunity of enabling you to secure a full and complete knowledge of every detail of the construction and operation of these machines before the completion of your plans.

THE EASTERN MACHINERY CO.

Manufacturers of Electric Elevators

NEW HAVEN, CONN.

Products.

ELECTRIC PASSENGER and FREIGHT ELEVATORS; BELT POWER ELEVATORS; ELEVATOR CARS; ELEVATOR EQUIPMENT.

Also, FRICTION WINDING DRUMS, FRICTION HOISTING MACHINES, FRICTION CLUTCHES, etc.; AUTOMATIC SAFETY GATES and AUTOMATIC HATCH DOORS.

Scope of Use.

The Direct-Connected Electric Elevator is adapted for *first-class* elevator service, passenger or freight, at all speeds.

Direct-Connected Electric Elevator Machine.

Operated by push-buttons or by full magnet control from switch in car, with direct or alternating current. Where direct current is provided, machine can be arranged for two-speed operation—a heavy load at slow speed, and light load at high speed. For alternating current, speed should not exceed 200 feet per minute. Design is good, construction is solid, and operation is smooth, reliable and safe (Figs. 1 and 2).

Accurate Construction—All parts are built with jigs and templates, accurately made, correctly put together, and are interchangeable, thus assuring efficiency and satisfactory service.

Drum—Mounted on turned steel drum shaft and bolted to heavy worm-gear center.

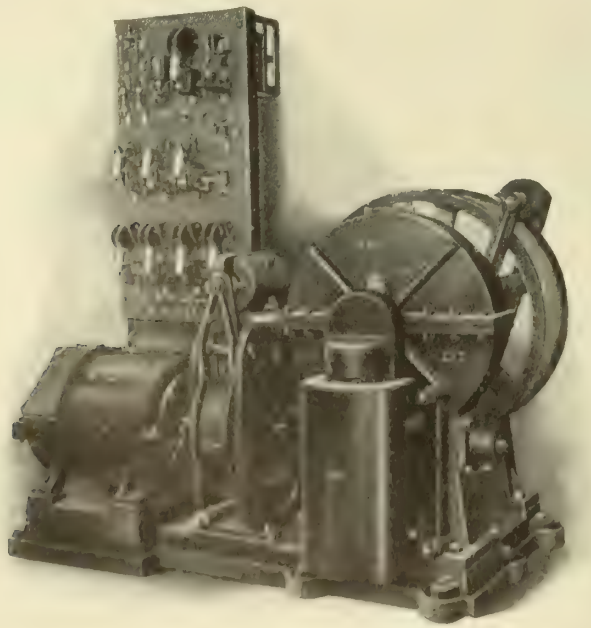


FIG. 1. DIRECT-CONNECTED ELECTRIC ELEVATOR MACHINE AND CONTROLLER
For Full Magnet and Push Button Control

Worm Gear—Made of gun metal bronze, accurately cut, with deep wide face teeth, and securely fitted and bolted to substantial iron center having a hub passing through gear case and securely bolted to drum.

Worm—The worm and worm shaft are one forging, made of high carbon steel and carefully turned.

Gear Case—Worm-gear, steel worm and ball thrust collars are enclosed in an oil-tight, dustproof gear case and are completely submerged in oil.

Brake—A powerful compound lever gravity brake grips a wheel of large diameter forming part of motor coupling. Operated by strong lever connection to shipper yoke cam or by electric solenoid.

Controller and Switch—Different types, of rugged construction, to suit current used and requirements of the service. Switches and contacts of ample capacity.

Motor—For direct current service, a compound wound, slow speed motor is coupled to worm shaft; and for alternating current service, a high torque, slip ring type alternating current motor is used.

Baseplate—These winding machines, whether located over well or on foundation in basement, are completely mounted on a substantial iron sub-base having deep groove flanges on all sides to prevent oil from dripping on car or running over floor.

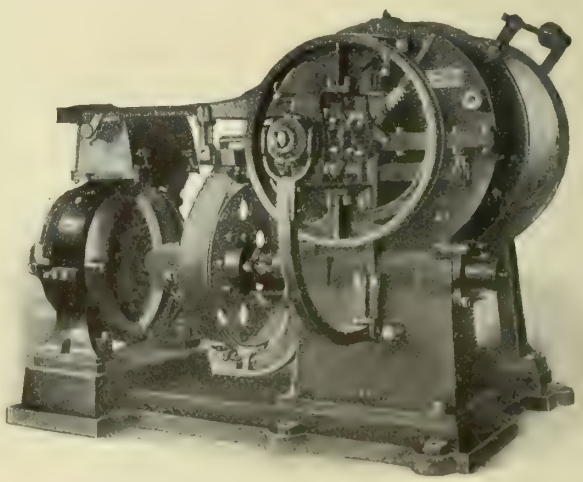


FIG. 2. DIRECT-CONNECTED ELECTRIC ELEVATOR MACHINE
For Freight or Passenger Service, with Shipper Rope Control

Single Belt Electric Elevators.

Scope of Use—For freight service, and where car speed is not over 70 feet per minute.

Operation—Operating parts consist of usual worm-gear winding machine, *driven with one belt* from compound wound reversing D. C. or A. C. motor, which runs *only when elevator is in motion.* An automatic electric controller is direct-connected to shipper wheel on winding machine, *for reversing and regulating current.* Any of these parts may hang from ceiling or stand on floor. Car and well-hole construction is same as required with ordinary belt power elevators.

Cost—This type is less expensive than the direct-connected type above described. The accurately cut worm-gearing and ball thrust collars in all our elevator machines, for reducing friction, *cause less power to be used in lifting load than is used by other similar apparatus on the market.*

Continued on next page

New Haven Worm-Gear Elevator Machine.

We also make a worm-gear, belt power elevator machine—built in several styles. These machines may be hung on ceiling or set on floor; and are made right hand or left hand, as required. All drums are scored in a lathe to fit cables. Worm-gears have ample proportions, with deep, wide face teeth, accurately cut. The worms are made of high carbon steel. Oil-tight gear case protects gear, worm and thrust collars, all submerged in oil. Double band gravity brake grips wheel of large diameter and sustains load at all points.

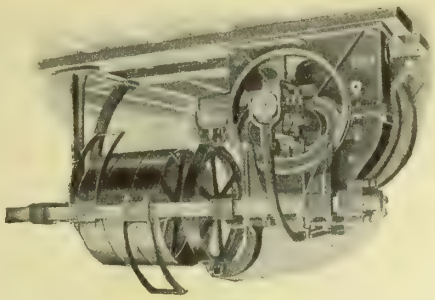


FIG. 3. NEW HAVEN WORM-GEAR ELEVATOR MACHINE

Equipped with large driving pulleys, automatic limitation stops and sensitive slack cable stops.

Freight Elevator Cars.

Built *for all purposes,* to order only. Cars made in any size or style desired, to be used with our winding machines (described on preceding page) or others.

Types—Manufactured in two types: (1) Wood or steel frame and side posts; (2) Wood or steel frame and corner posts.

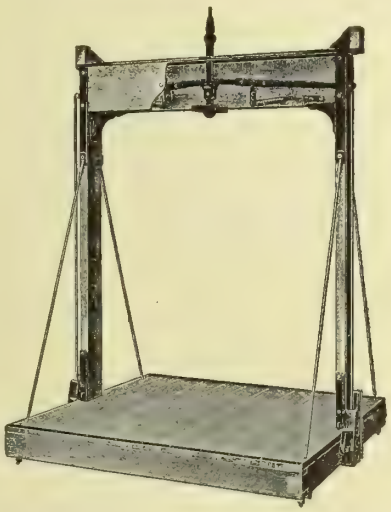


FIG. 4. FREIGHT ELEVATOR CAR
Position when hoisting cables are tight

FIG. 5. FREIGHT ELEVATOR CAR
Double head steel frame

Safety Mechanism—The safety stop is quick and positive. Safeties are at bottom of car.

If cables break, or become slack, a powerful spring (held in tension) in car head operates the levers, which raise wedges in guide cases, when sharp teeth immediately grip the guides, binding car solidly to post. After cables have been replaced and car has started upward, wedges will be released by action of wedge guide and drop back into their normal position in the case (Fig. 4).

With steel guide rails, hardened steel rollers are provided in place of wedges.

Car Speed Governors—These are provided for operating safety attachments on passenger or freight elevators, where required.

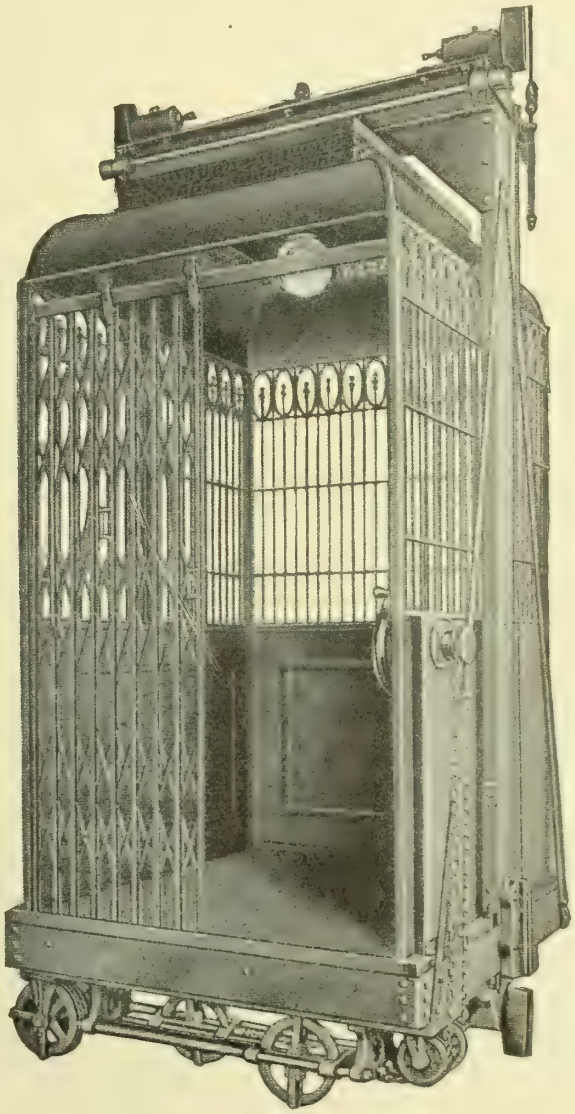


FIG. 6. ELECTRIC PASSENGER ELEVATOR CAR

Estimates and Prices.

After the necessary data are obtained, we are always pleased to make estimates and quote prices.

References.

Any one having our elevators in use.

GILLIS & GEOGHEGAN

Manufacturers of G & G Telescopic Hoist

542 West Broadway

NEW YORK, N. Y.

TELEPHONE, SPRING 6140

LIST OF AGENCIES IN THE UNITED STATES

BALTIMORE, MD., EASTERN SALES CO., 15 East Fayette Street
CHICAGO, ILL., WEBSTER ENGINEERING CO., 528 Stock Exchange Building
CLEVELAND, OHIO, QUEISSER-BLISS CO., Schofield Building
COLUMBUS, OHIO, R. L. WATSON, 407 Brunson Building
DETROIT, MICH., GEO. T. WALLACE SALES CO., 301 Penobscot Building
INDIANAPOLIS, IND., VONNEGUT HARDWARE CO.
KANSAS CITY, MO., JOS. T. WALSH & CO., 514 Kansas City Life Building
MINNEAPOLIS, MINN., AVERY SUPPLY CO., Essex Building
NEW HAVEN, CONN., THE WARNER-MILLER CO., Railroad Avenue and St. John Street
OMAHA, NEB., FRED F. SHIELDS CO., 1727 Leavenworth Street
PHILADELPHIA, PA., MANUFACTURERS' SALES CO., 253 North 12th Street
PITTSBURGH, PA., DEMPCY-DEGENER CO., 14 Wood Street
PORTLAND, ORE., ALBERT J. CAPRON, Ainsworth Building
ST. LOUIS, MO., BUILDING MATERIALS CO., Title Guarantee Building
SIOUX CITY, IOWA, HAAKINSON & BEATY CO., First and Nebraska Streets

Products and Services.

We manufacture the G & G TELESCOPIC HOIST (Patented) in the following Models:

MODEL A, HAND-POWER HOIST

MODEL B, OVERHEAD CRANE HAND-POWER HOIST

MODEL C, HOIST operated by ELECTRIC MOTOR

MODEL D, OVERHEAD CRANE HOIST operated by ELECTRIC MOTOR.

For Model E, Hoist operated by Electric Motor mounted on pipe standard, see page 1801.

We install the apparatus in New York, N. Y.

NOTE—We manufacture for use with hoist, the G & G SIDEWALK DOOR OPENING and CLOSING DEVICE with SPRING GUARD GATE. (Works automatically in connection with the G & G Telescopic Hoist, all Models).

The G&G Patented Telescopic Hoist with compound gear and brake attachment

TRADE-MARK

Model A Hoist.

The G & G Telescopic Hoist is a simple, safe and substantial means for hoisting and lowering between cellar and sidewalk, ash-cans, kegs, barrels, ice, etc. Fig. 1 shows Hoist as it is when not in use—*no part shows above sidewalk.* To put apparatus in position for hoisting (Fig. 3), the operator turns the telescoping handle as far as it will go. A safety ratchet device is provided with both telescoping handle and hoisting handle. For lowering, a powerful all-steel brake attachment is provided.

Advantages — One man, unaided, can operate hoist (Fig. 2).

Hoist raises the load at speed of thirty feet per minute. Equipped with patented "Silencer" — noiseless in operation.

Compact — Shipped complete, not "knocked down", therefore easy to erect.

All necessary clamps and bolts furnished; also blue-print showing erection in detail. No pit required.

Hoisting head revolves on ball bearings, depositing can on sidewalk without lifting.

When brake is used to lower load, *the hoisting handle does not revolve.*

The position of operator, standing at sidewalk when hoist is in use, protects public against danger of falling into hatch; and operator cannot be injured by anything falling through hatch.

Construction—Only the strongest and most durable materials are used. The hoisting head is of cast steel. The cable drum is grooved and the steel cable is non-rotating. Brake is lined with Johns-Manville brake lining. Every hoist is subjected to thorough working test, and is painted before shipment.

Capacity—No part has a factor of safety of less than eight, based on the ultimate strength of the material when the maximum load of 500 pounds is raised.

PRICES

Price, f.o.b. New York, N. Y., $115.00.
Erected complete in New York, N. Y., only, $125.00.
NOTE—A small additional charge is made if distance from area floor to sidewalk exceeds fifteen feet.

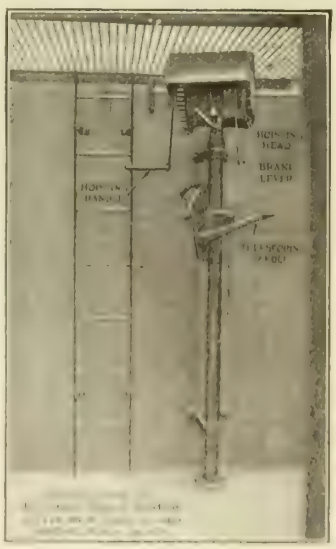


FIG. 1

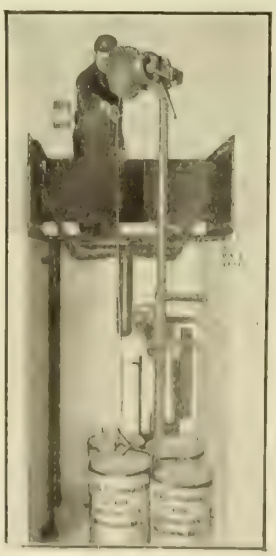


FIG. 2

FIG. 3

INSTALLATIONS OF G & G TELESCOPIC HOIST

FIG. 2 shows how one man, unaided, can "hook" and raise four or five G & G Swing Rail Cans *without leaving sidewalk.*

Continued on next page

Model B Overhead Crane Hoist.

Illustration (Fig. 4) shows the G & G Telescopic Overhead Crane Hoist (patented). This hoist is so arranged that the operator, standing at grade level, may raise ash-can from cellar to position six or seven feet above grade, and empty can directly into cart, without rehandling at grade level. This hoist has the telescopic feature, so that *no part shows above pavement when not in use.*

It is also constructed so as to retain the features of strength, safety, durability, ease and rapidity in operation, and economy of space occupied, the same as our Model A Hoist.

Capacity—Raises load at speed of thirty feet per minute. Maximum working capacity, 300 pounds. The can shown in Fig. 4 weighs 200 pounds, when full of ashes.

On request, we construct hoist with adjustable guy rods, running from top of hoist to building walls. When hoist is so arranged, its maximum working capacity is 500 pounds.

Price—f. o. b. New York, N. Y., $165.00.

Erected complete in New York, N. Y., only, $175.00.

NOTE—A small additional charge is made if distance from area floor to grade exceeds fifteen feet.

FIG. 4. MODEL B HOIST
Hoisting head revolves on ball bearings to swing can over wagon

Model C Hoist with Electric Motor.

The G & G Telescopic Hoist with Electric Motor (Figs. 6 and 7) is used in large buildings. Hoist has 1½ horse-power, series wound, totally enclosed motor and automatic upper limit. Maximum load, 500 pounds; speed, 60 feet per minute. Telescopic feature same as Model A Hoist.

Prices and specifications upon request.

Model D Hoist with Electric Motor.

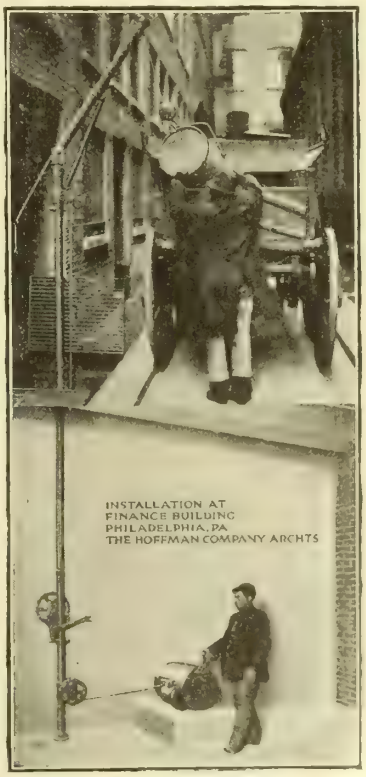
The G & G Telescopic Overhead Crane Hoist with Electric Motor (Figs. 8 and 9) is intended for use in large buildings where the grade level approach permits ash wagons to drive up alongside of hatch leading to boiler room.

Model D Hoist raises a maximum load of 300 pounds at actual speed of 60 feet per minute. The can shown in Fig. 8 weighs 200 pounds when filled with ashes.

FIGS. 6 AND 7. MODEL C HOIST IN OPERATION

On request we construct the hoist with adjustable guy rods connecting top of hoist with building wall. When so arranged the maximum working capacity is increased to 500 pounds. Motor is 1½ horse-power, and is identical with motor described with Model C Hoist. When not in use, hoist telescopes and *no part shows above pavement.*

Prices and specifications on request.



FIGS. 8 AND 9. MODEL D HOIST IN OPERATION

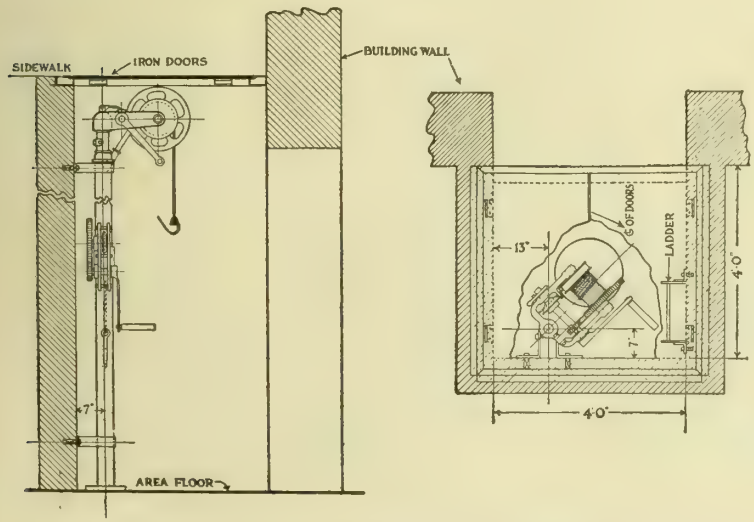


FIG. 5. ELEVATION AND PLAN SHOWING ARRANGEMENT OF G & G TELESCOPIC HOIST, MODEL A, IN AREA OF USUAL SIZE
NOTE—Area shown is large enough for Model A, B, C or D

Patents Issued in United States:

April 30, 1912
May 19, 1914
June 23, 1914
June 30, 1914 (Reissued)
October 19, 1915
August 17, 1915
December 7, 1915
February 1, 1916
March 7, 1916
March 28, 1916

Dominion of Canada:

May 14, 1912
December 9, 1913
April 7, 1914
April 17, 1914
June 22, 1915
August 31, 1915

Continued on next page

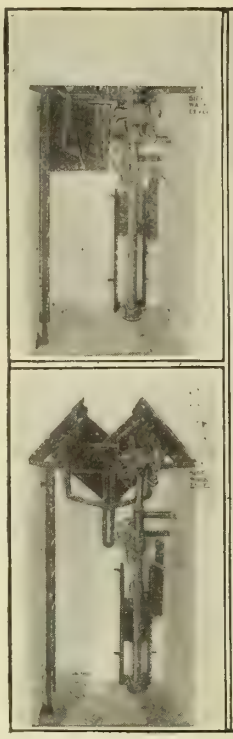
The G & G Sidewalk Door Opening and Closing Device With Spring Guard Gate.

This patented device is designed for, and works automatically in connection with, the G & G Telescopic Hoist. The sidewalk doors open and close automatically as telescoping handle of hoist is revolved to raise or lower hoisting head. A counterweight is provided so that telescoping handle works smoothly and easily.

An important feature is the *self-locking of doors, whether open or shut.* The Spring Guard Gate automatically closes up the opening at the sidewalk level, between the wide opened sidewalk doors. The gate *cannot be swung inward—swings outward only,* to permit passage of ash-can, thus protecting the public and the operator.

We furnish and install the Sidewalk Doors and G & G Sidewalk Door Opening and Closing Device with Spring Guard Gate and weatherproof electric alarm bell in connection with the G & G Telescopic Hoist, in New York City and vicinity. We also furnish and install an iron ladder, and furnish ash-cans, if desired.

Sidewalk doors as furnished by us, close flush with surface, are equipped with brass hinges, and have wrought steel frame constructed in one solid piece with extra deep gutter. Doors are wrought steel, entire surface checkered. When sidewalk doors are installed by us we run a three quarter inch wrought iron pipe connection from gutter in frame of doors to floor drain, sump or sink, as provided by the architect.



FIGS. 10 and 11

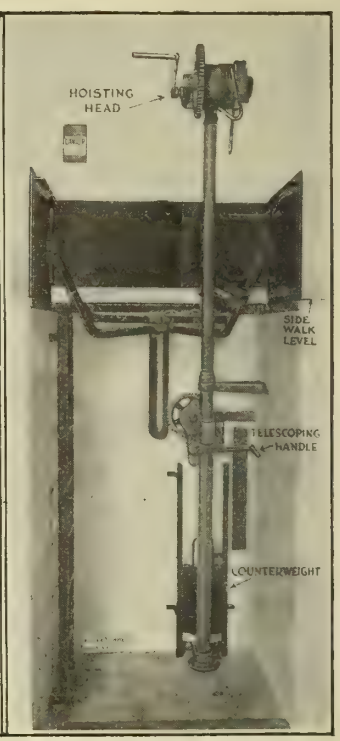


FIG. 12

SHOWING THE G & G SIDEWALK DOOR OPENING AND CLOSING DEVICE WITH SPRING GUARD GATE IN OPERATION

View of hatch, sidewalk doors closed and *automatically* locked

Sidewalk doors automatically open; alarm bell rings

Operator ascending iron ladder to sidewalk

"Hooking" a G & G Standard Hoisting Can with Swing Bail

Raising filled can with cover leaving sidewalk

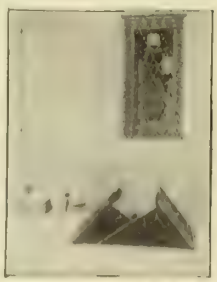
Swinging hoisting head to deposit can on sidewalk, pushes gate open

Can deposited on sidewalk without lifting

Four filled cans raised without leaving sidewalk

Lowering empty cans, closing handle closes and locks doors

Operator ascending iron ladder to sidewalk



As hoisting head is lowered doors automatically close

Sidewalk doors closed and automatically locked

Hoist in area, compact, out of the way

FIGS. 13. OPERATING THE G & G TELESCOPIC HOIST IN CONNECTION WITH THE G & G SIDEWALK DOOR OPENING AND CLOSING DEVICE WITH SPRING GUARD GATE

Note that bar leads, handle portion when in operation. Sidewalk doors are self locking, whether open or shut

Continued on next page

Shipment of device and sidewalk doors can be made, in connection with shipment of our hoist, to any part of the United States. We furnish blue-print showing how to erect. It is our custom to subject each hoist, door opening and closing device with spring guard gate, and sidewalk doors, to a thorough working test before shipment. For this reason, and also because it makes for ease of installation at the building, *we prefer to furnish our own sidewalk doors with each hoist and device.*

PRICES

Model A Hoist, G & G Sidewalk Door Opening and Closing Device, with Spring Guard Gate, and Sidewalk Doors to cover an opening 4 by 4 feet, f.o.b., New York, N. Y. $215.00

Model A Hoist, G & G Sidewalk Door Opening and Closing Device, with Spring Guard Gate and Sidewalk Doors, with weather-proof Electric Alarm Bell ten feet above sidewalk level to warn pedestrians, with battery, wiring, etc., all complete *as required by the Department of Public Works,* erected complete in New York, N. Y. 260.00

Note—For Model B Hoist complete as above, add $50.00 to each price. Patented February 1st, 1916. Other patents pending.

These prices are based on 4 by 4 foot area or opening, which is size we recommend. However, we furnish sidewalk doors to fit any size of opening and will forward prices on request. We also furnish *vault light doors.* Iron ladders 80 cents per lineal foot, f.o.b. New York, N. Y. Iron ladders $1.00 per lineal foot erected complete in New York, N. Y., in connection with Model A Hoist.

G & G Improved Hoisting Cans.

These ash-cans are manufactured in our own factory, especially for use with our hoists, and are constructed throughout of No. 16-gauge galvanized iron, reinforced at top and bottom with ¼- by 1¼-inch steel bands. The thickness and weight of the No. 16-gauge iron (very much heavier than the material ordinarily used in making ash-cans) makes for great strength and durability.

STANDARD HOISTING CAN

We recommend the use of the G & G standard 17- by 24-inch Hoisting Can *with swing bail* in all cases with Model B Hoist and Model D Hoist, and also with Model A Hoist, in buildings where *only one man* is employed to remove ashes. The "swing bail" can is "balanced." That is, the can may be easily emptied and will not spill the ashes when being raised. The "swing bail" is so arranged that it will not drag on the floor when can is being handled in the cellar, and will "stay put" when raised above can.

G & G HOISTING CAN WITH SWING BAIL (PATENTED)

We recommend the use of the G & G standard 17- by 24-inch Hoisting Can with Model C Hoist. This type of can may also be used with Model A Hoist, in buildings *where more than one man* is employed to remove the ashes.

PRICES

G & G Standard 17 x 24-inch Hoisting Can, $3.50 each; $37.80 per dozen, f.o.b. cars New York, N. Y. G & G Standard 17 x 24-inch Hoisting Can with swing bail, $4.75 each; $51.30 per dozen; f.o.b. cars New York, N. Y.

Samples.

Demonstrations can be seen at the Architects Samples Co.'s rooms, 101 Park Avenue, New York, N. Y.

References.

The following architects have repeatedly specified the G & G Telescopic Hoist:

Donn Barber, New York, N. Y.
Buchman & Fox, New York, N. Y.
W. W. Bosworth, New York, N. Y.
F. J. Berlenbach, Brooklyn, N. Y.
Wells D. Butterfield, Detroit, Mich.
Edgar L. Barber, Dennison, Iowa
Brown & Von Beren, New Haven, Conn.
Claude Bragdon, Rochester, N. Y.
Cross & Cross, New York, N. Y.
Clinton & Russell, New York, N. Y.
Cram & Ferguson, Boston, Mass.
Ogden Codman, New York, N. Y.
Carrère & Hastings, New York, N. Y.
A. P. Clark, Jr., Washington, D. C.
Chittenden & Kotting, Detroit, Mich.
Charlton & Kuenzli, Marquette, Mich.
C. Howard Crane, Detroit, Mich.
Seymour & Paul A. Davis, 3rd, Philadelphia, Pa.
Charles A. Dieman & Co., Cedar Rapids, Iowa
J. H. De Sibour, Washington, D. C.
Ellicott & Emmart, Baltimore, Md.
J. H. Felt & Co., Kansas City, Mo.
Foster & Gade, New York, N. Y.
C. S. Frost, Chicago & North Western R. R., Chicago, Ill.
C. P. H. Gilbert, New York, N. Y.
Bertram G. Goodhue, New York, N. Y.
E. T. P. Graham, Boston, Mass.
John Graham, Detroit, Mich.
Guilbert & Bettelle, Newark, N. J.
Edward M. Gee, Toledo, Ohio
Hunt & Hunt, New York, N. Y.
A. T. Hawk, Rock Island Lines, Chicago, Ill.
Hewitt & Emerson, Peoria, Ill.
J. Earl Henry, Louisville, Ky.
Halstead & Sullivan, Duluth, Minn.
Hewitt & Brown, Minneapolis, Minn.
C. H. Johnston, St. Paul, Minn.
Jannesen & Abbott, Pittsburgh, Pa.
Joseph & Joseph, Louisville, Ky.
W. W. Knowles, New York, N. Y.
Albert Kahn & Ernest Wilby, Detroit, Mich.
Kenny & Macomber, Minneapolis, Minn.
H. E. Kennedy & Co., Pittsburgh, Pa.
Guy Lowell, New York, N. Y.
H. T. Lindeberg, New York, N. Y.
McKim, Mead & White, New York, N. Y.
H. Van Buren Magonigle, New York, N. Y.
Milburn, Heister & Co., Washington, D. C.
Grant C. Miller, Fullenwider & Dowling, Chicago, Ill.
W. L. Mowll, New Bedford, Mass.
Monks & Johnston, Boston, Mass.
Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio
Martin & Hall, Providence, R. I.
Murphy, Hindle & Wright, Providence, R. I.
Lewis F. Pilcher, Albany, N. Y.
F. L. Packard, Columbus, Ohio
Parish & Schroeder, New York, N. Y.
Peabody, Wilson & Brown, New York, N. Y.
Parker, Thomas & Rice, Boston, Mass. and Baltimore, Md.
Harry J. Rill, Detroit, Mich.
John T. Rowland, Jr., Jersey City, N. J.
John Scott & Co., Detroit, Mich.
Stebbins & Haxby, Minneapolis, Minn.
J. B. Snook Sons, New York, N. Y.
Starrett & Van Vleck, New York, N. Y.
C. B. J. Snyder, New York, N. Y.
W. B. Tubby, New York, N. Y.
Tracy & Swartwout, New York, N. Y.
H. H. Turner, Grand Rapids, Mich.
C. R. Whitcher, Manchester, N. H.
J. Foster Warner, Rochester, N. Y.

Continued on page 1480.

HOLLISTER-WHITNEY COMPANY

Electric Elevators

QUINCY, ILL.

Products.

We manufacture a complete line of STANDARD ELECTRIC, HYDRAULIC, POWER, and HAND-OPERATED ELEVATORS, LIFTS and HOISTS; PUSH-BUTTON or AUTOMATIC ELECTRIC ELEVATORS and DUMB-WAITERS for stores, office buildings, hotels, hospitals and residences, and make a specialty of AUTOMOBILE ELEVATORS.

Facilities.

This Company maintains an energetic and capable management; has ample capital, a new factory equipped with modern high speed machinery, and a force of trained engineers and mechanics, thereby insuring clients a product of unusual merit.

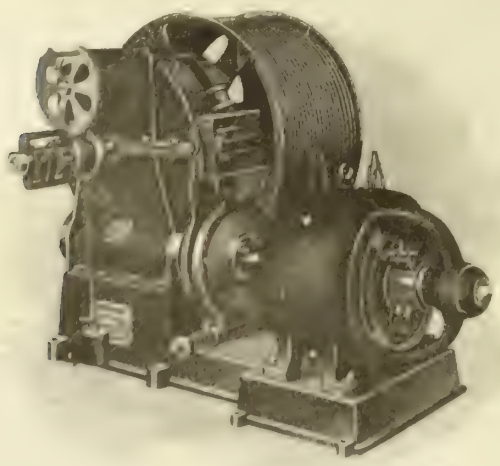
Co-operative Service.

We desire to co-operate with architects in furnishing preliminary plans and layouts, and other information necessary to the selection of apparatus suitable for the service required.

Our data sheets, mailed promptly on request, will assist in the preliminary work.

Illustration.

The construction details on the opposite page show typical layouts of overhead passenger and freight elevator installations.



HOLLISTER-WHITNEY WINDING ENGINE

Elevators of this class cost less, run easier, last longer, and subject the building to less stress than any other type.

Where conditions require it, however, the machinery may be placed on one of the lower floors or upon a concrete foundation in the basement.

References.

The following are a few of the prominent users of Hollister-Whitney Elevators:

Armour & Co.
International Harvester Co.
Swift & Co.
Standard Oil Co. (5)
Electric Wheel Co., Quincy, Ill.
Rock Island Sash & Door Co., Rock Island, Ill.
Rock Island Plow Co., Rock Island, Ill.
Western Illinois State Normal School, Macomb, Ill.
Greene County, Missouri, Court House, Springfield, Mo.
Nebraska State Capitol, Lincoln, Nebr.
Lincoln, Nebr., City Hall
Omaha & Council Bluffs Street Railway Co., Omaha, Nebr.
Cudahy Packing Co., South Omaha and Kansas City
Globe Realty Co., Indianapolis, Ind. (6)
Motor Car Mfg. Co., Indianapolis, Ind.
National Motor Vehicle Co., Indianapolis, Ind. (3)
Purdue University, LaFayette, Ind.
Baker-Vawter Co., Benton Harbor, Mich. (2)
Anaconda Copper Mining Co., Butte, Mont.
Sibley Warehouse, Chicago, Ill. (9)
Quincy Gas & Electric Co., Quincy, Ill. (4)
United Cereal Mills, Quincy, Ill. (3)
Dick & Bros. Quincy Brewing Co., Quincy, Ill. (3)
Purity Oats Co., Davenport, Iowa
American Rice & Cereal Co., Keokuk, Iowa
Iowa Biscuit Co., Burlington, Iowa
Excelsior Stove & Mfg. Co., Oklahoma City, Okla.
Lehmann-Higginson Grocery Co., Wichita, Kan. (2)
D. D. Thomas & Son, Memphis, Tenn. (2)
St. Paul Gas Light Co., St. Paul, Minn.
Beebe & Runyan Furniture Co., Omaha, Nebr. (3)
Lincoln Gas & Electric Co., Lincoln, Nebr.
Lincoln Telephone & Telegraph Co., Lincoln, Nebr.
Walter Clark Veneer Works, Grand Rapids, Mich.
Fuller & Sons Mfg. Co., Kalamazoo, Mich.
Decatur Railway & Light Co., Decatur, Ill.
McDonald Mfg. Co., St. Joseph, Mo.
Y. W. C. A., St. Joseph, Mo.
Y. M. C. A., Springfield, Ill.
Central Warehouse Co., Saginaw, Mich.
Schust Baking Co., Saginaw, Mich
Fulton Mfg. Co., Bay City, Mich.

Swift's Catalogue

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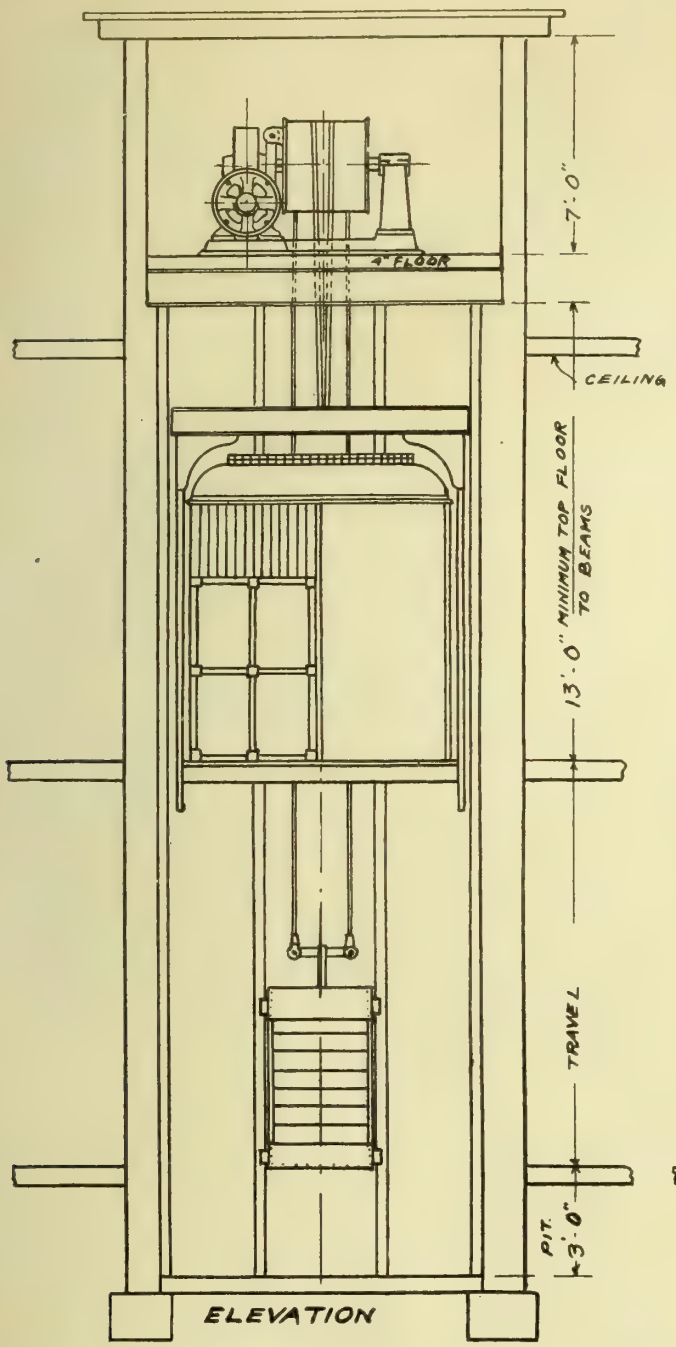
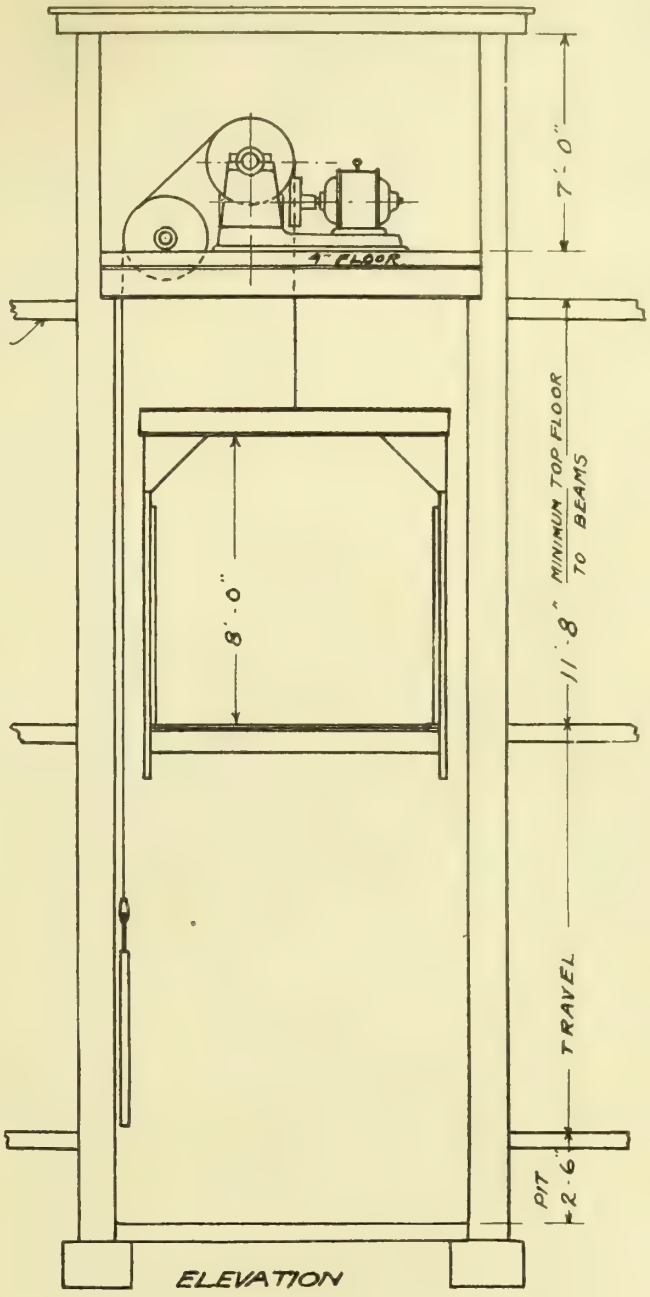
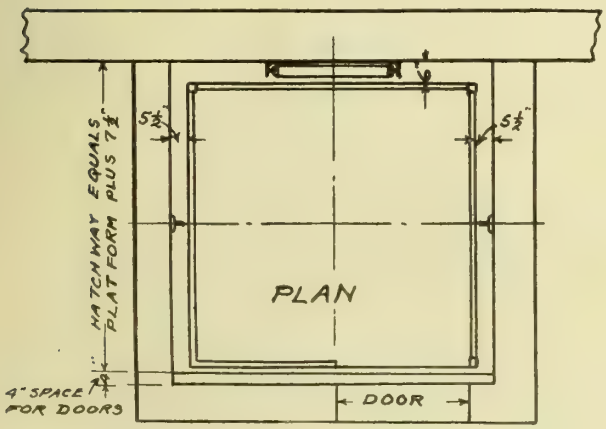
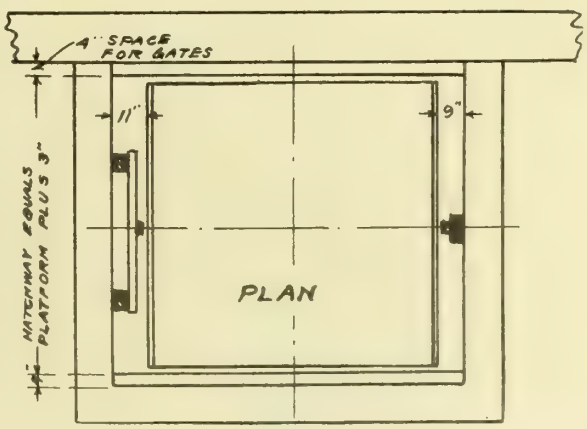






Overhead Hatch Passenger Elevator, with Steel T Guides



Overhead Hatch Freight Elevator, with Compound Wood Guides

CONSTRUCTION DETAILS OF HOLLISTER-WHITNEY ELEVATOR EQUIPMENT

KAESTNER & HECHT COMPANY

Electric Elevator Builders

OFFICES AND WORKS

Harrison, Throop and Congress Streets

CHICAGO, ILL.

Products.

ELECTRIC ELEVATORS for all varieties of PASSENGER and FREIGHT SERVICE, including types with AUTOMATIC PUSH-BUTTON CONTROL; ELECTRICALLY CONTROLLED HYDRAULIC LIFTS, HAND POWER ELEVATORS and MOVING CONVEYORS for PASSENGER or FREIGHT SERVICE.

Types Offered.

Stated briefly, we build a complete line of elevators which embraces a large number of types for the many varieties of passenger and freight service. These types may be roughly divided into Traction Type Elevators (described fully in our Bulletin No. 500) and Drum Type Elevators (described fully in our Bulletin No. 501). This distinction arises owing to the method of roping employed for raising and lowering the platforms.

Traction Type Elevators.

Utilize the friction generated between cables and driving drum to raise and lower the platform and counterweights and are almost exclusively used for speeds over 250 feet per minute.

Gearless Traction Type—Used for speeds of 450 feet per minute and over.

Helical Geared Traction Type—Built for speeds of 400-500 feet per minute.

Worm Geared Traction Type—Successfully used for speeds up to 450 feet per minute in a variety of single- and double-geared hoisting machines.

Drum Type Elevators.

Provided with spirally grooved drums upon which the winding and unwinding of the cables causes the suspended loads to be raised and lowered. Elevators of this type comprise the majority of machines and are built for all capacities up to fifteen tons.

"K. & H." Traction Elevators.

Manufacturing all parts of our product in our plant, we have been able to scrutinize carefully the production of each part of our equipment, to secure a greater perfection in finished parts and economy in production. Quality considered, we are in a position to offer competition that will interest owners and architects, as the reliability of our Company insures satisfaction to any purchaser.

We illustrate one of Chicago's newest tall buildings, now in process of construction under the supervision of Graham, Burnham & Co., Architects. The selection of our machines for this building was made after the most careful examination of the records we have made with our Gearless Traction Type Elevator, the outstanding advantages of which may be summarized briefly as:

KIMBALL BUILDING, CHICAGO, ILL.
GRAHAM, BURNHAM & CO., Architects

(1) Low current consumption.

(2) Machines can be installed in space of 5 feet 8 inches.

(3) Smoother riding cars.

(4) Ruggedness of control system.

"K. & H." ONE TO ONE GEARLESS TRACTION TYPE ELEVATOR

We are in a position to demonstrate that, regardless of price, no elevator built today excels the "K. & H." One to One Type of Elevator in point of economy or reliability in operation.

Continued on next page

Methods of Control.

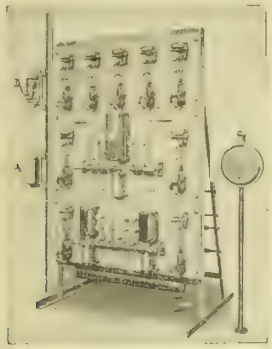
All Kaestner & Hecht Elevators are supplied with our standard controllers, which we manufacture complete in our own shops. Satisfactory results are assured with *less cost for repairs* than any competing controller.

Control systems governing the direction of movement of the elevator are supplied for:

Electric Car Switch Control.

Automatic Control Push Buttons, to call or dispatch car.

Hand Rope or Mechanical Lever.



VARIABLE SPEED FULL MAGNETIC CONTROLLER PANEL, WITH OPERATING SWITCH AND HATCH LIMIT SWITCHES

Manufacturing Facilities.

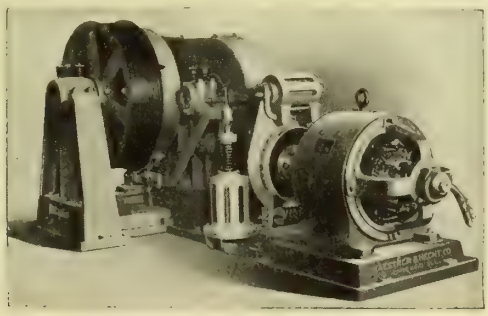
The KAESTNER & HECHT COMPANY, in offering competing values in the different types of elevators, recognizes the necessity of adequate manufacturing facilities. To those interested in comparing quality we extend the invitation to visit our plant and see in the actual process of construction the various elevators we build. We are manufacturers—not assemblers.

Data and Information.

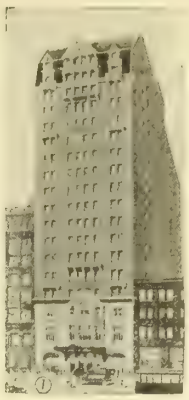
We will gladly supply architect or owner with proper information, fully describing the application of elevators for any type of service. We recommend this co-operation to insure proper allowance being made for engineering requirements.

Independent Competition.

The KAESTNER & HECHT COMPANY is independent of any other elevator company and endeavors to conduct its sales and manufacturing policy along lines which will result to the satisfaction of the owner and increase the scope of its business as a result of satisfied customers. The active management of the business is in charge of the owners, insuring personal attention to all contracts.



"K. & H." TANDEM GEAR TRACTION TYPE ELEVATOR



KAISERHOF HOTEL, CHICAGO, ILL.
MARSHALL & FOX, Architects
Equipped with K. & H. Helical Geared and Gearless Traction Elevators

WISCONSIN STATE CAPITOL, MADISON, WIS.
GEO. B. POST & SONS, Architects
Equipped with K. & H. Tandem Spur Gear Traction Type Elevators

BANK OF COMMERCE & TRUST BUILDING, MEMPHIS, TENN.
HANKER & CAIRNS and GRAHAM, BURNHAM & CO., Architects
Equipped with K. & H. Tandem Worm Gear Traction Elevators

INTER-SOUTHERN LIFE INSURANCE BUILDING, LOUISVILLE, KY.
BRINTON B. DAVIS, Architect
Equipped with K. & H. Tandem Worm Gear Traction Elevators

ESTABLISHED 1883

KIMBALL BROTHERS COMPANY

MANUFACTURERS OF

Passenger and Freight Elevators for all Purposes

TELEPHONE, 149

COUNCIL BLUFFS, IOWA

AGENCIES

KANSAS CITY, MO., G. S. Montgomery, 604 Broadway
DENVER, COLO., Western Engineering & Specialties Co.
OKLAHOMA CITY, OKLA., Gus Taliaferro
SALT LAKE CITY, UTAH, Wm. Watrous

Products.

Passenger, Freight, Hand, Electric and Belt-Power Elevators for Public Buildings, Residences, Stables, Garages, Factories; Automatic Push-Button Elevators for Apartment Buildings, etc.; Dumb-Waiters; Full- and Semi-Automatic Gates.

Statement.

We are a strictly independent company, having no Trust affiliations, and enjoy the reputation of being of high financial standing in the elevator business.

Kimball Elevators are in operation all over the country, from a house dumb-waiter to a 40,000-pound electric.

Co-operative Service and Detail Information.

Co-operation with architects and builders is desired. In writing for estimates, please give the following information:

Weight to be handled; speed desired; size of platform; number of landings; distance from lower to upper landing; kind of power to be used. If electric, state whether direct or alternating current; also, number of phases, cycles and voltage.

Plan for hatchways, pent-houses, etc., furnished free of cost.

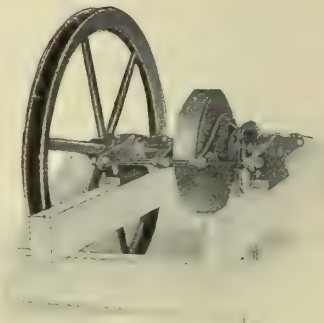
Information and details will be given upon inquiry; every detail desired being furnished by either personal letter or illustrated catalogue, or by both.

Electric Winding Machines.

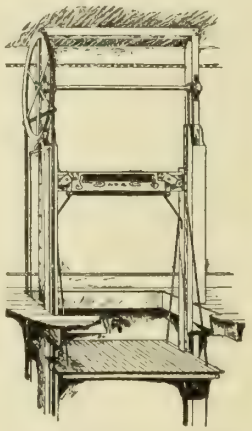
We build Electric Winding Machines for Full-magnet, Semi-magnet and Mechanical Control, and carry a full line.

Illustrations.

The accompanying illustrations clearly present the many excellent features of our elevators.

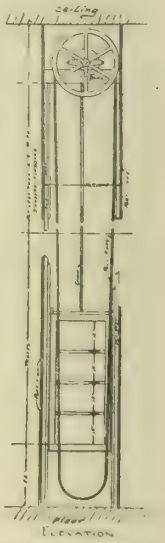


SELF-LOCKING DUMB-WAITER
Capacity 50 to 150 pounds



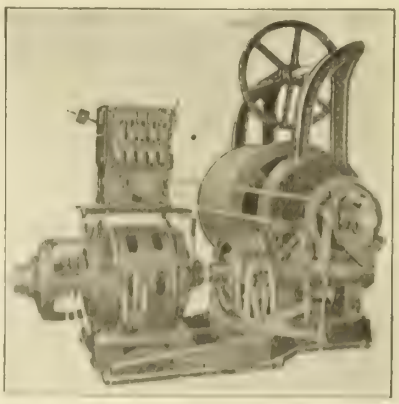
NO. 2 FREIGHT HAND ELEVATOR WITH PATENT STEEL LEAF CHAIN
Hatchway 18 inches wider and 2 inches longer than platform

ELECTRIC DUMB-WAITER OR SMALL ELEVATOR
Either push-button or cable control

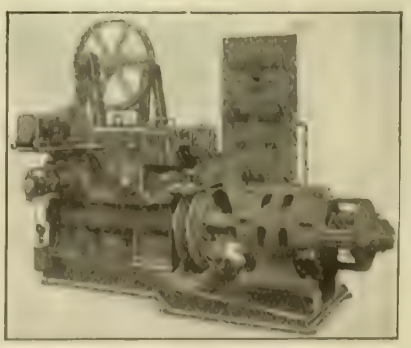


CONSTRUCTION NOS. 22 AND 23

AUTOMATIC ELECTRIC [illegible]
[illegible] and can also be furnished



LATEST TYPE DIRECT CONNECTED WINDING MACHINE
Belted and geared machines can also be furnished



HEAVY DIRECT CONNECTED WINDING MACHINE
Has two worms and two worm wheels for extra heavy passenger and freight work
Full-magnet or semi-magnet controls

OTIS ELEVATOR COMPANY

Eleventh Avenue and Twenty-Sixth Street
NEW YORK, N. Y.

OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD
For Addresses or Telephone Numbers, See Local Directories

Products.

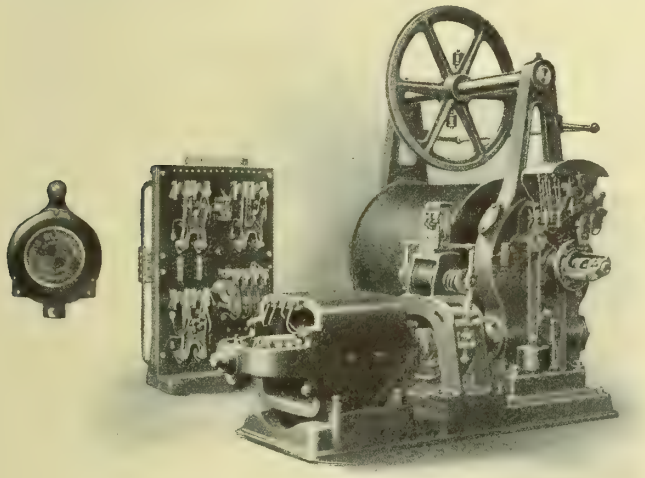
Manufacturer of Passenger, Freight and Sidewalk Elevators, operated by Electric, Hydraulic, Steam, Belt or Hand Power; Electric Dumb-waiters; Furnace Hoists; Automobile and Carriage Hoists; Whip Hoists; Incline Railways; Gravity Spiral Conveyors; Escalators or Moving Stairways; Inclined Elevators, etc.

The WORLD'S WORD for Otis ELEVATOR SAFETY
TRADE-MARK

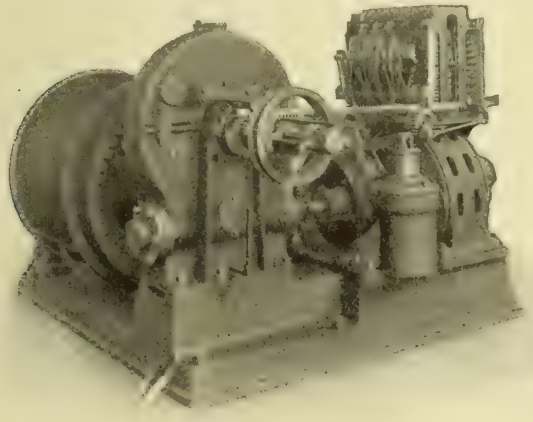
Electric Winding Drum Type Elevators.

With the Winding Drum Type Elevator the car is raised and lowered by winding and unwinding the hoisting ropes on a cast-iron drum. This type of elevator is used for high-grade service, passenger or freight duty. The machines are made to operate on alternating- and direct-current circuits, and can be provided for light and heavy capacities.

In this type of elevator, a worm and gear reduction is used between the motor and winding drum. The worm gears consist of bronze rims with hobbed teeth, and the worm thread is cut in solid steel forgings integral with the worm shaft. The gearing is enclosed in an oil-tight housing which is provided with hand-hole plates and with means for draining away the oil. Worm gear elevator machines are built in what are known as the single-screw and double-screw types, and the worm shaft of single-screw machines is provided with ball-bearing thrusts backed with self-aligning disks. These machines are provided with an electro-magnetic brake, and the brake pulley constitutes flange of coupling between worm and armature shafts. In order to preserve alignment, the machine parts are mounted on a continuous heavy iron bed. When it is desired to lift heavy loads at comparatively low speeds, a spur gear reduction, usually of the internal gear and pinion type, is provided between the worm gear drive and winding drum.



OTIS DIRECT-CURRENT SINGLE-SCREW ELEVATOR MACHINE WINDING DRUM TYPE, SWITCH CONTROL



OTIS ALTERNATING-CURRENT SINGLE-SCREW INTERNAL GEARED ELEVATOR MACHINE WINDING DRUM TYPE; HAND ROPE CONTROL

Motors—For direct-current circuits, moderate speed compound wound motors are used, combining high starting torque with reasonably low starting current. For alternating-current circuits induction motors are used, which are wound for the proper voltage, phase and frequency of the supply circuit.

Control—This type of elevator can be provided with car switch, push-button or hand rope control, so arranged as to give the attendant complete control of the elevator. The controller boards are provided with the necessary direction, accelerating and speed switches, all of which are of the electro-magnetic type except with hand rope type controllers, which are usually provided with mechanically operated reversing switches.

Safety Devices—This type of equipment is provided with all necessary complete and effective safety devices to suit the respective equipment. These devices include machine automatic terminal stopping device, hatchway limit switches, slack cable device, car safety device, overspeed governor, etc.

Automatic Push-Button Electric Winding Drum Elevators.

This type of elevator which has been used extensively in residences, hospitals, asylums, etc., is now being applied to freight service also, especially where very accurate floor stops are required, and also to passenger and freight installations where the expense of an operator is not desired. The control equipment consists of single call operating buttons at each landing and a full set of operating buttons in the car having one button for each landing. These buttons are electrically connected to the magnets on the control panel so that the momentary pressing of either a hall or car operating button will automatically bring the car to the designated landing. The hatchway doors and car gate are so interlocked that the elevator operates with complete

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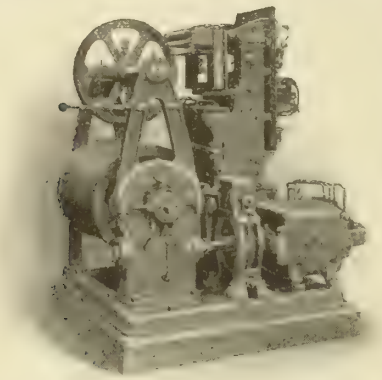
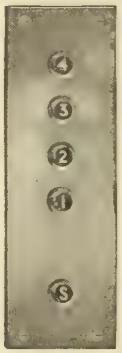


OTIS LIGHT-DUTY DIRECT-CURRENT PUSH-BUTTON ELEVATOR, FULL AUTOMATIC CONTROL



BANK OF BUTTONS IN CAR

safety and non-interference features are provided to prevent conflict between car and hall operation.

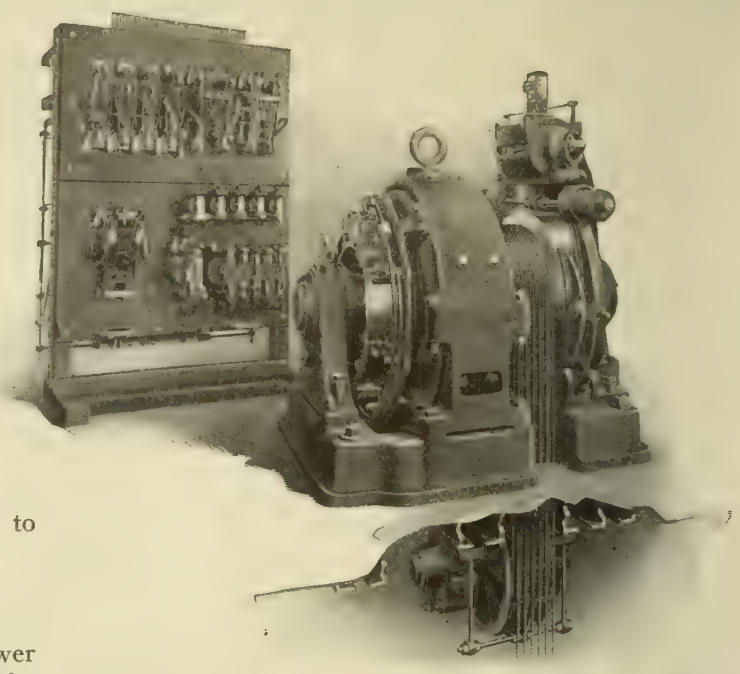
Traction Sheave Type Elevators.

With the traction sheave type of elevators, power is transmitted from the motor to the hoisting ropes by traction (friction) existing between the hoisting ropes and the traction driving sheave. One of the particularly prominent and inherent advantages resulting from this arrangement of ropes and method of driving them is the practical loss of traction obtained if either car or counterbalance is obstructed in its descent or bottoms on its respective oil buffer, causing complete cessation of further car motion, even though the driving member may continue to revolve. Another striking advantage of the traction sheave type of elevator results from the fact that the face of the sheaves is entirely independent of the height of the building, and the machines may be used for any rise whatsoever.

Gearless Traction Elevator, 1:1 Roping.

This type of elevator is the logical result of the present tendency to the greatest simplicity, combined with maximum operating economy and the highest possible degree of safety for high rise, high speed-elevators.

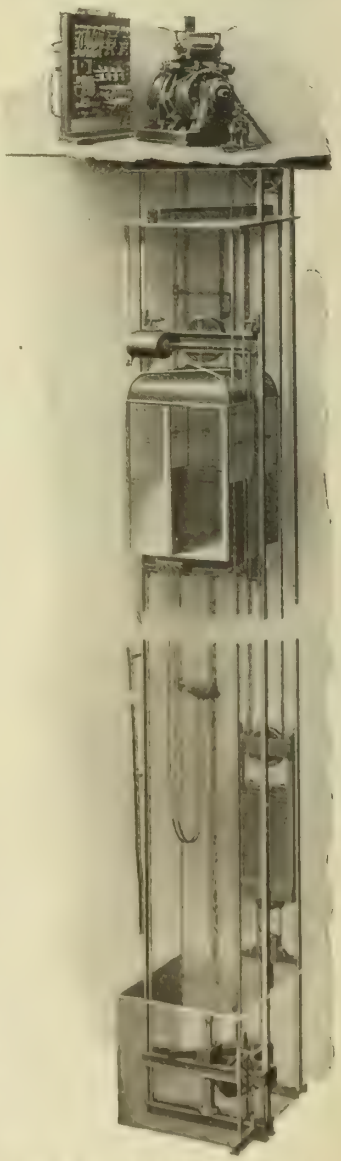
The machine for this type of elevator consists of a motor, traction driving sheave and electro-magnetic brake compactly grouped and mounted on a continuous heavy iron bed. The motors used are of the slow-speed, shunt wound, multipolar type, especially designed for elevator service, and have a remarkably high efficiency. A direct drive is provided between the armature and traction driving sheave, thereby relieving the armature shaft of all torsional strains and eliminating the use of keys. The direct drive and consequent elimination of all reduction gearing between the motor and traction driving sheave also insures that the machine will have an exceptionally high overall efficiency. The compact and extremely desirable arrangement of parts permits of the greatest simplicity of installation and relative economy of space. Machines of this type are preferably located at the top of the hatchway. To date it has been built for direct current only. This type of elevator is usually installed for lifting capacities ranging from 2000 to 3500 pounds at car speeds ranging from 500 to 700 feet per minute.



OTIS GEARLESS TRACTION ELEVATOR MACHINE, 1:1 ROPING

Controller—The controllers used with this type of elevator embody the very latest and most approved application of electro-magnetic switches, which are operated by a master switch located in the elevator car. These machines have a wide speed variation which is placed completely within the control of the operator, resulting in smooth acceleration and retardation and accurate stops at the landings.

Safety Devices—The safety devices usually installed in connection with modern high-grade elevator apparatus, including an automatic slow-down and terminal stopping device, hatchway limit switches, speed regulating device, over-speed governor, oil buffers, car safety device to clamp the guide rails and bring the car to a gradual stop in case of excessive speed, etc., are provided with this type of elevator. This type of elevator is also provided with an emergency device within the car by means of which the attendant can operate the car safety device, if necessary.



OTIS GEARLESS TRACTION ELEVATOR, 2:1 ROPING

Sweet's Catalog

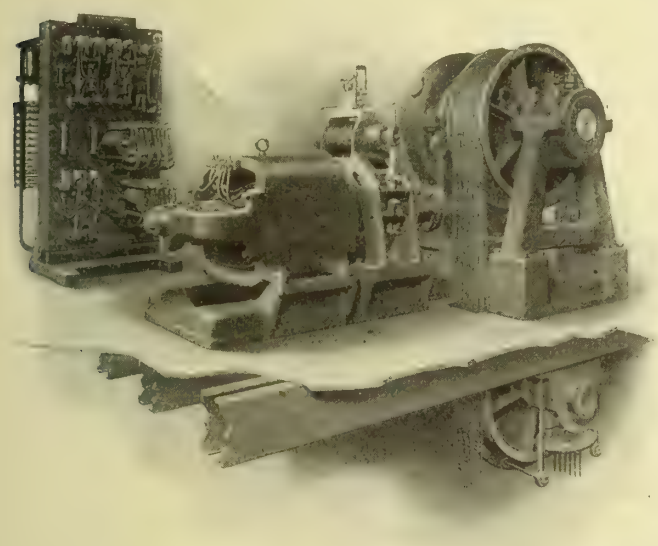
Continued on next page

Gearless Traction Elevator, 2:1 Roping.

This type of elevator represents an adaptation of the 1:1 gearless traction type in which lower car speeds are obtained by roping the car and counterbalance 2:1, and by means of which the high efficiency of the gearless traction machine is combined with the lower car speeds. These elevators retain all the safety and controlling features of the 1:1 gearless traction elevator, and are usually installed for car speeds ranging from 250 to 450 feet per minute. They have been installed for a lifting capacity of 11,000 pounds passenger load.

Worm Gear Traction Elevators.

The machine used with this type of elevator is essentially the same as the winding drum type elevator machines, the main difference being the substitution of a traction driving sheave for the winding drum. This type of elevator will give very satisfactory service in moderately high buildings requiring moderately high speed elevators.



OTIS DIRECT-CURRENT SINGLE-SCREW WORM GEAR TRACTION ELEVATOR MACHINE
For Overhead Installation

Motors—For direct-current circuits, moderate speed compound wound motors are used, combining high starting torque with reasonably low starting current. For alternating-current circuits induction motors are used, which are wound for the proper voltage, phase and frequency of the supply circuit.

Controllers—The controller boards are provided with the necessary direction, accelerating and speed switches, all of which are of the electro-magnetic type. The switches are connected to a master operating switch in the car, giving the attendant complete control of the elevator.

Safety Devices—This type of equipment is also provided with all necessary complete and effective safety devices.

Helical Gear Traction Elevator.

In addition to the application of the traction principle already described, we build machines of the traction type that employ helical cut herringbone gears in place of worm and gear.

These gears are cut with great accuracy, and run, immersed in an oil bath, in an oil-tight iron case or housing.

This type of equipment is likewise provided with complete safety devices.

Other Types and Service.

Hydraulic Elevators—Of the standard vertical- and horizontal-geared and direct-plunger types, for high- and low-pressure service. The plunger type employs a plunger within a vertical cylinder sunk into the ground below the bottom of the hoistway, the car resting directly on top of the plunger. In the vertical- and horizontal-geared types the hydraulic cylinder is made considerably shorter, by introducing multiplying sheaves. A cylinder with piston is used, and the car, properly counter balanced, is suspended by cables which pass over sheaves at the top of the hatchway.

Hydraulic elevators are built for all conditions of passenger and freight service, passenger elevators being usually controlled by a lever in the car actuating the main operating valve by means of a pilot valve.

Hydro-Steam Elevators—Of the hydraulic type, driven from a closed hydraulic tank from which the water is forced by steam admitted direct from boilers.

Aero-Hydro Elevators—Operate the same as the hydro-steam type, with compressed air substituted for steam.

Steam Elevators—Used for freight service; direct-driven and belted.

Belt-Power Elevators—Of slow speed, for freight service only; worm and gear transmission, controlled by hand cable.

Hand-Power Elevators, Carriage Hoists and Sidewalk Types—For use where the service does not warrant an expenditure for power-driven apparatus.

Otis Two-Speed Alternating-Current Motors.

The successful development of our two-speed alternating-current induction motor has materially broadened elevator possibilities in alternating-current circuit territory. These motors are used principally for higher car speeds and for conditions necessitating accurate floor stops. Our Engineers are always glad to explain these new developments to architects.

Otis Patented Oil Cushion Buffers.

Otis Patented Oil Cushion Buffers are furnished with all traction machine installations, and are a feature of security of the greatest interest and importance. They are placed in the hoistway, under the car and the counterweight, and are capable of bringing either the car or the counterweight to a gradual stop from full speed, through the displacement of oil in the buffer at a carefully calculated rate of retardation, which is regulated by the escape of the oil from one chamber of the buffer to another.

OTIS PATENTED OIL CUSHION BUFFER

Continued on next page

Electric Dumb-waiters.

We are prepared to furnish and install electric dumb-waiters of all descriptions to meet all classes of service. Electric dumb-waiters are usually of the winding drum type, and the machines are provided with a worm and gear reduction between the motor and winding drum. With some of the lesser expensive types a chain and sprocket drive is used. The machines are provided with electro-magnetic brakes, and limitation stops and slack cable devices are usually included. Push-button control is the more desirable, although hand rope control can be used with the lower speeds; and numerous button control arrangements have been devised to apply to a wider range of service conditions.

Furnace Hoists.

Electric or steam-driven, with full automatic control. Built to operate on both direct- and alternating-current circuits, with the same accuracy of regulation.

Incline Railways.

Electric and steam-driven, for passenger, freight and vehicle traffic service. Built to operate on direct- and alternating-current circuits. Installed in mountainous and hilly districts and in cities where the topography compels an abrupt ascent.

Catalogue, showing operating installations, on request.

Escalators.

The problem of inter-floor travel, where it is necessary to keep large numbers of people moving constantly and rapidly, has been successfully solved by the escalator, due to its continuity of motion and its enormous capacity. As many as 11,000 people can be carried in an hour without overloading the machine.

There are two types of escalators, known as the Step and Cleat Types. The Step Type begins as a moving platform, rising slowly into a perfect staircase as it breaks into steps. The Cleat Type is an endless moving platform formed of hardwood cleats located in longitudinal ridges and grooves.

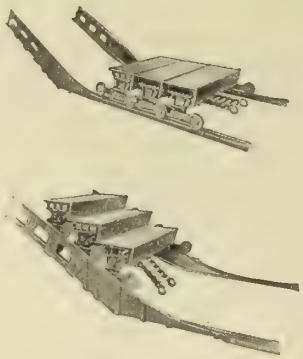
In both types, on each side, a hand-rail of flexible material moves upward at the same speed as the treads. An electric motor drives the mechanism running on rollers on an inclined plane, which supports the treads.

The escalator can be made to operate either up or down. The duplex escalator handles traffic in both up and down directions simultaneously.

Escalators are now being operated in large railway terminals, at elevated and subway stations of the big cities, in theaters, department stores, and in large mills and factories.

Architects should become familiar with this efficient method of moving great crowds of humanity. No department store, theater, public building, large railway terminal, or factory is complete without an escalator to supplement its elevator equipment in providing proper circulation within the building.

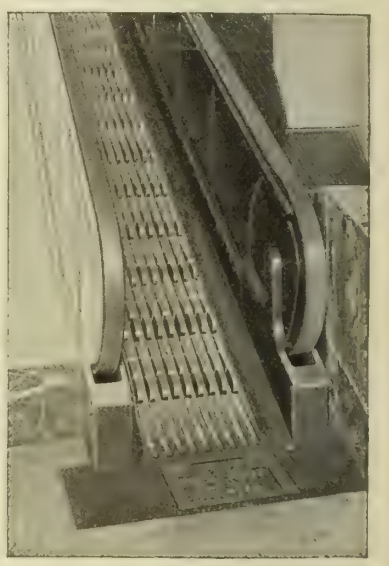
Catalogue, with plan drawings which give necessary preliminary information to architects in estimating space requirements and floor openings, will be sent on request.



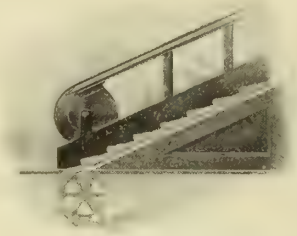
STEP-TYPE TREADS

On landing treads are flush, passenger stepping onto them from a stationary floor plate. Approaching incline, a step formation is produced. At upper end reverse action takes place and steps flatten out into a moving platform

ESCALATOR, STEP TYPE



ESCALATOR, CLEAT TYPE



CLEAT-TYPE TREADS

Treads are nearly horizontal, at an angle of 12½ degrees. Platform revolving over sprocket glides through prongs of comb at lower level and journeys upward. At upper landing it disappears through comb and revolving over sprocket, travels downward

Inclined Elevators.

The quick handling of heavy volumes of merchandise is a vital problem that confronts every transportation company, merchant and manufacturer, and the architect who has an intimate knowledge of labor-saving, rapid handling, mechanical apparatus can often aid his client by the suggestion of our various types of inclined elevators. The Otis Inclined Elevator meets the problem of rapid inter-floor conveyance, as it is a continuous motion carrier and adapted to the quick movement of freight.

OTIS SINGLE-FILE INCLINED ELEVATOR AT LARGE FREIGHT TERMINAL

Send for Catalogue

Continued on next page

There is no time or power lost in starts and stops to load and unload; accidents are unknown; it operates in either direction; saves employees' energy, and enables one man to do the work of many.

The Otis Inclined Elevator consists, primarily, of an endless steel chain or platform revolving about sprockets at each end, which are driven by a conveniently located motor. In operating, the flange or lug of the elevator engages with axle of truck; and truck and load together, with the man if desired, are transported from level to level, quickly, safely, and without physical effort.

The Otis Inclined Elevator is particularly adapted to the varied merchandise of department stores; parcels in express offices and railroad stations; freight to and from vessels and docks; bags, bales, boxes and packages in stores and warehouses; transfer of finished parts, or merchandise in process of manufacture, in mills and factories.

Catalogue, containing floor plans of the various types for estimating floor space, on request.

OTIS DUPLEX INCLINED ELEVATOR IN DEPARTMENT STORE

Scope of Escalators and Inclined Elevators.

No operator is required with either the passenger or freight type.

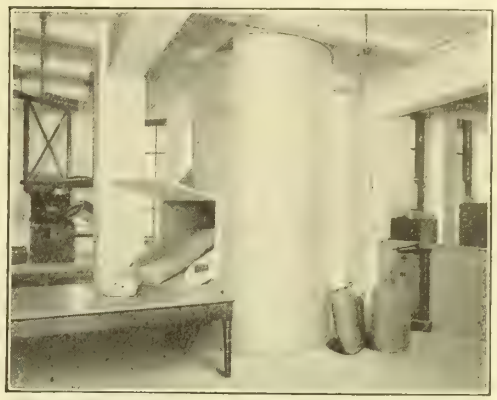
Built to operate on both direct- and alternating-current circuits.

Gravity Spiral Conveyors.

For moving speedily and safely, by force due to gravity, all sorts of packages, bundles, boxes, bales, heavy cases or barrels, from an upper level or floor to a lower level. Installed in various sizes to convey material weighing from a few ounces up to boxes and cases weighing 1000 pounds each. Built of high-grade sheet steel in form of spiral, giving smooth riding surface for goods. One of the greatest modern labor- and money-saving devices. Used in factories, department stores, warehouses, jobbing houses, printing and publishing establishments, etc.

Catalogue, giving full description of types, sizes, list of installations, typical layouts, etc., on request.

OTIS OPEN TYPE GRAVITY SPIRAL CONVEYOR



OUTLET, OTIS CLOSED TYPE GRAVITY SPIRAL CONVEYOR

Co-operation, Specifications and Estimates.

We cordially invite all architects to call upon us in laying out their elevator, escalator and conveyor requirements. Because of the wide range of elevator apparatus which we manufacture and the diversified conditions of installation measurements, we find it impossible to show here exact construction requirements. We are willing at any time to lend our experience and facilities to work out with the architect plans for economical space arrangements, and to submit estimates of cost.

Organization.

Our complete organization, with offices in one hundred cities in the United States alone, makes this full co-operation possible. No matter in what part of the country the architect is situated, he will find an Otis office near by. This element of personal attention, aside from the excellent quality of our elevator machines, makes the architect's dealing with this Company a most profitable and pleasing connection.

Service After Installation.

The fact that this Company has been sixty-four years in the elevator business is a guarantee of stability and successful engineering work.

By specifying Otis apparatus, the architect identifies his client with a stable, resourceful organization that, from the time of installation, will look carefully after the user's needs.

Service after installation is important. We have complete facilities for inspection and proper maintenance work. This fact is fully appreciated by the building owner and manager who is a user of Otis Elevators.

RICHMOND SAFETY GATE CO.

MANUFACTURERS OF

Elevator Safety Gates, Fire Doors, Etc.

RICHMOND, IND.

AGENCIES

ATLANTA, GA., 1202 Candler Building
BALTIMORE, MD., 321 Equitable Building
BOSTON, MASS., 4 Post Office Square
BROOKLYN, N. Y., 309 McDonough Street
CHICAGO, ILL., 615 Cambridge Building
CINCINNATI, OHIO,, Merchants Building
CLEVELAND, OHIO, 1900 Euclid Building
COLUMBUS, OHIO, Lynn and Ludlow Streets
DENVER, COLO., 1534 Blake Street
DETROIT, MICH., 175 Larned Street, West
GRAND RAPIDS, MICH., Builders and Traders Exchange
INDIANAPOLIS, IND., 502 Chamber of Commerce Building
KANSAS CITY, MO., 209 Hall Building
PHILADELPHIA, PA., 1414 South Penn Square
PITTSBURGH, PA., 550 Century Building
SAN FRANCISCO, CAL., 199 First Street
ST. LOUIS, MO., 448 Pierce Building
SEATTLE, WASH., 411 Globe Building

Products.

ELEVATOR SAFETY GATES.

Also, ANGLE FRAMES and LIGHT STRUCTURAL WORK; SASH VENTILATING APPARATUS, etc.

For Standard Tin-Clad Doors and Shutters; Underwriters' Iron Fire Doors; Hardware for Fire-Doors; Horizontal Folding Doors; Horizontal Trolley Doors; Counterbalanced Elevator Doors; Vertical Telescoping Elevator Doors; Elevator and Stairway Gravity Closing Doors, see our name in General Index.

Experience and Facilities.

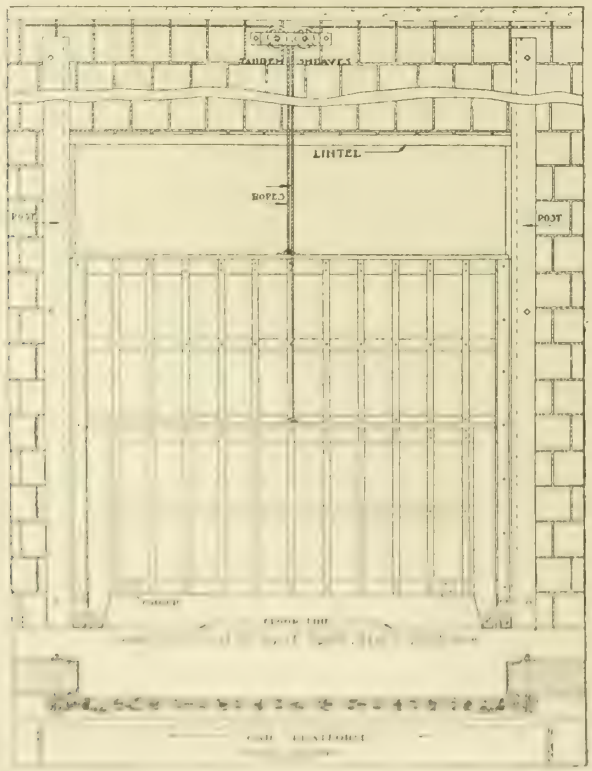
We were pioneers in the manufacture of practical elevator gates and fire doors. Improvements have been made from time to time and our products have been greatly developed. Complete manufacturing equipment, together with convenient railroad connection, enable prompt and efficient service to be guaranteed.

Installation.

Richmond products are sold f.o.b. factory or erected complete at the option of purchaser. With all f.o.b. shipments blue-prints and instructions are provided showing the method of setting up gates or doors and the most practical manner of applying the operating attachments.

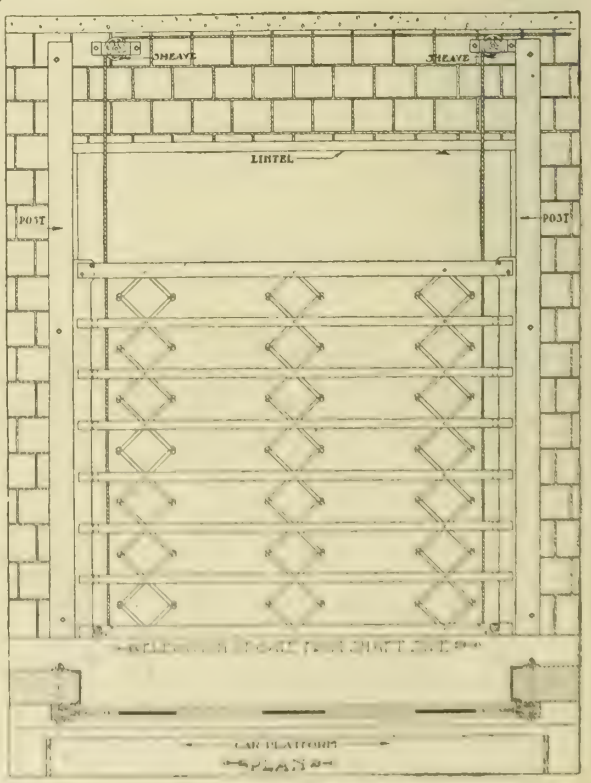
Estimate.

Quotations on Richmond products promptly obtainable from Main Office or through Agencies. Suggestions for the solution of individual problems submitted promptly upon receipt of drawings or information showing general conditions. Blue-prints showing in detail the construction of gates or doors mailed on request.



TELESCOPING GATES

Top section telescoping gate made of wood or metal recommended where ceilings are extremely low and where a gate six or seven feet high is desired. The clear wall space above lintel should be at least eighteen inches



COLLAPSIBLE GATES

Made of wood or metal recommended where ceilings are extremely low and where a gate six or seven feet high is desired. The clear wall space above lintel should be at least eighteen inches

Continued on next page

Zeller Full-Automatic Gate.

This gate is operated wholly by the action of the elevator. The operating device consists of a skilfully arranged rack and pinion device in combination with a large winding sheave and a double incline fastened to car. When the elevator approaches a landing the gate opens automatically without noise or jar and remains open while the elevator is at landing. When the elevator leaves the landing, either ascending or descending, the gate closes the opening without assistance from the operator.

The Zeller Gate can be used with any type of elevator operating at a high or low speed.

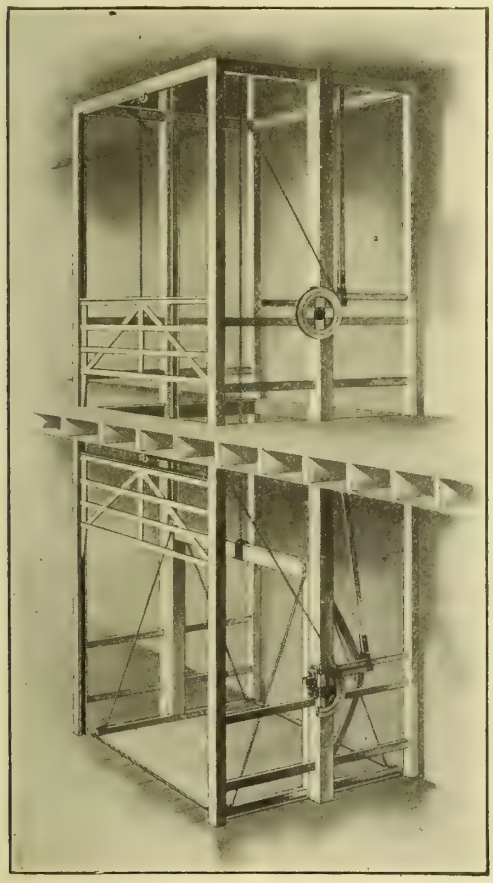
The drawing below shows the operation device in detail.

Columbia Semi-Automatic Gate.

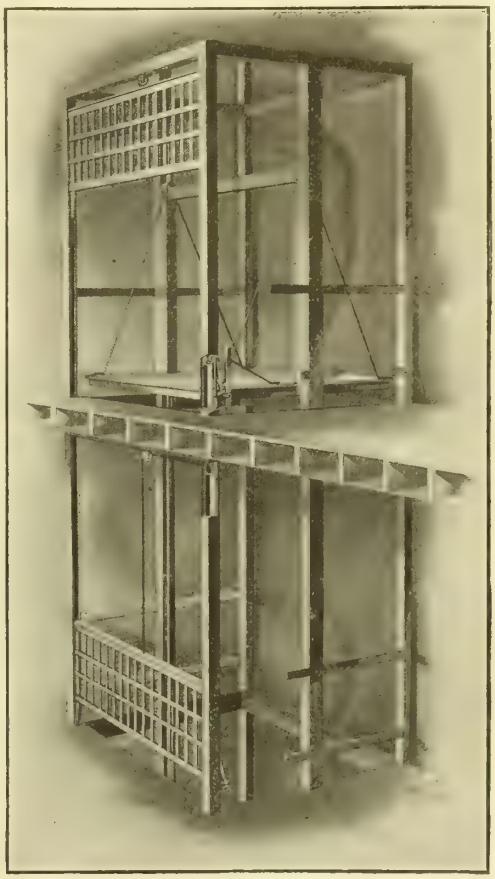
The Columbia Gate is simple and durable; although essentially different in construction, it equals a Full-Automatic Gate in protection and is a cheaper outfit.

This gate is not operated by the elevator, but must be raised by hand, and is held in position by means of a malleable iron lever which engages with the teeth in a ratchet weight. This weight also serves to counterbalance the gate. As the elevator leaves the landing, either ascending or descending, the lever is disengaged, allowing the gate to descend, thereby effectively closing the entrance.

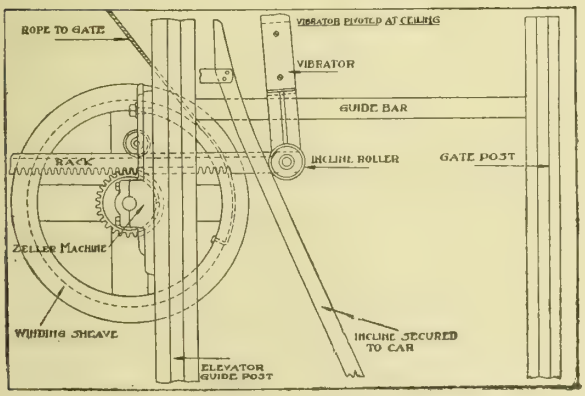
The drawing below shows the relative position of hollow post, machine, etc.



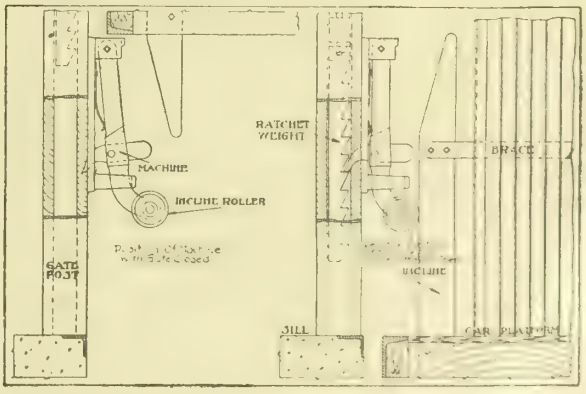
ZELLER FULL-AUTOMATIC GATE



COLUMBIA SEMI-AUTOMATIC GATE



DETAIL OF ZELLER OPERATING DEVICE



DETAIL OF COLUMBIA OPERATING DEVICE

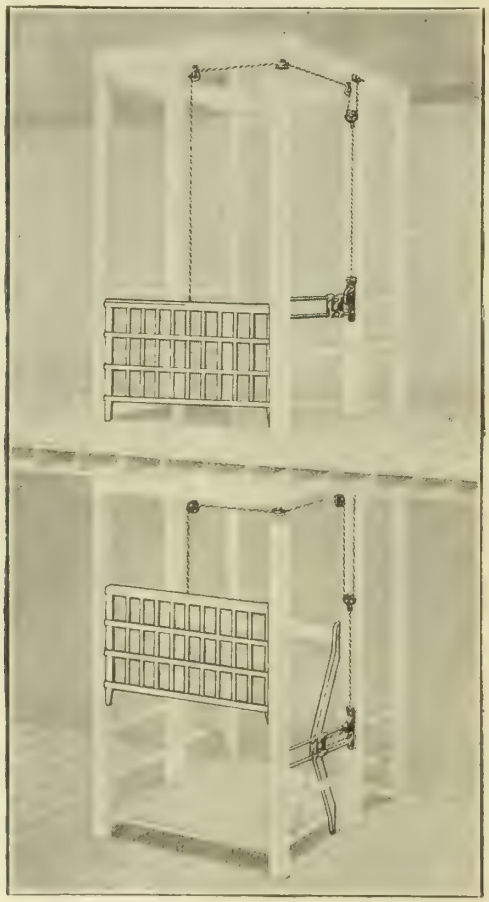
Continued on next page

Keystone Full-Automatic Gate.

This gate is operated by the action of the elevator. The operating device consists of a carriage sliding on two parallel horizontal bars in combination with an equalizing pulley and a double incline fastened to the car. All parts are carefully machined and assembled, thus reducing the wear and tear on the ropes to a minimum.

This gate is especially recommended for use on medium size elevators operating at a speed of not over 75 feet per minute.

The drawing below shows the operating parts in detail.

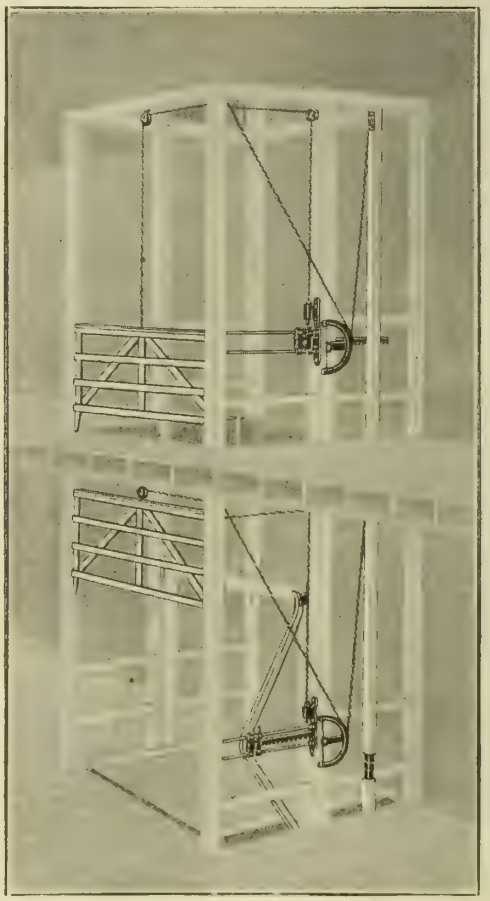


KEYSTONE FULL-AUTOMATIC GATE

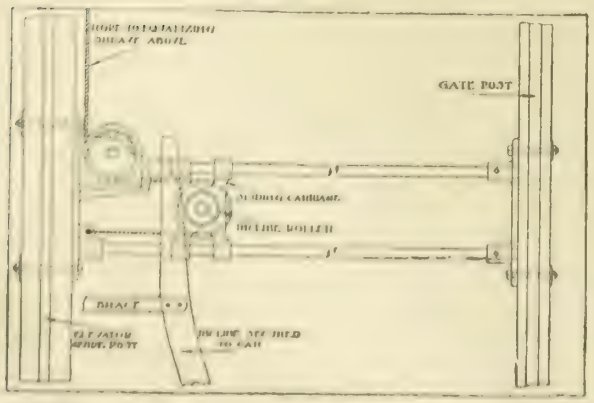
Zeller Optional Gate.

This gate is a modification of the Zeller Gate shown on the preceding page. Through the addition of a locking attachment and weight, the gate can be opened only at the option of the elevator operator. The gates are not disturbed by the elevator in passing, but can only be opened when the elevator stops at a landing. The controlling device is a handle or lever easily accessible from the car platform. When the elevator leaves the landing, either ascending or descending, the gate closes automatically and is locked in position.

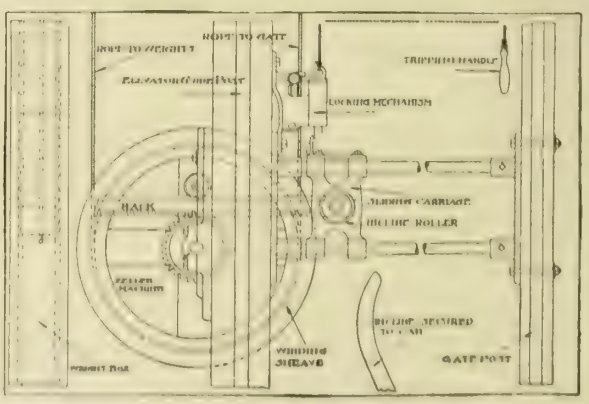
The drawing below shows the application of the locking device, machine and parallel guides.



ZELLER OPTIONAL GATE



DETAIL OF KEYSTONE OPERATING DEVICE

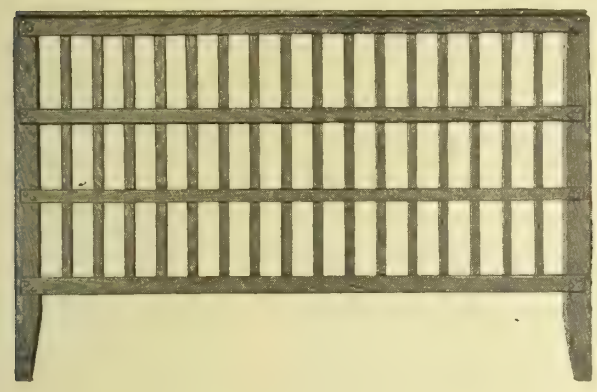


DETAIL OF OPERATING DEVICE OF ZELLER OPTIONAL GATE

Continued on next page

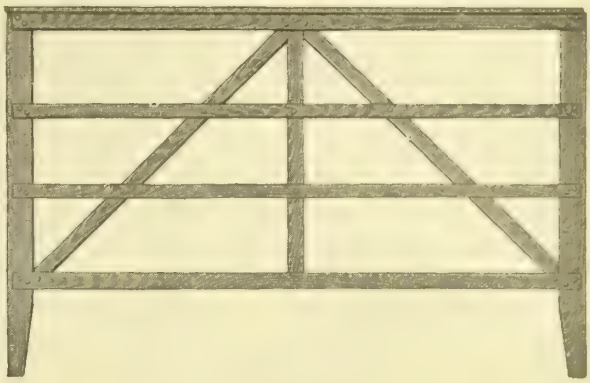
Specifications, Gates.

Type I Gate—Made of No. 1 white oak, oil finish, rails and stiles securely bolted together. Pickets of 5/16 x 1½-inch stock, attached to rails with barbed nails. Stiles, ⅞ x 3½ inches. Top and bottom rails, ⅞ x 2½ inches. Intermediate rails, ⅞ x 2 inches. Caps, ¾ x 1¾ inches, attached with screws.



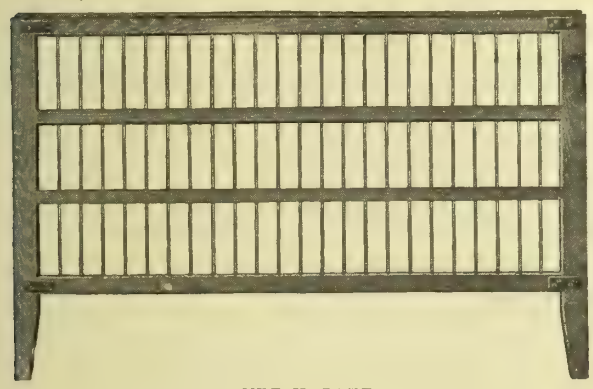
TYPE I GATE

Type G Gate—Made of No. 1 white oak, oil finish, rails, stiles and braces securely bolted together. Stiles, ⅞ x 3½ inches. Top and bottom rails, ⅞ x 2½ inches. Intermediate rails, ⅞ x 2 inches. Caps, ¾ x 1¾ inches, attached with screws.



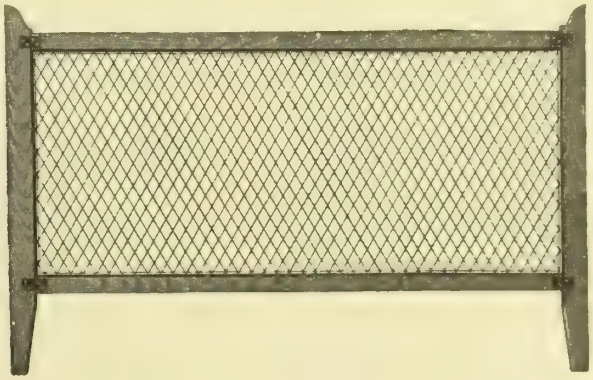
TYPE G GATE

Type X Gate—Made of No. 1 white oak, oil finish, rails and stiles joined with maple dowels reinforced with iron fish plates at corners. Pins of ½-inch maple, each end set into rails ¾ inch. Stiles, ⅞ x 3½ inches. Top and bottom rails, ⅞ x 2½ inches. Intermediate rails, ⅞ x 2 inches. Caps, ¾ x ⅞ inches, attached with screws.



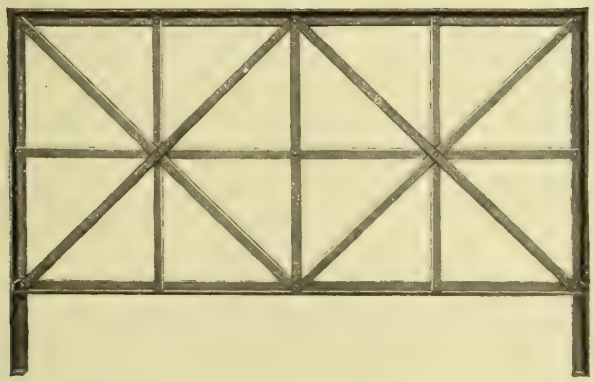
TYPE X GATE

Type K Gate—Made of diamond mesh wire set into a channel iron frame with No. 1 white oak, oil finish, rails and stiles. Rails and stiles joined with maple dowels, reinforced with fish plates. Stiles, ⅞ x 3½ inches. Rails, ⅞ x 3 inches. Size of mesh and wire as ordered.



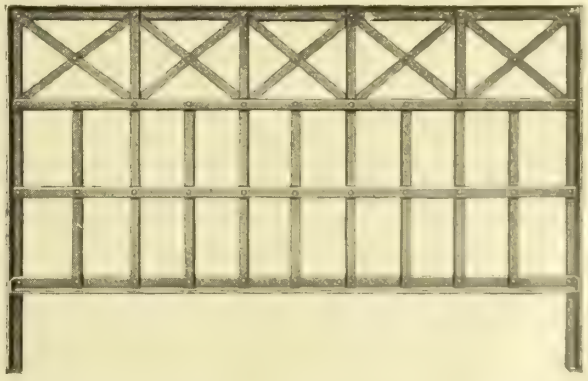
TYPE K GATE

Type Z Gate—Made of steel, with 1¼ x ⅛-inch angle frames. Rails and braces are of ⅛ x 1-inch flat steel, all joints securely riveted. Frames are provided with metal shoes to slide on angle or Tee bar guides. Metal gates corresponding in design with various types of wood gates shown above can also be furnished.



TYPE Z GATE

Type H Gate—Made of steel with 1¼ x ⅛-inch angle frames. Rails and braces are of ⅛ x 1-inch flat steel, all joints securely riveted. Frames are provided with metal shoes to slide on angle or Tee bar guides. Gates made of gas pipe or steel tubing can be supplied in any design or combination with any type of operating device.



TYPE H GATE

ESTABLISHED 1887

ENERGY ELEVATOR COMPANY

PHILADELPHIA, PA.

Products.

"Little Beauty," "Energy," "Little Giant," and Electric Dumb-waiters; Hand Elevators; Automobile Lifts, Basement Lifts; Belt-Driven and Electric Freight Elevators.

"Little Beauty" Dumb-waiter, 25 Pounds' Capacity.

Specification — Operating gear of iron wheels mounted in guarded iron stands, revolving on steel roller bearings. Car of highly finished hardwood trays with polished brass fittings and adjustable guide shoes. Car runs on polished brass pipes; one contains the counterweight and the other is used as a speaking-tube. It can be controlled from any floor by a self-holding band-brake.

Price—For ten-foot travel, $60.00. Extra travel, $1.65 per foot. This includes the box at top in which the wheel and brake are set ready for use, but does not include the closet at bottom nor enclosure around opening in top floor. Car over 20 by 16 inches extra.

Hand-Power Invalid Elevator, 500 Pounds' Capacity.

Specification—Operating gear of the automatic self-retaining type, of 500 pounds' capacity, spur wheel machine-cut, all bearings antifriction steel rollers, mounted in an iron frame containing the entire mechanism. Car of hardwood panels 4 feet high on sides and back, with wire work above this and overhead; car equipped with spring grip safety device and suspended by two Swedish iron hoist cables. Pull rope of hemp. Counterweight sufficient to balance one passenger.

Price—For ten-foot travel, $200.00. 80 cents for each additional foot of height.

"Energy" or Residence Dumb-waiters, 100 Pounds' Capacity.

Specification—Machine of the automatic type, which securely sustains the car at any point without the use of lines or cords. Shaft is polished turned steel, revolving on roller bearings, and all parts accurately bored and carefully fitted, resulting in a perfect machine. It is mounted in an iron frame, containing the entire mechanism including the wheels for deflecting the hoist rope. Car of well-seasoned hardwood, finished with filler and varnish; it has adjustable guide shoes, reinforced back, and iron bound corners.

Hoist rope, of wire cable; pull rope, of hemp. Counterweight runs in open guides.

Price—For ten-foot travel, $34.00. 30 cents for each additional foot of travel. Double fixtures, extra.

"Little Giant" Dumb-waiters or Trunk-Lifts, 300 Pounds' Capacity.

Specification—Operating gear of the automatic self-retaining type, of 300 pounds' capacity, mounted in an iron frame with the wheels and brake permanently fixed, the shafts revolving on steel roller bearings. Car of hardwood enclosed with lining on the back and sides (made any size up to 2 feet 6 inches wide by 3 feet 6 inches deep by 4 feet high; this will receive large trunks). Car suspended by one Swedish iron hoist cable; weight to run in a closed box.

Price—For ten-foot travel, $60.00. 30 cents for each additional foot of travel. Car can be the same as "Energy" and weight run in guides if preferred.

Plans.

Working plans are furnished for installing these lifts. Special plans will be supplied for special sizes, if stock sizes do not suit.

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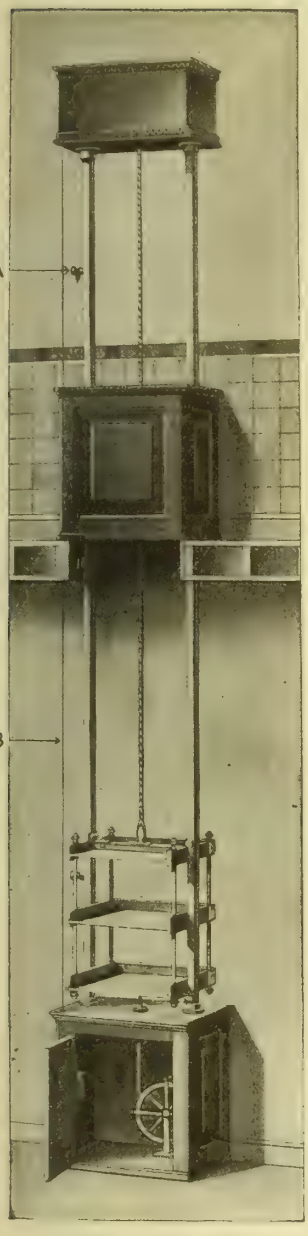
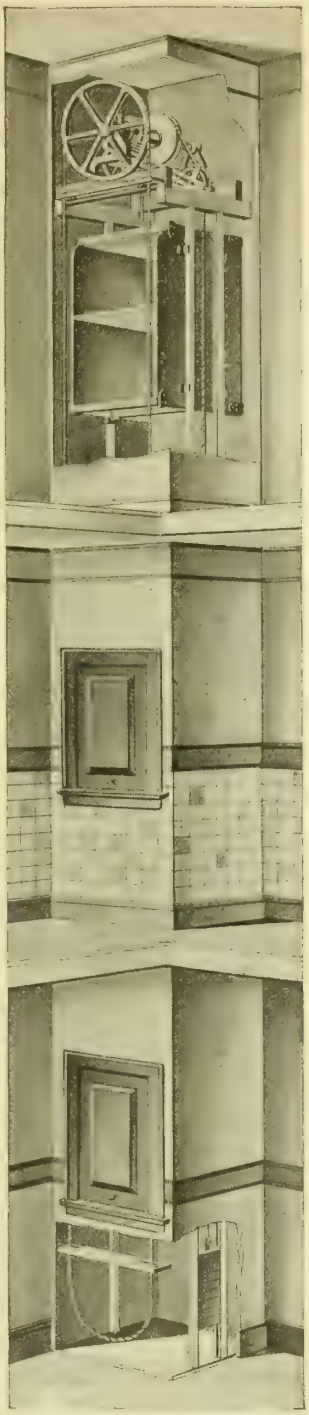
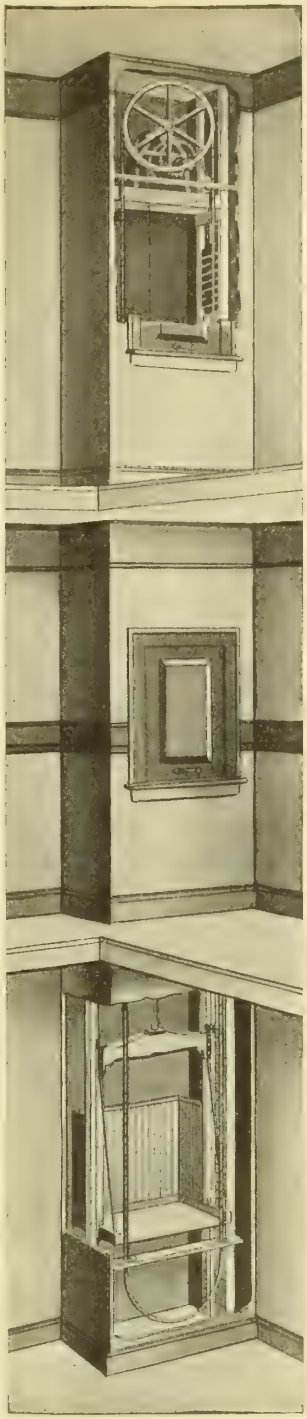


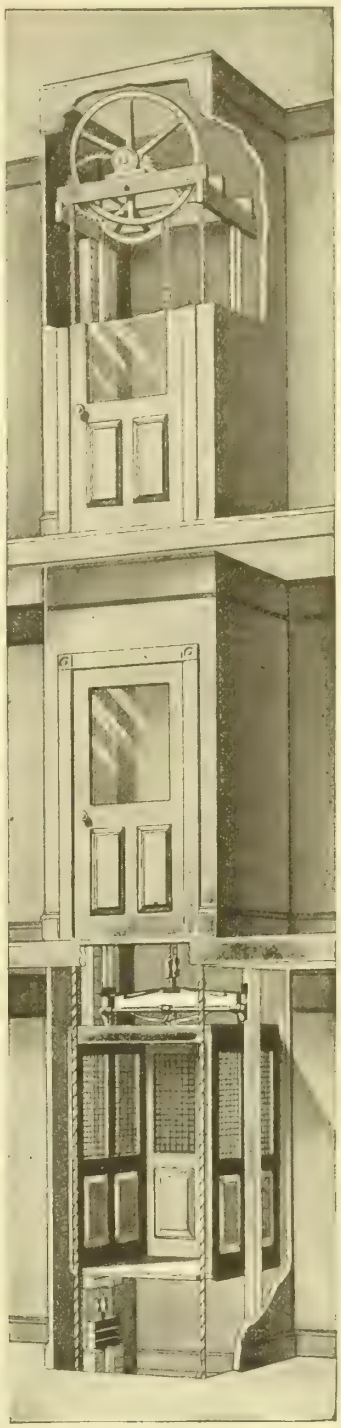
"LITTLE BEAUTY" DUMB-WAITER
A—Speaker
B—Brake line



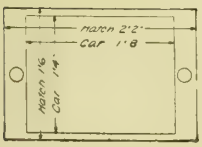
"ENERGY" OR RESIDENCE DUMB-WAITER



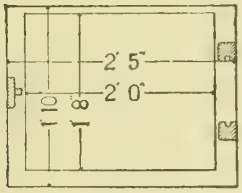
"LITTLE GIANT" DUMB-WAITER OR TRUNK-LIFT



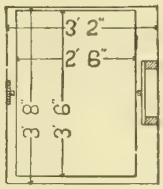
HAND-POWER INVALID ELEVATOR



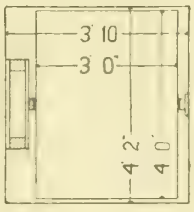
For car 20 x 16 in.



For car 24 x 20 in.



For car 2 ft. 6 in. x 3 ft. 6 in.



For car 3 x 4 ft.

PLANS OF SHAFTS SHOWING POSITION OF WEIGHTS

Continued on next page

Hand-Power Elevator.

Machine—Machine with all wheels, steel shafts, keys, antifriction roller bearings, self-oiling boxes, powerful self-holding band-brake, 4 inches wide, and brake wheels on a plank.

Car with Safety Catch—Car of hardwood, equipped with our improved spring-grip safety device, to sustain the car in case hoisting cable should break.

Cable—Cable of best Swedish iron, fitted with necessary attachments to connect it to the car and counterweight. This cable has a breaking strain five times greater than the rated capacity of the elevator.

Hand Rope—Hand rope of best quality manila and amply large and strong for its work.

Check Line—Check line of proper diameter and length to operate brake.

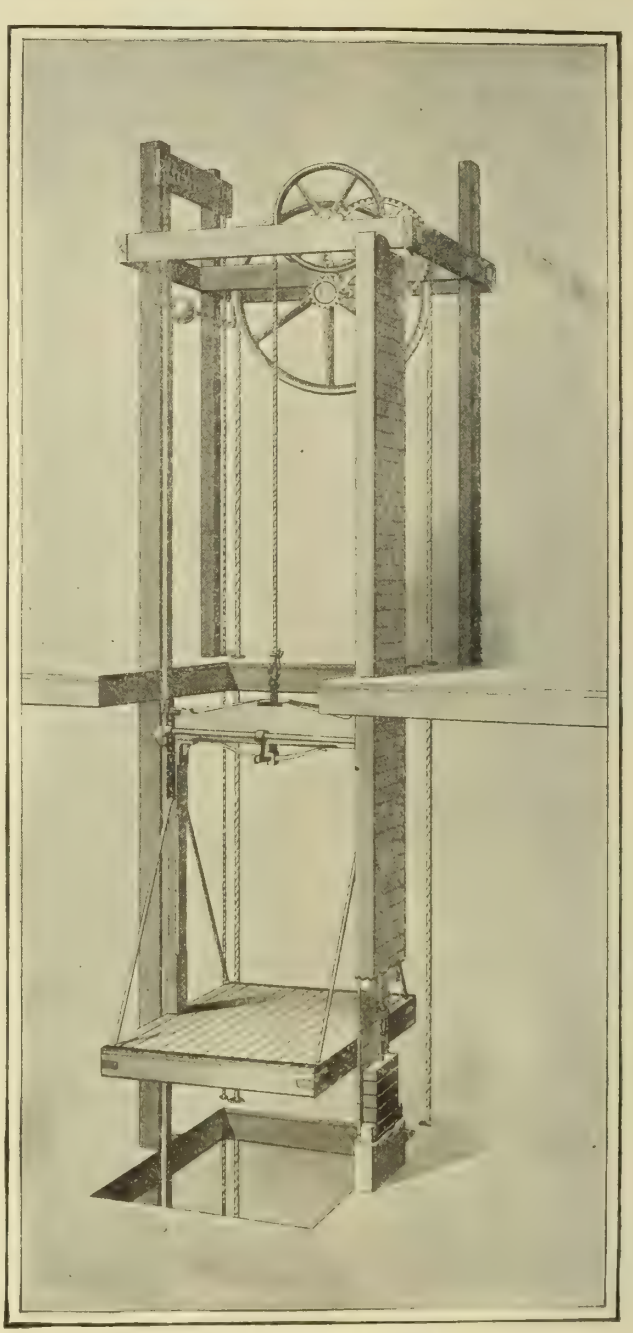
Counterweight—Counterweight adjustable and sufficient to lift empty car.

Guide Runs—Guide runs of first quality hard maple, to fit the guides on the car, bored and countersunk for screws.

Floor Eyelets—Floor eyelets for the hand rope and checkline.

Drawings—Drawings to direct the mechanic in setting the elevator in place.

The foregoing is a complete elevator except the guide posts, machine supports, weight box and bolts for setting it up.



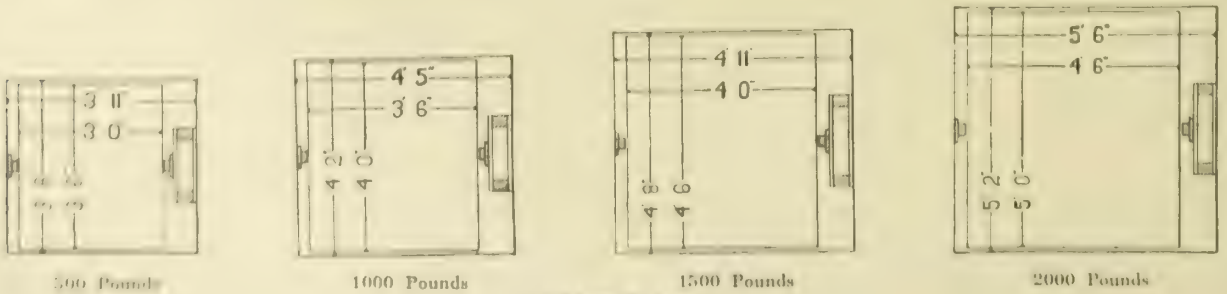
HAND-POWER ELEVATOR

Prices.

		Shipping Weight, Pounds
For 10-foot travel:		
500-lb. capacity, car not over 3 ft. wide by 3 ft. 6 in. deep	$80.00	1000
1000-lb. capacity, car not over 3 ft. 6 in. wide by 4 ft. deep	100.00	1325
1500-lb. capacity, car not over 4 ft. wide by 4 ft. 6 in. deep	120.00	1589
2000-lb. capacity, car not over 4 ft. 6 in. wide by 5 ft. deep	140.00	1810
For travel over 10 feet, add, for each additional foot of height	.80	
500-lb., 1000-lb., and 1500-lb. cars are not made larger than sizes here given. 2000-lb. car will be made larger, for, per square foot of increased area	2.00	
Bow Irons for top of car (to operate one set of doors)	11.00	
Irons to operate automatic hatch doors, in addition to bow irons, per floor	11.00	

NOTE—The sizes of the cars are outside measurements.

NOTE—If the Safety Device is left off the car, a reduction of $10.00 will be made from the list price.



500 Pounds 1000 Pounds 1500 Pounds 2000 Pounds

SHAFT PLANS

Continued on next page

Electric Dumb-Waiter, Type H-1.

Capacity, 100 pounds, with one half horse-power motor. Speed 40 feet per minute.

Capacity, 200 pounds, with one horse-power motor. Speed 40 feet per minute. This is without counterweight.

It is good for 400 pounds at 25 feet per minute when counterbalanced, and can be attached to house lifts for trunks or light passenger service.

This lift is driven by belt from a reversible motor; the motor and car start and stop in unison, so that the motor runs only when the car runs; this saves the electric current, also wear and tear of the machine.

Hoisting Gear—Has worm and worm wheel cut from solid blanks of a pattern to give a maximum of wearing surface, while consuming a minimum of power; they are enclosed in a tight case and run in oil that protects them from dust, and insures perfect lubrication of the vitals of the machine; gear has phosphor bronze bearings and roller bearing thrusts on both ends.

Automatic Band-Brake—Easily sustains a full load; it is quick in action, operates without jar or vibration, and is so arranged that it automatically takes up the wear.

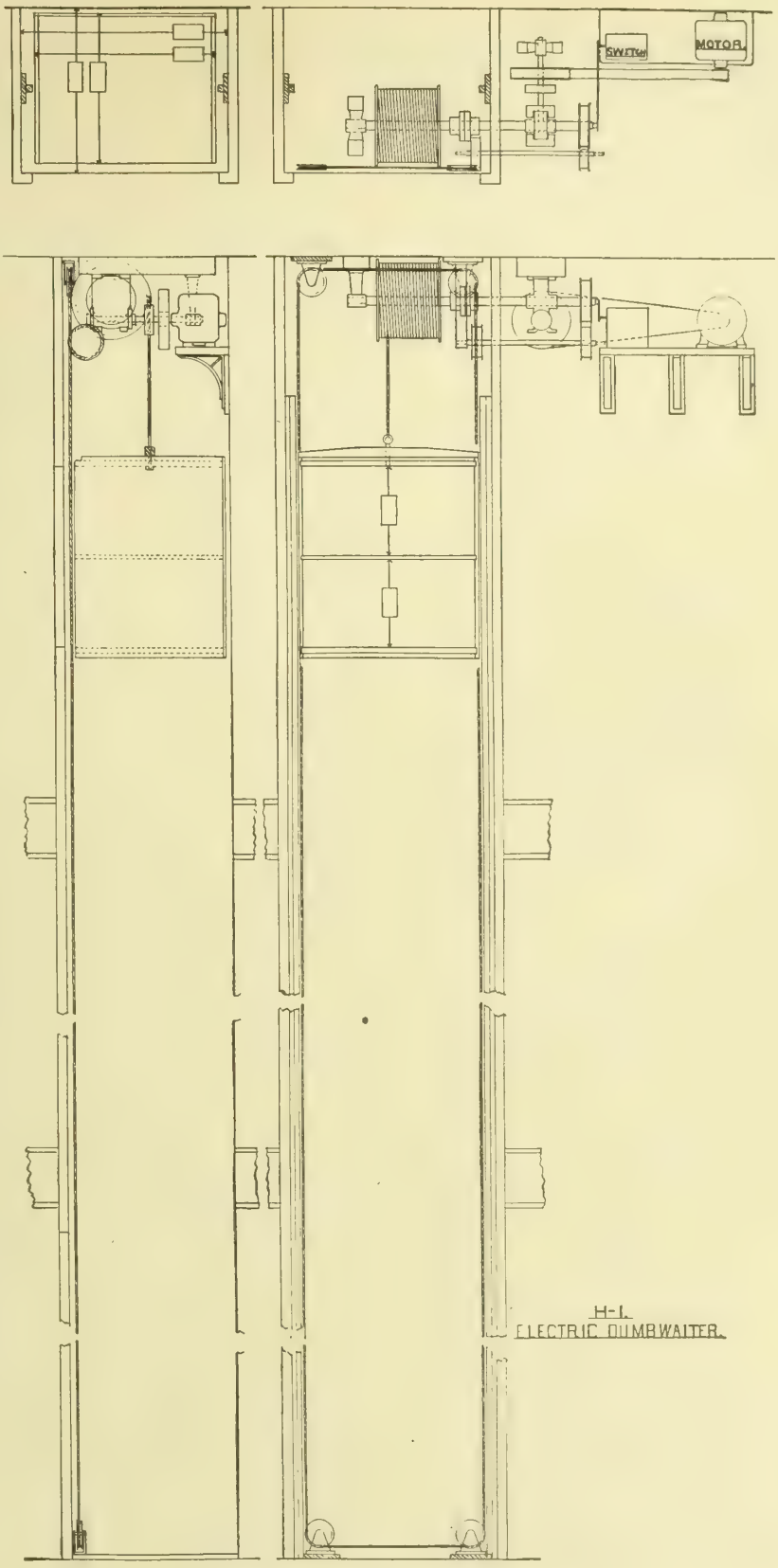
Automatic Stop—Placed on drum shaft stops the car at the top and bottom floors. It is always reliable, and acts automatically, or independently of the operator, on the shifting cable.

Winding Drum—Is spirally grooved by machinery to secure a smooth surface for the cables, and thereby lengthen their time of service.

Car—Of hardwood; iron reinforced; adjustable guide shoes, to take up the wear. It can be either cabinet or platform shape as desired; equipped with sure grip safety device.

Hoist Cable—Capacity ten times greater than the rated capacity of the waiter.

Guide Strips—Form guides for the car, and are of hard white maple, fastened to the face of the guide posts.



ELECTRIC DUMB-WAITER—TYPE H-1

Prices.

Hoisting machine, hoist cable and connections, maple guide runs, rigging to start and stop; car 36 in. by 24 in., in two compartments, 18 in. and 16 in.
For 10-foot travel.....$133.00
For travel over 10 feet, add, for each additional foot of height ..... .75
Cars can be made larger, for, per square inch of increased area ..... .04
Shipping weight for 10-foot travel, 600 lbs.

Note—The foregoing does not include the motor, switch or belt. It is necessary to have a description of the current to be used, the capacity and speed required, to quote on these parts.

Hoisting machine alone.....$100.00
If for two belts and shifter, to be driven from a line shaft in a factory or mill..... 115.00

SEDGWICK MACHINE WORKS

MANUFACTURERS OF

Hand-Power Dumb Waiters and Elevators

TELEPHONE, RECTOR 2463

228 Liberty Street
NEW YORK, N. Y.

FACTORY
POUGHKEEPSIE, N. Y.

Products.

HAND-POWER DUMB WAITERS and ELEVATORS of all types and for every purpose: PRIVATE HOUSE DUMB WAITERS; APARTMENT HOUSE DUMB WAITERS; HOSPITAL DUMB WAITERS and ELEVATORS; HOTEL and RESTAURANT DUMB WAITERS; LIBRARY BOOK LIFTS; FUEL LIFTS; BRASS TUBE DUMB WAITERS; HIGH SPEED, AUTOMATIC BRAKE, BAND BRAKE, and GEARED DUMB WAITERS; TRUNK LIFTS, INVALID ELEVATORS, DOMESTIC ELEVATORS, FREIGHT ELEVATORS, SIDEWALK ELEVATORS, CARRIAGE ELEVATORS, AUTOMOBILE ELEVATORS, ASH HOISTS, HATCHWAY HOISTS, etc.

Special Features.

Long life, easy operation, freedom from trouble, low repair cost—all the result of superior design and principle, executed in the best of materials by skilled workmen in a factory devoted exclusively to the manufacture of Hand-Power Dumb Waiters and Elevators, and equipped with special machinery for this purpose. Quantity production on the interchangeable-part system guarantees a uniformly high-grade product.

Guarantee.

"Sedgwick" Dumb Waiter Machines are guaranteed for five years from date of purchase and will be repaired free of charge at any time within that period if returned to the factory at Poughkeepsie, N. Y., charges prepaid.

Deliveries.

Catalogue sizes are carried in stock, and shipment is made the day order is received. Special sizes require three to four days—principally to allow for proper finishing.

Installation.

Proper installation is essential to satisfactory operation. We furnish blue-prints and full directions for installing with each outfit, from which local labor may install. Or, we will send our experienced mechanics to install, on request. Customers will always secure better results by purchasing complete outfits from us, rather than by securing part of the equipment from local sources.

Sedgwick Service.

Complete satisfaction depends upon the selection of Dumb Waiter or Elevator Outfits exactly suited to the conditions and requirements of each case. Sedgwick Service places at the disposal of architects and others, without charge, the benefit of our specialized experience of more than twenty years. Our Service Department will work with architects in deciding upon the proper Dumb Waiter or Elevator equipment to give specific results under specific conditions.

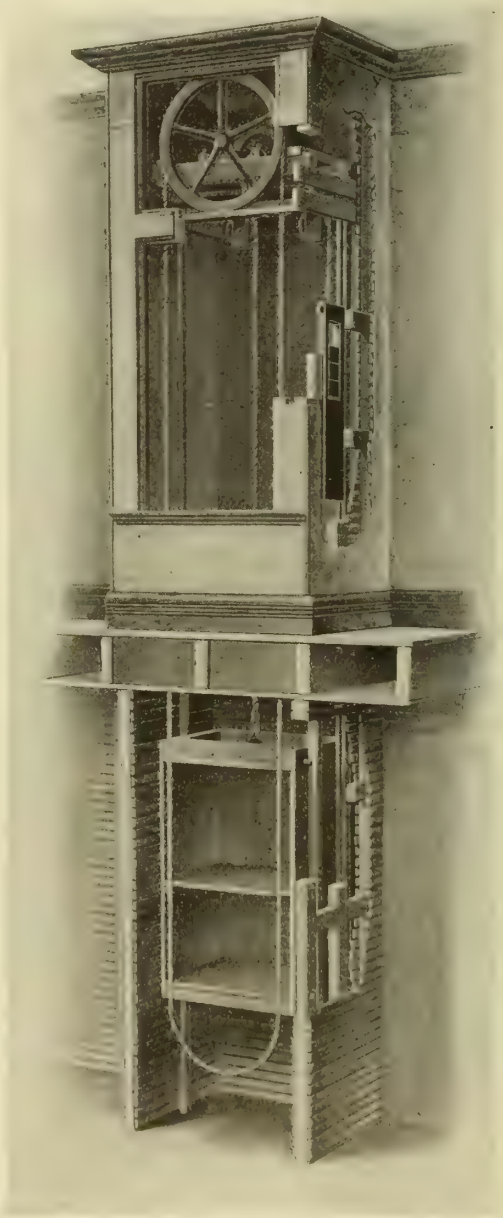


FIG. A. "SEDGWICK" AUTOMATIC BRAKE DUMB WAITER ERECTED IN PLASTERED SHAFT

Specifications.

Specify as follows: "The Dumb Waiter (or Elevator) to be manufactured and installed by the SEDGWICK MACHINE WORKS, 228 Liberty Street, New York." Thus all contractors may figure on the same equipment, the owner gets maximum value, and the architect has our guarantee that the outfit will be satisfactory and the work properly done. If local mechanics are to install, simply omit the words "and installed."

Continued on next page

Prices, Drawings, etc.

On the following pages are listed some of the standard Sedgwick types and sizes, the prices given being net to the consumer. Whenever further data are desired, we will be glad to submit drawings, estimates, and more complete descriptive matter.

Special Outfits.

We have thousands of special drawings and designs developed in our long experience for special purposes. If these pages do not offer what you want, consult us. We can furnish special constructions on very short delivery without sacrifice of quality and with our usual guarantee.

Plain Dumb Waiters (Figs. A and B).

The word "Plain" is used in contradistinction to the "Geared" type, described later. The three Plain Dumb Waiter types here described are the ones most largely used for average service, where usual loads are less than twenty-five pounds. The Automatic Brake Dumb Waiter is for general work in private houses. The load cannot run down, but is automatically held by the machine itself without any check or brake line.

The Band Brake Dumb Waiter is for high wells, as in factories, apartments, hospitals, etc., where a harder service is imposed. The Simplex Dumb Waiter is a good, low-priced outfit for light work, with a spring check on the hand ropes.

DATA, "SEDGWICK" IMPROVED DUMB WAITER OUTFITS (FIGS. A AND B)

No.	Size of Car (Outside) **	Size of Ceiled Well (Inside) **	Capacity (Pounds)	Shipping Weight (Pounds)	Prices of Single Face Outfits *				Prices of Double Face Outfits *	
					"Automatic"	"Simplex"	"Band Brake"	Add for Extra Height Per foot	Add for Double Face	Add for Extra Height Per foot
1	20″ x 16″	23″ x 19″	25	215	$36.00	$24.25	$43.50	$0.30	$6.00	$0.45
2	24″ x 20″	27″ x 23″	50	285	44.00	30.00	52.00	.35	6.00	.45
3	28″ x 24″	31″ x 27″	75	360	53.00	35.00	62.50	.40	7.00	.55
4	34″ x 30″	37″ x 33″	100	470	62.00	40.00	71.50	.40	7.00	.55

* and **—See note to table below.

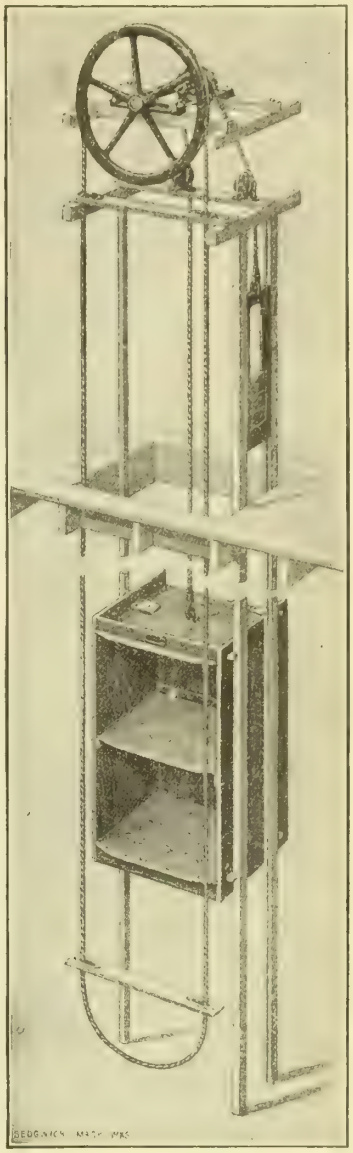


FIG. B. "SEDGWICK" AUTOMATIC BRAKE DUMB WAITER ERECTED
Enclosure removed

Geared Dumb Waiters.

These are intended particularly for locations where the service is heavier than in the average private house, such as hospitals, hotels, restaurants, factories and commercial establishments where the usual load will exceed twenty-five pounds. They are built in two types—the Automatic, and the Band Brake—as listed below.

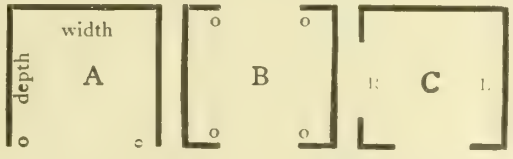
DATA, "SEDGWICK" GEARED DUMB WAITER OUTFITS

No.	Size of Car (Outside) **	Size of Ceiled Well (Inside) **	Shipping Weight (Pounds)	Prices of Single Face Outfits *			Prices of Double Face Outfits **	
				"Band-Brake"	"Automatic"	Add for Extra Height Per foot	Add for Double Face	Add for Extra Height Per foot
1	20″ x 16″	23″ x 19″	300	$68.00	$78.00	$0.40	$10.00	$0.70
2	24″ x 20″	27″ x 23″	400	77.00	87.00	.40	10.00	.70
3	28″ x 24″	31″ x 27″	500	85.00	95.00	.45	10.00	.80
4	34″ x 30″	37″ x 33″	600	95.00	105.00	.60	10.00	1.00

* Complete outfits include machine on platform, car, adjustable counterweight, guide runs for car and weight, and ropes for total height of 20 feet over all, f. o. b. Poughkeepsie, N. Y.

** No extra charge for outfits of different sizes and smaller dimensions. Price of special sizes is that of the regular size, out of which the special size could be made.

Inside dimensions of ceiled well is specified, as the guide runs may be screwed direct to the ceiling boards. If the shaft be fireproof or lathed and plastered inside, grounds or cleats must be provided, to which the guide runs may be screwed. If these grounds or cleats are not provided in the walls and must be put on the face of the plaster, add two inches to the inside finished width of the well for this cleating.



FLOOR PLANS OF DUMB WAITERS

A—Open at front on all floors; the best arrangement where it can be used
B—Requires a Double-Face Outfit to operate from both fronts
C—Open at front and R or L, say which. This arrangement is to be avoided, if possible

Continued on next page

Dumb Waiter Cars.

These are regularly built 3 feet high inside, with one hinged shelf; or 3 feet 6 inches high inside, with two fixed shelves in addition to top and bottom; except that No. 1 cars are usually 6 inches less in height. In the tables, the first measurement given is the width from right to left; the second, the depth from front to rear. Thus, a No. 2 car is 24 inches wide, right to left, and 20 inches deep, front to rear.

Invalid Elevators (Fig. E).

The "Sedgwick" Automatic Brake Hand-Power Invalid Elevator (Fig. E) is a practical outfit for the purpose intended. The essential features of such an outfit are ease of operation, absolute safety, and simplicity of design, so that no interruption of service need be anticipated. These essentials are embodied in the Sedgwick outfits. While the weakness which prevents the invalid climbing stairs would probably make it inadvisable for him to operate the elevator himself, the amount of power required is so small that even a child can safely operate the elevator either up or down with full load. Special booklet on application.

DATA, "SEDGWICK" INVALID ELEVATORS, FIG. E

Size of Car	SIZE OF WELL		Price of Outfit	Add per ft. of Height	Shipping Weight, Lbs.
	Width	Depth			
3′ x 3′	3′ 4½″	x 3′ 3″	$275.00	$1.00	950
3½′ x 3½′	3′ 11½″	x 3′ 9″	350.00	1.25	1,200
4′ x 4′	4′ 6″	x 4′ 3″	400.00	1.50	1,300
4½′ x 4½′	5′ 0″	x 4′ 9″	425.00	1.75	1,700
5′ x 5′	5′ 6″	x 5′ 4″	450.00	2.00	1,800
6′ x 6′	6′ 8″	x 6′ 4″	500.00	2.50	2,000

Complete outfits include machine, car 6 feet 3 inches high in clear, guide runs, ropes and cables for total height over all of 20 feet or less, and counterweight, f.o.b. Poughkeepsie, N. Y. For extra height, see table above.

Sidewalk Elevators (Fig. O).

Many improvements make the "Sedgwick" the simplest, strongest, safest, most durable, most easily operated sidewalk elevator that an architect can specify. It is designed for heavy duty and stands up under the work.

PRICE-LIST, "SEDGWICK" SIDEWALK ELEVATOR, FIG. O

Capacity, Lbs.	Size of Platform	Price	Add per ft. of Height
[illegible]	3′ x 3′	$125.00	$2.00
[illegible]	[illegible]	150.00	2.00
1500	4′ x 4′	190.00	2.50
[illegible]	5′ x 5′	200.00	2.50
2500	[illegible]	210.00	3.00

Prices cover outfits complete f.o.b. Poughkeepsie, N. Y., for a total height of 10 feet. Extra for additional height as per table above.

Prices on heavier outfits on application.

Blue prints and full directions for erecting with each outfit.

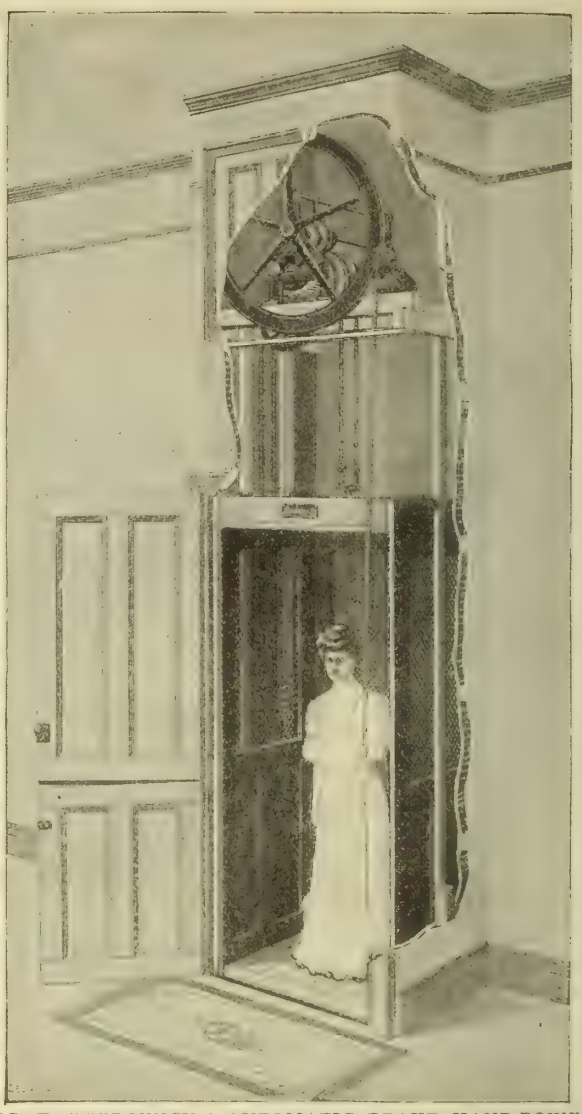


FIG. E. "SEDGWICK" AUTOMATIC BRAKE HAND-POWER INVALID ELEVATOR

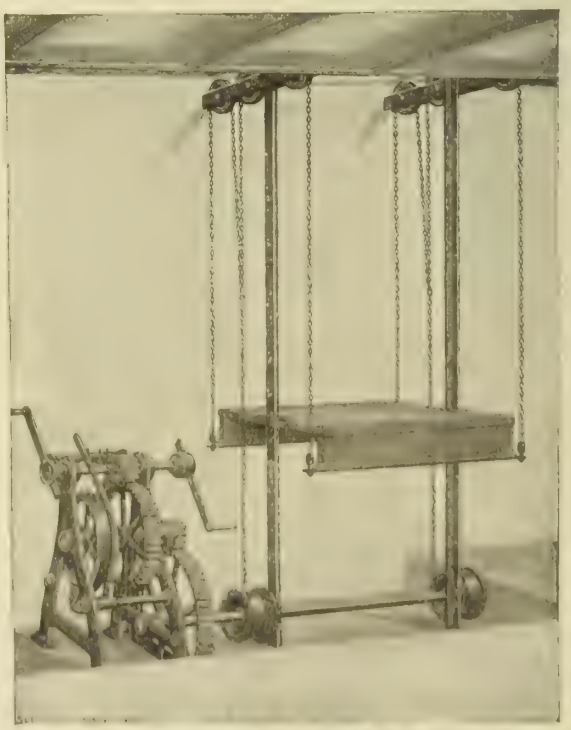


FIG. O. "SEDGWICK" SIDEWALK ELEVATOR

Continued on next page

Carriage and Automobile Elevators (Fig. C).

"Sedgwick" quality is here represented in high-grade equipment for stables, garages, livery stables, etc.

These elevators are simple, easy running, safe, and substantially built. They can be furnished in any size and capacity.

DATA, "SEDGWICK" AUTOMOBILE ELEVATORS, FIG. C

Capacity	1500 lbs.	2000 lbs.	2500 lbs.	4000 lbs.	5000 lbs.
Gearing	$102.00	$120.00	$132.00	$200.00	$250.00
Platform	7½x12 ft.	7½x14 ft.	8 x 15 ft.	8 x 18 ft.	8 x 18 ft.
	$36.00	$42.00	$45.00	$85.00	$100.00
Guide Runs	7.25	7.25	7.25	15.00	25.00
Ropes and Cables	41.75	45.75	45.75	50.00	60.00
Counterweight	23.00	28.00	30.00	50.00	65.00
For total of 20 feet or less	$210.00	$243.00	$260.00	$400.00	$500.00
Add for each additional foot of height	$1.70	$1.90	$1.90	$2.00	$2.00
Shipping weight about	2000 lbs.	2400 lbs.	2800 lbs.	3500 lbs.	4000 lbs.

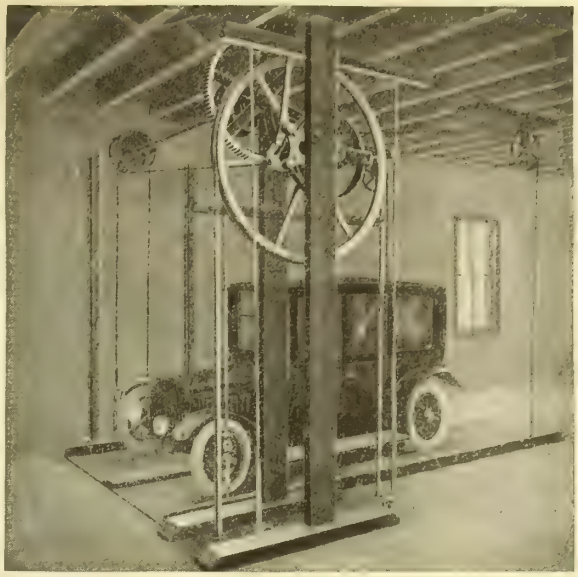


FIG. C. "SEDGWICK" AUTOMOBILE ELEVATOR

Freight Elevators (Fig. D).

These equipments are built in the most substantial manner, designed for severe service and easy operation. In smaller sizes they are used in private homes as Trunk Lifts. The larger sizes find application in factories, shops, stores, warehouses, schools and industrial buildings for all purposes. They have steel antifriction roller bearings and rigidly braced iron frames, resulting in correct alignment and easy running. They are fitted with the improved "Sedgwick" self-locking indestructible band brake.

We recommend double cables independently attached to car and counterweight.

DATA, "SEDGWICK" IMPROVED HAND-POWER FREIGHT ELEVATORS, FIG. D

Capacity, Lbs.	Size of Car	Size of Well	Price of Outfit	Add for each extra foot of Height	Shipping Weight, Lbs.
500	3′ x 3′	3′ 4½″ wide x 3′ 3″ deep	$89.00	$0.55	750
600	3′ x 3′	3′ 4½″ wide x 3′ 3″ deep	102.50	.70	950
800	3½′ x 3½′	3′ 11½″ wide x 3′ 9″ deep	140.50	1.00	1175
1000	4′ x 4′	4′ 5½″ wide x 4′ 3″ deep	158.50	1.05	1260
1200	4½′ x 4½′	5′ 0″ wide x 4′ 9″ deep	180.00	1.10	1665
1500	5′ x 5′	5′ 6″ wide x 5′ 4″ deep	198.00	1.20	1800
2000	6′ x 6′	6′ 10″ wide x 6′ 4″ deep	224.00	1.50	2200
2500	6′ x 6′	6′ 10″ wide x 6′ 4″ deep	238.00	1.60	2500

Complete outfits include machine, side post freight car 6 feet 3 inches high in clear, guide runs for car and weight, requisite ropes and cables for total of 20 feet over all, and adjustable counterweight, f. o. b. Poughkeepsie, N. Y.

Price on outfits of greater size or capacity quoted upon request.

Blue-prints and full directions for erecting sent with each outfit.

In the 500-pound outfit the car is carried by the best quality of manila rope.

In all other sizes the car is carried by two wire cables, each independently attached both to car and counterweight.

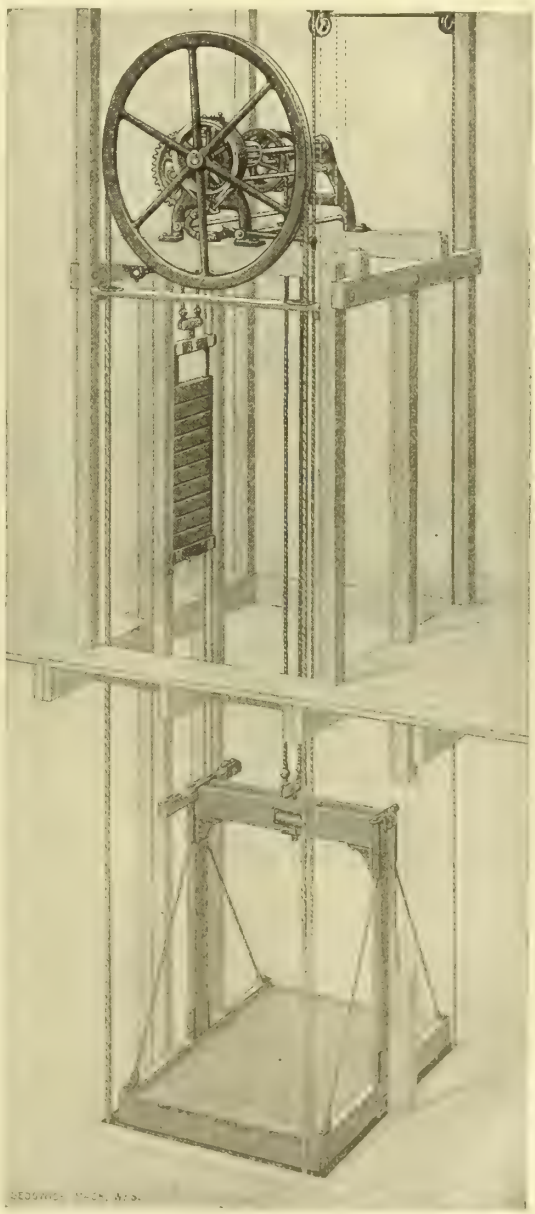


FIG. D. "SEDGWICK" FREIGHT ELEVATOR

ESTABLISHED 1868

GEORGE MASSA

Manufacturer of Brass Tube Dumb-Waiters

OFFICE AND FACTORY
245 South 6th Street
PHILADELPHIA, PA.

Products.

Specialist in BRASS TUBE DUMB-WAITERS, for Dwellings, Cafés, Book Lifts, etc.

Description.

The brass tube dumb-waiter is operated by hand power and is intended for use in dwellings, hotels, restaurants, libraries, offices, stores, banking-houses, etc., or for any purpose where the best is desired.

Adapted to almost any position or requirement. Is noiseless and easily operated.

Installation can be made by any good mechanic.

Fig. 1 shows quick service dumb-waiter for restaurants, cafés, etc.

The guides are polished brass tubes, one containing counterweight which balances the car, while the other is utilized as a speaking tube for communication with the various floors.

Sizes and Capacities.

We build these any size or capacity. Cars are made in either metal or wood. Fig. 2 shows cage suitable for book lift or store use, with wire mesh at sides and back.

Fig. 3 shows cage suitable for cafés, dwellings, etc.

Further Information.

Architects are invited to send for full particulars. Sizes, prices, etc., will be promptly furnished.

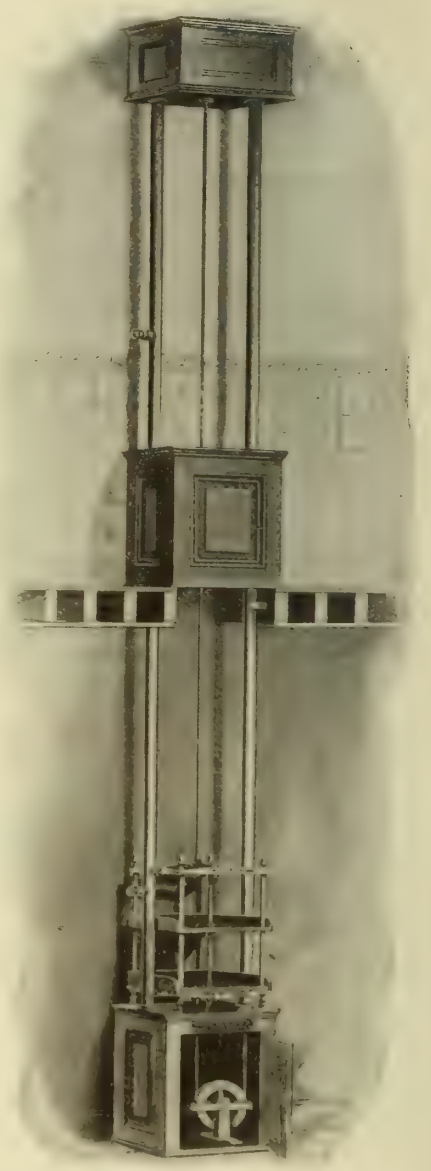


FIG. 1. QUICK SERVICE DUMB WAITER FOR RESTAURANTS, CAFES, ETC.

FIG. 2. CAGE SUITABLE FOR BOOK LIFT OR STORE USE.

FIG. 3. CAGE SUITABLE FOR CAFÉ, RESIDENCE, ETC.

References.

Following are a few of the long list of names of those who are already using our dumb-waiters:

John Wanamaker, Philadelphia, Pa.
Pennsylvania Railroad Co., Philadelphia, Pa.
Strawbridge & Clothier, Philadelphia, Pa
Wm. F. Murphy's Sons, Stationers, Philadelphia, Pa.
George E. Bryan, Druggist, Philadelphia, Pa.
Otto Eisenlohr & Bro., Cigars, Philadelphia, Pa.
Horn & Hardart Baking Co., Philadelphia and New York
Horn & Horn, Restaurant, Philadelphia and Baltimore
G. A. Schwarz, Toys, Philadelphia, Pa.
Widener Memorial, Philadelphia, Pa.
United States Capitol Building, Washington, D. C.
Siegel, Cooper Co., Dep't Store, New York, N. Y.
Bert Dunnett, Builder, Buffalo, N. Y.
J. W. Storandt Mfg. Co., Fixtures, Rochester, N. Y.
James B. Lambie Co., Hardware, Washington, D. C.
Driscoll Bros., Ithaca, N. Y.
Yawman & Erbe, Rochester, N. Y.
Art Metal Construction Co., Jamestown, N. Y.
The Mohican Co., New York, N. Y.
Manufacturers' Contracting Co., Wilmington, Del.

THE STORM MANUFACTURING CO.

Dumb-Waiters and Elevators

TELEPHONE, MULBERRY 996

48 Vesey Street
NEWARK, N. J.

Products.

Manufacturers of DUMB-WAITERS, and HAND POWER ELEVATORS of all descriptions for all kinds of buildings, including Private houses, Apartment houses, Libraries, Restaurants, Hospitals and Hotels. BRASS TUBE DUMB-WAITERS, AUTOMATIC LOCK or BAND BRAKE GEARED DUMB-WAITERS, TRUNK LIFTS, SIDEWALK LIFTS, AUTOMOBILE LIFTS, INVALID LIFTS, HOSPITAL ELEVATORS, ASH HOISTS, and FREIGHT ELEVATORS, of all descriptions; also, ELECTRIC DUMB-WAITERS, and SIDEWALK ELEVATORS.

Materials and Workmanship.

Highest grade of material, construction, and finish. Our Automatic Machines have a positive automatic lock, holding the load at any point, and are *built to fit your well-hole*. Shipments within one week after receipt of order, and full detail instructions and blueprints with every shipment.

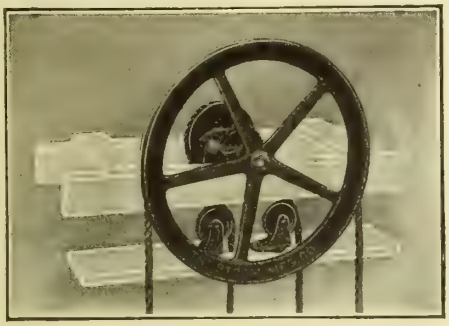


FIG. 1. FIXTURES OF PARAGON SELF-RETAINING AUTOMATIC DUMB-WAITER

Guarantee.

Guaranteed as to workmanship and material, and we will make good any defective part free of charge.

Specifications, etc.

Specify the following machines: Paragon Automatic Lock, New York Safety, Manhattan, Newark Dumb-Waiter, or Paragon Automatic Lock and Humphrey Hand Elevators, or Trunk Lifts, to be manufactured by THE STORM MANUFACTURING CO., Newark, N. J. We are always ready to submit specifications and detail sketches for any regular or special machines and to quote prices delivered, or erected.

Instructions for Ordering.

In ordering, the total height of the well-hole and the size of the finished well-hole inside should be stated. Send sketch if possible. State kind of material of which well-hole is built, and whether plastered or wood lined. Give position of counterweight looking into well-hole, and whether inside or outside.

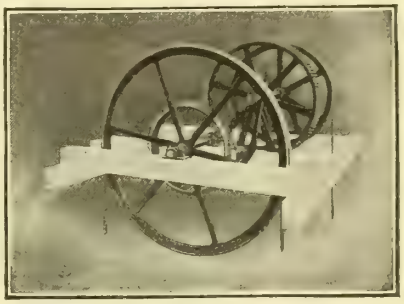


FIG. 2. FIXTURES OF HUMPHREY HAND ELEVATOR

PRICES AND SIZES, BUILT TO FIT WELL-HOLE

DUMB-WAITERS

	Capacity lbs.	Maximum Well-holes	Overhead Fixtures Only Single face	Overhead Fixtures Only Double face	*Complete with Car first ten feet of Travel Single face	*Complete with Car first ten feet of Travel Double face	Each additional foot of Travel Single face	Each additional foot of Travel Double face
New York Safety	75	24″ x 24″	$22.50		$80.00		$0.60	
Newark	125	24″ x 24″	18.00	$25.00	45.00	$55.00	.70	$0.85
Paragon No. 3	50	20″ x 20″	25.00	32.00	77.00	85.00	.70	.85
Paragon No. 2	100	27″ x 27″	30.00	38.00	85.00	95.00	.70	.85
Paragon No. 1	150	32″ x 32″	37.00	45.00	105.00	116.00	.75	.90
Paragon No. 4	150	32″ x 32″	40.00	48.00	110.00	120.00	.85	1.00

For any of the above, weights can run at right, left or back.
* Includes Car, Counterweight, Guide Runs, Weight Runs, and all Ropes ready for erection.

GEARED DUMB-WAITERS AND HAND ELEVATORS

	Capacity lbs.	Maximum Well-holes	Overhead Fixtures Only Single face	Overhead Fixtures Only Double face	*Complete with Car first ten feet of Travel Single face	*Complete with Car first ten feet of Travel Double face	Each additional foot of Travel Single face	Each additional foot of Travel Double face
Manhattan	200	36″ x 36″	$43.00	$52.00	$120.00	$130.00	$0.90	$1.10
Paragon No. 5	225	36″ x 36″	43.00	52.00	120.00	130.00	.90	1.10
Paragon No. 6	300	42″ x 42″	55.00	67.50	126.00	140.00	.90	1.10
Paragon No. 8	500	54″ x 54″	75.00	90.00	160.00	182.00	1.00	1.25
Humphrey No. 1	500	54″ x 54″	75.00		160.00		1.00	
Humphrey No. 2	750	60″ x 60″	110.00		198.00		1.00	
Humphrey No. 3	1.200	66″ x 66″	140.00		300.00		1.50	
Invalid Lift	500	54″ x 54″			400.00		1.50	

Weights for above machines run at right, left, or at back.
* Includes Car, Counterweight, Guide Runs, Weight Runs, and all Ropes and Cable ready for erection.

GIFFORD-WOOD CO.

Manufacturers of Elevating and Conveying Machinery and Ice Tools

MAIN OFFICE AND WORKS

HUDSON, N. Y.

BRANCH OFFICES

NEW YORK, 30 Church Street BOSTON, 51-52 North Market Street CHICAGO, 565 W. Washington Street

Products.

ELEVATING and CONVEYING MACHINERY for Handling Coal, Ashes, Stone, Sand, Gravel and Ice (natural and manufactured), and Bulky Materials of any nature, WAREHOUSE CONVEYORS; WAGON LOADERS.

Also, COAL and COKE BAGGING MACHINERY.

Services.

Our Engineering Department places at your disposal the services of experts on these lines. Before deciding on any particular type of machinery equipment ask our advice, as you will find our recommendations peculiarly fitted for your exact conditions.

G.-W. Ice Elevators and Conveyors.

We design, build and install, ready to operate, Ice Elevators, Conveyors and Lowering Machines for houses of any capacity. Plans and specifications for construction of ice houses furnished without charge.

G.-W. Ice Lowering Machinery and Tools.

In manufactured ice plants, cold storage plants and breweries, these machines are extensively used. Built entirely of steel and very durable, and automatic in operation. Also, complete equipments for car icing stations.

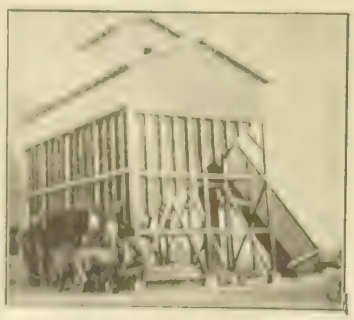
Our stock comprises every tool used for harvesting and handling ice. The large variety of styles and sizes provide for the most exacting user.

Illustrated catalogue on request.

G.-W. AUTOMATIC ICE LOWERING MACHINE

Coal Handling Machinery.

In designing retail coal pockets, the question of the proper type of machinery equipment is of the greatest importance and depends largely upon individual conditions. Our co-operation in solving these problems is offered to those who may require this service.

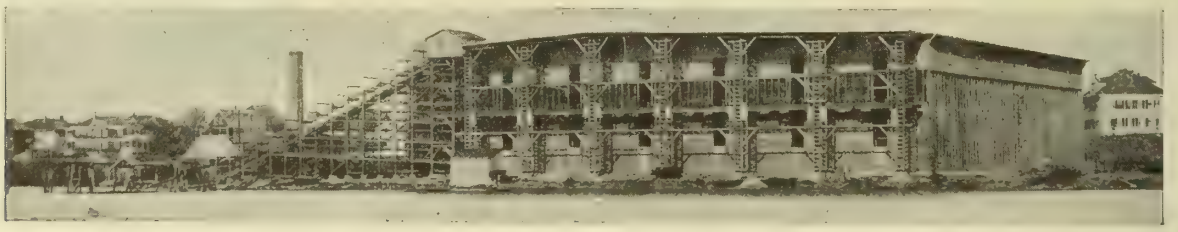


G.-W. COAL HANDLING MACHINERY

G.-W. Collapsible Wagon Loader.

The new Gifford-Wood Collapsible Wagon Loader marks the crowning point in wagon loader efficiency and modern coal yard equipment, this new design embodying many of the valuable suggestions offered by our customers. A radical departure in driving mechanism has been made by the substitution of cut gears for the detachable chain drive. Light in construction and easily moved about the yard. Write for booklet No. 22.

G.-W. WAGON LOADER



G.-W. ICE ELEVATORS AND CONVEYORS

G.-W. Pivoted Bucket Carrier.

Every modern power-house to-day requires a machine of this description. The carrier not only takes care of the coal from the cars to the bunkers, but removes the ashes from under the boilers to cars or to separate bins provided for storage. The chain is one of the most essential points of this type of carrier. The self-oiling chilled rollers require little or no attention; the short pitch chain eliminates the jerky motion incident to long pitch chains and does away with any device necessary to correct this difficulty; it also gives a more substantial method of driving, due to the increased number of teeth on the wheels and in action at one time

G.-W. PIVOTED BUCKET CARRIER

THE HASLETT SPIRAL CHUTE CO.

Tioga Station
PHILADELPHIA, PA.

310 California Street
SAN FRANCISCO, CAL.

NEW YORK OFFICE, 5636 Grand Central Terminal

Products.

HASLETT SPIRAL CHUTES, GRAVITY ROLLER CONVEYOR, BELT and CHAIN CONVEYORS, INCLINED ELEVATORS, AUTOMATIC HOISTS, FIRE-DOORS, etc.

Spiral Chutes.

The Haslett spiral chute has a patented concave bottom which causes a counterbalance between gravity centrifugal force and friction. It offers the only solution of speed control of packages on gravity slides.

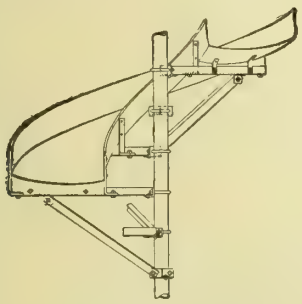


FIG. 1. STANDARD CONSTRUCTION

Gravity Roller Conveyor.

Haslett ball-bearing roller conveyor has shafts hung in patented adjustable shaft holders. These are easily adjustable on side rails for spacing rollers, and permit of training for straight travel. Side rails are not weakened by punching.

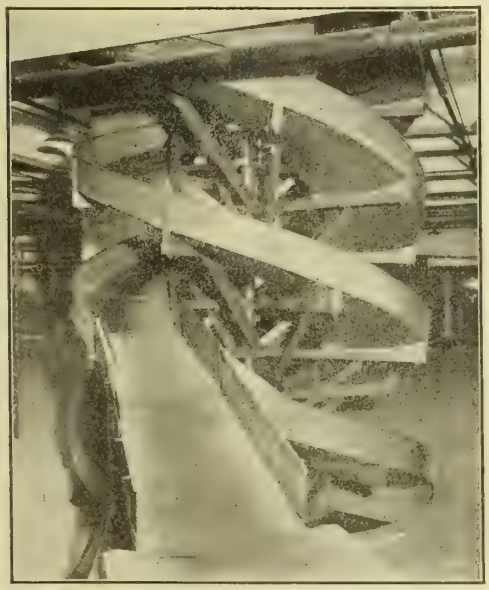


FIG. 2. TRIPLE CHUTE, AUSTIN, NICHOLS & CO., BROOKLYN, N. Y.
Showing tangent delivery switch from triple spiral

Vertical Lifts.

We have several standard designs of vertical lifts suitable for heavy warehouse work, jobbing house requirements, factory service, department store work, and for handling trays of dishes between basement and upper restaurant floors. These are made to operate both up and down, and from one or both sides. We also design special vertical conveyors for any requirements for which standard machines are not suited.

Bakery Conveyors.

We design special conveyors for handling hot bread from the ovens, tins of delicate crackers, etc., and lay out and design complete equipment for bread and cracker bakeries.

Power-Driven Conveyors.

For mail-order houses, department stores, factories, etc. We make a specialty of devising and laying out complete systems, including belt and chain conveyors, inclined elevators, etc., with noiseless transmission.

Our treatise on speed control in spiral chutes will be mailed on request, and information will be furnished on special conveyors for any kind of work. We solicit correspondence with architects, engineers and builders.

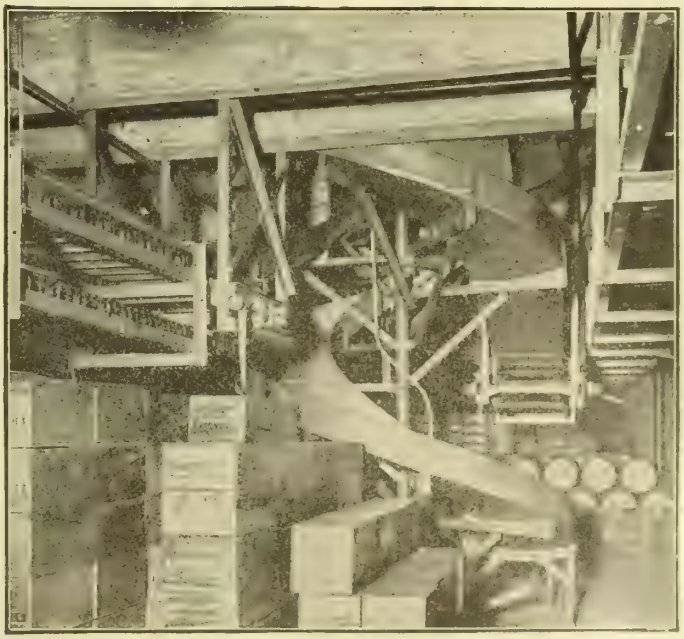


FIG. 4. TRIPLE HASLETT SPIRAL CHUTE, AUSTIN, NICHOLS & CO., BROOKLYN, N. Y.
Two troughs delivering to power-driven, ball-bearing, Pallet Conveyors, and one trough to first floor

LINK-BELT COMPANY

MANUFACTURERS OF

Elevating, Conveying and Power Transmission Machinery

PHILADELPHIA CHICAGO INDIANAPOLIS

BRANCH OFFICES AND AGENCIES

NEW YORK, N. Y., 299 Broadway
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BOSTON, MASS., 49 Federal Street
BUFFALO, N. Y., 698 Ellicott Square
ST. LOUIS, MO., Central National Bank Building
SEATTLE, WASH, 580 First Avenue, South
DETROIT, MICH., 732 Dime Bank Building
LOS ANGELES, CAL., 204 North Los Angeles Street
BIRMINGHAM, ALA., General Machinery Co.
DENVER, COLO., Lindrooth, Shubart & Co., Boston Building
SAN FRANCISCO, CAL., N. D. Phelps, Sheldon Building
NEW ORLEANS, LA., C. O. Hinz, Hibernia Bank Building

Products.

Elevating and Conveying Machinery for handling all kinds of materials, Coal and Ashes Handling Conveyors, Coal-Storage Systems for Power-Houses, etc.; Silent Chain Drives, Department Store Service Conveyors, Freight and Package Carriers, Electric Hoists, Coal Tipples and Coal Washeries, Locomotive Cranes, Grab Buckets, Power-Transmission Machinery, Coal Crushers, Wagon and Truck Loaders and Unloaders.

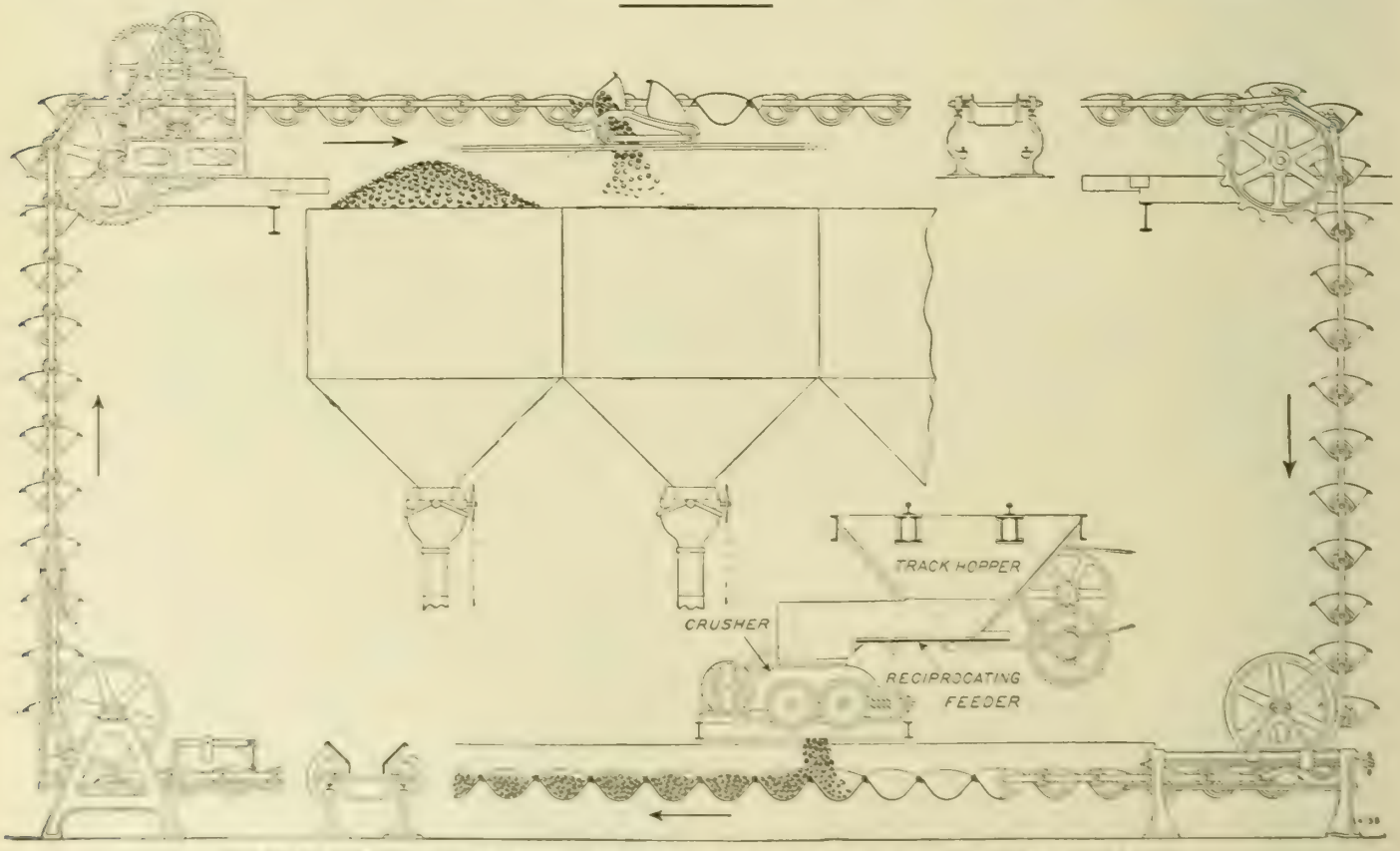


DIAGRAM SHOWING OPERATION OF THE PECK OVERLAPPING PIVOTED BUCKET CARRIER

Peck Carrier for Coal and Ashes.

The Peck Carrier is the recognized standard conveyor for coal and ashes in the modern power-house. The pivoted overlapping buckets are made of one-piece malleable castings. Capacities ranging from 15 to 200 tons an hour. Twenty miles of Peck Carrier are in successful operation to-day.

This is the only overlapping carrier in which, through its entire path, the buckets can always maintain their carrying position by gravity. It is the only one in which a fully loaded bucket can make a complete circuit without discharging.

Advantages.

The material is carried and the buckets are supported by rollers. Destructive friction and injury to the material itself is therefore eliminated, and the power required for operation reduced to the minimum.

The ability of the one machine to elevate and convey avoids transfers, which are always troublesome, take up valuable space and necessitate deep pits. The driving connections are also correspondingly simplified.

The material is readily discharged at any desired point. Operation is silent, and as they are run at slow speed there is no vibration.

Working Drawings.

Peck Carrier catalogue contains complete working drawings, giving clearance dimensions, to enable architects to make adequate provision in their plans for the coal and ashes handling machinery. We shall also be pleased to furnish copies of these drawings on request.

STANDARD STORE SERVICE, INC.

BUILDERS OF

Pneumatic Tube Systems, Cash and Package Carriers, Conveyors, Etc.

GENERAL OFFICES AND FACTORY

PLANTSVILLE, CONN.

Products.

Wire Line Cash and Package Carriers; Cable Carriers; Pneumatic Despatch Tube Systems; Belt and Gravity Roll Conveyors; Hand-Power and Push-Button Lifts.

Standard Cable Cash Carriers.

One important feature found only in Standard Cable Carriers is the unique design of our drop station. In using this drop station, boxes going from one station to another do not go through intermediate stations, but remain on the main line until they reach the station for which they are intended. This important feature means greatly increased speed in transit, obviates all danger from collision with the operator's hands, and reduces the strain on the cable; eliminates considerable noise; and, in short, is the most efficient drop station designed up to this time.

Uses.

Our systems are extensively used in offices, stores, factories, banks, libraries, post offices, etc., for the conveyance of papers, money, merchandise and heavier materials between floors, departments and buildings.

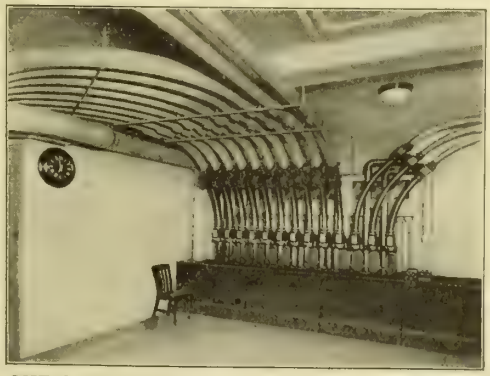
Repairs and Supplies.

We manufacture and sell repair parts and supplies for all makes of systems at reasonable prices, and every inquiry or order will receive prompt attention.

CLEVELAND PUBLIC LIBRARY
Showing installation of noiseless book conveyor

Guarantee.

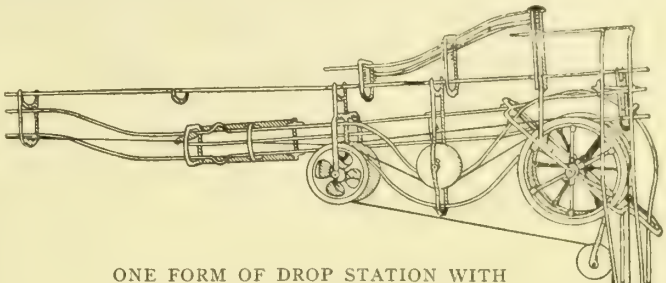
Every endeavor has been made to fully meet the most exacting conditions to which any and all parts of our systems are subjected. Therefore, the guarantee, made by a responsible and financially strong company to furnish all repair parts except cords only, for a period of five years, is positively safe to make.



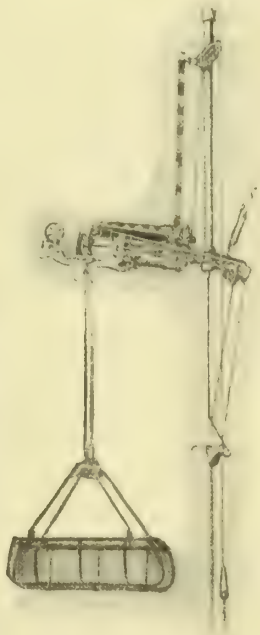
ONE OF THE CENTRAL STATIONS, DOMINION BANK, TORONTO
Darling & Pearson, Architects
Largest installation ever made of 3 x 6 Pneumatic Dispatch Tubes

Services.

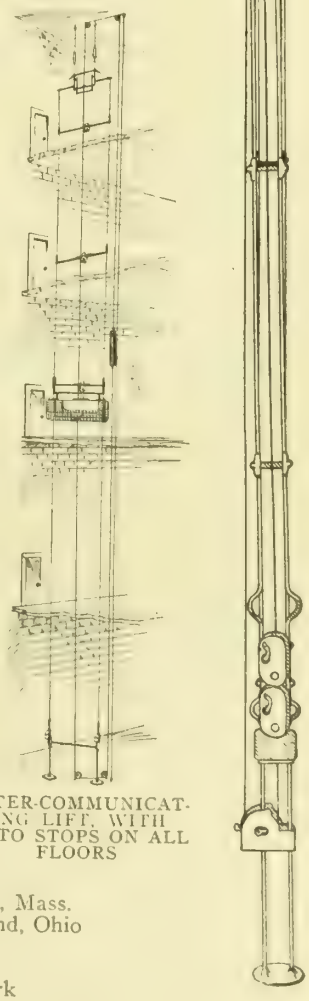
Separate booklets, covering our systems, also any other information, may be had on request.



ONE FORM OF DROP STATION WITH CROSSOVER
This station requires but 4 or 5 inches of fixture or aisle space. Various forms and sizes of cars may be used on this track



WIRE LINE BASKET CARRIER
Showing basket suspended above counter



INTER-COMMUNICATING LIFT, WITH AUTO STOPS ON ALL FLOORS

References.

Andrew Dutton Company, Boston, Mass.
Cleveland Public Library, Cleveland, Ohio
City Hall, Boston, Mass.
Dominion Bank, Toronto, Can.
Empire Trust Company, New York
Ford Motor Co., Service Building, Toronto and Montreal, Can.
Haynes & Co., Springfield, Mass.
Higbee Co. (Additions), Cleveland, Ohio
Jos. Woodwell Co., Pittsburgh, Pa.
Lockwood & Palmer, Stamford, Conn.
Palace Hardware Co., Erie, Pa.
Sisson Drug Co., Hartford, Conn.
Peoples State Bank, Detroit, Mich.
Steinman Hardware Co., Lancaster, Pa.
The Home Co., Ashland, Ohio
United States Post Office, New York, N. Y., and Norfolk, Va.
W. G. Johnston Co., Pittsburgh, Pa.

THE LAMSON COMPANY

Builders of Pneumatic, Electrical and Selective Carrier and Conveyor Apparatus

100 Boylston Street
BOSTON, MASS.

WORKS
LOWELL, MASS.
TORONTO, CANADA

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CLEVELAND, OHIO, 2063 East Fourth Street
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SEATTLE, WASH., 215 Stewart Street
PITTSBURGH, PA., 319 Third Avenue
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OMAHA, NEB., 925 City National Bank Building
KANSAS CITY, MO., 200 Ridge Building
LOS ANGELES, CAL., 627 Broadway
TORONTO, ONT., 126 Wellington Street, West

For Texas, Oklahoma, New Mexico and Western Louisiana Business, Refer to
THE LAMSON COMPANY OF TEXAS, DALLAS, TEX.

Products.

PNEUMATIC DISPATCH TUBE SYSTEMS, all Types and Sizes. FOOT-POWER TUBES, SELECTIVE PICK-UP and SWEEP-OFF CARRIERS, AUTOMATIC TRAY CONVEYORS, BELT CONVEYORS, GRAVITY ROLLER CONVEYORS, LIGHT HAND- and ELECTRIC-POWER ELEVATORS and LIFTS, ELECTRIC CABLE and WIRE LINE CASH and PARCEL CARRIERS, SECTIONAL METALLIC RECEIVING and STORAGE BINS.

Scope of Use.

Used in stores, offices, factories, libraries, banks, hotels, post offices, warehouses, freight yards, etc., for the conveyance of money, papers, merchandise, books, mail matter, and heavier materials between departments or buildings. In practically every business some type of Lamson Carrier equipment can be installed that will save time, help and money. Over three hundred different lines of business are using Lamson carrying and conveying equipment with profit and satisfaction.

Co-operative Service.

Architects, engineers and contractors are invited to avail themselves of Lamson experience and service. Specialists and engineers employed by this company are constantly solving complicated conveying and carrying problems in all lines of business, and are in a position to apply Lamson Service to its best advantage. Full information and plans, covering any problem to which Lamson Pneumatic, Electrical and Selective Carriers and Conveyors may be adapted, gladly furnished without charge.

Lamson Systems.

Lamson Systems cover the following types, and with their modifications can be made to suit any problem for conveying money, mail, merchandise, papers, blue-prints, documents, tools, stock, parts, packages and heavier merchandise, etc.:

Pneumatic Tube Systems.

Consist of tubes, terminals and carriers operated by vacuum, or pressure, supplied through special power equipment. The value of the system consists in the rapidity of intercommunication and delivery of papers, cash, etc., to a central point by special carriers, which are placed in the tubes and automatically carried to points of delivery. This System is designed in the following types:

Independent Lines—Consist of two tubes connecting two stations. Carriers may be sent in either direction. No lids to open or levers to manipulate at central desk. Carriers are taken from operator's hand by suction at bell mouth.

Combination (Shifting Current) Line—Two or more out-stations may be intermittently operated by vacuum of a single ingoing line. Speed of carriers is the same as Independent Lines. All carriers are sent to central desk regardless of others in transit.

Vacuo-Pressure Start and Stop Tubes—Built in units. Each unit a circuit reaching from two to eight out-stations. Motor remains idle until carrier is put in tube at any sending point, when it automatically starts, and stops only after carrier arrives at destination.

FIG. 1. LAMSON PATENT COMBINATION SHIFTING CURRENT VACUUM TUBE CONSTRUCTION

Lamson Patent Pick-Up and Delivery Carriers.

Traveling metal fingers or clips, which move on an endless wire, are arranged to pick up and deliver envelopes or single sheets automatically to indicated stations (Fig. 2).

Belt Conveyor.

Designed in conjunction with gravity chutes and elevators. Will handle boxes and packing cases, mail, etc. (Fig. 4, also Fig. 7). For heavy loads, Lamson Gravity Roller Conveyors are recommended.

Gravity Roller Conveyor.

Consists of a series of rollers mounted on ball bearings carried in angle iron frames. The conveyor is inclined so that boxes, barrels or other packages, placed upon it, will be carried by gravity from place to place. Gravity Conveyors use no power, are always ready to carry a package and require no care or attention (Fig. 6).

Light Elevators and Lifts.

Hand, hydraulic and electrically operated; made for simple, light delivery or varied heavy service (Fig. 9).

Parcel and Money Carriers.

For store and office service. Operated by push of

hand for short distance; by spring, gravity, and endless overhead cable. These carriers made in a variety of styles for carrying money, merchandise, papers, etc.

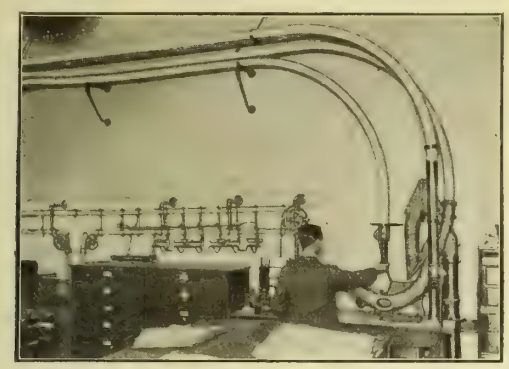


FIG. 2. LAMSON PNEUMATIC TUBES AND PICK-UP SYSTEM INSTALLED IN A BANK

Used in stores, offices, factories, businesses of all kinds, to provide quick communication between departments, save time, trouble and expense in sending correspondence, documents, pass books, checks, bills, papers, orders, blue-prints, etc., from place to place. Each system designed to fit needs of particular business using it. Style and finish made to harmonize with the most attractive surroundings

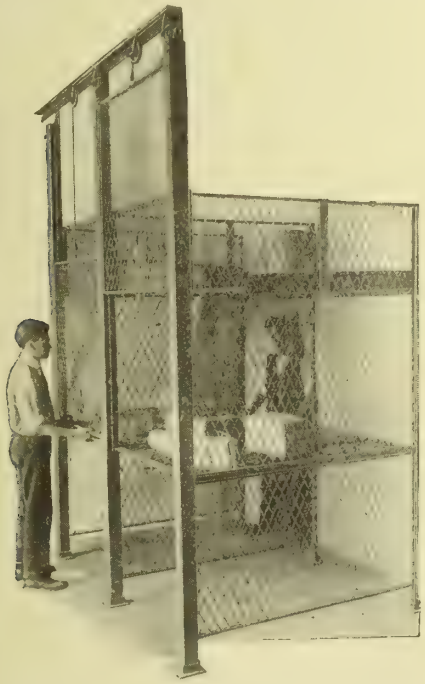


FIG. 3. LAMSON STANDARD DELIVERY BIN

Two units shown

Used to protect parcels and other merchandise while in the delivery room, waiting to be placed upon delivery wagons. Built in standard sectional units so that a merchant may add to his equipment from time to time as his needs increase

FIG. 4. LAMSON BELT CONVEYORS IN HAT FACTORY

For moving merchandise of all sorts and loads of materials in raw, unfinished and finished stages, from place to place. Systems designed to fit special conditions in each business

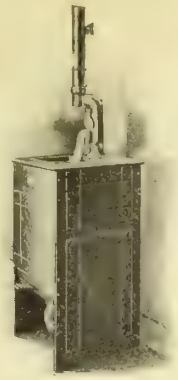


FIG. 5. LAMSON FOOT-POWER TUBES

For lines about 200 feet in length. One pressure of the foot sends carrier 75 feet on horizontal line, or raises carrier 40 to 50 feet vertically. Made in 2¼- and 3-inch tubing

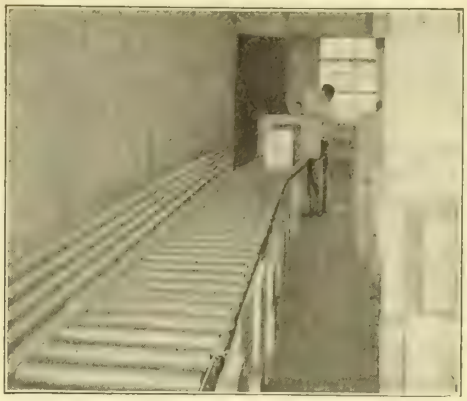


FIG. 6. LAMSON GRAVITY ROLLER CONVEYOR IN A SHOE WAREHOUSE

Used for handling boxes, barrels, or other packages, in factories, warehouses, breweries, bottling establishments, etc., quickens work of every department and does away with employees wasting time in merely carrying merchandise from place to place. Systems may be run around corners, between floors, etc.

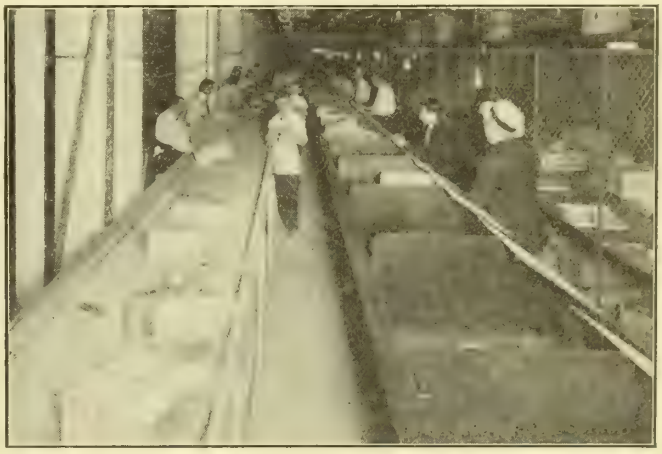


FIG. 7. LAMSON PARCEL BELT CONVEYOR IN DEPARTMENT STORES

Used to save time and money in collection and delivery of parcels. Enables parcels from various floors to be placed in delivery trucks and wagons in shortest time with least expense. Designed to meet needs of each individual store

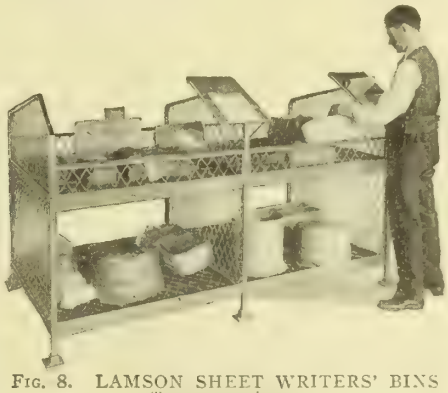


FIG. 8. LAMSON SHEET WRITERS' BINS

Two units shown

Parcels, removed from the routing conveyors in department stores, are placed in the Sheet Writers' Bins where they are entered upon the store's records. Bins are made in standard sectional units so that installations may be increased to care for additional delivery wagon equipment

FIG. 9. LAMSON [illegible] ELEVATOR

Types range from light hand-operated to hydraulic and electric. Made for light or heavy loads and to meet any type of service requirement

References.

University of Chicago, Chicago, Ill.
Victor Talking Machine Co., Camden, N. J.
Washburn-Crosby Co., Minneapolis, Minn.
American Graphophone Co., Bridgeport, Conn.
Winchester Repeating Arms Co., New Haven, Conn.
Janney, Semple, Hill & Co., Minneapolis, Minn.

LOWERATOR COMPANY, INC.

631-633 Kent Avenue
BROOKLYN, N. Y.

Products.

The Lowerator, Vertical Elevators, Spiral Chutes and Gravity Rollers; Special Conveying Machinery.

The Lowerator.

A patented machine to lower merchandise, without power—discharges automatically. Built for erection anywhere, either by local or our own skilled mechanics, if required. We supply working drawings and diagrams for this purpose.

Advantages—The Lowerator combines efficiency, reliability, and simplicity of operation. Economy, as it operates without "power," eliminating the services of an attendant. Time saving, as it is automatic and positive in action. Workmanship and materials used to the best possible advantage in its manufacture and erection. The first cost is practically the only one, enabling it to pay for itself soon after it is installed. Permits quick movement of merchandise from the upper floors to the shipping room. Can be built any height and arranged to discharge on packing tables or conveyors. Enables trucks and wagons to make more deliveries on account of the rapidity with which they can be loaded. Eliminates the use of flat trucks on the shipping floor. No time is lost in loading. The operative risks are reduced to a minimum. A modern and systematic freight handling method.

Design and Construction—The Lowerator consists of a series of cars, equally spaced, attached to endless cables, which engage sheave wheels at upper and lower terminals. An iron partition divides the cars lowering merchandise from the empty ones returning on the opposite side.

Operated by Gravity—No power required—weight of merchandise upon the cars starts the machine.

Speed—The speed is controlled by an automatic governor brake (patented) and can be regulated to any speed, always maintaining same, irrespective of varying weights placed upon the cars. A brake lever, conveniently placed on the shipping floor, controls the entire machine. This can be locked at any time.

Cars—Cars are built of finger type and arranged to discharge by passing through a chute of similar construction. They travel between guides, which assures stability.

Stopping and Locking—The equipment includes a hand brake rope connected with the stopping and locking device at each floor, so that the machine may be stopped and locked at any point, allowing the lowering of merchandise from one floor to another and facilitating the loading of heavy packages.

Discharging Chute—This is substantially built of iron and arranged to receive the goods deposited by cars. Length is made to meet requirements. Cut-out chutes installed to facilitate automatic discharge at intermediate floors.

Material—The entire construction is of steel and iron throughout.

Types—Lowerators are built in standard sizes. For capacity, dimensions and other particulars see table. We also build Lowerators to meet special requirements.

Vertical Elevators.

For elevating and lowering merchandise of any description. Automatic receiving and discharging chutes. Electric and mechanical control. Direct motor connections or belt drive.

Spiral Chutes.

We build chutes, open type, sizes to meet particular requirements.

Gravity Rollers.

Designed to handle goods packed in cases, cartons, etc. Built in required widths, portable lengths, and adjustable stands.

DETAILS OF STANDARD LOWERATORS

Information Required for Estimates. Distance from Level of Top Floor to Floor of Shipping Department

Number of Machine	AA		OO		1		2		3	
	Depth	Width	Depth	Width	Depth	Width	Depth	Width	Depth	Width
Size of shaft required if enclosed	84″	76″	76″	56″	60″	44″	54″	42″	38″	28″
Size of shaft required if not enclosed	84″	62″	76″	48″	60″	38″	54″	32″	38″	24″
Size of car	36″	48″	26″	36″	24″	28″	20″	24″	14″	16″
Maximum size of package carried	42″	54″	32″	40″	28″	32″	24″	28″	16″	18″
Maximum height of package carried	60″		54″		54″		48″		36″	
Carrying capacity per car, pounds	800		500		400		200		50	
Machine can be loaded to extent of, pounds	4,000		3,000		2,000		1,500		600	
Distance between cars	6′-8″—8′-0″		6′-8″—8′-0″		6′-0″		5′-6″—6′-0″		4′-0″—5′-0″	
Speed per minute—in feet	60 to 80		60 to 80		60 to 100		60 to 120		60 to 120	
Discharging chute, length in feet	16′-0″		16′-0″		14′-0″		12′-0″		10′-0″	
Elevators selected for the equipment	Warehouses, Dock Cos., Dry Goods and Paper Jobbers		Lott Buildings, Hardware Jobbers and Dept. Stores		Grocery, Drug, Confectionery, Hardware and Shoe Jobbers		Drug and Shoe Jobbers, Candy and Cracker Factories		Handles small packages of every description	

REFERENCES

Lowerators

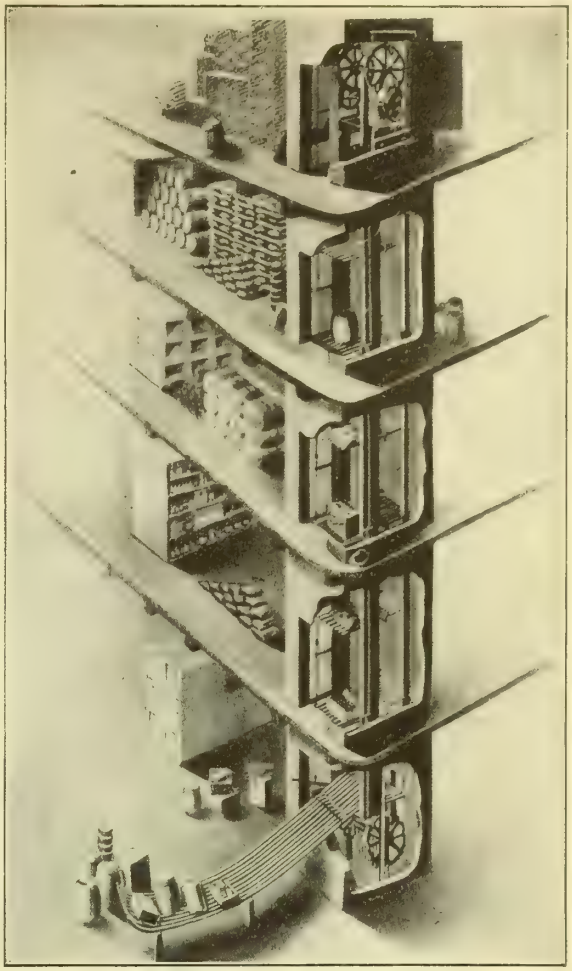
F. H. Leggett & Co., New York
J. F. Linde Paper Co., New York
Loeser Bros., New York
Chas. Schwender Bro., New York
The F. Widlar Co., Cleveland, Ohio
Himes & Egan Co., Cleveland, Ohio
Lockett, Johnson Co., New York
Eastern Drug Co., Boston, Mass.
Shapleigh Hdw. Co., St. Louis, Mo.
W. H. Maule, Inc., Philadelphia, Pa.
Letts-Parker Grocer Co., St. Joseph, Mo.
Park & Tilford, New York
Foley Bros. & Quinlan, St. Paul, Minn.
Nathan Dohrmann Co., San Francisco, Cal.
Fischer Bros., Seattle, Wash.
Wm. H. Walker & Co., Buffalo, N. Y.
Philadelphia Wholesale Drug Co., Philadelphia, Pa.
T. G. Bush Grocery Co., Mobile, Ala.
Boeckh & Co., Toledo, Ohio
Bering-Cortes Hdw. Co., Houston, Tex.

Vertical Elevators

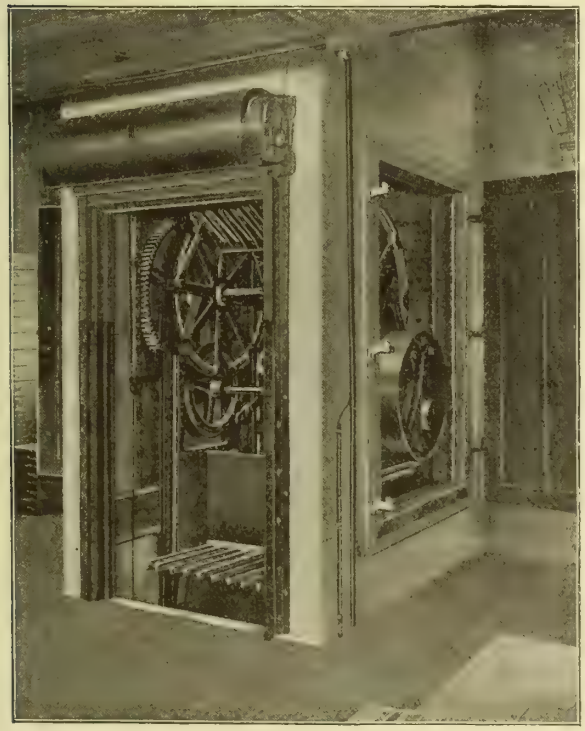
Victor Talking Machine Co., Camden, N. J.
Pennsylvania Warehouse & Safe Deposit Co., Philadelphia, Pa.
Howard Lamp Co., Newark, N. J.
Chas. Broadway Rouss, New York
Morley Bros., Saginaw, Mich.
Baltimore Bargain House, Baltimore, Md.
Borden Milk Co., New York
Hulman & Co., Terre Haute, Ind.
Lovell-McConnell Mfg. Co., Newark, N.J.

Continued on next page

LOWERATOR INSTALLED IN WHOLESALE GROCERY WAREHOUSE
View of shipping floor



LOWERATOR WITH ENCLOSURE, AS INSTALLED IN MERCANTILE HOUSES
Installations also made without enclosure



MANNER OF ENCLOSING UPPER TERMINALS IN FIREPROOF SHAFTS

Door openings shown on sides of enclosures give access to working parts and accommodate gears and governor. No roof openings necessary where ceiling is 8 feet high

VERTICAL ELEVATOR

For elevating and lowering merchandise of every description. Automatic receiving and unloading chutes at intermediate floors. Complete electric and mechanical control

WESTBROOK ELEVATOR COMPANY

Manufacturers of Passenger and Freight Elevators

DANVILLE, VA.

Products.

ELECTRIC, HYDRAULIC, BELT-DRIVEN and HAND-POWER ELEVATORS; HAND or ELECTRIC DUMB-WAITERS; HAND, ELECTRIC, or HYDRAULIC SIDEWALK LIFTS; AUTOMATIC HATCHWAY DOORS, and SAFETY ELEVATOR GATES.

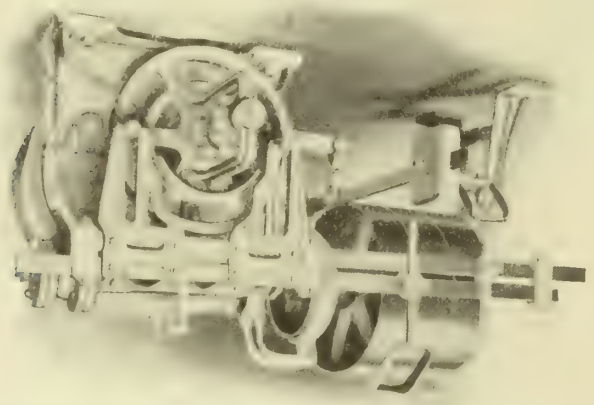
Materials and Workmanship.

Only the best materials and workmanship enter into the construction of "Westbrook" products.

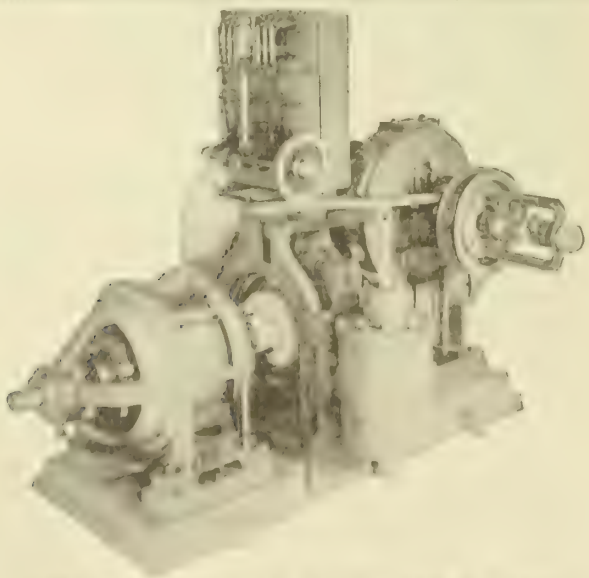
Types and Service.

Electric Drum-Type Elevators and Dumb-Waiters—For first-class service, passenger or freight. Hand rope, semi-magnet lever, or full magnet car switch control. Full magnet control alternating current passenger elevators operate at a speed of three hundred feet per minute. Smooth in operation—starting and stopping with quiet magnet brake and controller.

Automatic Push-Button Elevators—Especially desirable for residences, hospitals, and apartment houses. Do not require an attendant. Push-buttons located in elevator car and at floor landings provide for automatic starting and stopping of elevator. Customers have experienced no trouble with the automatic machines, as electricians from the factory at Danville, Va., are sent to install these elevators. References from satisfied customers will be furnished upon request.



DOUBLE BELT ELEVATOR WINDING MACHINE, CEILING TYPE



INTERNAL GEARED DIRECT CONNECTED ELECTRIC ELEVATOR ENGINE
Type for Alternating Current or Direct Current

Belt-Driven Elevators—Three types, direct belt- or chain-driven by reversible motor, and double belts run from line or countershafts. Hand cable control, especially adapted for mercantile and factory service, of slow speed.

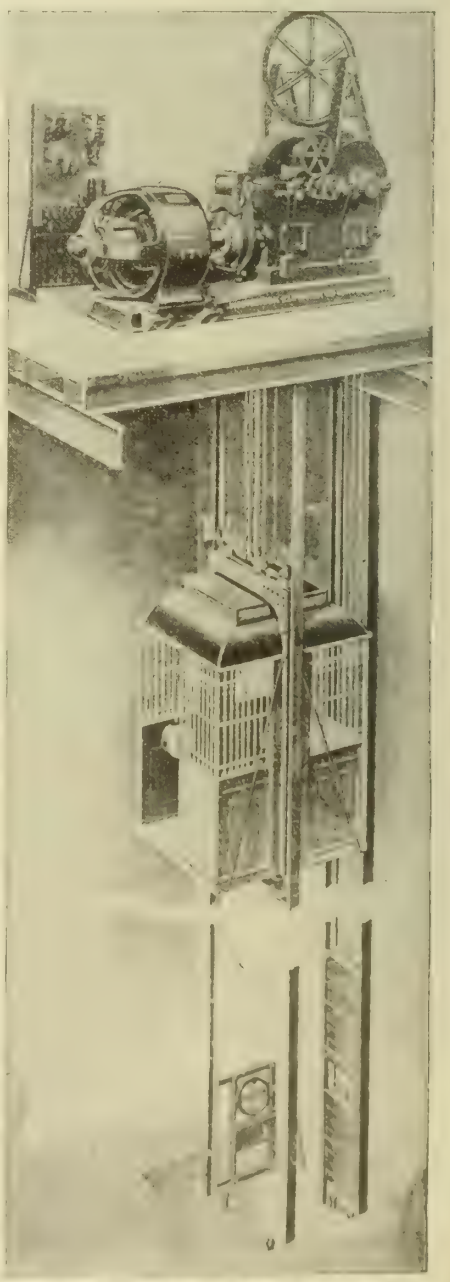
Automobile Elevators—Three types, direct-connected, direct belt and double belt. Capacities 4,000 to 10,000 pounds.

Hand-Power Elevators—Built with winding drum, have roller bearings, making easy operation. Equipped with automatic safety devices to comply with all insurance regulations.

Dumb-Waiters—Electric and hand-power. Neat and attractive in design. Arranged for either floor or ceiling installation.

Automatic Hatchway Doors—Quiet operating. For use on freight elevators running at a speed of fifty to eighty feet per minute.

Safety Gates—Automatic and semi-automatic, in conformity with insurance regulations. Will operate promptly and readily.



ELECTRIC DRUM TYPE ELEVATOR
Type "A" High Speed Direct-connected Engine

THOMAS W. JENKINS

Manufacturer of Elevator Safety Appliances

1215 Summer Street
PHILADELPHIA, PA.

Product.

The JENKINS MECHANICAL INTERLOCK for Elevator Doors.

Advantages.

This interlock is a strictly mechanical device, positive in its action and durable in its construction.

Its cost of maintenance is reduced to a minimum.

It costs nothing to operate.

It minimizes the possibility of elevator accidents, seventy-five per cent of which happen in the doorways, most of them due to lack of an efficient interlocking device.

When Jenkins interlock is installed, elevator doors can be opened only when the car is at the landing; and the car cannot be started until the door is closed.

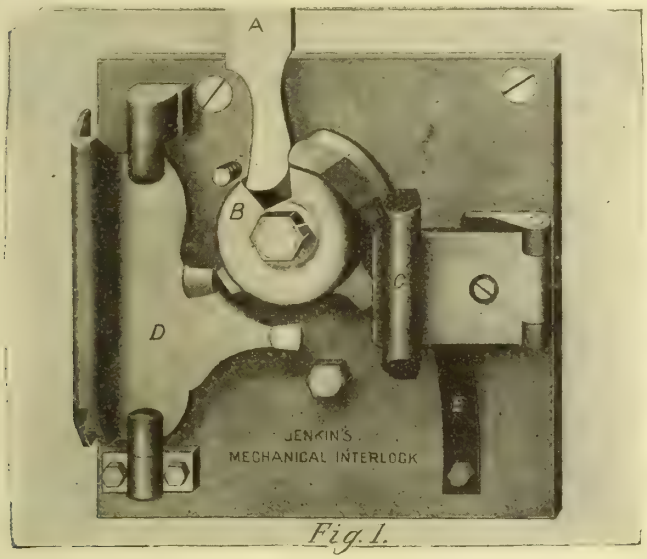


Fig. 1.

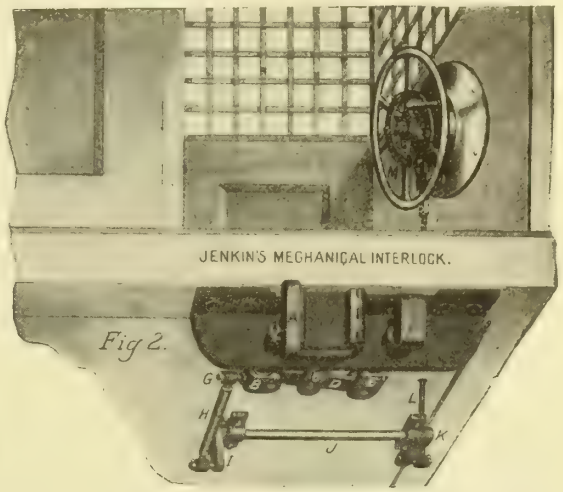


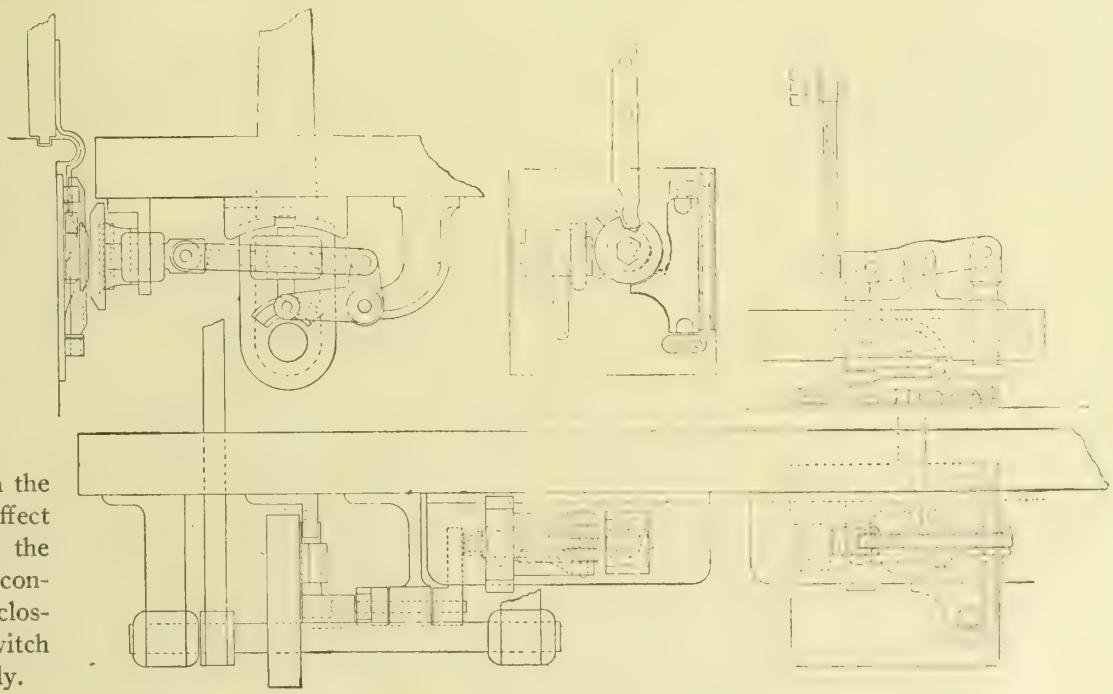
Fig 2.

VIEWS SHOWING OPERATION OF THE JENKINS MECHANICAL INTERLOCK FOR WHEEL-CONTROL ELEVATORS

When the door is opened it moves the finger A (Fig. 1), which extends downward from the door, and the finger A revolves the plunger B. The bracket C (Fig. 2) is a fulcrum for the lever D, and gives it a reverse motion that carries the plunger E and the pad F in the direction of the range-stop D (Fig. 1), and moves the point of D out to allow the tumbler B (Fig. 1) to pass under it as the door is opened. G (Fig. 2) carries the end of the rod H, which is connected with the crank I, secured to the end of the shaft J. The other end of J carries the crank K, which gives a lifting motion to the rod L, engaged in the slotted disk M, and thereby locks the control till the door is closed

Electric Control.

An electric switch may be installed in connection with this device so as to come into contact with the end of the plunger B, which, when pushed back, by opening the door, opens the switch and cuts off the current at any point at which the current would affect the operation of the car. When the contact is released by closing the door, the switch closes automatically.



DETAILS OF JENKINS MECHANICAL INTERLOCK FOR PLUNGER-TYPE AND LEVER-CONTROL ELEVATORS

SHUR-LOC ELEVATOR SAFETY CO., INC.

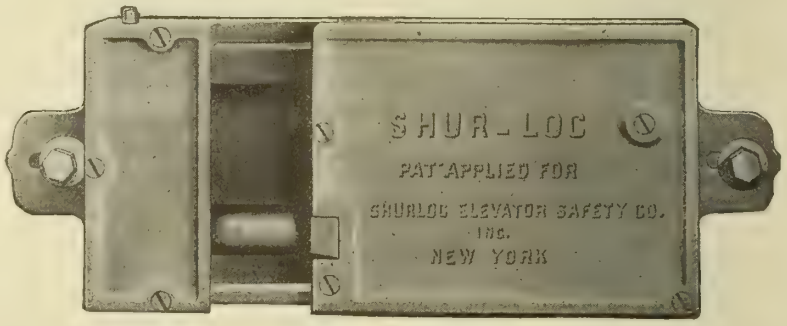
Inter-Locking Safety Systems For Elevators

Suite 706, 65 Park Row

NEW YORK, N. Y.

Products.

COMBINATION DOOR LOCKS and CAR INTER-LOCKS for use on Electric, Hydraulic or Steam Elevators, having either car switch, lever, wheel or cable control, and horizontal sliding, vertical sliding, hinged or combination shaftway doors.



TYPE "B" SHUR-LOC

Shur-Loc Purposes and Features.

The purpose of these systems is to provide unqualified and more positive safety than is otherwise possible at elevator shaftway landing doors or gates, where eighty-five per cent of all elevator tragedies occur.

All Shur-Loc systems keep the elevator shaftway landing door locked so that it cannot be opened from the inside or from the outside until the car is safely positioned at the landing of the door to be opened, and the car controlling mechanism mechanically locked so that the car cannot be moved in either direction until the shaftway door is again locked.

Shur-Loc systems are fool-proof and trick-proof, because the locking of the car controller precedes the opening of the door, and the locking of the door precedes the release of the controller.

They prevent the elevator operator from taking any chances by doing what he should not do, or leaving undone what he should do.

They prevent obstinate or reckless passengers from entering or leaving the car while it is moving, or opening the shaftway door from the landing, and falling through the shaft or being crushed by the car.

Industrial and Tenement Commissions accept Shur-Loc in lieu of self-closing doors.

A fire panic release is provided for the controller against remote, extraordinary contingencies.

Flame and smoke cannot spread through the shaft in case of fire, because door must be not only closed but *locked* before the car leaves the landing.

Operation.

The operator stops car in front of door to be opened, and steps on a pedal in the car floor, which locks the car controller, unlocks the door, and lights a threshold lamp.

Opening the door secures the inter-locking of the car controlling mechanism, and keeps it locked so that the car cannot be started in either direction until the shaftway door is *again* locked.

Cost.

Estimate $125.00 for elevator car and two openings installed complete, which is New York City basis; add thereto $15.00 for every additional shaftway door on this elevator. Outside of New York City, add railroad fare and living expenses for two mechanics, approximating six days for the installation of each elevator.

Types.

Type "B" Shur-Loc, shown above, is for horizontal sliding (right and left) shaftway doors.

Type "B2" Shur-Loc is for vertical sliding (up and down) shaftway doors.

Type "B3" Shur-Loc is for single or double "hinged-doors" which swing.

The interior moving parts of all of these locks embody the same principle, variations being made to meet the different operations of each type of doors or gates. Casings of the locks are of cast iron, interior parts of steel.

Each door is a unit of safety independent of every other door.

Suggestion for Specification.

"Furnish and install some device that will prevent the doors of the shaftway being opened either from the inside or the outside until the car is safely positioned at the door to be opened, and that will lock the controlling mechanism of the car mechanically and keep it locked while the shaftway door is open, so that the car cannot be moved in either direction until the shaftway door is closed within four inches and locked."

Any device that will accomplish the above will secure one hundred per cent safety at shaftway doors.

Prize Awards.

Awarded the Grand Prize of the International Exposition of Safety and Sanitation, December, 1914.

Awarded the Solid Gold Scientific American Medal, February 15, 1915, by the American Museum of Safety, for the best safety device exhibited in 1914.

CHARACTERISTIC INSTALLATIONS

Municipal Building, New York, N. Y.
Public Library, New York, N. Y.
Union Theological Seminary, New York, N. Y.
Pulitzer (New York World) Building, New York, N. Y.
Brooks Brothers, New York, N. Y.
Brokaw Brothers, New York, N. Y.
Y. M. C. A., Hanson Place, Brooklyn, N. Y.
Masonic Temple, Brooklyn, N. Y.
Union Gas Company Buildings, Brooklyn, N. Y.
Brooklyn Trust Company, Brooklyn, N. Y.
Colgate & Co., Jersey City, N. J. (new factory)
Others on request

BICALKY FAN CO.

Air Engineers and Manufacturers

BUFFALO, N. Y.

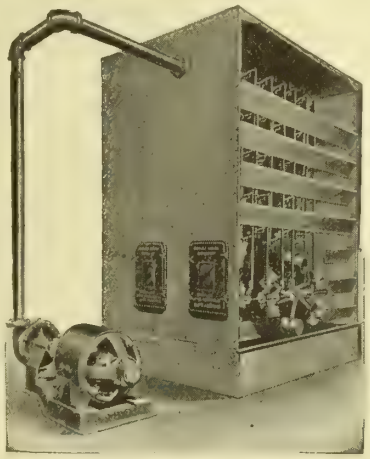
Products and Services.

Manufacturers and Installers of BICALKY FANS, DUST ARRESTERS, DUST SEPARATORS, AIR WASHERS and HUMIDIFIERS, ROOF FAN VENTILATORS, MUSHROOM VENT CAPS, etc.

Bicalky Air Washer.

This machine cleanses, cools and humidifies air by passing it through mist-filled chambers. The mist is produced by a series of spray heads placed in a vertical plane across this chamber.

The spray heads are made with necks of two different lengths, and so spaced as to produce two perfect sheets of mist vertically across the air washer. The construction and mechanical manipulation of the Bicalky air washer assure the mist from the spray heads remaining intact while flushing. As spray heads cannot clog, continuous operation is positive.



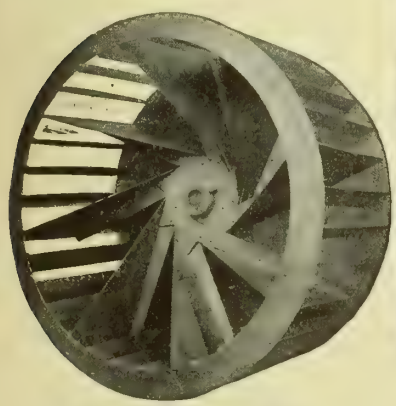
BICALKY AIR WASHER

Automatic Flushing—Across the air washer, above the sump, is placed a rigid shaft which runs freely and is rotated by means of buckets filled with falling spray water from the spray heads. On this shaft cams are arranged under each vertical row of spray heads so as to operate a series of T-iron rods connected with the different rows of heads. These rods fall and produce a hammer blow on the nozzles, which dislodges all foreign matter, thereby insuring a perfect mist spray.

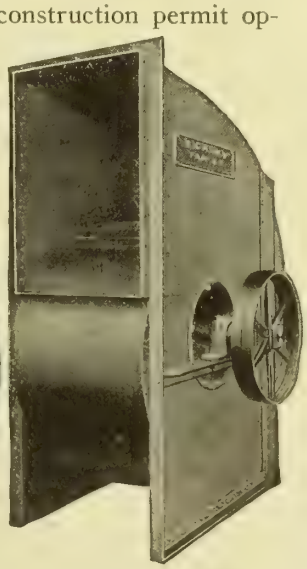
Pump Strainer—The Bicalky Air Washer is equipped with an automatic, self-cleaning, rotary type pump strainer, which requires absolutely no attention.

Bi-Multi Fans.

The Bi-Multi design and construction permit operation at the highest pressure without racking. The fans are used throughout this country and abroad.



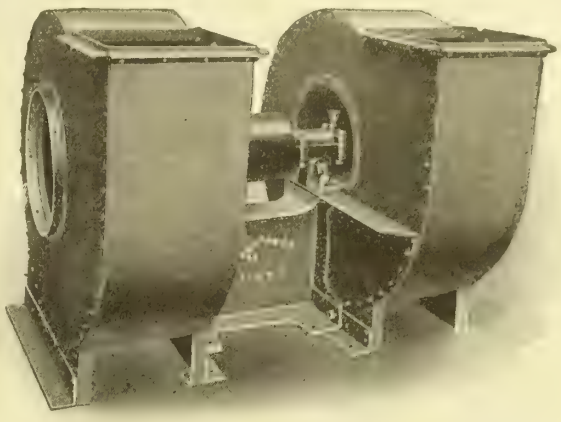
BI-MULTI FAN WHEEL



BI-MULTI FAN

Bicalky Double Slow Speed Planing Mill Exhauster.

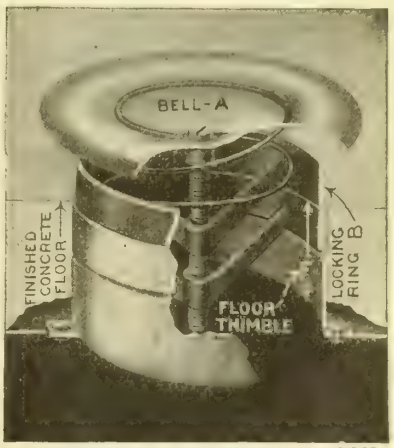
Illustration shows up-blast discharge. On account of their scientific construction, efficiency and saving in horse-power, Bicalky slow speed fans are continually replacing other makes of fans. Write for further information.



BICALKY DOUBLE SLOW SPEED PLANING MILL EXHAUSTER

Mushroom Vent Cap.

The Bicalky Mushroom Vent Cap and Floor Thimble illustrated is far superior to any other cap on the market in simplicity, appearance and efficiency, as well as in lowness of price. The Bicalky cap acts as a combination damper and diffuser, and the screw as a support, adjusting rod and lock for the cap. The cap is raised or lowered by simply turning the screw. This increases or decreases the opening through which the air escapes, thereby insuring an equal distribution of air at the periphery of the cap. Write for further information.



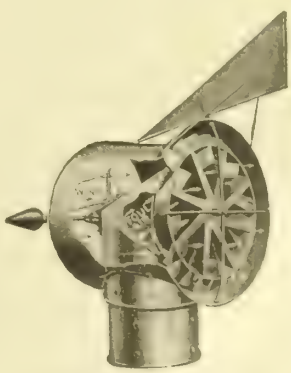
MUSHROOM VENT CAP IN CONNECTION WITH CONCRETE FLOOR

Also made to use with wood floors

Bicalky Roof Fan Ventilator.

Works on an entirely new principle. Affords positive ventilation without power bills, the air passing over the building furnishing the power to ventilate it.

The large area is exposed to outdoor currents of air which the double cone-shaped opening compresses and brings into contact with the outer turbine fan wheel that causes the inner fan wheel to suck out the foul air.



BICALKY ROOF FAN VENTILATOR

AMERICAN BLOWER COMPANY

DETROIT, MICH.

WORKS: DETROIT, MICH.; TROY, N. Y.; WINDSOR, ONT., Canadian Sirocco Co.

BRANCH OFFICES

NEW YORK, 141 Broadway
ROCHESTER, Insurance Building
PHILADELPHIA, Hale Building
PITTSBURGH, Empire Building
BOSTON, 120 Milk Street
CHICAGO, Marquette Building
ST. LOUIS, Title Guaranty Building
COLUMBUS, Huntington Building
INDIANAPOLIS, 645 Lemcke Annex
KANSAS CITY, R. A. Long Building
ATLANTA, Empire Building
MINNEAPOLIS, Plymouth Building
SAN FRANCISCO, 667 Mission Street
LOS ANGELES, 921 Hollingsworth Building
SEATTLE, 538 Central Building
MONTREAL, QUE., 301 McGill Building

Products.

Manufacturers of Heating, Ventilating, Purifying, Cooling, Humidifying, Drying and Blast Equipment; "Sirocco" Fans and Blowers; "ABC" Cone Fans; Fans and Blowers for all purposes; "ABC" Unit Heaters; Disc Ventilators; Exhaust Fans and Blowers; Pressure Blowers.

Scope of Use.

The American Blower Company's lines of fans and blowers include a type of machine to meet every air handling problem, from a small office fan to a complete ventilating or heating system for the largest factories and public buildings. The superiority of these fans is proven by their adoption in the world's largest plants.

"ABC" fans are adapted to heating, ventilating, exhausting, purifying, cooling, humidifying, dehumidifying and drying equipment in office, public, educational and industrial buildings.

Air Purification.

All improvements made in air washers (for the purification of air) during the past eighteen or twenty years are embodied in the "Sirocco" Purifier, Cooler and Humidifier. See illustrations opposite.

Bacteria Tests—Tests and chemical examinations of impurities removed by air washers distinctly prove that millions of dust particles and bacteria germs are removed by these machines, as well as ammonia compounds, chlorides, sulphates, sulphuric acid and iron.

The "Sirocco" Purifier.

The "Sirocco" Purifier, to properly cleanse air, removing practically all of the foreign material and gases, incorporates every one of the following qualifications:

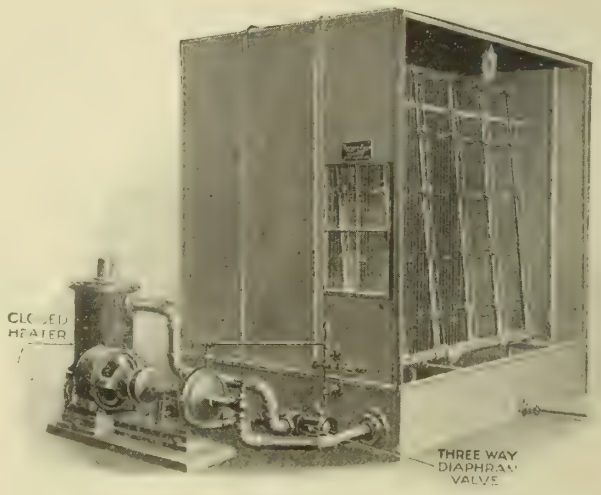
(1) Mist spray from adjustable nozzles.

(2) Large spray chamber, so that the air will be in contact with a bank of mist for a comparatively long period.

(3) Wet, or scrubbing surfaces, arranged for least resistance; therefore, low operating cost.

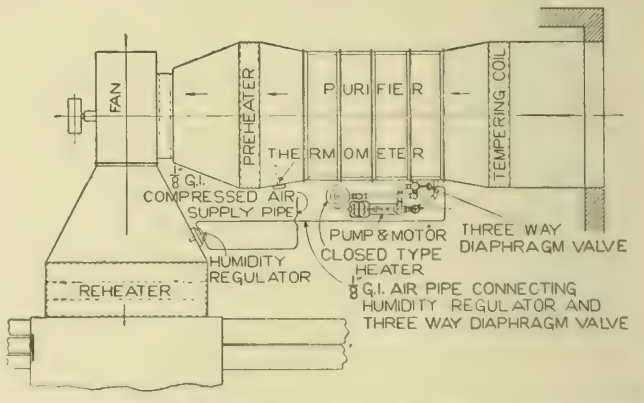
(4) Sufficient eliminator surface for removal of entrainment.

The wet or scrubbing surfaces are necessary for removal of some foreign matter, because such surfaces, against which cinder, soot and grease covered particles of dirt must impinge, require to be *flooded*, so that the



"SIROCCO" PURIFIER, WITH CLOSED HEATER HUMIDITY CONTROL

Built in sizes with capacities of 3500 to 300,000 cubic feet of air per minute



ARRANGEMENT OF HUMIDITY CONTROL WHERE PREHEATER IS AUTOMATICALLY CONTROLLED

Closed heater shown; ejector heater can also be used

lighter particles may at once become saturated with water and be washed into the tank.

Types—"Sirocco" Purifiers are built in three types, as follows: Type A, used in connection with heating and ventilating systems in public buildings; type B, "Sirocco" Purifier and Humidifier, for maximum cooling by evaporation, in manufacturing plants, etc.; and type C, "Sirocco" Purifier and Dehumidifier, used with refrigerating systems. The "Sirocco" Humidity Controlling System can be applied to all types of "Sirocco" Purifiers.

Construction—All these purifiers are strongly constructed, down to the minutest details—rivets, joints,

Spray Cooler

Continued on next page

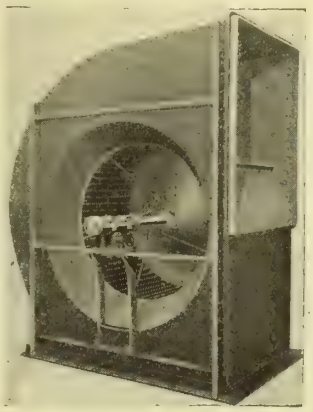
etc. No foreign material, as rubber or canvas packing, is used, all metal to metal joints and solder-sweated space between surfaces being filled with solder. All rivet heads, etc., are covered with non-corrosive material; casings and tank are permanently flanged and absolutely tight; bottom of tank is double riveted; and all parts readily fit together, without the services of an expert workman.

"Sirocco" Humidity Controlling System.

This system automatically controls the relative humidity (i. e., ratio per cent of moisture in air to amount of moisture contained in air when saturated at same temperature) in a room or building. Controlling device used is a "Sirocco" humidity regulator which controls action of a diaphragm valve or a diaphragm air motor. This control is accomplished by regulating the supply of compressed air to the valve or air motor. In public buildings and manufacturing plants, where temperature regulation is installed, results are obtained by varying the temperature of the spray water. See illustration of arrangement of humidity control on preceding page. Further particulars sent upon application.

"Sirocco" Fans.

"Sirocco" fans in all sizes are regularly constructed with full housings; larger fans are built, however, with seven eighths housings. Housings being small for any given capacity, it is usually possible to use full housed fans; but when head room is limited, seven eighths housed fans are used.



SINGLE INLET AMERICAN "SIROCCO" FAN
Full housed. Left hand. Top horizontal discharge, inlet side

Full housed fans, up to and including No. 6, are adjustable as to discharge, it being possible with the same fan to change the discharge to any direction desired and to shift the pulley from one side of the fan to the other. This cannot be done with the seven eighths housed fans, each fan being constructed to meet the requirements of individual installation. If desirable to have ducts leading from the fan in opposite directions, double discharge fans can be furnished.

Single inlet fans are constructed with either overhung wheel or pulley, as conditions require. Double inlet fans cannot be built with overhung wheels.

Drive—"Sirocco" fans may be engine, motor or turbine driven, both direct-connected or by belt.

Cone Fans.

Applications—Cone fans are designed for installations where conditions will not permit of the use of fans with housings. For such special conditions and purposes the cone fan is the most practical means of moving the volume of air required, particularly in connection with warm-air furnace heating plants.

Cone fans are ordinarily used as plenum fans, discharging into chambers from which ducts radiate, but they are also often used for exhausting air from buildings. Will overcome resistance in places where disc fans would not be applicable.

Disc Ventilating Fans.

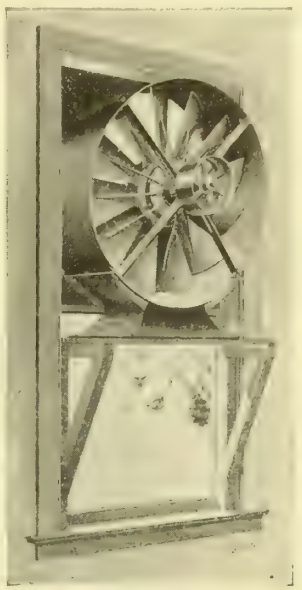
Adapted to ventilation of all types of buildings, for the removal of smoke, noxious fumes and gases, steam and dust; to heating and drying in connection with heating apparatus, either furnaces or steam coils. Also more economical and effective than the aspirating coils frequently employed to assist the draft in ventilating shafts or eduction flues in large public buildings.

Ventura Disc Ventilating Fans.

Ventura Disc Ventilating fans handle large volumes of air freely, or against resistances up to one-inch water gauge.

They have ten broad blades riveted to a large central disc, which absolutely prevents a back-flow of air through the center, when working against pressure.

They are suitable for ventilating rooms and buildings; for ventilating small mines, or at any mine where a disc fan (engine or motor driven) can be used, with capacities of 650 to 100,000 cubic feet per minute, resistance not exceeding one-inch water gauge.



BASE FAN SET IN TOP OF WINDOW
Showing standard base and pulley

"VENTURA" FAN
Wall type

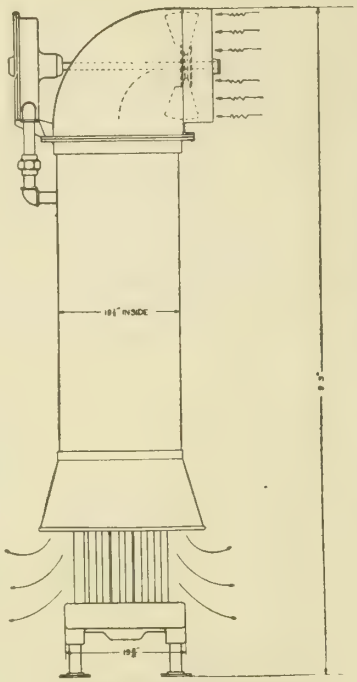
"ABC" Unit Heaters.

This compact, portable apparatus provides an ideal method for heating factories of all kinds, particularly small or medium size buildings. One or more units can be placed in a room where heat is most desirable. As extensions to the plant are made, additional units can be installed.

The fan is supplied for pulley drive, or direct-connected to a small, high efficiency turbine or to an electric motor. When turbine-driven, the exhaust steam is used to heat the coils over which the air passes.

Continued on next page

Construction — Cast-iron base supported by four legs. Base is divided by a partition in center making two separate chambers, one for live steam side, the other for the return. Into top of base is screwed a nest of steam pipes, built up in return loops, thus insuring perfect circulation of steam.



"ABC" UNIT HEATER
Turbine-Driven

Advantages of "ABC" Unit Heaters —(1) No lines of hot-air ducts to interfere with shafting, light, etc. (2) Air temperature regulated at each unit. (3) Minimum power consumption. (When turbine-driven, exhaust steam is condensed in heater.) Negligible maintenance expense. (4) Condensation taken care of at each unit. (5) Small floor space required. (6) Units easily portable. (7) Units tested to withstand steam pressure up to 150 pounds. (8) Steam is not wasted by this heater by overheating some portion of building in an effort to maintain desirable temperature in some other part.

Indirect Radiation—A pipe can be attached to a unit for the purpose of extending such pipe through wall or roof to bring in fresh air, and to heat and circulate the same.

CAPACITY TABLE, "ABC" UNIT HEATER

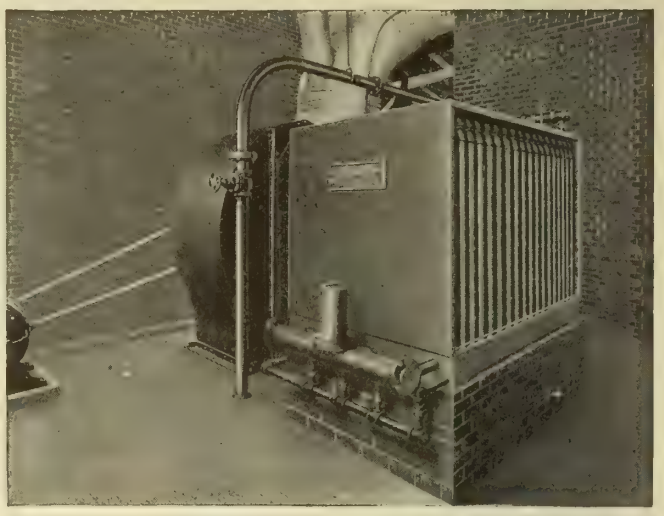
Steam Press. Per Sq. In.	R. P. M. of Fan	Volume of Air C.F.M.	Steam Condensed Lbs. Per Hour	Initial Air Temperature: 20° Below Zero	10° Below Zero	Zero	10°	20°	40°	60°	B. T. U. Per Hour
				Temperature of Air Discharged							
40	1045	1790	194	74°	84°	94°	104°	114°	134°	154°	180,000
50	1090	1860	217	80°	90°	100°	110°	120°	140°	160°	198,500
60	1125	1925	237	85°	95°	105°	115°	125°	145°	165°	215,000
70	1155	1875	250	87°	97°	107°	117°	127°	147°	167°	225,000
80	1180	2015	259	88°	98°	108°	118°	128°	148°	168°	233,000
90	1160	2045	265	88°	98°	108°	118°	128°	148°	168°	237,000
100	1215	2070	268	87°	97°	107°	117°	127°	147°	167°	236,000

"ABC" Pipe-Coil Heaters.

"ABC" pipe-coil heaters are admirably adapted for heating and ventilating factories and all occupied buildings requiring a large volume of air freshly warmed by steam or hot water. "ABC" heaters are also well adapted for drying and cooling purposes.

"ABC" heaters are built in sizes to meet every requirement—two and four rows deep; up to forty pipes wide, and pipe lengths from two to twelve feet.

Construction—The heater has a sectional base. Sections consists of heavy cast-iron base, with two or four rows of holes tapped into the top, into which holes



"ABC" PIPE-COIL HEATERS ON FACTORY HEATING SYSTEM

are screwed one-inch steam pipes. Upper ends of each alternate row are jointed together by elbows with short horizontal nipples between.

Cast-iron bases made of varying lengths, and pipes of varying heights. Base is divided into two compartments by a partition running its whole length from end to end. No communication between the two compartments except through the vertical heating pipes; hence no short circuiting of the steam.

Heater contains from one to ten sections, depending on temperature desired as well as steam pressure and velocity of the air.

Casing (see illustration) around the standard apparatus is a sheet steel jacket enclosing both sides and top. Heater, however, is frequently enclosed by brick or hollow tile walls.

A fan can be attached to force the air through the coils or draw it through, according to local conditions.

"ABC" Mushroom Ventilators.

Use—Adapted for use with heating, cooling and

"ABC" MUSHROOM VENTILATOR

Continued on next page

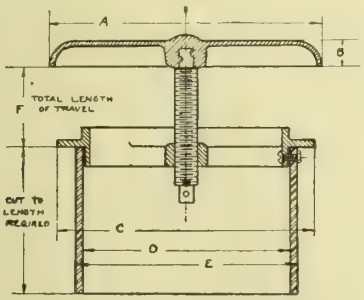
ventilating systems for theaters, churches, schools, auditoriums and public buildings.

Types—The Automatic Locking Type and Prong Type. Both types regulate quantity of air at delivery points, compelling it to flow evenly in all directions, thus preventing drafts.

Construction—Three principal parts—cap or head, floor socket, and thimble. Cap made of cast iron; thimble of black iron pipe or galvanized sheet iron.

Locking Feature—In center of cap is a steel bar with a pin at bottom. Bar fits inside a piece of pipe threaded on outside; pipe screws into hub of floor socket. Adjustment of head for height is made by simply lifting and turning head, but head is so lifted that pin in bar engages with slotted adjusting pipe. As soon as head is dropped it becomes automatically locked, thus delivering a *uniform* desired volume of air.

Prong Type—Adjustment is made by raising or lowering head to proper position and setting same in place by tightening the socket set screw.

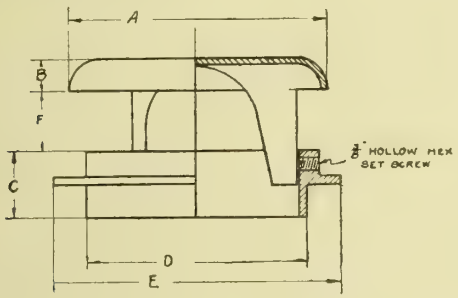


SECTION THROUGH "ABC" MUSHROOM VENTILATOR
Automatic Locking Type

Dimensions in Inches.

Size	A	B	C	D	E	F	Weight, *Lbs.
5	7½	1	7	5 3/64	5 9/16	2 3/4	8
6	9½	1	8	6 1/16	6 5/8	2 3/4	10
7	9½	1	9	7 3/32	7 5/8	2 3/4	13
8	10½	1	10	7 43/64	8 5/8	2 3/4	15

*Weight does not include thimble.



SECTION THROUGH "ABC" MUSHROOM VENTILATOR
Prong Type

Dimensions in Inches

Size	A	B	C	D	E	F	Weight, Lbs.
5	6	7/8	1 13/16	4 7/8	6 1/2	1 7/16	6
6	7	7/8	1 13/16	5 7/8	7 1/2	1 7/16	10
7	8	7/8	1 13/16	6 7/8	8 1/2	1 13/16	11
8	9	7/8	1 13/16	7 7/8	9 1/2	2 1/4	12

Tilting Automatic Steam Traps.

There is a Detroit Steam Trap for every condensation handling requirement.

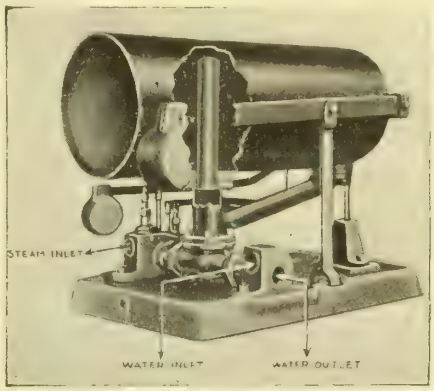
Return type, for returning condensation from any source directly to the boiler or feed-water heater without pumping.

Separating type, for removing condensation from low pressure lines.

Vacuum type, for draining vacuum heating systems, vacuum pans, or any system upon which a vacuum is carried.

Condensing type, for creating a vacuum within the trap to accelerate circulation in the system.

Any condensation problem can be successfully handled by one or another of the various types of Detroit Traps.



DETROIT RETURN TRAP
No working parts inside the tank

Size Trap, Inches	Water Inlet and Outlet, Inches	Size Steam Inlet, Inches	Capacity: Pounds Per Hour	Capacity: Square Feet Direct Radiation	Capacity: Lineal Feet 1-Inch Pipe Direct Radiation	Approx. Shipping Weight, Lbs.
10	3/4	1/2	830	2800	8400	275
11	1	3/4	1500	5000	15000	325
12	1 1/4	1	2500	8300	25000	425
13	1 1/2	1 1/4	5000	16500	50000	500
14	2	1 1/2	6600	22000	66000	700
15	2 1/2	2	15000	50000	150000	900
16	3	2	24000	80000	240000	1000

Special Drying Systems.

"ABC" Dryers can be designed to meet requirements for almost every material. "ABC" engineers have designed successful systems for drying such materials as glue, enamel on metal surfaces, cereals, leather, salt, soap, pottery, varnish, cloth, asbestos, ginger, starch, tobacco, paper, cocoa, sugar, powders, etc.

Shipments.

Having an enormous and completely equipped factory, this Company can make prompt shipments.

Co-operative Engineering Service.

Parties considering the installation of a ventilating or heating system are at liberty to make use of the Engineering Department of this organization in solving their problems. In writing, state size of room (width, length, height), for what room is used and number of people employed in it, etc.

GARDEN CITY FAN CO.

Fans and Blowers; Heating and Ventilating Apparatus

ESTABLISHED 1879 CHICAGO, ILL. WORKS AND FOUNDRY NILES, MICH.

Products.

VENTILATING FANS; Steel Plate and Disc Types; EXHAUSTERS (air only) and material; PRESSURE BLOWERS, Centrifugal and High-Pressure; HEATING APPARATUS, 1-inch Pipe Coil Heaters.

Everything in the FAN and BLOWER line, for any and all purposes, including Installations.

Cycloidal Multivane Fan.

The Cycloidal Multivane Fan for heating and ventilating is the last word in fan construction. Here are a few recent installations:

International Harvester Co., 16 fans
Corn Products Co., Argo, Ill., 18 fans
Mineral Point Zinc Co., Mineral Point, Wis., 8 fans
C. H. Harrison High School, Chicago, Ill., 13 fans
Public School 55, New York, N. Y., 8 fans
Washington High School, Milwaukee, Wis.
Eau Claire Normal School, Eau Claire, Wis.
Five schools in Madison, Wis.
Illinois Theatre, Chicago, Ill.
McVickers Theatre, Chicago, Ill.
Fifteen N. Y. City Schools
Thirty-five Chicago Schools
Runkle Chocolate Co., New York, N. Y.
U. S. Music Hall, Chicago, Ill.
R. R. Donnelly & Sons Co., Chicago, Ill.
Knickerbocker Club, New York, N. Y.

Specifications.

Furnish and erect (1) No. ..... Garden City Cycloidal Multivane Fan, complete with all automatic chain oiling, self-aligning journal bearings, with driving pulley ..... x ..... (or direct connected to electric motor) to have a capacity of ....., c.f.m. operating at a speed of ..... R.P.M., requiring ..... B.H.P. ..... oz.

See following page for capacity tables, etc.

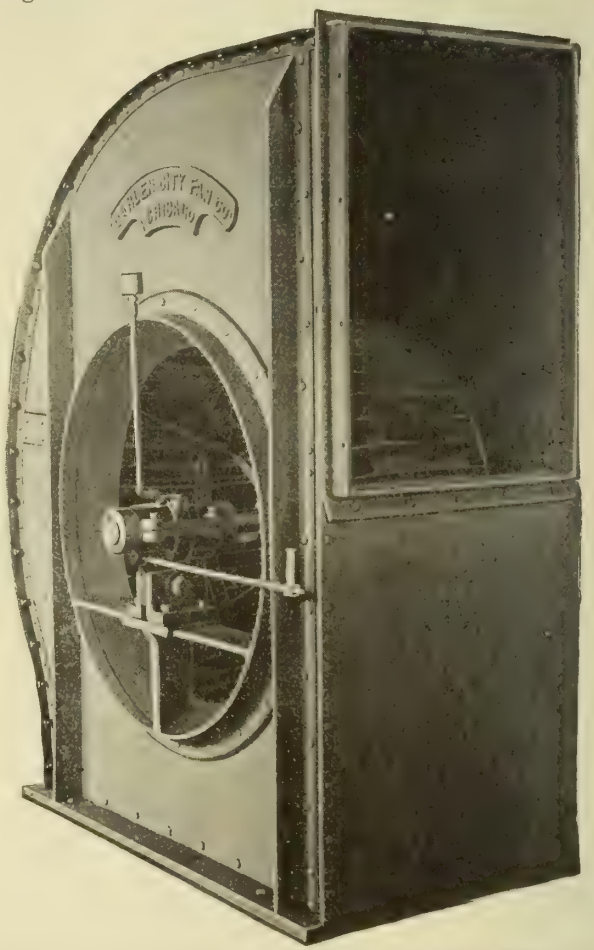
Also write for Engineering Book and Catalogue.

Co-operative Engineering Services.

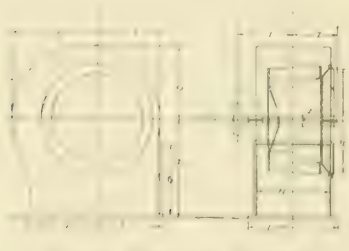
Our Engineering force is always at the command of architects and engineers, and we give you the benefit of thirty-seven years of experience in Fan and Blower Building and Engineering.

Guarantee.

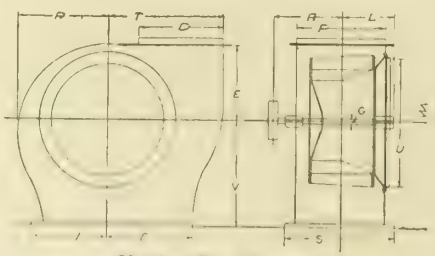
We guarantee our Cycloidal Shavings Exhauster to effect from fifteen to twenty per cent saving in power as against the old fashion standard fans.



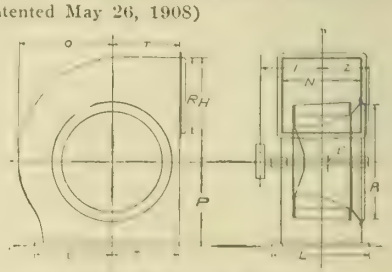
CYCLOIDAL MULTIVANE FAN, THE FAN OF HIGH EFFICIENCY
(Patented May 26, 1908)



Bottom Horizontal Discharge



Vertical Up Discharge



Top Horizontal Discharge

FULL HOUSING CROSS-SECTIONS WITH TABLES OF DETAILS

Fan No.	B	O	T	H	U	R	I	Z	A	S	L	E
6		12	16				14	17	25	1	16	24
7	27	23	19	32	13		20	19	30	21	19	
8	31	27	24	40			24	21	37	24	24	
9									44	28	27	34
10												
11		32	35		41				56			
12		47	39	64					62	42		
13			42									
14	67	57	43						73	49		
15			46								50	59
16			54									
17	82	70	58									
18			63									
20			73									

For seven-eighths Housings, 80 per cent of "H" equals height from base to center of $\frac{7}{8}$ Housings.

Fan No.	V	E	R	T	I	C	A	L	U	P	D	S	G
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
20													

For seven-eighths Housings, 80 per cent of "V" equals height from base to center of $\frac{7}{8}$ Housings.

Fan No.	T	O	P	H	U	R	I	Z	A	N	T	L	E
6	16	22	20	25	20	25	18	17	25	18	16	24	
7	19	27	24	31	23	28	20	19	30	21	19	27	
8	24	34	30	39	30	36	24	21	37	24	24	30	
9	27	38	33½	44	33	40	26	24	44	28	27	34	
10	32	45	39½	51	40	42	30	26	50	34	32	40	
11	35	49	43	56	44	48	32	29	56	36	35	43	
12	39	55	48	63	48	48	34	31	62	42	39	49	
13	42	59	51½	68	50	54	36	36	68	45	42	52	
14	47	67	58	78	56	60	40	38	74	48	47	58	
15	50	71	61½	82	60	60	44	40	80	52	50	59	
16	54	76	66	87	66	68	48	42	86	56	54	64	
17	58	82	71	92	72	72	50	46	92	60	58	68	
18	63	89	77	102	77	76	54	48	98	64	63	72	
20	73	99	87	112	87	90	58	52	120	72	73	80	

For seven-eighths Housings, 80 per cent of "P" equals height from base to center of $\frac{7}{8}$ Housings.

SWEET'S CATALOGUE

Continued on next page

CAPACITY TABLE, CYCLOIDAL MULTIVANE FANS

Size No.	Diam. Runner, Inches	Diam. Inlet, Inches	Wid. and Ht. Outlet	Static Pressure	¼-Inch			½-Inch			¾-Inch			1-Inch			1¼-Inch			1½-Inch			1¾-Inch		
					C. F. M.	R. P. M.	B. H. P.	C. F. M.	R. P. M.	B. H. P.	C. F. M.	R. P. M.	B. H. P.	C. F. M.	R. P. M.	B. H. P.	C. F. M.	R. P. M.	B. H. P.	C. F. M.	R. P. M.	B. H. P.	C. F. M.	R. P. M.	B. H. P.
2	10	10	8 x 8		514	580	.06	771	713	.13	860	812	.12	980	980	.3	1,110	1,100	.42	1,280	1,200	.64	1,410	1,300	.69
					780	660	.08	900	764	.16	900	970	.27	1,210	1,000	.41	1,390	1,150	.6	1,542	1,295	.78	1,780	1,450	1 2
					910	825	.26	1,093	810	.21	942	1,240	.32	1,480	1,050	.52	1,710	1,272	.88	1,800	1,555	1 3	2,160	1,560	1 72
					1,210	910	.33	1,365	870	.3	1,000	1,560	.3	1,800	1,210	.9	2,110	1,400	1.4	2,370	1,500	1.81	2,640	1,700	2 1
2½	12	12	10 x 10		720	480	.07	900	590	.15	1,054	810	.25	1,210	910	.38	1,342	1,075	.52	1,520	1,200	.6	1,710	1,310	71
					950	510	.08	1,050	620	.20	1,260	875	.29	1,400	926	.42	1,560	1,110	.68	1,850	1,246	.86	2,190	1,350	97
					1,150	600	.11	1,400	680	.31	1,820	910	.42	1,962	951	.68	2,192	1,172	.91	2,552	1,300	1.21	2,875	1,400	1 52
					1,340	710	.16	1,620	750	.42	2,090	1,025	.69	2,210	1,100	.92	2,710	1,220	1.21	3,140	1,385	1.75	3,690	1,452	1.82
3	14	14	11 x 10		887	410	.08	1,265	566	.21	1,290	680	.32	1,550	780	.5	1,740	875	.71	1,900	943	.93	2,120	1,000	1 2
					1,054	436	.1	1,375	579	.25	1,700	717	.49	2,070	828	.74	2,240	924	.98	2,450	1,010	1.24	2,760	1,046	1 98
					1,214	485	.16	1,570	620	.3	2,052	730	.63	2,415	904	1.02	2,620	968	1.25	2,897	1,092	1 75	3,380	1,150	2 21
					1,405	500	.19	2,056	695	.5	2,372	826	.87	2,760	992	1.5	3,338	1,122	2.2	4,080	1,223	2.85	4,560	1,280	3 45
4	17	17	13 x 14		1,200	320	.09	1,720	480	.24	1,920	589	.45	2,340	648	.72	2,600	730	.92	2,900	815	1.36	3,120	900	2.
					1,410	345	.18	2,010	510	.35	2,450	624	.58	2,840	702	.89	3,210	765	1.35	3,390	845	1.67	3,940	938	2 82
					1,765	380	.31	2,600	565	.48	2,990	662	.79	3,540	755	1.27	4,000	820	1.9	4,230	900	2.5	4,710	1,010	3 71
					2,100	410	.40	3,120	590	.75	3,670	700	1.2	4,350	840	1.95	4,680	925	2.75	5,200	1,040	3.91	5,880	1,150	4 85
5	20	21	16 x 18		1,620	290	.12	2,215	415	.39	2,672	485	.67	3,010	530	.9	3,205	610	.98	3,800	680	1.4	4,200	750	2 3
					1,850	305	.15	2,700	432	.48	3,300	505	.80	3,680	572	1.23	4,310	650	1.31	4,580	726	2.75	5,110	786	3 4
					2,345	320	.25	3,290	450	.61	4,150	552	1.3	4,710	640	1.81	5,085	715	2.5	5,510	790	3.22	6,205	862	4 7
					2,787	362	.32	4,000	485	.91	4,890	600	2.	5,690	695	2.75	6,470	785	3.95	6,975	850	5.02	7,880	910	5 75
6	25	26	18 x 23		3,120	254	.27	3,587	327	.50	3,900	426	.95	4,040	496	1.24	4,380	556	1.76	4,880	610	2.34	5,220	647	2 9
					3,676	266	.36	4,290	355	.72	4,333	437	1.3	4,500	505	1.44	6,120	662	2.48	6,090	621	2.73	6,750	662	3 67
					4,785	295	.63	4,765	376	.95	5,900	446	1.7	6,300	524	2.16	7,060	587	3.46	7,370	633	3 87	7,760	674	4 07
					6,083	332	.99	6,156	410	1.36	7,166	491	2.3	7,890	554	3.24	9,186	612	4.83	10,700	670	6.29	10,410	722	7.32
7	30	30	21 x 28		5,150	200	.43	5,757	270	.9	5,970	310	1.3	6,820	380	2.15	7,300	430	2.9	8,210	480	3.96	8,343	508	4 53
					6,027	210	.58	8,200	290	1.52	8,618	325	2.	8,710	392	2.72	9,160	440	3.6	9,200	490	4 70	9,300	521	4 87
					7,600	233	.99	9,370	308	1.97	10,700	345	3.	10,460	407	3.63	11,500	445	4.8	12,800	508	6.55	13,320	540	6 2
					8,650	263	1.09	10,590	326	2.5	11,300	370	3.8	13,820	433	5.86	14,550	485	7.2	15,820	530	9.27	16,000	580	9.9
8	37	37	24 x 36		7,260	168	.57	8,144	231	1.29	9,110	281	2.1	9,527	322	3.04	10,610	366	4.22	11,897	395	5.34	12,150	405	5 6
					8,527	179	.83	11,164	250	2 35	11,000	290	2.6	12,237	330	3.84	13,200	378	5.74	13,900	405	6.58	14,400	414	7 1
					10,525	195	1.39	14,416	268	3.4	13,200	301	3.5	15,990	344	5.85	16,820	390	7.05	17,200	419	9 54	18,120	434	8 62
					13,500	221	2.3	15,690	282	4.24	16,150	320	4.9	19,450	376	8.6	21,206	420	10.1	22,150	455	13.7	23,820	468	13 2
9	44	45	28 x 40		9,390	143	.82	12,450	200	2.	12,200	242	2.8	12,740	276	3.13	14,520	310	5.46	16,800	342	7 6	18,350	368	9 8
					12,000	153	1.13	14,500	210	2.64	16,000	252	3.9	17,730	286	5.6	18,400	320	7.2	19,900	352	9 3	22,900	382	12
					15,400	173	2 17	17,800	225	3 64	19,350	267	5.5	20,950	298	7.73	21,680	332	9.12	23,200	362	14.2	26,560	390	15 9
					21,000	190	2.97	21,100	248	5.56	23,900	293	8.2	26,650	329	12.4	27,560	359	15.3	30,900	391	19.4	32,860	420	22
10	50	48	34 x 42		12,500	128	1.18	14,300	175	2.34	14,940	216	3.6	16,930	244	5.23	17,980	275	7.	19,590	300	9.36	21,860	324	11.9
					15,600	148	2.16	19,180	183	3 41	21,030	226	4.4	20,900	257	6.9	21,600	285	8.42	24,020	310	11.2	26,800	334	14.4
					20,000	158	2.3	22,900	196	4.85	27,350	239	6.5	25,650	268	8.71	27,400	294	11.	29,500	318	14.6	31,900	345	18.1
					23,000	172	3.1	27,900	215	7.6	33,700	264	10.	30,840	284	12.4	32,230	310	16.3	34,500	329	19.6	38,000	360	25.8
11	56	57	36 x 48		14,120	110	1.72	16,600	155	2.51	19,720	190	4.5	22,200	220	6.8	24,040	246	8.29	26,330	271	12.5	28,140	294	15 1
					16,480	119	1.96	19,300	164	3.2	22,970	202	5.3	26,630	229	8.2	27,640	254	10.79	30,100	280	15 1	32,300	304	18 5
					20,100	132	2 82	24,300	174	4 31	28,430	210	7.3	32,400	240	11.4	34,700	265	16.3	36,700	289	21.1	42,860	315	26 1
					24,600	140	3.36	29,300	183	6.21	36,500	228	13.	40,800	252	17.1	45,600	284	24.3	48,660	306	31.	51,600	326	35.
12	62	61	42 x 48		16,750	100	2.2	20,370	140	3.06	24,200	172	5.5	27,250	199	8.32	29,510	222	11.4	33,300	244	15.3	34,300	250	19 2
					20,520	108	2.9	24,600	149	3 98	29,150	180	6.8	33,280	210	10.3	37,340	230	14.5	41,430	251	19 3	43,260	260	23 5
					23,960	119	3 45	28,900	155	5.04	36,940	191	9.2	41,740	221	14.5	47,100	239	20.8	51,240	260	26 9	53,240	274	29 9
					28,130	128	4.1	36,700	166	8.09	45,160	200	18.	51,583	222	22.1	56,230	257	31.7	62,630	279	37.8	69,300	298	42.
13	68	68	45 x 54		21,620	92	2.57	24,600	120	4.04	30,880	150	7.	35,230	178	10.1	37,680	200	14.6	38,600	220	18.7	39,630	235	21
					28,900	100	3.7	36,850	131	6 32	39,900	155	8.2	43,300	186	13.2	44,760	209	17.4	48,170	228	23 2	52,000	240	26 3
					35,800	108	4.4	40,430	136	7 66	44,060	160	11.	51,750	196	17.4	57,650	219	24.4	63,800	235	32 9	65,350	248	32.7
					42,300	112	5.57	51,300	145	11.4	56,150	175	19.	63,000	204	25.2	72,850	226	37.9	78,140	246	48.8	81,550	256	68.4
14	74	74	48 x 56		23,750	84	2.89	29,080	118	4 4	34,600	144	7.9	40,590	160	12.1	43,070	186	16.4	48,680	200	22.1	52,730	224	26 4
					28,800	89	3.12	36,000	126	5 5	41,950	150	9 6	50,070	169	15.6	56,200	192	21.9	59,870	209	27 5	68,470	228	30 2
					32,300	96	3.95	42,600	129	7 5	52,250	158	14.	59,890	176	20.7	67,900	200	29.7	73,317	222	38.4	78,750	234	41 5
					40,080	104	4.8	52,930	140	11.5	64,500	170	21.	73,570	190	31.2	83,400	215	45.2	89,400	245	57.	92,100	240	63.1
15	80	80	52 x 60		27,990	77	2 93	33,990	109	5 13	41,390	133	9.3	47,450	150	14.2	53,400	170	20.1	56,950	186	25.7	59,930	208	32 2
					32,170	85	3.66	42,130	117	6 64	49,900	139	11.6	58,560	156	18.2	63,600	177	24.5	69,800	191	32.2	71,120	215	35 2
					37,450	92	4.46	49,980	126	8 7	59,590	146	15.2	71,690	164	24.2	79,400	184	34.7	85,740	200	44.8	89,740	220	48 7
					44,780	99	5.18	61,890	132	13.5	75,300	155	24.6	86,030	173	36.5	98,290	197	52.9	106,720	215	69.8	114,100	227	77.
16	86	86	56 x 68		32,230	72	3.22	38,270	100	5 65	47,770	127	10.8	53,760	140	16.4	59,180	156	22.4	66,880	174	30 1	69,600	190	36 4
					37,440	79	3.72	48,600	108	7 68	57,680	132	13.3	65,200	146	20.	73,400	165	28 2	80,370	179	37 1	84,750	194	41 2
					43,210	84	4.3	58,970	115	10.	70,920	138	18.7	80,350	155	27.9	91,540	170	40.1	98,670	188	51.7	102,950	199	56 6
					50,720	89	5.52	71,390	122	15 5	86,940	148	28.5	98,980	164	42.2	112,500	185	61.	120,440	201	77.2	131,600	207	89.4
17	92	92	60 x 72		34,750	66	3.7	43,430	94	6 5	55,000	116	12.3	62,420	134	18.7	67,780	148	25.5	76,460	163	34 2	79,660	180	38 3
					38,090	71	3.98	52,900	99	8 1	62,200	123	15.2	79,200	138	23.4	83,900	154	32.2	92,020	169	55 6	97,500	185	49 6
					47,200	76	4.35	64,800	108	11.5	80,200	130	21 4	91,980	145	31.9	104,760	164	45.8	113,210	175	59 1	118,450	188	62 1
					56,900	81	6.44	81,720	116	17.8	94,400	140	32.4	110,110	154	48.2	128,630	176	69.7	137,900	188	87.8	145,600	194	102.
18	98	98	64 x 76		39,900	65	4.1	52,360	88	7.78	63,690	109	13 4	71,110	125	21.2	76,900	140	28.9	90,120	153	38 9	96,870	166	44
					44,950	70	4.61	58,200	92	9.16	78,200	114	17.6	84,490	129	26.	95,280	144	49.8	104,190	158	48 1	108,200	169	55
					53,300	74	5.2	74,870	97	12.9	90,830	119	22.8	104,120	133	36.1	118,540	150	51.9	128,800	166	66 9	136,710	175	72.
					66,110	79	7.58	92,800	103	20.1	114,270	125	36.8	128,600	144	54.6	146,000	162	79.1	156,400	177	99 2	170,580	183	116.
20	110	120	72 x 90		61,280	60	5.5	71,070	80	10.8	75,200	94	13.6	80,700	112	27 1	98,300	125	36.4	107,100	130	47 9	109,500	150	50.
					70,220	64	6.95	80,270	84	12.8	92,400	100	21.5	94,400	117	30.6	118,700	129	46.1	143,500	140	60 5	153,600	155	72.
					86,720	69	12.2	96,730	90	17.8	117,400	106	32.3	129,900	121	46.	142,100	135	61.5	159,100	146	84 5	162,340	159	88.
					107,990	78	18.	125,620	98	31.5	142,400	116	48.3	157,500	131	68.3	177,500	145	96.5	188,400	160	21.	202,700	168	139.

Used for ventilation, exhausters or supply blowers. Double width Cycloidal Multivane Fans have two inlets and double the above capacity. Cycloidal Multivane Fans, all sizes, will readily work up to a maximum static pressure of 3 inches, but like all Multivane Fans, the highest point of efficiency is at the lowest pressure.

ILG ELECTRIC VENTILATING CO.

Manufacturers of Fans, Blowers, Exhausters

150 Whiting Street

CHICAGO, ILL.

BRANCHES

NEW YORK, N. Y., 13 Park Row
Telephone, Cortland 8739

CLEVELAND, OHIO, 1314 Schofield Building
Telephone, Main 776

PITTSBURGH, PA., 719 Liberty Street
Telephone, C. D. & P. Grant 1577

PHILADELPHIA, PA., 810 Commercial Trust Building
Telephone, Spruce 4502

BOSTON, MASS., Tompkins-Stoddard Co., 77 Franklin Street

ST. LOUIS, MO., 118 N. 8th Street
Telephones: { Kinlock, Central 3450 / Bell, Main 193

Products.

Manufacturers of a complete line of Direct-Connected Electric Propeller and Disk Fans, Exhaust Fans, Ventilating and Steel Plate Fans, Heating Fans, Multiblade Blowers and Exhausters Direct-Connected and Belted, Ready-to-Run Ventilating Sets, Mechanical Draft Apparatus, Fans and Blowers for Drying; Motors for Driving Fans and Blowers; Automatic Louvers.

Ilg Self-Cooled Motor Propeller Fans.

The round-bodied motor fits into a cast-iron ring supported by forged arms fastened to the outer ring. This makes it possible to interchange or replace motor without disturbing the alignment. Frame and motor can be installed separately, thus dividing weight.

Ventilation of the motor is accomplished by the patent method shown in the accompanying cuts. The vacuum that is created at the axis of the motor draws a current of cool air from the outside over the motor, after which it is carried away with the general exhaust.

Oiling system of motors combines both ring oil bearings, thus eliminating possibility of back bearing running dry. This feature also permits the oiling of fan while in operation.

Fig. 1. ILG Self Cooled Fan

Fig. 2. ILG Self-Cooled Fan Showing cooling feature

Fig. 3. ILG Self Cooled Fan with Guard
Guard can be furnished in one, two or three sections at small extra cost

Fig. 4. Vertical Type ILG Self Cooled Fan

Specifications for Self-Cooled Propeller Fans.

Furnish and erect one ..... inch Ilg Self-Cooled Motor Propeller Fan direct-connected to 110, 220 and 500 volts direct current (single or multiphase) ..... cycle alternating current motor air delivery ..... c.f.m. with power output not to exceed ..... watts (see table).

PRICES, DIRECT CURRENT

Size Type	Cu. Ft. of Air per Minute	Watts Consu'ed per Hour	Speed Free Air	110 Volt	220 Volt	500 Volt	Approx. Shipping Weight
12" B	1100	70	1400	$25.20	$25.60	....	30
16" B	1600	90	1200	30.80	32.00	....	40
18" A	2530	110	1000	44.00	45.60	....	80
18" B	3100	160	1100	54.00	56.00	....	95
20" B	3590	198	900	76.00	78.00	$80.00	175
24" A	6300	275	800	84.00	86.00	88.00	220
24" B	7200	418	900	102.00	104.00	108.00	300
30" A	9200	440	700	116.00	118.40	124.00	335
30" B	11000	495	800	134.00	136.80	141.60	360
36" A	12500	560	600	144.00	147.20	152.00	395
36" B	14600	770	700	163.20	167.20	172.00	450
42" B	18000	880	500	194.40	198.40	204.80	600
48" B	23400	1320	450	239.20	245.60	252.00	830
54" B	28500	1780	400	340.00	346.40	353.60	1100
60" B	33600	2270	360	400.00	407.20	412.00	1500
72" B	44800	2880	270	504.00	513.60	528.00	2230

For vertical running fans add 10 per cent to list price, same discount applying.
Type "A" is not furnished for vertical operation.
Speed controllers are furnished with all direct current fans.

PRICES, ALTERNATING CURRENT, SINGLE PHASE, 60-CYCLE

Size Type	Cu. Ft. of Air per Minute	Watts Consu'ed per Hour	Speed 60-Cycle	110 Volt	220 Volt	Approx. Shipping Weight
12" S	1100	70	1400	$32.50	$33.00	30
16" S	1600	100	1200	35.00	37.00	50
18" SL	2200	110	850	65.00	69.00	90
18" SH	3240	160	1140	65.00	69.00	90
20" SL	3300	140	850	80.00	82.00	130
20" SH	4300	200	1140	89.00	91.00	130
24" SL	5800	240	690	105.00	107.00	180
24" SH	7000	280	850	112.00	114.00	180
30" SL	7600	320	565	150.00	152.00	280
30" SH	9100	460	690	155.00	157.00	280
36" SL	10000	520	490	200.00	202.00	390
36" SH	12000	600	565	200.00	202.00	390
42" S	17800	800	490	230.00	232.00	520
48" S	26200	1200	490	270.00	270.00	610

PRICES, ALTERNATING CURRENT, TWO AND THREE PHASE, 60-CYCLE

Size Type	Cu. Ft. of Air per Minute	Watts Consu'ed per Hour	Speed 60-Cycle	110-220 Volt	440-550 Volt	Approx. Shipping Weight
18" M	3240	180	1140	$72.00		105
20" M	4800	200	1140	84.00	$89.00	150
24" ML	5800	240	690	104.00	110.00	220
24" MH	7000	280	850	104.00	110.00	220
30" ML	7700	325	570	142.00	150.00	335
30" MH	9000	400	690	142.00	150.00	335
36" M	10000	520	490	168.00	176.00	402
36" MH	12000	600	570	168.00	176.00	402
42" M	17800	800	490	200.00	208.00	610
48" M	26200	1400	490	244.00	250.00	830
54" M	29000	1800	420	345.00	354.00	1100
60" M	38000	2200	380	450.00	460.00	1800
72" M	48000	2800	288	580.00	560.00	2200

Add 5 per cent to list price for 25-, 30- and 40-cycle.
Prices on application for 15-cycle.
For vertical running alternating fans add 15 per cent to list price.

Continued on next page

Ilg Automatic Louver or Shutter.

The Ilg automatic shutter is largely employed for the protection of vent openings in connection with propeller exhaust fans and blowers. It consists of several horizontal aluminum slats, pivoted into a rigid frame, and hanging free in front of exhaust vent.

The slats are so arranged that when hanging down they overlap each other, fitting closely, thus effectually preventing the ingress of sweeping winds, draughts, snow or rain.

The shutter is opened with the force of air current from the fan or blower, and it shuts automatically by gravity. No attention need be given them.

Standard sizes from 12-inch to 60-inch carried in stock. Special sizes built to order. Standard shutters are square.

SIZES AND PRICES

Size, Inches	Price
12	$4.50
16	6.00
18	9.00
20	10.00
24	12.00
30	15.00
36	18.00
42	21.00
48	30.00
54	35.00
60	40.00

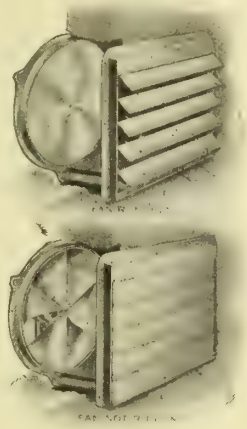


FIG. 5. AUTOMATIC LOUVER USED WITH PROPELLER FAN

SPEED, CAPACITIES AND BRAKE HORSE-POWER OF ILG UNIVERSAL BLOWERS AT VARIOUS PRESSURES

SIZE	DIAMETER OF WHEEL		1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2"
25	15 1/4"	CFM	1400	1600	1800	2200	2400	2800
		RPM	720	860	1030	1140	1230	1430
		BHP	.21	.35	.57	.78	.91	1.14
30	17 3/4"	CFM	2000	2400	2800	3300	3400	4000
		RPM	610	760	870	950	1050	1220
		BHP	.29	.53	.74	.97	1.25	1.94
35	20 1/4"	CFM	2700	3300	3800	4300	4600	5400
		RPM	530	660	750	820	900	1050
		BHP	.40	.74	1.04	1.42	1.82	2.68
40	22 1/4"	CFM	3500	4300	4800	5200	5700	7000
		RPM	460	580	660	720	790	920
		BHP	.69	.97	1.48	1.94	2.50	3.76
45	25"	CFM	4500	5500	6400	7200	7700	9000
		RPM	410	510	580	630	700	810
		BHP	.74	1.26	1.71	2.20	2.72	4.10
50	27 1/2"	CFM	5500	6700	7600	8000	9000	10500
		RPM	370	460	500	580	640	740
		BHP	1.02	1.90	2.28	2.62	3.66	5.45
55	30 1/2"	CFM	6100	7400	8600	9700	10500	12000
		RPM	330	410	470	510	570	660
		BHP	1.04	1.90	2.30	2.97	4.00	6.25
60	33"	CFM	7800	9600	10600	12000	13000	14500
		RPM	310	380	430	470	520	620
		BHP	1.14	1.52	2.84	3.88	5.00	7.20
70	38 1/2"	CFM	10700	13000	14000	15000	17000	19000
		RPM	260	330	370	400	460	520
		BHP	1.60	2.50	3.65	4.56	6.85	9.80
80	46"	CFM	16000	18500	22000	25000	28000	31000
		RPM	240	280	310	355	400	480
		BHP	2.51	3.65	4.60	6.65	9.55	13.9
90	51"	CFM	20000	24000	27500	31000	34000	37000
		RPM	190	235	290	310	340	365
		BHP	2.62	3.90	7.40	9.10	12.00	16.00
100	55"	CFM	25000	28000	33000	35000	36500	41000
		RPM	170	200	250	280	310	340
		BHP	4.55	5.90	8.80	9.90	13.10	17.70

Ilg Universal Blowers.

The construction of Ilg blowers and exhausters is a distinct departure from methods heretofore employed by blower or fan manufacturers. The motor is machined circular and set partially into the housing, giving a compactness never before accomplished in blower or fan construction. The motor is supported by a cast-iron ring bolted to the housing. The inlet side has a similar casting fastened in the same manner.

The holes in both castings are equally spaced, drilled to template, making it possible to change any blower from right- to left-hand drive, or vice versa. This construction also permits the discharge to be swung to any angle.

Fig. 6 shows motor side of direct-connected blower. Both bearings are ball bearings and are combined by copper pipe and oiled from front. Ilg Universal blowers are furnished direct-connected for direct current and alternating current at any speed.

Fig. 7 shows inlet side of blower and shows how wheel is supported directly on motor shaft with very small overhang and without bearing on inlet to obstruct flow of air.

Fig. 8 shows belted Universal blower. All Ilg Universal blowers are interchangeable belted to direct-connected or vice versa.

Fig. 9 shows Ilg multiblade wheel. Hub is malleable iron, spider is hand-wrought iron, and blades are ribbon steel electrically welded to one-piece, steel, retaining rings.

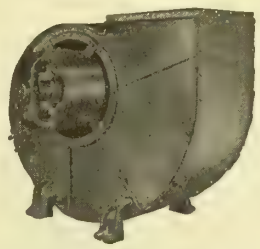


FIG. 6. MOTOR SIDE OF DIRECT-CONNECTED BLOWER

FIG. 7. INLET SIDE OF BLOWER

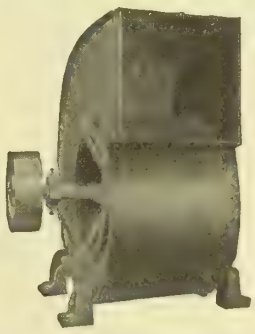


FIG. 8. UNIVERSAL BLOWER BELTED

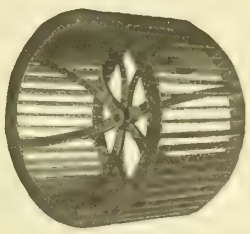


FIG. 9. ILG MULTI-BLADE WHEEL

Catalogue.

Our 95-page catalogue gives complete price-lists and dimensions on everything we build and contains a valuable encyclopedia of engineering data for the moving of air.

Prices are shown on direct-connected blowers for direct current, single phase and multiphase current; on propeller fans for all requirements; and on specialties such as pent-houses, guards, ventilating sets, etc.

The catalogue also shows a large number of typical installations of fans and blowers, such as those in restaurants, theaters, schools, laundries and industrial plants of various kinds.

Send for it. It is yours for the asking.

B. F. STURTEVANT COMPANY

Fans, Fan Systems, Heating and Ventilating Apparatus, and Allied Products

HYDE PARK, BOSTON, MASS.

BRANCH OFFICES

ATLANTA, GA., 647 North Jackson Street
BOSTON, MASS., 34 Oliver Street
CHICAGO, ILL., 530 South Clinton Street
CINCINNATI, OHIO, 514 Provident Bank Building
CLEVELAND, OHIO, 423 Schofield Building
DALLAS, TEXAS, 5124 Worth Street
HARTFORD, CONN., 324 Connecticut Mutual Building, 36 Pearl Street
KANSAS CITY, MO., 412 Reliance Building
MINNEAPOLIS, MINN., 837 Metropolitan Life Building
NEW YORK, N. Y., 52 Vanderbilt Avenue
PHILADELPHIA, PA., 135 North Third Street
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THE B. F. STURTEVANT COMPANY (INCORPORATED IN CALIFORNIA)
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GALT, ONT., MONTREAL, WINNIPEG AND VANCOUVER

STURTEVANT ENGINEERING COMPANY, LONDON, PARIS, AND TURIN

Products.

FANS, BLOWERS, EXHAUSTERS, DUST COLLECTING SYSTEMS, AIR CONVEYING APPARATUS, GAS FANS, MECHANICAL DRAFT APPARATUS, DRYING APPARATUS, GENERATING SETS, MOTORS, STEAM TURBINES, STEAM ENGINES, AIR WASHERS, TURBINE-DRIVEN CENTRIFUGAL PUMPS, FUEL ECONOMIZERS, HEATING and VENTILATING APPARATUS.

See also list of Catalogues below:

Sturtevant (REG U.S. PAT. OFF.)
TRADE-MARK

Co-operative Service to Architects and Engineers.

The large and experienced engineering organization maintained by this Company is at the disposal of engineers and architects and will co-operate with them. The organization is divided into departments which are in charge of experts in that particular line. Each department has available the data accumulated during fifty years' experience in building, applying and installing apparatus peculiar to that department.

READY-TO-RUN PORTABLE VENTILATING SET
Also used for drying, cooling and blowing

Apparatus.

We give here just a bare synopsis of Sturtevant apparatus, but a letter to our nearest office will bring catalogues and full information.

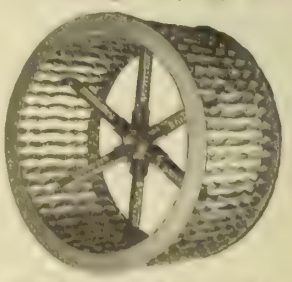
Fans.

Portable ventilating sets are made in five sizes, capacities 35 to 1150 cubic feet of air per minute. The three smaller sizes can be used with ordinary lamp sockets.

Multivane Fans.

Used for heating and ventilating, drying and forced draft.

Operate at low and medium pressures and deliver large volumes of air. Occupy small space and their light weight permits suspension from ceilings or structural iron work. For sizes and range of performance see table on following page.



MULTIVANE FAN WHEEL

Steel Plate Fans.

These have approximately the same range of sizes, volumes, and pressures as multivane fans. They are used to a large extent for the same service, but are specially suitable for induced draft work or in places where fan handles acid or corrosive gases.

LIST OF CATALOGUES ISSUED

NO.	NAME AND SUBJECT
195.	General Catalogue (English)
195.	General Catalogue (Spanish)
213.	Power Apparatus.
	BLOWERS AND EXHAUSTERS
126.	Gas Boosters.
148.	Gas Blowers.
134.	Steel Pressure Blowers.
199.	Monogram Blowers and Exhausters.
175.	High Pressure Blowers.
145.	Steel Plate Fans.
208.	Electric Propeller Fans.
149.	Disc and Propeller Fans.
155.	Steel Plate Planing Mill Exhausters.
185.	Slow Speed Low Power Planing Mill Exhauster.
180.	Multivane Fans.
196.	Steel Plate Fans, Light Hanger Type.
203.	High Pressure Blowers for Aerating Ice.
214.	Turbo-Undergrate Blower.
221.	Electric Fans.
177.	Electric Force Blower.
201.	Dust Blowing Set—Horse Groomer.
1019.	"A Cooler Booth"—On Telephone Booth Ventilator.
RR.	Ready-to-Run Ventilating Sets.
219.	Electric Heat Blower.
	[illegible]
130	[illegible]
164	[illegible]
150	[illegible]
	[illegible]
188.	Vertical Single Cylinder [illegible]
141	[illegible]
218	[illegible] VS.7 and VS.8.
	[illegible]
142	With [illegible]
144	With [illegible]
146	With [illegible]
	[illegible]
206	With [illegible]
206.	With [illegible]

NO.	NAME AND SUBJECT
	MOTORS
144.	DC Eight-Pole Type.
147.	DC Two-Pole and Four-Pole Types.
193.	DC Type H.
217.	DC Type D.
200.	Aeronautical Motors.
211.	Aeronautical Motors in Use.
216.	Marine Motors.
	STEAM TURBINES
209.	"How the Chief Engineer Was Convinced"—A visit to our plant.
210.	Steam Turbines.
	DRYING APPARATUS
202.	Drying Clay Products.
220.	Lumber Drying.
	MISCELLANEOUS
112.	Mechanical Ventilating and Heating by a Forced Circulation of Warm Air.
137.	Flinn Steam Traps.
138.	Centrifugal Exhaust Heads.
187.	Economical Fire Room Methods.
192.	Pullman Car Ventilating Set.
197.	Aeronautical Propellers.
225.	Air Washers.
230.	Heating Coils.
235.	Pneumatic Dust Collecting and Conveying Systems.
1006.	Portable Vacuum Cleaners (English and Spanish). Stationary Vacuum Cleaners.
1010.	Cooling Printers' Rollers.
1011	Heating and Ventilating Factories. 68 pp.
1012.	Heating and Ventilating Schools. 88 pp.
1013.	Heating and Ventilating Public Buildings. 96 pp.
1014	Heating and Ventilating Government Buildings.
1015.	Heating and Ventilating, Book, complete, 331 pages.
1016	Heating and Ventilating Waterchief Shops.
98	Mechanical Draft, cloth 385 pp. Price $4.00
214	Heating and Ventilation, 523 pp., cloth. Price $4.00

* In preparation.

[illegible] Catalogue.

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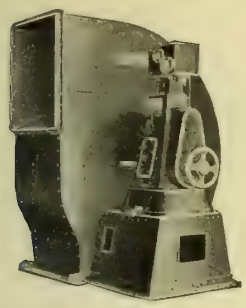
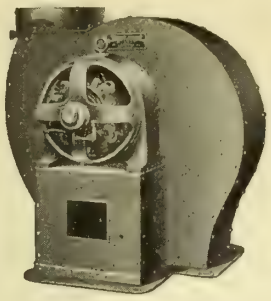


VS-7 ENGINE FAN



STEEL PLATE FAN MOTOR DRIVEN

RANGE OF MULTIVANE FANS AT EFFICIENT SPEEDS

Size of Fan, Ins.	Range of Volumes, Cu. Ft. per Min.	Range of Static Pressures, Ins. of Water
2	436 to 5450	⅛ to 9
3	682 to 8510	⅛ to 9
4	987 to 12300	⅛ to 9
5	1330 to 16600	⅛ to 9
6	1750 to 21800	⅛ to 9
6½	2220 to 28000	⅛ to 9
7	2730 to 34000	⅛ to 9
8	3960 to 49300	⅛ to 9
9	5350 to 66800	⅛ to 9
10	7020 to 87500	⅛ to 9
11	8730 to 110000	⅛ to 9
12	10900 to 136000	⅛ to 9
13	13200 to 165000	⅛ to 9
14	15800 to 197000	⅛ to 9
15	18500 to 231000	⅛ to 9
16	21500 to 268000	⅛ to 9
17	24700 to 307000	⅛ to 9
18	28000 to 314000	⅛ to 9
20	35300 to 441000	⅛ to 9
22	43600 to 545000	⅛ to 9
24	52800 to 658000	⅛ to 9
26	62800 to 785000	⅛ to 9

Monogram Fans.

These are medium pressure fans and as regards volume they occupy a position between the Multivane and steel plate types on one hand, and the steel pressure blowers on the other. Used for general utility work in factories, for supplying blast in industrial process, or for conveying materials such as wool, cotton, paper, chips, or grain, etc. Casing of fan is made in two halves and bolted together. Made in thirteen sizes. Maximum volume obtainable from largest size 30,000 CFM. Maximum working static usually recommended is about 15 inches but much higher pressures are often used.

Steel Pressure Blowers.

These are for high pressure work and are used for all purposes where pressures up to thirty inches of water must be maintained. The volumes delivered are not as great as in the case of Monograms, steel plates or Multivanes.

Propeller Fans.

Sturtevant standard propeller fans are guaranteed more efficient than any other fan of the same class.

We also build Blackman Fans and Davidson Fans to meet specifications or if specially ordered. As these are less efficient than the Sturtevant we do not recommend them.

Planing Mill Fans.

We build a complete line of exhausters for handling all classes of material such as wood refuse, wool, cotton, grain, etc.

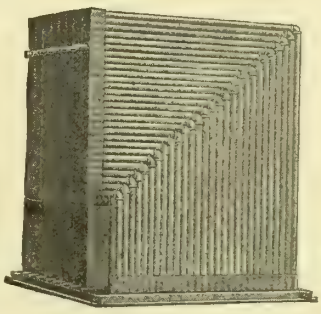
Different types of wheels are supplied depending on the material to be handled.

Heaters.

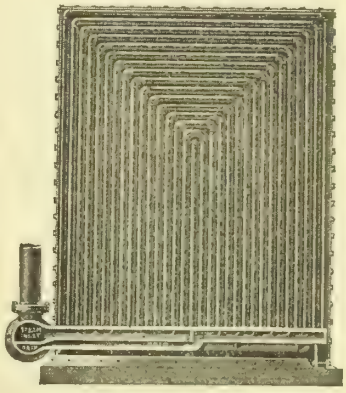
Heaters of all standard types are supplied. Standard Sturtevant Type, Mitre Type, and Return Bend Type.

Smaller units with one-piece cast-iron bases and a line of heaters for marine work are also made.

All Sturtevant coils are tested to 170 pounds pressure and are guaranteed for operation on any system where steam at 100 pounds pressure is used.



MITRE TYPE HEATER

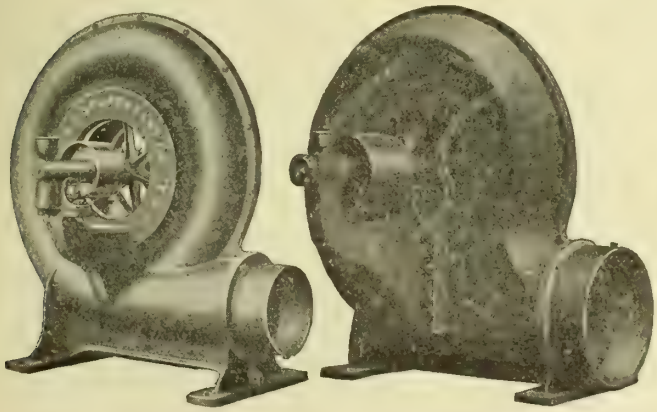


STURTEVANT STANDARD HEATER

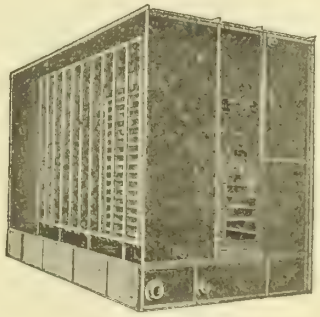
Air-Washers.

Sturtevant air washers are used for purifying, removing dust, and cooling.

They are made in two types, the rain type and the atomizer type and in more than fifty sizes—capacities 2500 to 100,000 cubic feet of air per minute.



STEEL PRESSURE BLOWERS MONOGRAM EXHAUSTERS



Type "H"

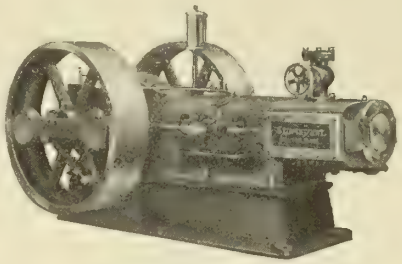
Type "S"

STURTEVANT AIR WASHERS

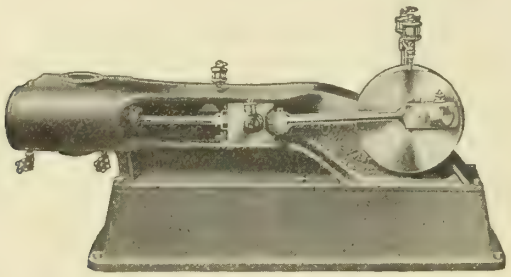
Continued on next page

Engines.

Sturtevant engines are made in different models and for different classes of service. The VS-7 and VS-8 types are the highest grade engines on the American market. If price, however, is the only consideration other types can be supplied, and these will give thoroughly satisfactory service. VS-7 and VS-8 Engines are made to meet United States Navy Specifications.

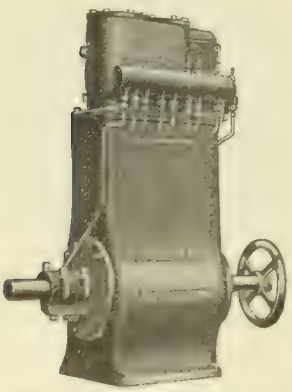


HC-1 ENGINE WITH TWO BAND WHEELS
Sizes to 250 Horse-Power



HS-1 ENGINE WITHOUT GOVERNOR OR FLY WHEEL, FOR FAN DRIVING

Sturtevant Horizontal Side Crank Engines of the HS-1 and HS-2 types are specially designed for fan driving. HS-1 Engines are built for pressures approximating 125 lbs. per square inch. HS-2, for lower pressures up to 70 lbs. All sizes up to 150 H.P. Not used for generating sets

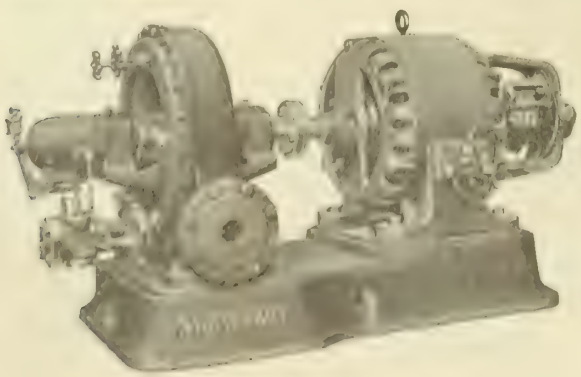


VD-1 ENGINE WITH HAND WHEEL

Sturtevant Vertical Double Engines of VD-1 type are for driving fans direct connected. They have two cylinders and single valves of balanced piston type. Sizes up to 100 H.P. Not used for generating sets

VS-1 ENGINE WITH HAND WHEEL WITHOUT GOVERNOR

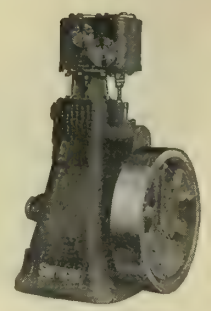
For direct-connected fan driving and as independent engines. Speed regulated by means of throttling governor.



TURBO GENERATOR SET
[illegible] up to 100 Kilowatts

Horizontal Engines.

Sturtevant horizontal center crank engines of the HC-1 type are regularly furnished as independent engines for belt drive or are direct-connected to fans, blowers, and electric generators. They are simple, single valve engines. It is possible to operate many of the sizes upon heating boiler pressure of fifteen and twenty pounds. They are also made for high pressures.



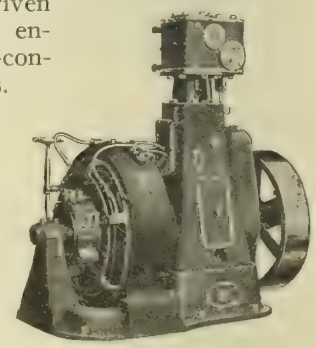
VS-7 ENGINE

All reciprocating parts entirely enclosed and readily accessible. Has automatic gravity lubrication. Made also in generating sets up to 100 k.w.

Generating Sets.

Sturtevant generating sets are made in many different combinations and comprise sets driven by steam engines, gasoline engines, and turbines direct-connected to electric generators.

The generators are liberally proportioned and are capable of sustaining a momentary overload of fifty per cent without destructive sparking and an overload of twenty-five per cent for short periods without undue heating or sparking. Our various types of engines are used for generating sets as indicated.

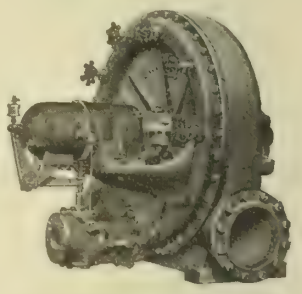


VS-8 GENERATING SET

Forced feed lubrication. Very close regulation due to Rites inertia governor. Generators of 8-pole type capable of heavy overload. 16 sizes up to 100 k.w. Engines made in sizes up to 150 H.P.

Turbines.

The Type 5 Steam Turbine is of single stage, velocity type. There are five sizes and by suitable combinations of steam pressure, size of rotor, nozzle capacity and rotative speed, a range of from one to three hundred horse-power is obtainable. The turbine is simple and of durable construction. This makes it a reliable source of power for driving fans, blowers, centrifugal pumps and electric generators.

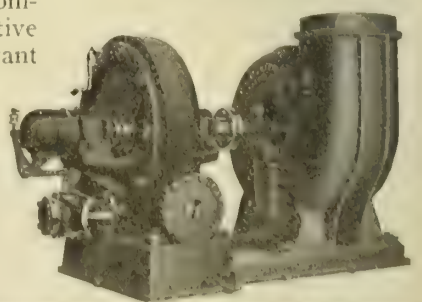


TYPE 5 STEAM TURBINE—SINGLE STAGE VELOCITY TYPE

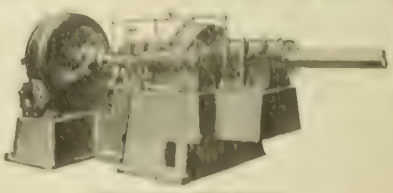
Ranges up to 300 H.P. obtainable in 5 sizes. Generating sets in sizes up to 150 kilowatts

Because of its comparative low rotative speed, the Sturtevant steam turbine is adaptable for direct-connection to fans, blowers and centrifugal pumps.

This turbine is also used for gear drive with fans and blowers. Such a combination is very frequently used in gas and forced draft work. See also Turbovane Fans.



DIRECT CONNECTED TURBO GAS BLOWER



GEARED TURBINE

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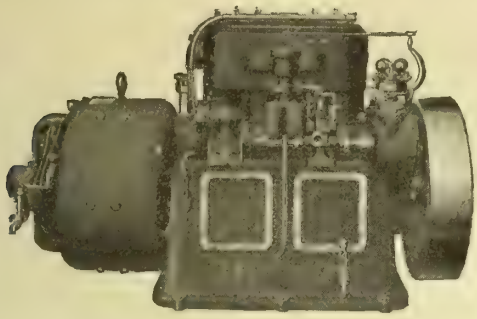


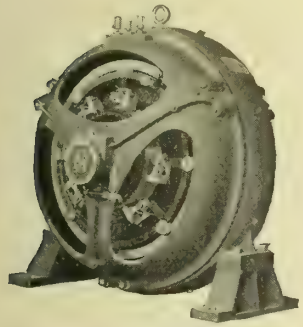
GASOLINE ENGINE GENERATING SET
Made in three sizes, 5, 10 and 15 K.W. Almost perfect regulation. No storage batteries necessary to keep constant voltage. Will operate on gasoline, kerosene or illuminating gas

Motors and Generators.

Sturtevant direct-current motors are built in three types B, C, and D. Type B is a bi-polar motor wound for 110 or 220 volts. The horse-power range is from one tenth to three. These are built semi-enclosed and enclosed for protection against dust and moisture. Any speed range from 450 to 3600 R.P.M.

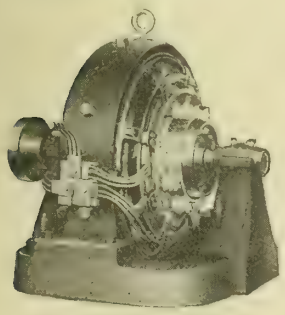
Type C motors are of direct current eight-pole type and are arranged for low rotative speed so they may be direct-connected to fans, exhausters, etc. Built in about fifty ratings—any speed from 85 to 625 R.P.M. and a horse-power range of one up to eight hundred. Built open or semi-enclosed. When used as generators these have a kilowatt range from 1 to 600.

Type D motors are direct current four-pole type with commutating poles. Built for 110, 220 and 550 volts. Motors are made open, semi-enclosed and enclosed, in about fifty ratings with a horse-power range of one to fifty. Any speed from 340 to 1700 R.P.M.—when used as generators k.w. outputs are from 0.8 to 40. Water-tight motors, and motors for vertical operation also used.



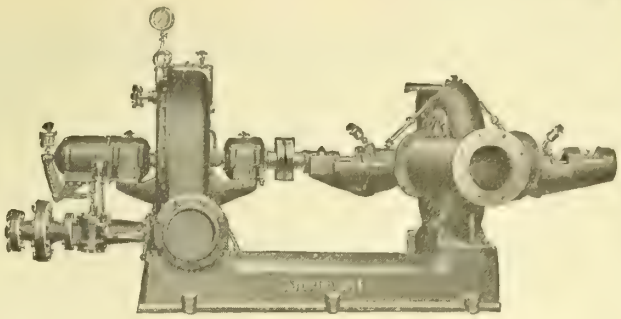
SEMI-ENCLOSED TYPE "C" MOTOR
For driving exhausters direct-connected.
Built in smaller sizes only

TYPE "D" MOTOR
For vertical operation. Adapted for direct-connection to vertical fans, centrifugal pumps and separators, machine tools, etc.



PEDESTAL TYPE "C" MOTOR
These are the larger sized motors of this type, magnet frames and bearing pedestal being mounted independently upon a cast-iron sub-base

TYPE "D" MOTOR
Of direct-current 4-pole type. Regularly built for voltages of 110, 220 and 500, and designed for general utility purposes.

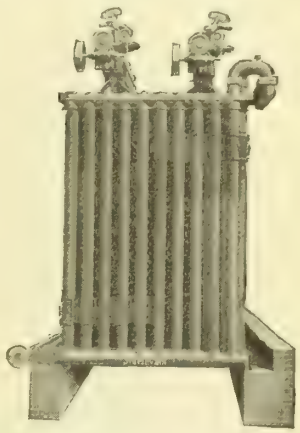


TURBO-DRIVEN CENTRIFUGAL PUMP
Speed of turbine is regulated by means of a centrifugal governor fastened to end of rotor shaft. This actuates a balanced throttle valve. An entirely separate emergency governor, operating a separate valve through mechanism of its own, will stop the turbine if speed exceeds a predetermined maximum

Fuel Economizers.

Sturtevant fuel economizers have important operating and mechanical advantages. These include staggered pipes, ground metal-to-metal joints, greater accessibility, and ease of making repairs. The Sturtevant Economizer has not a gasket throughout.

Sturtevant economizers have always been built for high pressures and have proved satisfactory in this service. The highest pressure machines ever built are Sturtevants.



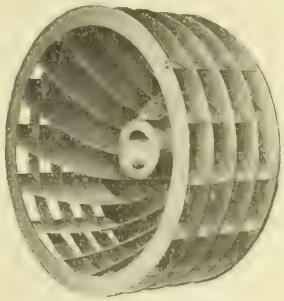
FUEL ECONOMIZER

Mechanical Draft.

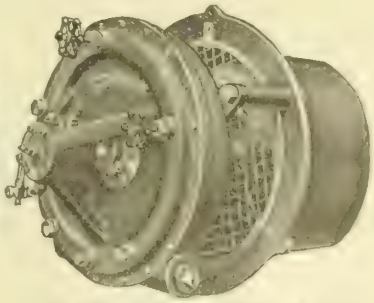
We install both forced and induced draft systems or, if conditions require it, we install a system combining both forced and induced draft fans. Such installations are governed entirely by conditions and only experienced engineers are qualified to make recommendations. For small boilers the Turbo-Undergrate Blower illustrated below can be used to good advantage for forced draft. For induced draft work, steel plate fans are generally used; and for forced draft, steel plates or turbovanes. Either engines-, motor-, or turbine-drive will be furnished. Geared turbine sets are often used.

Turbovane Fan.

This fan has been especially developed for high pressure forced draft work such as usually obtains in under-feed stoker installations and, although designed primarily for turbine drive, it is also used motor-driven. This fan is designed to operate at the economical speeds of Sturtevant turbines and, when so connected, it is a unit absolutely unique in its field.



TURBOVANE FAN WHEEL



TURBO UNDERGRATE BLOWER
For small boilers

THE NEW YORK BLOWER COMPANY

25th Place and Stewart Avenue
CHICAGO, ILL.

FACTORY
BUCYRUS, OHIO

BRANCH OFFICES

EAST ORANGE, N. J., 12 Railroad Place
CLEVELAND, OHIO, 365 Lennox Building
MINNEAPOLIS, MINN., 502 Plymouth Building
MEMPHIS, TENN., 477 South Main Street

Products and Services.

Manufacturers and erectors of HEATING and VENTILATING EQUIPMENT, including IMPROVED SECTIONAL HEATER, HIGH-EFFICIENCY MULTI-BLADE FANS, STEEL PLATE FANS, SPECIAL FANS for Drying Purposes, SHAVINGS EXHAUSTERS, DUST COLLECTORS or SEPARATORS, BLOWERS, FORGES, MECHANICAL DRAFT APPARATUS, AIR WASHERS, GALVANIZED PIPING, DIFFUSERS, DAMPERS, and DRY-KILNS.

PAPER DRYING by patented process.

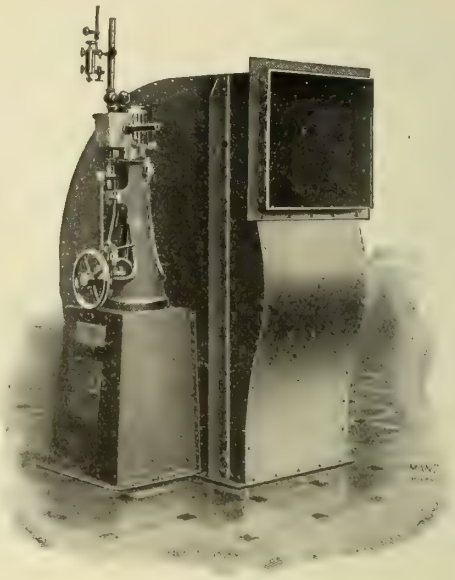
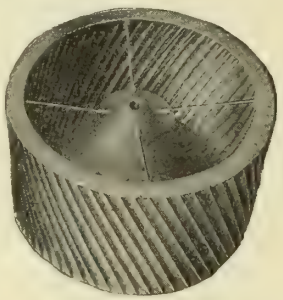


FIG. 1. STEEL PLATE FAN

Steel Plate and Multi-Blade Fans.

New York Blower Company Fans (Fig. 1) are made of the best grade steel plate it is possible to procure, of heavy gauge, and suitable for continuous operation under adverse conditions without undue straining.



FAN WHEEL USED IN MULTI-BLADE FANS

Air Washers.

New York Blower Company Air Washers are of the latest and most improved types, and are giving absolute satisfaction.

Drying Systems.

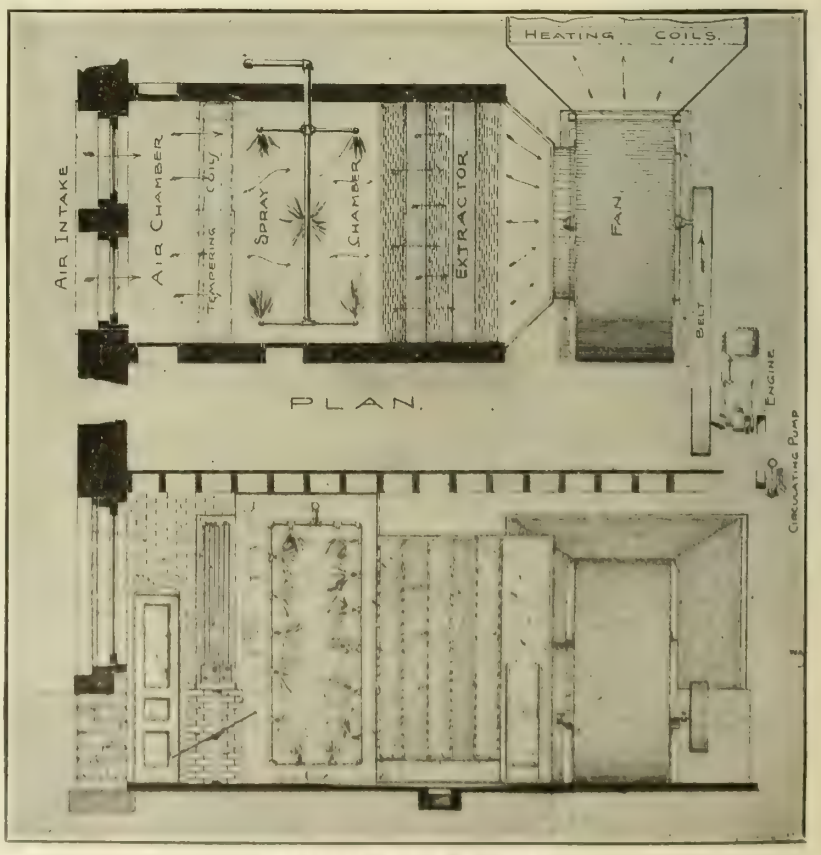
Special attention paid to the drying of paper, lumber, all clay products, starch and other materials.

Installation.

Our expert mechanics and engineers install our apparatus in the most scientific and practical manner, always having in view the specific working of the apparatus being installed. We have a force of draftsmen who are continually making plans and preparing specifications covering the heating and ventilating of public and private buildings.

Guarantee and Prices.

Our guarantee covers workmanship and quality of material, as well as capacity. Detailed catalogues and price-lists promptly furnished on application.



"PEERLESS" AIR WASHER

L. J. WING MFG. CO.

Manufacturers of Fans and Blowers

350-364 West 13th Street
NEW YORK, N. Y.

TELEPHONE, CHELSEA 7465-6

Products.

"DISC" and "SCREW PROPELLER" VENTILATING and EXHAUST FANS, Motor, Belt and Steam Turbine-driven; STEEL PLATE and MULTI-VANE FANS and BLOWERS.

Also, STEAM TURBINE BLOWERS for Mechanical Draft; DAMPER REGULATORS; FEED-WATER REGULATORS; POSITIVE PRESSURE BLOWERS, and VACUUM PUMPS.

Fan Requirements.

One of the most important service features of the modern building is its heating and ventilating equipment.

To be efficient this service must be both economical and continuous. For practical reasons the fan equipment is often exposed and so must be both sightly and noiseless. Since the fan acts naturally as a dust "magnet," the drive motor and bearings must be specially protected against dust. Finally, the capacity and the power requirements of the apparatus must be accurately determined to enable correct rating.

Quiet Operation.

Wing fans operate quietly at their standard rated speeds.

Dustproof and Reliable.

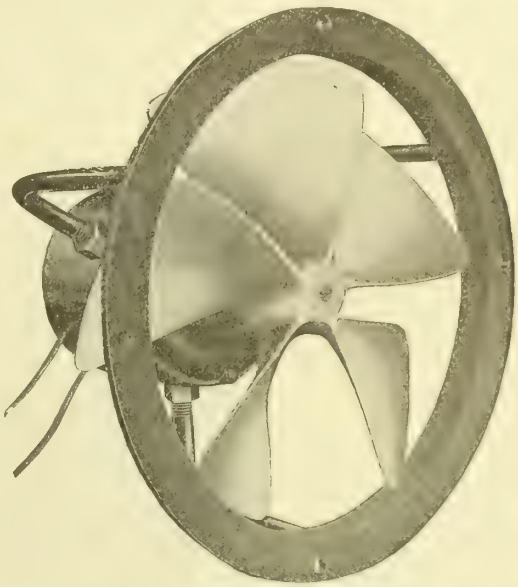
Drive motors are fully enclosed and absolutely dustproof. They are liberally designed to give continuous service under practical operating conditions. All parts requiring adjustment are easy of access.

Capacity and Power Ratings.

Our capacity and power ratings, determined by improved testing methods, are guaranteed to be correct for free air (exhausting into the atmosphere without resistance).

Wing "Screw Propeller" Fan.

To meet the ever increasing demand for fans of higher efficiency we have evolved the Wing "Screw Propeller" Fan illustrated here.



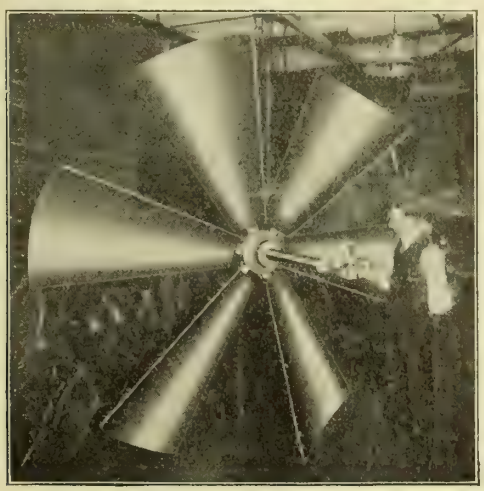
WING "SCREW PROPELLER" FAN

This fan has been designed to work effectively against heavy wind resistances and resistance offered by duct work in buildings, materials in drying rooms, etc. It is an evolution of the fan used with the Wing "Type E" Turbine Blower for mechanical draft for steam boilers, which service often requires static pressures ranging as high as 4 inches water gauge. It is not claimed that Wing "Screw Propeller" Fans in commercial units can reach as high pressures, as the speeds would be too noisy for ventilating work, but this serves to prove that the Wing "Screw Propeller" Fan is a pressure fan.

DATA, WING "SCREW PROPELLER" FANS

Diam. of Fan	Speed R.P.M.	Air del. ft. per minute	H.P. consumed	Diam. of Fan	Speed R.P.M.	Air del. ft. per minute	H.P. consumed
10"	2000	1,100	1/10	24"	850	5,000	3/10
	1750	950	1/20				
				30"	650	7,000	1/5
13"	1150	1,530	1/8				
	1500	2,000	1/6	36"	550	10,500	3/5
	1750	2,340	1/4				
				42"	475	13,500	3/4
17"	1150	3,150	1/4				
	1575	4,350	6/10	48"	450	18,500	1
	1700	4,700	7/8				
22"	1150	3,550	1/4				
	1575	4,850	6/10				
	1700	5,250	7/8				

Note—The 13-, 17- and 22-inch sizes in speeds above. 1500 revolutions per minute are designed for industrial plants and locations where a little noise is not objectionable. All other speeds given are "quiet speeds."



LARGE TYPE FAN

Fans larger than those listed are made as above, with proper supporting frames

Prices.

Bulletin No. 38 gives more complete information than the space here will permit, together with prices.

AREX COMPANY

J. C. KERNCHEN, President

Manufacturers of Siphonage Ventilators

107 South Dearborn Street
CHICAGO, ILL.

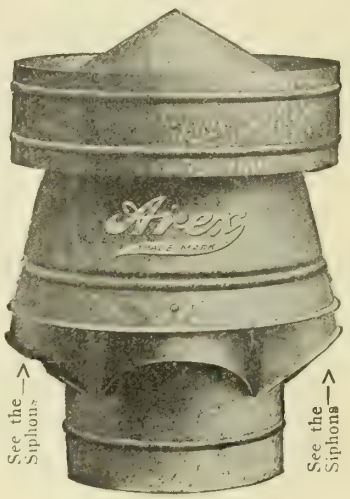
Product.

"Arex" Original Siphonage Ventilator, for ventilating Buildings, Cars, Ships, etc.

Description.

This ventilator, *the power fan's only rival,* is noteworthy for its ingenious siphonage feature, which is the result of ten years' analysis of air elements and study of wind currents.

The upper end of the eductor pipe is worked into four deflections, opposite which are four siphons, surrounded by a frustum, making four vacuo chambers. Thus are formed eight compartments, which create the most powerful natural vacuum conceivable. The upper part consists of a double conical deflector top, surrounded by a scientifically adjusted storm-guard.



"AREX" VENTILATOR (PATENTED)

The siphons are so placed that there is one for each point of the compass—north, east, south and west. They concentrate all passing wind currents into a steady, silent, pulling force. By means of the deflections opposite the siphons (see sectional view) the wind is turned into the continuous, powerful vacuum described above. "Arex" has no equal for quickly and completely removing foul air, warm air, fumes, gases, vapors, steam and smoke, regardless of the temperature within the building or the direction of the outside wind currents. No wind can enter the ventilator, for every opening *is an outlet.* "Arex" assures constant, positive ventilation under the most adverse conditions.

"Arex" is guaranteed storm-proof.

"Arex" shows greater exhaust than any other ventilator on the market. At a wind velocity of nine miles an hour, its capacity is three hundred cubic feet an hour per square inch outlet.

BOTTOM VIEW OF "AREX" VENTILATOR

Construction.

"Arex" is *union-made,* of only the best grades of galvanized sheet metal and copper. No solder is used; every joint is rigidly riveted and reinforced. "Arex" has no movable parts to rattle, no shutters or louvers to break off, no fancy trimmings to impede its ventilating action.

Advantages.

"Arex" can be installed on flat, slant or saw-tooth roofs, on skylights, monitors, etc.

"Arex" does the work of three ordinary ventilators and is surprisingly inexpensive.

Because of its tremendous exhaust, fewer or smaller "Arex" Ventilators are required for desired results.

"Arex" costs nothing for maintenance. It requires no attention and lasts longest. It is the most economical ventilator made.

SECTIONAL VIEW OF "AREX" VENTILATOR
Showing Siphonage System and extraordinary outlet for escape of air

Approval.

"Arex" has been approved by officials of the United States Government, as well as the leading and most prominent architects and engineers in the country.

"Arex" is conceded to be a scientific substitute for fans, blowers and other power-operated apparatus.

The United States Steel Corporation, Indiana Steel Co., Illinois Steel Co., Armour & Co., Morris & Co., Ford Motor Co., Chalmers Motor Co., Hupp Motor Co., Chevrolet Motor Co., American Bridge Co., Corn Products Refining Co., Continental Can Co., American Can Co., Bessemer Limestone Co., Board of Education of Chicago, and many other large concerns are satisfied users of "Arex."

Official Test.

An official test of the "Arex" Ventilator was made with anemometers inspected under various wind velocities, approved by the United States Government. The test was based on a wind velocity of nine and one third miles per hour, which is the gross average wind velocity of the United States.

The figures, which are official and accurate, are given in the accompanying table.

TEST DATA

Size of "Arex," Inches	Exhaust per Hour, Cubic Feet
4	4,189
5	6,545
6	9,425
7	12,828
8	16,755
9	21,206
10	26,180
12	37,699
14	51,313
16	67,021
18	84,823
20	104,720
22	126,711
24	140,796
26	176,976
28	205,251
30	235,619
36	339,293
42	461,813
48	603,187
54	763,407
60	942,477
66	1,140,397
72	1,357,167
84	1,847,236
96	2,412,743
108	3,053,626
120	3,769,900
132	4,561,621
144	5,428,667

How to Specify "Arex."

Simply multiply the cubical contents of the room by the number of air changes required per hour. The capacity table will tell exactly the size and the number of "Arex" to use.

A. M. BASMAN & CO.

Manufacturers of Ventilators

DETROIT, MICH.

Product.

The Detroit Siphon Ventilator.

Patent.

The Detroit Siphon Ventilator was patented at Washington, D. C., January 26, 1915, under patent number 1,126,348.

Description.

This is an absolutely stormproof ventilator, made on scientific principles, for the general ventilation of schools, theaters, hotels, factories, mills, stables, etc.

It is constructed of copper and non-corrosive iron. It has no movable parts, and is absolutely noiseless.

The object of this ventilator is to provide a construction that will induce an upward current within the gas-conductor. The invention relates to hoods or cowls for the upper ends of ventilators, chimneys, stovepipes and other conductors of gas. Air, vapor and smoke are included in the meaning of the word "gas," when that word is used in referring to this ventilator.

THE DETROIT VENTILATOR

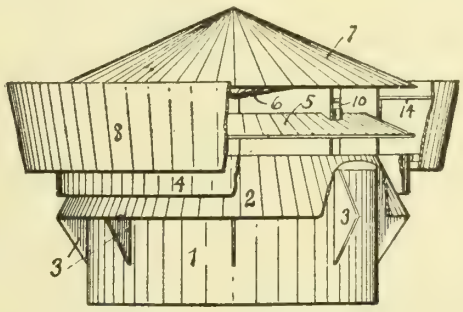
The invention to be noted in this ventilator is a frustro-conical skirting in combination with the upper, preferably detachable, end of a cylindrical stack, flue or pipe. This frustro-conical skirting surrounds that end and extends slightly above it.

An elevation of this improved ventilator is also shown on this page.

The upper cylindrical end (1), which may be mounted on a stack or flue, or be a part thereof, has secured to its outer edge a frustro-conical skirting (2), which is fastened in any suitable manner, but preferably by means of triangles (3). The upper edge of this skirting (2) is preferably of the same diameter as the cylinder (1), and is a short distance above it, so that the air striking against the cylinder may be accelerated in its upward movement and also have an ejector action on the gases passing upward through the cylinder.

Surrounding the skirting (2), and placed so that its upper edge is of substantially the same height as the upper edge of the skirting, is an inner storm band (4). The wind, no matter what its direction may be, strikes against the lower portion of the skirting (2) and passes up between it and this inner storm band (4). Because the space between these parts increases in size upward, the pressure of the air decreases. Immediately above the skirting (2) and the storm band (4) is a narrow deflector (5). Any gases that pass upward from the cylinder (1), and between it and the skirting (2), will pass upward within the deflector (5) and then flow outward when they come into contact with the second or upper deflector (6), which is secured to the lower side of the cap (7). The gases will then strike the edge of the cap (7) and flow out and up, uniting with the air that passes up between the conical skirting (2) and the inner storm band (4), and between the inner storm band (4) and the outer storm band (8).

When a blast of air is directed downward against this hood, it strikes the cap (7), the deflector (5) and the storm band (4), and is deflected outward by them, so that it will pass between them and the outer storm band (8). In the same manner rain will be prevented from entering the cylinder. Air that strikes the outer storm band (8) will be deflected outward and downward and have no effect whatsoever.



ELEVATION OF DETROIT VENTILATOR

Advantages.

The Detroit Ventilator will ventilate under any wind pressure; consequently, it will dispose *at all times* of impure air, gas, smoke and vapors. The air suction is continuous, and prevents down-draft and backward pressure of the air.

Because of its continuous disposal of foul air, gases, smoke and vapor, this ventilator improves the sanitary conditions of the factory, foundry, mill or other building on which it is used, and therefore lessens the chances of accident and of the employer's liability for compensation to injured workers.

The ventilator is noiseless; it has no movable parts.

Further Information.

Additional information concerning the Detroit Ventilator, with directions for fastening it in the best manner, will be sent on request; also concerning the discounts in price allowed under certain conditions.

PRICE LIST ON DETROIT VENTILATOR

Diam., Ins.	List Price	Gauge	Sq. In.
6	$6.00	26	28
7	6.35	26	40
8	6.75	26	50
9	7.50	26	64
10	8.35	26	78
12	10.75	24	113
13	13.50	24	134
14	15.75	24	164
15	20.50	24	177
16	23.50	24	201
18	28.00	24	255
20	35.00	24	314
22	38.50	22	380
24	42.00	22	453
26	50.00	22	521
28	61.50	22	615
30	70.00	20	707
32	81.50	20	804
34	90.00	20	908
36	105.00	20	1017
40	130.00	18	1257
42	140.00	18	1386
44	150.00	18	1620
48	160.00	18	1809
54	180.00	18	2390
60	200.00	18	2807
66	250.00	18	3456
72	275.00	18	4071

F. O. B. Detroit.

All ventilators 48 inches and over shipped K. D. Ventilator bases extra, larger sizes quoted on application.

THE BEST REGISTER COMPANY

Mushroom Ventilators

1500 Oklahoma Avenue
MILWAUKEE, WIS.

NEW YORK, N. Y., 26 Cortlandt Street
PHILADELPHIA, PA., 253 North 12th Street
JACKSONVILLE, FLA.
PITTSBURGH, PA., 906 Empire Building
CLEVELAND, OHIO, 816 Columbia Building
DETROIT, MICH., Builders Exchange
OAKLAND, CAL., 5300 Genoa Street
TORONTO and WINNIPEG, CAN.

Products.

MUSHROOM VENTILATORS for FLOOR, VENT or HEAT SUPPLY, Adjustable Head.

For Registers, Grilles and Screens, see our name in General Index.

Facilities.

The factory is equipped throughout with the most improved modern machinery. The capacity is unlimited; and the efficiency of the entire equipment, together with new methods of construction, ensure a high quality of workmanship and finish.

Description.

The "Best" mushroom ventilator head, consists of a circular head having a flange collar, to which the duct or flue pipe can be fastened; and a cap or cover, slightly crowned to properly diffuse the air currents, which is adjustable on a central threaded stud.

The hub in the center of the head has a threaded hole, which engages the stud of the cap. By turning the cap it is rapidly adjusted to be tightly closed or full open, and may be rigidly set in any desired position by tightening the lock nut, which is on the stud, at point of engagement with hub of head.

It will be noted thereby that the adjustment is not restricted only to a few absolute settings, as is the case with other mushroom heads, but that a range of adjustment is obtainable, at any point, from tightly closed to full open.

Uses.

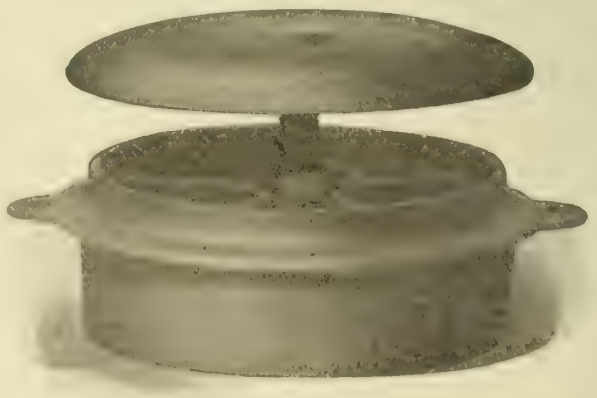
The "Best" mushroom ventilator is adaptable to use as either a supply or exhaust head. It is designed for heating and ventilating the auditoriums of theaters, schools, churches and public buildings, being especially suited to use in motion picture, or continuous performance theaters, where a rapid and continuous recirculation of tempered air is necessary.

Installation.

For installation on wood floor, three fastening lugs, drilled for flat head wood screws, are provided on the head.

For setting in concrete, the flange collar is of sufficient depth to connect to sleeve of duct, or longer cast collars can be made for the head to accommodate any thickness of concrete.

SECTION THROUGH CENTER OF MUSHROOM VENTILATOR
Showing threaded Hub of Head and Stud of Cover with Lock Nut



"BEST" MUSHROOM VENTILATOR

Made in five sizes to fit ducts or flues of the following diameters (dimensions being the size of the flue opening of duct): 4, 5, 6, 8 and 10 inches

THE BURT MANUFACTURING COMPANY

High-Grade Ventilators and Skylights

600 Main Street
AKRON, OHIO

GEO. W. REED & CO., MONTREAL, SOLE MANUFACTURERS OF "BURT" VENTILATORS FOR CANADA

Products.

Manufacturers of the "Burt" Sliding-Sleeve Glass-Top Ventilator, a combination Skylight and Ventilator, and the "Burt" Sliding-Sleeve Metal-Top Ventilator, for automatically removing impure air, hot air, smoke, steam or gas out of any building; "Burt" Fan Ventilator, "Burt" Sliding-Cone Damper Ventilator, and "Burt" Revolving Ventilator, designed to meet most difficult conditions.

Also, Skylights of standard form; Oil Filters and Exhaust Heads.

Construction of "Burt" Sliding-Sleeve Ventilators.

The "Burt" sliding-sleeve ventilator (Figs. 1, 2 and 3) are made only in the round pattern, of galvanized iron, brass, zinc, copper, or Toncan metal.

Great care is exercised in making the air shaft round; the sliding-sleeve damper being also perfectly round and fitting loosely against the pipe, slides easily up and down without friction. When the sleeve is at its highest point it is in contact with the top and completely closes the ventilator.

The sliding-sleeve damper is operated from below by means of a cord and pulley, and can be readily adjusted by the special attachment (patented), by which the rope is forced between the spring, and held permanently in place. The damper descends by gravity when the spring clutch is released, but it can be held firmly at any position wanted. It is not necessary to fasten the cord to a nail, hook, or post, as is the case where the common flat damper is installed. Also, there is nothing in the "Burt" ventilator to interfere with the operation of machinery, a frequent trouble where the flat damper method is used, from the way in which the cords require to be attached.

Exclusive Features—The "Burt" possesses the following features not found in any other ventilator:

(1) The telescopic or sliding-sleeve damper, which does not interfere with outgoing air currents, as do all flat dampers. It requires no attention after it has been installed and, having no flat movable surface set in the body of the pipe, does not collect dust or refuse to be shaken off into the building, as is the case with other dampers.

(2) A combination ventilator and skylight, in which the light is never shut out.

(3) The air shaft is unobstructed, and the air current never deflected downward.

(4) The temperature and ventilation of a building can be easily and exactly regulated by the use of the sliding-sleeve damper, which operates positively and is dustproof.

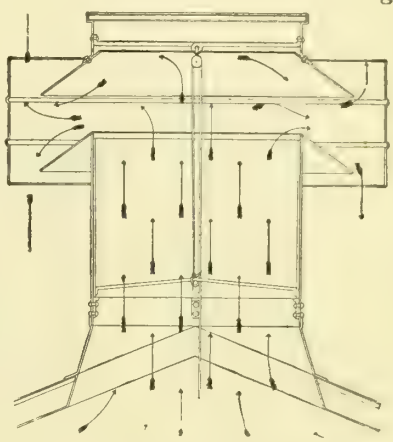


Fig. 1. "Burt" Sliding-Sleeve Ventilator
Arrows showing direction of air currents

(5) A condensation gutter (patented) placed under the rim of the glass collects all moisture, making it impossible for water to drop down into the rooms below.

(6) An especially designed band (patented) fastens the glass so that it can be shipped separately, and easily placed in position. If glass is broken it can be replaced without taking down the ventilator. No water can remain on the glass, and the ventilator is guaranteed absolutely stormproof.

The "Burt" Sliding-Sleeve Glass-Top Ventilator.

The "Burt" glass-top ventilator (Fig. 2) has a most important characteristic in that it constitutes both a skylight and ventilator. In many cases this makes the use of a regular skylight unnecessary. At times when it is desirable to close a ventilator, the "Burt" can be entirely closed without in the slightest degree obstructing the passage of daylight through it.

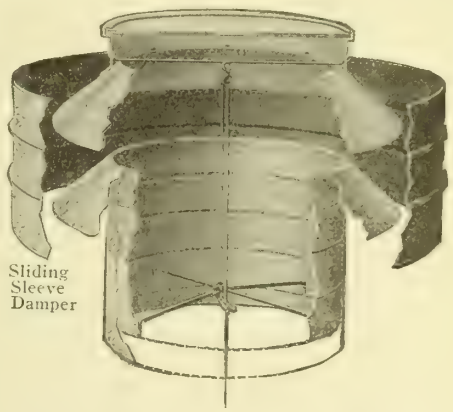


Fig. 2. Sectional View of "Burt" Sliding-Sleeve Glass-Top Ventilator

This feature is achieved by the patented damper mechanism which is, in fact, no damper at all in the ordinary acceptation of the term, but a slide sleeve which moves up and down, opening or closing to any desired degree the ventilating aperture.

The "Burt" is the only ventilator on the market having this valuable feature, which is fully protected by patents.

Continued on next page

In every other make of ventilator in which a glass top is used the common flat damper is employed, and when that damper is closed the light is wholly shut off.

The glass top is furnished in all sizes up to and including the 72-inch size. We use heavy wired glass of ample weight for each size.

The "Burt" Sliding-Sleeve Metal-Top Ventilator.

The "Burt" is made with a metal top instead of a glass top, when required (Fig. 3). With the exception of the top, both styles are precisely alike in construction and operation, but the metal-top style is a ventilator solely, and does not admit light. We furnish the sliding-sleeve damper in all metal-top ventilators, the same as in the glass-top style.

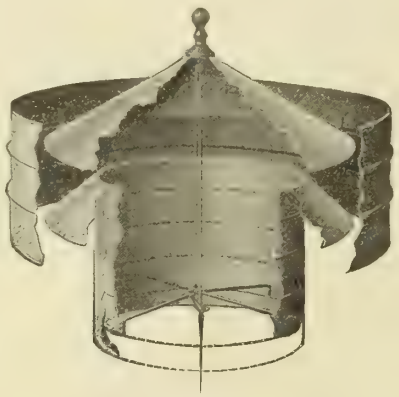


FIG. 3. SECTIONAL VIEW OF "BURT" SLIDING-SLEEVE METAL-TOP VENTILATOR

Specification Form.

"Furnish and set up 'Burt' ..... (glass or metal top) Ventilators with adjustable sliding-sleeve damper and clip for holding damper, of the size and number shown on plans, all to be made of ..... gauge galvanized iron (or copper or Toncan) and manufactured by THE BURT MANUFACTURING COMPANY of Akron, Ohio."

The "Burt" Fan Ventilator.

The attention of manufacturing concerns and mechanical engineers is directed to our fan ventilator.

This type of ventilator is designed only for most difficult conditions, and, at slight expense, will effectively and quickly remove excessive fumes and odors from blacksmith shops, dye houses, foundries, rubber factories, theaters, laundries and similar buildings. More economical than the average blower system.

Fan has a speed of 250 to 300 revolutions per minute, and is operated either from line shafting or by motor pulley drive or direct-connected. Power required to operate motor, about one quarter to one half horsepower.

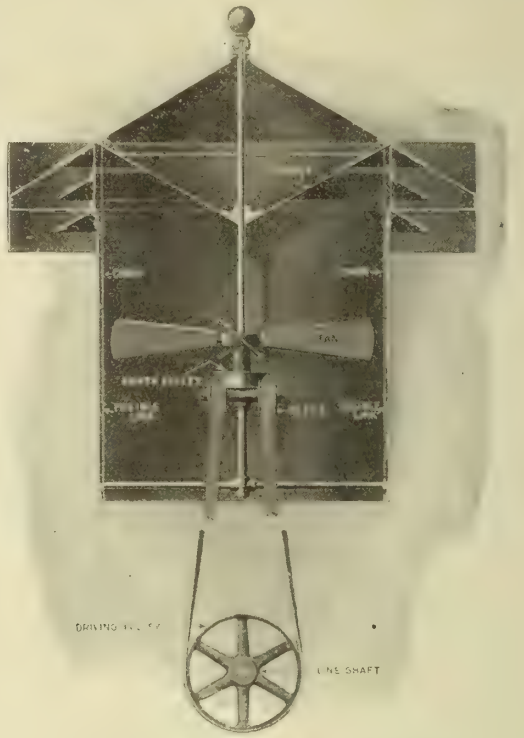


FIG. 4. THE "BURT" FAN VENTILATOR

Fan can be reversed to force cold air into the building, if desired.

In case of fire, fusible links will break, causing damper to drop and shut off draft.

Three stock sizes: 30-inch, 36-inch and 48-inch, but can be made in any required size above 30 inches.

The "Burt" Sliding-Cone Damper Ventilator.

This ventilator is designed by this Company to meet the demands of the trade for a strictly high-grade cone damper that possesses the merits of a good ventilator and at the same time has the important feature of closing automatically in case of fire.

PRICES, DIMENSIONS, WEIGHTS AND GAUGE OF IRON OF "BURT" SLIDING-SLEEVE VENTILATORS

Diameter of Neck	Price with Sliding-Sleeve Damper	Gauge of Iron	Diameter of Outside Rim or Band	Height of Glass Top Without Base	Height of Metal Top Without Base	Length of Air Shaft from Bottom of Wind Shield	Net Weight Metal Top Without Crating	Net Weight Glass Top Without Crating	Area of Diameter in Square Inches
12 inch	$5 00	22	22 in.	14 in.	17 in.	4 1/4 in.	17 lbs.	20 lbs.	113.10
14 "	7.50	22	24 "	15 "	17 1/2 "	4 1/4 "	20 "	24 "	153.94
16 "	10.00	22	26 "	15 1/2 "	19 "	5 "	24 "	30 "	201.06
18 "	12.50	20	29 "	16 "	21 "	5 1/2 "	28 "	34 "	254.47
20 "	15 00	20	32 "	18 "	23 "	5 1/2 "	33 "	42 "	314.16
24 "	18 00	20	38 "	22 "	26 "	6 "	45 "	56 "	452.39
30 "	25 00	18	46 "	24 "	30 "	6 "	90 "	105 "	706.85
36 "	37 50	18	54 "	27 "	36 "	8 "	130 "	155 "	1017.88
40 "	50 00	18	64 "	33 "	40 "	10 "	175 "	200 "	1256.00
42 "	54 00	18	68 "	34 "	42 "	10 "	190 "	225 "	1386.00
48 "	60 00	18	78 "	36 "	46 "	11 "	300 "	320 "	1809.00
54 "	70 00	18	86 "	40 "	51 "	14 "	350 "	400 "	2290.00
60 "	80 00	16	94 "	44 "	54 "	12 1/2 "	430 "	480 "	2827.00
66 "	90 00	16	102 "	46 "	55 "	15 1/2 "	500 "	550 "	3456.00
72 "	100 00	16	110 "	48 "	66 "	15 1/2 "	560 "	610 "	4071.00

Prices are f. o. b. Akron, Ohio.
Ventilator boxes are charged for extra, for which prices will be quoted on receipt of specifications.

Burt's Catalogue

Continued on next page

It is constructed with fusible link connection for automatic closing when fire occurs. Since the fusible link connection is sometimes insisted upon by the fire insurance companies, our customers may rest assured that the "Burt" sliding-cone damper ventilator will meet all of the requirements of the Underwriters' Association.

Fig. 5. "BURT" SLIDING-CONE DAMPER VENTILATOR With Cone Damper Closed

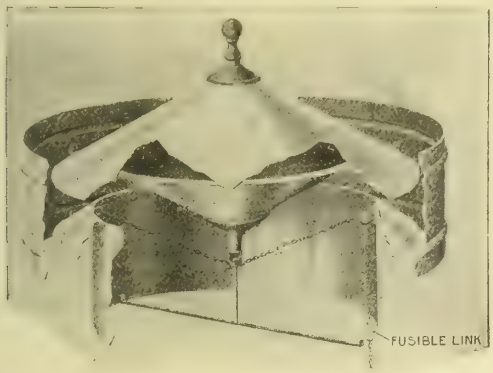


Fig. 6. THE "BURT" SLIDING-CONE DAMPER VENTILATOR With Cone Damper Open

Raising and Lowering Device—Patent applied for. Simple in construction and positive in action. This Company guarantees that damper will not stick or bind. Cone damper moves up and down on the center rod, and can be held in any position by means of the patented clip, so that it is not necessary to fasten cord or rope to nail, hook or post.

This style of ventilator is only made with metal tops. All sizes.

Dimensions—The gauge of iron and general outside dimensions of the "Burt" sliding-cone damper ventilator are the same as for the "Burt" sliding-sleeve damper ventilator.

Prices—The prices of the "Burt" sliding-cone damper ventilator are the same as the prices for the "Burt" sliding-sleeve damper ventilator mentioned on preceding page.

"Burt" Revolving Ball-Bearing Ventilator.

A late development in the "Burt" line of ventilators: neat, well constructed and highly effective. It is fitted with two sets of high-grade ball bearings, and is positively guaranteed not to stick or bind.

Its distinctive construction causes the exterior air currents to pass not only over the top and sides of the ventilator, but directly through the ventilator. This creates a partial vacuum, and greatly increases the pulling power of the ventilator in expelling the foul air from within. This same construction also has a tendency to hold the ventilator steady with the wind, thus preventing a continuous whirling motion which is a faulty feature to be found in some types of revolving ventilators.

Each ventilator is fully tested before shipment, thus insuring perfect balance.

If so specified, where bases are furnished by us, we will equip bases with dampers; if desired, the dampers can be of fire-retarding type which automatically close in case of fire.

Diameters of neck, weights of iron same as for "Burt" sliding-sleeve ventilator, tabulated on preceding page.

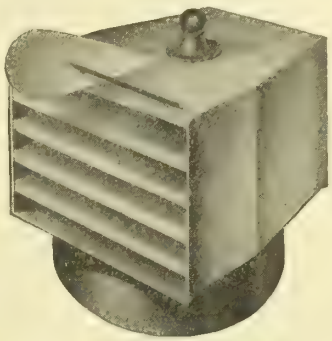


Fig. 7. "BURT" REVOLVING BALL-BEARING VENTILATOR

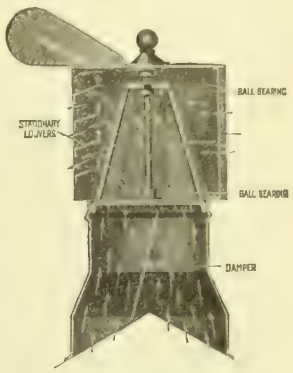


Fig. 8. SECTIONAL VIEW OF "BURT" REVOLVING VENTILATOR

Ordering, Etc.

In ordering bases always furnish sketch showing pitch of roof, and location of ventilators whether on ridge or slope, and round or square.

Ventilator bases are charged for extra, for which figures will be quoted on receipt of specifications. All bases equipped with dampers without extra charge.

Prices on ventilators made of copper, Toncan, American Ingot Iron, or any other material desired will be furnished on application.

Guarantee.

This Company expressly agrees to replace free of charge, any of its ventilators which shall at any time be found to have been defective in workmanship or material.

Co-Operative Service.

The engineering department of this organization will gladly and expeditiously co-operate with architects, contractors and others, in the selection of proper types and sizes of ventilators, to suit particular conditions and requirements.

Blue-prints of all types will be furnished on application.

References.

U. S. Steel Corporation, 325 orders; U. S. Government, 56 orders; Standard Oil Company, 130 orders; American Beet Sugar Company, 20 orders; Stone & Webster Engineering Corporation, 44 orders; American Steel & Wire Company, Cleveland, Ohio, 104 orders; American Steel & Wire Co., Waukegan, Ill., 69 orders; American Steel & Wire Company, Joliet, Ill., 23 orders; American Steel & Wire Co., De Kalb, Ill., 17 orders; Goodyear Tire & Rubber Company, Akron, Ohio, 12 orders; Firestone Tire & Rubber Company, Akron, Ohio, 17 orders; Canadian Pacific Railroad Company, Montreal, Canada, 13 orders; Sheffield Farms-Slawson-Decker Company, 38 orders; Imperial Tobacco Company, 10 orders; Union Pacific Railroad Company, 8 orders.

CENTURY VENTILATING COMPANY, INC.

MANUFACTURERS OF

Automatic Suction Ventilators

Miscellaneous Sheet Metal Products

TELEPHONE, GRAMERCY 4560

426 East 23rd Street

NEW YORK, N. Y.

Products.

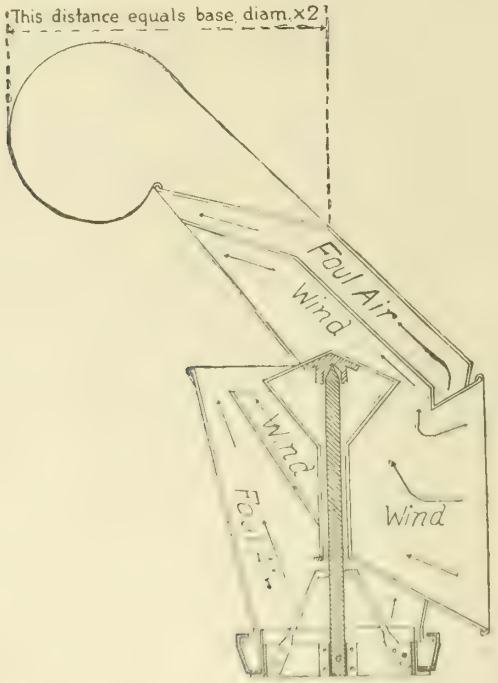
AMERICAN STANDARD AUTOMATIC AIR PUMP; "GEM" AUTOMATIC SUCTION VENTILATOR.

Scope of Use.

Both of above products will successfully remove foul air, fumes, vapor, etc., from all manner of buildings.

American Standard Automatic Air Pump.

Principle and Construction — The American Standard is so constructed as to cause the wind to take action on entire base area, giving it a greater pulling power than any other type of revolving air pump; and,



SECTIONAL VIEW, AMERICAN STANDARD AUTOMATIC AIR PUMP
(Patented)

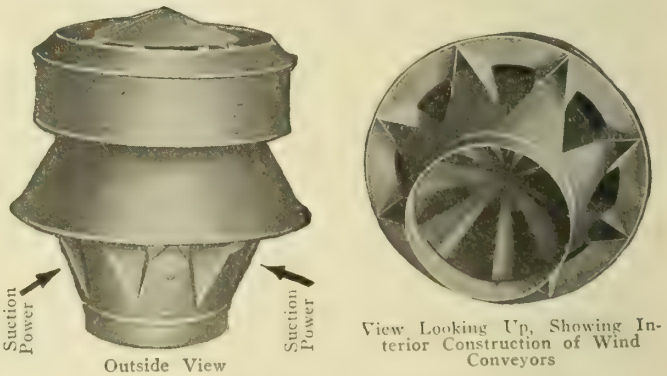
further, to prevent a down-draft should a cross current of wind enter vent outlet. It is the only revolving air pump from which a down-draft is impossible. Its No Down Draft feature will be readily seen by the fact that there is a direct connection between vent outlet and wind inlet; should the air pump be held so that wind would be allowed to enter vent outlet, the wind would continue through wind conveyor instead of entering the base. By revolving on a self-lubricating pivoted ball bearing, air pump is under control of slightest movement of exterior air, and, guided by a bronze bushing, its operation is noiseless.

Sizes and Displacement—Made in sizes of from eight to thirty inches in diameter; average displacement, one thousand linear feet per minute.

"Gem" Automatic Suction Ventilator.

Principle and Construction—In the construction of the "Gem," the wind takes a course through the ventilator in narrow streams, and the base area is divided into narrow spaces between the streams of wind, causing the wind to take action on its entire area, and create as powerful a suction as is possible.

The eight wind conveyors inserted in the lower conical shell continue through, terminating horizontally at center in triangular form, leaving like triangular spaces for the passage of the vitiated air; and, as the wind passes through the conveyors, a partial vacuum is



"GEM" AUTOMATIC SUCTION VENTILATOR
(Patent applied for)

formed in the spaces and a high automatic suction is created. The flaring wings connected to the exterior of the wind conveyors catch the wind, and serve as supporting bases for the upper conical shell through which the foul air passes to the stormproof construction of vent outlets above.

Having always an upward pressure, a down-draft is impossible.

Sizes and Displacement—The "Gem" ventilator is made from eight to seventy-two inches in diameter; average displacement, seven hundred linear feet per minute.

Prices.

Estimates furnished. These products do not compete in price with inferior natural draft ventilators, and should be specified alone.

DECATUR CORNICE & ROOFING CO., INC.

Manufacturers of Roof Ventilators

NEW DECATUR, ALA.

GENERAL AGENCY: DALLAS, TEX., Gaines & Dewees

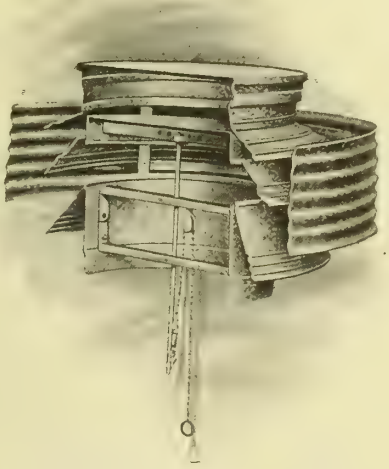
Products.

"Alabama" Roof Ventilators (Glass or Metal Tops); "Dixie" Metal Skylights and Awnings; Cornice and Special Sheet Metal Work from Architects' drawings; Gutters, Conductor Pipe and Elbows; Corrugated Wall Ties; Metal Lath; Corner Bead, Ridge Roll, Valley, Tin Plate, and Roofing; Ash and Garbage Cans; Metal Covered Windows; "Dixie" Galvanized Stove Boards; "Invisible Joint" Steel Ceiling; "Titelock" Metal Shingles and Tiles; Galvanized and Painted Steel Roofing; Felt Roofing; "Kantleke" Galvanized Roofing, Roofing Cement and Paint; Portable Houses.

For Steel and Iron Products, see our name in General Index.

"Alabama" Ventilator.

The "Alabama" Ventilator is made of galvanized, genuine open-hearth rust-resisting iron, and will positively never corrode. The corrugated rim affords the maximum of strength; extra wind guard eliminates back drafts; condensation trough prevents leaks.

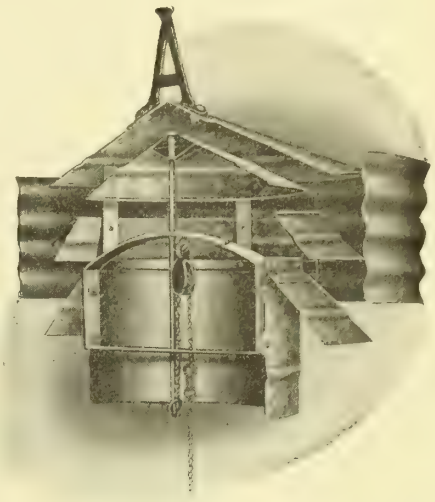


SECTIONAL VIEW OF GLASS-TOP "ALABAMA" VENTILATOR, WITH GLASS DAMPER

Unobstructed Air Shaft—The air shaft is unobstructed at all times, giving the maximum "pull."

Advantage of Glass-Top Type—Having glass tops of one quarter-inch fireproof wire glass admits light whether open or closed. Puttyless construction allows for expansion and contraction, reducing breakage of glass to a minimum.

Fire-Retarding Dampers—All "Alabama" Ventilators may be equipped with automatic sliding self-closing dampers, arranged with chain and fusible link to close automatically in case of fire. No counterweights are used to accomplish this result. Galvanized pulleys of correct size assure easy operation of the heavy galvanized chain, which never needs replacement. Damper adjustment easily and quickly made by a slotted device in damper bridge.



SECTIONAL VIEW OF METAL-TOP "ALABAMA" VENTILATOR, WITH METAL DAMPER

Guarantee—"We guarantee that each and every 'Alabama' Ventilator, both glass- and metal-top, with and without dampers, is regularly made of Galvanized Genuine Open-Hearth Iron, Rust-resisting Metal, absolutely free from defects in both material and workmanship when shipped from factory; and we hereby agree to replace or repair any Ventilator found defective, promptly upon receipt of advice."

Both metal- and glass-top Ventilators, with dampers, are guaranteed positively weatherproof under all conditions.

SIZES, PRICES, ETC., "ALABAMA" VENTILATORS

Diameter of Stem, Ins.	No. of Cu. Ft. Discharge per Hour	Area of Stem, Sq. Ins.	Diameter of Corrugated Rim, Ins.	Gauge of Iron	Metal Top, No Damper		Metal Top, With Damper		Glass Top, No Damper		Glass Top, With Damper		Round Bases	Square Bases
					No.	Price	No.	Price	No.	Price	No.	Price	Price	Price
8	7530	50.2	17	27	8M	$2.00	8MD	$3.00	8G	$3.00	8GD	$4.20	$1.33	$2.00
10	11775	78.5	20	27	10M	2.40	10MD	3.40	10G	3.75	10GD	4.90	1.33	2.00
12	16950	113.1	22	26	12M	2.80	12MD	3.80	12G	4.50	12GD	6.25	1.33	2.00
14	23100	153.9	25	24	14M	4.00	14MD	5.15	14G	6.75	14GD	8.65	1.67	2.66
15	26500	176.7	28	24	15M	5.00	15MD	6.25	15G	8.65	15GD	10.00	2.00	3.16
16	30150	201.1	32	24	16M	6.00	16MD	7.35	16G	9.00	16GD	11.10	2.33	3.67
18	38175	254.5	34	24	18M	8.00	18MD	9.55	18G	12.00	18GD	14.25	3.00	4.33
20	47130	314.2	37	22	20M	10.00	20MD	11.75	20G	15.00	20GD	17.80	3.33	5.00
24	67860	452.4	42	22	24M	12.00	24MD	14.00	24G	18.00	24GD	21.60	4.33	6.33
30	106050	706.9	52	22	30M	17.00	30MD	19.40	30G	27.00	30GD	31.95	5.33	7.66
36	152100	1017.8	62	20	36M	28.00	36MD	30.80	36G	40.50	36GD	46.70	7.67	11.33
40	188550	1256.6	68	20	40M	40.00	40MD	43.70	40G	54.00	40GD	61.10	9.33	16.00
44	228000	1520.5	74	20	44M	45.00	44MD	49.45	44G	60.00	44GD	69.50	10.88	17.33
48	271500	1809.5	84	20	48M	50.00	48MD	55.20	48G	64.50	48GD	74.40	12.33	18.66
60	424110	2827.4	100	18	60M	68.00	60MD	76.00	60G	90.00	60GD	107.40	22.00	32.66
72	610725	4071.5	124	18	72M	85.00	72MD	95.55	.....	...	.....	.....	.....	.....

GLOBE VENTILATOR COMPANY

205 River Street
TROY, N. Y.

Products.

We are sole manufacturers of "Globe" Ventilators and Chimney Caps, "Globe" Car Ventilators and Lamp Jacks, "Globe" Barn Ventilators; also, "Globe Ventilated Ridging."

Description of "Globe" Ventilators.

The "Globe" ventilator is simply and strongly constructed, symmetrical in appearance, absolutely stormproof, and it furnishes a continuous exhaust with no downward draft. It is scientifically correct in principle and construction, and has back of it over thirty-six years of proved efficiency.

Our glass-top ventilators possess all the qualities of our metal top ventilators, and are designed for use where it is desired to secure the greatest degree of ventilation and the largest area of light.

Uses.

The "Globe" ventilator is especially adapted for removing excessive heat and foul air from churches, schoolhouses and public buildings; for exhausting steam, smoke and gases from mills, foundries and factories; and impure air, moisture and odors from barns and stables; in fact, it meets every requirement of a stationary ventilator.

Sizes, Capacities, Prices.

We give below sizes of "Globe" ventilators, gauges of galvanized iron used in their construction, a table showing area of vent pipe in square inches, also approximate volume of air the "Globe" ventilator will exhaust per hour with the wind blowing about seven miles an hour. We also show price-list on "Globe" ventilators without bases from which discounts will be quoted upon application.

Sizes, Inches	Gauge of Iron	Area, Square Inches	Extreme Outside Diameter, Inches	Cubic Feet Exhaust Per Hour	Price-List (Liberal Discount)
2	26	4	4¾	460	$1.00
3	26	7	6¾	950	1.50
4	26	13	7¾	1500	1.75
5	24	20	10	2180	2.50
6	24	28	11¼	3215	3.40
7	24	38	12½	4590	4.00
8	22	51	14	5740	4.65
10	22	79	17	8950	5.75
12	22	113	18¾	12970	6.75
14	20	154	25	18800	13.00
15	20	177	25	20300	16.00
16	20	201	27½	23060	20.00
18	20	255	32	29250	27.00
20	20	314	36½	35990	33.00
24	20	453	43½	51935	40.00
26	20	531	44	59730	50.00
28	20	616	50	70500	56.00
30	18	707	50½	81050	65.00
32	18	804	54	92170	80.00
34	18	908	54	104090	100.00
36	18	1017	68	116575	120.00
40	18	1257	74	144090	180.00
42	18	1385	74	158900	190.00
44	18	1520	74	174360	200.00
48	18	1810	84	207510	240.00
50	18	1963	88	240675	260.00
54	18	2290	92	274000	300.00
60	18	2828	99	321750	360.00
72	18	4072	111	466625	480.00
84	18	5542	126	634890	600.00

Chimney Caps and Ventilated Ridging.

Our chimney caps prevent downward currents in chimneys and increase drafts in sluggish flues.

The "Globe" Ventilated Ridging is for use on buildings where it is not desired to break the sky line by placing ventilators.

DOME TOP "GLOBE" VENTILATOR

GLASS TOP "GLOBE" VENTILATOR

"GLOBE" BARN VENTILATOR
For Barns, Stables, Creameries and Silos, furnished with or without Weather Vanes

KERNCHEN COMPANY

Ventilating Engineers

TELEPHONE, HARRISON 3072

McCormick Building
CHICAGO, ILL.

NEW YORK OFFICE: 1265 BROADWAY—Telephones, Madison Square 2769 and 9478
AGENCIES IN ALL PRINCIPAL CITIES

Products.

KERNCHEN SIPHONAGE VENTILATORS (Patented), with or without Dampers.

Kernchen Siphonage Ventilator.

For any type of building or enclosure, railway and street cars; chimneys, defective drafts, etc.

The Kernchen Siphonage Ventilator does the work of three others, save this cost.

The siphon is the most powerful force known to gravity science.

The siphons harness the most delicate air currents, compressing and compelling them to coact in terrifically increasing the upward movement of air through the ventilator.

The Kernchen Siphonage Ventilator is in one piece and stationary. It has no mechanism to get out of order. It has no loose parts to clog up. Nothing rotary or revolving. No cost to operate or for maintenance. Nothing flopping around. No sliding sleeves.

Stormproof—It is guaranteed absolutely and positively stormproof.

CAUTION—Beware of imitations and infringements. Protect yourself by specifying as follows: "Kernchen Siphonage Ventilators, manufactured by KERNCHEN COMPANY, McCormick Building, Chicago, Ill.," and see that Kernchen Company brass tags are on ventilators.

Booklet—"It Pulls."

A postal will bring our latest illustrated booklet, entitled, "It Pulls," containing complete information concerning the Kernchen Siphonage Ventilators, and giving prices, weights and gauge of metal, etc., of the various sizes, together with a few of our numerous testimonial letters.

Our Engineers are at your service, gratis.

Send your plans to us. Let us specify for you. We keep ethical in all instances.

Official Tests.

Below are two indisputable evidences of efficiency proved by Science and Official Tests.

Note these Official Tests signed by eminent authorities who conducted them.

The Case School of Applied Science Official Test was made on the roof of a building.

The Armour Institute Official Test was conducted in the laboratory

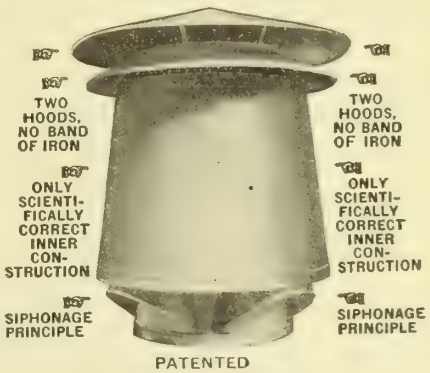
Note corroboration, verification, and scientific proof.

We challenge all to furnish such signed, Institutes of Technology Official Tests.

OFFICIAL TEST OF KERNCHEN SIPHONAGE VENTILATORS, MADE BY ARMOUR INSTITUTE OF TECHNOLOGY, CHICAGO

SHOWING EXHAUST UNDER DIFFERENT WIND VELOCITIES, AND WHICH SCIENTIFICALLY PROVES 100 TO 300 PER CENT MORE EFFICIENCY THAN THAT OF ANY OTHER VENTILATOR

Wind Velocity, Miles per Hour	Air Velocity in Ventilator, Feet per Minute	Size of Ventilator, Inches	Cubic Feet Air through Ventilator									
			12	14	16	18	20	24	30	36	40	48
5	460	Per Min.	364.0	492.2	644.0	814.2	900.0	1,444	2,250	3,247	4,000	5,776
		Per Hr.	21,840	29,532	38,640	48,852	54,000	86,640	135,000	194,820	240,000	346,560
10	670	Per Min.	525.0	717.0	938.0	1,186	1,460	2,103	3,280	4,730	5,830	8,412
		Per Hr.	31,500	43,020	56,280	71,160	87,600	126,180	196,800	283,800	349,800	504,720
15	960	Per Min.	754.0	1,027	1,344	1,699	2,100	3,014	4,700	6,777	8,350	12,056
		Per Hr.	45,240	61,620	80,640	101,940	126,000	180,840	282,000	406,620	501,000	723,360
20	1,220	Per Min.	957.0	1,305	1,708	2,159	2,660	3,830	5,980	8,613	10,610	15,320
		Per Hr.	57,420	78,300	102,480	129,540	159,600	229,800	358,800	516,780	636,600	919,200
25	1,480	Per Min.	1,161	1,584	2,072	2,619	3,230	4,647	7,250	10,448	12,870	18,588
		Per Hr.	69,660	95,040	124,320	157,140	193,800	278,820	435,000	626,880	772,200	1,115,280



KERNCHEN SIPHONAGE VENTILATOR

(Signed) G. F. GEBHARDT, A. H. ANDERSON, Mechanical Engineers, Armour Institute of Technology.

CASE SCHOOL OF APPLIED SCIENCE—TEST NOV. 6, 1913 ON ROOF OF BUILDING		ARMOUR INSTITUTE OF TECHNOLOGY—TEST APRIL 17, 1911 IN LABORATORY
15 inches	Diameter of Ventilator	15 inches
5.32 miles per hour, or 6⅔% stronger than Armour	Velocity of Outside Wind	5 miles per hour
497	Velocity of Air through Ventilator per minute, lineal feet	460
610	Exhaust of Ventilator per minute, cubic feet	564
Outside Temperature, 67° Fahr.	Inside Temperature, 85.8° Fahr.	

(Signed) F. H. VOSE,
Head of Mech. Eng. Dept.,
Case School of Applied Science.

(Signed) G. F. GEBHARDT,
A. H. ANDERSON,
Mech. Engrs., Armour Institute of Technology.

KING VENTILATING COMPANY

MANUFACTURERS OF

King System of Ventilation and King Aerators

1178 North Cedar Street

OWATONNA, MINN.

Products.

KING SYSTEM OF VENTILATION for Farm Barns and Creameries; KING AERATORS.

King System of Ventilation.

There are three units in the King System of Ventilation: the King Aerator, which is the part above the roof; the Foul Air Flues, and the Fresh Air Intakes. It is the proper application of these three units that insures satisfactory results. Each King Barn Ventilation System is designed individually for the building it goes into. Just as there are no two buildings exactly alike, neither are there two ventilating problems the same. We take the plan of the building, study its construction—how many head of stock it has to house—and plan the King System to meet the requirements of that particular building.

Because of the excessive moisture and the great quantities of carbonic acid gas continually being thrown off by the live stock, these buildings present an entirely different problem in barn ventilation than that found in any other building.

King Aerator.

The part above the roof is the aerator. It is made on the siphon principle. Fig. 1 shows how the air pours out on the windward side as well as on the leeward side. This principle insures the greatest efficiency, by causing a more rapid movement of the air.

There are no moving parts to get out of order nor anything on the inside to prevent a free movement of the air at all times. The King Aerator is made in ten sizes. There is a size for every building. It is also made with a round base for round buildings, and with octagon base for octagon buildings; also, in several sizes for silos.

All King Aerators are made of the very best grade of special coated galvanized steel, with satin silver finish. They are beautiful in design and add many times their cost to the appearance of the building.

Foul Air Flues.

This is the unit of the King System through which is discharged the air from the room below into the King Aerator on the roof. The aerator, therefore, cannot move any more air from the room than will pass through the foul air flues. Size of the flues must be governed by the size and construction of the building and number of head of stock to be housed. It is made of galvanized steel, thus insuring a tight flue at all times; is equipped with dampers and doors which

FIG. 1.
FOUL AIR FLUE

are used to regulate the temperature of the building and to insure the proper circulation in all parts of the room.

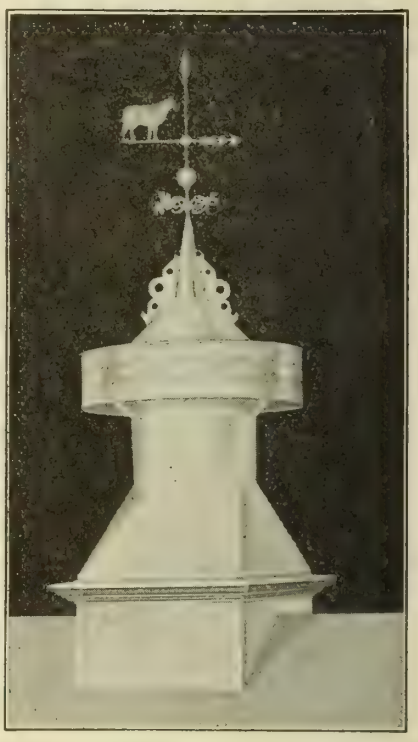


FIG. 2. KING AERATOR
First part of the King System of Ventilation

SIZES AND PRICES

No.	Flue	Price
50	13 inches	$20.00
100	16 inches	25.00
200	20 inches	32.00
300	24 inches	37.00
350	28 inches	40.00
400	30 inches	45.00
500	36 inches	50.00
600	40 inches	55.00
700	44 inches	60.00
800	48 inches	65.00

Fresh Air Intakes.

This unit is the supply valve for the system. As the temperature of the building must be under control during cold weather it is necessary that the intakes be properly controlled, so as to hold the animal heat in the building and still admit the proper amount of fresh air through it into the room. These intakes are made in many different sizes, to conform to the requirements of each individual building.

BUILDING WITH KING AERATORS
Note beauty and refinement

Farm's Contract

Continued on next page

Creamery Ventilation.

Just as in barn ventilation, there are three units to the King Ventilating System for Creameries, but these units must be applied in an entirely different way.

Proper ventilation of creameries has long been a big problem—not only among creamery owners, but architects and contractors as well. The difference in the problem of creamery and barn ventilation is that in a barn there is always about the same amount of moisture being discharged from the stock at all times, while in a creamery there is a greater quantity at one time and this must be removed more rapidly.

If this excessive moisture is left in the building it reduces the life of the building and its contents, including belts, machinery, etc. The moisture is also the cause of many of the diseases which have reduced the time of the buttermaker to an average of twelve years in service.

King System, planned individually for the building it goes into, discharges this excessive moisture: First, through a series of flues that take out a greater part of the steam; second, through the flues that take out the damp, heavy air which cannot be removed with the steam.

Your endorsement of the King System for Creameries will give you a prestige that comes only from recommending the best system of ventilation.

RIVER FALLS CO-OPERATIVE CREAMERY, RIVER FALLS, WIS.

From R. P. Colwell, Mgr. and B. M.—The King System we installed in our new creamery one year ago works perfectly. We were using a Wizzard open vat for pasteurizing when the weather was 40° below zero, and had no trouble with moisture on the walls.

GILT EDGE CREAMERY, OWATONNA, MINN.

From Alfred Camp, B. M.—We are never bothered with damp or sweaty walls or ceiling and our floor is dry in less than an hour after we are through with our work. Such results lead me to believe that many good butter-makers are handicapped because their creameries are not properly ventilated.

King Aerators are furnished with vanes of any of the following designs: Horse, Cow, Bull, Auto, Hog, Rooster, Sheep and Arrow. Lightning Rod Attachment, $3.00 extra.

Experience.

Our experience is your gain. We have planned and installed Ventilating Systems in many types of creameries; we have learned through these many years of experience the best and most economical way to remove excessive moisture from the workrooms with the least possible loss of heat.

Book on Creamery Ventilation.

In searching the libraries of many of the largest cities we have been unable to find anything on this very important subject, and have, therefore, written a book which is illustrated and which you can secure now for the first time by sending a postal to us.

You can also have our book on Barn Ventilation free, if you will write for it. We will send you the Professor King Book on Ventilation for 10 cents to cover postage and packing; it has always sold for 75 cents.

GENEVA VILLAGE CREAMERY, GENEVA, MINN.

From John Grosser, B. M.—King Ventilating System works good, does all you claim for it. The creamery and all the machinery, including belts, etc., are dry and it is a more healthy place to work in.

CLARKS GROVE CREAMERY, CLARKS GROVE, MINN.

From J. C. Johnson, Sec'y—Herewith find check for the Ventilating System installed in our creamery. We now see our mistake in not putting it in sooner, as the ceiling is in bad shape and must be replaced soon. "King" does dandy work in our creamery. Kings may have equals, but if there is anything better than the King Ventilating System we do not know it.

KNOWLES MUSHROOM VENTILATOR CO.

SUCCESSOR TO GEO. E. KNOWLES

9 Church Street

NEW YORK, N. Y.

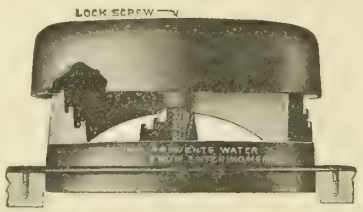
TELEPHONE, CORTLAND 7811

Products.

KNOWLES "NOTCH" AIR CONTROLLING HEAD or VENTILATOR (Patented), for Indirect Heating and Ventilating.

Description.

The Knowles "Notch" Air Controlling Head is constructed to evenly regulate the flow and deliver an equal quantity of air in all directions, whether wide open or only partly open



KNOWLES "NOTCH" AIR CONTROLLING HEAD

Uses.

The Knowles "Notch" Air Controlling Head is used in connection with the indirect or mechanical system of heating and ventilating the auditoriums of Theaters, Schools, Churches, Public Buildings, etc., and is equally effective in either the Up-Draught or Down-Draught methods.

It is located on the floor under the seats, and connected with the plenum chamber, or ducts, through which either hot or cool fresh air is forced by a blower fan.

The openings in head are adjusted by simply raising or lowering the top part (hood) and resting it in the notches and locking with screw (not thumb-screw), assuring uniform distribution without draught. Absolutely rigid, no knocking nor stepping on can possibly disturb or break this head when set at the desired opening and screw tightened.

SHOWING APPLICATION OF KNOWLES "NOTCH" AIR CONTROLLING HEAD UNDER THEATER CHAIRS

Construction.

It is composed of two interlocking parts, a hood or top piece and the bottom or floor piece, which are easily and quickly adjusted by simply releasing a top lock screw, by which means the hood is raised or lowered to the desired opening, corresponding to the notches on the head, of which there are four. It is made of cast iron, and is absolutely rigid.

The opening is adjusted, depending upon distance from fan, so that head delivers the same quantity of air which is distributed uniformly throughout auditorium.

This device cannot be tampered with, as the lock screw makes it fool proof. A raised rim above the floor prevents water, dirt, etc., from entering the head.

Application.

When ventilators are installed on a wood floor, they are fastened securely by means of three lag screws and are connected with the plenum chamber or duct by a galvanized iron sleeve. For concrete floors, if desired, a cast-iron sleeve is provided, which may be set in place before concrete is poured. The head is then attached to floor by means of expansion bolts, making a very rigid connection. Or a head with special floor piece may be used—this has three drop lugs extending from floor flange, which secure head when cement top dressing is set.

Sizes and Weights.

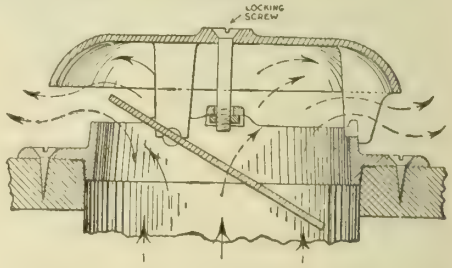
These heads can be made in any size to suit your conditions. 4-, 5-, 6- and 8-inch sizes promptly supplied. Full-size prints and prices furnished on application.

SIZES AND WEIGHTS

Diameter Head, Inches	Diameter, Inches	Area, Square Inches	Weight, Pounds	Weight, Ounces
4½	4	12.566	1	12½
5½	5	19.635	2	10
6½	6	28.274	3	7
8½	8	50.625	6	3

Single and Double Damper Air Diffusers.

We are the original manufacturers of the Single Damper and Double Damper Mushroom Air Diffusers.



KNOWLES AIR-CONTROLLING HEAD AND DIFFUSER
Single Damper Style

Knowles Air Controlling Head and Diffuser, Single Damper Style, is made of cast iron in the following sizes:

4 8s-inch opening.....6-inch head
5 " " .....6 " "
8 " " .....9 " "

Full-size blue-prints and prices furnished on application.

The Knowles Air Controlling Head, Twin Damper Style, is made of cast iron. The dampers are so arranged that they may be turned in either direction, thus allowing the air to be delivered to the center of the cap or to the sides, as desired. The twin dampers may be quickly adjusted to any desired opening, depending upon the distance from fan, and locked so that the flow of fresh air is *uniformly* distributed throughout the auditorium without draughts. The gates are controlled by one locking screw. It is made in 8-inch size, with 9½ inch diameter hood. Send for booklet.

THOMAS LEE

Manufacturer of Dampered Ventilators

OFFICE AND FACTORY
128-132 West Second Street
CINCINNATI, OHIO

Products.

LEE DAMPERED VENTILATORS (Patented) with Metal or Glass top; RAIN WATER STRAINERS.

For Metal Windows, Tin-Clad Fire-Doors and Metal-Clad Paneled Doors, see our name in General Index.

Special Features of Lee Ventilators.

Lee Ventilators possess these important features:

A simple, powerful damper-operating device that will not get out of order.

A damper-locking device that will permit the damper to be adjusted so that the amount of ventilation desired can be obtained.

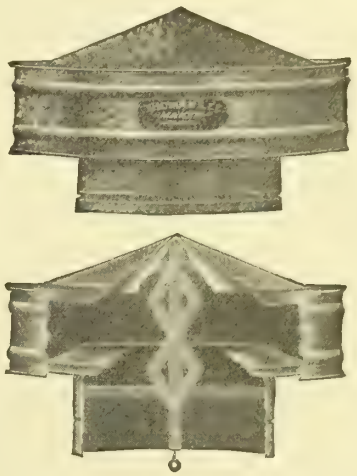
A damper that cannot bind.

Adaptability—The Lee Ventilator is especially desirable for churches, schoolhouses, residences, factories, barns, or any building demanding perfect ventilation.

The Glass Top style should be used where the maximum amount of light and ventilation is desired, and will in many cases serve the purpose and save the expense of a skylight.

Materials and Sizes—Lee Ventilators are made of heavy galvanized iron or copper, firmly braced, riveted and soldered. In sizes from 12 to 96 inches in diameter, with or without damper. Less than 12-inch size are not made with damper.

Prices—Price-list, with discount, will be furnished upon application. If bases are required they are charged extra. Prices of Glass Top and Copper Ventilators will be given upon receipt of schedule of sizes required.

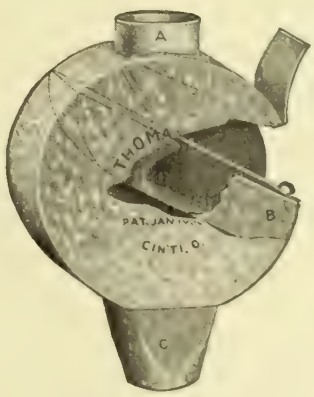


Damper open and locked
METAL-TOP VENTILATOR
(Patented)

Damper closed
GLASS-TOP VENTILATOR
(Patented)

Lee Straining Joint.

Prevents insects, dead leaves and all foreign matter from entering cistern. It is the simplest yet most useful device ever invented to keep the cistern free from all manner of pollution.



STRAINING JOINT

Co-operative Service.

Any further information desired will be furnished on application to those interested in Lee Ventilators or Straining Joints.

THE MACK VENTILATOR CO.

Sole Manufacturers of the Mack Ejector-Ventilator

602-603 Swetland Building

CLEVELAND, OHIO

Products.

The Mack Ejector-Ventilator.

Scope of Use.

The Mack ejector-ventilator is particularly valuable in ventilating mills, factories, breweries, dry houses, power-houses, theaters, schools, dairies, creameries, dairy barns, large office buildings, warehouses, private dwellings, stores, stables and other buildings where proper ventilation and air circulation are required. The Mack ventilator is particularly adapted to the requirements of moving picture theaters and dark rooms of photo supply manufacturers, where ventilation is very often insufficient.

Description and Operation.

The Mack ejector-ventilator is strongly constructed of sheet metal; and, as shown in illustrations, is a combined weather-vane and ventilator.

This ventilator is so designed that it points directly into the face of the wind, deflecting the air current through three separate horizontal ducts which cover the head. These ducts, decreasing in size toward the discharge ends, compress the current so that it discharges at high velocity.

This powerful ejector-discharge generates a pull, or partial vacuum, inside the head, causing a strong suction in the stack, independent of temperature. This causes the impure air from the building below to be drawn up and ejected through the ventilator.

It is impossible for rain or snow to enter stack or ventilator, as it is designed to be absolutely weatherproof.

Down-draft or back-pressure of outside air is impossible.

Wind Velocity.

The average wind velocity for the year is from nine to eighteen miles per hour, according to geographical location. The low and rarely measured velocity of two and one half miles per hour is sufficient to create a suction in the Mack ventilator. As its operating power is constant, this ejector-ventilator is effective twenty-four hours of every day.

Bearings.

Freedom of motion and absolutely noiseless operation are obtained by using an inverted bronze cone-bearing. The repairs and attention required by ball or other bearings are eliminated. Upon the slightest shift in the direction of the wind, the Mack ventilator responds and maintains its steady draw.

Efficiency.

Fewer Mack ejector-ventilators and of smaller size will discharge more air, smoke, or gas in a shorter time than can be accomplished by other ventilators of larger size and numbers. They work at all times and under all conditions without attention or cost for operation, and are as efficient as ventilating fans without the cost of power.

Co-operative Service.

In the engineering department of this Company are experts on ventilation, who will study architects' ventilation problems and give suggestions absolutely free of charge.

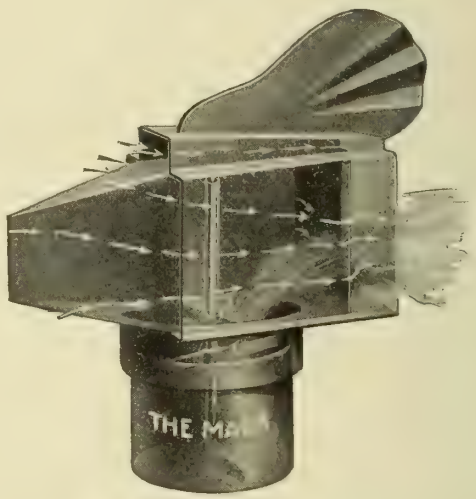


DIAGRAM OF MACK EJECTOR-VENTILATOR

DATA, MACK EJECTOR-VENTILATOR

Sizes	Weight	Displacement	Price
No. 4	15 lbs.	4,300 cubic feet per hour	$18.00
" 6	18 "	9,600 " " " "	27.00
" 8	20 "	17,000 " " " "	36.00
" 10	35 "	26,600 " " " "	45.00
" 12	45 "	38,400 " " " "	54.00
" 14	65 "	52,200 " " " "	63.00
" 16	85 "	68,200 " " " "	72.00
" 18	120 "	86,300 " " " "	81.00
" 20	135 "	106,500 " " " "	90.00
" 24	185 "	153,400 " " " "	108.00
" 30	265 "	230,000 " " " "	180.00
" 36	450 "	278,000 " " " "	216.00
" 42	560 "	326,000 " " " "	294.00
" 48	725 "	374,000 " " " "	336.00

Specification.

An ejector type of revolving ventilators to be used which will exhaust horizontally with the wind current.

Ejector discharge to be uniform throughout; at no point to be of less velocity than another.

Exhaust opening of head to be greater area than stack itself, and have no obstruction to the stack flow placed for weather protection purposes.

Revolving section of ventilator to be supported by a bronze cone, inverted so that the socket may hold a lubricant.

Ventilator must be supported by a steel bar across top that no weight strain be borne by sheet metal.

Type used to be the Mack Ejector Ventilator as manufactured by The Mack Ventilator Co., 602 Swetland Building, Cleveland, Ohio.

Continued on next page

Testimonial.

CLEVELAND, OHIO,
October 29, 1913.

GENTLEMEN:

We desire to notify you regarding the two 24-inch Mack Ejector-Ventilators, which have been installed at our factory since October 1st.

We enlarged our Galvanizing room, which required more scaling tanks. These tanks contain sulphuric acid, which is necessary to scale the bolts before being galvanized.

The fumes from the acid made it impossible for the men to work.

Our Nickel Plating Department being in the same room caused us considerable trouble. As fast as the bolts were nickel plated and buffed they would tarnish. The fumes passed through into other departments, causing the bright bolts which were in process to become badly coated with rust.

Since your installation of these ventilators all of our trouble has been avoided, the air in this room being perfectly pure at all times. Not only ourselves but the men working in this department praise your ventilators every day.

We have other makes of ventilators throughout the factory, but none can equal the Mack Ejector-Ventilator.

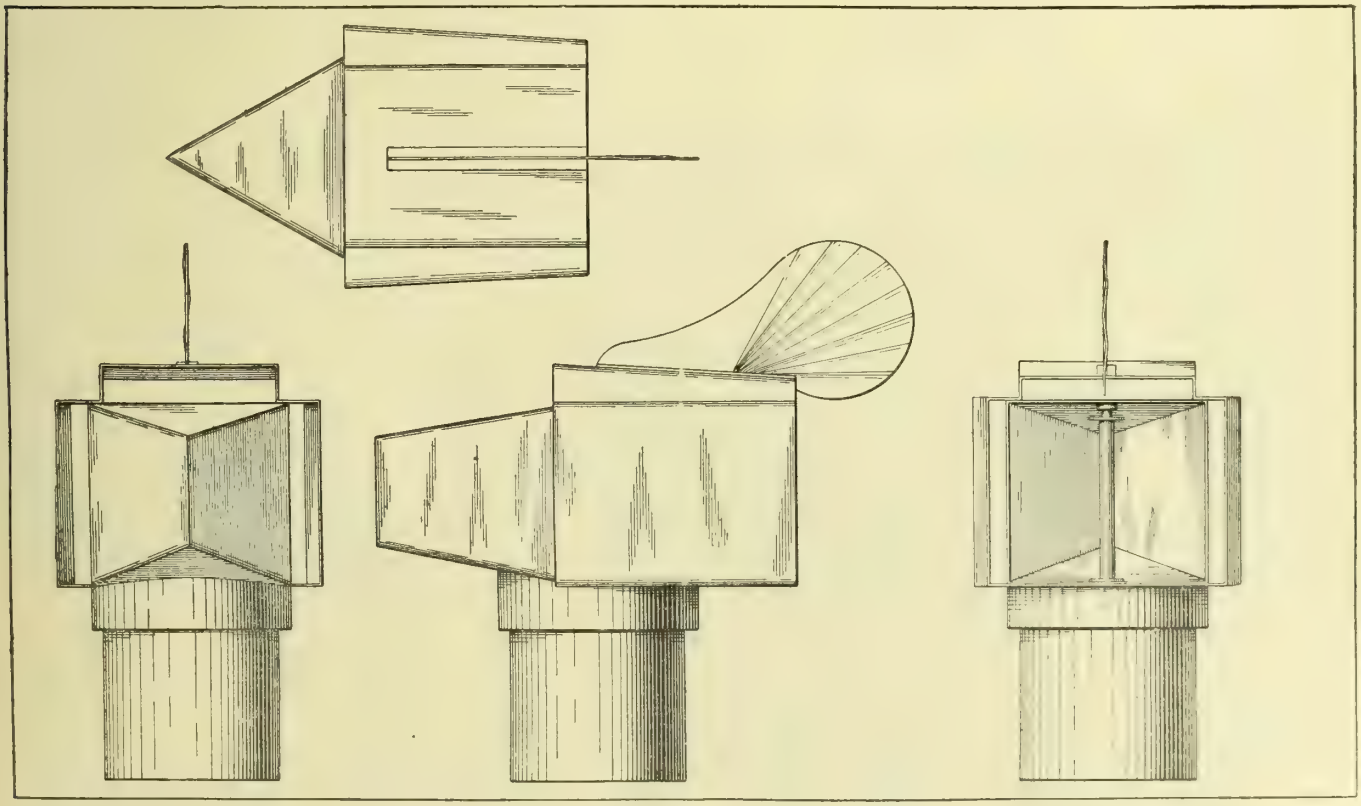
With best wishes, we are

Very truly yours,
THE NATIONAL SCREW & TACK CO.

List of References.

The following prominent buildings are equipped with Mack Ejector-Ventilators:

BUILDING	LOCATION
Victoria Theatre	Pittsburgh, Pa.
National Screw & Tack Co.	Cleveland, Ohio
Nickel Plate R. R. Co.	Stoney Island, Ill.
National Electric Lamp Works	Cleveland, Ohio
Kelley-Springfield Tire Co.	Akron, Ohio
Statler Hotel	Cleveland, Ohio
Shuster's Restaurant	Cleveland, Ohio
Firestone Tire & Rubber Co.	Akron, Ohio
American Trust Building	Cleveland, Ohio
Plain Dealer Building	Cleveland, Ohio
Cuyahoga Building	Cleveland, Ohio
West High School	Akron, Ohio
Indianapolis School Buildings	Indianapolis, Ind.
Goshen Cornice Works	Goshen, Ind.
Hudson High School	Hudson, Ohio
International Harvester Co.	Auburn, N. Y.
John Eichleay, Jr., Co.	Pittsburgh, Pa.
John R. Squire Co.	Youngstown, Ohio
Theodor Kundtz Co.	Cleveland, Ohio
Cleveland Arcade Building	Cleveland, Ohio
Star Theatre	Cleveland, Ohio
H. P. Cahill Plumbing Co.	Akron, Ohio
St. John's Hospital	Cleveland, Ohio
W. H. Gunlock Chair Co.	Wayland, N. Y.
Hart Brothers	Cleveland, Ohio
National Malleable Castings Co.	Cleveland, Ohio
Cleveland Electric Illuminating Co.	Cleveland, Ohio
Scholes Bros.	Pittsburgh, Pa.
Park Drop Forge Co.	Cleveland, Ohio
The White Co.	Cleveland, Ohio
Chittenden Hotel	Columbus, Ohio
Tellings-Belle Vernon Ice Cream Co.	Columbus, Ohio
Cleveland Athletic Club	Cleveland, Ohio
St. Ann's Church	Cleveland, Ohio
St. Philip Neri's School	Cleveland, Ohio
Indianapolis Public Schools	Indianapolis, Ind.
Cleveland Public Schools	Cleveland, Ohio
Lakewood Public Schools	Lakewood, Ohio
East Cleveland Public Schools	East Cleveland, Ohio
Akron Public Schools	Akron, Ohio
Niles Tool Works	Hamilton, Ohio
Empress Theater	Colorado Springs, Col.



TOP, REAR, SIDE AND FRONT VIEWS OF THE MACK EJECTOR-VENTILATOR

POWELL EVANS, President

MERCHANT & EVANS CO.

ESTABLISHED 50 YEARS
(1866-1916)

SOLE MANUFACTURERS OF
New Standard "Star" Ventilators
PHILADELPHIA, PA.

OFFICES AND WAREHOUSES
PHILADELPHIA
NEW YORK
BALTIMORE
WHEELING
CLEVELAND
CHICAGO
KANSAS CITY

WORKS
PHILADELPHIA
WHEELING
CHICAGO

Products.

The New Standard "Star" Ventilator, New Fire-Retarding "Star" Ventilator, Fire-Retarding Skylight "Star" Ventilator.

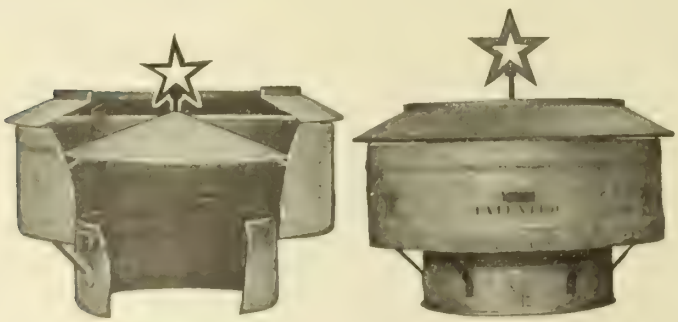
For Fire-Doors and Metal Roofing Products, see our name in General Index.

Scope of Use.

These three types of ventilators completely provide every method or system of ventilation required in the application of stationary ventilators, from the smallest dwelling to the largest plant. They are usually made of galvanized iron or steel, or sheet copper. Bases can be furnished to fit any roof construction, on receipt of specifications, including pitch and type of roof.

New Standard "Star" Ventilator.

This device is an improved natural siphonage type of ventilator. The sectional view below shows its construction along strictly scientific lines. The "Star" Ventilator gives more cubic feet exhaust per dollar cost than any other ventilator on the market. We manufacture rectangular shaped "Star" Ventilators to meet special conditions.



Sectional View
NEW STANDARD "STAR" VENTILATOR
(Patented)

Standard Base for "Star" Ventilators.

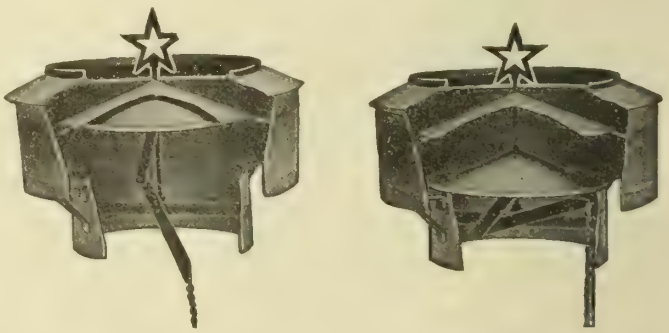
The illustration shows the regulation or standard base for "Star" Ventilators, which can be furnished with or without damper.

Cases to fit over any style of chimney also supplied.

STANDARD BASE
For "Star" Ventilator
With Disc Damper

New Fire-Retarding "Star" Ventilator.

The Fire-Retarding Gravity Damper of this Ventilator is operated by a lever movement, controlled by a chain with fusible link. In event of fire the link parts, and the damper drops by gravity, which closes the opening and shuts off the draft entirely. The damper can be regulated at will by simply pulling the chain from full open to closed position.



Open Closed
NEW FIRE-RETARDING "STAR" VENTILATOR
With Automatic Gravity Damper
(Patented)

Fire-Retarding Skylight "Star" Ventilator.

This device is recognized as a superior combination of skylight and ventilator. Absolutely weatherproof and of ample exhaust capacity. Has a fire-retarding movable damper readily controlled by a chain, which has a fusible link.

Damper can be easily raised or lowered and does not interfere with passage of light.

FIRE-RETARDING SKYLIGHT "STAR" VENTILATOR
(Patented)

Multiple Control.

We can provide Multiple Control for our ventilator dampers, designed to meet the needs of any case, especially long rows for mills and stations.

Trade-Marks.

All genuine "Star" Ventilators carry our registered trade-marks. Specify the "Star."

Proof of Worth.

Over one million now in use.

THE OHIO BLOWER COMPANY

"Swartwout" Rotary Ball-Bearing Ventilators

5125 Perkins Avenue, N. E.
CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., The Ohio Blower Co., 132 Nassau Street
CHICAGO, ILL., The Ohio Blower Co., 168 North Michigan Avenue
ST. LOUIS, MO.
ATLANTA, GA., The Ohio Blower Co., 702 Candler Building
LOS ANGELES, CAL., U. S. Metal Products Co., 750 Keller Street
SAN FRANCISCO, CAL., U. S. Metal Products Co., 525 Market Street
SEATTLE, WASH., D. E. Fryer & Co., Lumber Exchange

AGENTS IN ALL PRINCIPAL CITIES

Products.

"Swartwout" Rotary Ball-Bearing Ventilators; Air-Light Ventilators.

Also, "Swartwout" Helico-Centrifugal Steam Specialties, Cast-Iron Exhaust Heads, Steam and Oil Separators, Steam Traps, Water Level Control Valves, Low-Pressure Boiler Feeders, Ohio Blower Company Handiline Sheet Metal and Angle Iron Specialties.

Ohio Blower Company Low-Power, Slow-Speed Dust-Collecting Systems.

"Swartwout" Rotary Ball-Bearing Ventilator.

The increase in knowledge on ventilating engineering has taught us that "A hole in the roof isn't ventilation," yet perfect ventilation is necessary, if the occupants of a building are to live in comfort and work to their full efficiency. You can "put the wind to work" with a "Swartwout" and assure your clients of steady, continuous ventilation at the least cost.

"SWARTWOUT" ROTARY BALL BEARING VENTILATOR

Advantages.

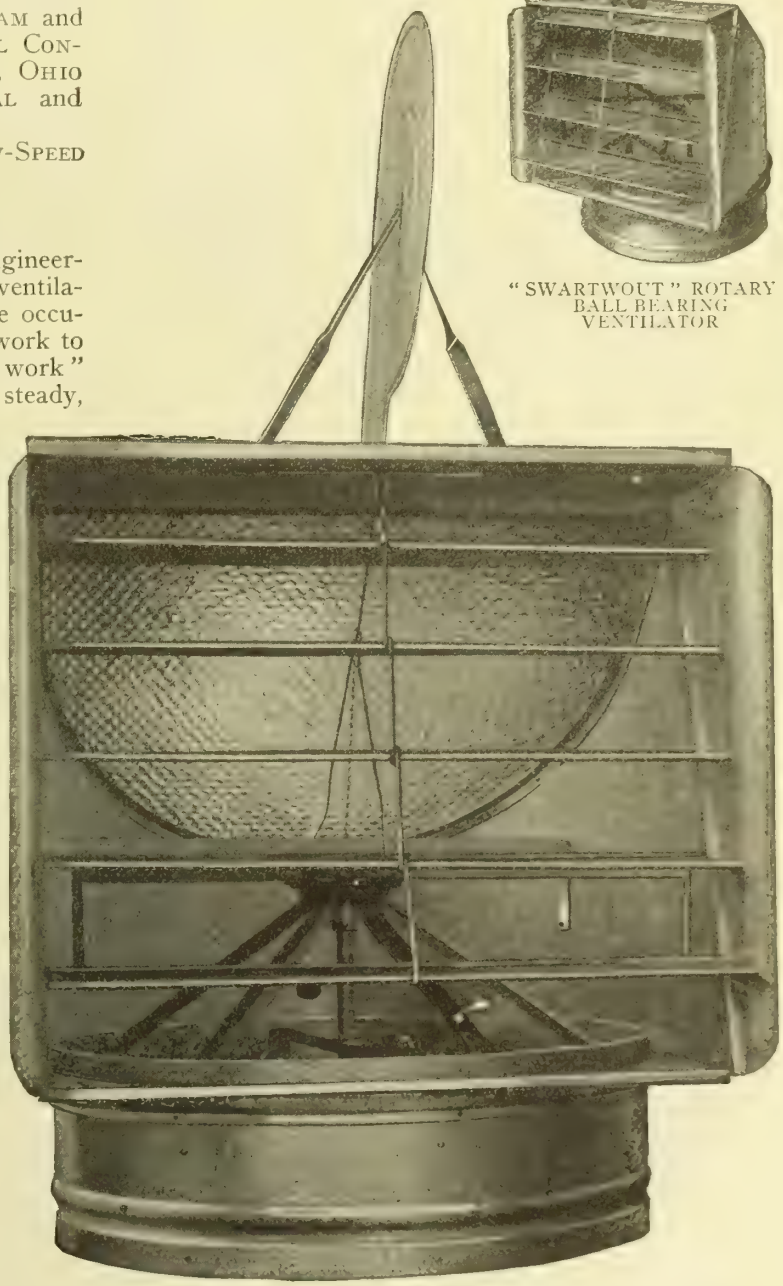
The movement of air past ventilator produces a vacuum in front of its mouth, which is continually filled by foul air from within. As government weather reports show us that there is rarely a wind velocity less than five miles an hour, it is easily understood why a "Swartwout" Ventilator handles from 50 to 300 per cent more air than any stationary type. It also operates better, because escaping air makes only one turn, that of a right angle on large radius. Pivoted dampers make operation easy, regardless of size. Absolutely storm-proof—a hose can be turned on it without getting any water into ventilator. No shield is required.

The "Swartwout" is distinctly efficient and impressive in appearance. On account of its great capacity, fewer or smaller ventilators are required, eliminating the necessity of a "forest" of ventilators, and *reducing the cost.*

Absolutely non-corrosive. Journals are made of rust-proof metal; bearings, of hard bronze fitted with special composition bell metal balls, which absolutely will not corrode, rust or stick. A counterweight *outside* the ventilator insures perfect balance. Reasonable in price.

The Air-Light Ventilator.

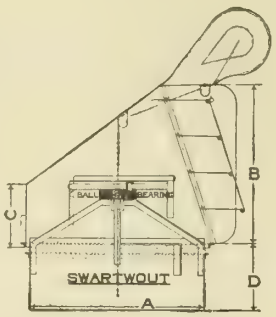
The difference between the Air-Light and the standard "Swartwout" Ventilator is the



THE AIR-LIGHT VENTILATOR
Note glass top in the Air-Light. Top, of wired-glass, practically indestructible.

Continued on next page

glass top. This is of strong wired-glass, and is practically indestructible. The introduction of this new pitched top skylight ventilator provides the only self-cleaning glass-top ventilator on the market. In many tests and in practical use, snow, ice, soot, etc., have failed to find a permanent hold on this smooth, sloping surface. The "Swartwout" standard construction is followed throughout.



SECTIONAL DRAWING OF "SWARTWOUT" ROTARY BALL-BEARING VENTILATOR

A Few "Swartwout" Users.

The International Harvester Company	Chicago, Ill.
Swift & Company	Chicago, Ill.
Carnegie Steel Company	Baltimore, Md.
Anheuser-Busch Company	St. Louis, Mo.
B. F. Goodrich Company	Akron, Ohio
Goodyear Tire & Rubber Company	Akron, Ohio
Horlick's Malted Milk Company	Racine, Wis.
Standard Oil Company	New York, N. Y.
General Electric Company	Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.	Pittsburgh, Pa.
American Can Company	Brooklyn, N. Y.
Seattle Public Schools	Seattle, Wash.
Kansas City Public Schools	Kansas City, Mo.
Quaker Oats Conmpany	Akron, Ohio
Bethlehem Steel & Iron Company	South Bethlehem, Pa.
Detroit Edison Company	Detroit, Mich.
Crucible Steel Company	Pittsburgh, Pa.

TABLE OF DIMENSIONS IN INCHES, GAUGES, WEIGHTS AND PRICES, AND CODE WORDS

A	B	C	D	Gauge Iron	Weight of Copper Oz.	Net Wgt.	Crated Wgt.	Price	Code Word
10	9 1/8	4 1/4	4 1/2	24	18	12	32	$10.00	Rosy
12	11	5	4 1/2	24	18	16	40	10.00	Rotary
14	12 7/8	5 3/4	5 1/2	24	18	32	53	15.00	Rotate
16	14 3/4	6	5 3/8	24	18	48	75	20.00	Rotula
18	16 1/2	6 5/8	7	24	18	55	80	25.00	Rotund
20	18 1/2	7 9/16	5 3/8	24	18	65	95	30.00	Rouge
24	22	9	6 5/8	24	18	90	125	35.00	Round
30	27 1/2	11 5/16	9 1/4	22	20	125	175	50.00	Rouse
36	33	13 1/2	11 1/4	22	24	196	270	75.00	Route
42	33 1/2	15 3/4	11	20	26	248	345	105.00	Rover
48	44	18 7/8	11	20	26	337	430	120.00	Rowel
54	49 1/2	20 1/4	13 3/4	20	28	452	580	140.00	Royal
60	55	22 1/2	17	20	28	667	735	160.00	Rub
66	60 1/2	24 3/4	16 3/4	20	28	710	825	180.00	Rubble
72	66	27	22 1/2	20	28	800	960	200.00	Ruddy

Discounts on request.
For "A," "B," "C," "D," see drawing above. Collars two gauges heavier than top.
All ventilators are supplied with chain through ventilator.
These data also supplied in card form for card index, free on request.
Similar data for bases, in card form, also furnished on request.

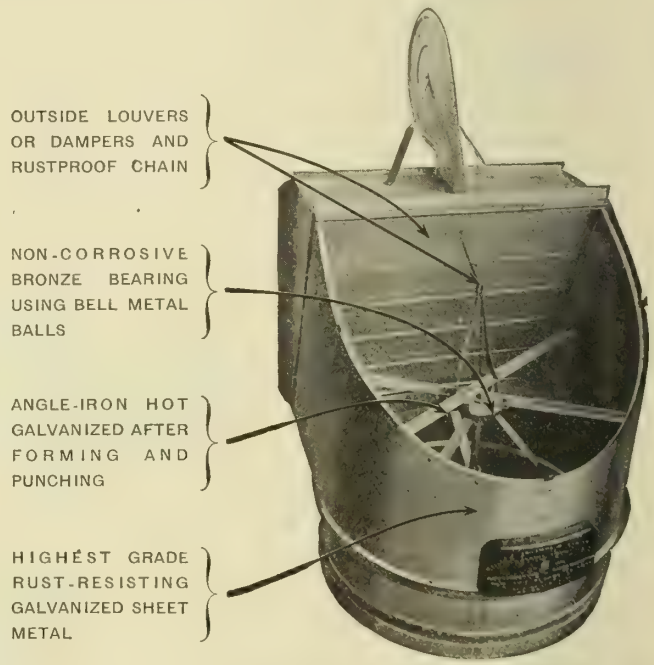
Standard Specifications.

All ventilators to be of the Rotary Ball-Bearing type (glass top, metal top), of galvanized rust-resisting metal, or copper, all interior members of angle-iron, hot galvanized *after* forming and punching. The ventilators to turn sensitively on accurately machined bronze bearings, employing bell metal balls, and counterweighted on outside. The ventilators to be equipped with outside louver dampers to throw accumulated dust outside of building, louver to be operated from within by brass chains over brass pulleys. Gauge of metal* to be The Ohio Blower Co., Cleveland, Ohio, standard as furnished in "Swartwout" Rotary Ball-Bearing Ventilators at regular prices. Top of collar and bottom of hood to be stiffened with galvanized angle-iron rings.

Follow with specifications of base from The Ohio Blower Co. Standard Blue Print (see next page).

* If desired, see standard gauge for each size as specified above.

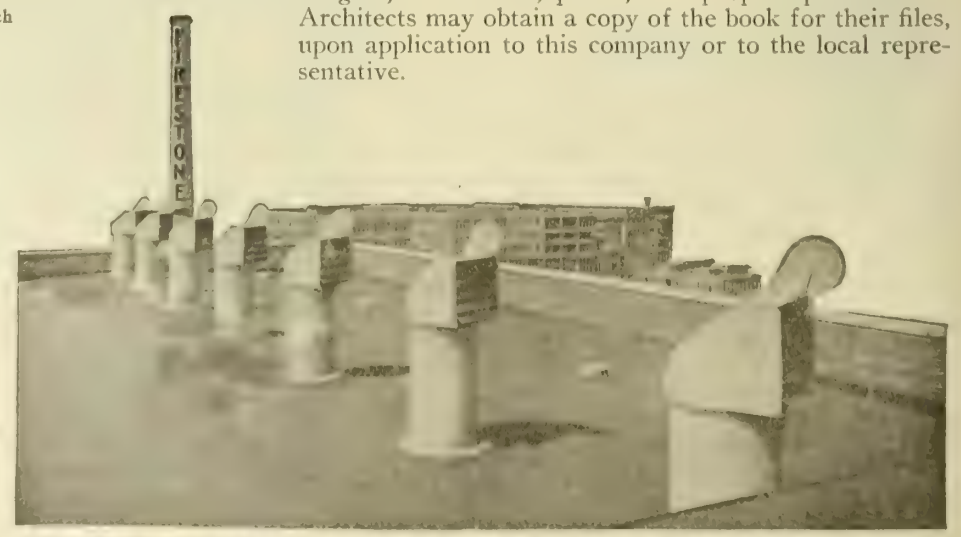
BACK VIEW OF "SWARTWOUT" SKYLIGHT TYPE VENTILATOR



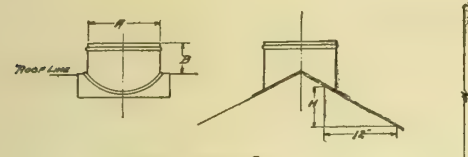
BACK VIEW OF VENTILATOR WITH TOP REMOVED

Catalogue.

We have prepared for the architect's use a handbook on ventilation, entitled *The Gospel of Fresh Air*, containing data on air requirements, labor, efficiency, etc. The balance of this book is devoted to the "Swartwout" Ventilator, its simple principles, its construction, weights, dimensions, prices, and proper specifications. Architects may obtain a copy of the book for their files, upon application to this company or to the local representative.

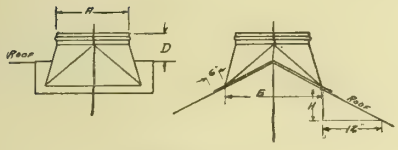


A PART OF THE FIRESTONE TIRE & RUBBER COMPANY'S PLANT AT AKRON, OHIO
Equipped with "Swartwout" Rotary Ball Bearing Ventilators

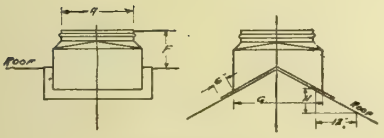


BASE TYPE A

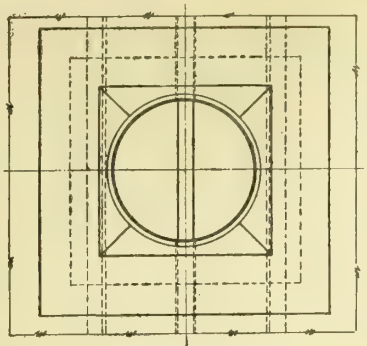
BASE TYPE B

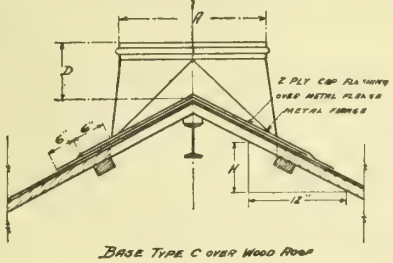


BASE TYPE C.

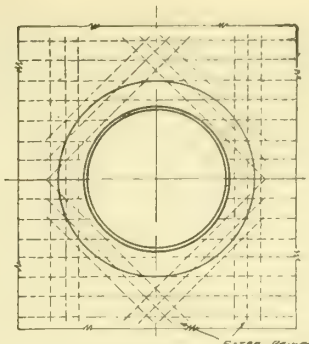


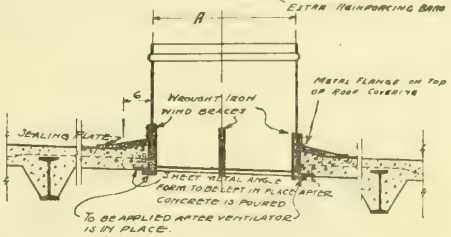
BASE TYPE D.



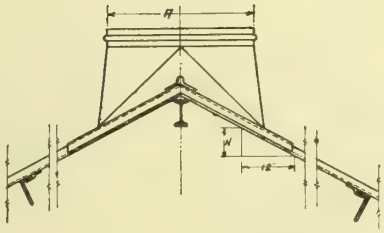


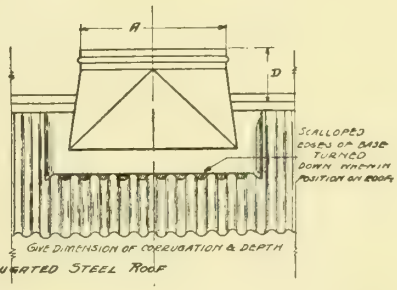
BASE TYPE C OVER WOOD ROOF





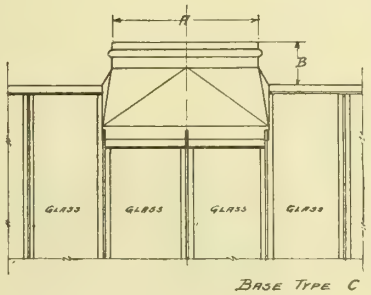
BASE TYPE B ON CONCRETE ROOF SLAB

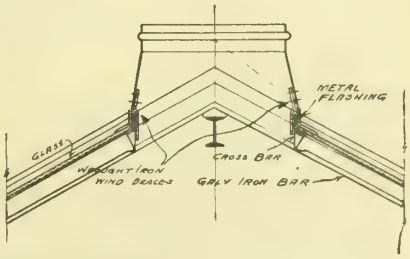




BASE TYPE C ON CORRUGATED STEEL ROOF

STANDARD VENTILATOR BASES								
Diameter	Type A	Type B	Type C		Type D		All Types	Gauge of Metal
A	B	C	D	E	F	G	H	
12	6	10	6	16	10	16		22
14	6½	11	6½	18	10½	18		22
16	7	12	7	20	11	20		22
18	8	15	8	22	12	22		22
20	9	16	9	24	13	25		22
24	10	18	10	28	14	30		22
30	12	20	12	34	16	36		20
36	15	24	15	40	19	44		20
42	18	28	18	46	22	50		18
48	20	32	20	52	24	56		18
54	22	36	22	58	26	62		18
60	24	40	24	64	28	68		18
66	26	44	26	72	30	74		16
72	28	48	28	78	32	80		16





BASE TYPE C ON GLASS SKYLIGHT

Thousand	A	B	C
1	440	250	320
2	417	303	340
3	393	245	290
4	340	343	350
5	398	317	370
Av	398	296	334

$\frac{A+B+C}{3}$ = 343 FEET PER MINUTE.

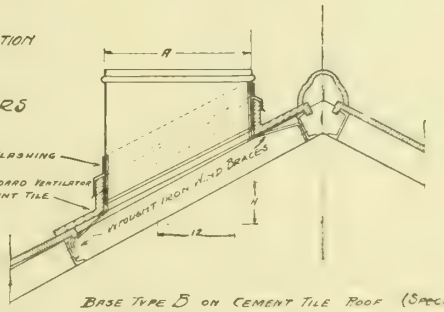
Size of Vent.	Cu. Ft. per Minute	Size of Vent.	Cu. Ft. per Minute
12"	430	36"	2550
14"	510	42"	3400
16"	590	48"	4450
18"	650	54"	5300
20"	800	60"	6850
24"	1100	66"	8250
30"	1700	72"	9650

TEMPERATURE OUTSIDE 30° INSIDE 60°
ALL READINGS IN FEET PER MINUTE
AVERAGE WIND VELOCITY 445 FT PER MIN. OR 5 MI. PER HR.
NOTE: A, B & C SHOW POSITION OF ANEMOMETER DURING TEST.

DETAILED DRAWINGS FOR BASES FOR THE APPLICATION OF "SWARTWOUT" ROTARY BALL BEARING VENTILATORS TO VARIOUS TYPES OF BUILDING CONSTRUCTION.

DESIGNED AND ISSUED FOR THE CONVENIENCE OF THE ARCHITECT AND ENGINEER BY

THE OHIO BLOWER CO., CLEVELAND, OHIO.



BASE TYPE B ON CEMENT TILE ROOF (SPECIAL)

DETAIL DRAWINGS FOR BASES FOR THE APPLICATION OF "SWARTWOUT" ROTARY BALL-BEARING VENTILATORS TO VARIOUS TYPES OF ROOF CONSTRUCTION

Square Bases are recommended. Specifications and drawings on request

Directions Required.

When specifying, inquiring or ordering, refer to type of base by letter. State character and pitch of roof, and whether ventilator will rest on peak or slope. When located on peak, Type "C" is recommended.

Co-operative Service.

Our engineering department, with twenty-five years' practical experience in mechanical ventilation, will gladly study your ventilation problems and make suggestions absolutely free. Write them to-day.

ROYAL VENTILATOR COMPANY

MANUFACTURERS OF

Royal Double Cone Ventilators, Standard and Special Designs

412 Locust Street

PHILADELPHIA, PA.

Products.

ROYAL VENTILATORS of Galvanized Steel, Toncan Metal, American Ingot Iron, Brass, and Copper.

Double Cone Ventilators.

Actual tests have developed the necessity of the following parts, in combination, for producing the greatest efficiency in ventilators: The Inverted Cone, Tapered Frustums, Identical Areas of Neck and Outlet.

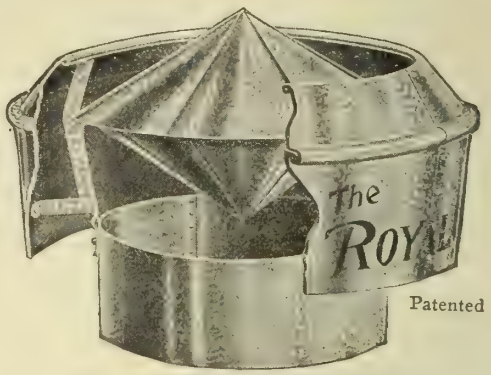
The Double Cone construction consists in attaching the lower inverted cone, with a sharpened point, to the rim of the upper cone. The lower cone is placed directly in the center of the ascending air, which, upon striking it, is deflected directly upward and outward. The Double Cone has two thicknesses of metal, thus prolonging the life of the ventilator. The Tapered Frustums draw the outward air currents over the top and down the sides of the ventilator, providing a constant upward draft. Downward currents of air are impossible.

Construction.

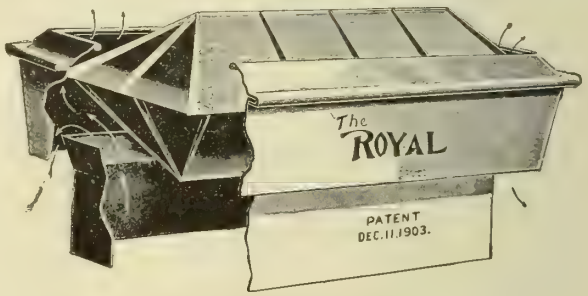
The "Royal" embodies every known mechanical improvement. All sections are built with lapped seams, giving three thicknesses of metal at joints. All edges are lapped over wire, for rigidity, wear and weather resistance. All bracing is accomplished with malleable iron stays, so arranged as not to impede the passage of air.

Specification.

"Royal Double Cone or Glass Top Ventilators, manufactured by ROYAL VENTILATOR COMPANY, Philadelphia, Pa."

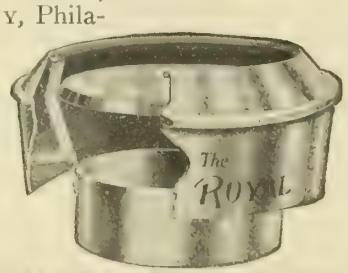


"ROYAL" DOUBLE CONE VENTILATOR

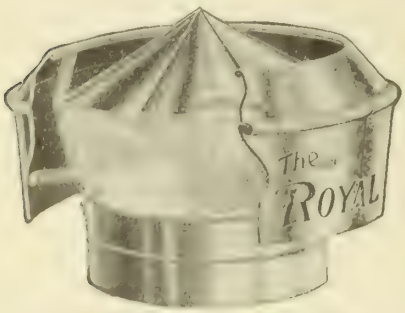


RECTANGULAR "ROYAL"
Metal or Glass Top

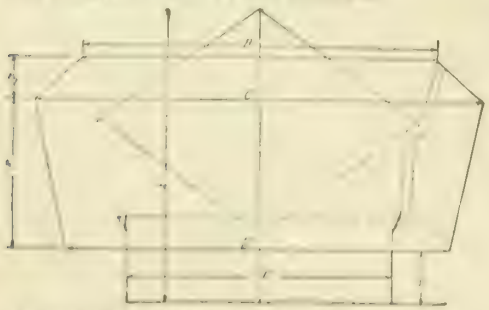
"ROYAL" VENTILATOR
With Fire Damper



"ROYAL" GLASS TOP VENTILATOR
Gives more light and ventilation



INSECT-PROOF VENTILATOR
For Hospitals, Barns, Powder Mills, etc.



SECTIONAL DRAWING "ROYAL" DOUBLE CONE VENTILATOR
Send for Catalogue and Model

DATA WITH REFERENCE TO SECTIONAL DRAWING

Size of Inches	A	B	C	D	E	F	G	H	Area	Gauge of Iron	Ounces of Copper	Price	Cu. Ft. Exhaust Per Min., Wind 7 Miles
10	12	13	16	11	10	5	2	3	78	24	16	85 75	141
12	13	15	19	16	12	6	2	3	113	24	16	76 75	159
14	17	20	26	23	16	8	3	3	201	24	16	20 00	288
16	18	23	29	26	18	8	3	3	288	24	16	37 00	490
20	21	28	34	28	20	10	4	5	314	24	16	53 00	606
22	24	26	34	32	22	11	4	5	380	24	16	76 00	729
24	24	30	39	34	24	11	5	5	485	22	16	40 00	874
26	24	33	42	36	26	13	4	3	527	22	16	50 00	1008
28	26	33	45	40	28	13	5	3	615	20	16	56 00	1186
30	26	35	44	41	30	14	5	4	707	20	18	68 00	1364
32	28	37	47	44	32	14	5	4	804	20	18	80 00	1551
34	28	40	50	48	34	15	5	4	908	20	18	140 00	1765
36	28	44	56	51	36	15	6	4	1017	20	18	150 00	1961
40	34	47	61	55	40	16	7	5	1257	18 and 20	18	180 00	2424
42	32	52	68	63	42	17	7	5	1386	18 and 20	18	140 00	2675
44	34	54	70	64	44	18	7	5	1520	18 and 20	18	200 00	2124
48	36	59	77	70	48	19	8	4	1809	18 and 20	20	240 00	3489
54	42	68	84	77	54	22	9	4	2290	18 and 20	20	300 00	5414
60	47	76	94	85	60	25	8	5	2827	18	24	360 00	6665
66	51	81	103	91	66	26	9	6	3801	18	24	420 00	7881
72	56	86	108	97	72	28	10	6	4071	18	24	480 00	10682

CHICAGO VENTILATOR AND IRON WORKS

Church and Prism Ventilators, Steel Sash, Domes, etc.

838-842 West Austin Avenue
CHICAGO, ILL.

Products.

CHURCH and PRISM DOUBLE and DOUBLE DOUBLE VENTILATORS, STEEL SASHES, CASEMENTS, CANOPIES, DOMES, SKYLIGHTS.

Church Double Ventilator.

Fig. 1 shows our standard Church Double Ventilator for single glazing. Outer frame one inch angle iron painted; inner frame ¾ inch angle iron galvanized; malleable iron, wide bearing, substantial pivot hinge and cord ring, brass lock and catch, two cross bars, loose or one riveted. Same can be hinged at bottom for screens.

For smaller ventilators we can use 1" x ⅝" x ⅛" outer frame; ¾" x $\frac{7}{16}$" for inner frames.

All church ventilators and iron work should be galvanized, and unless otherwise specified we furnish flat galvanized cross-bars.

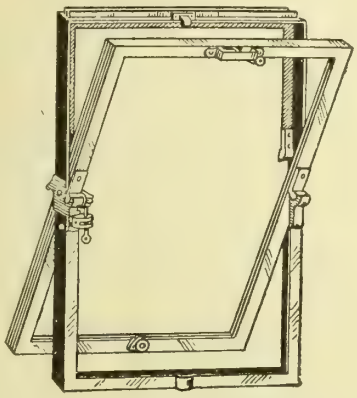


FIG. 1. CHURCH DOUBLE VENTILATOR

Hinge construction provides a wide bearing which is essential to the life of a ventilator.

Double Double Church Ventilators.

Our Double Double Ventilators are made in two grades, regular and special. Fig. 2 represents our special grade, which is the highest standard in ventilators.

Corners are welded, not bent, and are absolutely square. We guarantee that the corners on our Double Double Ventilators will not lose their shape, thus insuring you against a very common defect of most ventilators.

Outer frame usually 2½ in. x 1 in. angle, painted; swinging frame of band iron, with channel on inside, usually one inch for division space between leaded and protection glass. This ventilator, with one-inch space, can be also used with economy in cases where woodwork is larger than one inch, by simply placing larger channel on top or bottom to match woodwork, leaving space inside of vent one inch. Cleats on both sides of inner frame to hold glass; swinging frame, detachable; round cross-bars fastened with screws; cord ring and brass lock.

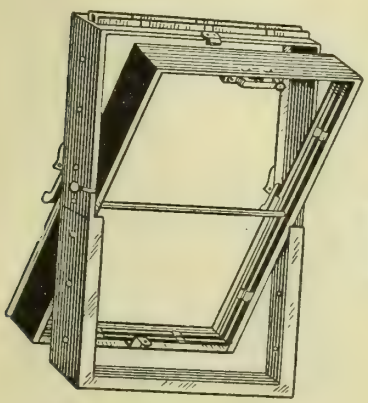


FIG. 2. DOUBLE DOUBLE BOTTOM VENTILATOR

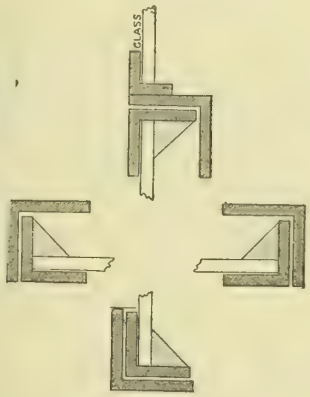


FIG. 3. SECTION OF A BOTTOM VENTILATOR

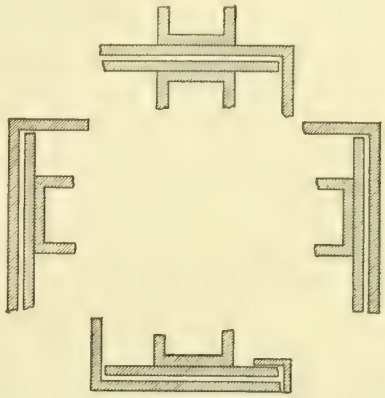


FIG. 4. SECTION OF DOUBLE DOUBLE BOTTOM VENTILATOR

Data Required When Ordering.

State if vents are for bottom, middle, top or full size opening, and give width and height.

State if round or flat cross-bars are wanted, and measure from extreme bottom to center of each bar.

State if water bar shall be angle or channel, and size preferred.

State if angles are wanted on sides and bottom for rabbet.

State if weather-strips are wanted across bottom of inner frame.

State if all galvanized or inner frame only.

State pivot in center or half inch below or above center.

State if adjusting bars wanted.

If double double, state space between art and ribbed glass.

Domes.

Fig. 5 shows the iron construction of a Bent Dome, in any given radius and from any size of T iron, which can be set by any handy man. Send in your blue-prints and let us quote you prices.

Our equipment is complete for this line of work, and we can guarantee prompt shipments and first-class work.

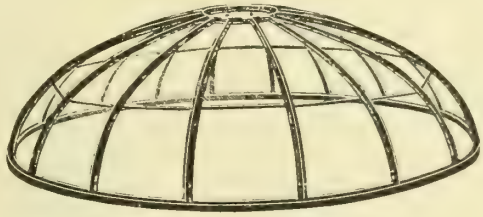


FIG. 5. IRON CONSTRUCTION FOR DOMES

REFERENCES

St. Paul's Cathedral, St. Paul, Minn., E. L. Masqueray, Architect
H. M. Hooker Co., Chicago, Ill.
Forman, Ford & Co., Minneapolis, Minn.
Carl Reiman, Milwaukee, Wis.
Indianapolis Art Glass Co., Indianapolis, Ind.
Western Art Glass Works, Wichita, Kans.
Toledo Plate and Window Glass, Detroit, Mich.

UNIVERSAL VENTILATING COMPANY

Manufacturers of Window Ventilators

Price Building, 14th and Oak Streets

KANSAS CITY, MO.

Product.

"Universal," "Shurnuf" and "Delany" Window Ventilators.

"Universal" Window Sash Ventilator.

Is simple and compact in construction, and was designed by an architect to avoid projections and insure protection against dust and weather. Fits flush within upper or lower rail of a window sash. Easily manipulated in controlling the entrance of fresh air into the room.

Construction and Action.

The "Universal" consists of an outer and an inner metal frame (Figs. 1 and 2), which are fitted into a 2- by 16-inch vent cut in the sash. The outer metal frame is provided with a longitudinal opening 7/8 by 15⅝ inches, and a protecting bronze screen fitted back across opening in a slanting position. On special orders, a flush fitting outer frame is furnished, with a removable screen, having a longitudinal air opening of 1½ by 15 inches, and an air capacity of 22½ square inches. The screen is of 16 mesh. The door can be closed and the flow of air regulated by the damper slide only, or a greater volume of air can be obtained by simply closing damper and adjusting the door by the end friction slides to an angle sufficient to create the necessary deflection of air upwards into the room to protect against drafts. By attaching the "Universal" on the upper and the lower sash, a continuous circulation of fresh air may be created.

Distinctive Features.

The "Universal," fitting flush in the sash rail, has no unsightly boxes extending on both sides of the sash, to be knocked off and crushed because of interference with the passing of the upper and lower sash rails. It is made of heavy gauge metal reinforced by angle construction, so does not weaken the sash. It is very desirable for office buildings, schools, homes, hospitals, factories, etc.; and for bathroom and closet windows; also, for large casement or pivoted sash, which are difficult to regulate for moderate ventilation.

Size.

The "Universal" is made in one standard size—3 by 17 inches over all. Each rails should be at least 3⅝

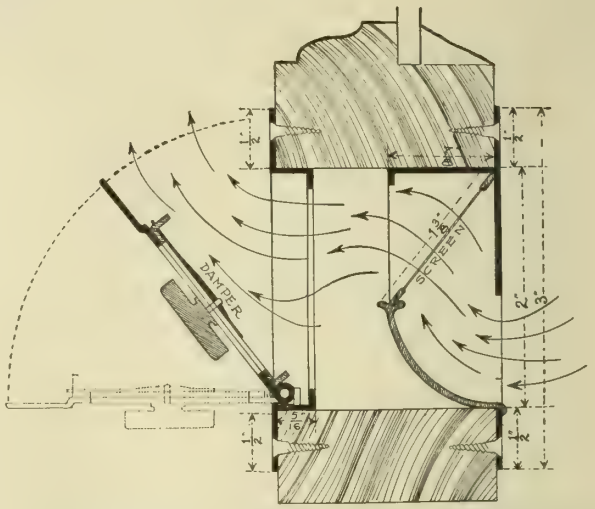


Fig. 1. CROSS-SECTION OF "UNIVERSAL" VENTILATOR INSTALLED IN SASH RAIL, SHOWING DIFFERENT DIMENSIONS

Note unique construction of outside box, designed to keep out dust and weather

inches wide and 1⅜ inches thick, with proper length.

Material.

All brass; all steel; or outer frame steel, inside brass; or the reverse.

Finishes.

Stock Finish: Inside damper doors copper oxidized gun-metal; outside steel frame dull enamel baked on; brass, copper oxidized gun-metal. Special finishes, as ordered.

A Few Users of the "Universal."

Magee Hospital (502), Pittsburgh; Isolation Hospital (306), St. Louis; Temple Beth Zion (122), Buffalo; Wayne Normal School (170), Nebraska; Waldheim Building (230), Kansas City; St. Joseph Hospital (500), Kansas City.

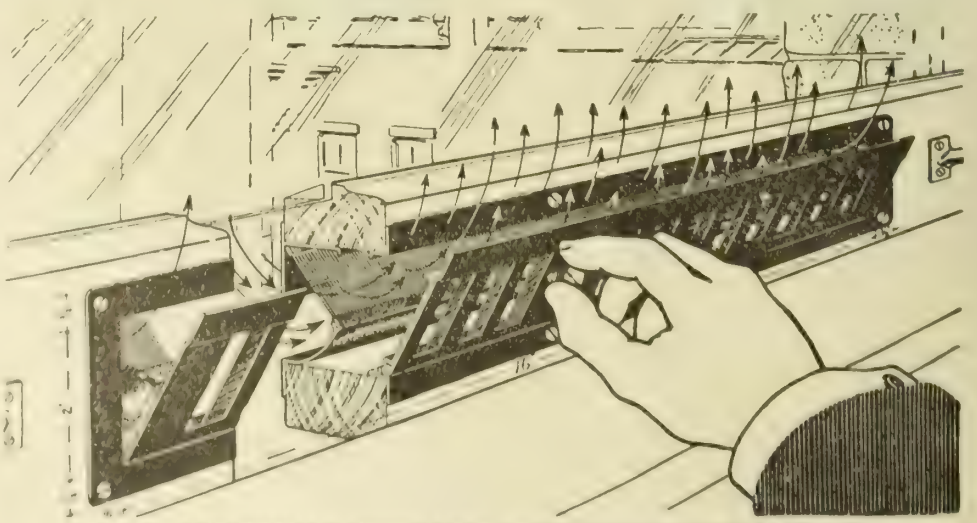


Fig. 2. "UNIVERSAL" VENTILATOR INSTALLED IN LOWER SASH RAIL

Showing outside and solid metal frames, adjustable door and damper, removable screen, outside air intake and bar deflector, also end friction slides for adjusting door

W. D. ALLEN MANUFACTURING COMPANY

Fire Protection Equipment

133-135 West Lake Street
CHICAGO, ILL.

BRANCH OFFICES

69 Warren Street
NEW YORK, N. Y.

SALT LAKE CITY, UTAH, Scott Building
DENVER, COLO., Colo. National Bank Building
SEATTLE, WASH.
NEW ORLEANS, LA., 410 Camp Street

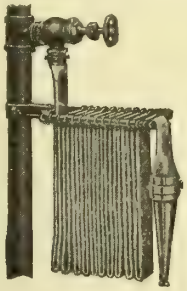
Products.

Manufacturers of FIRE-FIGHTING APPLIANCES, including HOSE RACKS and REELS, NOZZLES, COUPLINGS, VALVES, SIAMESE CONNECTIONS, and complete FIRE PROTECTION EQUIPMENTS; also, UNLINED LINEN FIRE HOSE and CHEMICAL FIRE EXTINGUISHERS.

"Bowes" Hose Rack.

It will be noted by the illustrations that the supports remain on the rack and are a part of it. As the hose is drawn off, the supports are retained by the extension arm. There is no possibility of supports binding or of entangling the hose.

STYLE L "BOWES" HOSE RACK
With nipple attached to valve



STYLE K "BOWES" HOSE RACK
For attaching to standpipe

Made for any size hose

"Bowes" Semi-automatic Underwriters' Labeled Rack.

The "Bowes" idea of the positive supports and extension arms has been incorporated into our semi-automatic Underwriters' Labeled Rack. In case of fire the valve is opened, a simple arrangement automatically holds the water at the first fold of hose, as shown, until a slight tug at the nozzle end releases it. This rack is labeled and approved.

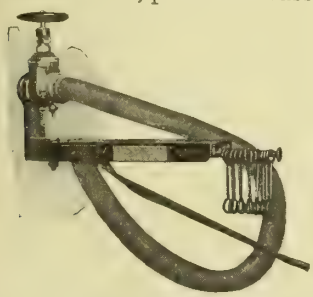
Architects wishing to secure the lowest possible insurance rates for their clients should specify the "Bowes" Labeled Rack.

Made to carry 1½-inch hose only.

"Bowes" Storage Rack.

"Bowes" Storage Rack for 2½-inch Underwriters' Unlined Linen Hose is labeled to Underwriters' specifications, but is without the semi-automatic feature.

Finished in red enamel, aluminum bronze, nickel-plated on iron, polished brass and nickel-plated on brass.



Semi-Automatic

Storage

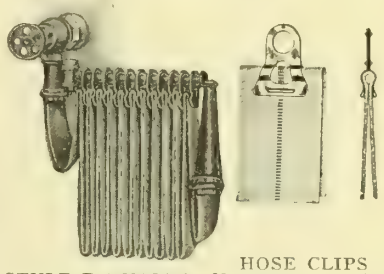
"BOWES" UNDERWRITERS' LABELED RACKS

"Yale" Hose Rack.

Note that the hose is supported by a series of brass clips, slideably and permanently mounted on an extension arm. The pressure of the clips is sufficient to support the weight of the hose, but is not great enough to interfere with its easy withdrawal in case of emergency.

It will be seen from the enlarged drawing of the clip that the pressure is applied at the center of the hose only and not on the edge or fold. Pressure so applied cannot possibly injure linen hose.

The "Yale" Rack is made either in iron or brass. The normal finish of the iron rack is architectural bronze plate, with brass clips dipped and lacquered. The brass rack is highly polished and lacquered throughout.



HOSE CLIPS
No pressure on folds or edges of hose

STYLE P "YALE" HOSE RACK
Made for any size hose

Siamese Connections.

A Siamese Connection can be made an ornament to a building by specifying the Fig. 232 or Fig. 231.

Fig. 232

Fig. 231

SIAMESE CONNECTIONS

Figure 232 Combination Siamese and Sill Cock as shown is made of bronze, well designed and finished.

Figure 222 (not illustrated) is the same as Figure 232, but without the sill cock and wall plate.

Figure 231 is made as illustrated, with a brass sleeve to cover pipe, sidewalk escutcheon, and is used when the supply comes through the sidewalk.

Continued on next page

Hose.

The practice of specifying two and a half-inch hose for use of the occupants of the building is happily passing away, as hose of that size is too large to be used by persons other than trained firemen.

One and a half-inch hose is usually required for a first aid stream, and is shown in the detail below.

Fire protection engineers usually limit the maximum length of hose served by one standpipe to 100 feet. If longer lengths of hose are required, additional standpipes should be provided or municipal or insurance authorities having jurisdiction should be consulted.

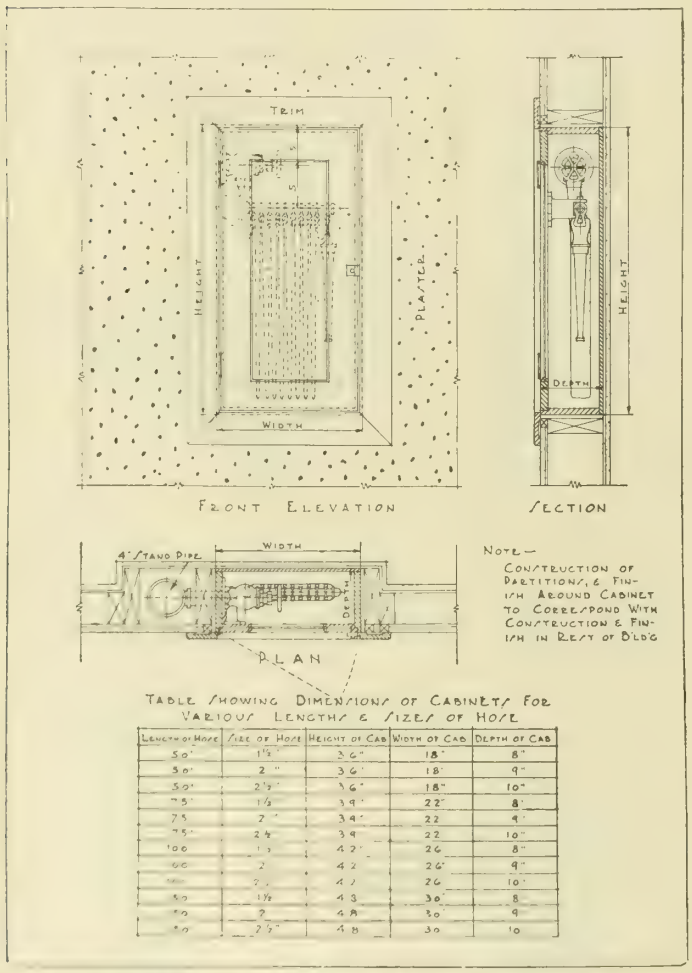


TABLE SHOWING DIMENSIONS OF CABINETS FOR VARIOUS LENGTHS & SIZES OF HOSE

Length of Hose	Size of Hose	Height of Cab	Width of Cab	Depth of Cab
50'	1½"	36"	18"	8"
50'	2 "	36"	18"	9"
50'	2½"	36"	18"	10"
75'	1½	39"	22"	8"
75'	2 "	39"	22	9"
75'	2½	39"	22	10"
100	1½	42"	26	8"
100	2	42	26	9"
100	2½	42	26	10"
50	1½	48	30	8
50	2	48	30	9
50	2½"	48	30	10

TYPICAL DETAIL OF FIRE HOSE CABINET, SHOWING ANGLE VALVE AND YALE OR BOWES FIRE HOSE RACK HUNG ON DOOR

Scale, one half inch to a foot

Full scale detail and complete specifications furnished on request.

Specifications for Interior Standpipe.

Furnish, set up and run from sidewalk to roof, riser pipe not less than 4-inch diameter, complete with valves as specified hereinafter, all to be securely fastened to beams and walls; standpipe to be carried up as shown in diagram. Run main 4-inch pipe line from standpipe to street at front wall as directed, attach a [illegible] W. D. Allen Manufacturing Co's. double clapper Siamese with *sensible caps*. On inside of main wall, located where frost cannot affect it, not less than 10 feet from wall, place 4-inch check valve, to check against hose tank or pump pressure, with ½-inch automatic ball drip valve, placed at lowest point between check valve and Siamese connection. All fittings to be of long sweep pattern.

Pipe Line to House Tank—Connect 4-inch pipe line from standpipe to house tank at roof with 4-inch Underwriters' Pattern Indicator Gate Valve and 4-inch Underwriters' Pattern Check Valve placed in a horizontal position to check against steamer pressure.

Pipe Line to Fire Pump—(If a fire pump is specified.) Connect standpipe to fire pump in basement, properly valved and checked against steamer pressure.

Direct Connections to City Mains—(When interior standpipes are connected directly to city water pressure, and such pressure is increased in case of fire.) Make necessary connections for interior standpipe. Provide a strainer and pressure regulating valve for house supply, in order to keep house supply at constant pressure.

Hose Equipment—On each connection, as shown, provide a ..... inch New York Angle Hose Valve with a "Yale" or "Bowes" Hose Rack and sufficient 1½-inch Nella brand labeled and approved Underwriters' Linen Hose to reach any portion of the floor served by this standpipe, hose to be coupled in lengths not longer than 50 feet and equipped with one 1½-inch x 12-inch long, ½-inch discharge, plain hose nozzle with lugs.

FIG. 184. WOOD OR STEEL CABINET

Specification Reminder.

The size of the valves and hose depends largely upon local conditions. Insurance and municipal authorities having jurisdiction should be consulted.

In the absence of specific requirements we recommend that on all buildings 1½-inch valves and hose be installed. On buildings over five stories in height a 2½-inch valve should be provided for the use of the Fire Department.

Install a 2½-inch valve and cap with a 1½-inch valve for the hose line, or a 2½-inch valve with an auxiliary reducer for the 1½-inch hose.

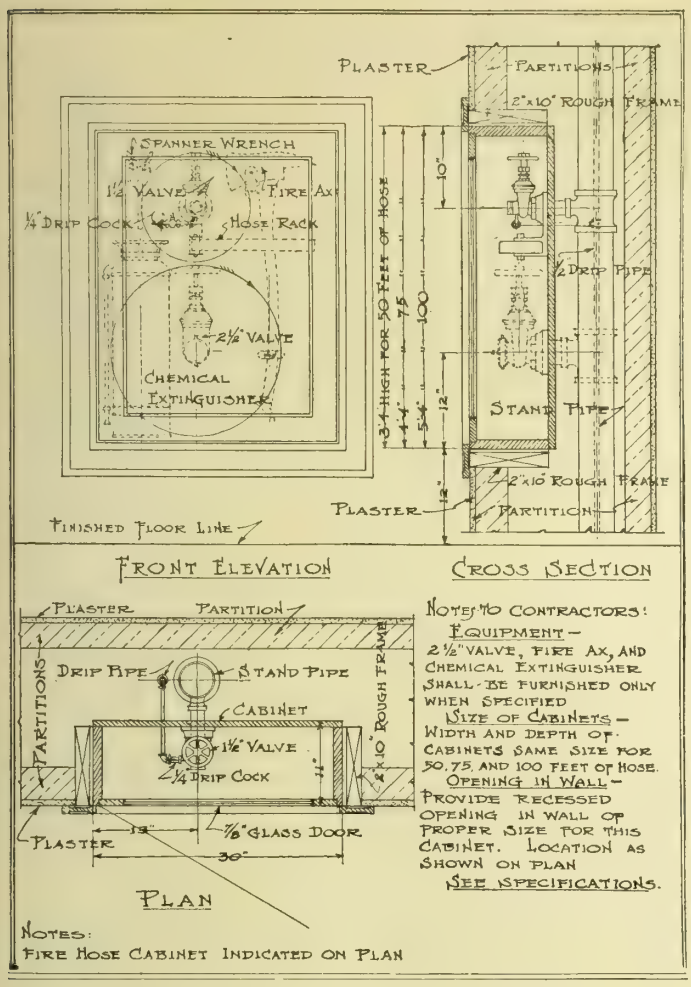
Material can be supplied with any finish, but the following is standard:

Valves { rough body, finished trimmings / rough body, nickel-plated / polished brass / polished brass, nickel-plated }

with nozzles and couplings to match valves.

Yale or Bowes Racks { polished brass / nickel-plated brass / nickel-plated on iron / oxidized bronze on iron }

(Continued on next page)



TYPICAL DETAIL OF FIRE HOSE CABINET
Scale, one half inch to a foot
Full scale detail and complete specifications furnished on request

Hose Equipment.

Many cities are requiring the installation of labeled hose racks and approved gate valves.

The above layout includes approved equipment, a chemical extinguisher and fire axe, all contained in a cabinet as indicated. This cabinet, of wood or steel, preferably the latter, and finished to match the trim, costs less than the ordinary closet, is more ornamental, the equipment is prominently displayed, and is instantly available.

On all buildings five stories or more in height, even if not required by City or State Ordinance, the 2½-inch valve should be installed for use by the Fire Department.

When this equipment is to be installed in the cabinet detailed above, it is necessary to insert in the specifications the following paragraph in lieu of the "Hose Equipment" listed on the preceding page:

Specifications—As indicated in the detail, install one 1½-inch (and one 2½-inch) Alenco Underwriters' Pattern Hose Gate Valve, with polished brass combination escutcheon and wall brackets to support the hose rack.

The 1½-inch Valve to be provided with ¼-inch drain in barrel of valve.

Furnish and install in each fire hose cabinet as shown, one "Bowes" Underwriters' Labeled Hose Rack with sufficient 1½-inch Nella Brand Labeled Underwriters' Unlined Linen Hose, to reach any portion of the floor served by this standpipe (but not longer than 100 feet in each cabinet).

The hose to be coupled in lengths not longer than 50 feet, equipped with one 1½ inch x 12-inch long ½-inch discharge, nozzle with lugs.

Specification Reminder.

Material can be supplied with any finish, but the following is standard:

VALVES— { rough body, finished trimmings
rough body, nickel-plated
polished brass
polished brass, nickel-plated

with nozzles and couplings to match finish on valves.

LABELED RACKS— { polished brass
nickel-plated brass
nickel-plated iron
red enamel iron

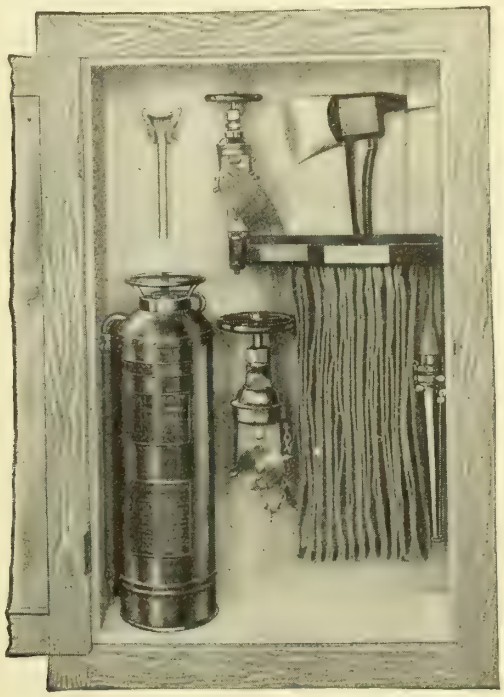


FIG. 190. WOOD OR STEEL CABINET

Chemical Extinguisher and Fire Axe.

The installation of an axe and a chemical extinguisher is required in many cities and it should be a part of every standpipe equipment. Its timely use can many times save the water damage incident to the use of the fire hose. We recommend the following as part of your specifications:

"Provide an 'ALENCO' 2½-gallon Approved Extinguisher and one approved Fire Axe, with necessary brackets, as shown on detail."

Steel Cabinets.

Steel cabinets can be furnished instead of wood cabinets, as shown on detail, and should be included in the Plumbing Specifications.

Specification—Furnish and install "Alenco" steel fire hose cabinet where shown on plans. Body of cabinets to be made of No. 18-gauge steel. The hollow steel frame forming the door to be made of No. 14-gauge steel and to have a plate glass panel in door with bullet catch and pull handle. Finish to be four coats of hard-baked filler enamel and varnish.

FINISHES— { white enamel
grained to match trim

AMERICAN TELEPHONE FIRE ALARM CO.

208 South La Salle Street
CHICAGO, ILL.

Products.

Fire-Alarm Systems as follows: Telephone Fire-Alarm Systems, Automatic Fire-Alarm Systems, Thermopiles, Atco Fire-Alarm Systems, Fire-Drill System, Atco Fire-Alarm Bells, Atco Primary Batteries, Signal Systems, Code Alarms.

Telephone Fire-Alarm Systems.

These are manufactured by this Company and operate over the telephone lines and standard equipment of manual and automatic telephone systems.

In cities and towns which have adopted or may adopt our system, the subscriber is offered fire-alarm service with direct connection to fire headquarters, using the same wires as are used for telephone service.

The systems are equally well adapted to plants which are equipped with private branch exchange telephone systems and private fire departments.

Alarms may be sent either *manually,* by the act of operating a fire-alarm box; or *automatically,* from the automatic action of our thermopile automatic fire detector.

Underwriters' Approval—Our telephone fire-alarm systems are approved by the National Board of Fire Underwriters and carry reductions in insurance rates.

Automatic (Thermopile) Fire-Alarm System.

Thermopiles are installed in all classes of buildings, either as a local fire-alarm or in connection with our telephone fire-alarm and the Atco System for the purpose of detecting and announcing fires *in their incipiency,* and are a radical departure in automatic fire-alarm systems.

The system consists of:

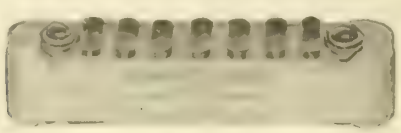
(A) Thermopiles (fire detectors).

(B) Indicator cabinet with test resistance, trouble buzzer, one or more galvanometers (depending upon the number of indications wanted).

(C) Fire-Alarm bells.

(D) Batteries.

(E) Wiring.



THERMOPILE (REICHEL PATENT)

Principle of Operation—A sudden rise in temperature, such as is caused by a fire, generates in the thermopile a current of electricity which flows in the circuit, operating the galvanometer and moving its deflecting needle into contact for fire-alarm. Ordinary changes of temperature have no effect and cannot cause an alarm. The system is of the closed circuit type and *is under constant test.* A break in the circuit, a drop in battery voltage, or total failure of the battery causes the operation of a trouble alarm.

Installation—Thermopiles are distributed throughout a building on the ceilings, and installed according to the rules of the National Board of Fire Underwriters to comply as to location and spacing with the following requirements:

Maximum floor area for one thermopile, four hundred square feet.

Maximum distance between centers of thermopiles, twenty-five feet; in corridors, forty feet.

Maximum distance between centers of thermopiles nearest walls, ten feet; twenty feet from ends of corridors.

Thermopiles are connected in series with each other and with the galvanometer in the indicator cabinet. One galvanometer required for each indication wanted; i. e., for each floor or section of building. Connections are also made from the indicator cabinet to the fire-alarm bells and trouble buzzer.

Underwriters' Approval—This system is approved by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.

Atco Fire-Alarm and Fire-Drill System.

Atco fire-alarm and fire-drill system consists of Atco fire-alarm boxes, gongs (Atco vibrating or electro-mechanical), Atco control panel, trouble bell, batteries, and series closed circuit wiring.

Atco boxes sound definite code signals on all bells, indicating location of box. For school fire-drill, where one code signal, denoting fire, is required, a master box controlled by auxiliary stations is provided. Boxes are locally non-interfering, and when once started, the manipulation of the starting device does not interfere with the transmission of a complete code of signals. Atco boxes are of the "break glass, push-button" type, provided with a chained hammer, or of the self-winding pull lever type in which the lever is protected by a closed door. All boxes are equipped with the "silent test," whereby the box mechanism may be tested without disturbing the fire-alarm system. Provision is also made for testing the system from any box without disturbing the starting lever. Atco boxes may be operated automatically by thermostats connected to the system.

Atco control panel contains the testing device and terminals for connection to boxes, bells and batteries. The circuit is kept under constant test through a one milli-ampere discharge. A break anywhere in the system, a drop in voltage, or a complete failure of the battery causes a trouble alarm, which continues until the trouble is remedied. In Atco systems using the pull lever type of box, no resetting of the system is required.

Boxes and control panel are of pressed steel or cast iron, finished in cherry red enamel. Atco 300-ampere hour batteries are used in connection with dry cells.

These systems have the approval of the State and Municipal Fire Prevention Bureaus.

Co-operative Service.

Wiring diagrams and estimates furnished on application. Correspondence solicited.

THE BALTIMORE COOPERAGE CO.

Engineers and Manufacturers

BALTIMORE, MD.

Products.

We specialize on WATER-WORKS INSTALLATION, ACID TANKS, ACID TOWERS, WOODEN STAVE PIPE, and special MILL CONSTRUCTION used in connection with tanks.

We carry a large stock of PUMPS, GASOLINE ENGINES, RAMS, MOTORS, PIPE, CYLINDERS, etc.

SIMPLEX WATER WORKS SYSTEM

TRADE-MARK

Facilities.

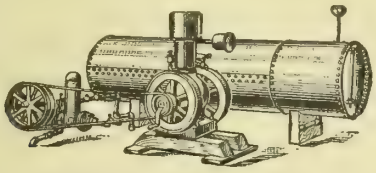
We manufacture our products on our own premises in Baltimore. The plant is centrally located on the Atlantic seaboard, with up-to-date facilities for the manufacture of tanks in any size or shape, and for every purpose for which a tank can be used.

Water-Works and Water-Saving Systems.

We design and install water-works and water-saving systems for railroads, factories, hospitals, schools, institutions, and rural residences, either with wooden tanks for a gravity system, or steel tanks for an air pressure system, the latter better known as our Simplex System. We are specialists on power which is used in connection with water-works installation; either electric motor, wind motor, hydraulic ram, gasoline engine, or water wheels.

Steel Towers.

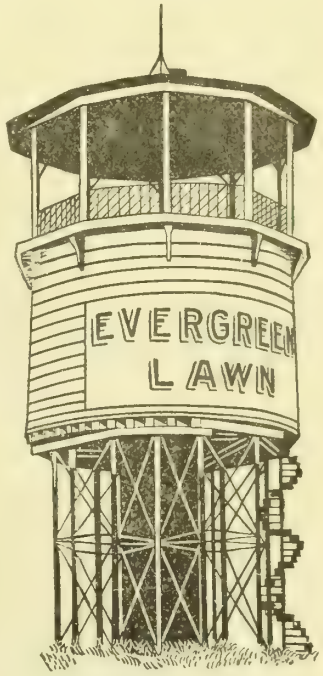
We also design and install the latest and most approved type of steel towers for elevating tanks to any required height, also windmill and bell towers.



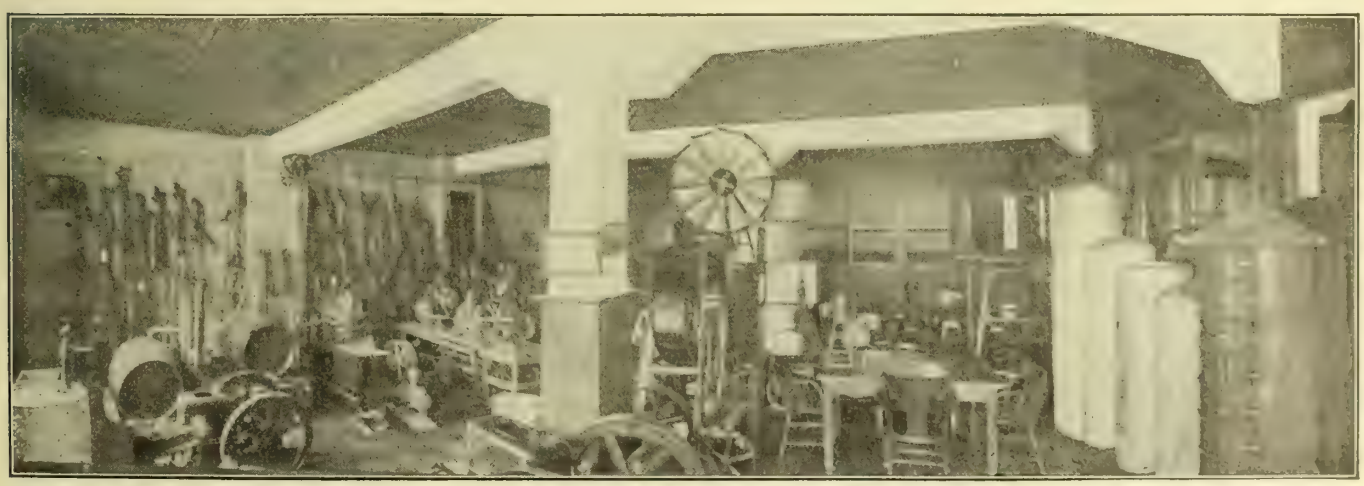
COMPLETE EQUIPMENT—TANK, PUMP AND GASOLINE ENGINE

Services.

Regardless of location, we can estimate on shipping our goods "knocked down," together with blue-prints and directions for installation; or we can estimate for complete installation. Our goods can be found in almost every state in the Union; in Mexico, South America, and other foreign countries. Many years of practical experience not only enable us to name attractive prices for this class of work, but place us in a position to install plants that will give adequate service at all times. We maintain one of the most complete showrooms for water-works equipment.



WATER TANK ELEVATED BY STEEL TOWER



SHOWROOM OF THE BALTIMORE COOPERAGE COMPANY
Showing a complete line of water-works equipment

THE GLOBE AUTOMATIC SPRINKLER COMPANY

EXECUTIVE OFFICES
2019-2035 Washington Avenue
PHILADELPHIA, PA.

MANUFACTURING PLANTS
PHILADELPHIA, PA. WARWOOD (WHEELING), WEST VA.

DEPARTMENT OFFICES

ATLANTA, GA., 507 Trust Company of Georgia Building
BALTIMORE, MD., 531 Munsey Building
BOSTON, MASS., 141 Milk Street
BUFFALO, N. Y., 531 Ellicott Square
CHARLOTTE, N. C., 15 West 6th Street
CHICAGO, ILL., 1105 Association Building
CINCINNATI, OHIO, 1000 First National Bank Building
CLEVELAND, OHIO, 612 Cuyahoga Building
DALLAS, TEX., 822 Busch Building
GRAND RAPIDS, MICH., 314 Powers Building
HARTFORD, CONN., 538 Albany Avenue
NEW YORK, N. Y., 120 Broadway
OMAHA, NEB., 447 Omaha National Bank Building
PHILADELPHIA, PA., 2019-2035 Washington Avenue
ST. LOUIS, MO., 1025 Pierce Building

Products and Services.

Manufacturers of and Contractors for GLOBE AUTOMATIC SPRINKLER SYSTEMS, using GLOBE AUTOMATIC SPRINKLERS, ALARM VALVES, including MECHANICAL or ELECTRICAL ALARM DEVICES, RETARDING CHAMBERS, where water pressure is variable; DRY PIPE VALVES, where buildings are unheated; and all parts of Complete Equipment.

Great care is given to all engineering details in connection with Globe installations. The Engineering Department will at all times assist those interested with information relative to layouts and specifications.

Description of Systems.

A Globe Automatic Sprinkler Equipment consists of parallel lines of piping suspended about ten inches from the ceiling, this piping being supplied by mains, which in turn are supplied by risers connected to the main source of water supply at the base. Globe Automatic Sprinklers in an upright position are screwed upon these lines, eight to ten feet apart. The spacing between the heads and lines of piping is controlled by the rules of the Underwriters having jurisdiction, and depends upon the construction of the building.

Two independent sources of supply of water are usually maintained, consisting of city connection with either gravity or pressure tank, or both. When city water is not available, the double supply is usually secured from two independent tank systems supplied from one source only, namely, city connection, are now becoming very popular in small buildings where city pressure and the size of the mains are ample to maintain the necessary pressure on the highest row of sprinklers. Where buildings are unheated during the cold seasons, a dry pipe valve is installed at the base of the riser. By means of this device air under pressure is maintained in the system in place of water, eliminating all danger of freezing.

GLOBE AUTOMATIC SPRINKLER
Recessed Type

Saving of Insurance.

Globe Automatic Sprinkler Equipments reduce insurance rates from forty to eighty per cent. This saving is usually enough to pay the total cost of the system in from two to seven years' time, after which the annual saving in insurance premiums amounts to approximately twenty per cent of the cost of the system.

Financing of Sprinkler Equipment.

The saving in insurance effected by the installation of a Globe Automatic Sprinkler equipment is generally sufficient to enable property owners to have such equipment installed on a deferred payment basis. Under such conditions THE GLOBE AUTOMATIC SPRINKLER COMPANY is prepared to install its equipment, accepting in payment therefor the saving in insurance over a period of from two to seven years, and after the expiration of that period to present the equipment to the property owner free of any encumbrances.

Compulsory Installation of Sprinkler Equipment.

The latest building codes in most of the cities require the installation of a sprinkler equipment in certain classes of buildings. The Fire Prevention and Fire Marshall Laws generally give to the Fire Prevention Bureaus and Fire Marshalls authority to order buildings equipped with sprinklers when in their judgment the construction or the occupancy warrants their so doing.

These laws are becoming more drastic and more widely extended. The best interest, therefore, of the architect and the property owner is served, by includ-

Continued on next page

ing in the plans and specifications provision for Automatic Sprinkler protection and thus avoid expensive changes with attendant inconveniences to occupants.

Estimates and Specifications.

Estimates and specifications approved by the Underwriters for full equipments can be furnished upon receipt of the following data, or by a personal call of an engineer from the nearest office.

(1) Detailed blue-prints, showing construction of buildings.

State whether buildings are brick, iron-clad, concrete or frame. Give exact measurements of posts and beams; also depth and exact measurements of all beams and girders from center to center; also, from wall to center of nearest beams. State whether ceilings and roofs are of open joist, smooth sheathes, or concrete construction. State length of buildings each floor; also, occupancy of each floor in each building. State whether basement floor is wood, concrete or dirt. State which buildings are heated during cold seasons. If buildings are unheated and dry pipe systems are necessary, shall THE GLOBE AUTOMATIC SPRINKLER COMPANY furnish boxing around dry valve? If hydrants are required by insurance interest, state whether customer will furnish necessary hose and hose house equipment. State whether high or low pressure boilers are used. If high pressure, state amount of steam pressure carried.

(2) Give exact location of buildings, naming streets near plant.

(3) Give exact distance of curb line from buildings.

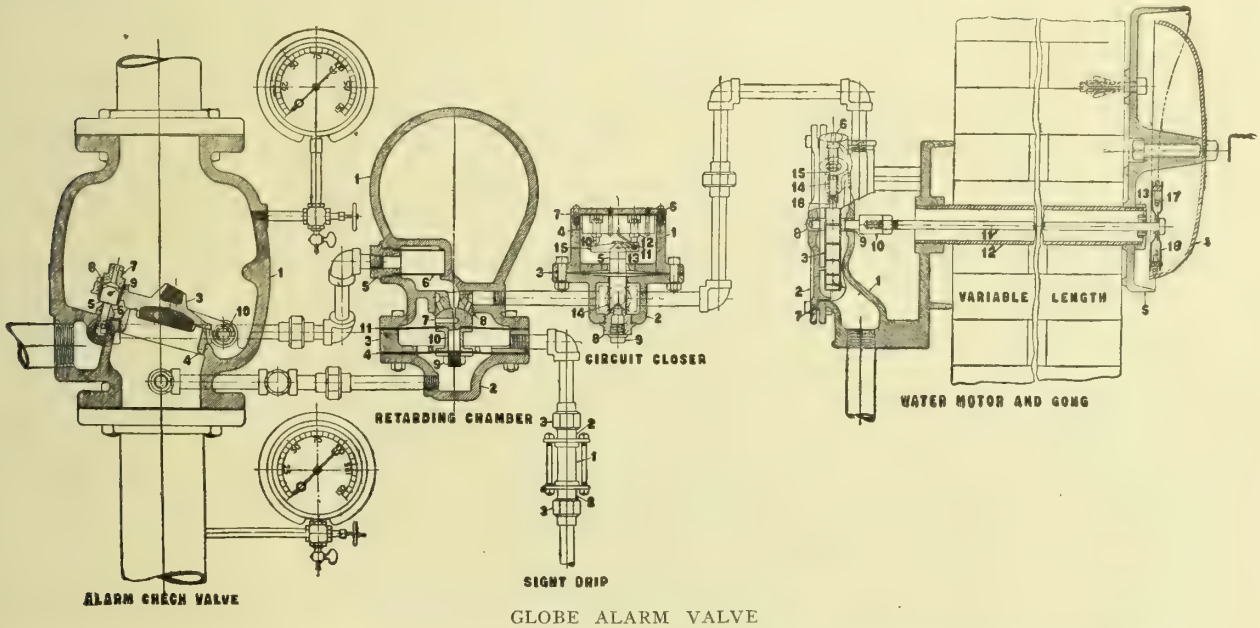
(4) Give size and pressure of city mains, marking best location for city connection. Unless otherwise noted it is assumed that the purchaser will furnish city connection and all necessary excavating, backfilling, carpentry and masonry.

(5) State whether city mains around building are circulating or dead; also, give location of any city hydrants.

(6) Indicate best location for pressure or gravity tanks.

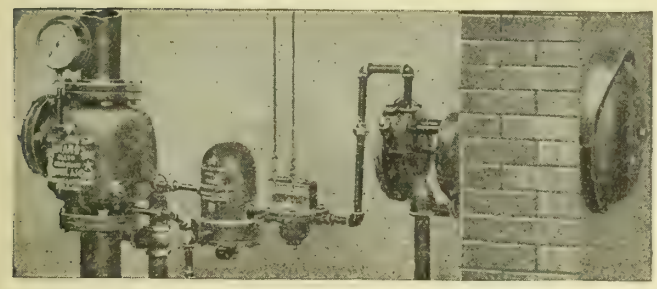
(7) State nature of electric current entering building.

(8) State whether insurance will be carried in stock or in mutual companies.

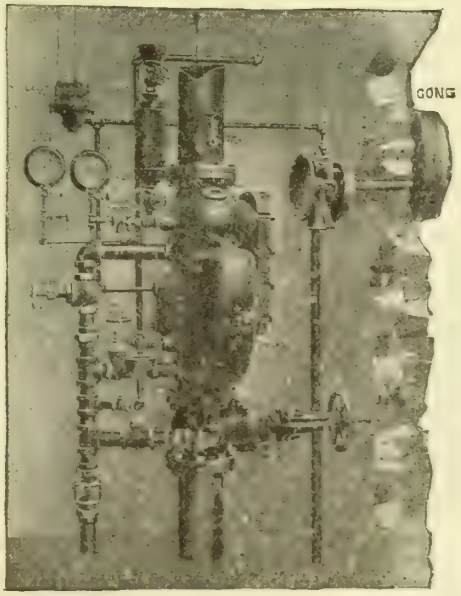


GLOBE ALARM VALVE

Sectional diagram showing Alarm Valve with Retarding Chamber and both Mechanical and Electrical Alarms



PHOTOGRAPH OF ACTUAL INSTALLATION OF GLOBE ALARM VALVE (COMPLETE)



EXTERIOR VIEW, SHOWING TYPICAL INSTALLATION OF GLOBE STRAIGHT-PIPE DRY-VALVE

Official Approval.

These equipments are approved by all the insurance interests in the United States and Canada. Such approval is due, mainly, to the fact that Globe Automatic Sprinklers are the nearest approach to perfection on the market. They are *mechanically* the simplest, strongest and best.

CHICAGO BRIDGE & IRON WORKS

DESIGNERS, MANUFACTURERS AND ERECTORS OF

Elevated Steel Tanks and Towers for Sprinkler Service

SALES OFFICES

CHICAGO, ILL., 2110 Old Colony Building
NEW YORK, N. Y., 3135 Hudson Terminal Building
DALLAS, TEX., 1622 Pretorian Building
MONTICELLO, FLA., P. O. Box 377
DETROIT, MICH., 326 Ford Building
CHARLOTTE, N. C., 501 Realty Building
GREENVILLE, PA., 122 Pine Street
LOS ANGELES, CAL., 309 Union Oil Building
SAN FRANCISCO, CAL., 753 Monadnock Building
SEATTLE, WASH., L. C. Smith Building
SALT LAKE CITY, UTAH, 1026 Kearns Building
BRIDGEBURG, ONT., CAN., 127 Janet Street

WORKS

GREENVILLE, PA. (Pittsburgh District) CHICAGO, ILL. BRIDGEBURG, ONT., CAN.

Products.

ELEVATED STEEL WATER-TANKS for Automatic Sprinkler Service; Factory and Combined Factory and Sprinkler Service; Advertising Service—through the medium of distinctive design; Railway Service—in any climate; Municipal Water-Works Service.

Also STANDPIPES, OIL STORAGE TANKS, ACID TANKS, SMOKESTACKS, COALING STATIONS, GIRDERS, BRIDGES, and a universal variety of STEEL PLATE WORK.

Specifications.

Materials—All metal in structure made in accordance with Manufacturers' Specifications.

Stability—Designed to properly support its own weight, weight of water in tank and wind pressure incurred by a hurricane blowing at rate of 100 miles per hour from any direction.

Balcony Girder—Circular girder provided at connection of post to tank to resist horizontal stresses induced at that point.

Painting—All steel work receives one shop and one field coat of graphite, or equally good paint.

Roof—A steel roof, conical in form, made of steel sheets, with a cast-iron finial, is well secured at the apex of the roof.

Frost Casing—Circular in form, and made of one or more thicknesses of lumber as the climate demands, built around riser pipe.

Anchor Bolts—Furnished f.o.b. cars at delivery point.

Indicator—Made of a target sliding vertically in a steel channel over a graduated scale.

Expansion Joint—A brass-lined expansion joint is furnished with hemispherical tanks for connecting the riser pipe to the bottom of the tank. No expansion joint is necessary with our patented elliptical bottom style of tank.

Inlet Pipe—A standard cast iron flanged pipe is used for inlet pipe, unless hub and spigot or wrought pipe is desired. At proper intervals the riser pipe is stayed to the main post by horizontal rods.

Delivery of Material—Material is to be unloaded and delivered at the proposed tank location.

Guarantee—The CHICAGO BRIDGE & IRON WORKS guarantees the structure for one year, and will repair any defects due to faulty design, workmanship or material which may appear during that period.

Information Required in Making Quotations.

Inquiry for estimate on a water tower should give as fully as possible the following information:

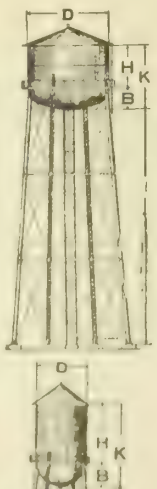
(1) Capacity of tank required in gallons.
(2) Height of tower, which should be given to the lowest point of bottom of tank, above top of foundations.
(3) The city where tank is to be built.
(4) The erection conditions at proposed site.
(5) Name of insurance company that will approve sprinkler supply tank.
(6) Whether purchaser or contractor furnishes foundations.
(7) Which, if any, of the following accessories manufacturer is to furnish: Riser pipe, frost casing, overflow, indicator, pressure gauge, tank heater, heater house, foot elbow, gate valve, float valve. None of these accessories are included in quotations except when expressly so stated.
(8) The haul from nearest railroad siding to site of installation.

Territory, Prices, etc.

We are in a position to contract to erect elevated steel water-tanks anywhere, quote favorable prices and make prompt deliveries.

Catalogue.

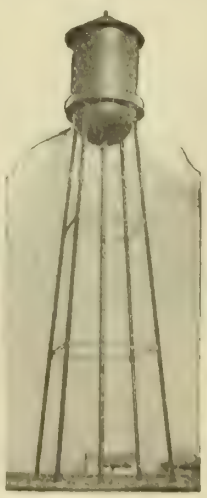
Illustrated Catalogue No. 50 mailed on request.



DIMENSIONS OF STANDARD STEEL TANKS

Capacity, Thousand Gallons	Elliptical Bottom			Hemispherical Bottom		
	D	H	K	D	H	K
5	10′-0″	7′-0″	9′- 6″	8′-0″	12′-0″	16′- 0″
10	13′-0″	8′-0″	11′- 3″	10′ 0″	14′-0″	19′- 0″
15	15′ 0″	9′-0″	12′- 9″	12′-0″	14′ 0″	20′- 0″
20	16′-0″	11′ 0″	15′- 0″	12′-9″	17′-3″	23′- 7″
25	17′-6″	11′ 0″	15′- 4″	14′-1″	17′ 3″	24′- 3″
30	18′ 6″	12′ 0″	16′- 7″	15′-3″	17′ 3″	24′-10″
35	19′ 0″	13′-4″	18′- 1″	16′-4″	17′-3″	25′- 5″
40	20′-0″	13′ 9″	18′- 9″	17′-4″	17′-3″	25′-11″
48	22′-0″	12′ 4″	17′ 10″	18′-3″	17′-3″	26′- 4″
50	22′ 0″	14′ 0″	19′- 6″	19′-0″	17′-6″	27′- 0″
60	24′-0″	14′-0″	20′- 0″	19′-0″	22′ 3″	31′- 9″
65	24′ 0″	15′ 0″	21′- 6″	20′ 0″	21′-3″	31′ 3″
70	25′-0″	15′ 0″	21′- 3″	21′ 0″	20′-3″	30′- 9″
75	26′-0″	15′ 0″	21′- 6″	22′-0″	19′-4″	30′- 4″
80	26′-0″	16′ 0″	22′- 6″	22′-0″	21′ 1″	32′- 1″
90	26′ 8″	14′-0″	21′- 2″	22′ 0″	24′-6″	35′- 6″
100	28′-8″	16′-0″	23′- 2″	22′-0″	28′-0″	39′- 0″
120	30′ 0″	14′ 8″	22′- 8″	24′-0″	28′ 0″	40′- 0″
125	32′ 0″	15′-6″	23′- 6″	24′-0″	29′ 0″	41′ 0″
150	34′ 0″	16′ 6″	25′- 0″	26′-0″	29′ 3″	42′- 3″
175	36′-0″	17′ 6″	26′- 6″	26′-0″	35′-0″	48′- 0″
200	38′-0″	17′-6″	27′- 0″	28′ 0″	35′ 0″	49′- 0″
250	40′-0″	20′ 0″	30′- 0″	30′ 0″	37′-0″	52′- 0″
300	41′ 0″	23′ 9″	34′- 0″	32′-0″	40′-0″	56′- 0″
400	47′ 0″	23′ 0″	34′ 9″	38′-0″	44′-0″	61′- 6″
500	51′-0″	24′-3″	37′- 0″	38′-0″	46′-6″	95′- 6″

Elliptical.	Depth of Bottom	$B=\frac{D}{4}$
	Square of Base	$=.71D+.118\ (T+B)$
Hemispherical	Depth of Bottom	$B=\frac{D}{2}$
	Square of Base	$=.71D+.162\ (T+B)$



Allentown, Pa. American Steel & Wire Company Capacity, 50,000 gallons; 100 ft. to bottom

Tulia, Texas Capacity, 50,000 gallons; 78 ft. to bottom

HEMISPHERICAL AND ELLIPTICAL BOTTOM TANKS CONSTRUCTED BY CHICAGO BRIDGE & IRON WORKS

H. J. M. HOWARD MANUFACTURING CO., INC.

Manufacturers of the Peerless Swinging Hose Racks

148-150 Pierce Street, N. W.
WASHINGTON, D. C.

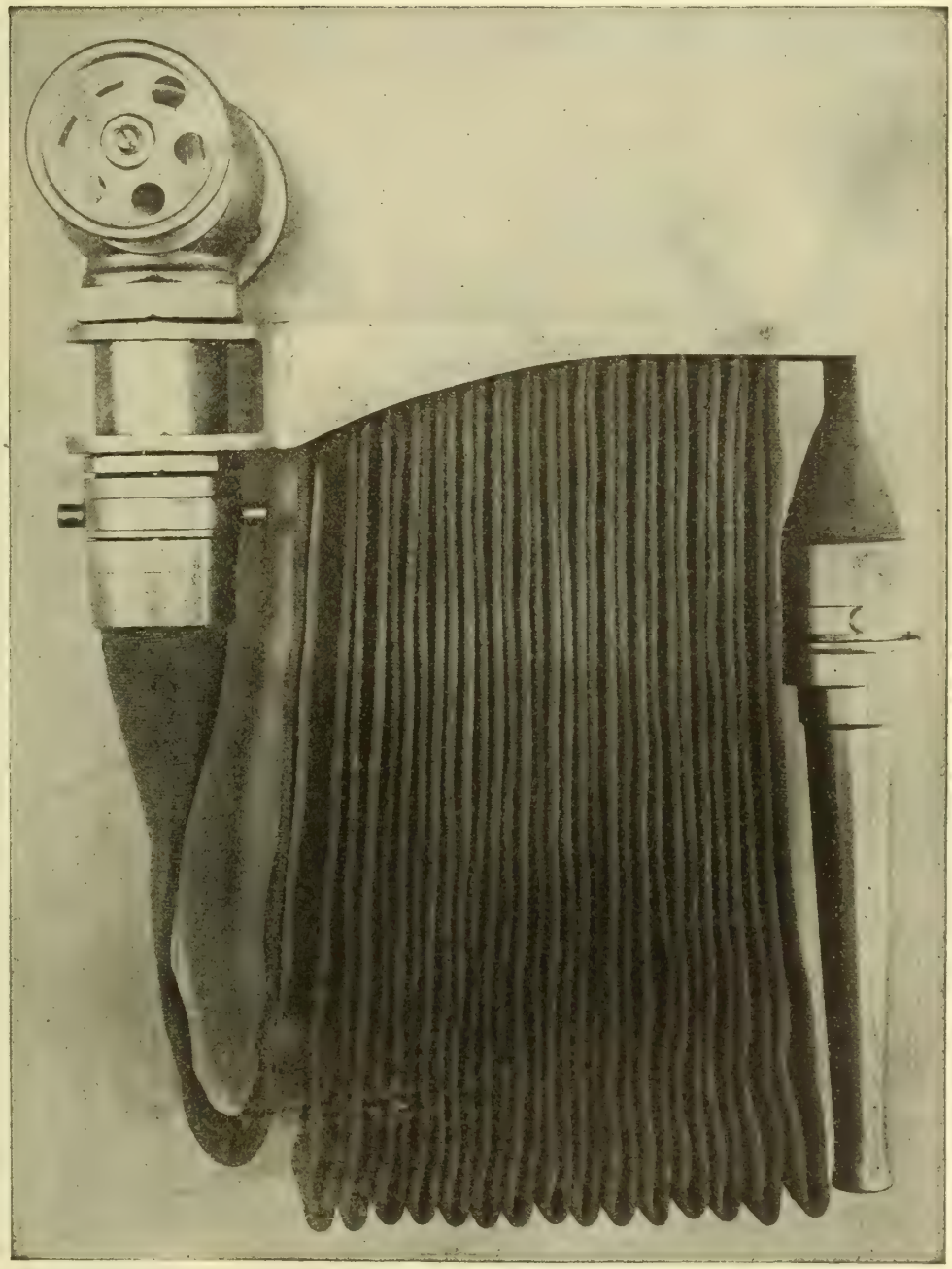
TELEPHONE, Main 2732

FACTORY
148-150 PIERCE STREET, N. W.

Products.

Fire Protection Devices, including Peerless Swinging Hose Racks and Perfecto Labeled Underwriters' Linen Hose.

Also, Howard Swinging Hose Racks, Ideal Swinging Hose Reels, Hose Couplings, Hose Pipes; Perfecto Brand of Unlined Linen Hose; Howard Chemical Fire Extinguishers and Hand Grenades.



PEERLESS SWINGING HOSE RACK

Specification.

"On each floor where indicated, at a height of 6½ feet above the floor, install a —" brass angle valve with brass milled edge wheel and renewable soft disc for cold water and — feet of —" Perfecto Labeled Underwriters' Linen Hose, with patent expansion ring couplings, and —" x 12" hose nozzle with —" outlet.

"The hose to be supported on a solid brass Peerless Swinging Hose Rack, as illustrated and described on Plate No. —, Specification No. —, in catalogue H of the H. J. M. Howard Manufacturing Co., Inc., Washington, D. C.

"All metal parts are to be brass, heavily nickel-plated and polished all over."

Catalogue.

Our new 64-page Catalogue H, which fully illustrates and describes our complete line, with specification for each different style of construction, will be mailed on application.

NEW YORK BRASS FOUNDRY CO.

MANUFACTURERS OF

Fire Equipment Specialties and Supplies

102-104 Centre Street
NEW YORK, N. Y.

Products.

Approved Fire Extinguishing Apparatus, including Linen Fire Hose, Cotton Rubber-Lined Fire Hose, Hose Valves, and Fire Extinguishers, Standard Siamese Connections, Hose Cabinets, Fire Axes, Crowbars, Fire Hooks and Poles, Hydrants, Chemical Engines, Hose Carts, etc.

Trade-Mark.

The trade-mark under which our underwriter brand linen hose, cotton rubber-lined underwriter hose, fire extinguishers, and brass fittings are sold, indicates definite grades of quality, which are absolutely maintained by us. These products have established standards for the purposes for which they are intended, and should not be classed with other products whose specifications are not definitely fixed.

TRADE MARK. STILLBECH

TRADE-MARK

Castings.

All genuine New York Brass Foundry Co.'s brass, bronze and machinery castings bear the Stillbech trademark, and are guaranteed to be absolutely perfect in workmanship, and to be suitable and efficient in the service for which they are designed.

Acme (Double Arm) Hose Rack.

This hose rack is automatic in its action, having a yoke nozzle holder, same as that employed in the construction and operation of the Duplex hose rack.

Duplex Hose Rack and Cabinet Combined.

One of the very few devices which are safe to operate with the hose remaining in position on the rack, whether under pressure or not, until nozzle is released from nozzle holder.

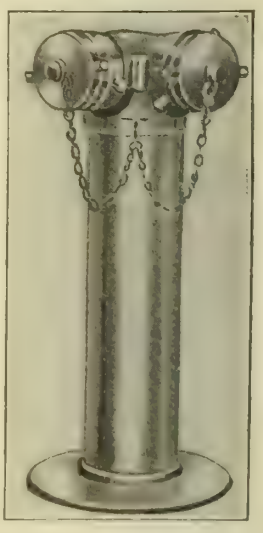
For cabinet use, the Duplex hose rack is "made up" on inside of door frame; and when door is opened, the complete outfit (except valve enclosed) is swung free of the cabinet, hose is dropped, and lies in horizontal folds on the floor (see illustrations on following page).

Cabinets fitted with the Duplex hose rack require a minimum depth in partition, or just enough space to swing the valve in making up.

The Duplex hose rack is also made with wall plate, or pipe clamps, to clamp direct to riser, or to fit over and swing on extension nipple of the valve.

Siamese Connections.

These connections are made in "Y," 45-degree and 90-degree patterns, of cast iron and brass, and are furnished complete with flange plates and brass tubing to fit over wrought iron pipe if desired.



SIAMESE CONNECTION

Facilities.

Our plant consists of foundry, and machine and brass finishing shops, fully equipped, which insures prompt deliveries at all times.

Estimates.

Estimates furnished upon application with architect's specifications.

STEAM, WATER, OIL AND GAS FITTINGS AND CASTINGS

Continued on next page

HOSE IN CLOSED CABINET

DATA FOR DUPLEX CABINET

Length of Hose, Ft.	Diameter of Hose, Ins.	Height, Ins.	Width, Ins.	Depth, Ins.
50	2½	28	16	6
75	2½	30	21	6
100	2½	36	21	6

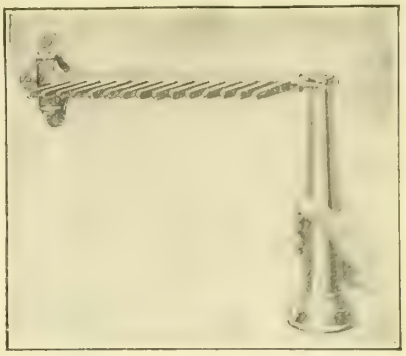
Duplex Hose Rack.

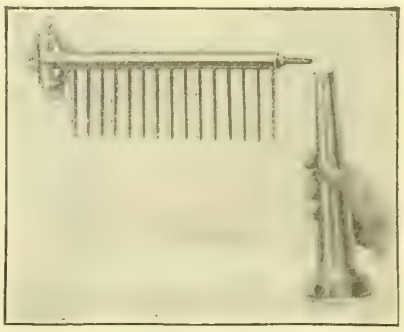
This is a single arm rack, constructed of a single tube, with pins (cast in one piece) fitted over steel bar and yoke nozzle holder at end, as shown in illustrations.

Simple and positive in its operation.

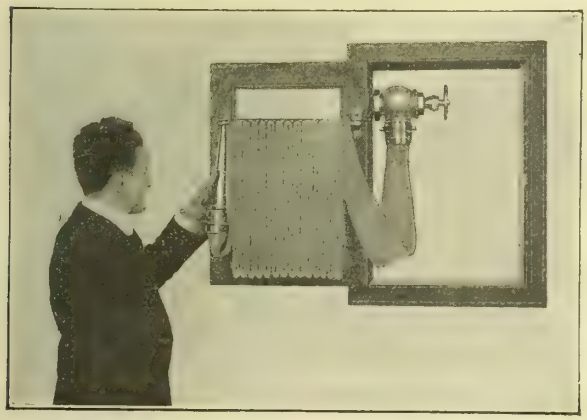
Made of malleable iron or brass, with wall plate, pipe clamps, or fitted to extension nipple from valve.

Duplex hose rack works automatically right or left.

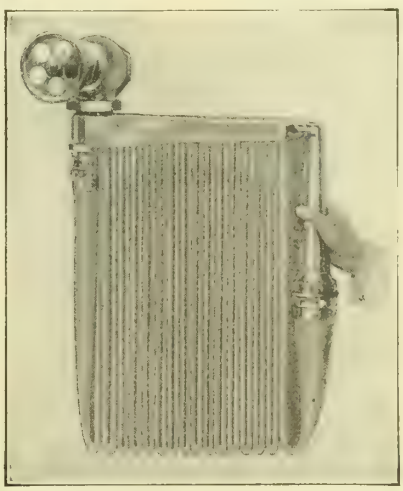




DUPLEX HOSE RACK
(Patent applied for)

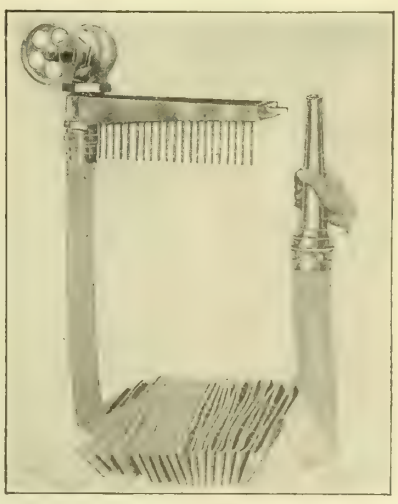


DUPLEX HOSE RACK SWUNG FREE OF CABINET



ACME HOSE RACK (DOUBLE ARM), WITH VALVE, SHOWING HOSE MADE UP
(Patent applied for)

DUPLEX HOSE RACK AND CABINET COMBINED, SHOWING HOSE READY FOR USE



ACME HOSE RACK (DOUBLE ARM), WITH VALVE, SHOWING HOSE READY FOR USE
(Patent applied for)

THE SAFETY FIRE EXTINGUISHER CO.

Manufacturers of Approved Fire Extinguishing Appliances

291-293 Seventh Avenue

NEW YORK, N. Y.

Products.

APPROVED FIRE EXTINGUISHING APPARATUS, including the SAFETY FIRE BUCKET TANK, SAFETY FIRE EXTINGUISHER, CHEMICAL ENGINES, UNDERWRITERS' FIRE HOSE, RACKS and REELS, HOSE CARTS, AXES, HOOKS, WATCHMAN'S CLOCKS and WASTE CANS.

Safety Fire Bucket Tank.

The Safety Fire Bucket Tank is accepted by all Boards of Fire Underwriters. It is always ready for immediate use and requires no attention. The solution does not evaporate, foul or freeze in any temperature.

Exterior View

Sectional View

SAFETY FIRE BUCKET TANK

No. 1. Height, 31 in.; diameter, 15½ in. Contains 25 gals. chemical solution and six 10-qt. buckets. List price, $16.00 each

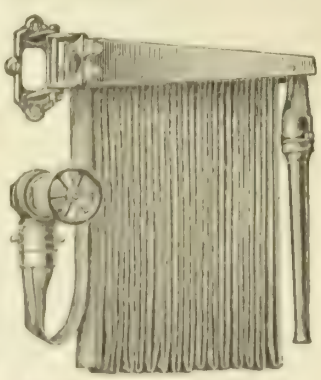
No. 2. Height, 34 in.; diameter, 18½ in. Contains 40 gals. chemical solution and six 14-qt. buckets. List price, $18.00 each

Description—Body of heavy steel, top and bottom reinforced with wrought-iron rim. Cover and bottom stamped out of one piece, hinges and hasps malleable iron, and entire tank and buckets galvanized after being made. Cover closes on rubber packing, making tank practically air-tight and preventing evaporation.

Operation—It is so simple to operate the tank that a child can use it effectively. Open the cover and the top bucket is full with the handle up, contents of which should be thrown at the base of the fire. As fast as one bucket is removed the next fills and the handle rises automatically. Six men can each remove a bucket and use its contents on a fire and then four of the buckets can be refilled with the solution remaining in the tank.

Hose Racks and Reels.

Racks and Reels furnished with aluminum bronze finish on iron, solid brass, brass-plated, bronze-plated, nickel-plated. We make all styles of Hose Reels and Racks. Send for catalogue.



SAFETY APPROVED HOSE RACK

Safety Fire Extinguisher.

SAFETY FIRE EXTINGUISHER

The Safety Fire Extinguisher is tested and labeled by the Underwriters' Laboratories, Inc., and approved by the National Board of Fire Underwriters. The tank is made of extra heavy Lake Superior cold-rolled copper, the body of eighteen gauge, and the head and bottom of seventeen gauge. The outside is highly polished, making it attractive in appearance, and the inside is thoroughly coated with a special preparation of lead to prevent corrosion of the copper. Every machine is subjected to a hydrostatic pressure of 400 pounds to the square inch before leaving the factory, and so guaranteed.

How to Operate—To use the Safety Fire Extinguisher simply turn bottom up and play the stream from the hose on the base of the fire. If it is not necessary to use the entire contents of the extinguisher, the discharge may be stopped immediately by reversing the extinguisher.

TYPES A AND B SAFETY CHEMICAL ENGINE

Chemical Engines.

For factory, mercantile and suburban use. Horizontal and perpendicular types.

Capacities from 25 to 60 gallons.

Catalogue gives full description, sizes and use.

Fire Hose.

Unlined Linen or Cotton Rubber-Lined, with Underwriters' label.

All sizes, with couplings, nozzles, racks, reels and valves.

Let us figure on your needs.

UNLINED LINEN OR COTTON RUBBER LINED FIRE HOSE
With Underwriters' Label

Hose Carts.

For factories, warehouses, railroads, and country residences.

Catalogue shows various styles.

PYRENE MANUFACTURING CO.

52 Vanderbilt Avenue
NEW YORK, N. Y.

TELEPHONE:
OFFICE, MURRAY HILL 3585

Products and Services.

PYRENE FIRE EXTINGUISHER.

Complete FIRE PROTECTION EQUIPMENT.

Competent INSPECTION SERVICE for all kinds of buildings furnished free of charge. Estimates on complete fire protection of buildings made without obligation.

Uses.

For use in factories, garages, homes, schools, and all classes of buildings.

Efficiency.

Especially efficient because:

It weighs only 6 pounds.

Can be operated easily by a woman or ten year old boy.

Operates like a pump; no instruction needed.

Pyrene Liquid.

Pyrene is the only kind of liquid that will extinguish all kinds of fire.

It is the only kind of liquid that will extinguish blazing gasoline, benzine, kerosene and other oils, and acetylene gas, on all of which water is useless.

Pyrene is a non-conductor; hence it can be used on electrical fires without danger to operator. An arc of 110,000 volts has been extinguished with Pyrene without injury to the operator.

Pyrene will not freeze at fifty degrees Fahr. below zero.

Pyrene will not damage the finest fabric, nor stain the most delicate colors. It will not corrode metal, affect fine machinery, or harm anything but fire.

Lasts forever; never deteriorates.

Can be bought in bulk, and extinguisher refilled by owner.

How Pyrene Works.

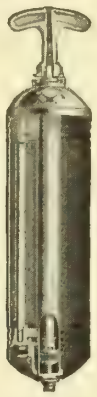
Pyrene consists of a double-acting pump, containing one quart of liquid. It is operated by hand, and will throw a steady stream twenty-five feet.

At two hundred degrees Pyrene liquid is transformed into a heavy, dry, cohering, non-poisonous gas, which extinguishes the fire by settling on it and shutting out the air.

Reliability and Durability.

The Pyrene Fire Extinguisher is a highly perfected machine. It consists of forty-three parts, and is constructed for long, efficient and reliable service. The strength of all materials far exceeds the requirements of the Underwriters.

SECTION DETAIL OF CABINET SET IN WALL FOR PYRENE EXTINGUISHER



Sectional View

General View

VIEWS OF PYRENE EXTINGUISHER
Diam., 3 ins.; Height, 14 ins.; Weight, about 6 lbs. filled

Prices.

Pyrene Extinguishers are supplied filled and ready for use. Prices are f.o.b. New York, N. Y., or any one of forty-one shipping points in the United States.

Brass Extinguisher	$7.00	Wall Brackets	$ .50
Nickel-plated Extinguisher	8.00	Liquid (quart)	1.00

Liquid is furnished in one-, two- and four-quart cans.

Official Endorsements.

Tested, approved and labeled by the Underwriters' Laboratories, Inc.

Gold Medal, Highest Extinguisher Award, at Panama Pacific Exposition, San Francisco, Cal., 1915.

Approved by the United States Steamboat Inspection Service.

Approved by Good Housekeeping Institute.

REPRESENTATIVE INSTALLATIONS

HOMES

John D. Rockefeller
Amos Pinchot
Finley J. Shepard
Charles M. Schwab
Mrs. William K. Vanderbilt

FACTORIES

National Cash Register Co.
Charles L. Avery Co., Peoria, Ill.
Borden's Condensed Milk Co.
Standard Oil Co.
Dayton Engineering Laboratories

WAREHOUSES

Memphis Terminal Corporation Cotton Warehouse

SCHOOLS AND COLLEGES

Harvard, Columbia, Princeton, Vassar, Barnard, Bryn Mawr, Berkeley School, Riverside School, Rice Institute, La Salle School, Buffalo High Schools, Public Schools in New York, Atlanta, Kansas City, Mo., Newark, N. J., Tacoma

Also used by the United States Army and Navy.

JOHN SIMMONS COMPANY

Fire Equipment, Flagpoles

TELEPHONE, FRANKLIN 5000

110 Center Street
NEW YORK, N. Y.

Products.

Approved FIRE EXTINGUISHING APPARATUS, including LINEN FIRE HOSE, HOSE RACKS, HOSE VALVES and FIRE EXTINGUISHERS.

METAL FLAG POLES; IRON PIPE, FITTINGS and VALVES; STEAM, HOT-WATER and PLUMBING SUPPLIES.

Also, STANDARD SIAMESE CONNECTIONS, HOSE CABINETS, FIRE AXES, CROWBARS, HOOKS and POLES, MALLEABLE FIRE LINE FITTINGS, HYDRANTS and CHEMICAL ENGINES.

Linen Fire Hose.

"SS" Approved Underwriter Brand Hose, tested to 400 pounds pressure to the square inch; and "SSS" Commercial Grade Hose, tested to 300 pounds pressure to the square inch.

"Lightning" Pin Hose Rack, with Hose, Angle or Gate Valve.

Fig. 1 shows the "Lightning" Hose Rack. The rack is quickly and easily operated; the mere act of pulling the nozzle releases the hose from the pins. Two sizes; with wall brackets or pipe clamps; finished in bronze, electroplated or japanned; also in solid brass or iron.

DATA, "LIGHTNING" PIN HOSE RACK

DIMENSIONS Length from end of bracket or pipe clamp to end of rack	CAPACITY
No. 1, 20" x 7" wide	No. 1, 75 feet or less of 2½", 2", 1½", 1¼" or 1" hose
No. 2, 24" x 7" wide	No. 2, 100 feet of 2½", 2", 1½" 1¼", or 1" hose

"Josico" Fire Extinguisher.

Fig. 2 shows the "Josico" open bottle with lead stopple extinguisher. We also make a bottle breaking type, which will not operate until required. Most desirable for steamship service. Approved by the Steamboat Inspection Service, Bureau of Commerce and Labor. Made in two sizes, 1½- and 3-gallon. Guaranteed tested to 350 pounds pressure.

"Star" Swinging Hose Reel.

Fig. 3 shows improved design of our well-known "Star" Swinging Hose Reel. Furnished also with pipe clamps; in iron, bronze, japanned or electroplated; also in brass.

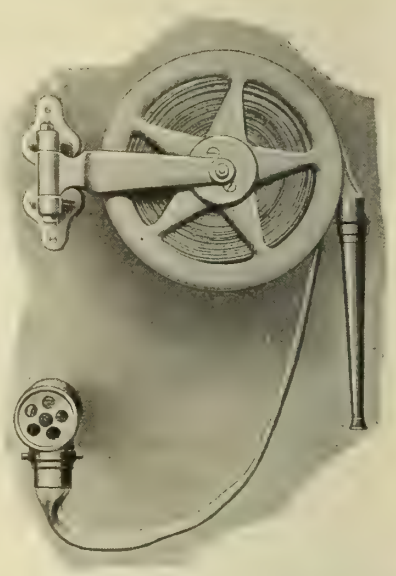


FIG. 3. "STAR" SWINGING HOSE REEL

DATA, "STAR" SWINGING HOSE REEL

DIMENSIONS Length from end of bracket or pipe clamp to end of reel	DIAMETER OF WHEEL	CAPACITY
Nos. 1-2-3, 18 5/16"	12"	50' hose
Nos. 4-5-6, 23"	16"	75' hose
Nos. 7-8-9, 24"	18"	80' hose
Nos. 10-11-12, 26"	20"	100' hose
Nos. 13-14-15, 35"	26"	(150' or 200')
	Extreme width, 7½ inches	

"Star" Swinging Hose Rack.

Fig. 4 shows the "Star" Swinging Hose Rack with folds. Exceptionally attractive with either wall brackets or pipe clamps, finished in bronze, japanned or electroplated; also in solid brass or iron.

DATA, "STAR" SWINGING HOSE RACK

DIMENSIONS Length from end of bracket or pipe clamp to end of rack	CAPACITY
Nos. 4-5-6, 25½" x 10" high	50' hose
Nos. 7-8-9, 26½" x 13" high	75' hose
Nos. 10-11-12, 27½" x 15½" high	100' hose

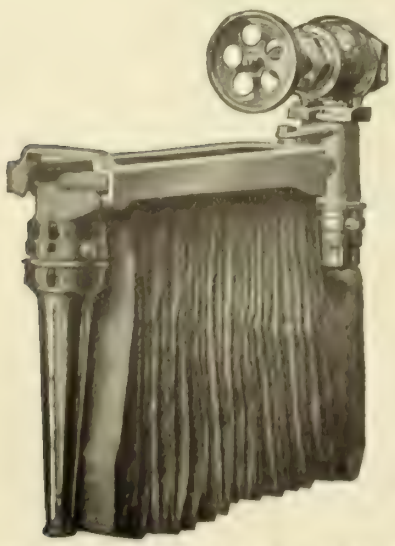


FIG. 1. "LIGHTNING" PIN HOSE RACK

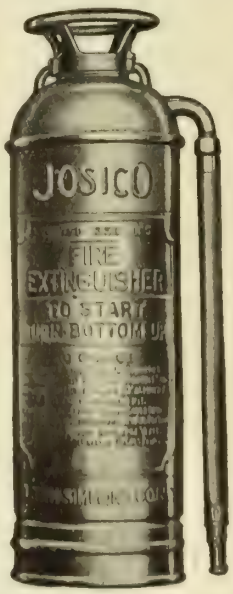


FIG. 2. "JOSICO" FIRE EXTINGUISHER

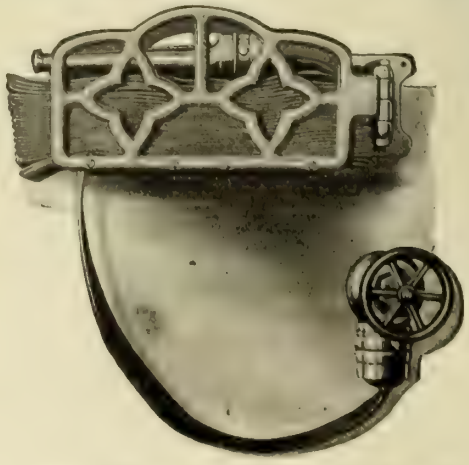


FIG. 4. "STAR" SWINGING HOSE RACK

Continued on next page

COUNTY COURT HOUSE, HACKENSACK, N. J.

Mast 125 feet above ground

HIGH SCHOOL, JERSEY CITY, N. J.

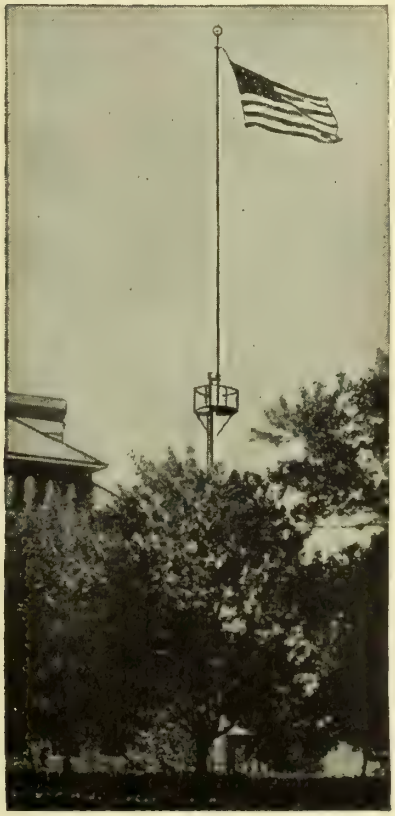
Pole 90 feet above ground

GUARANTEE TRUST COMPANY, NEW YORK, N. Y.

60-foot Pole, taper welded

HOTCHKISS SCHOOL, LAKEVILLE, CONN.

Signal Mast, 100 feet above ground



NORMAL AND AGRICULTURAL INSTITUTE, HAMPTON, N. C.

Mast 110 feet above ground

PRODUCE EXCHANGE, NEW YORK, N. Y.

90-foot Pole, 60 feet exposed

THE AUTOMATIC REFRIGERATING COMPANY

Automatically Controlled Refrigerating and Ice-Making Plants

HARTFORD, CONN.

BRANCH OFFICES

NEW YORK, N. Y., 30 Church St. BOSTON, MASS. CHICAGO, ILL. ATLANTA, GA. CLEVELAND, OHIO
LOUISVILLE, KY. SEATTLE, WASH. SAN FRANCISCO, CAL.

Products.

Manufacturers of complete AUTOMATICALLY CONTROLLED AMMONIA COMPRESSION REFRIGERATING and ICE-MAKING PLANTS, including COMPRESSORS, CONDENSERS, COILS, PIPING and TRAPS, and AUTOMATIC CONTROLLING and SAFETY DEVICES for REFRIGERATING PLANTS.

"Automatic" Refrigerating Plants.

These plants (fully patented) are designed to provide mechanical refrigeration without the necessity of an operating engineer. Automatic features absolutely control starting and stopping of machine as temperature in boxes rises above, or falls below, predetermined points, and also control feed of ammonia to expansion coils, and feed of water to condenser. Safety devices immediately stop plant in case of trouble with water or electric power service.

The Grand Prize was awarded to this company exclusively in refrigeration at Panama-Pacific International Exhibition.

Economy.

A table is appended as to cost of operation, with a three-cent power rate, and based upon readings of an automatic time recorder. The compressor of this plant, during July, ran only 73.1 per cent of the time. A compressor, during entire year, may average 60 per cent of entire time.

TABLE SHOWING COST OF OPERATION OF A 10-H.P. PLANT

	July		August		September		Three Months	
	Per Cent	Dollars	Per Cent	Dollars	Per Cent	Dollars	Per Cent	Dollars
Power consumption, if run continuously	100.00	133.44	100.00	133.44	100.00	133.44	100.00	400.32
Actual power consumption with thermostatic control	73.1	97.54	67.9	90.60	66.1	80.20	69.0	269.34
Actual water consumption	Cu. Ft. 44,250	26.55	Cu. Ft. 41,050	24.63	Cu. Ft. 36,400	21.84	Cu. Ft. 121.70	73.02
Total cost of refrigeration		124.09		115.23		102.04		341.36
Cost of ice to furnish equivalent refrigeration at $3 per ton	Tons 110	330.00	Tons 102	306.00	Tons 99	297.00	Tons 311	933.00
At $4 per ton	110	440.00	102	408.00	99	396.00	311	1244.00

NOTE—Ratio between operating cost and ice is about 1 to 3 and 1 to 4

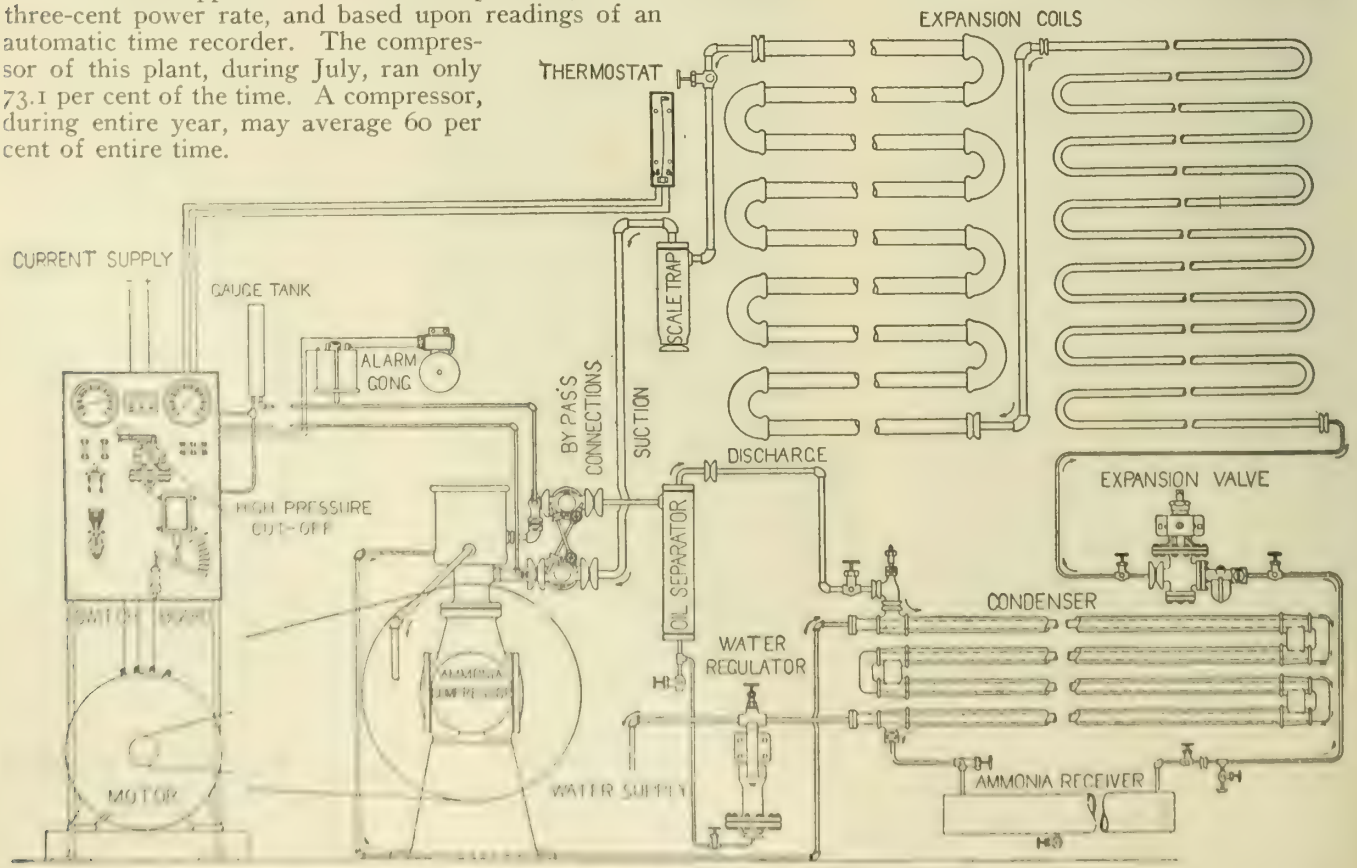
Sizes.

Single units have from ½ ton to 30 tons refrigerating capacity per twenty-four hours.

Also "Baby Automatic," for household use, complete plant occupying floor space of 30 by 78 inches.

SIZES OF MOTORS REQUIRED FOR VARIOUS REFRIGERATING CAPACITIES FOR 24 HOURS

Horse-power of Motor	1	2	3	5	7½	10	15	20	25	30
Capacity in Pounds	1,000	2,000	3,000	5,000	7,000	10,000	15,000	20,000	25,000	32,000



CONNECTIONS FOR COMPLETE AUTOMATIC SYSTEM

Continued on next page

Power.

Any type of electric current.

Compressors.

The Compressors are vertical two-cylinder, single-acting, enclosed type; of rugged construction, built to accurate dimensions with parts interchangeable, and with Patent "Safety Heads" to obviate danger to cylinder heads from non-gaseous substances getting into cylinder. Cylinders and pistons specially designed to prevent objectionable oil-pumping into expansion piping. The construction is particularly rugged, and all parts and materials are thoroughly tested. Fitting and assembling carefully done by skilled mechanics.

Condensers.

The Condensers are of the double-pipe type with water and ammonia flowing in opposite directions. Atmospheric condensers are used where conditions make them more desirable.

Coils.

Coils are continuously welded, or with screwed or flanged return bends, whichever type is best adapted to the specific installation. All screwed joints are thoroughly "sweated" and tested under high pressure.

Automatic Parts.

The Automatic Parts economize power and water consumption, and at the approach of danger stop the machine.

Thermostat.

The Thermostat produces economy of power consumption by causing machine to run only when temperature of boxes requires it. It is of the bar type, of rugged construction specially designed for its place and service.

Automatic Expansion Valve.

The Expansion Valve (patented) automatically controls the feed of ammonia to the expansion coils, allowing just the proper amount to maintain the required suction or back pressure, and causing further economy of operation.

Automatic Water Regulator.

The Water Regulator (patented) automatically controls the flow of water to the condenser, opening valve as head pressure rises and closing valve as head pressure falls, a great economizer on water consumption.

Safety High-Pressure Cut-Out.

The Safety High-Pressure Cut-Out (patented) automatically stops the machine in case the head pressure approaches the danger line due to failure of water supply or any other accidental cause, and at same time rings an alarm bell to call attention to the trouble.

Power Control.

The starting and stopping of the machine by the various automatic devices is through a special switchboard, which further holds automatic safety devices that shut machine down, and cut off all power in the event of trouble in the electric service, thus preventing danger of damage to motor. It is patented.

Repair Parts.

All parts of the plants are of superior construction and are interchangeable. A stock of parts always carried, which can be shipped promptly. No delays or holding up of apparatus while a new part is being constructed.

Prices and Estimates.

In dividing the work to be done in the erection of a building, architects should provide for a separate contract to cover the Refrigerating System; and should not include this kind of special technical work as a part of any heating, lighting, and plumbing contract.

In this connection, we shall be glad to make estimates and quote prices on completely installed plants, depending on individual requirements and conditions.

DATA SHEET FOR ESTIMATING

	Room 1	Room 2		Room 1	Room 2
Length of Room			Desired Temp.		
Width of Room			Thickness of Walls		
Height of Room			Wall Construction		
Used for			Is door often opened?		
Lbs. Cooled Daily			Is any part exposed to direct rays of sun?		
From Temp. of					
Outside Temp.					

Voltage ..... D. C. or A. C. .....
Phase ..... Frequency .....
Source of Water Supply .....
Summer Temp. of same .....
Maximum Amt. of Ice now used .....
Special Data .....

Co-operation.

Architects and others are invited to consult our engineering department regarding prospective refrigerating plant installations. Drawings and data supplied; no obligations entailed. Prompt attention is assured.

Some Recent Installations.

Armour & Co. (Packers), Branch Houses
Cudahy Packing Co. (Packers), Branch Houses
Sulzberger & Sons Co. (Packers), Branch Houses
Kingan & Co. (Packers), Branch Houses
Keeley Brewing Co. (Brewers), Depots
Hotel Heublein, Hartford, Conn.
Hotel Garde, Hartford, Conn.
Bangor House, Bangor, Me.
Van Ness House, Burlington, Vt.
Georgian Terrace Hotel, Atlanta, Ga.
Hotel Wentworth, Portsmouth, N. H.
Hotel Savannah, Savannah, Ga.
Hartford Club, Hartford, Conn.
Providence Public Market, Providence, R. I.
Hartford Market, Hartford, Conn.
C. N. Dodge (Market), Hartford, Conn.
Burke Bros. (Market), Chicago, Ill.
Astor Market, 95th Street and Broadway, New York, N. Y.
Astor Court Apartments, New York, N. Y.
F. F. Brewster (Residence), New Haven, Conn.
C. S. Mellen (Residence), Stockbridge, Mass.
Morton F. Plant (Residence, Dairy and Poultry Farm), Eastern Point, Groton, Conn.
Snow & Palmer (Dairy), Bloomington, Ill.
Bryant & Chapman (Dairy), Hartford, Conn.
Somers Creamery Co. (Dairy), Somers, Conn.
N. Y. State Cancer Laboratory, Buffalo, N. Y.
Robert Brigham Hospital, Boston, Mass.
Flower Hospital, New York, N. Y.
State Hospital for the Insane, Norwich, Conn.
State Hospital for the Insane, Danville, Pa.
New Hampshire Orphan's Home, Franklin, N. H.
Union National Bank Building, Houston, Tex., Water Cooling
Heard Building, Jacksonville, Fla., Water Cooling
Wise, Smith & Co. (Department Store), Hartford, Conn.
Palais Royal (Department Store), Washington, D. C.
Underwood Typewriter Co. (Factory), Hartford, Conn., Water Cooling
Colt's Patent Fire Arms Co. (Factory), Hartford, Conn., Water Cooling
American Hardware Co. (Factory), New Britain, Conn., Water Cooling
Hartford Electric Light Co. (Offices), Hartford, Conn., Water Cooling
Aetna Life Insurance Co., Hartford, Conn., Water Cooling
Municipal Building, Hartford, Conn., Water Cooling

AMERICAN CARBONIC MACHINERY COMPANY

Carbonic Safety System Refrigerating Machinery

MAIN OFFICE AND FACTORY
GRAND RAPIDS, WIS.

BRANCH OFFICES
NEW YORK, N. Y. DETROIT, MICH. CHICAGO, ILL. MINNEAPOLIS, MINN.

Products.

Refrigerating and Ice-Making Machinery, Carbon-Dioxide Refrigerating Compressors, Condensers, Brine Coolers, Fittings and Coils. Contractors for Complete Plants for all purposes.

Advantages.

Simple in operation. Smaller and more compact units than other types of compression or absorption systems. It is the safest method for producing refrigeration, because the refrigerating medium is not poisonous, explosive, inflammable or corrosive like ammonia or other mediums. Any temperature far below the limit of other systems can be produced.

Operation.

The operation cycle consists of three stages: Compression, Condensing and Expansion. The apparatus shown in the diagram illustrates a complete plant, which may be arranged for any purpose.

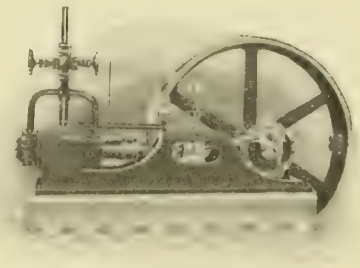
Capacities and Appliances.

Carbonic Safety Compressors are built in sizes from one to one hundred and fifty tons daily refrigerating capacity.

They are the ideal refrigerating apparatus for public institutions, factories, dairies, cold storage, air cooling, drinking-water cooling, ice-making, and all purposes where mechanical refrigeration must be produced safely and economically.

Installations.

South Shore Country Club, Chicago, Ill., Marshall & Fox, Architects
Tribune Color Press Building, Chicago, Ill., Holabird & Roche, Architects
Oppenheimer Department Store, Chicago, Ill., Martin E. Schwab, Engineer
Miami Hotel, Dayton, Ohio; Olmsted Hotel, Cleveland, Ohio, H. L. Stevens & Co., Architects, Chicago, Ill.
Fletcher Trust & Savings Bank, Indianapolis, Ind., Vonnegut & Bohn, Architects
Guardian Bank, Cleveland, Ohio, Walker & Weeks, Architects
Minneapolis Athletic Club, Minneapolis, Minn., Chas. Pillsbury, Architect
United States Battleship "Texas" and other Government installations.
Tutwiler Hotel, Birmingham, Ala., A. L. Stoddart, Architect
Tuller Hotel, Detroit, Mich.
Pontchartrain Hotel, Detroit, Mich.
Red Wing Brewery, Red Wing, Minn.
Hospital for Sick Children, Toronto, Canada



AMERICAN CARBONIC SAFETY COMPRESSOR

AMERICAN CARBONIC INSTALLATION, MORRISON HOTEL, CHICAGO, ILL.

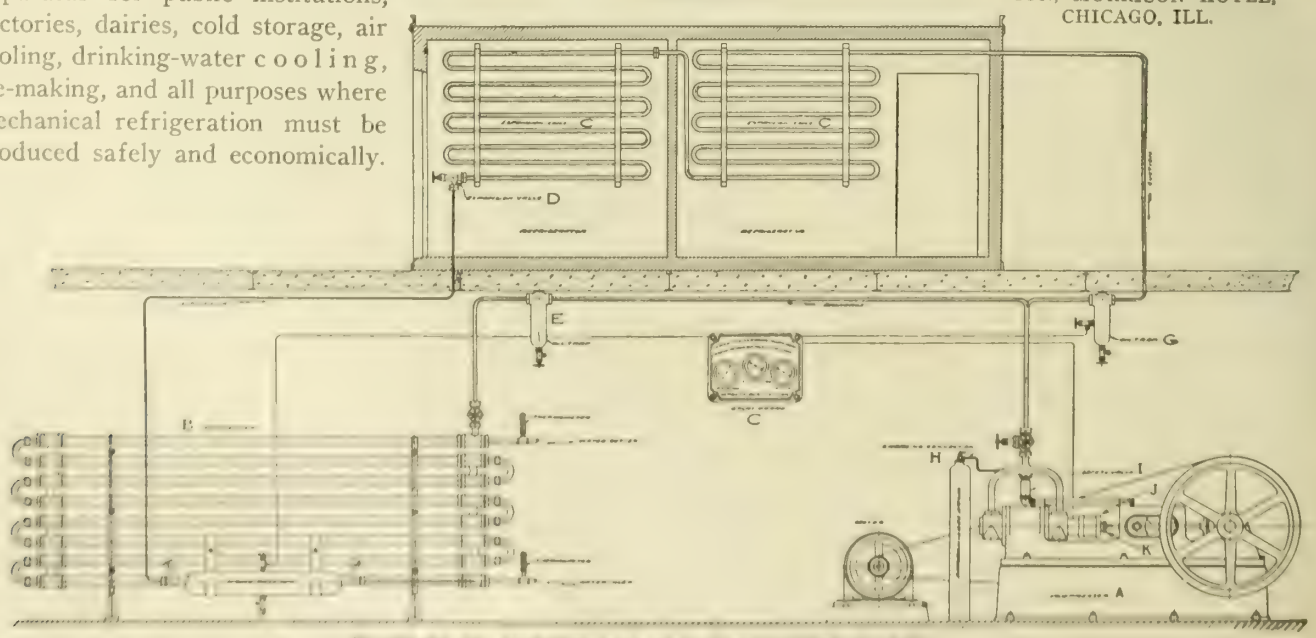


DIAGRAM OF CONNECTIONS FOR A COMPLETE PLANT

CARBONDALE MACHINE COMPANY

MANUFACTURERS OF

Exhaust Steam Ice-Making and Refrigerating Machinery

CARBONDALE, PA.

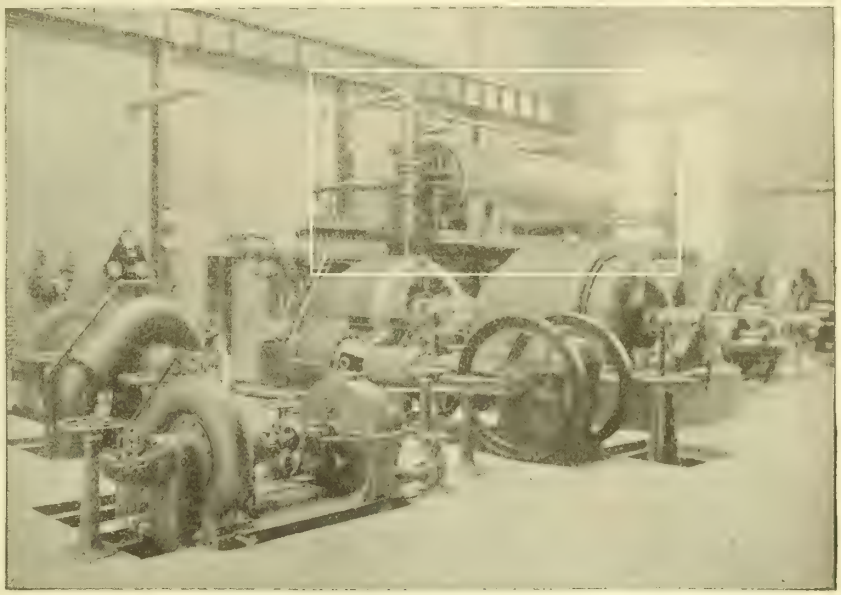
BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street
BALTIMORE, MD., 304 Continental Building
PHILADELPHIA, PA., 509 Harrison Building
CHICAGO, ILL., 1017 Manhattan Building
NEW ORLEANS, LA., 501 Title Guaranty Building
PITTSBURGH, PA., 1122 Allegheny Avenue

Products and Services.

Absorption Refrigerating Machines; Paraffine Wax Machinery, consisting of Distillate Chilling Machines, Hydraulic Filter Presses, Pumping Equipment, Sweating Pans, etc., Ice-Making Plants; Steam and Power Aqua Ammonia Pumps; Ammonia Economizers; Brine Coolers; Gland Ammonia Fittings.

We are prepared to design, furnish and install complete Refrigerating, Ice-Making and Paraffine Wax Plants.



EXHAUST STEAM FROM A 75 H.P. TURBINE IS USED IN AN AMMONIA GENERATOR OF A 75-TON ABSORPTION ICE MACHINE

Advantages of Absorption Refrigerating Machines.

(1) Can run by exhaust steam.
(2) No heavy moving parts.
(3) Noiseless.
(4) No heavy foundations.
(5) Very little attention required.
(6) Adapted for any floor space or head-room.
(7) Most economical, with low cost of maintenance.

Type of Machines.

The type of machine is determined by local conditions. These are, first, the atmospheric type, which is adapted to warm or muddy water; second, double pipe type, which is used in engine rooms where water conditions are favorable, and on account of having straight pipes is very accessible for repairs and cleaning; third, shell and coil type, adapted for water which is not corrosive.

Ice Making.

Central stations, gas plants and steam users with a source of exhaust steam can operate a Carbondale Ice Machine to advantage. If a complete plant is desired with boiler equipment, the evaporator system is recommended, and we are prepared to guarantee fuel consumption.

Refrigeration.

Carbondale exhaust steam machines are used, not only in ice-making plants, but also for cold storage, packing houses, apple and fruit storages, fur storages, powder plants, chemical plants, cotton-seed oil plants, paraffine wax plants, candy and ice-cream manufactories, fish and poultry freezers, air and drinking water cooling plants.

Installations can be inspected in hotels, restaurants, office buildings, department stores, clubs, hospitals, public and educational institutions, creameries and dairies; also in railroad stations.

General.

Both architects and engineers realize the many advantages of the absorption type of machine in all classes of refrigerating and ice-making installations. A test plant at our works has brought about many results toward advancement in design of the different parts. As a result of many years experience, our machines produce refrigeration at a minimum cost per ton.

References.

The Carbondale Machine Company's Refrigerating Plants are in operation throughout the United States and many foreign countries. We give below one important installation in different classes of buildings:

Hotel Astor, New York, N. Y.
University Club, New York, N. Y.
Marshall Field & Co., Chicago, Ill.
Western Pennsylvania Hospital, Pittsburgh, Pa.
Filene Building, Boston, Mass.
Apthorpe Apartments, New York, N. Y.
Equitable Building, New York, N. Y.
Harvard Medical College, Boston, Mass.
W. F. Schrafft & Sons Co., Boston, Mass.
Sulzberger & Sons Co., Chicago, Ill.
Miller & Hart, Chicago, Ill.
Chicago & Northwestern R. R., Chicago, Ill.
Sweeney Bros., Gasport, N. Y.
Standard Oil Co., N. Y., N. J., Pa.
E. I. du Pont de Nemours Powder Co., Wilmington, Del.

LARSEN ICE MACHINE CO., INC.

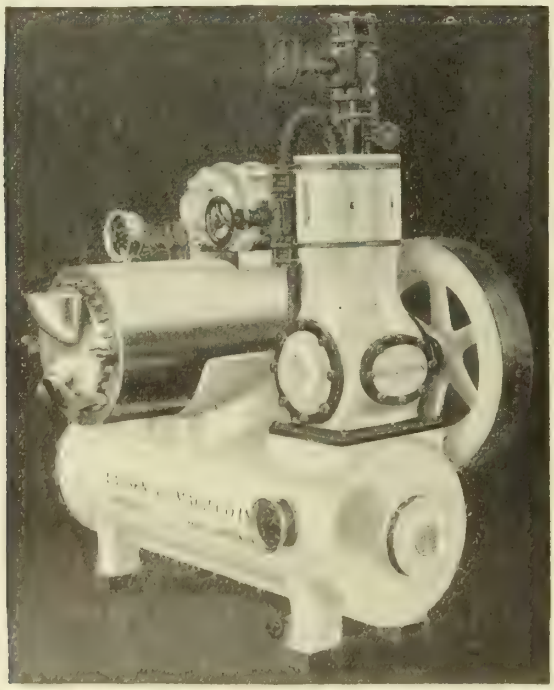
1604 Harris Trust Building
CHICAGO, ILL.
FACTORY: FT. MADISON, IOWA

roducts and Services.

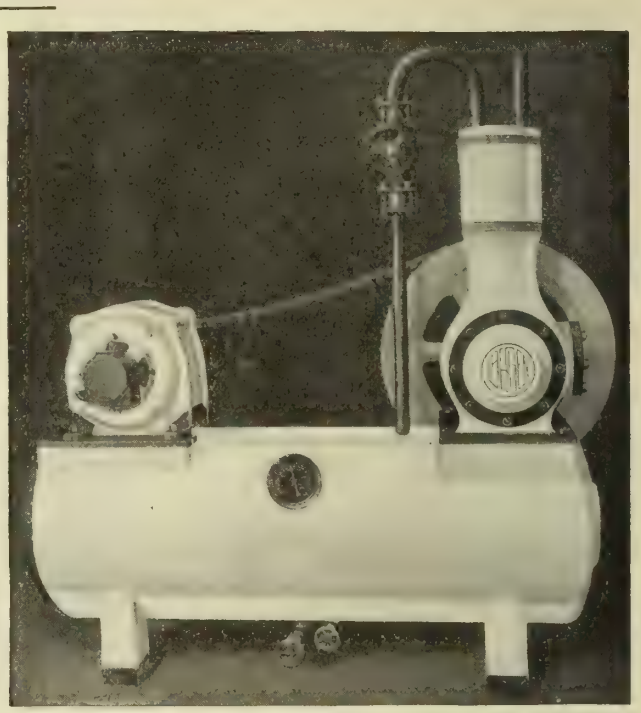
Manufacturers of Refrigerating Machines, and Pioneers and Specialists in designing modern, efficient Ice Cream Factories, Raw-Water Ice Plants, or Combination Plants of both; in addition to which we handle efficiently any Refrigerating Cold Storage or Ice-Making Proposition and build complete Plants, guaranteeing results.

Larsen Refrigerating Units.

These machines are designed for every form of refrigeration and ice making. They are complete—unit, motor, condenser, oil separator and liquid receiver—all in one compact unit. Made in four sizes: Model "A" 1½- to 2-ton, model "B" 2½- to 3-ton, model "C" 4- to 5-ton, model "D" 6- to 7-ton.



LARSEN REFRIGERATING UNIT WITH ICE CREAM FREEZER



LARSEN REFRIGERATING UNIT WITH MOTOR

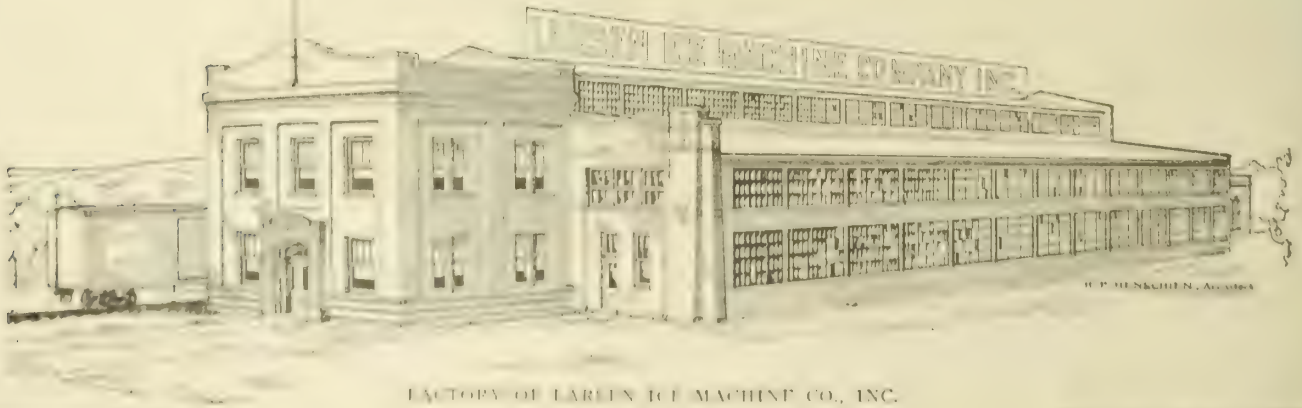
Larsen Ammonia and Ice Cream Freezer.

Freezing is done by means of ammonia direct, doing away with holding brine for twenty-four hours and loss of two thirds of the refrigeration. With ammonia direct, refrigeration starts only when wanted and no more of it used than is actually absorbed by the freezing of the cream, and gives instant control of temperatures from thirty degrees Fahr. to below zero, when making sherbets, etc.

Larsen Refrigerating Unit with Ice Cream Freezer.

This is a complete portable refrigerating plant, including compressor, motor, ammonia condenser, liquid receiver, oil separator, liquid pre-cooler, ammonia ice cream freezer, gauges, etc., all on one base, tested and shipped, charged with oil and ammonia, ready for operation in a few minutes after reaching destination, needing only water and wire connections.

In the manufacture of ice cream, these machines use no ice or salt, and reduce labor two thirds. They are clean, sanitary and efficient.



FACTORY OF LARSEN ICE MACHINE CO., INC.

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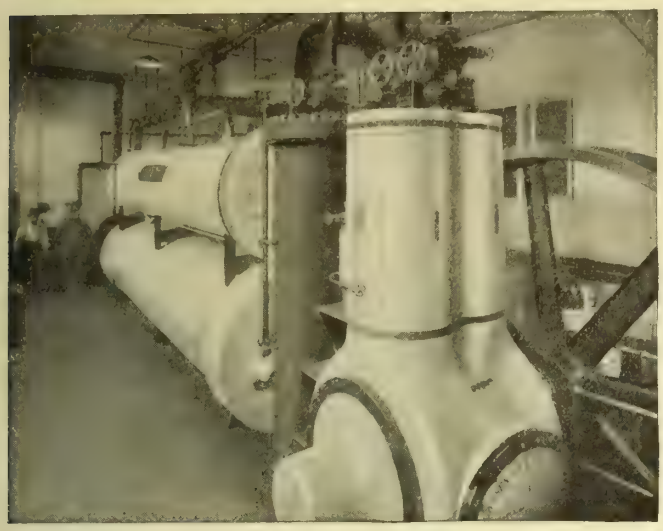
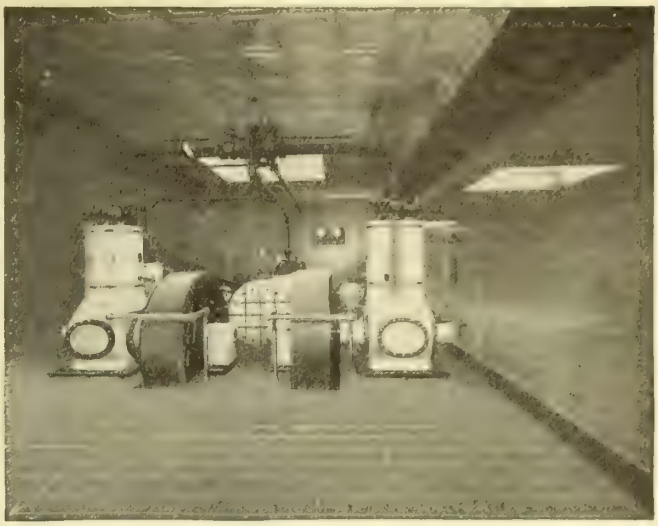


125-TON REFRIGERATING PLANT, WITH SHELL CONDENSER AND BRINE COOLER
Lawrence Ice Co., 937 West 21st Street, Chicago, Ill.



ENGINE AND TANK ROOMS, ZERO ICE COMPANY
A 50-ton Raw-Water Ice Plant

125-Ton Refrigerating Plant.

This plant holds, we believe, by a long, wide margin, the record for lowest operating cost for refrigeration and ice-making of any ice cream plant in America, considering price of electric current. This plant made in five months 210,000 gallons of ice cream and 5,144 tons of ice, with a total cost for power (at a rate averaging 1 8-10 cent per kilowatt), $2,871.54. This includes entire power and light throughout plant. Total cost for labor for operating ice plant, pulling and crushing the ice and furnishing refrigeration for freezing and hardening the ice cream was $952.00; total for power and labor, $3,823.54.

Engine Room Western Dairy Company, Chicago, Ill.

To place a 50-ton plant with both high and low sides complete in as small a space as shown below, and make it convenient, serviceable, perfect, in fact ideal in arrangement, is extraordinary indeed, bringing everything close together, meaning efficiency and easy control—everything being under the eye at one glance. The large accumulator and liquid pre-cooler in connection with our flooded shell system renders the plant fool-proof, absolutely preventing possibility of liquid ever reaching compressor, and insures uniform cool gas to the machine.

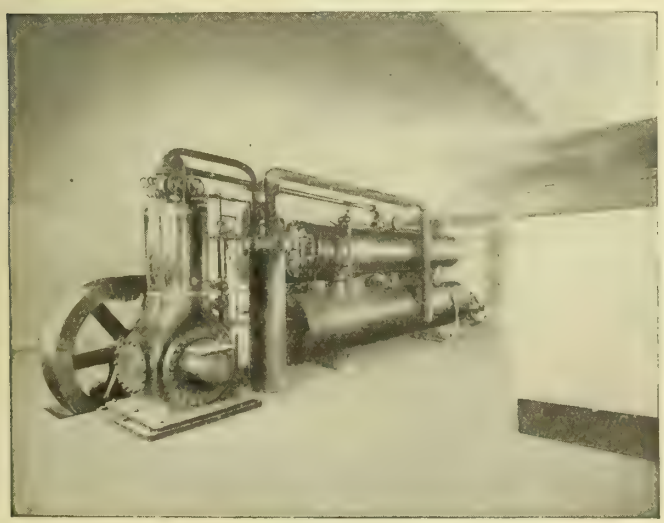
Engine and Tank Rooms, Zero Ice Company.

Installed by this company two years ago, the above illustrated simple and efficient plant has attracted a great deal of favorable notice. It has been successful from the start, and it is the third order received from this company during a period covering more than ten years.

Tank Room, 50-Ton Raw-Water Ice Plant.

The plant, as pictured below, is extremely neat, walls and ceiling being finished in white enamel; and there is an entire absence of untidiness and sloppiness usually present in the average ice plant.

This 50-ton plant has been operated successfully with two men on each shift of 12 hours, both men being handy men, none of them engineers, at wages of 18 cents per hour. They have handled this plant successfully for an entire season, without losing a minute by reason of any difficulty, thus setting a record for low cost of labor and reliability, and speaking volumes for the simplicity, quality and design of our raw-water ice plants.



ENGINE ROOM OF WESTERN DAIRY CO., CHICAGO, ILL.
Showing standard 40- to 50-ton Refrigerating Plant complete with shell condenser, shell brine cooler, accumulator, compressor and motor, all in a floor space of 8′ by 28′, only a small fraction of the space required by other systems for plants of equal capacity

TANK ROOM, 50-TON RAW-WATER ICE PLANT
Showing a de luxe tank room (with engine room in distance) of a plant designed and constructed by this company complete under one contract. The building, fully equipped, was turned over to the customer as a complete operating plant, ready for service

PEERLESS ICE MACHINE COMPANY

MANUFACTURERS OF

Automatic, Self-Contained Refrigerating Machinery

72 West Adams Street

CHICAGO, ILL.

Products.

PEERLESS AUTOMATIC, SELF-CONTAINED REFRIGERATING MACHINES of one eighth to ten tons capacity, for the Home, Apartment Houses, Hotels, Hospitals, Asylums and other Institutions; for Grocery and Drug Stores, Meat Markets, Dairies, Florists, etc.

Description.

The great objection offered by those who have wanted mechanical refrigeration is lack of space; but with the Peerless space does not enter into the proposition, all the space required being that occupied by the base.

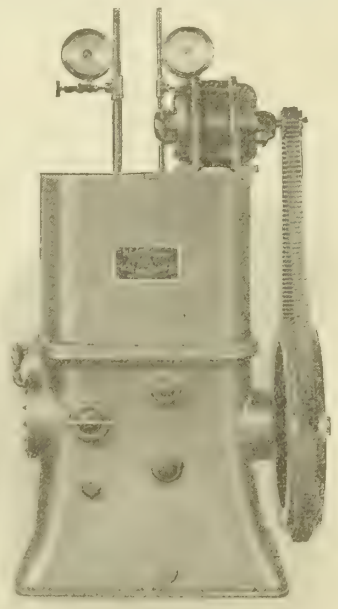


FIG. 1. PEERLESS AUTOMATIC REFRIGERATING MACHINE.

The machine is a self-contained unit of every essential refrigerating factor, outside of expansion coils and brine tank. The compressor, oil trap, condenser and ammonia receiver are all on one base, assembled, connected and tested, under operating conditions, at the factory.

The automatic feature gives the strongest indorsement for installation. The required degree of temperature is maintained by setting the thermostat at the desired point, and machines will continuously maintain the same temperature in the refrigerator, day and night.

Details of Parts—The compressor is vertical, single-acting, self-oiling and perfectly balanced to run without vibration. The condenser coils, of extra heavy ammonia pipe, surround the cylinders and oil trap, and the whole is inclosed in a jacket and water cooled. The ammonia receiver is in the base of the machine.

Machines up to three tons capacity have motor mounted on top of water jacket; larger sizes have special motor stand upon of low dimensions. Equipped with a silent chain drive which has ninety-eight per cent efficiency.

All working parts are easily accessible and interchangeable.

Power—Any kind of power; but most Peerless machines are electric-motor driven, and with the thermostatic control the Peerless requires no attention other than an occasional oiling.

Steam power, with machine direct-connected to engine, on same base, makes a compact and reliable outfit.

Countershaft drive, where desired, is easily provided for. Gasoline and oil engines prove efficient and economical in operating cost.

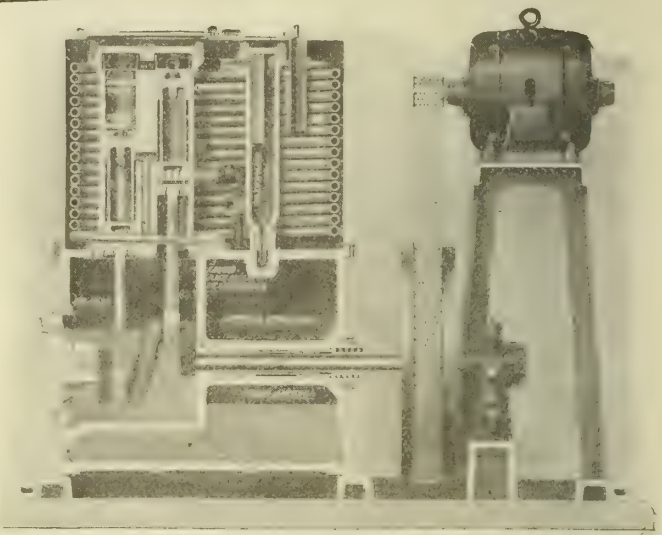


FIG. 2. SECTIONAL VIEW FIVE-TON PEERLESS REFRIGERATING MACHINE
Motor mounted on frame

Advantages.

Peerless machines now in operation have continuously maintained the same temperature in the refrigerator, day and night, year in and year out—proof-positive of the Peerless efficiency in the automatic feature.

The Peerless can be operated with push-button control, where a constant, uniform temperature is not required.

No valves to be changed every time the machine is started or shut down, or to be adjusted from time to time.

The high pressure side being submerged, the machine is not subject to annual official inspection—an assurance of the absolute safety of the Peerless.

Every part being perfectly balanced, no special foundation is required; it may be placed wherever convenient. Practically noiseless; all working parts inclosed; always neat and clean.

Two ammonia and two water connections only are necessary, thus requiring the minimum of time for making installation.

No Fumes—The Peerless is absolutely odorless. The high pressure piping is constructed in one continuous coil, eliminating the many joints and connections subject to leak and inclosed in water-tight jacket.

CAPACITIES AND DIMENSIONS PEERLESS REFRIGERATING MACHINE

No.	Capacity, Lbs.	Size of Base, Ins.	Height, Ins.	Weight, Lbs.	Sizes Crated for Export, Ins.	Weights for Export, Lbs.
2	500	18x14	24	360	24x20x36	500
3	1500	22x18	38	1150	30x24x40	1400
4	2000	32x26	50	1900	40x36x60	2300
5	4000	38x31	58	2700	50x40x70	3200
6	6000	56x32	50	3000	48x42x60	3500
7	10000	47x32	59	5875	50x40x66	6700
8	20000	98x44	69	8500	108x60x76	9300

THE PORTSMOUTH ENGINE CO.

Manufacturers of Jack Frost Ice-Making and Refrigerating Machines and New Era Engines

OFFICES AND WORKS
PORTSMOUTH, OHIO

AGENTS

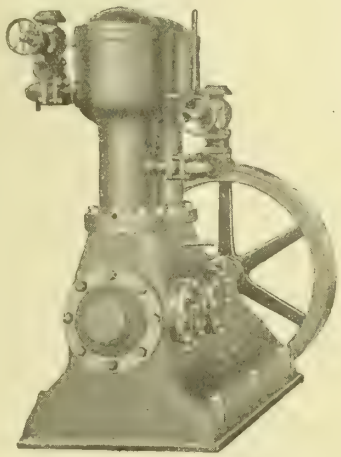
BOSTON, MASS., L. N. Wheelock, 141 Milk Street
BUFFALO, N. Y., Hill-Rodler Machine Co., 48 E. Swan St.
CLEVELAND, OHIO, E. H. Loughridge, Garfield Building
MONTGOMERY, ALA., C. W. Hunter, 623 Madison Avenue
NEW YORK, N. Y., F. M. Woodford, 90 West Street
OKLAHOMA CITY, OKLA., Mid-West Engineering Co.
ST. PAUL, MINN., K. & W. Engineering Co., 534 Prior Street
WASHINGTON, D. C., Egerton Graham, Union Trust Bldg.

Products.

Compression Jack Frost Refrigerating Machines; New Era Gas, Gasoline, or Kerosene Engines and all parts needed to equip Complete Ice or Refrigerating Plants.

Jack Frost Refrigerating Machine.

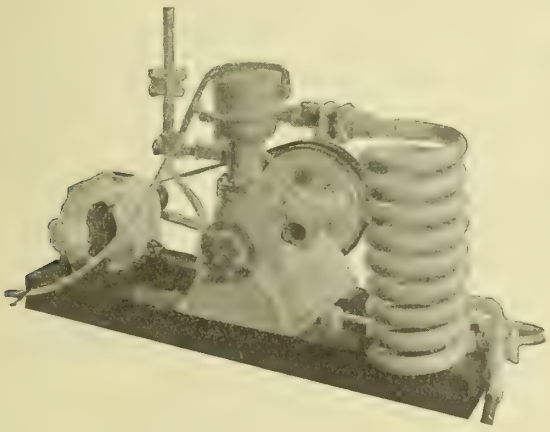
This type of machine is of a new, yet thoroughly tested, design. Modern in simplicity, strength, removable and adjustable parts, safety and reliability. It is of the vertical enclosed single-acting type; base, cylinder shaft, rod and piston all heavy; very large suction valve of chrome steel; wearing parts are all adjustable or removable; and it is positively the most simple, strong and economical machine on the market. Made in sizes from one quarter to ten tons capacity.



EIGHT-TON JACK FROST REFRIGERATING MACHINE

We make a portable outfit, weight two tons, that will produce two tons of refrigeration in twenty-four hours or make one ton of ice in the same time. This complete ice-making plant, with gasoline engine, ice tank and cans all upon one base, making it easy to load on a motor truck, is an entirely new thing and is very simple.

Definition—By a two-ton refrigerating plant is meant a plant which will create an amount of cold equal to the amount of cold produced by the melting of two tons of ice in twenty-four hours—thus, in twelve hours the equivalent of 2000 pounds of ice.



JACK FROST JR. REFRIGERATING MACHINE

Jack Frost Jr. Refrigerating Machine.

This machine, as illustrated, can be easily installed in connection with an ordinary or with a "built-in" refrigerator, and will eliminate the bother of the ice man tracking dripping ice through the house daily. No modern home should be designed by competent architects without one of these machines being included.

New Era Engines.

Built in sizes from 40 to 60 horse-power, horizontal, equipped with Bosch magneto and Detroit automatic oiler. A very sturdy engine, and one which is about as simple to operate as the old steam engine

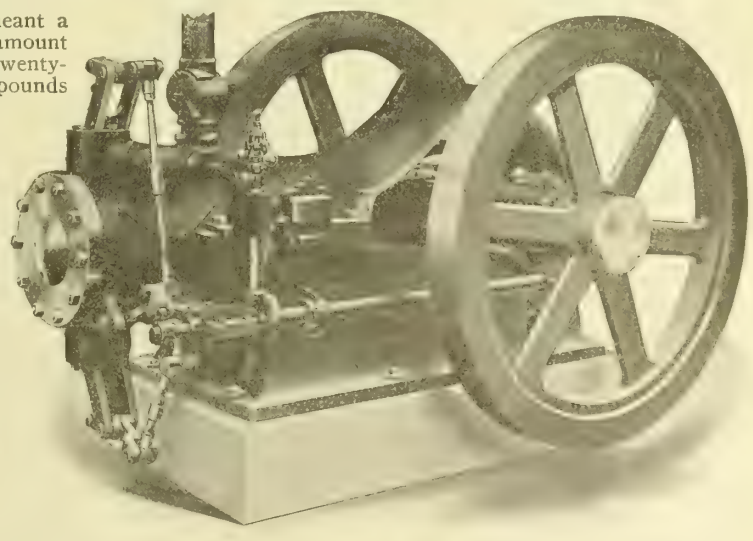
New Era Engines are running in California, in Louisiana, in New York, in Maine and in Wisconsin. Have a national reputation; are splendid machines, sturdy, economical, and simple to run.

Application.

These refrigerating machines can be used wherever ice-making or refrigerating is necessary, and our engineering department makes careful study of each particular application.

Guarantee.

We guarantee that our refrigerating machines will furnish their rated amount of refrigeration, when properly supplied with the requisite water at a temperature not to exceed seventy degrees Fahr. and proper amount of power. Also, that our Improved New Era Gas Engines will furnish their rated power, when supplied with the proper mixture of fuel and air. Further, we will furnish, without charge, duplicate parts for our refrigerating machines and gas engines, which may prove defective in material or workmanship within one year from date of delivery.



NEW ERA ENGINE

YORK MANUFACTURING CO.

Ice-Making and Refrigerating Machinery Exclusively

MAIN OFFICE AND WORKS
YORK, PA.

BRANCH OFFICES

BOSTON, MASS., 88 Broad Street
BROOKLYN, N. Y., Warren and Columbia Streets
PHILADELPHIA, PA., 2222-24 Arch Street
PITTSBURGH, PA., 47 Terminal Way, S. S.
ATLANTA, GA., 13 South Forsyth Street
NEW ORLEANS, LA., 4118 Carrollton Avenue
CHICAGO, ILL., 26-28 North Clinton Street
ST. LOUIS, MO., 117-119 South 11th Street
HOUSTON, TEX., Franklin Avenue and Louisiana Street
LOS ANGELES, CAL., 308 Boyd Street
SAN FRANCISCO, CAL., 832 Folsom Street
SEATTLE, WASH., 508 Terry Avenue N
TORONTO, CAN., Canadian Ice Machine Co., Ltd., 82 Chestnut Street

Products.

Compression Refrigerating Machines, Absorption Refrigerating Machines, Ice-Making Plants, Refrigerating Plants, Ammonia Valves, Ammonia Fittings, Ammonia Condensers, Brine Coolers, Aqua Ammonia Pumps, Ice Cans, and all parts needed to equip a complete Ice-Making or Refrigerating Plant.

Description.

We make, in our own Factory, all the machinery and apparatus used in ice making and for general refrigeration, confining ourselves to the ammonia system, both Compression and Absorption types, and the CO_2 system.

Sizes.

Our Enclosed Machine is built in sizes from ⅛ ton refrigerating capacity upwards; our Vertical Single-Acting Machines from 20 to 600 tons; our Horizontal Double-Acting Machines from 10 to 600 tons—either belt- or steam-driven type. Ammonia Absorption and Carbonic Anhydride (CO_2) Machinery.

Application.

Our machines can be used wherever ice making or refrigeration is required, the style of machine being determined, to a great extent, by local conditions.

Our Enclosed Machine is particularly adapted for residences, apartment houses, small hotels, creameries, ice-cream factories, etc.

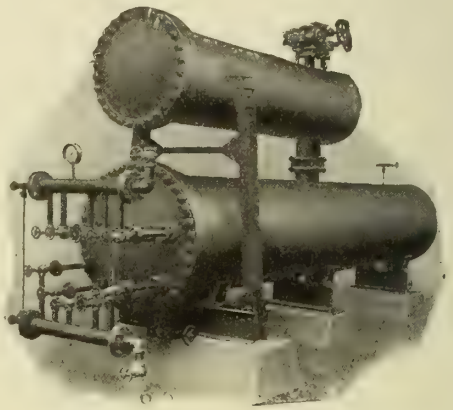
Valves and Fittings.

York Ammonia Valves and Fittings are guaranteed to give satisfaction under all usual working pressures.

VERTICAL SINGLE ACTING ENCLOSED MACHINE

Service.

We carry in stock at all our Agencies a complete line of Ammonia Valves and Fittings, also a line of Enclosed Machines.



GENERATOR AND ANALYZER

What a Service Department is to the owner of an automobile, the York Sales Organization is to the user of Ice-Making and Refrigerating Machinery.

You can secure both *Quality* and *Service* by patronizing the York Organization.

References.

A few installations are given below:

Hotels
Hotel Adelphia, Philadelphia, Pa.
Hotel McAlpin, New York, N. Y.
Hotel Sherman, Chicago, Ill.
Copley-Plaza Hotel, Boston, Mass.
Hotel Traymore, Atlantic City, N. J.

Stores
Rosenbaum & Co., Pittsburgh, Pa.
Lord & Taylor, New York, N. Y.
B. Altman & Co., New York, N. Y.

Hospitals
Homeopathic Hospital, Pittsburgh, Pa.
Bellevue Hospital, New York, N. Y.
Government Hospital for the Insane, Washington, D. C.
Pennsylvania State Sanitarium for Tuberculosis, Hamburg, Pa.
Medico Chirurgical Hospital, Philadelphia, Pa.

Schools
Cornell University, Ithaca, N. Y.
University of Illinois, Urbana, Ill.

Office Buildings
Singer Building, New York, N. Y.
Metropolitan Life Building, New York, N. Y.
Whitehall Building, New York, N. Y.
Curtis Publishing Co., Philadelphia, Pa.
North American Building, Philadelphia, Pa.

Clubs
New York Yacht Club, New York, N. Y.
Players' Club, New York, N. Y.
Army and Navy Club, Washington, D. C.
Union League Club, Philadelphia, Pa.
Chevy Chase Club, Chevy Chase, Md.

THE BRECHT COMPANY

ESTABLISHED 1853

Packing House Machinery and Equipment

MAIN OFFICE AND FACTORIES

ST. LOUIS, MO.

BRANCHES

NEW YORK, 176 Pearl Street HAMBURG, GERMANY BUENOS AIRES, SOUTH AMERICA

Products.

ABATTOIR, PACKING HOUSE and SLAUGHTER HOUSE EQUIPMENT, including HOISTS, TRACKING and OPERATING APPLIANCES; FERTILIZER, LARD, OLEO and OIL, SAUSAGE MAKING, CANNING and GENERAL MEAT MACHINERY, TOOLS and SUPPLIES pertaining to the Meat Industry and its By-products. COOLING ROOMS, ICE MACHINES, and COLD-STORE DOORS.

Also, MUNICIPAL MARKET HOUSE EQUIPMENT, BLOCKS and GENERAL MARKET FIXTURES.

Packing House Design.

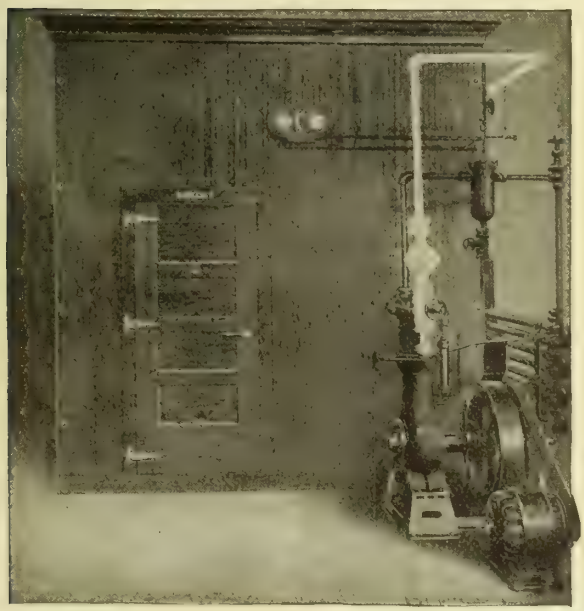
General—About seventy-five per cent of the money expended in converting the raw into a finished product in a packing house is for labor, the other twenty-five per cent is for interest, insurance, administrative expenses, supplies, etc. Hence, a plant that is designed for operation in the most economical manner, and at the same time provides for economy of construction, is undoubtedly the acme of perfection. It is also important to plan so that departments may from time to time be enlarged as the growth of the business may require.

Co-operation.

There has been such a large demand for expert and reliable information in regard to the erection of Abattoirs, Packing Houses, Slaughter Houses, Lard-Refining Plants, Oleo and Fertilizer Plants and Cold Storages, that we have found it necessary to place these special independent departments under personal supervision of our experts with long practical experience.

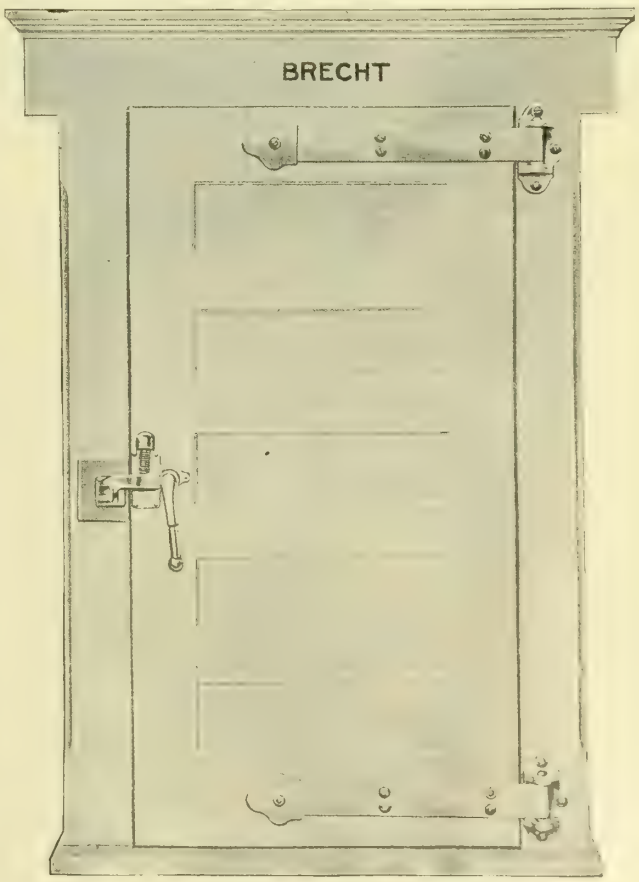
Architects contemplating the erection of such plants, or the remodeling of old ones, will find it to their interest to consult with us. We furnish all necessary cooperative information and specifications for the proper location and installation of required machinery and appliances.

Our sixty-two years' experience and familiarity with the requirements, and resulting expert knowledge on the subject, will prove beneficial both in the study of a given problem and in the final economical arrangement and equipment of the building.



BRECHT SECTIONAL COLD-STORAGE ROOMS WITH BRECHT REFRIGERATING MACHINES

Refrigerators for every purpose



BRECHT COLD-STORE DOOR

Ball-bearing Hinges and Automatic Self-locking Fastener

Also, Automatic Track Shutter when used on rooms having overhead tracking

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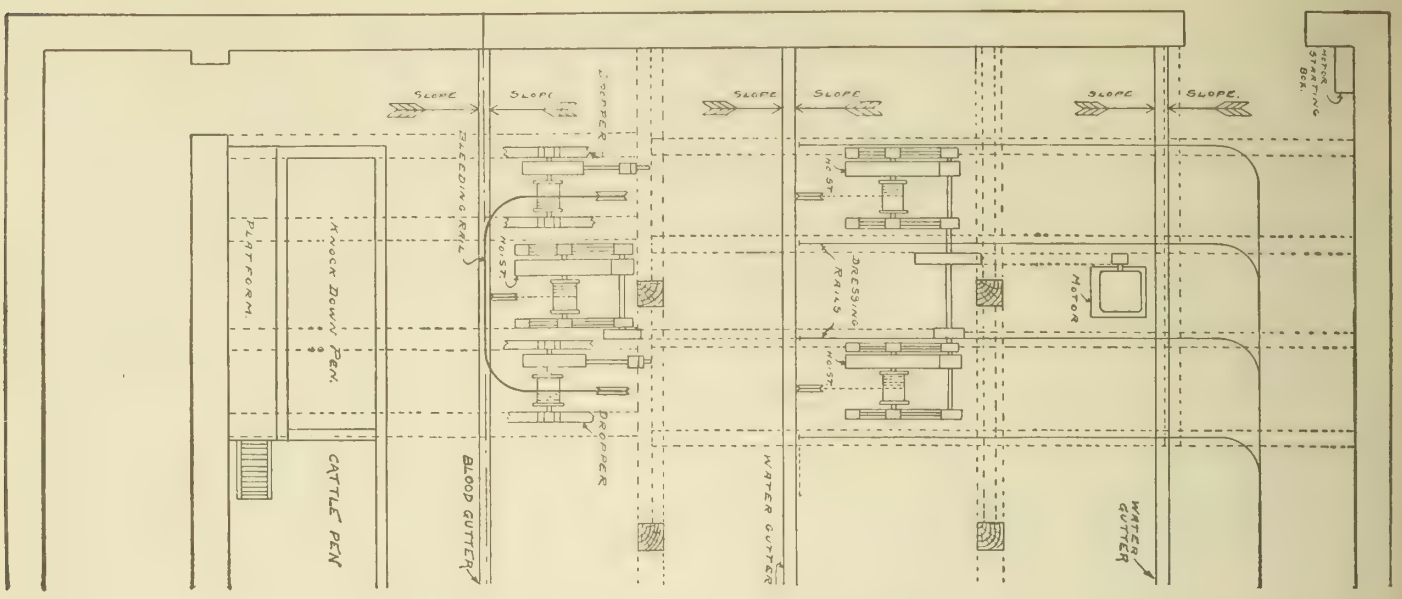
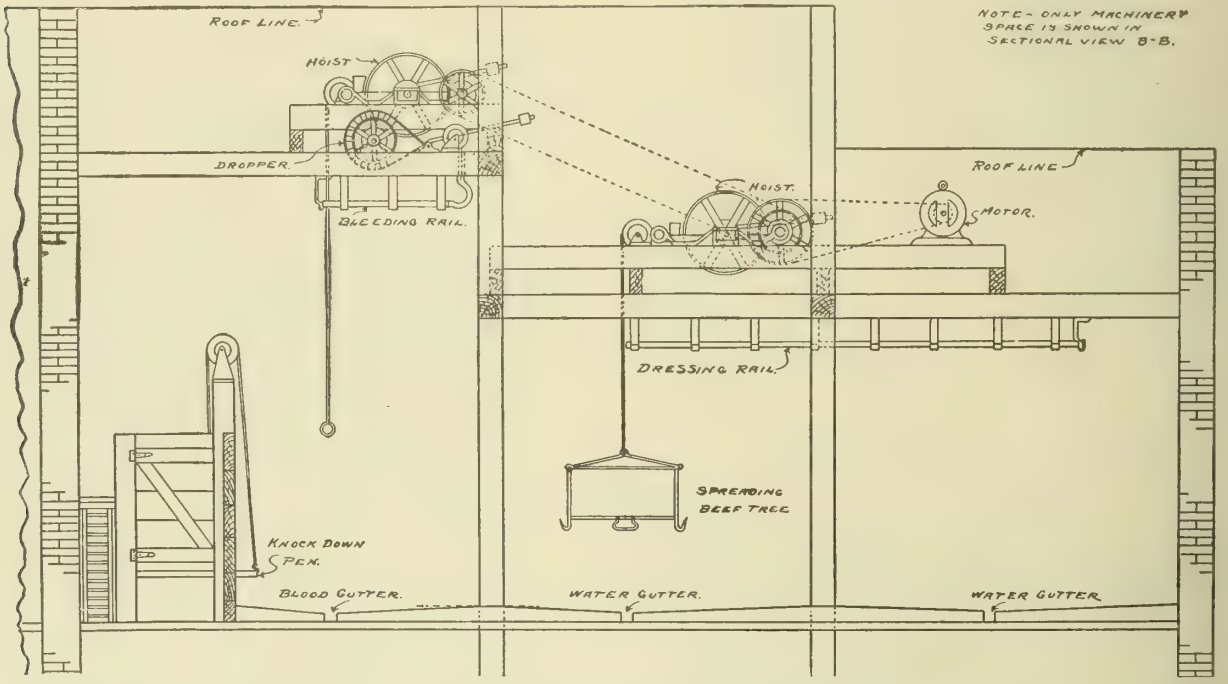
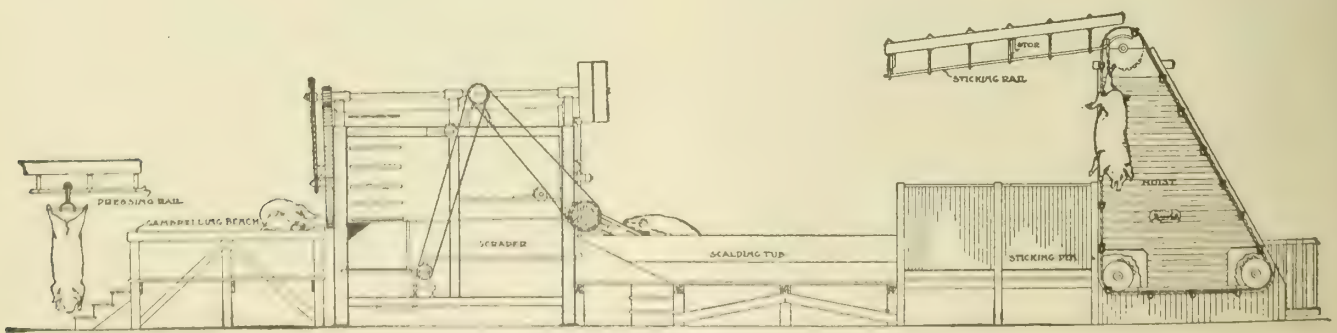


PLAN OF BRECHT'S BEEF-KILLING EQUIPMENT



ELEVATION OF BRECHT'S BEEF-KILLING EQUIPMENT

Plan and Elevation showing Brecht's Improved Beef-Killing method and arrangement of Knock-down Pens, Bleeding Rail, Double Hoist, Droppers Dressing Rails, etc.



BRECHT'S MODERN HOG-KILLING EQUIPMENT

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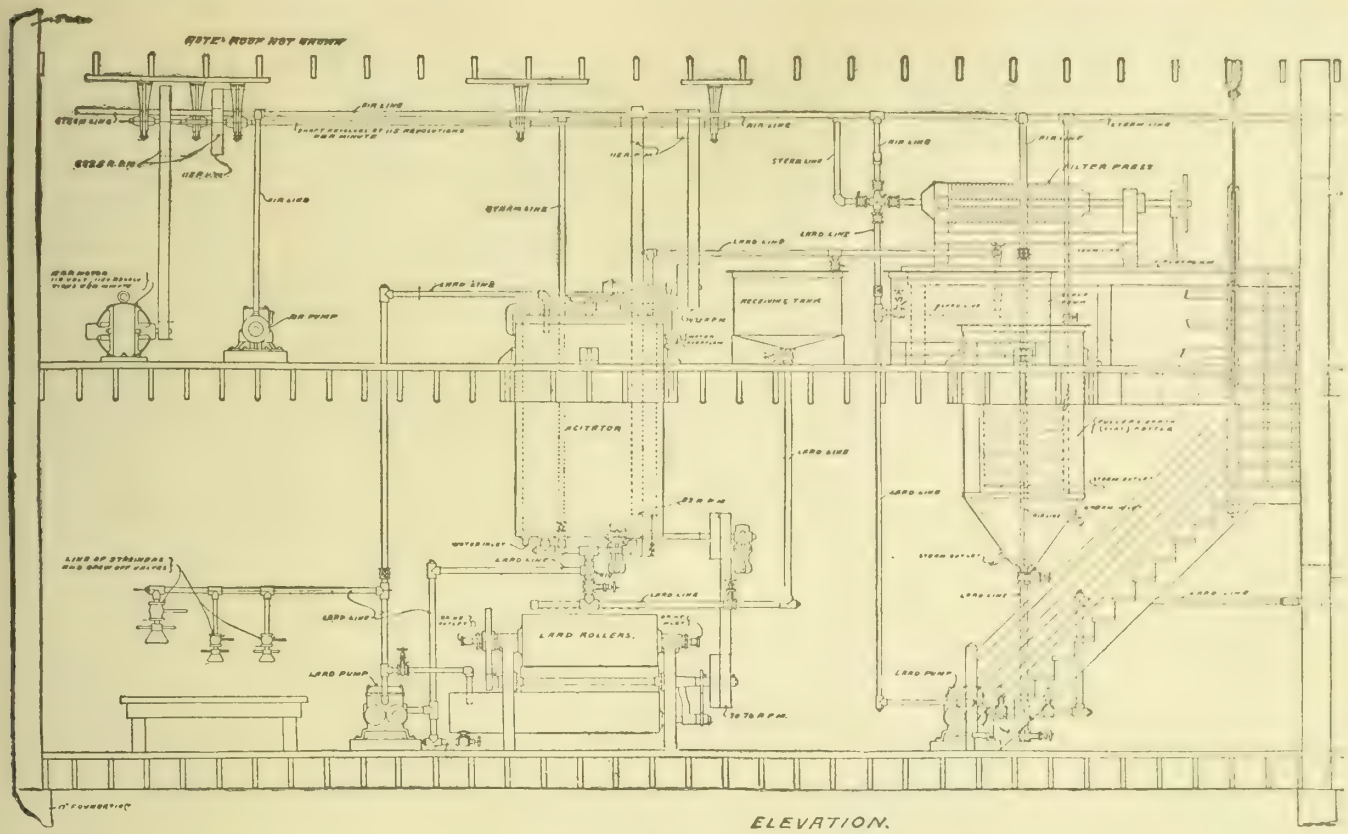
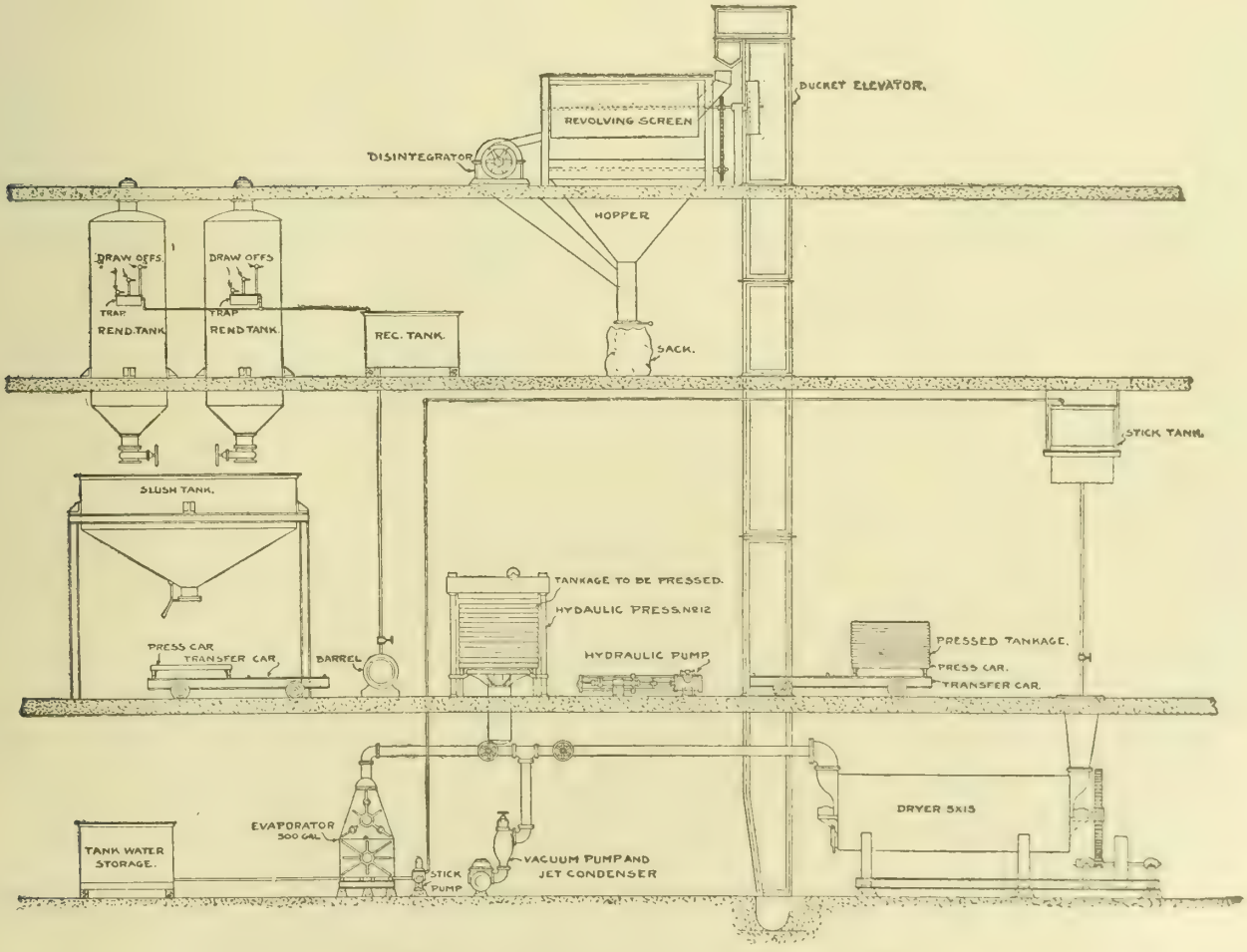


BRECHT MODERN LARD-REFINING PLANT



THE BRECHT LATEST IMPROVED FERTILIZER PLANT

J. V. JAMISON, President T. B. SOUTH, Vice-President J. V. JAMISON, Jr., Secretary and Treasurer

JAMISON COLD STORAGE DOOR CO.

FORMERLY JONES COLD STORE DOOR CO.

HAGERSTOWN, MD.

Products.

We manufacture the original "Jones" Cold Storage Door; also, the "Noequal" Cold Storage Door, two distinct types as shown by figures Nos. 1 and 2. We make from either type, Sharp Freezer Doors, Cold Storage Windows, either fireproof or non-fireproof. Also a Revolving Door, with automatic unloading device, for passing Ice Cream to and from Hardening Room; Ice Recording Doors and Chutes for passing and recording Blocks of Ice; and Insulated Vertical Sliding Cold Storage Doors.

Two Distinct Types, "Jones" and "Noequal."

The "Jones" Cold Storage Door (Fig. 1) is built with two seals of contact between the door and frame, providing a confined air space entirely around the door, making double protection against leakage at this usually weak point. The air space (k) prevents the door from swelling enough to stick fast in the frame.

The "Noequal" Cold Storage Door (Fig. 2) is built with round jambs and *three* seals of contact and two air spaces (k) between the door and frame. The advantages of the round jambs are obvious—no sharp corners to get knocked off by the trucks; can not be excelled for freezer purposes.

Gasket Seals.

The seals of contact are formed with a special gasket or packing of our own make. It is a soft, pliable, twisted wicking, encased in rubber sheeting. The seals at the bottom are made of heavy hair felt and can be easily replaced when worn out.

Bracing and Insulating.

The door has inserted a diagonal 2" x 4" brace and heavy angle-irons in the corners to keep the door true and rigid and free from sagging. We will use any of the standard kinds of insulating material specified.

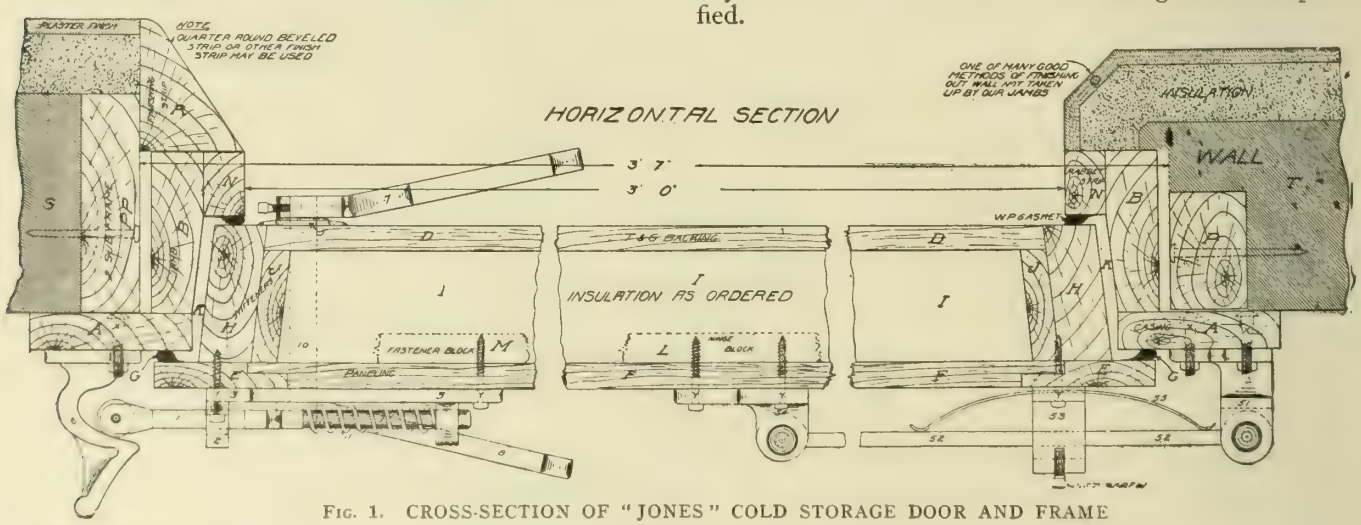


Fig. 1. CROSS-SECTION OF "JONES" COLD STORAGE DOOR AND FRAME

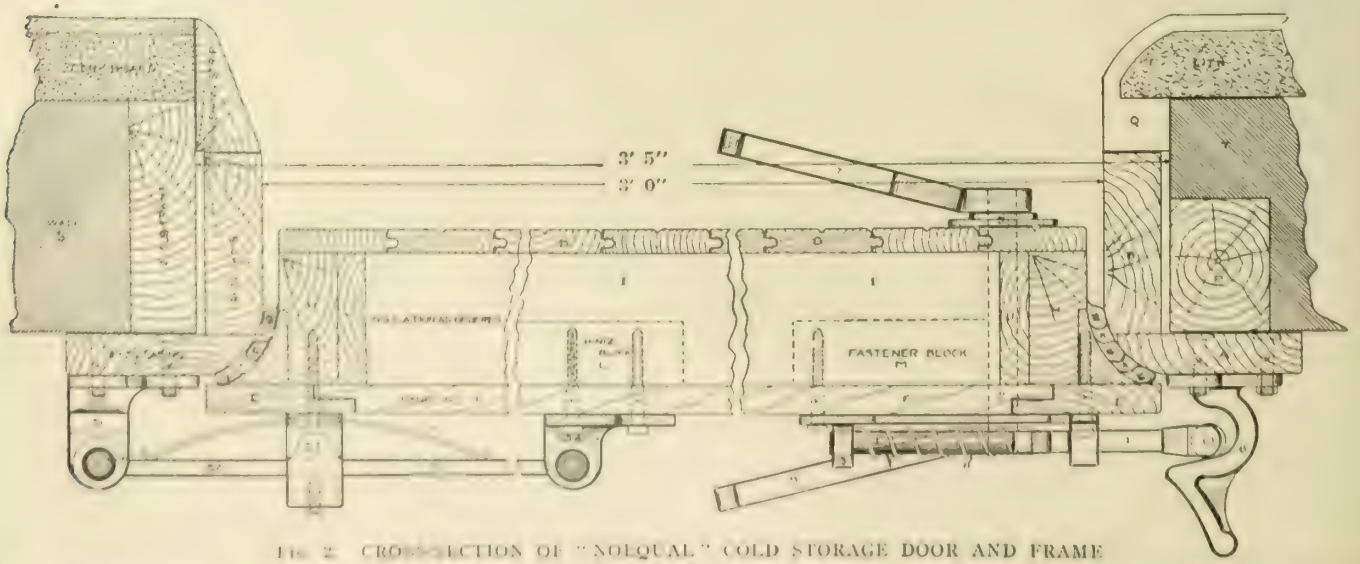


Fig. 2. CROSS-SECTION OF "NOEQUAL" COLD STORAGE DOOR AND FRAME

Sweet's Catalogue

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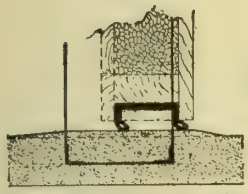


Fig. 3. Arrangement for Concrete Floor

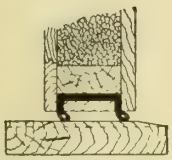


Fig. 4. Beveled Oak Sill

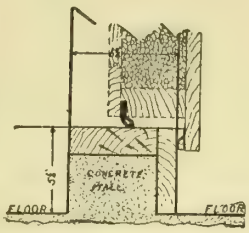


Fig. 5. High Sill

SILLS, VARIOUS KINDS

TABLE OF STANDARD SIZE DOORS

Dimensions Inside of Frames (Door in the Clear)					Size of Wall Opening "Jones Door"				Size of Wall Opening "Noequal Door"			
OurStock Door No.	Width Feet	Width Inches	Height Feet	Height Inches	Width Feet	Width Inches	Height Feet	Height Inches	Width Feet	Width Inches	Height Feet	Height Inches
0	2		3		2	7	3	5	2	5	3	5
1	2		6		2	7	6	5	2	5	6	5
2	2	6	6		3	1	6	5	2	11	6	5
3	2	6	6	6	3	1	6	11	2	11	6	11
4	3		6		3	7	6	5	3	5	6	5
5	3		6	6	3	7	6	11	3	5	6	11
6	3	6	6		4	1	6	5	3	11	6	5
7	3	6	6	6	4	1	6	11	3	11	6	11
8	3		7		3	7	7	5	3	5	7	5
9	3	6	7		4	1	7	5	3	11	7	5
10	4		6		4	7	6	5	4	5	6	5
11	4		6	6	4	7	6	11	4	5	6	11
12	4	6	6		5	1	6	5	4	11	6	5
13	4	6	6	6	5	1	6	11	4	11	6	11
14	4		7		4	7	7	5	4	5	7	5
15	4	6	7		5	1	7	5	4	11	7	5

In ordering doors use stock numbers in first column of table. State whether "Jones" or "Noequal" is wanted.

Construction, Standard Doors.

Our doors are built of odorless and tasteless spruce on the inside; the exterior may be of any wood desired, either in plain ceiling boards or paneled; they may be solid doors or arranged for glass panels, the latter formed like windows, of several thicknesses of glass.

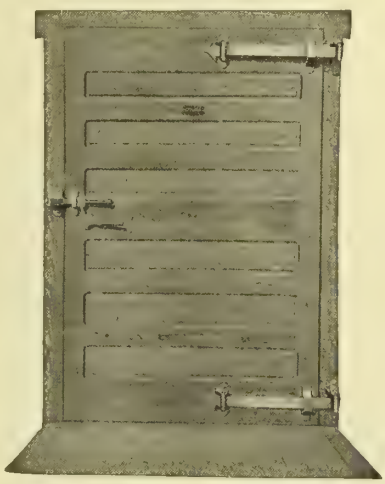


Fig. 6. "JONES STANDARD" DOOR
Right hand, raised panel front

Track, Freezer, Fireproof and Ice Recording Doors.

Note the simplicity and durability of the automatic trap-lift device for track doors. Freezer doors are of the same construction as the Standard, but with better insulation. Fireproof doors are of our regular wood construction, metal covered; carrying the same temperature as the Standard door. Ice recording doors and chutes, of three distinct types, for passing and recording number of blocks passed. Made of wood or steel; strong and reliable in action.

Hardware.

The pressure of our adjustable spring hinge is regulated by a set screw, by turning which a new seat is given the door from time to time, thus keeping it as tight as when new. Our automatic self-tightening fastener is a spring-projected slide-bolt worked by a lever; a strong, reliable device that draws the door up tight. The same hardware (60 lbs. per set) is used upon doors of both types. The automatic trap-lift for doors with overhead rail is a simple, reliable mechanism that will not get out of order.

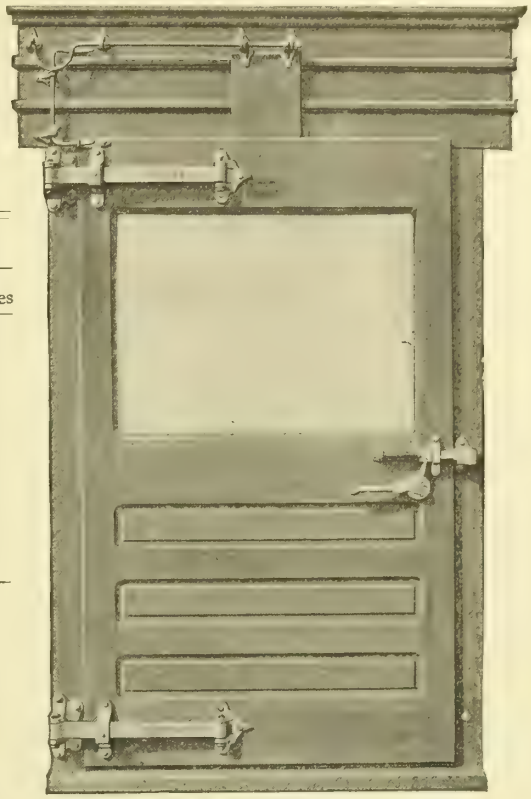


Fig. 7. TRACK DOOR WITH GLASS OPENING

Cold Storage Windows.

Are built either fireproof or non-fireproof and of general construction, like the doors. (See Fig. 8.) From four to six thicknesses of glass are nested in one sash, 5½ inches thick with air spaces between them. Ask for list of stock sizes, but they should always be made as small as practical to suit conditions, usually about half the size of doors used.

Catalogue.

Write for General Catalogue No. 7. The most complete treatise on doors and windows ever published.

Fig. 8. COLD STORAGE WINDOW

THE JEWETT REFRIGERATOR COMPANY

BRANCH OFFICES
NEW YORK, N. Y., 1135 Broadway
CHICAGO, ILL., 38 South Dearborn
CLEVELAND, OHIO, 340 Leader-News Building

Builders of Refrigerators

MAIN OFFICE AND FACTORY
BUFFALO, N. Y.

BRANCH FACTORIES
LONG ISLAND CITY, N. Y.
BRIDGEBURG, CANADA

Products.

Builders of Refrigerators and Refrigerator Work to order from special designs.

Facilities and Territory.

Our long experience (since 1849) and ample facilities enable us successfully to execute contracts in all parts of the country.

Estimates.

We make a specialty of preparing layouts and drawing up general specifications for all classes of Refrigerator Construction, which we are always ready to furnish promptly, and without charge, together with detail drawings, specifications and estimates covering refrigerators in any size, arrangement or finish. We invite your inquiries.

References.

Our qualifications as builders of Refrigerator Work on the most advanced lines may be exemplified by the following recent contracts:

BUILDING AND ARCHITECT

Hotels and Apartments

Vanderbilt Hotel, New York, Warren & Wetmore
Davenport Hotel, Spokane, Cutter & Malmgren
Hotel Palliser, Calgary, Alta., Edward & W. S. Maxwell
Hotel Statler, Detroit, Geo. B. Post & Sons
Hotel Vancouver, Vancouver, B. C., Francis S. Swales
Algonquin Hotel, St. Andrews, N. B., Barott, Blackader & Webster
Hotel Knickerbocker, New York, Trowbridge & Livingston
Hotel Rector, New York, D. H. Burnham & Co.
Hotel Utica, Utica, N. Y., Esenwein & Johnson
Royal Connaught Hotel, Hamilton, Ont., Esenwein & Johnson
Hotel Miami, Dayton, Ohio, H. L. Stevens & Co.
Hotel Ritz-Carlton, New York, Warren & Wetmore
The Windsor, Montreal, Que., H. J. Hardenbergh
The Bancroft, Worcester, Mass., Esenwein & Johnson
Hotel Pantlind, Grand Rapids, Mich., Warren & Wetmore
Hotel Kimball, Springfield, Mass., Samuel M. Green, Inc.
The Fontenelle, Omaha, Neb., Thomas R. Kimball

Hospitals and Institutions

Post Graduate Hospital, New York, McKim, Mead & White
Perkins Institution, Watertown, Mass., R. Clipston Sturgis
New Bellevue Hospital, New York, McKim, Mead & White
Schuylkill Haven Insane Asylum, Pottsville, Pa., H. C. Pelton & L. L. Stockton
Mt. Sinai Hospital, New York, Arnold W. Brunner
Boston Consumptives' Hospital, Mattapan, Mass., Hollis French & Allen Hubbard
Cornell Medical College, New York, McKim, Mead & White
St. Luke's Hospital, New York, Ernest Flagg
St. Mary's Hospital, La Salle, Ill., Victor Andre Matteson
New York Orthopaedic Hospital, Delano & Aldrich
Burke Relief Foundation, McKim, Mead & White
J. N. Adam Memorial Hospital, Perrysburg, N. Y., Lansing, Bley & Lyman
Cornell University, Ithaca, N. Y. (Sage College, Home Economics Building, Poultry Husbandry Building, Animal Husbandry Building), Green & Wicks

Clubs and Restaurants

Lambs Club, New York, McKim, Mead & White
Cleveland Athletic Club, Cleveland, Ohio, J. Milton Dyer
Columbia University Club, New York, H. C. Pelton
Detroit Athletic Club, Detroit, Albert Kahn
Lackawanna Terminal Restaurant, Hoboken, N. J., Kenneth M. Murchison

HOTEL STATLER, DETROIT, MICH.

BUILDING AND ARCHITECT

Clubs and Restaurants—Continued

Union Club, Cleveland, Ohio, Chas. F. Schweinfurth
University Club, Buffalo, N. Y., Green & Wicks
University Club, Cleveland, Ohio, J. Milton Dyer
Genesee Valley Club, Rochester, N. Y., Claude Bragdon
Virginia Club, Norfolk, Va., Kenneth M. Murchison
Grand Central Terminal, New York, Warren & Wetmore
Canadian Pacific Railway Co.: Windsor Station Restaurant, Montreal, Que.; Dining Car Department, St. John, N. B.; Restaurant, Calgary, Alta.; and Vancouver Terminal, Vancouver, B. C.

Residences

Henry Ford, Dearborn, Mich., W. H. Van Tine
Frank A. Seiberling, Akron, Ohio, Geo. B. Post & Sons
William Fahnestock, Katonah, N. Y., Charles A. Platt
Henry C. Frick, New York, Carrère & Hastings
Woodbury Langdon, Portsmouth, N. H., McKim, Mead & White
Franklin Murphy, Newark, N. J., Charles Alling Gifford
Payne Whitney, Manhasset, L. I., Guy Lowell
John D. Rockefeller, Pocantico Hills, N. Y., Delano & Aldrich
Mrs. L. Z. Leiter, Beverly Farms, Mass., Parker, Thomas & Rice
Ralph Pulitzer, Manhasset, L. I., Walker & Gillette
William Sloane, Mt. Kisco, N. Y., Delano & Aldrich
Mrs. R. H. Townsend, Washington, D. C., Delano & Aldrich
Robert Bacon, Westbury, L. I., John Russell Pope
Hon. Nelson W. Aldrich, Warwick Neck, R. I., Carrère & Hastings
Arthur Curtiss James, Newport, R. I., Howells & Stokes
H. K. Wick, Youngstown, Ohio, Abram Garfield
Senator Wm. A. Clark, New York, Lord, Hewlett & Hull
Albert H. Loeb, Chicago, Ill., Arthur Huen
Charles M. Schwab, New York, Maurice Hébert
Murray Guggenheim, West End, N. J., Carrère & Hastings
J. Harper Poor, New York, Howells & Stokes
Col. O. H. Payne, Esopus, N. Y., Carrère & Hastings
Cornelius Vanderbilt, New York, Delano & Aldrich
Harold F. McCormick, Lake Forest, Ill., Charles A. Platt
Henry Phipps, New York, Trowbridge & Livingston
John D. Rockefeller, Jr., New York, Delano & Aldrich
Hon. Whitelaw Reid, White Plains, N. Y., McKim, Mead & White

ARMSTRONG CORK & INSULATION COMPANY

Manufacturers of and Contractors for Cold Storage Insulation
Hot and Cold Pipe Covering and Heat Insulating Materials

135 Twenty-Fourth Street

PITTSBURGH, PA.

BRANCH OFFICES IN THE LARGER CITIES

Products and Services.

NONPAREIL CORKBOARD, ACME CORKBOARD, EUREKA CORKBOARD, GRANULATED CORK, used for insulating Cold Storage Warehouses, Packing Plants, Breweries, Ice Factories, Fur Vaults, Dairies, Creameries, Ice Cream Plants, Refrigerators, Freezing and Brine Tanks, and generally wherever refrigeration is employed. Contractors for COLD STORAGE INSULATION.

NONPAREIL CORK COVERING for Brine, Ammonia, Ice Water, Beer, and Cold Water lines. Contractors for COLD PIPE COVERING.

NONPAREIL INSULATING BRICK for Furnaces, Boiler Settings, Breechings, Stacks, Bake Ovens, Kilns, etc. INSULATING CEMENT.

NONPAREIL HIGH PRESSURE COVERING, BLOCKS and CEMENT for High Pressure and Superheated Steam Lines, Feed-Water Heaters, Breechings, Tanks, Enameling Ovens.

Also, Manufacturers of Linotile Flooring, and Cork Paving Brick, for which see our pages in General Index.

Nonpareil Corkboard.

Nonpareil Corkboard consists of pure granulated cork, slightly compressed in sheets, and baked at a moderate temperature. This process brings out the natural waterproof gum or rosin in the cork, which binds the whole mass together firmly.

SOLID PARTITIONS OF NONPAREIL CORKBOARD ERECTED IN NEWARK ICE & COLD STORAGE CO., NEWARK, OHIO
The studding is removed after the corkboard is in place

Advantages—Containing no foreign substance, the heat conductivity of Nonpareil corkboard is the lowest of any commercial insulator. The material will not disintegrate in the presence of moisture, if properly erected; and it is proof against rot, mould and offensive odors. It has been tested and officially approved by the National Board of Fire Underwriters. Nonpareil Corkboard is giving excellent satisfaction in hundreds of plants employing refrigeration, situated throughout the civilized world. It is also used for preventing the condensation of moisture on concrete roofs of textile and other mill buildings; in bungalows and houses for protection against heat and cold; and for insulating Turkish bathrooms, fever rooms in hospitals; dough mixing and proving rooms in bakeries, etc.

Dimensions—Nonpareil Corkboard is made in sheets of standard size, 12 by 36 inches, of the following thicknesses: 1, 1½, 2, 3, 4 and 6 inches.

Methods of Construction—The ease with which Nonpareil Corkboard may be erected is one of the chief points in its favor. It can be nailed, sawed and put up just as readily as lumber in buildings of frame construction, or erected in Portland cement mortar against brick, stone, concrete, or hollow-tile walls and ceilings.

Solid corkboard partitions as high as twenty-four feet are constructed without the use of any studding whatsoever, saving space and the cost of lumber otherwise required.

In insulating floors, Nonpareil Corkboard is laid down in hot asphalt, a concrete or lumber finish being put down directly on top.

Wherever the material is installed in two courses, joints are broken both horizontally and vertically between the layers. Portland cement plaster finish may be readily applied directly against its surface, making a thoroughly sanitary and hygienic finish.

Corkboard Catalogue.

A 152-page catalogue, entitled, "Nonpareil Corkboard Insulation," will be cheerfully sent on request. Our branch offices, situated throughout the United States and Canada, will co-operate with architects and engineers in solving insulation problems, without charge or implied obligation.

Continued on next page

Nonpareil Cork Covering.

Nonpareil Cork Covering is the only thoroughly satisfactory covering for brine, ammonia and ice water lines, and cold pipes of every kind. It consists of pure granulated cork, compressed and moulded in sectional form to fit the different sizes of pipe and various fittings in ordinary use. It is coated inside and out with a mineral rubber finish, and is applied with waterproof cement on the joints, rendering them impervious to moisture.

Service Details—Nonpareil Cork Covering is manufactured in four thicknesses to meet different service conditions:

(1) Standard Brine Covering, from 2 to 3 inches thick, is designed for temperatures from 0 to 25 degrees Fahr.

(2) Special Thick Brine Covering, from 3 to 4 inches in thickness, for temperatures below 0 degrees Fahr.

(3) Ice Water Covering, approximately 1½ inches thick, for temperatures of from 25 to 45 degrees Fahr.

(4) Cold Water Covering, approximately 1 inch thick, for temperatures of 45 degrees Fahr. and above. It is not made in sizes larger than 4-inch.

Advantages—(1) Maximum insulating efficiency, insured by the millions of sealed air-cells of the natural cork. (2) Free from capillary attraction, non-absorbent of moisture. (3) Light, clean, and neat in appearance. (4) Easy to apply.

On a brine or ammonia line, under average conditions, it will pay for itself in a single year. The book entitled, "Nonpareil Cork Covering," sent on request, renders it easy to figure out how much can be saved in any given case by installing it.

NONPAREIL CORK COVERING INSTALLED ON BRINE LINES IN PLANT OF JOHN F. JELKE CO., CHICAGO, ILL.

Drinking Water Systems—Nonpareil Cork Covering is the ideal cold pipe covering for drinking water systems in mills, factories, office buildings, hotels, apartment houses, etc. Its high insulating efficiency insures water being delivered at the proper temperature, and its moisture-resisting properties give it remarkable durability in service.

Cork Covering Literature.

The books, "Nonpareil Cork Covering" and "Drinking Water Systems" (containing much valuable data), together with price-list, will be mailed on request.

Nonpareil Insulating Brick.

Nonpareil Insulating Brick, for boiler settings, furnaces, ovens, stacks, etc., are composed principally of diatomaceous earth. This peculiar material is practically pure silica, being composed of the skeletons or shells of microscopic plants that grew in the sea ages ago. It is estimated that there are 39 billions of these shells to the cubic inch, each one hollow and filled with air. It is this large amount of "dead" or entrapped air which gives Nonpareil Insulating Brick their high heat insulating value. They are, in fact, ten times as efficient nonconductors of heat as fire brick or common brick. In other words, one 4½-inch course of Nonpareil Brick will retain as much heat as a wall of common brick or fire brick 45 inches thick.

Advantages—Nonpareil Brick will greatly reduce the amount of heat lost by radiation from boiler settings, furnaces, ovens, etc., resulting in a material saving in fuel and making the rooms themselves much more comfortable. This last feature is of special importance in office buildings, hotels, apartments, etc., where hot boiler rooms and stacks cause inconvenience and discomfort to those in nearby rooms.

SETTINGS OF THREE WATER TUBE BOILERS IN PLANT OF PENNSYLVANIA RUBBER CO., JEANNETTE, PA.
Insulated with 30,000 Nonpareil Insulating Brick

A condition of this kind was corrected in the Chamber of Commerce Building, Detroit, Mich. The heat from the boiler room was quite noticeable in the store above. By installing one course of Nonpareil Brick, set on edge, on the tops of the boiler settings and over the drums, the temperature above the boilers was lowered thirty degrees. In addition, enough fuel was saved in less than a year to pay for installing the brick.

Adaptability—The convenient form of Nonpareil Brick makes them particularly well suited to the service for which they are intended. They combine low heat conductivity with sufficient structural strength to support any ordinary load when built in as an integral part of the structure to be insulated.

Size, Shapes and Weight—The standard straight Nonpareil Brick are nominally 9 by 4½ by 2½ inches, and weigh approximately 1½ pounds each. A variety of special shapes are also carried in stock.

Continued on next page

Information—Complete information regarding the various applications of Nonpareil Insulating Brick is given in the following booklets:

In boiler settings: "*Saving Fuel.*"

In furnaces and ovens: "*Good Furnaces Made Better.*"

In bread baking ovens: "*Comfort and Economy in the Bakery.*"

In glass plants: "*Conserving Fuel and Men.*"

Any or all of the above will be sent, free of charge, on request, together with samples.

Insulating Cement.

To obtain the best results, Nonpareil Brick should be laid in special insulating cement, which we are in position to furnish. The cement has practically the same insulating value as the brick, and by using it, continuous walls of insulation are obtained.

Nonpareil High Pressure Covering.

Nonpareil High Pressure Covering is also composed largely of diatomaceous earth (see description under Nonpareil Insulating Brick), combined with a small quantity of asbestos fiber as a binder. Here again the remarkable insulating value of the former material is utilized to excellent advantage.

Merits—Due to the large amount of entrapped or "dead" air it contains, Nonpareil High Pressure Covering is a much more efficient non-conductor of heat than other types of pipe coverings. The only air confined in high pressure coverings, heretofore in general use, is that which is caught in the voids between the minute interlacing crystals of the substances of which they are composed. In Nonpareil Covering, not only is a large amount of air entrapped between the diatoms, which are of all shapes and sizes, but the diatoms themselves are hollow and full of air to begin with.

In addition to being a superior heat insulator, Nonpareil High Pressure Covering will withstand much higher temperatures without calcining or disintegrating. It is particularly well suited, therefore, for the insulation of superheated steam lines, retorts, breechings, etc., and has given remarkable service when used for insulating oil burning marine boilers, where the service is unusually severe.

Another valuable characteristic of Nonpareil High Pressure Covering is its ability to bear repeated wetting and drying. It may be soaked in water for weeks, and when dried out again will be found to have lost none of its insulating efficiency or structural strength. For this reason Nonpareil High Pressure Covering is the ideal insulation for underground steam lines, where moisture is present almost constantly.

Easy to Apply—Nonpareil High Pressure Covering is supplied in sectional, segmental, block and Plastic cement form. The sectional covering is for small and medium size pipes, the segmental for large pipes, the blocks for feed-water heaters, breechings, tanks, ovens, etc., and the plastic cement for fittings and irregular surfaces.

Literature and Samples—Literature, price-list, samples and further information will be cheerfully furnished on request.

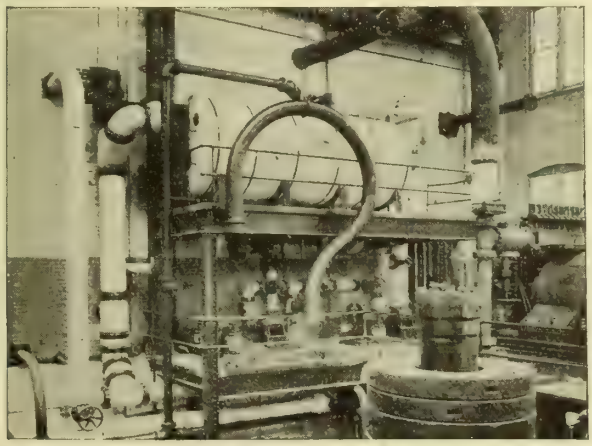
Nonpareil Cork Machinery Isolation.

Nonpareil Cork Machinery Isolation is similar to Nonpareil Corkboard in composition, except that it is much denser.

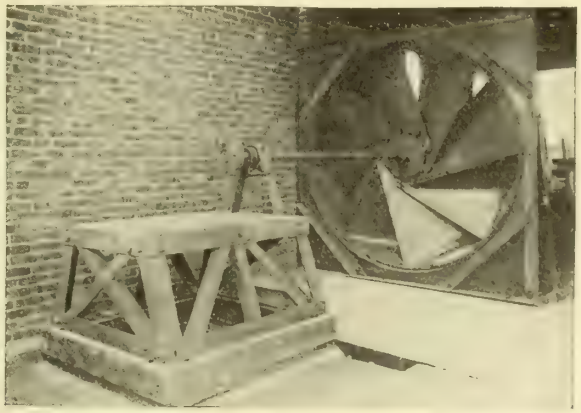
Advantages—The natural resiliency of the cork makes Nonpareil Machinery Isolation a highly efficient medium for deadening the noise of fans, motors, presses, pumps, refrigerating machines, engines, conveyors, etc., in hospitals, sanitariums, hotels, apartment houses, and industrial establishments where noise and vibrations are objectionable.

Sizes—Nonpareil Cork Machinery Isolation is supplied in sheets 12 by 36 inches and in the following thicknesses: ½, ¾, 1, 1½, 2, 3, 4, 5 and 6 inches.

Samples—Further information and samples will be supplied on request.



NONPAREIL HIGH PRESSURE COVERING, BLOCKS AND CEMENT INSTALLED ON STEAM LINES AND FEED-WATER HEATER IN MUNCIE ELECTRIC LIGHT CO.'S PLANT, MUNCIE, IND.



MOTOR FOUNDATION ISOLATED WITH NONPAREIL CORK MACHINERY ISOLATION, POST GRADUATE HOSPITAL, NEW YORK, N. Y.

BANNER ROCK PRODUCTS CO.

Cold-Storage Insulation

ALEXANDRIA, IND.

Products and Services.

ROCK CORK COLD STORAGE INSULATION
BANNER PURE CORK BOARDS
TRADE-MARK

Rock Cork, Pure Cork Boards, Granulated Rock Cork and Granulated Natural Cork, for Cold-Storage Insulation.

Rock Wool, for Refrigerators, Protection from Heat or Cold in Walls, and around Pipes.

Rock Cork Lath, for Partition Construction, resisting Heat, Cold, Moisture and Sound.

Rock Cork Stucco Sheathing for Sound-Deadening, Roof Insulation and Sheathing, for Protection from Heat, Cold, Moisture and Sound, in Roofs, Walls, Floors and Partitions.

Our business is manufacturing Cold-Storage Insulation and contracting to apply same as per drawings and specifications, furnishing all materials and performing all work necessary to give the best insulation obtainable at moderate expense, turning the rooms over completely ready for business, with a guarantee on materials and workmanship. Or, we will furnish the insulating materials and a competent man to direct their application, the owners furnishing other materials and labor.

Description.

Rock Wool is quarried rock melted under intense heat and converted into fiber.

Rock Cork is a board made of Rock Wool, bound with a waterproofing binder, consisting largely of crude paraffin wax.

Banner Pure Cork is made from imported cork, granulated to proper size, all dust being removed with an air blast. Granules are screened, eliminating those too fine or too coarse.

The board is made with pressure and heat, and owing to the process is without large voids between the particles, giving a structure like the original bark as near as possible.

Sizes.

Rock Cork is formed in slabs 16 inches by 36 inches, and ½ inch, 1 inch, 1½ inches, 2 inches and 3 inches thick.

Banner Pure Cork boards are 16 inches by 36 inches, the largest sized Pure Cork Board. They are made 1 inch, 1½ inches, 2 inches, 3 inches and 4 inches thick.

Application.

Rock Wool is adapted for insulating in any condition permitting a loose filling, as in walls or floor systems, in refrigerators, garages, cellars above ground, and around pipes. It has the advantage of being absolutely fireproof.

Granulated Rock Cork and Granulated Cork are similarly applied, and are moisture resisting.

Rock Cork and Banner Pure Cork are applied to walls and ceilings either by nailing or by setting in a bed of Portland cement, mortar or insulating cement, receiving a protection of Portland cement plaster. Solid walls are built by erecting temporary studs, removing the studs, and plastering both sides.

Insulating Efficiency.

Rock Cork and Banner Pure Cork are guaranteed to have equal insulating efficiency when applied in the same manner.

In 1908 Purdue University, Lafayette, Ind., conducted exhaustive tests for the insulating efficiency of Rock Cork.

Results reported were B. T. U. per square foot per twenty-four hours for each degree Fahrenheit of difference in temperature on the two sides. A 1-inch thickness of Rock Cork transmitted only 5.72 B. T. U. A 2-inch thickness only 3.37 B. T. U. A 3-inch thickness 2.55 B. T. U. This would indicate that one thousand square feet of 1-inch Rock Cork would transmit only one ton of refrigeration in twenty-four hours, with a temperature of eighty-two degrees on one side and thirty-two degrees on the other. A 2-inch thickness, under the same conditions, transmits only fifty-eight hundredths of a ton of refrigeration; a 3-inch thickness only forty-eight hundredths of a ton.

The average of tests made for ourselves and for others at different times, on different samples, by different methods, and conducted by disinterested, competent engineers shows that a 4-inch thickness of Rock Cork permits a leakage of only three tenths of a ton of refrigeration in twenty-four hours through one thousand square feet surface, with fifty degrees difference in temperature. This is practically the result of tests on Pure Cork Boards.

Rock Cork Lath.

Rock Cork Lath is a painted metal lath, imbedded in Rock Cork composition, ½ inch thick; made in 4-foot lengths, 18 inches wide; capable of being nailed to interior or exterior studs, on 16-inch centers, and of receiving a finish of plaster or stucco for partition construction, or outside stucco finish—resisting heat, cold, moisture and sound.

Fireproof solid partitions, 2 inches thick, are constructed with metal studs, Rock Cork Lath and plaster composition. Granulated Rock Cork, mixed with the plaster composition, gives a partition 60 per cent of the weight of solid construction, and increases sound resistance. Such partitions are adapted for hospitals, hotels and apartment houses.

REFERENCES

Cincinnati Abattoir, Cincinnati, Ohio
Natchez Packing Co., Natchez, Miss.
Baldwin Packing Co., Paris, Ky.
Geo. D. Mansfield Co., Fourth and Poplar Streets, Milwaukee, Wis.
Notre Dame College, South Bend, Ind.
Syracuse Cold Storage Co., Syracuse, N. Y.
Milwaukee-Waukesha Brewing Co., Waukesha, Wis.
Crystal Springs Ice Co., Cumminsville, Ohio
St. Joe Ice Co., Elkhart, Ind.
Miller & Hart, Union Stock Yards, Chicago, Ill.
North American Provision Co., Union Stock Yards, Chicago, Ill.
Roberts & Oaks, Union Stock Yards, Chicago, Ill.
Kokomo Sanitary Milk and Ice Cream Co., Kokomo, Ind.
Springfield Brewing Co., Willimansett, Mass.
White River Creamery Co., Muncie, Ind.
Indiana Ice & Dairy Co., Anderson, Ind.
Sanitary Milk Products Co., Indianapolis, Ind.
Indianapolis Abattoir Co., Indianapolis, Ind.
Burge Machine Works, Chicago, Ill.

H. W. JOHNS-MANVILLE CO.

Cold Storage Insulation

NEW YORK AND EVERY LARGE CITY
SEE BRANCH ADDRESSES IN OUR CATALOGUE IN ROOFING SECTION

Products.

J-M Pure Cork Sheets, J-M Impregnated Corkboard, J-M Granulated Cork, Audiffren-Singrun Refrigerating Machine, J-M Sectional Underground Conduit.

Also, J-M Hair Felt; J-M Mineral Wool; J-M Weathertite Paper; J-M Keystone Hair Insulator.

For complete list of J-M Building Materials see our name in Roofing Section.

Services.

The field of cold storage insulation is so broad, and so varied that no one material can satisfy every requirement. Each cold storage problem is an individual one. Each requires special thought and treatment.

Johns-Manville Cold Storage Insulation Service

JOHN B. AGEN BUILDING, SEATTLE, WASH.
John Graham, Architect, Seattle

goes further than the mere selling of materials. It suggests their intelligent application; it provides for installation work through its contract departments all over the country; and it vouches for the satisfactory performance of the materials recommended.

The architect who accepts a suggestion from this service avails himself of a complete line of insulations made, and installed (if desired), by an organization whose experience dates back twenty-five years.

Your cold storage insulation work is solicited.

SULZBERGER & SONS CO., NEW YORK, N. Y.
L. Levy, Architect
Insulated with J-M Pure Cork

J-M Pure Cork Sheets.

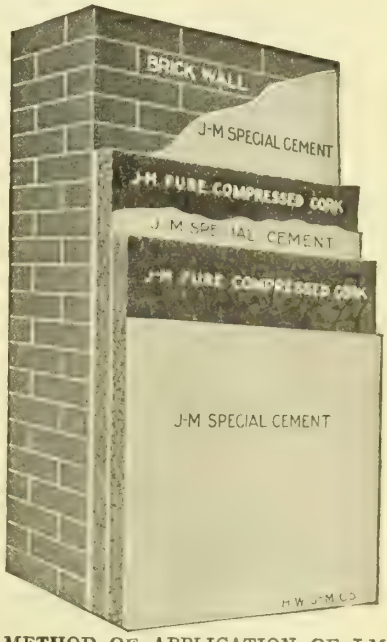
By our process of manufacturing J-M Pure Cork Sheets, its natural properties are retained in the finished product.

The pure cork is ground, compressed in moulds, and heated to a temperature sufficient to liberate the natural gum. When cooling, this gum binds the particles together, forming a reconstructed sheet of pure cork.

Advantages—J-M Pure Cork Sheets are the best commercial non-conductors of heat known. They are unaffected by moisture, and retard the progress of fire to such an extent that when erected in cement with cement finish (see illustration) they are approved for fireproof construction by the National Board of Fire Underwriters.

J-M Impregnated Corkboard.

Next in insulating efficiency is J-M Impregnated Corkboard. This is made of granulated cork moulded under pressure with an asphaltic binder. It possesses much of the insulating properties peculiar to cork, has good structural strength, and being absolutely waterproof, is well suited to locations subjected to excessive moisture, such as floors of ice storage rooms, brewery cellars, under brine and freezing tanks, etc.



METHOD OF APPLICATION OF J-M SHEET CORK INSULATION TO BRICK WALL

Sizes—J-M Pure Cork Sheets and J-M Impregnated Corkboard are made twelve inches by thirty-six inches, and one, one and one half, two and three inches in thickness.

Impregnated also made four inches thick.

J-M Granulated Cork.

Grades—Fine Regranulated, $^{12}/_{20}$ Granulated, Coarse Regranulated and Impregnated Regranulated.

Use—Adapts itself readily to many constructions and application to irregular shapes.

Used as fills where sheet cork cannot be applied and space is a secondary consideration.

Fine Regranulated is approximately fifty per cent as efficient as J-M Pure Cork Sheets. It oftentimes is considerably cheaper.

NORTHERN INSULATING CO.

Flaxlinum Insulation and Keyboard, Plaster and Stucco Base

ST. PAUL, MINN.

Products.

FLAXLINUM INSULATION, for Sound Deadening and Cold Storage Purposes; FLAXLINUM KEYBOARD BASE, for Plaster and Stucco, Sound Deadening and Cold Storage Insulation.

Patents.

Products patented January 5, 1909; April 9, 1912; April 16, 1912; August 25, 1914; November 3, 1914; January 19, 1915; January 26, 1915, and April 27, 1915.

Co-operative Service.

Architects, contractors and owners are cordially invited to write for detailed information, blue-prints and specifications for guidance in use of products.

Description.

Flaxlinum is composed of flax fibre thoroughly degummed and chemically treated. It is in board form, applied and cut like lumber, and is rat and vermin proof. Efficiency equal to cork, thirty thicknesses building paper, or four inches back plaster.

Scope of Use.

Sound-deadener in floors, partitions, party walls in apartment buildings, schoolhouses, lodge halls, etc. Insulation for roof and side walls of building, as protection against cold in winter, heat in summer. Insulation for ice houses, refrigerators, refrigerator cars, creameries, cooling rooms, packing houses, fruit storage, potato houses, hospitals, hotels, chicken houses, stock farms, silos, incubators, fireless cookers, etc.

Sizes.

Flaxlinum is manufactured in ¼-, ½-, ¾-, and 1-inch thicknesses. Comes in sheets 3 feet by 8 feet, 32 ins. by 8 ft. 6 ins. up to 10 ft.; 16½ ins. flanged for studding, 8 ft. 6 ins. to 10 ft.; deafening pads and headers 3 ins. by 3 ft., 16½ ins. by 4 ins., 16½ ins. by 6 ins.; insulation headers 16½ ins. by 8 ins., 16½ ins. by 10 ins., and 16½ ins. by 12 ins.

TRADE-MARKS

FLOOR DEAFENING SPECIFICATIONS.

Frame Construction. Detail No. 1.—All top plates each floor to be covered with ½-inch Flaxlinum to receive joists, false studs, and lathing strips.

Place ½-inch x 3-inch Flaxlinum joist pads on top joists, also over false studs to receive underflooring laid diagonally, and tight.

Place lower plates on ½-inch Flaxlinum pads projecting ¾-inch each side to receive grounds for lath and plaster. Over upper plates, under lathing strip or joist, place ½-inch pads the width of the plate.

Place headers (joist dimension) between joists over bearing or deafened partitions.

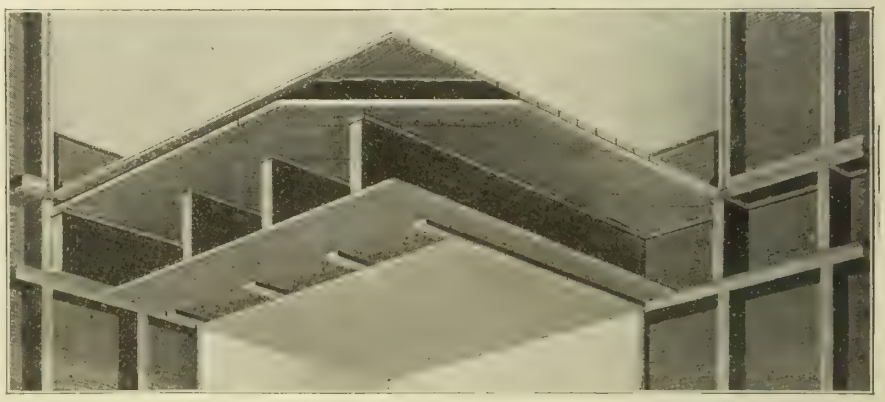
Before lathing cover ceiling with ½-inch Flaxlinum on bottom of ceiling joists. Furrow down with 1 x 2's placed parallel joists to receive lath. Between joists to receive end joints, place headers, all other joints meet on joists.

Cover underfloor with ¼-inch Flaxlinum before laying finished floor directly thereon, or substitute two layers of 1½-lb. Rag Felt.

To insulate flat roof of apartment building, place Flaxlinum on ceiling, furrow down same as specified and illustrated for deafening.

Brick and Tile Construction, Detail No. 2.—Object of Rake is to prevent sound or fire traveling between the wall and joists or plaster from one floor to another.

Rake brick out 2 incnes between joists.



FLOOR DEAFENING DETAIL NO. 1, IN FRAME CONSTRUCTION

After joists are spaced and leveled, place 1 x 2's, paralleling wall bottom of joists, to receive brick.

Place joists paralleling wall 2 inches in from wall line and rake out to fill space. Place blocks in wall flush bottom edge joists for nailing bearing.

Place ½-inch x 3-inch Flaxlinum joist pads on top joists, also over brick projection to receive underflooring laid diagonally and tight.

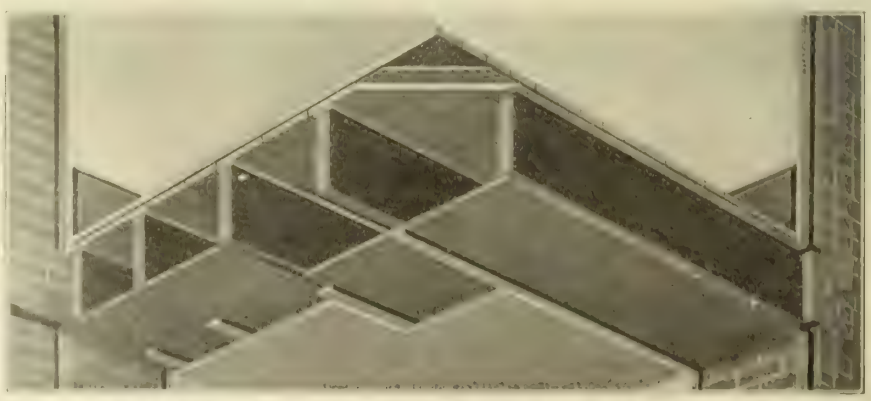
Place lower plates on ½-inch pads projecting ¾-inch each side of plate to receive grounds for lath and plaster. Over upper plates, under lathing strip or joist, place ½-inch Flaxlinum the width of the plate.

Place headers (joist dimension) between joists over bearing or deafened partitions.

Before lathing cover ceiling with ½-inch Flaxlinum on bottom of ceiling joists. Between joists to receive end joints place headers; all other joints meet on joists. Furrow down with 1 x 2's placed parallel joists to receive lath.

Cover underfloor with ¼-inch Flaxlinum before laying finished floor directly thereon, or substitute two layers of 1½-lb. Rag Felt.

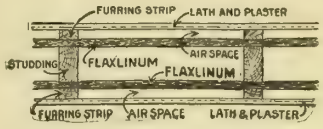
To insulate flat roof or apartment building place Flaxlinum on ceiling; furrow down same as specified and illustrated for deafening.



FLOOR DEAFENING DETAIL NO. 2, IN BRICK AND TILE CONSTRUCTION

Continued on next page

Frame Partitions, Sound Deafening Detail No. 3—Place lower plates on ½-inch Flaxlinum pads projecting ¾-inch, each side to receive grounds for lath and plaster. Over upper plates, under lathing strips or joists, place ½-inch pads the width of the plate.



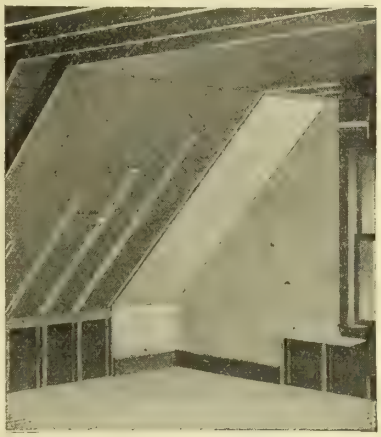
DETAIL NO. 3. SOUND DEAFENING FRAME PARTITIONS

Place headers (joist dimension) between joists over the partitions.

Apply ½-inch Flaxlinum over face of studdings, joints centering thereon, both sides partition, beginning at floor pad and up to bottom of ceiling joists. Headers to be placed between studs to receive end joints. Furrow with 1 x 2-inch strips to receive lath, plaster, etc.

INSULATION SPECIFICATION

For Roof as Applied to Rafters and Collar Beams, Detail No. 4—Place blocks between studdings, flush bottom edge collar beams or ceiling joists paralleling walls to receive Flaxlinum either flanged between studdings or over face of same.



DETAIL NO. 4. INSULATING ROOF APPLIED TO RAFTERS AND COLLAR BEAMS

Collar beams to be mitered and spiked to edge of rafters, rather than alongside, to save cutting and shifting Flaxlinum at intersection of collar beams.

Apply ½-inch Flaxlinum on the bottom edge of rafters, joints centering thereon, beginning at plate following rafters and across collar beams down rafters to plate opposite side.

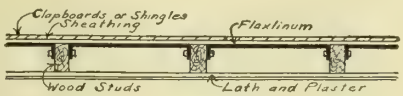
Headers to be placed between rafters, and collar beams to receive end joints.

Furrow with 1 x 2's to receive lath plaster, etc.

Flanged Between Studdings, Substitute Back-plaster; Paper Improved Method, Detail No. 5—Apply ½-inch flanged Flaxlinum between studdings set 16 inches on centers directly back against sheathing or paper; hold in place with lath, thereby caging air in the indentations.

When purchasing Flaxlinum, order lengths long enough to reach from top of upper underfloor down through to lower underfloor, allowing flange on lower plate.

Where joists intersect walls, notch Flaxlinum dimension of joist. After Flaxlinum is in place at intersection of end joints, cleat with lath over joints.

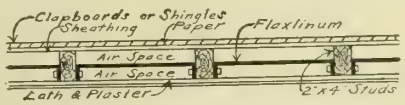


DETAIL NO. 5. SIDE WALL INSULATION FLANGED BETWEEN STUDDINGS

Advantages: caging of air; elimination 2 x 2-inch headers; notching for ribbon board; and saving labor.

Flanged Between Studdings, Substitute Back-plaster; Paper, Detail No. 6—Apply ½-inch flanged Flaxlinum between studdings set 16 inches on centers half way between sheathing and plaster; hold in place with lath.

When purchasing Flaxlinum, order lengths long enough to reach from top of upper underfloor down through to lower underfloor, permitting flange on lower plate.



DETAIL NO. 6. SIDEWALL INSULATION FLANGED BETWEEN STUDDINGS

Where joists intersect wall on ribbon, notch Flaxlinum dimension of joist and ribbon.

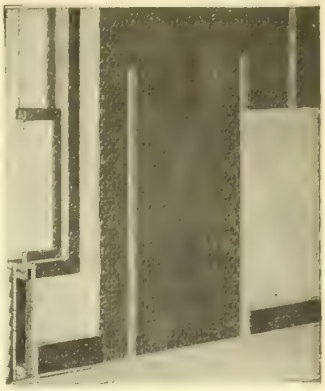
After Flaxlinum is in place at intersection of end joints, place 2 x 2's against sheathing back of Flaxlinum, and cleat with lath over joints.

Over Face of Studdings, Detail No. 7—Place blocks between studdings, flush bottom edge ceiling joists paralleling wall to receive Flaxlinum.

Apply ½-inch Flaxlinum over face of studdings, joints centering thereon, beginning at underfloor and up to bottom ceiling joists.

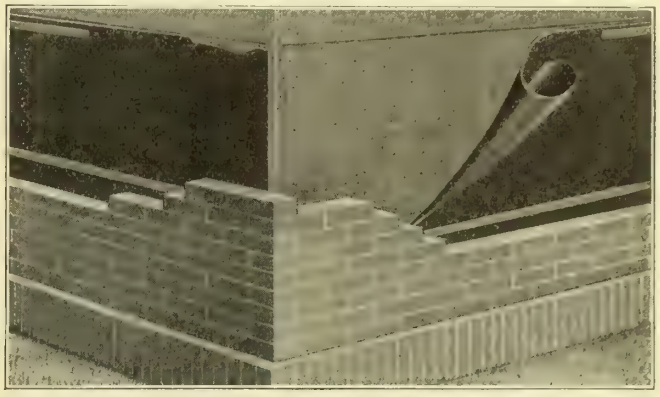
To insulate space between joists, place headers of Flaxlinum flanged between joists against studdings. Furrow with 1 x 2's to receive lath and plaster.

Important—This application demands specially made frames, and requires 1¼ inches additional jamb depth, allowing for one additional blind casing, the thickness of Flaxlinum compressed, and furring strips.



DETAIL NO. 7. SIDE WALL INSULATION OVER FACE OF STUDDING

Brick Veneer, Detail No. 8—Apply ½-inch Flaxlinum over sheathing, fit same tightly to brick mould, cover with waterproof paper, and furrow horizontally with lath.



DETAIL NO. 8. SIDE WALL INSULATION FOR BRICK VENEER

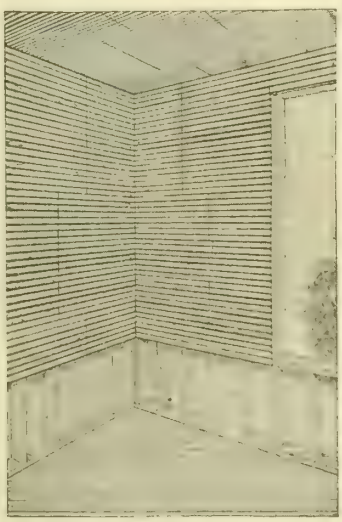
Interior Flaxlinum Keyboard, Detail No. 9—Flaxlinum Keyboard is ½-inch Flaxlinum overlaid heavy waterproof paper, on which is mounted No. 1 wood lath beveled both edges.

Apply sheets (32 inches x 3 feet, 48 inches x 3 feet) directly to inner face studding, fitting horizontal joints tight, nailing each lath every studding. All perpendicular joints broken every 3 feet.

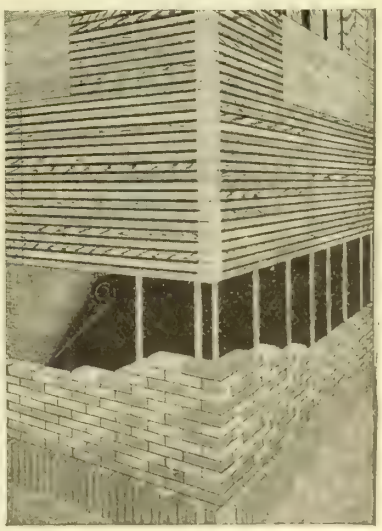
Increase depth door and window jambs ⅜-inch to accommodate insulation.

Keyboard for Stucco, Detail No. 10—Above brick veneer apply Flaxlinum Keyboard over sheathing, covering all corners and angles with wire cloth.

To insulate brick veneer area, apply ½-inch Flaxlinum over sheathing, and cover with waterproof paper; furrow with lath.



DETAIL NO. 9. INTERIOR FLAXLINUM KEYBOARD



DETAIL NO. 10. KEYBOARD FOR STUCCO

UNITED CORK COMPANIES

50 Church Street
NEW YORK, N. Y.

FACTORY AND MAIN OFFICE
LYNDHURST, N. J.

BRANCH OFFICES

CHICAGO, ILL., Westminster Building, 110 South Dearborn Street
PHILADELPHIA, PA., Land Title Building, Broad and Chestnut Streets
CLEVELAND, OHIO, Citizens Building, 818 Euclid Avenue
BOSTON, MASS., New England Refrigerating Co., 807 Sumpter Building, 88 Broad Street
DALLAS, TEX.
SAN FRANCISCO, CAL., Faget Engineering Co., 354 Pine Street
ATLANTA, GA., Grant Building

Products.

Star Brand—Waterproof Corkboard; Crescent Brand—Baked Pure Corkboard; Granulated Cork; Regranulated Cork for Cold and Heat Insulation; also for Sound- and Damp-proofing in cold storages, packing houses, bakeries, breweries, ice houses, creameries, ships, hotels, private residences, etc.

Crescent Cork Tile.

Star Cork Brick.

For further information on Cork Tile and Brick, see United Cork Flooring Co. in General Index.

Star Corkboard.

This board consists of ninety-four per cent pure, screened, granulated natural cork and six per cent of an odorless binder which completely coats every granule of cork, making the board *absolutely moistureproof.* The cork is not baked, but remains in its natural state, thus retaining all its life and vitality.

Star corkboard being waterproof is particularly adaptable for breweries and packing houses, also cellars, floors, roofs, bunkers, and damp places in general. The cementing substance we use gives Star corkboard superior structural strength over all other kinds of corkboards. Unsurpassed for floor work and self-supporting cork partitions.

Crescent Corkboard.

Crescent corkboard consists of one hundred per cent pure, screened, granulated natural cork, compressed in a mould and baked at a moderate temperature.

No foreign substance is used as a binder. It meets the U. S. Government specifications and is approved by the National Board of Fire Underwriters of Chicago.

Crescent corkboard is used for walls, ceilings, and all cold-storage insulation generally, except where insulation is continuously exposed to moisture. Used for drying rooms, as it will withstand a temperature of about two hundred degrees Fahr.

Granulated and Regranulated Cork.

Granulated cork, as well as regranulated Star and Crescent, is used for insulating tanks, and for filling in between joists and sheathing, and wherever insulation in board form would be too expensive to apply.

Installation of Corkboard.

Corkboard does not require experienced mechanics to install. The boards can be sawed and fitted like lumber, or built up like masonry. To brick or concrete surfaces they are applied with a bed of Portland cement mortar or asphalt cement.

On wood surfaces, asphalt may be used or the corkboards may be nailed on, placing first one or two courses of waterproof insulating paper. For exposed cork surface we recommend a cement finish, which gives a smooth and even surface that can easily be kept clean and in a sanitary condition.

Weights, Shipments, etc., of Corkboard.

Star Corkboard, 1 square foot, 1 inch thick weighs 1.33 pounds.

Crescent Corkboard 1 square foot, 1 inch thick weighs .90 pounds.

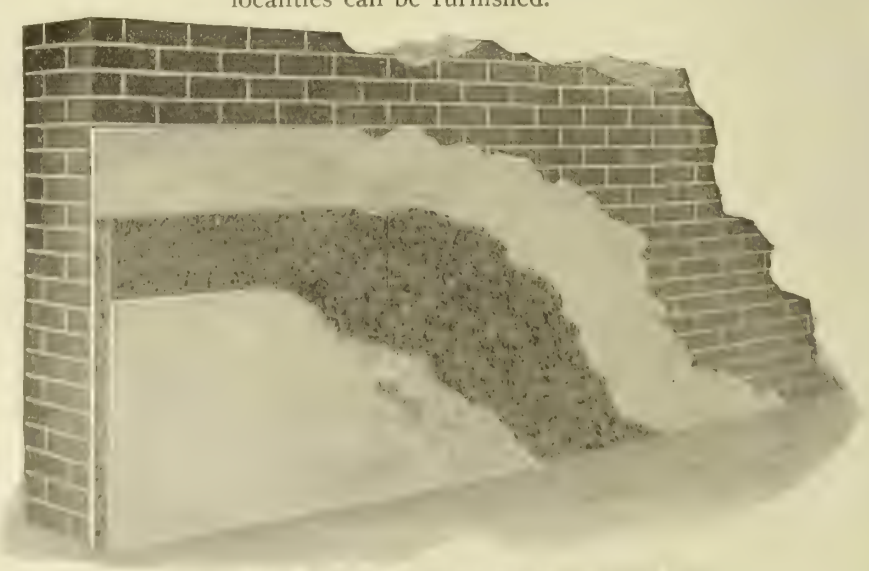
Both boards are made 12 by 36 inches and of all thicknesses, from ¼ to 4 inches.

Cork Tile or Flooring and Cork Brick.

These products are now being distributed by the United Cork Flooring Company, a department of this company; although they are being manufactured under our own supervision and at our plant at Lyndhurst, N. J., same as heretofore.

Co-operation and Service.

We furnish plans and suggestions, or if desired will install and erect our insulation complete according to customer's specifications. Write for catalogue. Having installed our corkboard insulation in thousands of plants throughout the United States, references in all localities can be furnished.



APPLICATION OF CORKBOARD TO BRICK SURFACE

McCRAY REFRIGERATOR CO.

655 Lake Street
KENDALLVILLE, IND.

BRANCHES IN ALL PRINCIPAL CITIES
Refer to Telephone or City Directory for Address of Local Branch

Products.

McCRAY REFRIGERATORS and COOLERS for Residences, Hotels, Restaurants, Cafes, Clubs, Hospitals, Institutions, Florists, Groceries, Meat Markets, Steamships, Dining Cars, etc.

Also MORTUARY REFRIGERATORS for Morgues and Hospitals, and COLD STORAGE ROOMS for all purposes, arranged for either ice or mechanical refrigeration.

Interior Linings.

Of white opal glass; one piece solid porcelain, white enamel or odorless white wood.

Insulation.

Prepared to furnish mineral wool, cork, or any other dependable insulating material. (See cut of wall sections.)

Outside Icing.

Any McCray refrigerator or cooler can be arranged with extra rear or end door, so that ice can be supplied from the outside of the building, see illustration below. (For location of wall openings, etc., see tables on second page following.)

Special Built-to-Order Refrigerators and Coolers.

We maintain a special designing department for planning refrigerators and coolers for all purposes and to fit any space. This department is at your service without charge or obligation.

Facilities.

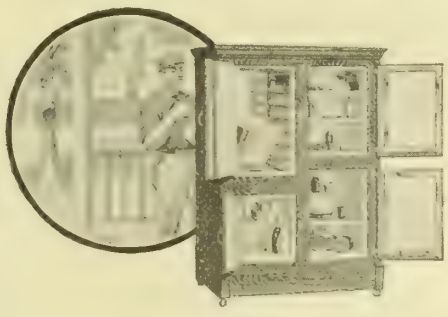
Stock size refrigerators are shipped upon receipt of orders. Orders for special refrigerators and coolers are executed promptly.

Catalogues.

For the convenience of your files we issue six distinct catalogues covering our different lines, as follows; any or all of which are mailed on request.

No. 92 Stock Size Refrigerators for residences.
No. A. H. Built-to-order Refrigerators for residences.
No. 50 Refrigerators for hotels and institutions.
No. 74 Refrigerators for florists.
No. 70 Refrigerators for groceries.
No. 61 Refrigerators for meat markets.

NO. 171 McCRAY COOLER
One of many styles of large coolers suitable for hotels and institutions. We are prepared to conform to any specifications encountered in large cooler work for ice or mechanical refrigeration. Estimates furnished on request



OUTSIDE ICING FEATURE
Tables, showing location of wall openings, etc., will be found on the second page following.

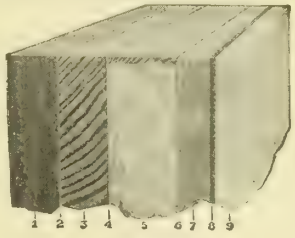
LIST OF INSTALLATIONS

HOTELS, RESTAURANTS AND CLUBS

Battle House, Mobile, Ala.
Hotel Oakland, Oakland, Cal.
U. S. Grant Hotel, San Diego, Cal.
U. S. Senate Restaurant, Washington, D. C.
Piedmont Hotel, Atlanta, Ga.
Oliver Hotel, South Bend, Ind.
Hotel Morton, Grand Rapids, Mich.
Ohio Hotel, Youngstown, Ohio
Rice Hotel, Houston, Tex.
Grand Hotel, Yokohama, Japan
Pittsburgh Athletic Association, Pittsburgh, Pa.

HOSPITALS AND INSTITUTIONS

Yale University, New Haven, Conn.
Georgetown University, Washington, D. C.
U. S. Laboratories, Washington, D. C.
Notre Dame University, Notre Dame, Ind.
New Cook County Hospital, Chicago, Ill.
Harvard University, Cambridge, Mass.
Michigan Insane Hospital, Kalamazoo, Mich.



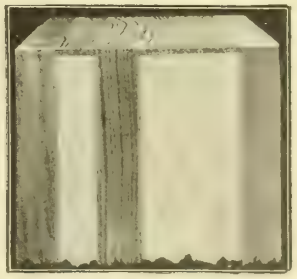
OPAL GLASS WALL SECTION
1—Exterior, quartered-sawed oak
2—Insulating sheathing
3—Thickness of lumber
4—Insulating sheathing
5—Mineral wool
6—Insulating sheathing
7—Thickness of lumber
8—Insulating felt
9—Interior lining of white opal-glass $^{7}/_{16}$-inch thick

HOSPITALS, ETC., CONTINUED

Rockefeller Institute, New York, N. Y.
Providence Hospital, Seattle, Wash.

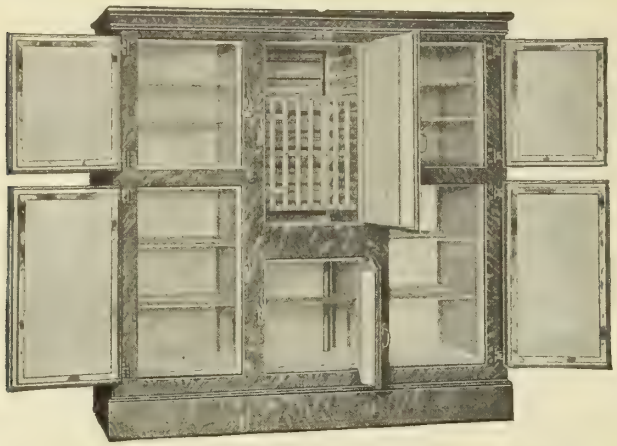
RESIDENCES

J. D. Spreckels, San Diego, Cal.
Perry Belmont, Washington, D. C.
Mrs. Lucy Carnegie, Fernandina, Fla.
Franklin MacVeagh, Chicago, Ill.
J. M. Studebaker, South Bend, Ind.
Hon. Edwin Denby, Detroit, Mich.
Mrs. C. W. Post, Battle Creek, Mich.
C. S. Pillsbury, Minneapolis, Minn.
Jos. Pulitzer, Jr., St. Louis, Mo.
J. D. Rockefeller, Jr., New York, N. Y.
Mrs. W. K. Vanderbilt, Westbury, N. Y.
Morton F. Plant, New London, Conn.
George Gould, Lakewood, N. J.
Mrs. Grover Cleveland-Preston, Princeton, N. J.
Orville Wright, Dayton, Ohio
Howard Heinz, Pittsburgh, Pa.
Hon. P. C. Knox, Valley Forge, Pa.
Col. G. C. Pabst, Milwaukee, Wis.
His Majesty the King of Greece, Athens, Greece

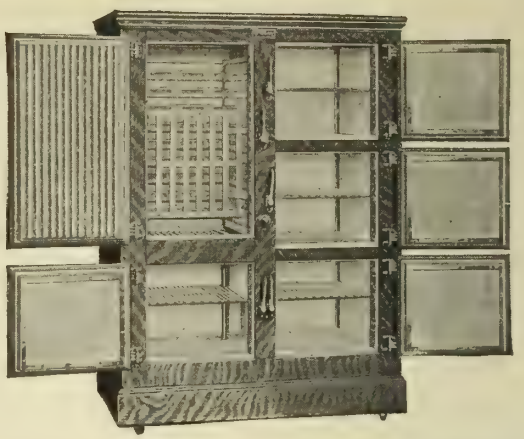


WALL SECTION, LARGER COOLERS
1—Exterior, $\frac{7}{8}$-inch oak
2—Insulating sheathing
3—One inch of mineral wool, cork or any other dependable insulating material
4—Insulating sheathing
5—Thickness of lumber
6—Insulating sheathing
7—Two inches of mineral wool, cork or any other dependable insulating material
8—Insulating sheathing
9—Inside lining [illegible] less spruce or poplar

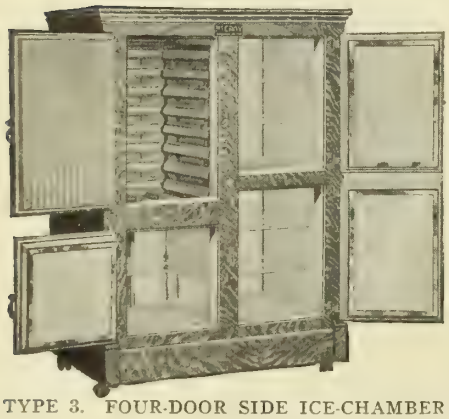
Continued



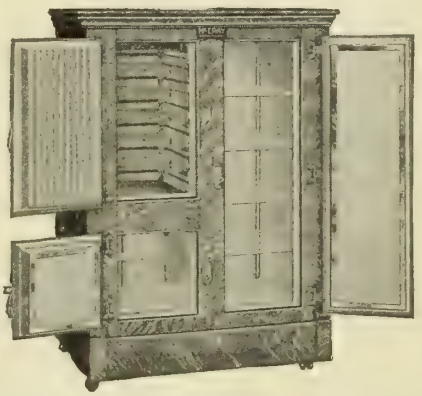
TYPE 1. McCRAY REFRIGERATOR SIX-DOOR FRONT, CENTER ICE-CHAMBER
See Nos. 420, 820, 120, 132



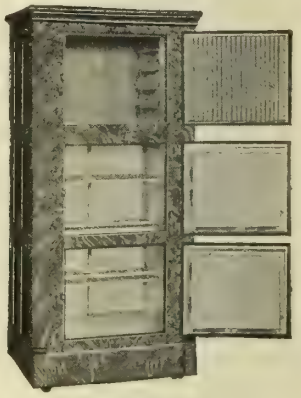
TYPE 2. FIVE-DOOR FRONT, SIDE ICE-CHAMBER REFRIGERATOR



TYPE 3. FOUR-DOOR SIDE ICE-CHAMBER
See Nos. 475, 460, 455, 450, 445, 860, 855, 845, 155, 145, 75, 65, 60, 50



TYPE. 4. THREE-DOOR SIDE ICE-CHAMBER
See Nos. 440, 140, 130, 40, 30

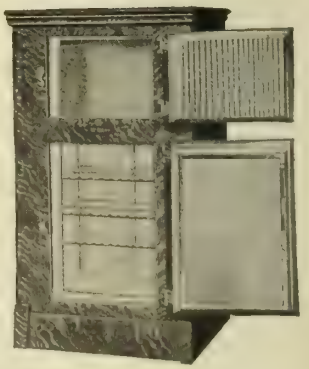


TYPE 5. THREE-DOOR OVERHEAD ICE-CHAMBER
See No. 438

DIMENSIONS, CAPACITIES, CONSTRUCTION, WEIGHTS, ETC., STOCK SIZE RESIDENCE REFRIGERATORS

Type No. (See Illustration)	1	1	1	1	2	2	3	3	3
Exterior Case	Quartered Oak	Quartered Oak	Plain Oak	Plain Oak	Quartered Oak	Plain Oak	Quartered Oak	Quartered Oak	Quartered Oak
Interior Lining	Opal Glass	Solid Porcelain	Odorless Wood	Odorless Wood	Opal Glass	Odorless Wood	Opal Glass	Opal Glass	Opal Glass
Catalogue No.	420	820	120	132	470	80	475	460	455
Width over Cornice, in.	72¼	73	72½	87½	50	50¾	57½	47	45
Depth over Cornice, in.	28¾	24½	28¾	31¼	29	29¼	30¼	28	27
Height overall, in.	72	69	72	75	70	75½	74	63½	60½
Number of Shelves	11	11	11	11	6	6	6	6	6
Shelf Space, sq. ft.	36	25¾	36	52¾	22	27⅓	27⅓	18½	16½
Ice Capacity, lbs.	370	280	360	475	300	300	370	200	175
Shipping Weight, lbs.	1750	1745	1065	1380	1200	700	1275	1025	910
Code Word	Owl	Nation	Wind	Witness	Organ	Whist	Orator	Orange	Onyx

Type No. (See Illustration)	3	3	3	3	3	3	3	3	3
Exterior Case	Quartered Oak	Quartered Oak	Quartered Oak	Quartered Oak	Quartered Oak	Plain Oak	Plain Oak	Plain Oak	Plain Oak
Interior Lining	Opal Glass	Opal Glass	Solid Porcelain	Solid Porcelain	Solid Porcelain	White Enamel	White Enamel	Odorless Wood	Odorless Wood
Catalogue No.	440	440	860	855	845	155	145	75	65
Width over Cornice, in.	44½	44½	46¾	46¾	41	45	40	57½	51
Depth over Cornice, in.	26	24	24	24	24	27	25	30¼	29
Height overall, in.	63	63	63	54¼	48¼	60½	54½	74	66½
Number of Shelves	6	6	6	5	5	6	5	6	6
Shelf Space, sq. ft.	14	14	17½	11¾	7	20½	13¾	30¾	27½
Ice Capacity, lbs.	140	105	140	138	92	215	135	412	325
Shipping Weight, lbs.	700	660	1040	820	775	570	440	825	620
Code Word	Oracle	Opera	Notary	Napkin	Naked	Edward	Ease	Whip	Wheat



TYPE 6. TWO-DOOR FRONT, OVERHEAD ICE-CHAMBER
See Nos. 428, 128, 28

Type No. (See Illustration)	1	3	4	4	4	4	4	5	6	6	6
Exterior Case	Plain Oak	Plain Oak	Quartered Oak	Plain Oak	Plain Oak	Plain Oak	Plain Oak	Quartered Oak	Quartered Oak	Plain Oak	Plain Oak
Interior Lining	Odorless Wood	Odorless Wood	Opal Glass	White Enamel	White Enamel	Odorless Wood	Odorless Wood	Opal Glass	Opal Glass	White Enamel	Odorless Wood
Catalogue No.	60	50	440	140	130	40	30	438	428	128	28
Width over Cornice, in.	44	44½	44	38	36	38	36	33	30½	29	29
Depth over Cornice, in.	24	24	24	24½	20	24½	20	23½	21¼	20½	20½
Height overall, in.	63½	63½	54½	72½	46¾	54½	46½	68½	53	52½	52½
Number of Shelves	6	6	5	5	5	5	5	3	3	3	3
Shelf Space, sq. ft.	13½	13¾	9	11	8¾	12½	9½	10	7	8	8¼
Ice Capacity, lbs.	255	140	90	145	65	190	70	115	75	80	65
Shipping Weight, lbs.	740	740	660	800	615	550	485	650	460	800	775
Code Word	Whale	West	Olive	Earnest	Eagle	Wax	Walnut	Orion	Ode	Eagerly	Waif

Net prices quoted on request

Continued on next page

TABLES FOR LOCATION OF WALL OPENINGS FOR OUTSIDE ICING AND DRAIN LOCATION

Measurements and instructions for locating wall openings and drain pipes for all stock size McCray Refrigerators, with either end or rear outside icing-doors, can be determined by referring to the tables and floor plans on this page.

Casters—When it is desirable to remove the casters from the refrigerators, deduct two inches from dimensions "C" for all refrigerators *except* Nos. 75, 120, 132, 420, and 820, which are not furnished with casters.

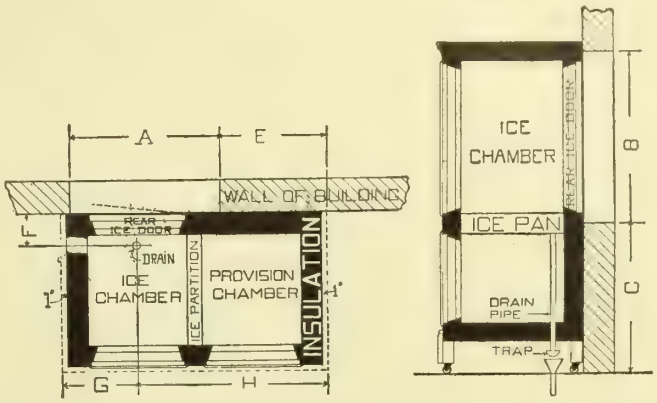
Cornice—If cornice is to be removed from the ends of refrigerators, deduct 1 inch from dimensions "D," "E," or "G," in tables 1 and 3 only.

Reversing Ice-Chamber.—In the event it is necessary to reverse the ice-chamber, i.e., in the right side of the refrigerator instead of the left side as regularly equipped, dimensions "A," "E" and "G" will be reversed and an additional charge is made for this change. It is impossible to reverse the ice-chambers in Nos. 860, 855 and 845.

MEASUREMENTS FOR LOCATING WALL OPENINGS FOR OUTSIDE ICING REFRIGERATORS

TABLE NO. 1, FOR SIDE ICE-CHAMBERS REAR ICING-DOORS

No.	A	B	C	E	F	G
30	20″	23″	22″	14″	5″	10¼″
130	20	23	22	14	5¼	10½
40	20	27	23½	16	5	10¾
140	20	27	23½	16	5¼	11
440	20	27	22½	15	6½	10⅛
145	22	27	25	16	5¼	11½
445	22	27	23½	15	6½	10⅝
50	23	29	26	17½	5	12
450	23	29	26	17½	6½	11½
155	24	31	27½	19	5¼	12¾
455	24	31	27½	19	6½	12⅛
60	25	32	29	20	5	13
460	25	32	29	20	6½	12⅝
65	27	34	30	22	5	14¼
470	26	37	30½	22	7¼	21½
80	25	37	36	23½	7	20⅞
75	29	38	33½	26	6¾	26
475	29	37	34½	26	7¼	25
480	30	28	37½	26½	7¼	38½
860	25	35	26½	20¼	6½	13
855	25	27	26¼	20¼	6½	13
845	22	23	24¼	17½	6½	11½

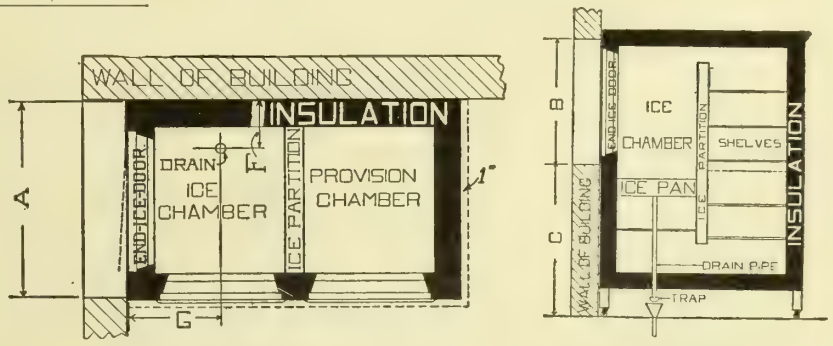


FLOOR PLAN AND VERTICAL SECTION FOR SIDE ICE-CHAMBER, REAR ICING-DOOR

Applying to table No. 1

TABLE NO. 2, FOR SIDE ICE-CHAMBERS END ICING-DOORS

No.	A	B	C	F	G
30	18″	23″	22″	5″	9¼″
130	18	23	22	5¼	9½
40	22	27	23½	5	9¾
140	22	27	23½	5¼	10
440	22	27	22½	6½	9⅛
145	22	27	25	5¼	10½
445	22	27	23½	6½	9⅝
50	24	29	26	5	11
450	24	29	26	6½	10½
155	25	31	27½	5¼	11¾
455	25	31	27½	6½	11⅛
60	26	32	29	5	12
460	26	32	29	6½	11⅝
65	27	34	30	5	13¼
470	27	37	30½	7¼	20½
80	27	37	36	7	19⅞
75	28	38	33½	6¾	24¾
475	28	37	34½	7¼	23¾
480	25	28	37½	7¼	37¼
860	22	35	26½	6½	12¼
855	22	27	26¼	6½	12¼
845	22	23	24¼	6½	10¾

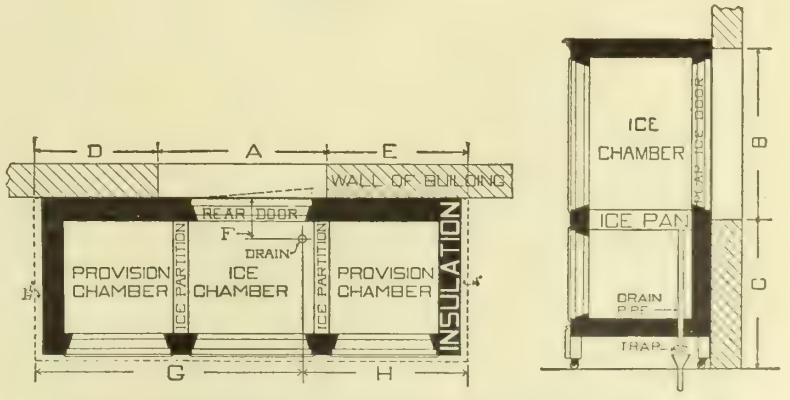


PLAN AND VERTICAL SECTION FOR SIDE ICE-CHAMBER, END ICING-DOOR

Applying to table No. 2

TABLE NO. 3, FOR CENTER AND OVERHEAD ICE-CHAMBERS REAR ICING-DOORS

No.	A	B	C	D	E	F	G
28	26″	18″	34″	1½″	1½″	4¾″	14½″
128	26	18	34	1½	1½	5	14½
428	26	18	34	2¼	2¼	6¼	14¼
438	28	22	45	2½	2½	6¼	15½
120	29	40	29	20¾	22¾	7	45⅞
420	29	40	29	20¾	22¾	7¼	45
132	32	38	34½	26¾	28¾	8	55¼
820	30	40	26¾	20½	22½	6½	36½



PLAN AND VERTICAL SECTION FOR CENTER AND OVERHEAD ICE-CHAMBER, REAR ICING-DOOR

Applying to table No. 3

EXPLANATION OF LETTERS IN TABLES AND PLANS

A—Width of wall opening in the clear (inside of frame)
B—Height of wall opening in the clear (inside of frame)
C—Distance from floor to bottom of wall opening
D—Distance from left-hand (facing front) end of refrigerator to wall opening
E—Distance from right-hand (facing front) end of refrigerator to wall opening
F—Distance from back of refrigerator to center of drain-pipe
G—Distance from left-hand end of refrigerator to center of drain-pipe

HERRICK REFRIGERATOR & COLD STORAGE CO.

WATERLOO, IOWA

Products.

HERRICK REFRIGERATORS for all classes of Homes, finest Residences, Apartment Houses, Hotels, Clubs, Florists, Cafés, and Dining Cars. SPECIAL BUILT-IN RESIDENCE REFRIGERATORS with HERRICK OUTSIDE ICING ATTACHMENT, ICE BOXES.

Also, DISPLAY CASES, ICE CHESTS, ICE-CREAM CABINETS and SODA FOUNTAIN BASES, etc. WATER COOLER ATTACHMENT for direct connection to water pipe, or with improved tank. Used in Government, State, and Private Institutions, on Battle Ships, in Hospitals, etc. Herricks are made either Right or Left Icing.

Description.

Cases—All Herrick cases in stock sizes are built of solid oak with mortised and tenoned frame. Quarter-sawed oak in Herrick opal plate glass lined cases. Specials built of solid mahogany, oak, birch, etc.

Interior—So designed that larger storage space is afforded than in ordinary refrigerators. Every square inch easily accessible; all racks and drainage parts can be taken out; hence, it is easily kept clean and sweet.

Insulation—The Herrick is famous for its economy of operation. In all sizes, every wall and panel door is heavily packed with the best practical insulation, No. 1 white mineral wool and heavy insulating paper in connection with the durable walls of lumber.

Circulation—This is a feature in which Herrick refrigerators excel. A constant current of pure, cold, dry air is forced to every part of the refrigerator, keeping it perfectly dry and free from odors or taint. All food impurities are carried off through condensing system in ice chamber.

Drainage—The new Herrick cleanable system used in all styles and sizes. Every part removable without taking ice out of chamber. Highly commended by all users.

Trimmings—All trimmings are nickel-plated on heavy brass. Hinges have long bearings, and do not cut or allow doors to sag; and the improved lever fasteners close doors practically air-tight.

Linings—White opal plate glass, full $\frac{7}{16}$ inch thick, lines the whole interior, including ice chamber, of the finest Herrick models. Pure aluminum mouldings trim these interiors, making a most beautiful and durable style for finest residence use. The Herrick white enamel styles are lined throughout with this high quality, fine gloss, durable white that practically seals the full interior. Sanitary odorless white spruce is used in the medium-priced styles. Is always dry and sweet, and far more sanitary and high-class than the usual metal-lined styles.

Herrick Outside Icing Refrigerators.

The advantages of outside icing are that the iceman never enters the house; there is no tracking of floors and unnecessary scrubbing; all house doors may be locked, yet refrigerator can be iced regularly without entrance; during cold weather no ice is required, and door can be left open for entrance of cold air. Large number of stock sizes for architects' convenience. (See opposite page.)

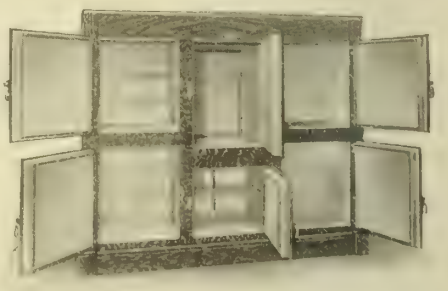
Outside Back Icing Specifications.

Dimensions given are the sizes of frame opening to be cut in wall of house. The casing on refrigerator around the outside icing door just fits into this opening.

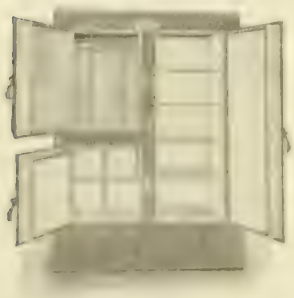
"G" in table of dimensions represents height from floor to bottom of opening in wall, which is computed without the casters under refrigerator, except where marked; "E" the height of opening, "A" the width of opening, "K" the distance from flush right end of refrigerator (as you face the front) to edge of finished opening in wall.

For sizes up to and including second four-door size No. 411, if the refrigerator sets against left wall, finished *edge of opening in the wall of house for back icing is 1⅝ inches from corner of room or from the left end of refrigerator.* In all sizes above this allow 3⅞ inches from corner of refrigerator to edge of opening, which does not include moulding on top, but does allow for ⅞ inch base block, and casing on lower part of refrigerator. If top moulding on end is desired, edge of opening should be 5⅜ inches from corner of room, on sizes No. 212 and larger.

Back outside icing door is made regularly in back ice chamber. *This can be reversed to other side* if necessary, or refrigerator can be iced from the left hand end (as you face the front), if desired, and right hand end, if found necessary to conform to space.

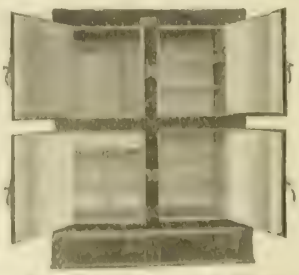


No. 428. Mesh Wire Shelves, Enamel Lined, Latest Design. Width, 86 ins.; depth, 31 ins.; weight, 1050 lbs.
List price, $169.00.
No. 528. All Opal Glass Lined

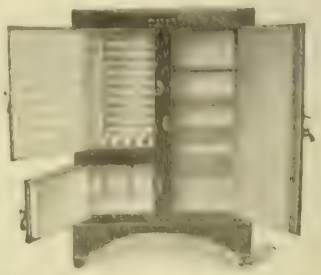


No. 55. Residence Model. White Opal Plate Glass Lined. Mesh Wire Shelves. Width, [illegible] ins.; depth, 22¾ ins.; height, 54 [illegible]

No. 706. Double Mesh All Steel Doors Opal Plate Mirror [illegible] Width, 58 ins.; depth, 31 [illegible]; height, 65½ ins.; weight, 1200 lbs.
List price, $165.00



No. 112. Residence Model. Mesh Wire Shelves. Enamel Lined. Width, 52 ins.; depth, 30½ ins.; height, 66½ ins.; weight, 525 lbs.
List price, $93.50
No. 512. Opal Glass Lined



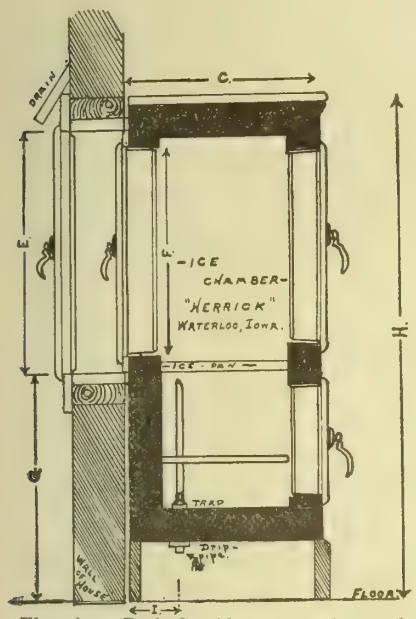
No. 220. Residence Model. Spruce Lined, with Mesh Wire Shelves. Width, 36 ins.; depth, 20¾ ins.; height, 48 ins.; weight, 220 lbs.
List price, $50
Nos. 42 to 45 are same Style as above, but All Enamel Lined.

A FEW TYPES OF HERRICK REFRIGERATORS
Prices Subject to Discount

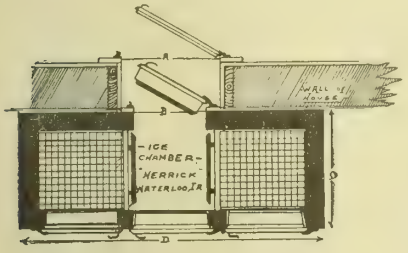
Continued on next page

The outside icing door on back or end of refrigerator swings through opening in wall.

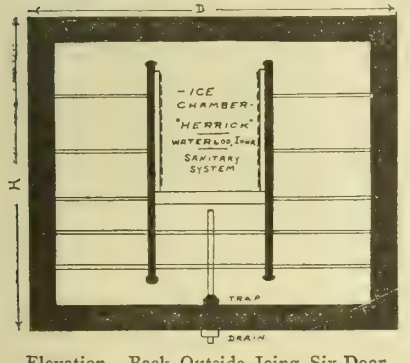
The outside of the opening in the wall, as shown in plan, should be finished with a small batten door, as shown.



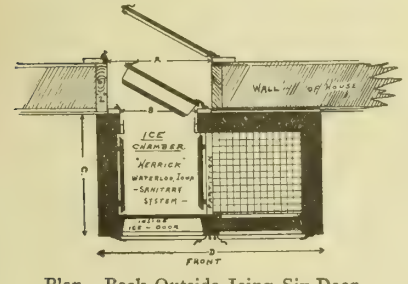
Elevation—Back Outside Icing—Three-and Four-Door Refrigerator



Plan—Back Outside Icing Refrigerator



Elevation—Back Outside Icing Six-Door Refrigerator



Plan—Back Outside Icing Six-Door Refrigerator

BACK ICING STYLE

Number of Refrigerators	*Size of Refrigerators, outside, without moulding			Opening in wall of house for outside icing			Refrigerator back icing door		Location of drain pipe under refrigerator, from end of refrigerator to center of hole		Edge of refrigerator to edge of opening in wall, not including moulding
	Width	Depth	Height	Height from floor	Opening Width	Opening Height	Width	Height			
	D	C	H	G	A	E	B	F	I	J	K
No. A, 200, 300	34	18	41	20¼	16½	19½	13	15¾	3¾	9	16
No. B, 210	34	19	44	22¼	16½	20½	13	16¾	3¾	9	16
No. 22, 32, 42, 220	36	20	46	20	18½	23¼	14	19½	4¼	9⅝	16
No. 23, 43, 230	36	20	48	20¾	18½	24½	14	20½	4¼	9⅝	16
No. 44, 24, 54, 240	36	20	50	20½	18	27¾	13¼	23	4¼	9⅝	16¾
No. 45, 25, 55, 250	38	22	52	22½	18½	27¾	13¼	23	4½	10⅜	18⅜
No. 43T, 23T, 230T, Texas	36	20	48	18½	18	27¾	13¼	23	4¼	9⅝	16¾
No. 215, 415	32	19	48	18½	18	27¾	13¼	23	3¾	7¾	12½
No. 9, 29, 39, 49, 59, 290	42	24	56	26¾	21¼	27¾	15¾	21⅜	4½	11	20½
†No. 11, 211, 311, 411, 511	46	24	59	29½	22½	27¾	17¾	22⅜	4½	13	22⅛
†No. 212, 312, 412, 512	50	28	64½	29½	23¾	32¼	19¾	28¼	4¾	14½	24¾
†No. 214, 314, 414, 514	54½	28	70	33	25¾	35	21¾	31	5	14½	26½
†No. 216, 316, 416, 516	60½	30¼	73	34	28	36	24	32	5	15½	29¾
†Chef, 228, 328, 428, 528	85¾	30¼	71	32½	27	36¼	23	32¼	4¾	42⅞	28
No. 766, 466	85¾	30¼	78	36	27	37½	23	33½	4¾	42⅞	28
No. 580½	66	26¼	68	27	22	38½	16¼	33	5½	33⅞	21
Herrick Grand with Corner Blocks											
No. 50, Herrick Grand	44½	26½	55	24	19	28½	15	24½	5½	13½	20¼
No. 90, Herrick Grand	47	28	62	27¼	21	28¼	15½	24	5½	14	23

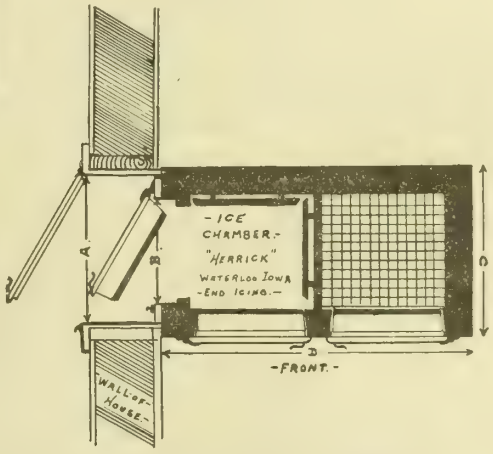
* For "over-all" dimensions, including mouldings, refer to catalogue. † With casters (2 in. high) (Chef casters 1 in.) Texas style has long ice chamber for 22 inch artificial ice.

END ICING STYLE

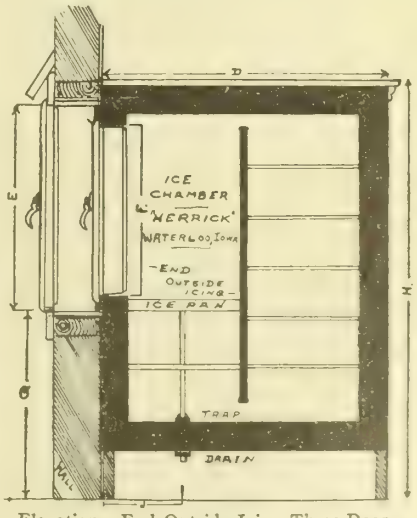
Number of Refrigerators	*Size of Refrigerators, outside, without moulding			Opening in wall of house for outside icing			Refrigerator end icing door		Location of drain pipe under refrigerator, from end of refrigerator to center of hole		Edge of refrigerator to edge of opening in wall, not including moulding
	Width	Depth	Height	Height from floor	Opening Width	Opening Height	Width	Height			
	D	C	H	G	A	E	B	F	I	J	L
No. A, 200, 300	34	18	41	20¼	16½	19½	13	15¾	3¾	9	½
No. B, 310, 41, 210	34	19	44	22¼	16½	20½	13	16¾	3¾	9	⅞
No. 22, 32, 42, 220	36	20	46	20	18½	23¼	14	19½	4¼	9⅝	3¼
No. 43, 23, 230	36	20	46	20¾	18½	24½	14	20½	4¼	9⅝	3¼
No. 44, 24, 54, 240	36	20	50	20½	18	27¾	13¼	23	4¼	9⅝	3¼
No. 45, 25, 55, 250	38	22	52	22½	18½	27¾	13¼	23	4½	10⅜	1⅜
No. 43T, 23T, 230T, Texas	36	20	48	18½	18	27¾	13¼	23	4¼	9⅝	¾
No. 215, 415	32	19	48	18½	18	27¾	13¼	23	3¾	7¾	½
No. 29, 39, 49, 59, 290	42	24	55	26¾	21¼	27¾	15¾	19	4½	11	1⅜
No. 211, 311, 411, 511	46	24	59	29½	22½	27¾	16¾	20	4½	13	⅞
†No. 212, 312, 412, 512	50	28	64½	29½	23¾	32¼	19¾	28¼	4¾	14½	2⅛
†No. 214, 314, 414, 514	54½	28	70	33	25¾	35	21¾	31	5	14½	1
†No. 216, 316, 416, 516	60½	30¼	73	34	28	36	24	32	5	15½	1¼
Herrick Grand with Corner Blocks											
†No. 50, White House	44½	26½	55	24	19	28½	15	24½	5¼	12¼	2¾
†No. 90, America	47	28	62	27¼	21	28¼	14¾	23¼	5¼	13¼	3

* For "over-all" dimensions, including mouldings, refer to catalogue. † With casters (1⅝ inches high). Texas style has long ice chamber for 22 inch artificial ice.

Specify if Back or End Icing, and if Regular Left Hand ice chamber, as in illustrations, or the opposite Right Hand facing front of refrigerator.



Plan—End Outside Icing Refrigerator



Elevation—End Outside Icing Three-Door Refrigerator

SPECIFICATIONS AND DIMENSION DIAGRAMS FOR HERRICK OUTSIDE ICING REFRIGERATORS

STEVENSON COLD STORAGE DOOR COMPANY

Manufacturers of Cold Storage and Freezer Doors

CHESTER, PA.

Products.

Stevenson's Standard Cold Storage Door.

Stevenson's Overhead Track Doors, with Positive Motion Shutter.

Stevenson's Special Freezer Door, for Icy Doorways.

Stevenson's Vertical Sliding Doors, Counterbalanced.

Stevenson's Combined Self-Acting Ice Door and Chute.

Stevenson's Fireproof Cold Storage Door.

Stevenson's 1912 Platform Ice Door.

Stevenson's Revolving Ice Cream Door.

Stevenson's Cold Storage Windows.

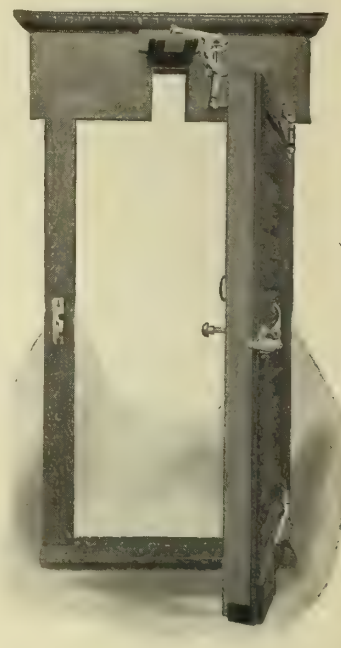
Furnished either Plain or Fireproof.

Advantages.

Straight, clean, sanitary jambs. No frail rebate strips in doorway. Adjustable, flexible door-frames, set to conform to door, not to wall. A single seal, and that in sight; a look shows if it is tight. Hinges are self-adjusting, spring-tempered steel, galvanized, with big, generous bearings, three times their former size. A powerful hinge guard on lower hinge protects the hinge from excessive strains, and insures tight sealing at that point. Door swings off to one side of doorway, which can therefore be six inches less in width; an important economy in refrigeration.

Automatic Roller Fastener—This fastens itself. Its handles are right out at edge of door, where they ought to be. No slackening as it latches. Just a touch from either side frees and opens it. Nothing ever made to fasten a door works so easily or holds so firmly. Can be operated forty times per minute.

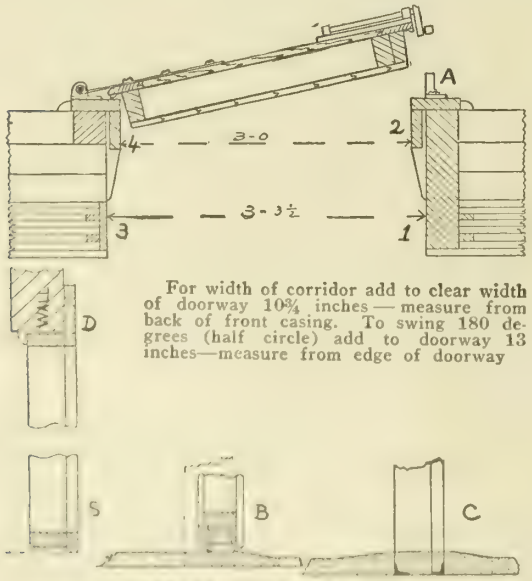
All Stevenson Doors are now fitted for padlock (see "A" in illustration of Automatic Roller Fastener below.



STEVENSON'S OVERHEAD TRACK DOOR

Beveled threshold in door-frame. Doorway 3-6 x 6-9

Tall abattoir doors stiffened by being made thicker, and thus avoid the difficulties of using two fasteners



For width of corridor add to clear width of doorway 10¾ inches — measure from back of front casing. To swing 180 degrees (half circle) add to doorway 13 inches—measure from edge of doorway

INSTALLATION DIAGRAMS

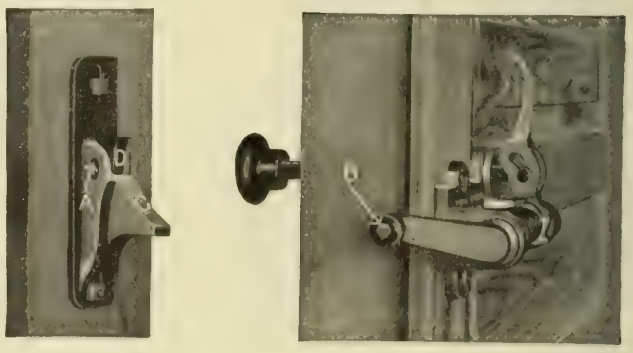
Fig. A shows how flat closure is secured; also, how Stevenson door-frame set in wall. Opening in wall should be 3½" wider and 4½" higher than clear size of doorway. (Follow construction Nos. 1 and 2.) Overhead track doors require rough opening extending 11" above upper edge of track. Door-frames are secured with lag screws ⅝" x 4" inserted through front casing at A. Set door-frame to conform to door, not to wall.

Fig. D shows head or door-frame used on all sizes of Stevenson Regular Doors and indicates method of fitting into wall.

Fig. S shows door-frame with full standard sill, not suited for trucking.

Fig. B shows our Wooden Beveled Threshold which connects lower ends of door-frame and forms part of it. Let down into floor. No feather edge, no splinters, no jolt; ideal for trucking or sliding ice.

Fig. C shows Stevenson Patented Construction for concrete Floors. Lower ends of door-frame concreted by angle iron extending across doorway and imbedded in floor 3" below surface.



AUTOMATIC ROLLER FASTENER

The Roller latch (B) passes over the knuckle of the keeper (C), drops into the pocket (D) before the door strikes the face of the door-frame, and reaches its locked position at the instant the gasket is most tightly compressed. There is no bending of latch. No lost motion to be taken up. No slackening as it latches. No walking around the edge of the door to enter. A padlock shackle, through hole (A), prevents the roller from lifting out. Door can be operated forty times per minute

STOCK SIZES, STEVENSON'S STANDARD COLD STORAGE DOORS

List Number	Size of Doorway in Clear	Size of Wall Opening to receive our Door-Frames	Estimated Weight, crated
Ice Doors	2-3 x 2-0	2-6½ x 2-4½	100
2	2-0 x 4-0	2-3½ x 4-4½	140
3	2-0 x 5-0	2-3½ x 5-4½	170
4	2-0 x 5-6	2-3½ x 5-10½	185
5	2-0 x 6-0	2-3½ x 6-4½	200
6	2-6 x 6-0	2-9½ x 6-4½	250
7	3-0 x 6-0	3-3½ x 6-4½	300
8	3-6 x 6-0	3-9½ x 6-4½	350
9	4-0 x 6-0	4-3½ x 6-4½	400
10	3-0 x 6-6	3-3½ x 6-10½	325
11	3-6 x 6-6	3-9½ x 6-10½	380
12	4-0 x 6-6	4-3½ x 6-10½	440

Overhead Track Doors	Height Under Track	Clear Size of Doorway	Opening in Wall from Higher Floor
13	7-0	3-6 x 6-9	4-0 x 8-1
14	10-0	3-6 x 9-9	4-0 x 11-1

Continued on next page

SPECIAL FREEZER DOOR FOR ICY DOORWAYS

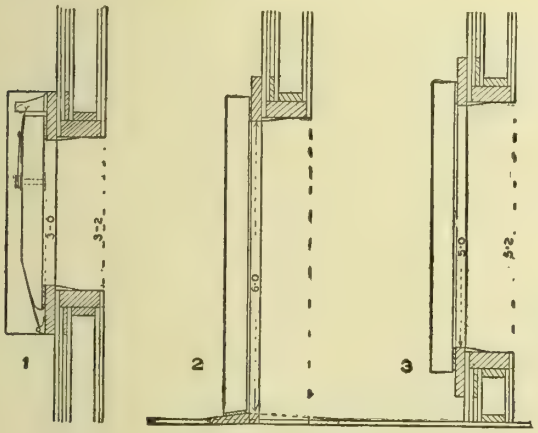
Beveled threshold (as in Figs. 1 and 2). Perfectly tight and perfectly free regardless of temperature, moisture, or accumulation of ice. No portion fits within the opening. Now fastens itself. Has latest Stevenson Hinge, Hinge Guard and Roller Fastener

VERTICAL SLIDING DOORS

Insulated and counterbalanced. Wire rope, roller sheaves. Windproof, but free

STEVENSON'S COLD STORAGE WINDOW

Frame made same as door-frame. Have two or more thicknesses of glass, as required, with dead air space between



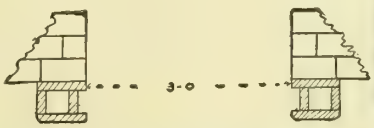
DETAILS OF SPECIAL FREEZER DOOR
Scale, ¼ inch—1 foot

Fig. 1—Floor plan showing beveled threshold and cross-section of door-frame, hinge and timber work in wall to provide for securing door-frame.

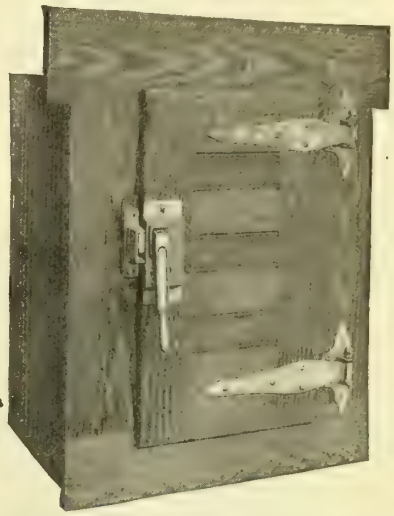
Fig. 2—Vertical section, showing door, door-frame, beveled threshold and timber work in wall.

Fig. 3—Vertical section, door-frame and door, set up from floor. Door overlaps at bottom. No beveled threshold.

For width of corridor add to clear width of doorway 21½ inches—measure from back of front casing. To swing 180 degrees (half circle) add to doorway 29 inches—measure from edge of doorway. Set door-frame to conform to door, not to wall.



CROSS-SECTION OF VERTICAL SLIDING DOOR
Scale, ½ inch—1 foot



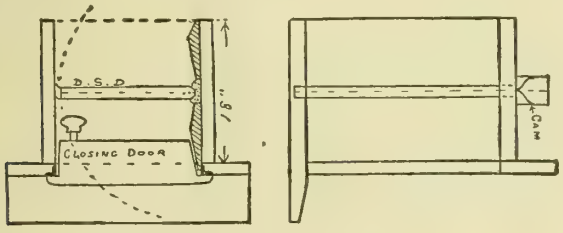
REVOLVING DOORS FOR ICE CREAM HARDENING ROOMS

Iron, do not swell and bind. Wall opening for 20 qt. size, 30½ in. wide by 36 in. high; for 40 qt. size, 39½ in. by 37½ in. high

All dirt under table drops to floor at rear through spacious opening. Separable, by removal of one screw, into three parts for cleaning. See special catalogue

STEVENSON'S 1911 HINGE GUARD

Protects the hinge from all excessive strains; is applied on the face of the regular lower elastic hinge; fits any hinge we have made in the past. Insures perfect sealing



1912 PLATFORM ICE DOOR
Scale, ½ inch—1 foot

Self-closing, double-swing door, with regular door to seal it when idle. Out-going ice opens both doors. With counter if desired. Sets entirely within the wall, saves floor space, passes ice in and out. Our new style cam operates in oil reservoir. One oiling lasts for years

For ice 11 x 22 ins., wall opening 24 x 34 ins.
14 x 14 ins., wall opening 27 x 34 ins.
24 x 14 ins., on flat 34 x 26 ins.
11 x 22 ins., twin chute 46 x 34 ins.

Shipping Note.

All Stevenson Doors and Windows are shipped crated, ready to set in the wall, Stevenson Adjustable Door-Frame and the required hardware being included in all shipments.

Form of Specification for Architects.

The doors for refrigerators, hardening rooms, cold-storage and ice rooms to be Stevenson's overlapping, non-binding doors, manufactured by Stevenson Cold Storage Door Company, Chester, Pa., fitted with Stevenson's automatic roller fastener, and hung with Stevenson's elastic clamping hinges—Stevenson's 1911 hinge guard to be used on lower hinge of all doors in touch with floors.

Frames to be of the Stevenson standard type for kind of floor on which they are used, and to be set strictly in accordance with the Stevenson Company's instructions for same.

Note—Where door frame is set in concrete floors, specify "Lower ends of door frame connected by angle irons extending across doorway below surface of floor."

THE AMERICAN LAUNDRY MACHINERY CO.

EASTERN SALES DIVISION
132 West 27th Street
NEW YORK, N. Y.

SOUTHERN SALES DIVISION
Norwood Station
CINCINNATI, OHIO

WESTERN SALES DIVISION
208 West Monroe Street
CHICAGO, ILL.

PACIFIC SALES DIVISION
(Succeeding Western Laundry Machinery Co.)
416 Mission Street
SAN FRANCISCO, CAL.

335 East Third Street
LOS ANGELES, CAL.

FOREIGN SALES DEPARTMENT
Norwood Station
CINCINNATI, OHIO

SELLING AGENTS
THE CANADIAN LAUNDRY MACHINERY CO.
47-79 Sterling Road
TORONTO, ONT.

1404 Main Street
WINNIPEG, MAN.

2395 Hutchinson Street
MONTREAL, QUE.

Products—Specialties.

Laundry Machinery of every description, a complete line.

Complete Laundry Plants for Hospitals, Hotels, Public Institutions and Private Residences, as well as for the Commercial Laundry.

Disinfecting Plants for Hospitals and Asylums; Sterilizers and Washing Machines, of various sizes, for handling contaminated and infected linen.

TRADE-MARK

Service.

The services of our Engineering Department are at your call. We will gladly furnish complete plans, specifications and estimates promptly and on short notice, and without any liability on your part. We have a complete set of specifications, covering all "American" laundry machinery, which we will gladly send to any architect on request.

TWO VIEWS OF THE PATIENTS' LAUNDRY IN THE NEW CINCINNATI GENERAL HOSPITAL
All "American" Equipment

References.

The following is a representative list of "American" installations:

Hotels

Hotel Fontenelle, Omaha, Neb.
Hotel Morrison, Chicago, Ill.
Hotel Mealbach, Kansas City, Mo.
Statler Hotels
Hotel McAlpin, New York, N. Y.
Hotel Traymore, Atlantic City, N. J.
Hotel Schenley, Pittsburgh, Pa.

Hospitals

Presbyterian Hospital, Chicago, Ill.
Minneapolis City Hospital, Minneapolis, Minn.
Cincinnati General Hospital, Cincinnati, Ohio
Charity Hospital, New Orleans, La.
State Institution for Feeble-Minded, Polk, Pa.
Bellevue Hospital, New York, N. Y.
Johns Hopkins Hospital, Baltimore, Md.

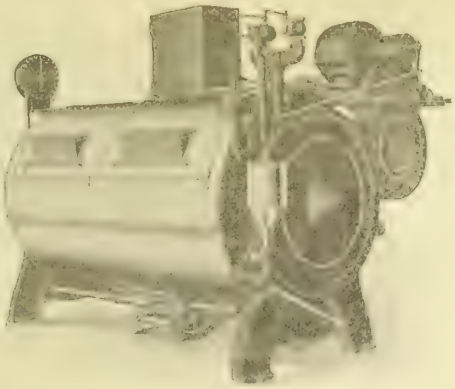
Clubs, Stores and Residences

Chicago Athletic Association, Chicago, Ill.
Missouri Athletic Club, St. Louis, Mo.
Chevy Chase Country Club, Washington, D. C.
Marshall Field & Co., Chicago, Ill.
Gimbel's, New York, N. Y.
Whitelaw Reid, Purchase, N. Y.
Howard Heinz, Pittsburgh, Pa.
E. L. Kilgour, Cincinnati, Ohio
F. A. Seiberling, Akron, Ohio
Julius Koop, Chicago, Ill.
West Side Y. M. C. A., Chicago, Ill.
Y. M. C. A., Dayton, Ohio
Y. M. C. A., Youngstown, Ohio
Central Branch Y. M. C. A., Brooklyn, N. Y.

Continued on next page

Catalogue.

Catalogue, illustrating and describing our complete line, will be gladly mailed on request. This will prove a handy and valuable reference book. Our experience in manufacturing laundry equipment extends over a period of more than thirty years. We have every facility for turning out high-grade work. The "American" line is not only the largest, but the most complete made, including the smaller as well as the larger equipment for the modern and efficient laundry.



CASCADE WASHER

Made with brass cylinder, of either brass or galvanized iron outer case; cylinder 42 ins. in diameter, and either 64 or 72 ins. in length; has capacity of four ordinary washers and particularly adapted for use in hotels and institutions

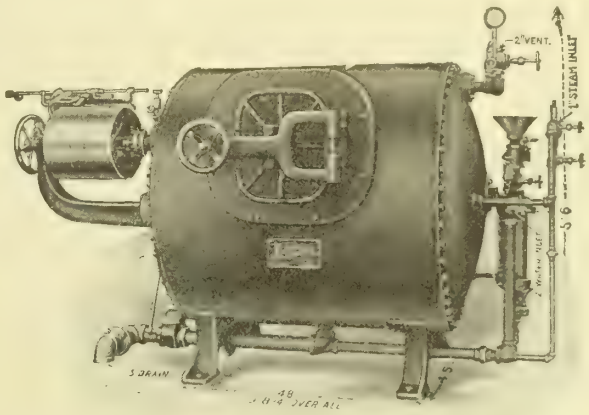
UNIVERSAL PRESS

For ironing ladies' clothes, duck coats, underwear, aprons, nurses' and physicians' uniforms and countless other similar goods.

Buck and head steam heated, with ironing surface 38 ins. long and 12 ins. wide, tapering to 8¼ ins. at the narrow end. Has shoulder, steamer and sponge cup. Floor space, 58 by 60 ins.; weight, 1,075 lbs. Built also with 51- and 52-inch ironing surface

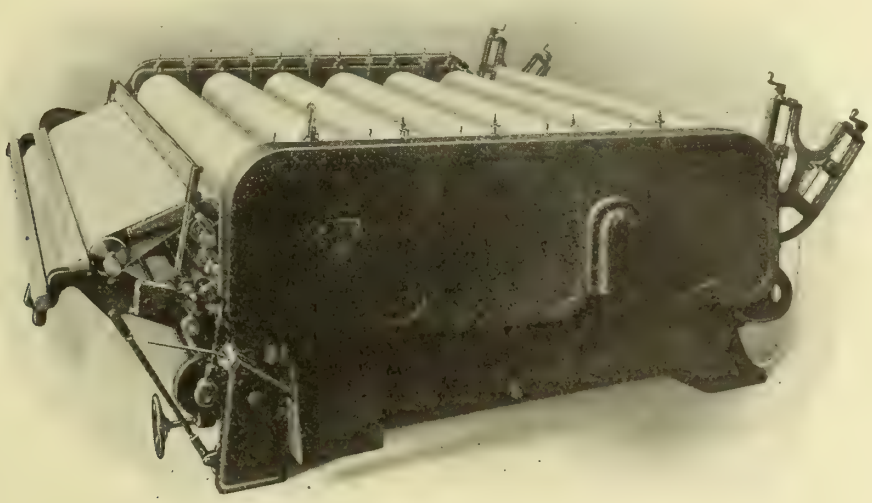
"AMERICAN" EXTRACTOR WITH AUTOMATIC SAFETY COVER

Inner basket revolving rapidly removes moisture by centrifugal force. Smoothly running and highly efficient. Made both under-driven and over-driven, with either belt or motor drive. In 20 to 48 ins. diameter



STERILIZER

For hospitals, etc. Destroys all germs, bacilli, etc. Sterilization carried on in connection with regular washing. No extra handling of goods. Cylinder, 48 ins. by 54 ins.; pulleys, 16 ins.; belts, 3½ ins.; total pulley face, 15¾ ins.; floor space, 60 by 93 ins.; weight, 7,416 lbs. Built in various sizes



"AMERICAN" SIX-ROLL FLAT WORK IRONER

The famous Hagen line, made in all convenient sizes, from single-roll to six-roll and larger; equipped with all "American" features, such as ribbon feed, automatic finger guard, power pressure device, pressure indicator, etc. Made in 100-, 110- and 120-inch lengths

CHICAGO DRYER COMPANY

Laundry Room Equipments

624-630 South Wabash Avenue

TELEPHONE, HARRISON 3774 CHICAGO, ILL.

Products.

"CHICAGO" LAUNDRY EQUIPMENTS.
"CHICAGO" CLOTHES DRYERS.
"CHICAGO-FRANCIS" DRYERS.
"CHICAGO" ELECTRIC WASHERS.
"CHICAGO" IRONING MACHINES.
"CHICAGO" IRONING BOARDS.

Especially adapted for use in Residences, Apartment Buildings and small Institutions.

CHICAGO
TRADE-MARK
(Registered U. S. Pat. Off.)

Experience.

We have been building clothes dryers for the past twenty-eight years. We invite correspondence from architects and others interested in our goods. Our experience and engineering department is at your service free. Parties making inquiry are in no way obligated.

Catalogue.

Architects and others interested are requested to write for our No. S 15 Catalogue, which contains full and complete information relative to our clothes dryers and equipments.

General Construction.

Framework consists of heavy angle, channel and bar iron of suitable size, firmly and substantially bolted together. Casing of heavy galvanized sheet steel. Casing made double, with air-space intervening, or double and insulated with asbestos, when so specified.

Hanging Racks.

Panels of racks are of heavy galvanized sheet steel. Front panels are made double and heavily insulated with asbestos. Hanging bars are specially galvanized and ventilated. Bars are attached to panels by means of double flange arrangement. Interior flanges on bars galvanized. Can not rust or stain the finest fabrics. Overhead traveler bars also galvanized. Rollers or sheave wheels used in conjunction with racks are of noiseless type with steel or ball bearings. Wheels at base of front panels and arranged to roll on floor are provided with rubber tires.

Ventilating System.

The successful drying of clothes by artificial method depends upon the speed with which the moisture emanating from the clothes can be removed. This, in conjunction with the heat secured in the drying cabinet, determines the rapidity with which the clothes can be dried. The principal feature is the removal of moisture without loss of heat in the drying cabinet.

The most successful and efficient system of ventilation on drying cabinets is that known as the "Chicago-Francis" Patented Heating and Ventilating System, with which our dryers are provided. With this system of ventilation the air is admitted into the drying cabinet evenly, and preferably near the top. This is accomplished by various methods.

The moisture emanating from the wet clothes is quickly and evenly drawn out, by natural circulation, without loss of heat, through vent system properly placed at or near base of drying cabinet, or along casing near bottom of drying cabinet, according to heating system used. Said vent system is connected to vent pipes in drying cabinet. These vent pipes are connected to main vent pipe, which connects with flue as provided.

A natural and constant circulation of air is maintained in the drying cabinet, with the result that the clothes dry quickly, and are as sanitary, pure, fresh and sweet as if dried in the open air or sunshine. Positively guaranteed against discoloration of garments.

Efficiency.

With the "Chicago-Francis" Patented Heating and Ventilating Systems, provided with our dryers, we are enabled to produce clothes dryers, the efficiency of which is fully 100 to 200 per cent above similar machines made by other manufacturers.

Patents.

The "Chicago-Francis" Patented Heating and Ventilating System as used by us is fully covered by United States and Foreign patent rights, and can not be used on drying cabinets except by ourselves.

None genuine without inscription on name-plate, namely, "Chicago-Francis Dryer," manufactured by CHICAGO DRYER COMPANY, Chicago, U. S. A.

Measurements and Sizes.

All our dryers are built to order. Cabinets are generally built 7 feet to 7 feet 6 inches high and 7 feet long, but we can vary these measurements to suit conditions of the room in which the dryer is to be placed. The rack panels are made in different widths, viz.: 6, 7½, 9, 12, 16, 16¼ and 18 inches. Each rack is equipped with proper number of hanging bars for best service, or as may be specified.

The following table gives the width of dryers containing three to nine racks, inclusive, with rack panels 6, 7½, 9 and 12 inches wide each. Measurements of larger sizes furnished upon request:

No. of Racks or Draws	Type "W" Racks 6 ins. wide each	Type "A" Racks 7½ ins. wide each	Type "B" Racks 9 ins. wide each	Type "C" Racks 12 ins. wide each
3	25 in.	29½ in.	34 in.	43 in.
4	31 in.	37 in.	43 in.	55 in.
5	37 in.	44½ in.	52 in.	67 in.
6	43 in.	52 in.	61 in.	79 in.
7	49 in.	59½ in.	70 in.	91 in.
8	55 in.	67 in.	79 in.	104½ in.
9	61 in.	74½ in.	88 in.	118 in.

The No. 10 Laundry Stove, as shown in Plate No. 4910, occupies a space of 27 x 30 inches. The Gas Laundry Stove, as shown in Plate 3906, occupies a space of 22 x 23 inches. Stove as shown in Plate 6607 occupies a space of 22 x 28 inches. No. 08 Stove, shown in Plate No. 4908, occupies space of 24 x 32 inches.

SWEET'S CATALOGUE

Continued on next page

PLATE NO. 3906. "CHICAGO-FRANCIS" COMBINED DRYER AND GAS LAUNDRY STOVE

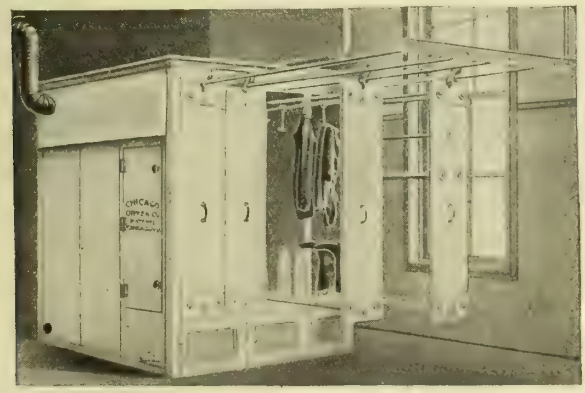
Containing 3 racks, each 9 in. wide, with No. 06 Gas Stove

Suitable for use in residences, apartment buildings and small institutions. Adapted for artificial or natural gas, as may be ordered. Stove boils clothes, heats flatirons and heats the dryer by waste heat. Cost of operating stove 2 to 3½ cents per hour, figuring cost of gas at $1.00 per 1,000 cubic feet. Will dry dryer full of clothes in ten to thirty minutes. Built in various sizes ranging from 3 racks or draws, and up. For residences we recommend dryer containing 3, 4 or 5 racks, each 9 in. wide. When used in apartment buildings, it is customary to allot Dryer containing 3 racks, each 9 in. wide, with each set of tubs.

PLATE NO. 6607. "CHICAGO-FRANCIS" COMBINED DRYER AND DOUBLE GAS LAUNDRY STOVE

Contains 6 racks or draws, each 6 in. wide, with No. 07 Stove, suitable for artificial or natural gas, as may be ordered

Adapted for use in laundry room of apartment building when desired to accommodate two tenants. Stove specially designed to accommodate two wash boilers at a time. Waste heat from both halves of stove is carried into drying cabinet. Each tenant is allowed the use of three racks or draws for drying clothes. Center of feed rail of stove is provided with valve, thus properly sub-dividing the operating expense when used by two tenants at a time, providing piping so arranged that each tenant pays for own gas used in stove. Each half of stove can be operated at an expense of two to three cents per hour, figuring cost of gas at $1.00 per 1,000 cubic feet.



"CHICAGO-FRANCIS" GARMENT DRYER WITH RACKS, EACH 16¼ IN. WIDE

Equipped with No. 09 Model Gas Heating System, same as shown in Plate 5909. Built in sizes ranging from 2 racks or draws, and up. Suitable for fire-engine houses, police stations, etc.

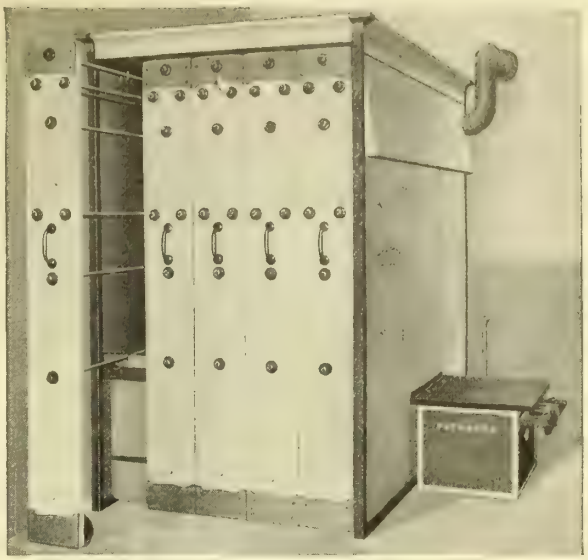


PLATE NO. J-5907. "CHICAGO-FRANCIS" COMBINED DRYER AND GAS LAUNDRY STOVE WITH FLOOR CARRIAGE RACKS

Contains 5 racks, each 9 in. wide with No. 07 Gas Stove. Stove suitable for burning artificial or natural gas, as may be ordered. Built in sizes ranging from 3 racks or draws, and up. Front panels may be made flush, so that outside flanges of front panels are invisible, when so specified.

Front panels of racks reinforced to a thickness of one inch. Base of front panels provided with rubber-tired wheels which allow rack to be pushed into or pulled out of cabinet with the utmost ease. Rear panels of racks are provided with extension plates, so that, when racks are pulled out full length, the heat will not escape from cabinet.

When so specified, in lieu of gas stove, can furnish these dryers equipped with our No. 10 Laundry Stove suitable for burning coal or wood; or can furnish dryer without laundry stove, and, in lieu thereof, equip with our Model 09 Direct Gas Heating System, same as that shown in Plate No. 5909.

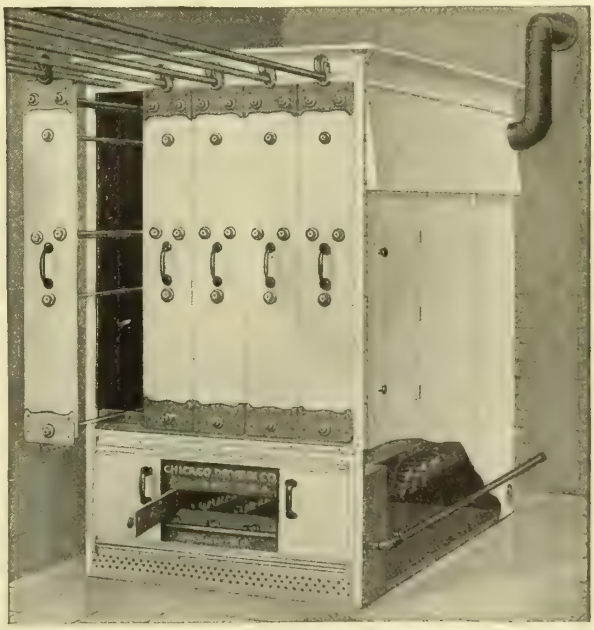


PLATE NO. 5909. "CHICAGO-FRANCIS" DIRECT GAS HEATED DRYER WITH MODEL 09 GAS HEATING SYSTEM

Contains 5 racks or draws, each 9 in. wide. Built in various sizes ranging from 3 racks or draws and up, with rack panels 6, 7½, 9 or 12 in. wide, as may be specified. Adapted for use in residences, apartment buildings and institutions. Suitable for artificial or natural gas. No flame exposed. Only pure and clean heat enters drying cabinet.

Gas burners are placed at base, in an interior heat-retaining drum made of heavy galvanized sheet steel, so formed that the heat from the burners is retained therein, thus heating the drying cabinet with minimum gas consumption. Drum is provided with one, two or more small pipe burners, depending upon the size of the dryer. Each burner provided with independent shut-off valve, so that the heat in the dryer may be regulated to suit conditions.

Base of drying cabinet provided with independent vent ducts, so that all moistures, etc., emanating from clothes while being dried, are carried away by natural air circulation without loss of heat in the drying cabinet. No possibility of accidents or explosions. Efficiency fully 100 to 200 per cent over and above similar machines made by other manufacturers.

Continued on next page

PLATE NO. 4908
"CHICAGO-FRANCIS" DRUMLESS COMBINED DRYER AND NO. 08 LAUNDRY STOVE

Contains 4 racks, each 9 in. wide. Stove suitable for coal or wood and so arranged that clothes boiler may be heated on top, flatirons heated on side and dryer heated, all at same time. Built in sizes containing 2, 3 or 4 racks, each 9 in. wide. Especially adapted for residences. A special feature is that no heating drums or heating system of any kind is placed inside of drying cabinet. Stove not equipped with water-back, but furnished with plain linings only.

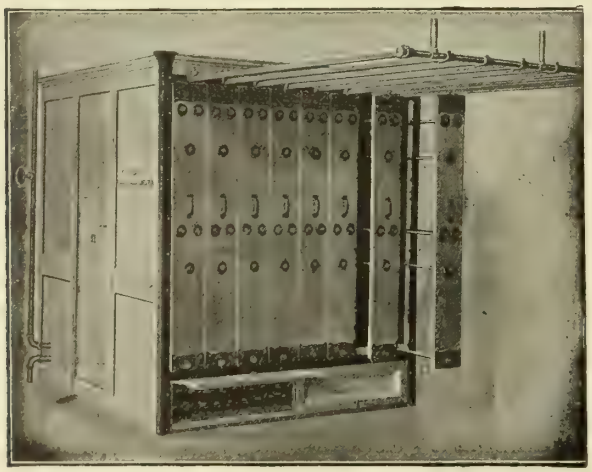


PLATE NO. 8990
"CHICAGO" STEAM HEATED DRYER

Contains 8 racks, each 9 in. wide. Built in sizes ranging from 2 racks or draws, and up. Unlimited as to size. Also built with racks 6, 7½, 12, 16¼ and 18 in. wide.

PLATE NO. 4916 "CHICAGO-FRANCIS" COMBINED DRYER WITH MODEL 16 GAS LAUNDRY STOVE

Suitable for artificial or natural gas. No fumes or odors can possibly come in contact with the clothes, only pure and clean heat enters drying cabinet. Moisture removed at base through independent vent ducts.

Cost of operating gas laundry stove 2 to 3½ cents per hour, figuring gas at $1.00 per 1,000 cubic feet.

Built in various sizes ranging from 3 racks or draws and up, with panels 6, 7½, 9, or 12 in. wide, as may be specified.

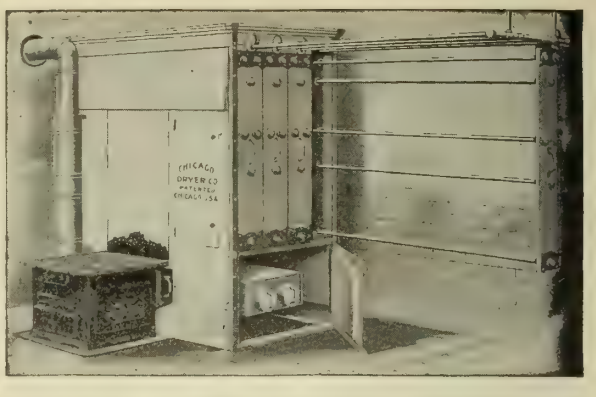


PLATE NO. 4910
"CHICAGO-FRANCIS" COMBINED DRYER AND NO. 10 COAL LAUNDRY STOVE

Contains 4 racks, each 9 in. wide. Stove suitable for coal or wood. Stove furnished with or without water-back, as may be ordered. Built in sizes ranging from 3 racks or draws, and up. Suitable for residences, apartment buildings and institutions where purchasers desire to use coal or wood for fuel in laundry stove.

The base of drying cabinet below racks is provided with system of heating drums, through which products of combustion emanating from stove circulate before being carried to flue. Heat radiated from heating drums rises through clothes and dries them. Heating drums, made of heavy galvanized sheet steel, can not break or crack, and are practically indestructible. Drums built in size to conform with the dryers in which they are placed, with result that the maximum amount of radiation is secured. No. 10 Laundry stove, used in conjunction with this dryer, is of extra heavy construction, of cast iron throughout and weighs 400 pounds. Stove is provided with damper arrangement so that heat can be thrown into heating drums in dryer, or direct to flue. Moisture removed by means of independent vent ducts at base, without loss of heat in drying cabinet. When so specified, stove may be equipped with our No. 2 Water-back, capable of heating a 60-gallon tank.

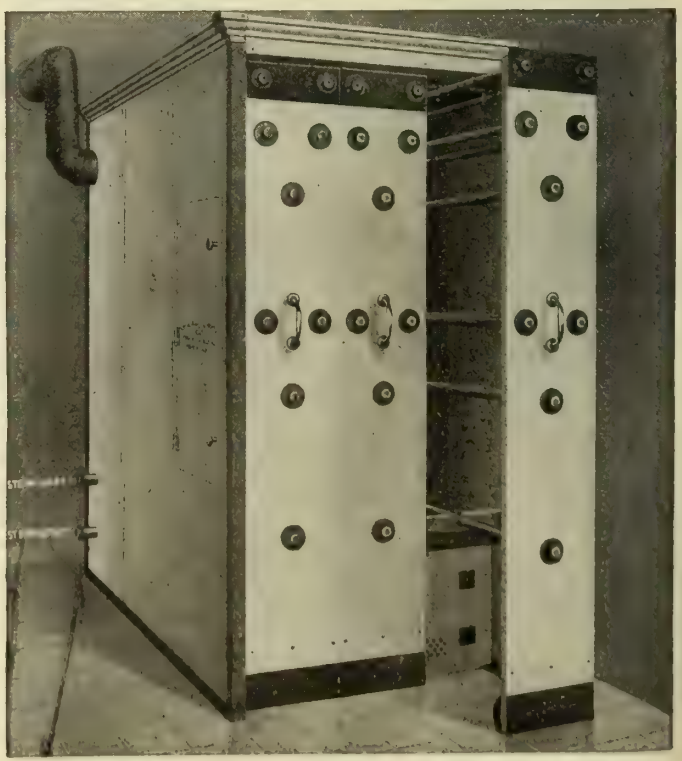


PLATE NO. J-31290 "CHICAGO" STEAM HEATED DRYER WITH FLOOR CARRIAGE RACKS

Each rack or draw measures 12 in. wide.

Furnished in various sizes ranging from 2 racks or draws and up, and of extra heavy construction. Front panels of racks are reinforced to a thickness of one inch. Base of front panels provided with rubber-tired wheels which allow the racks to be pushed into or pulled out of cabinet with utmost ease. Construction throughout the best that can be produced. When specified, the lower part of racks may be provided with wire screen basket for drying of shoes, etc.

May be heated by means of coal, wood or gas stove attached; or by means of gas direct, when so specified, in lieu of the steam heat.

Continued on next page

"CHICAGO" ELECTRIC WASHER AND SAFETY WRINGER, MODEL "D"

Especially adapted for use in residences and small institutions.

Only machine on the market with wringer equipped with automatic conveyor, for conveying clothes into rolls, and automatic safety stop.

Prevents tearing of clothes, and insures absolute protection against possible accidents to operator. Washer tub made of copper with nickeloid plating on inside. Framework is of malleable iron. Provided with water inlet for stationary water and drain connections.

Will wash clothes thoroughly clean and without injury in 10 to 15 minutes. The outside of washer tub including framework finished in white enamel.

Made in three sizes, viz.:

Number	Capacity	Size of Wringers	Size of Motor
D312	30 shirts	12 in.	1/6 H.P.
D314	35 shirts	14 in.	1/6 H.P.
D414	40 shirts	14 in.	¼ H.P.

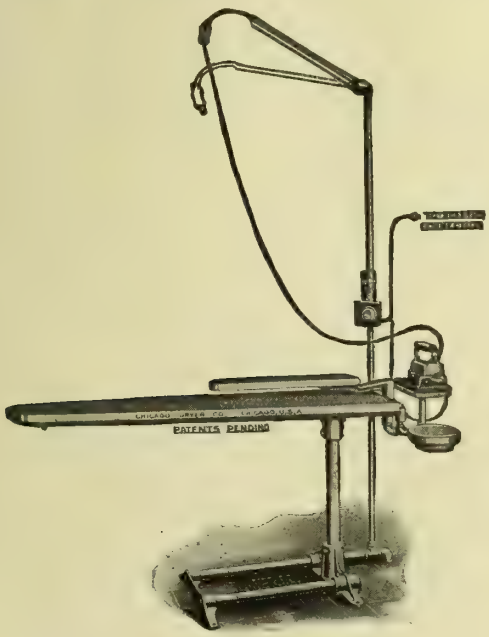
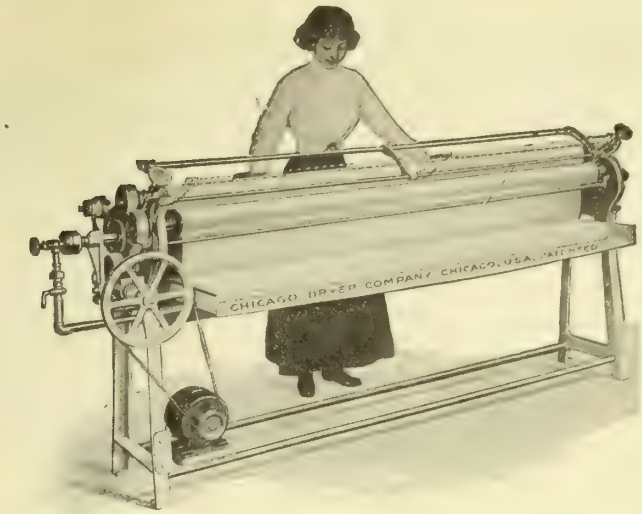


PLATE NO. 302
"CHICAGO" IRONING BOARD WITH PORTABLE STAND

Equipped with pipe standard, snap-switch, pilot light, suspension arm and connector cord. Furnished either with or without electric iron as may be ordered.

Ironing Board measures 59 in. long by 1¾ in. thick. Large end measures 18½ in. wide and tapers to 10 in. at small end. Underside of board provided with our patented attachment for holding padding. Base and stand finished in white enamel. Can furnish above equipment without electric attachments, in which event it is designated as No. 300 "Chicago" Ironing Board and Stand.

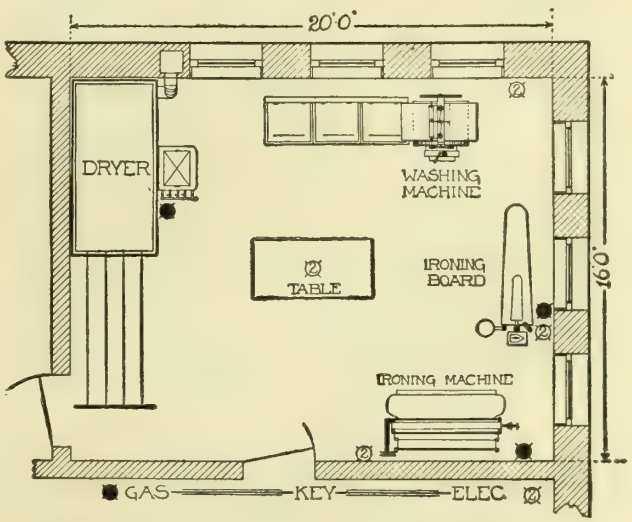


"CHICAGO" THREE-ROLL IRONING MACHINE WITH MOTOR ATTACHED, MODEL "R"

Heated by means of gas or gasoline. Suitable for ironing all kinds of flat work, such as sheets, pillow cases, napkins, towels, laces, embroideries, etc.

Equipped with one heated, and two compression rolls. All rolls revolve, which positively eliminates any possible wear on the linens during process of ironing.

Made in various sizes, with rolls 37, 42, 50, 60, 75 and 90 in. long. Equipped with 1/6 H.P. electric motor, which may be connected to any lighting circuit. For residences, we recommend the 50-inch size. Each machine is sold under absolute and positive guarantee to accomplish entirely satisfactory work. Framework of ironing machine finished in white enamel.



Plan No. 3 Scale: ⅛ in. = 1 ft.

FLOOR PLAN OF MODERN AND UP-TO-DATE RESIDENCE LAUNDRY ROOM

Showing installation of "Chicago" Laundry Appliances

One No. 314 Model "D" "Chicago" Electric Washer and Safety Wringer.

One "Chicago-Francis" Combined Dryer and Laundry Stove, containing 4 racks or draws, each 9 in. wide. Dryer may be equipped with stove suitable for coal, wood, artificial or natural gas, as may be specified.

One 50-inch Model "R" "Chicago" Three-Roll Ironing Machine with motor attached. One No. 302 "Chicago" Ironing Board complete, including electrically heated flatiron.

Above appliances may be had in smaller or larger sizes, thus enabling us to provide suitable appliances from the smallest to the largest residence. Our larger sizes are also adapted for small institutions.

Co-operative Service.

We furnish individual machines or complete outfits as may be desired. Send us a plan of your laundry room and we will be pleased to submit blue-prints, showing how the various appliances may be installed and the space each device will occupy. All plans and blue-prints, including estimate, furnished free without any obligations whatsoever.

DOMESTIC LAUNDRY EQUIPMENT CORPORATION

SUCCEEDING "CHICAGO" CLOTHES DRYER WORKS OF NEW YORK, "AMERICAN" CLOTHES DRYER CO., SHANNON MFG. CO.

Domestic Laundry Equipment

TELEPHONE, CHELSEA 8560

150-154 West Twenty-Second St.

NEW YORK, N. Y.

Products.

DOMESTIC LAUNDRY, KITCHEN and VALET EQUIPMENT; "CHICAGO" CLOTHES DRYERS; "AMERICAN" CLOTHES DRYERS; "PERFECTION" RACK DRYERS; TOWEL and MOP DRYERS.

"AMERICAN" DOMESTIC CLOTHES WASHER; "CHICAGO" ELECTRIC CLOTHES WASHER.

"AMERICAN" DOMESTIC IRONING MACHINE; "CHICAGO" DOMESTIC IRONING MACHINE.

IRONING BOARDS, SOLID BASE.

FOLDING IRONING BOARDS.

SKIRT TABLES, VALET'S TABLES.

ELECTRIC HAND IRONS

GAS IRON HEATERS.

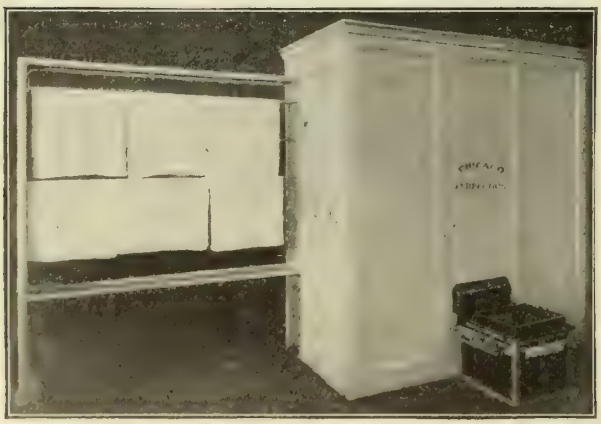
GAS-, STEAM- and ELECTRIC-HEATED CLOTHES BOILERS, SOAP TANKS and STARCH COOKERS.

SIMPLEX and DUPLEX DISH WASHERS; PLATE WARMERS.

LAUNDRY SUPPLY and LINEN CABINETS.

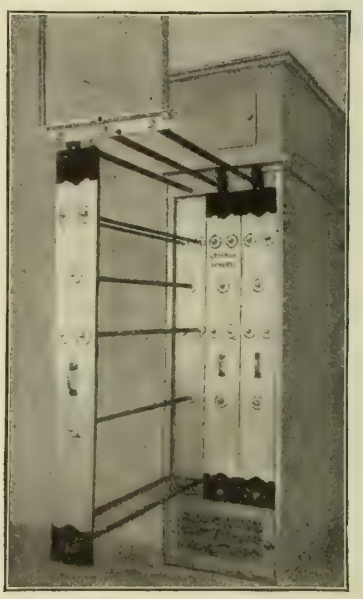
"DOMESTIC" INCINERATORS (Borge System).

The "INCINERITE."



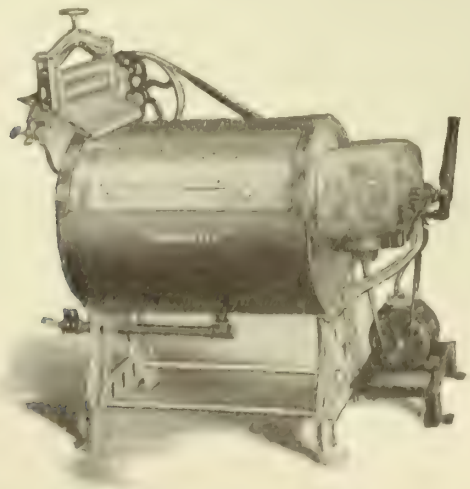
"CHICAGO" PERFECTION TYPE COMBINED CLOTHES DRYER AND LAUNDRY STOVE

Made with any number of racks, each rack 7½ inches, 9 inches or 12 inches wide. Height and length to meet individual conditions heated with coal or gas stove direct gas steam or electricity



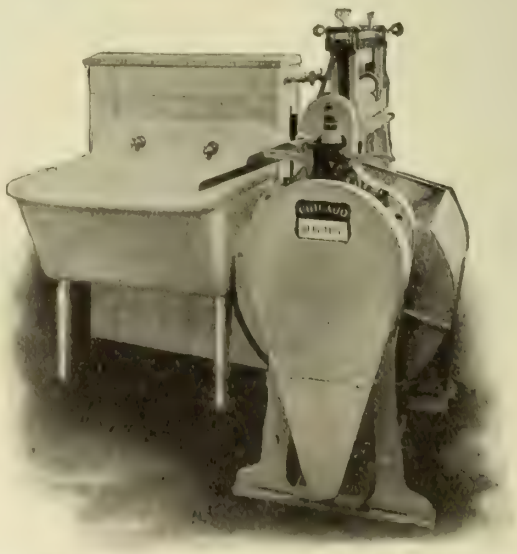
"AMERICAN" MODEL "RAPIDO" (DIRECT GAS) CLOTHES DRYER

Made in same sizes as "Chicago" Perfection type; gas-, steam- and electric-heated, or with combination coal or gas laundry stove. Made in locking divisions for apartments



DOMESTIC WASHER AND WRINGER

The most substantial and cheapest electric-driven washer made. Three capacities. Are particularly adapted to large families, clubs, institutions, etc.

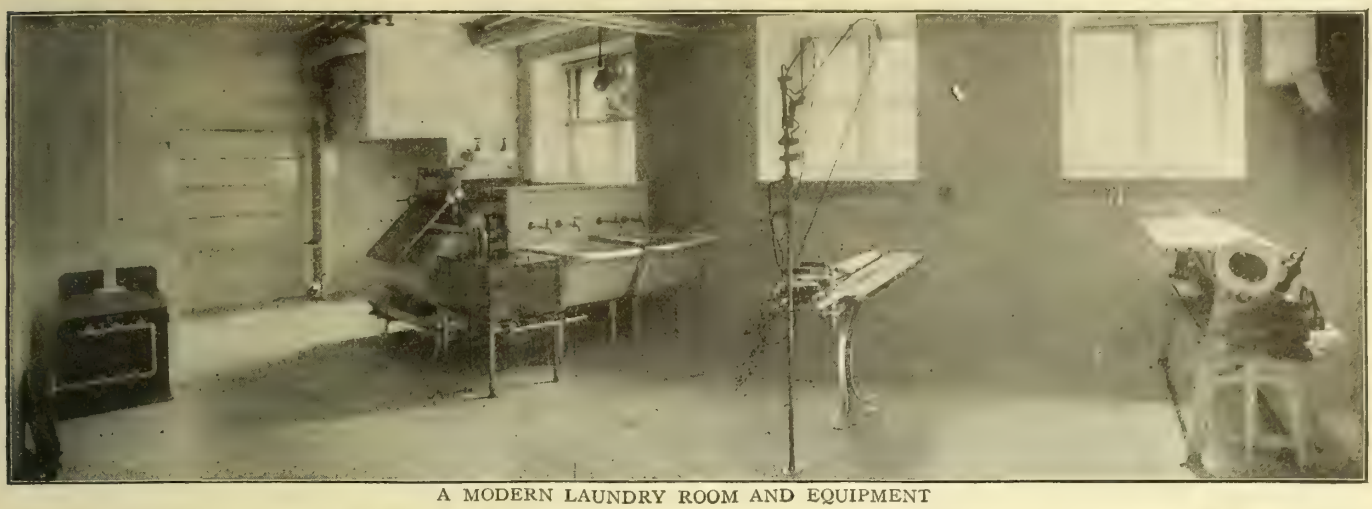


"CHICAGO" ELECTRIC WASHER AND SAFETY WRINGER

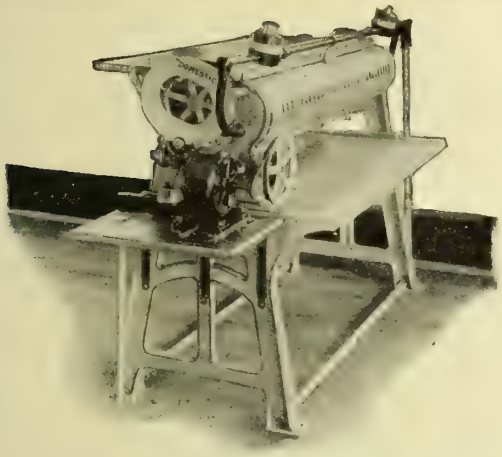
For family use and small institutions, made in three sizes; oscillating movement with no cylinder. Produces the usual hand-work by mechanical means.

Select's Catalogue

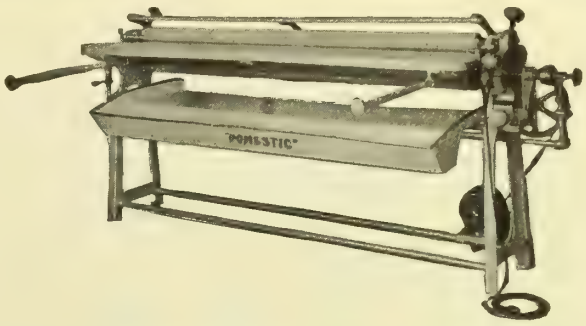
Continued on next page



A MODERN LAUNDRY ROOM AND EQUIPMENT



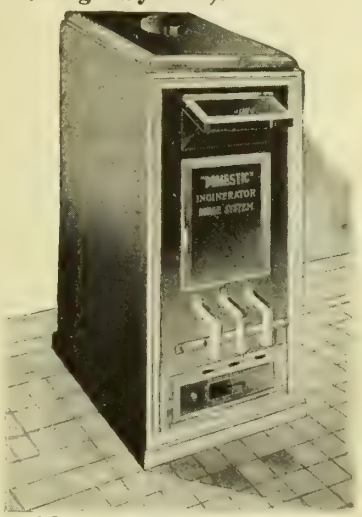
"AMERICAN" DOMESTIC SIMPLEX IRONER
Stationary shoe and revolving table, gives results of hand-work on all kinds of flat work. Gas-, gasoline- or electric-heated, made in eight sizes for every requirement



"CHICAGO" ELECTRIC THREE-ROLL IRONER
Friction ironing by mechanical means, giving results of hand-work; made in sizes up to 90 inches for large requirements; gas- or gasoline-heated

"Domestic" Incinerator (Borge System).

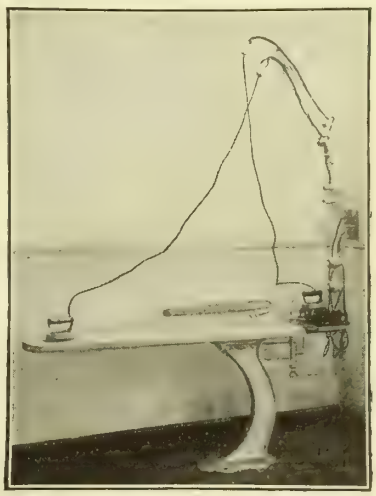
A garbage and refuse destructor that burns the refuse and not the machine. A domestic incinerator, of construction adapted from large community plants. Fire tile and fire clay construction, that insures long life, destroying within itself all noxious gases and eliminating all objectionable odors both at the machine and at the chimney top. Passes requirements of Health Authorities.



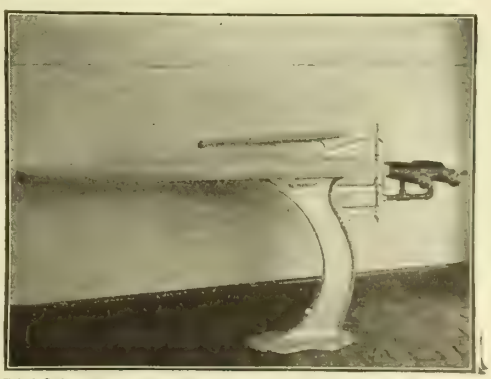
"DOMESTIC" INCINERATOR
(BORGE SYSTEM)

DOMESTIC SIZES: DIMENSIONS IN INCHES

	Size "A"			Size "B"			Size "C"		
	Wide	Deep	High	Wide	Deep	High	Wide	Deep	High
Gas burning.....	21	21⅝	50½	26	28¼	55¼	31	34	65¾
Coal burning.....	21	21⅝	70	26	28¾	73⅜	31	34	85½
Diam. Smoke flue....	6			8			10		
Diam. gas supply.	¾			1			1¼		



"CHICAGO" SELF-CONTAINED SKIRT IRONING TABLE
With electric hand-iron equipment, including double arm cord supports, signal lamps, snap switches with automatic regulator stands that reduce current consumption when irons are idle



"CHICAGO" SELF-CONTAINED SKIRT IRONING TABLE
With gas-iron heaters arranged for one, two or three irons

W. W. McCAIN

MANUFACTURER OF

Clothes Dryers and Radiator Shields

944-950 East Maryland Street

INDIANAPOLIS, IND.

Products.

"FAMILY" CLOTHES DRYERS, with COAL or GAS STOVE for Residences, Apartment Buildings and Institutions. Also, three styles of "HAWKINS" RADIATOR SHIELDS for Steam and Water Radiators.

Construction.

The "Family" dryer is substantially made of galvanized sheets securely bolted together. The stoves are so constructed that the air passes over the sides and bottom of fire chamber into the dryer, thus supplying it with clean, warm air. Dryers can also be made with gas burners enclosed in heating drum placed in the bottom, without stove, and do not require flue connection.

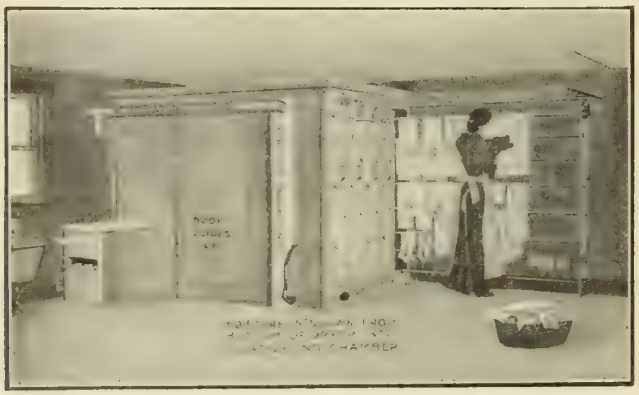


FIG. 1. "FAMILY" CLOTHES DRYER, WITH GAS STOVE FOR NATURAL OR ARTIFICIAL GAS

Showing seven clothes bars to each rack. Highest bar only 5 feet 9 inches from floor

Distinctive Features.

The gas stove dryer, as well as coal stove dryer, has an upright heating drum, so placed as to leave a clear floor space; the laundress can enter through sliding door. The gas fumes pass through the drum and not through the clothes. Dryer is thoroughly ventilated by drawing the heavy, damp air from the bottom. The cast metal, roller-bearing wheel (Fig. 3) carries the racks on heavy tee-iron rails. A ventilated, U-shaped clothes bar (Fig. 4) is used, having smooth galvanized surface.

FIG. 2. SECTIONAL VIEW "FAMILY" CLOTHES DRYER WITH COAL STOVE

Upright heating drum leaves clear floor space in dryer

DIMENSIONS OF STANDARD SIZE DRYERS

No. of Racks	Length of Closet	Width of Closet	Full Width over all with Coal Stove	Full Width over all with Gas Stove	Clothes Bars Total Length
3	7 ft.	2 ft. 4 in.	4 ft. 4 in.	4 ft. 8 in.	115 ft.
4	7 ft.	3 ft.	5 ft.	5 ft. 4 in.	153 ft.
5	7 ft.	3 ft. 7 in.	5 ft. 7 in.	5 ft. 11 in.	192 ft.
6	7 ft.	4 ft. 3 in.	6 ft. 3 in.	6 ft. 7 in.	230 ft.
7	7 ft.	4 ft. 10 in.	6 ft. 10 in.	7 ft. 2 in.	269 ft.
8	7 ft.	5 ft. 6 in.	7 ft. 6 in.	7 ft. 10 in.	307 ft.
9	7 ft.	6 ft. 2 in.	8 ft. 2 in.	8 ft. 6 in.	345 ft.
10	7 ft.	6 ft. 10 in.	8 ft. 10 in.	9 ft. 2 in.	384 ft.

Drying closet is 6 feet 6 inches high. When racks are extended, dryer occupies space 12 feet 8 inches long.

Stove can be connected to right or left side, rear or front of dryer. Stove and dryer can be placed in separate rooms, with connection through wall. Dryers can be made to fit any space, and we will furnish sketch if dimensions of room are given.

An 8-inch flue is sufficient, but 8 by 12 inches is better for coal stove.

Insulated dryers are made with double casing, having asbestos between.

Ask for literature giving full description and list of users.

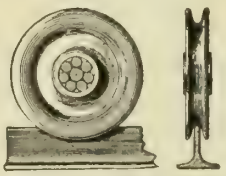


FIG. 3. ROLLER-BEARING METAL WHEEL

FIG. 4. U-SHAPED VENTILATED BAR

"Hawkins" Radiator Shields.

Will fit any style or width of steam or water radiators.

These shields are made of heavy, crimped, sheet iron, with cast-iron ends and supports, and are bolted direct to radiator. A dust gutter catches the dust, and the felt edge on apron makes a tight connection to the wall. Two other styles are made.

Circular with full details will be furnished on request.

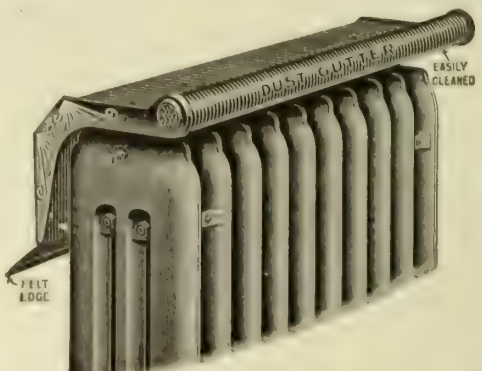


FIG. 5. "HAWKINS" STYLE C RADIATOR SHIELD

THE JOHN E. MANNEN CO.

Manufacturers of Laundry Dryers and Stoves

2241-2255 St. Clair Avenue

CLEVELAND, OHIO

Products and Services.

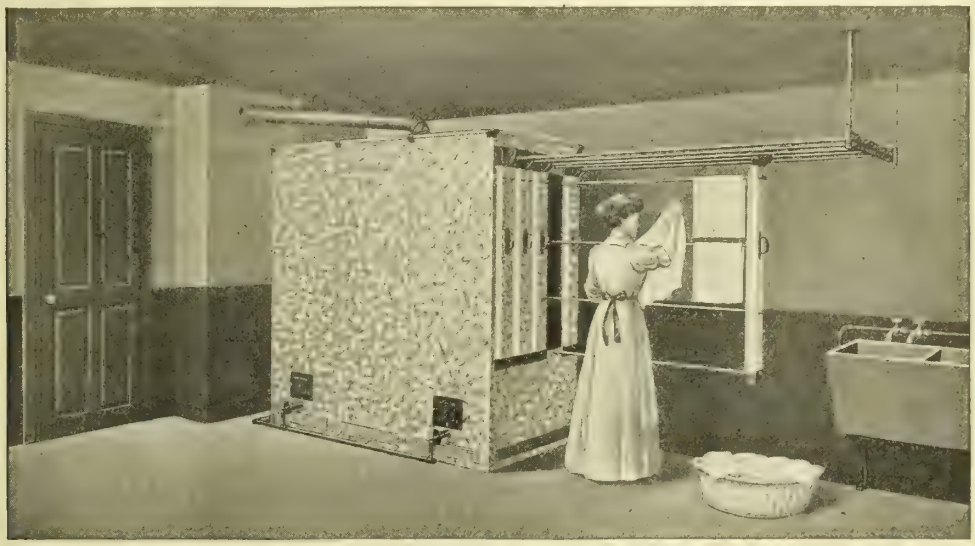
"DRIRITE" CLOTHES DRYERS, of various sizes, for Residences, Apartment Buildings, Institutions, Hotels and Special Purposes; "MANEST" ECONOMY LAUNDRY STOVES.

Also, METAL CEILINGS, ROOFING and CORNICES; SKYLIGHTS; EXHAUST SYSTEMS; GALVANIZED IRON PIPE WORK; HEAVY IRON WORK.

GENERAL SHEET METAL CONTRACTORS.

DIMENSIONS OF DRYING CABINET

No.	Racks	Height, feet	Width, inches	Length closed, feet	Length with Rack extended, feet	Prices, Net
3	3	7	24	7	14	$ 75.00
4	4	7	31	7	14	90.00
5	5	7	39	7	14	105.00
6	6	7	46	7	14	120.00
7	7	7	54	7	14	135.00
8	8	7	61	7	14	150.00



"DRIRITE" DRYER, WITH GAS STOVE

"Dririte" Clothes Dryer.

The illustration shows the dryer and the gas stove that goes with it. This stove can be placed anywhere that is most convenient. It can be operated by natural or artificial gas.

Dririte TRADE-MARK

Ventilating Process—The Ventilating Process used in the "Dririte" is the most sanitary, because the hot air rises and passes up through the clothes, and the steam arising therefrom, laden with impurities, is immediately withdrawn from the cabinet by means of a vent pipe of suitable size connected to a vacuum pipe at the chimney, and not brought down through the cabinet again, as is the case with other makes of dryers on the market. Hot air must rise. When it passes through clothes once, why not pass it out?

Location of Burners—The burners are located at the base of the drying chamber underneath a spreader or baffle-plate. This gives a more active and quicker heat than in passing it from the stove, as was done in the old way.

Fuel Used—The "Dririte" is a gas dryer. It can be operated with either artificial or natural gas.

Co-operative Service.

We make dryers of all descriptions, and will gladly give further information or assistance upon request.

"Manest" Economy Laundry Stove (Patented).

Air supply is so controlled that no more than the right amount to secure the most intense heat reaches the flame. The only stoves of the kind in which burners can be raised for artificial or lowered for natural gas. Enclosed burners retain and concentrate the heat; central and ring draft doubles the heat of the open flame.

Price, net, $5.00.

"MANEST" ECONOMY LAUNDRY STOVE

THE PFAUDLER CO.

Sanitary and Non-corrosive Glass Enameled Steel Products

ROCHESTER, N. Y.

BRANCH OFFICES

NEW YORK DETROIT CHICAGO SAN FRANCISCO

Products.

GLASS ENAMELED STEEL LAUNDRY CHUTE and GLASS ENAMELED STEEL TANKS for WATER STORAGE.

Laundry Chute.

The Pfaudler Laundry Chute was developed by an expert in hospital construction, as a necessary and economical means of conveying the germ-laden soiled linen from the wards and operating rooms of a hospital, direct to the laundry without spreading infection throughout the building.

It consists of a durable, fireproof steel shaft, lined with glass enamel, which is fused *into* the steel at high temperature. It extends from the top floor to the laundry; is equipped with plate or wire glass doors at each floor for admission of the linen, and with a ventilator extending through the roof. From a flushing ring at the top, a shower of hot water sterilizes the chute as often as desired, washing all infection and foul deposits into the sewer through a connection at the bottom.

The chute is built in sections, bolted together and sealed with gaskets, making a tight, smooth, non-absorptive, and absolutely sterile conveyor, which costs nothing to maintain.

References—Among the hospitals equipped with Pfaudler Laundry Chutes the following are prominent:

Sarah Morris Hospital, Chicago, Ill.
German Hospital, Chicago, Ill.
Cook County Detention Hospital, Chicago, Ill.
Central Hospital, Chicago, Ill. Richard E. Schmidt, Garden & Martin, Chicago, Ill., Architects of above
Cook County Hospital, Chicago, Ill. Paul Gerhardt, Chicago, Ill., and Richard E. Schmidt, Garden & Martin, Architects
Chapin Memorial Hospital, Springfield, Mass., Kirkham & Parlett, Springfield, Mass., Architects
Union Benevolent Association Hospital, Grand Rapids, Mich., York & Sawyer, New York, N. Y., Architects
Henry Ford Hospital, Detroit, Mich., Malcomson & Higginbotham, Detroit, Mich., Architects
Mission Hospital, Asheville, N. C., W. H. Lord, Asheville, N. C., Architect
Milwaukee Co. Tuberculosis Sanatorium, Wauwatosa, Wis., R. A. Messner & Bro., Milwaukee, Wis., Architects
St. Luke's Hospital, St. Paul, Minn., C. H. Johnson, St. Paul, Minn., Architect

Water Tanks.

Pfaudler Glass Enameled Steel Water-Tanks are non-absorptive, leakproof and rustproof; they combine the purity of glass and the durability of steel with maximum capacity for space occupied. With all possibility of contaminating their contents through rust or the harboring of dangerous organisms removed, they are the most sanitary as well as the most serviceable containers that can be built in large capacities.

The owners of the Blackstone Hotel, Chicago, say after five and one half years' use of a Pfaudler Water Storage Tank:

"The interior of the tank is clean and in far better condition than an ordinary uncoated tank could possibly be. As the Blackstone stands for the best in everything, we can not help but express our satisfaction that our water storage supply should be protected in this way for the benefit of our guests."

SPECIFICATIONS FOR LAUNDRY CHUTE

Provide and install laundry chute where shown. Same shall be glass enamel lined, 24 inches inside diameter and not over 2 feet 5 inches outside diameter of flange. (36 inches I. D. optional.)

The chute shall be made of steel properly flanged and bolted together in sections or rings not to exceed 48 inches long. Door sections shall be of length to receive the openings where shown.

Provide and set at each floor where shown German silver doors with either plate glass or polished wire glass set in rubber bed to prevent jarring.

Doors to be 22 inches in diameter and equipped with closing clamps which permit their being closed water-tight.

Throat to which door is attached shall be of steel welded to chute proper and enameled. The bottom of chute shall be closed with head of enameled steel with 2-inch outlet bushing for drain connections.

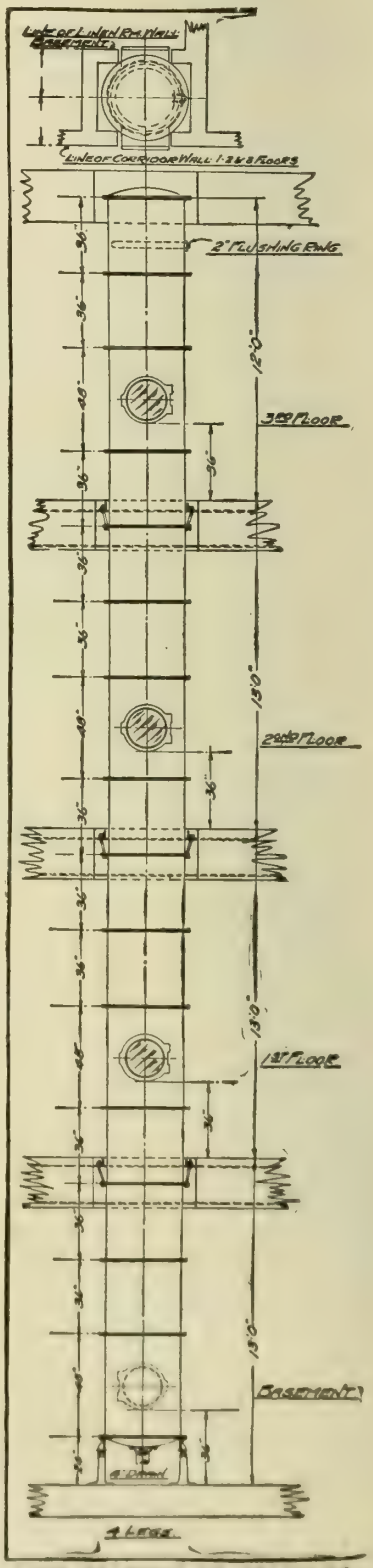
Chute shall be provided with four legs for its proper support. Additional supports shall be provided at each floor. These supports to consist of ⅝-inch tie rods and three angle irons to rest in steel work at each floor.

The enameling of interior shall extend into section joints. All sections shall be erected in accordance with manufacturers' direction.

All joints shall be properly packed so that the chute shall be water-tight.

Chute shall be of The Pfaudler Co., Rochester, N. Y., make.

The top section shall be provided with a 2-inch flushing ring of brass, nickel plated, to which may be connected by means of standard 2-inch bushing, the water service pipe.



LINE DRAWING OF PFAUDLER LAUNDRY CHUTE

Prices.

Prices promptly quoted upon specific inquiries.

SILL STOVE WORKS

Manufacturers of Scientific Heating Systems and Sterling Ranges

ROCHESTER, N. Y.

Products.

"Scientific Sterling" Combination Gas and Coal Range.

Also, Sterling Coal Ranges, "Double" Oven Sterling Coal Ranges and Sterling Furnaces.

Description.

The "Scientific Sterling" is a kitchen range that will cook, roast, bake and broil with coal or gas all in the same range. It is only 36 inches wide, and is especially designed to occupy *small space* in the kitchen and at same time give the cooking capacity of large ranges.

The cooking top has two holes for coal and four for gas. Coal fire-box is extra deep, with water-front of unusual capacity, lined with heavy brick and equipped with Sterling grates. When used as a coal range entire top may be used for cooking service, which gives as much space as the ordinary six-hole coal range.

The heat from coal in fire-box does not go directly up the chimney, but is forced to pass through the entire length of the extended flues which surround the oven. The outer surface of these flues is exposed to the room, and this large radiating surface, together with the cast-iron construction of the range, gives sufficient heating capacity to warm the kitchen where no other heat is supplied.

The top is fitted with standard gas equipment of five burners, consisting of three regular star burners, one giant star burner, and one simmering burner. Oven is 18 inches square, and is used for both coal and gas. Broiling is done in baking oven by placing broiling pan underneath deflector plate, which slides in guides close over the meat. The vent in the oven is connected directly with chimney, so that when oven door is closed the odor and smoke from broiling pass up the chimney.

Operation.

The oven bakes and roasts equally well when gas or coal is used. To bake or broil with gas, push forward lever (located at right outside of range), thus turning on gas and opening safety damper in oven—all with one simple operation. Should gas go out, fumes can not escape into room, but are carried off up the chimney. To use oven for coal, pull lever back; this will shut off gas and close safety damper.

Advantages.

In baking with either coal or gas, both oven racks may be filled with loaves of bread, or other food, such as biscuits or cake, and the perfect heat distribution will cook the food in the center of the oven practically as well as that placed close to the side, top or bottom. The oven is adjustable in size; so, when a small baking is to be done, the unused portion of the oven can be closed off. This saves time and gas.

Sizes, Dimensions, etc.

The "Scientific Sterling" is made in one size only, with Leg or Cabinet Base.

DIMENSIONS

No.	Style	Baking Oven, Inches	Length, Inches	Floor to Cooking top, Inches	Gas and Coal top, Inches
FT–681–B	Leg Base	18 x 18	36	32	32 x 25
CT–681–B	Cabinet Base	18 x 18	36	32	32 x 25

How to Specify.

T-13 High Shelf, or T-19 High Warming Closet. White Enameled Splasher Back and White Enameled Door.

Cast Water-front, or 4-strand or 6-strand brass coil for boilers up to 60-gallon capacity.

Ash-chute to cellar.

Open [closed] griddles.

Terms.

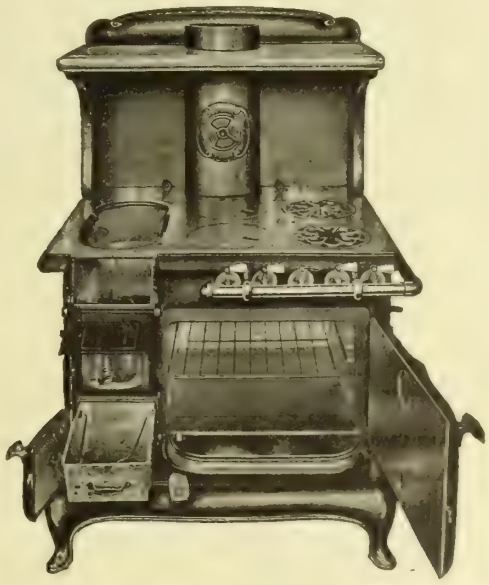
The "Scientific Sterling" is sold by gas companies and exclusive Sterling dealers, who will quote prices. When no Sterling dealer is conveniently located, quotations will be promptly made direct, and this company will arrange for installation through any local contractor designated.

Co-operation.

Blue-prints showing space required and location of water and gas connections, as well as arrangements and location of ash-chute from range to cellar, will be supplied on application.

"SCIENTIFIC STERLING" WITH LEG BASE AND HIGH SHELF

Occupies only 36 inches of space in the kitchen



"SCIENTIFIC STERLING" GAS AND COAL RANGE

Has deep fire-box, roomy ash pan and large square oven. Oven is 18 inches square and free from "bags" and corners

ESTABLISHED 1864 CAPITAL AND SURPLUS $1,500,000

WROUGHT IRON RANGE COMPANY

MANUFACTURERS OF

"Home Comfort" Hotel Ranges and Hot-Air Furnaces

5661 Natural Bridge Avenue

ST. LOUIS, MO.

EASTERN OFFICE: BOSTON, MASS., 201 Devonshire Street

Products.

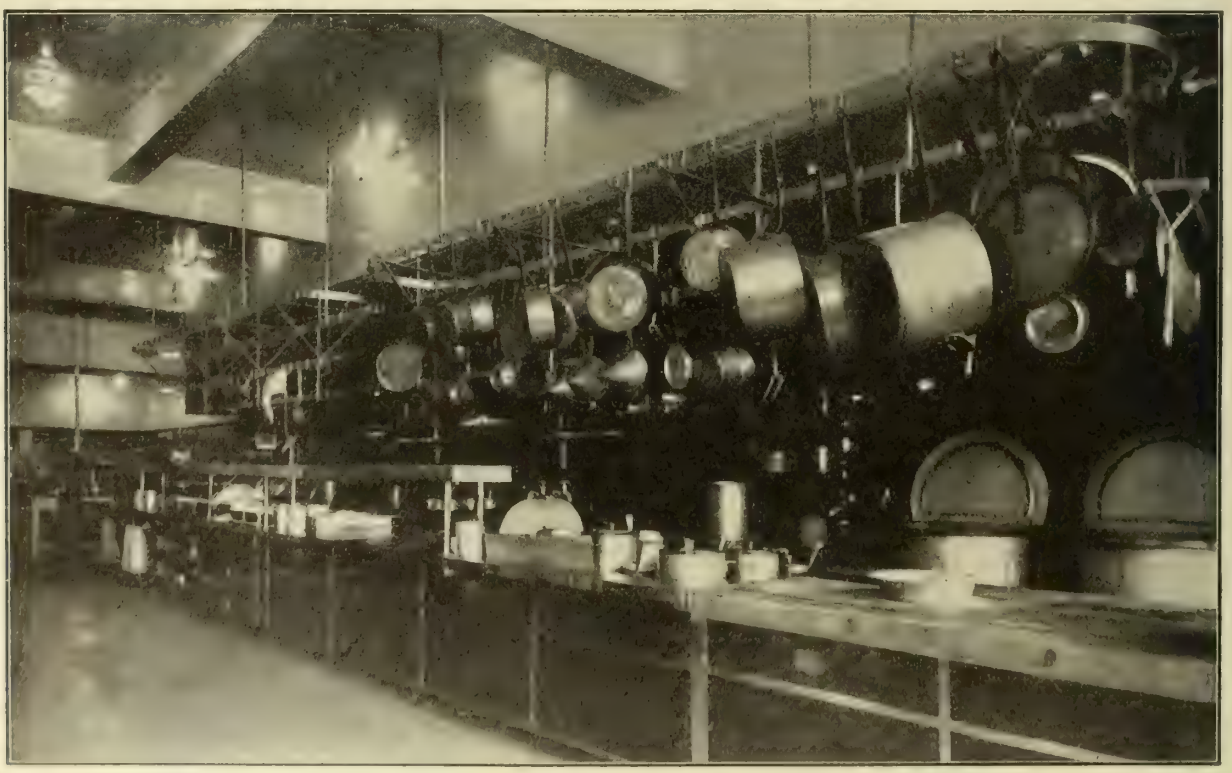
Complete KITCHEN and CULINARY EQUIPMENTS, including "HOME COMFORT" RANGES made for hard or soft coal, wood, natural gas or oil; BAKE OVENS, CHARCOAL BROILERS, PLATE WARMERS, URNS, OYSTER and CHOP-HOUSE RANGES, JACKET KETTLES, ROASTING OVENS, COMPARTMENT STEAMERS, TOASTERS, CARVING TABLES, BAIN-MARIE FOOD WAGONS, DISH WASHERS, CANOPIES, LAUNDRY STOVES, COPPER WARE of all kinds.

Also, "HOME COMFORT" STEEL HOT-AIR FURNACES for dwellings, flats, stores and institutions.

Co-operative Service.

Our Drafting Department is prepared to co-operate with architects in the planning of complete kitchen outfits for hotels, restaurants, boarding houses, private dwellings, public institutions, army posts, and so on.

Upon submission of a plan or sketch indicating location of dining room, doors, windows, posts and chimney flue, together with statement of other conditions and general requirements, this department will furnish free, and without entailing any obligation, a complete plan and estimate for an efficient kitchen equipment.



A PART OF THE COMPLETE "HOME COMFORT" EQUIPMENT INSTALLED IN THE LOS ANGELES ATHLETIC CLUB KITCHEN
JOHN PARKINSON & EDWIN BERGSTROM, Architects

References.

A few of the thousands of hotels and institutions using "Home Comfort" Goods:

Palace Hotel, San Francisco, Cal.
St. Francis Hotel, San Francisco, Cal.
Hotel Utah, Salt Lake City, Utah
Newhouse Hotel, Salt Lake City, Utah
Albany Hotel, Denver, Colo.
Oxford Hotel, Denver, Colo.
Severin Hotel, Indianapolis, Ind.
Murphy Hotel, Richmond, Va.
Jefferson Hotel, Richmond, Va.
Yource Hotel, Shreveport, La.
Jefferson Hotel, St. Louis, Mo.
Adams Hotel, Phoenix, Ariz.
Gunter Hotel, San Antonio, Tex.
Chisca Hotel, Memphis, Tenn.
King Edward Hotel, Toronto, Can.
Boston City Club, Boston, Mass.
Los Angeles Athletic Club, Los Angeles, Cal.
Y. M. C. A., Louisville, Ky.
Ft. Iobel Temple, Denver, Colo.
Culver Military Academy, Culver, Ind.
U. S. Military Academy, West Point, N. Y.
Ft. Slocum Recruit Station, Ft. Slocum, Davids Island, N. Y.
Boston City Hospital, Boston, Mass.
Moolah Temple, St. Louis, Mo.
Y. W. C. A., St. Louis, Mo.
City Insane Hospital, St. Louis, Mo.
Robt. Koch Hospital, St. Louis, Mo.
Jefferson Barracks, St. Louis, Mo.
Grover Cleveland High School, St. Louis, Mo.
St. John's Hospital, St. Louis, Mo.
Masonic Home, St. Louis, Mo.
Ft. McPherson, Angel Island, Cal.
Anna State Hospital, Anna, Ill.
St. Elizabeth Hospital, Washington, D. C.
Louisiana Insane Hospital, Pineville, La.
U. S. Penitentiary, Atlanta, Ga.
Hampton Normal School, Hampton, Va.

SOLLITT KITCHEN DOOR

407 Rookery Building
CHICAGO, ILL.

TELEPHONE, WABASH 750

Product.

The SOLLITT KITCHEN or DELIVERY DOOR (Patents Pending).

Scope of Use.

The Sollitt Kitchen Door has been designed for, and is adaptable to, installation in all kitchens or other delivery departments of residences, apartment houses, clubs, restaurants, hospitals, etc.

Description.

The object of this invention is to secure delivery of small goods and supplies through a closed and locked door, without the supply dealer's seeking or gaining access to the premises within.

Construction—Door is made of best varieties of wood, as desired. It contains a cabinet of several compartments, each of which has its own door (with printed sign thereon) *on the outside.* One door on *inside of cabinet* provides access to all its compartments, which vary in size to meet usual requirements. The cabinet projects about six inches beyond the front and rear sides of door.

Outside Inside
THE SOLLITT KITCHEN DOOR

Operation—The supply dealer places his goods in the proper compartment, outside door of which has been left ajar for his convenience; he then pushes shut the particular door or doors used by him, which action automatically causes a latch to fasten the same securely on the inside.

Installation in Old Doors—Cabinets complete will be installed in any old (the present) door; will be painted outside and varnished inside; and will be equipped with all necessary lettering, with requisite hardware in place, etc.

Sizes of Cabinet—Standard sizes (inches) of four compartments are: All shelves, 11½ by 24 inches; heights, 9½, 9½, 8 and 4 inches, respectively.

Special sizes made to order.

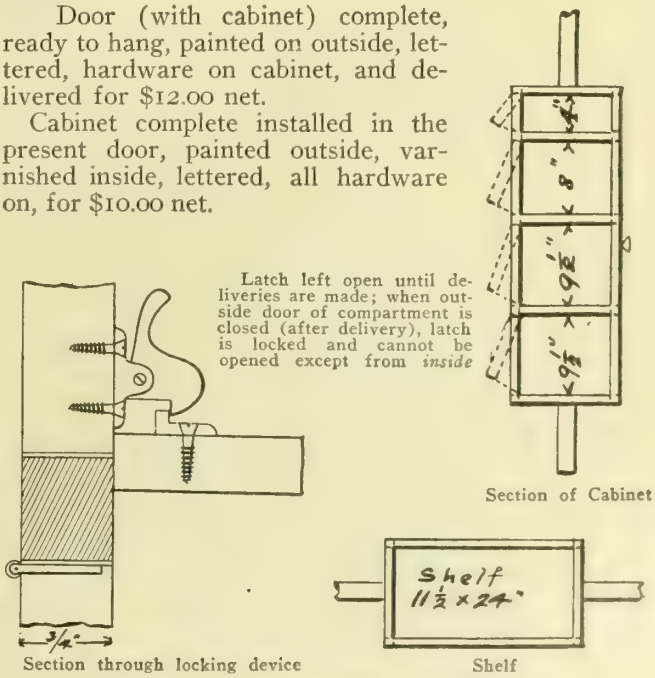
Advantages.

(1) Answering ring of door bell for each package, as delivered, is eliminated. (2) Thus time is saved by both dealer and buyer. (3) Supplies are delivered where and when wanted. (4) A great convenience whether occupants are or are not at home. (5) Delivery of goods through the Sollitt Door bars out tramps, beggars, thieves and defectives prone to commit crime. (6) Contact of children with delivery men, who may have been in homes where contagious disease exists, is avoided. (7) Useless conversation with such persons is dispensed with. (8) All strangers are properly barred. (9) Safety of inmates is secured. (10) Kitchen floors escape the dirt and germs carried in by delivery men daily.

Prices.

Door (with cabinet) complete, ready to hang, painted on outside, lettered, hardware on cabinet, and delivered for $12.00 net.

Cabinet complete installed in the present door, painted outside, varnished inside, lettered, all hardware on, for $10.00 net.



Section of Cabinet
Section through locking device Shelf
DETAILS OF CABINET CONSTRUCTION

BRAMHALL, DEANE COMPANY

French Ranges, Cooking Utensils, Sterilizers for Hospitals, etc.

261-265 West 36th Street
NEW YORK, N. Y.
TELEPHONE, GREELEY 4254

Products and Services.

Specialists in COMPLETE KITCHEN EQUIPMENT for Clubs, Residences, Hotels, Hospitals and other Institutions, Cooking Classes, etc.

Included among the products of this Company are FRENCH RANGES for Coal, Gas and Electric Heating; GRILLS, BROILERS, BRICK and IRON BAKING OVENS, LAUNDRY STOVES for Coal and Gas, JACKET KETTLES, COFFEE URNS, PLATE WARMERS, STEEL COOKS' TABLES, etc.

Also, CULINARY UTENSILS, DISH WASHERS, ICE-CREAM MACHINES, CAST-IRON SINKS, COAL WATER HEATERS, RANGE BOILERS, STERILIZERS for Hospitals and Barber Shops, etc.

Contracts solicited for all parts of the United States.

Experience, Quality and Facilities.

This organization has back of it over fifty years of specialized experience as manufacturers and contractors of high class kitchen equipments. The wide range of practical knowledge gained during this period has given it an expert grasp of requirements in this field, and has helped in the improvement and development of its full line of products. These facts insure installations of highest quality, efficiency and economy.

The manufacturing facilities of this company are most modern, and are sufficiently extensive to insure prompt execution of contracts. Shipping facilities are sufficiently convenient to insure economy and despatch in shipments to all parts of the United States.

All work is done under expert supervision.

Co-operation.

In the study of kitchen equipment, it is very necessary that elements be selected and placed with utmost regard to efficiency of operation as well as economy of first cost. It is, therefore, important that the architect take advantage of the specialized expert advice that the engineering department of this concern offers. Its recommendations are made only after careful study of all conditions and requirements, such as number of people to be served, style of service, whether for hotel, institution or club. The service required varies also with the locality; for instance, a resort hotel in New England demands a different layout from one in the South.

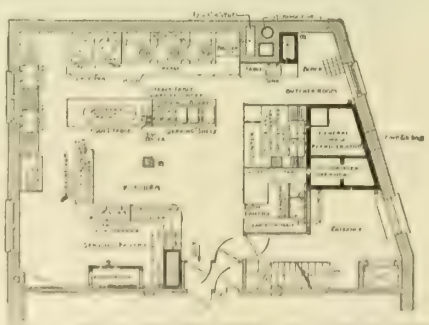


FIG. 1. PLAN OF KITCHEN, BARRE HOTEL CO., BARRE, VT.
GEO. M. BARTLETT, Architect, New York, N. Y.

After consideration of these factors, an equipment is recommended which not only represents completeness in equipment, but also real kitchen service—scientific, simplified, efficient and economical.

Suggested plans and specifications as well as estimates will be gladly supplied, free of charge, and without obligating the inquirer, on receipt of such request from architects or others in authority. These inquiries should be accompanied with full particulars and blue-prints, if possible. A representative will be sent for consultation, if necessary, to discuss possibilities and costs.

Upon acceptance of contract, full detail drawings are prepared by this organization, together with plans showing roughing-in dimensions for all fixture plumbing, steam, gas and electrical connections.

Equipments.

The Bramhall, Deane Company service includes the careful consideration of kitchen proper, dish pantry, serving room and all other related cooking and service departments. In the table on the third page following are indicated the more important elements which should be included in the average equipment. This table is only suggestive; since every case presents individual problems which can be solved only after intelligent consideration of all the factors involved.

For example, the installation shown in Fig. 1 was designed for a hotel of about 100 rooms, operating all year, on the American plan. Provision had to be made for some automobile business which develops during the summer months and which is mostly à la carte service. Note the course the waiters take coming from dining room; they drop the soiled dishes as soon as they pass through the doorway; then they get the clean dishes, and go to the steam table to fill their orders of meat, vegetables, etc., continuing around to the coffee urns for the last supply. There is no congestion of waiters anywhere, nor any criss-crossing to interfere with quick, efficient service.

Fig. 2 illustrates a hospital installation planned to meet the needs of 3,000 to 4,000 patients, both male and female. The food is placed in tin food carriers by the cooks, placed on small push wagons and wheeled into dining rooms. Note the number of steam cookers and kettles, as most of the food in these large institutions is cooked by steam. Coffee and tea are drawn in large carriers and served direct on the tables in the dining room. The cooking equipment is arranged so that male and female patients can be taken care of with equal facility, and yet economically.

A good general rule to adopt in the selection of equipment is to give preference to units regularly kept in stock, as this will make replacement easier and less expensive in cases of breakage and burning out of parts.

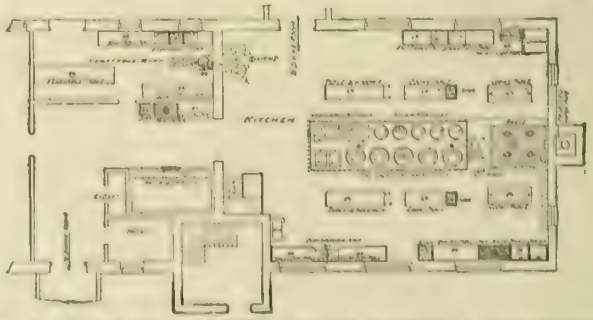


FIG. 2. PLAN OF KITCHEN, STATE HOSPITAL FOR INSANE, COLUMBIA, S. C.
GEO. E. LAFAYE, Architect, Columbia, S. C.

Continued on next page

Deane French Ranges.

The durability and efficiency of these ranges have recently been enhanced by several patented improvements.

Deane French Ranges cost more because they are worth more. They are the result of best workmanship, best material and best design.

All vital parts are made of Armco iron, the pure rust-resisting iron of uniform quality. All fuels, whether coal, wood or gas, subject the range to corrosive sulphur fumes, and alternating heating and cooling hurry the rusting process. Armco iron resists these attacks better than any other sheet iron or steel.

Features—(1) Oven door supports so constructed that they can not be broken by allowing the door to drop suddenly.

(2) Water-backs of various sizes may be put into any of the fire-chambers to suit the capacity of the boilers.

(3) Grates, either flat, anticlinker, duplex revolving, or a semi-revolving grate, as desired, in any range.

(4) Adjustable flue-brakes for adjusting the draft for each oven.

(5) New patent flue-door which can not be misplaced.

(6) Patent non-warping oven bottom, so made that the bottom is always level.

SIZES, ETC., HOTEL TYPE DEANE PATENT FRENCH RANGES

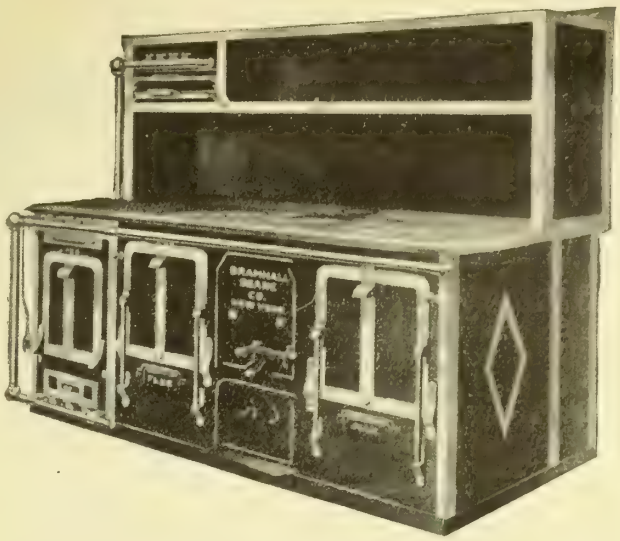
OTHER SIZES TO ORDER

Extreme Length	Floor Space	Size of Flue	No. of Fires	Ovens No.	Ovens Size
3′ 0″	36″ x 26″	8″ x 8″	1	1	16¾″ x 15 ″ x 12″
3′ 6″	42″ x 29″	8″ x 8″	1	2	12 ″ x 19½″ x 13″
4′ 0″	48″ x 29″	8″ x 8″	1	2	12½″ x 19½″ x 14″
4′ 6″	54″ x 33″	8″ x 8″	1	2	14½″ x 24 ″ x 14″
5′ 0″	60″ x 33″	8″ x 8″	1	2	16½″ x 24 ″ x 14″
6′ 0″	72″ x 39″	8″ x 8″	1	2	22¾″ x 28 ″ x 16″
7′ 0″	84″ x 39″	10″ x 10″	2	2	28 ″ x 18 ″ x 16″
8′ 0″	96″ x 39″	12″ x 12″	2	2	28 ″ x 22¾″ x 16″
9′ 0″	108″ x 39″	12″ x 12″	2	3	28 ″ x 20¼″ x 16″
10′ 0″	120″ x 39″	12″ x 12″	2	3	22¾″ x 28 ″ x 16″
10′ 6″	126″ x 39″	12″ x 12″	3	3	28 ″ x 18 ″ x 16″
12′ 0″	144″ x 39″	12″ x 12″	3	3	28 ″ x 22¾″ x 16″
14′ 0″	168″ x 39″	12″ x 12″	3	4	28 ″ x 18 ″ x 16″
16′ 0″	192″ x 39″	12″ x 16″	4	4	28 ″ x 22¾″ x 16″
17′ 6″	210″ x 39″	12″ x 16″	5	5	28 ″ x 18 ″ x 16″
20′ 0″	240″ x 39″	12″ x 16″	5	5	28 ″ x 22¾″ x 16″

NOTE—All sizes are made in either brick-set or portable form, and have the anticlinker or revolving grate, as desired. Fuel can be hard or soft coal, or wood, as ordered.

HOTEL TYPE DEANE PATENT FRENCH RANGE, BRICK-SET, PLATE 107-S

Range consists of two primary units, which are the basis of all hotel work Water-backs, Plate Shelves and Flat or Revolving Grates, as ordered



RESIDENCE TYPE DEANE COMBINATION COAL AND GAS FRENCH RANGE, PLATE 20-S

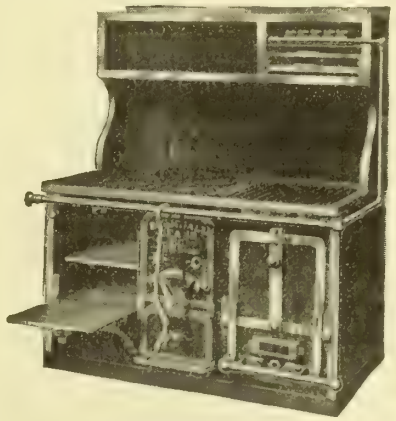
Water-backs, Plate Shelves and Flat or Revolving Grates, as ordered

Coal range, 4 feet 6 inches long; one fire, two ovens. One 18-inch gas range. Double plate warming shelf shown. Elevated gas broiler over gas range, right or left of coal range, as preferred

REGULAR SIZES

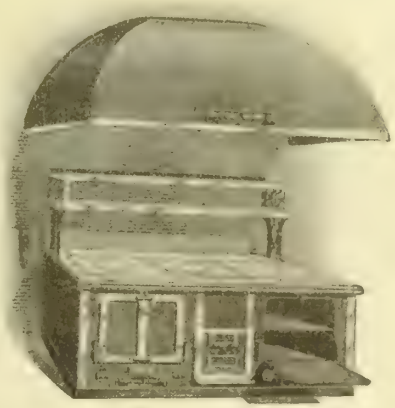
Coal Range				Gas Range	
Length	Depth	Ovens No.	Ovens Size	Front	Oven
5′	2′ 5″	2	19½″ x 12 ″ x 13″	18″	23″ x 14″ x 12″
5½′	2′ 5″	2	19½″ x 12½″ x 14″	18″	23″ x 14″ x 12″
6′	2′ 9″	2	24 ″ x 14½″ x 14″	18″	23″ x 14″ x 12″
6½′	2′ 9″	2	24 ″ x 16½″ x 14″	18″	23″ x 14″ x 12″

Other sizes to order; special sizes for heating large quantities of water.



DEANE COMBINATION GAS AND COAL RANGE FOR RESIDENCES, PLATE 209-S

One gas-heated oven, one coal-heated oven, and elevated broiler. A compact outfit easily kept clean. Regular size, 48 inches long, 27 inches deep, 30½ inches high. Size of ovens, 13½″ x 18½″ x 13″ high



DEANE PATENT FRENCH COAL RANGE AND HOOD FOR RESIDENCES, PLATE 210-S

Continued on next page

DEANE IMPROVED PLATE WARMER FOR STEAM OR GAS, PLATE 349-S

For hotels, clubs and institutions

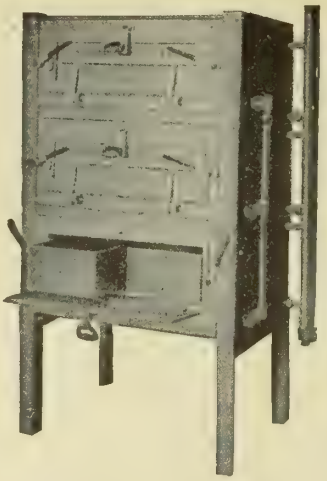
Made of heavy galvanized or planished black iron in width of 2½, 3, 3½, 4, 5 and 6 feet; all 5 feet high and 22 inches deep.

Made also in special types for residence pantries

PORTABLE CABINET OVEN, PLATE 275-S

For wood or coal; also made to be heated with gas

No.	Outside Dimn's, Ins.			Shelves	Sq. Ft. Baking Surface	Stoves in each
	H.	W.	D.			
114	45	32	32	3	12	1
115	55	37	32	4	18	1
116	63	37	32	5	24	1
117	63	42	32	5	28	1
118	63	74	32	10	48	2
119	63	84	32	10	56	2

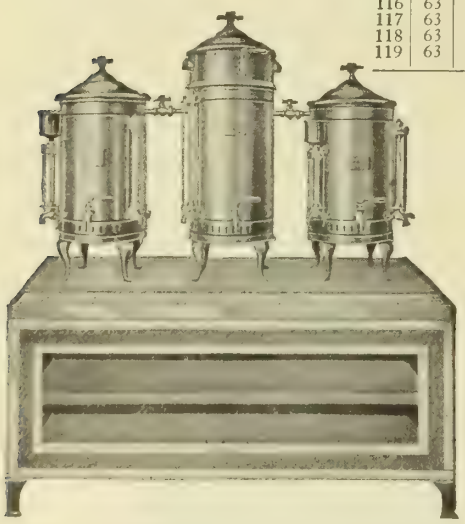


"ROYAL" SECTIONAL CAST-IRON STEAM COOKER, PLATE 330-S

Built on unit system; units measure 30 inches wide, 24 inches deep and 12 inches high, and are bound by heavy angle-irons extending to floor and forming legs to elevate sections to proper working height. Heavily constructed to stand hardest usage of hotel and institution work

DEANE KEYSTONE STEAM COOKER, PLATE 318

35-gallon, full jacket cooker, for roasting and boiling by steam. Body cast in one piece; steam chamber extending under bottom and around sides; boils contents readily at moderate steam pressure. Tested at 150 lbs. pressure. Conveniently cleaned. Approximate weight, 600 lbs.; greatest outside diameter, 32 inches; height, 35 inches



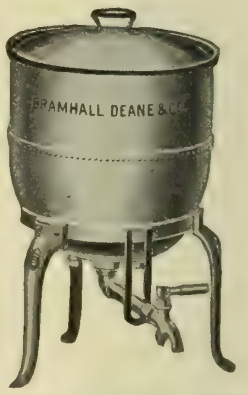
DEANE URNS FOR COFFEE, TEA AND WATER, PLATE 398-S

With milk top. Heated with steam, gas, oil, electricity, gasoline or acetylene gas. Sizes for 3, 4, 5, 6, 8, 10, 12 and 15 gallons.

Galvanized or Russia iron cup heater

DEANE CAST-IRON STEAM VEGETABLE KETTLE, PLATE 323-S

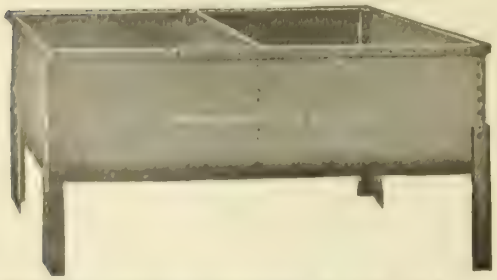
Constructed for use for confined steam circulation for boiling purposes, or for free live steam for steaming purposes. Four sizes: 15, 25, 33 and 55 gallons capacity



COPPER STEAM JACKET KETTLE

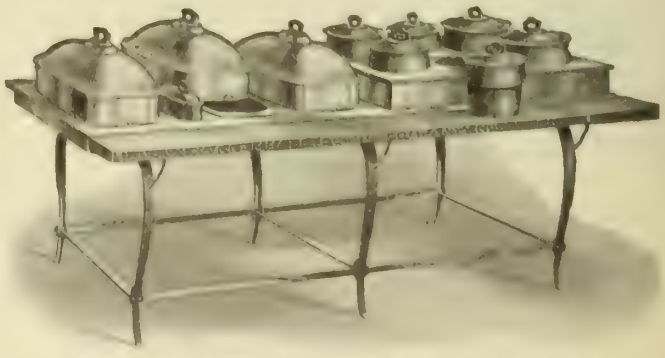
Made also in aluminum

Capacities 5 to 300 gallons. Riveted jacket, with loose or hinged copper covers



POT AND VEGETABLE SINK, PLATE 420-S

Plain or galvanized iron. Any size desired, single or double, with or without drain boards. On heavy boiler plate, with riveted and caulked joints, bottom dished to brass waste connection, with ground-in plug and chain. Will not rust, absorb grease or wear out



DEANE IMPROVED CARVING TABLE, PLATE 357-S

Heavy copper, tinned inside; tinned or highly polished outside. Built any length. Heated by steam, gas or electricity. Above outfit has 3 meat platters, 2 gravy boats, 2 soup and 4 vegetable dishes and ash carving board 8 feet long. Dishes are enameled, with heavy tin covers

Continued on next page

Suggested Specification Form.

This contractor shall deliver and set all of the following equipment for kitchen and supplementary service, furnishing all necessary materials to complete the job and leaving the work ready for steam plumbing and electric connections to be made thereto by other contractors.

Item 1, Range—One Deane's patent Armco Iron French range, 39 inches wide, containing ..... ovens and ..... fires; fires lined with extra quality fire brick, and fitted with revolving, dumping and shaking grates; ovens to have quadruple section non-warping Armco iron bottoms of No. 14-U. S. gauge; to measure ..... wide, 28 inches deep and 16 inches high; oven doors to be of platform pattern, with springless lifting latches and forged hinges; body of range to be made of No. 16-U. S. gauge Armco iron, with top of extra heavy gray iron castings, trimmed with heavy polished band iron around doors, top and bottom, and to have polished guard rail; tops to be neatly fitted together. Range provided with revolving dampers, and concealed flue brakes for independent control of each oven.

Item 2, Plate Shelf—One plate shelf to be set on top of range 14 inches wide and ..... long, made of same material as range.

Item 3, Broiler—One Armco iron charcoal broiler and base with closet for storage of charcoal, complete with revolving blower having counterweights and chains, wrought iron oval bar gridiron. Broiler to be made of same material as range, trimmed to match and connected to range with brightly polished binding strip.

Item 4, Cabinet Oven—One galvanized iron cabinet oven, measuring ..... long, ... deep, containing five shelves.

Item 6, Pot Sink—One wrought iron pot sink ..... long, ... wide, ... deep, made of No. 12 boiler plate, flush riveted inside, having a 1½-inch angle flange around entire top edge, fitted with 2-inch waste outlet, to be mounted on 1¼-inch iron pipe legs, with flange feet to bolt to floor.

Item 8, Cook's Working Table—One cook's table ..... long; top made of No. 10 boiler plate in one piece, having a 3-inch flange turned down on all four sides with welded rounded corners. Entire top and flange to be highly polished, and to be mounted on tubular cast-iron galvanized legs with ball feet. Table to be provided with one galvanized iron drawer.

Item 9, Saucepan Rack—One triple bar wrought iron saucepan rack ..... long, 24 inches wide, with bars made of 2 x ¼-inch steel, having square shouldered hooks studded on both faces of bars 6 inches apart. With wrought iron bar hangers to suspend from ceiling.

Item 10, Vegetable Steamer—One heavy cast-iron vegetable steamer of ..... gallons capacity, containing two heavy tin perforated baskets. Top of steamer to have water seal edge and to be fitted with a cover and provided with draw off pipe and brass faucet mounted on cast-iron legs.

Item 11, Soup Stock Kettle—One ..... gallon heavy copper riveted jacket pattern soup stock kettle, tested to 100 pounds pressure, lined inside with pure tin, complete with brass pipe and faucet, loose copper cover and iron stand.

Item 12, Vegetable Peeler—With direct-connected motor; capacity, 15 pounds [to 60 pounds].

Item 13, Ice Cream Freezer—One ice cream freezer with best quality cedar tub and retinned steel can, for electric current with direct-connected motor.

Item 14, Urns—One set of coffee urns, to consist of one hot-water urn and two coffee urns; made of heavy cold-rolled copper, nickel-plated, and fitted with all necessary valves, gauges, etc., to be heated by steam [gas or electricity].

Item 15, Cup Heater—One cup heater for above urns made of heavy planished black iron, fitted with two shelves. To be trimmed with brightly polished band iron, and to have a Tennessee marble top full length and width.

Item 16, Steam Table—One heavy copper steam table ..... long, ... wide, tinned inside, standpipe overflow and waste outlet with water seal top edge, and provided with ..... meat platters and openings for ..... vegetable and ..... gravy dishes; vegetable and gravy openings to be fitted with seamless porcelain enamel dishes, and all dishes and meat platter covers to have retinned steel covers; to be mounted on iron stand and fitted with an 8-inch ash carving board. To be heated by steam [gas or electricity].

SIZES OF OUTLETS FOR STEAM, RETURN, WATER AND WASTE CONNECTIONS

Item	Steam	Return	Hot Water	Cold Water	Waste
Sink	...	...	½"	½"	2"
Steamer	⅜"	...	...	½"	...
Soup	½"	½"	...	½"	...
Peeler	...	...	...	⅜" hose connec-	...
Coffee Urn	½"	½"	...	½" tions	...
Milk Urn	½"	½"	...	...	...
Water Urn	½"	½"	...	...	...
Heater	¾"	¾"	...	...	...
Steam Table	½"	½"	...	...	...
Stand	¾"	¾"	...	...	...

TABLE INDICATING MAIN UNITS RECOMMENDED FOR VARIOUS TYPES OF EQUIPMENTS

Unit	Hotels, 100 Rooms		Hospitals, 100 Beds	Association Buildings	Clubs, 300 Members	Residences $15,000	Residences $30,000 or over
Kitchen Equipment							
		Plate No. *					
Range	12-ft.	107-S	One 12-ft.	One 8-ft. (two)	One 12-ft. (three)	One 4-ft. (two oven)	One 5-ft. (two oven) } Plate
Gas Stove						One 18-inch	One 18-inch } 210
Charcoal Broiler	30-in.				One 30-in.		
Gas Broiler	24-in.		One 30-in.				
Vegetable Steam Kettle	One 33-gal.	323-S	Two 33-gal.		One 33-gal.		
Cast-iron Steam Jacket Kettle	One 40-gal.	318-S					
Copper Steam Jacket Kettle	One 50-gal.	314-S	One 40-gal.		One 40-gal.		
Upright Sectional Steam Cooker	One 3-compartment	330-S	One 3-compartment				
Cook's Table	One 15-ft.		One 15-ft.	One 10-ft.	One 14-ft.	One 5-ft.	One 6-ft.
Saucepan Rack	One 12-ft.		One 12-ft.	One 8-ft.	One 10-ft.		
Dish Warmer and Tray Table	One 8 ft.		One 6-ft.	One 8-ft.	One 8-ft.		
Carving Table	One 10-ft.	357-S	One 7-ft.		One 10-ft.		
Cup Warmer	One 4-ft.	398-A S	One 4-ft.	One 4-ft.	One 4-ft.		
Roll Warmer	One			One			
Oven	One No. 117	275-S	One No. 117	OneNo.216-gas	One No. 117		
Pastry Kettle	One 10-gal.						
Dough Trough	One 4-ft.						
Baker's Table	One 6-ft.						
Ice Cream Freezer	One 20-qt.		One 20-qt.	One 30-qt.			
Dish Pantry Equipment							
Dish Washer	One		One	One	One		
Dish Washer Table	One		One	One	One		
Cutlery Renovator	One						
Plate Warmer	One 5-ft.	349-S	One 4-ft.		One 4-ft.	To Fit	To Fit
Tables for Silver	One				One		
Vegetable Peeling Machine	One		One		One		
Vegetable Sink	One		One		One		
Pot Sink	One		One		One		
Meat Block	One		One	One	One		
Table	One		One	One	One		
Bain Marie Pan	One		One	One	One		
Serving Pantry Equipment							
Table	One			One	One		
Combined Griddle and Waffle	One			One			
Roll Warmer	One						
Egg Boiler	One 3-cup		One 3-cup	One 2-cup			
Urns	Three 5-gal.	398-A S	Three 5-gal.	Three 8-gal.	Two 5-gal.		
Sterilizers for Bandages, Water and Instruments			Depending on Character of Hospital				

*Plate numbers given are illustrated on preceding pages.

KITCHEN SERVICE COMPANY

Manufacturers and Distributors of Dishwashing Machinery and Kitchen Equipment

1325-1335 Old Colony Building
CHICAGO, ILL.

Products.

"Minit" Cleansing Machines; Dishwashing, Bottle-Washing and Sterilizing Machines; Hotel and Restaurant Dishwashing Machinery; Kitchen Equipment; Kitchen and Sink Fixtures.

"Minit" Electric Cleansing Machine for the Home.

The Permanent Electric "Minit" Cleansing Machine for the Home is installed in connection with the kitchen sink. The tank, pedestal and top of this machine are cast of gray iron, finished in porcelain, to match the enamel of the best modern sink. The dotted lines in the illustration show the installation of the water pipes and invisible wiring connecting the machine. The top of the machine becomes the drainboard of the sink.

The pipe connection at the bottom of the machine shows the small amount of water that is required. The drain-pipe at the side of the machine automatically carries off the water at this level. Only the amount of water that will stand below this drain-pipe is required for the operation.

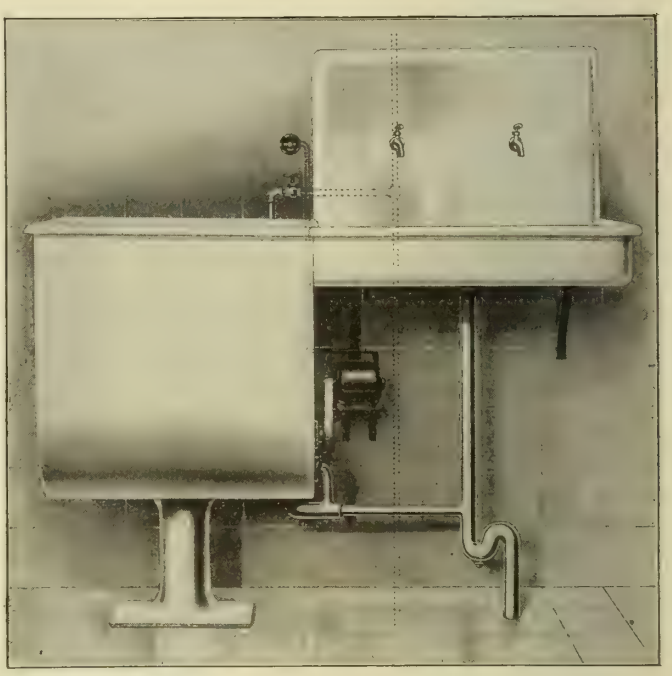
Automatic Electric Power Cleansing Machine.

The Automatic Electric Power Cleansing Machine, for restaurants, hotels, etc., has the cleansing compartment at the right and the rinsing compartment at the left of the machine, as illustrated by sectional view. A small amount of water is required for each operation, the bottom of the tank being filled with water to a point below the basket level. The shafts in the machine operate up to 600 revolutions per minute. This operation constantly forces the water up against the top of the machine, the water returning by gravity to the basin, to be forced up through the dishes hundreds of times in a single minute of operation.

Another view shows the soiled dishes at the right, ready to go into the cleansing compartment. As these dishes go in, those that are already in the cleansing compartment are automatically passed on to the rinsing compartment, while those in the rinsing compartment are automatically passed to the position shown at the left. These dishes have been thoroughly cleansed, rinsed, sterilized, and dried by their own heat, and are ready to be placed on the shelves. One minute's operation is all that is necessary to take care of both processes. This machine is made in types having a capacity for cleansing from 2400 to 9000 dishes per hour. Larger machines and machines of special sizes will be built on order.

Advantages.

In addition to providing an efficient means of solving the drudgery of dishwashing, the Permanent Electric "Minit" Cleansing Machine for the Home adds materially to the beauty of the home and saves space. It appeals to the sense of cleanliness, as well as to the desire to save money, time and trouble.



PERMANENT ELECTRIC "MINIT" CLEANSING MACHINE, FOR THE HOME
Showing how machine is installed in connection with the kitchen sink

The distinctive advantage in connection with the "Minit" Automatic Electric Power Machine for hotels and restaurants is that it can be constructed in sizes to meet all requirements. Such devices as have heretofore been used for this purpose have been of such elaborate and expensive character that they were of advantage only to the largest hotels and restaurants.

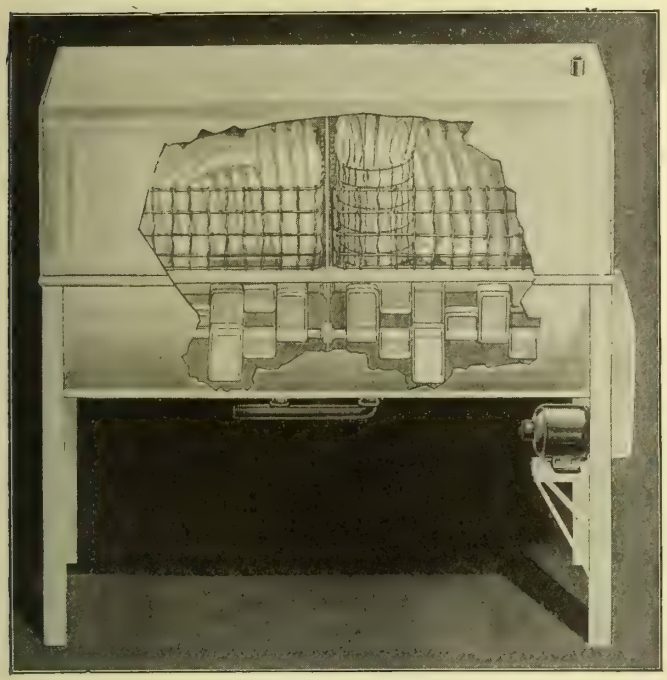
PERMANENT ELECTRIC CLEANSING MACHINE, FOR THE HOME
Showing how machine is installed without taking up any usable space

Continued on next page

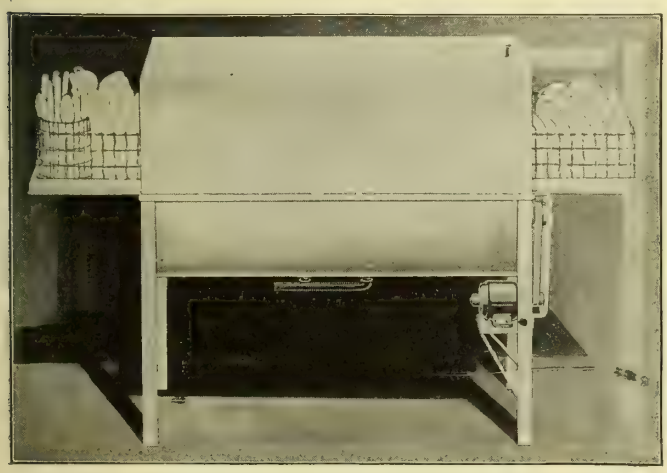
Economical Features.

A particular feature of the economy of the "Minit" Cleansing Machine is represented in the fact that only a trivial amount of water and electric current is necessary. It removes the meanest drudgery and solves the servant problem.

With the use of the "Minit" Cleansing Machine, one person should do the work of ten; there is no breakage; and the installation of a machine in the average restaurant will save the owner the price of the machine the first month or so, and thereafter pay him a good income by doing away with help and giving him more space in his kitchen.



AUTOMATIC ELECTRIC POWER MACHINE
Sectional view, showing how dishes are located during operation of cleansing and rinsing



AUTOMATIC ELECTRIC POWER MACHINE
Another view, showing the convenient manner in which dishes are handled

Sanitary Features.

The "Minit" Cleansing Machine thoroughly sterilizes, cleanses and dries all kinds of utensils with which your food is prepared and served. There can be no sanitary restaurant with hand-washed dishes, and it will pay any hotel or restaurant owner to advertise that his dishes are thoroughly sterilized with a "Minit" Cleansing Machine.

Special Note to Architects.

There seems absolutely no question but that every builder of apartments will readily grasp the opportunity to install "Minit" Cleansing Machines. This is borne out not only by the general knowledge of the advantages of these machines to apartment houses, but by personal interviews with numerous apartment house builders on the subject.

The demand for Permanent Electric "Minit" Cleansing Machines for installation in apartment houses can be better understood when it is realized the trivial percentage of added cost that the installation of these machines will mean upon the investment of the apartment house builder. The built-in conveniences are the primary means of renting apartments and keeping them rented.

Styles and Sizes.

Permanent Residence Machines—The floor space necessary for installation of Permanent Residence Machines is twenty inches by twenty-four inches, the dimensions of the machine, which stands thirty-two inches high. The height can be varied slightly by the adjustable pedestal. The body of the machine stands eight inches from the floor.

The sink trap must be located not more than two inches above the floor, and the wall switch controlling the motor should be at least twenty-four inches above the machine, when closed ready for operation.

This machine includes the drainboard of the sink and will fit sinks that use drainboards twenty inches in width by twenty-four to thirty inches in length.

SIZES, ETC., OF RESTAURANT MACHINES

Model No.	Height, Open, in Inches	Height, Closed, in Inches	Width in Inches	Length in Inches	Distance from Floor in Inches	Floor Space Occupied by Machine only in Inches	Floor Space for Operator and Operating Tables in Inches	Size of Drain in Inches	Size of Intake in Inches
1–R	63	53	24	36	14	26 x 40	26 x 84	2	1
2–R	63	53	24	42	14	27 x 46	27 x 94	2	1
3–R	63	53	24	48	14	28 x 53	28 x 101	2	1
4–R	63	53	24	60	14	30 x 65	30 x 113	2	1

Co-operative Services.

Prices, literature, or any information desired, may be had on request.

POWELL'S STEEL KITCHEN CO.

Manufacturers of Buffet Kitchens and Cabinets

175 West Jackson Boulevard
CHICAGO, ILL.
(Care of Building Material Exhibit)

101 Park Avenue
NEW YORK, N. Y.
(Care of Architects' Samples Co.)

Products.

POWELL'S BUFFET KITCHENS and POWELL'S "BUILT IN" WALL KITCHEN CABINETS.

Powell's
TRADE-MARK

These steel kitchens are sanitary and high-grade, and especially adapted for diet kitchens in hospitals.

When kitchen is used in a butler's pantry, another electric heating element is placed in the upper section and makes a warming oven.

Powell's Buffet Kitchen, (Patents Pending).

Description—This is a complete kitchen, in a closet eighteen inches deep, seven feet wide, and seven feet high, designed for one-, two- or three-room apartments and bungalows, butlers' pantries and diet kitchens.

Construction and Equipment—We furnish steel cabinet, white enamel, baked on, refrigerator enameled to match; standard insulation; forty pounds ice capacity.

Electric stove, electric oven and fireless cooker combined—each heat unit controlled by a three-heat switch; high, medium and low, to economize on current. The heating units are guaranteed. A master switch automatically cuts off the fuel supply when the front doors of the cabinet are closed, to prevent the forgetful housewife leaving it burning when cabinet is shut.

A three-burner gas stove and portable oven can be furnished in place of electric if so ordered.

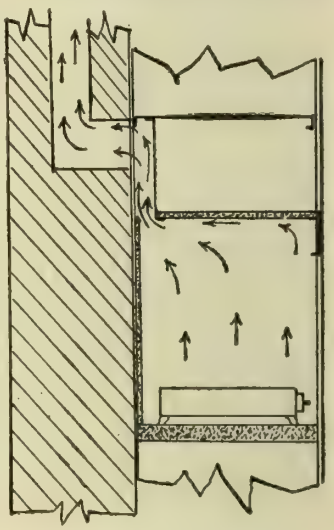
The stove recess is porcelain enameled, with asbestos insulation.

There are two drawers inside the lower cupboard for linen, etc.

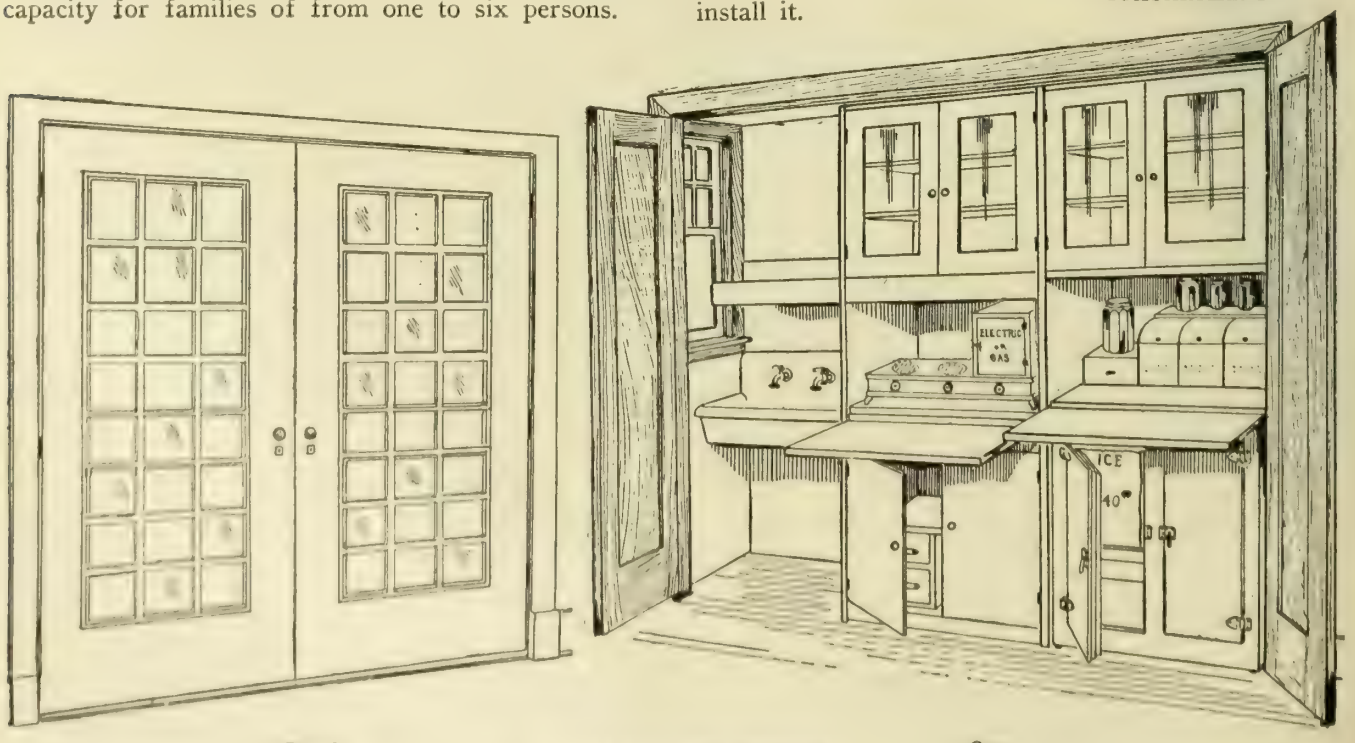
The entire kitchen is a consistent unit; every part designed especially for its place, so that it has a good appearance. It is very compact, and of sufficient capacity for families of from one to six persons.

Economy—Powell's Buffet Kitchen in steel occupies only ten and one half square feet of floor space, and it is evident that this is the minimum space that a complete kitchen can occupy. As a kitchen is used only ten per cent of the time, the extra space usually wasted in an old-fashioned kitchen should be utilized in rooms that can be rented. Therefore this modern buffet kitchen is a space saver and money producer.

Considering the great demand all over the country for the smaller apartments, this "built-in" kitchen meets that need. Its neat appearance, either open or closed, pleases the most fastidious and it is really a saving to the builder to install it.



SECTION SHOWING METHOD OF VENTILATING STOVE COMPARTMENT



Closed Open

POWELL'S BUFFET KITCHEN

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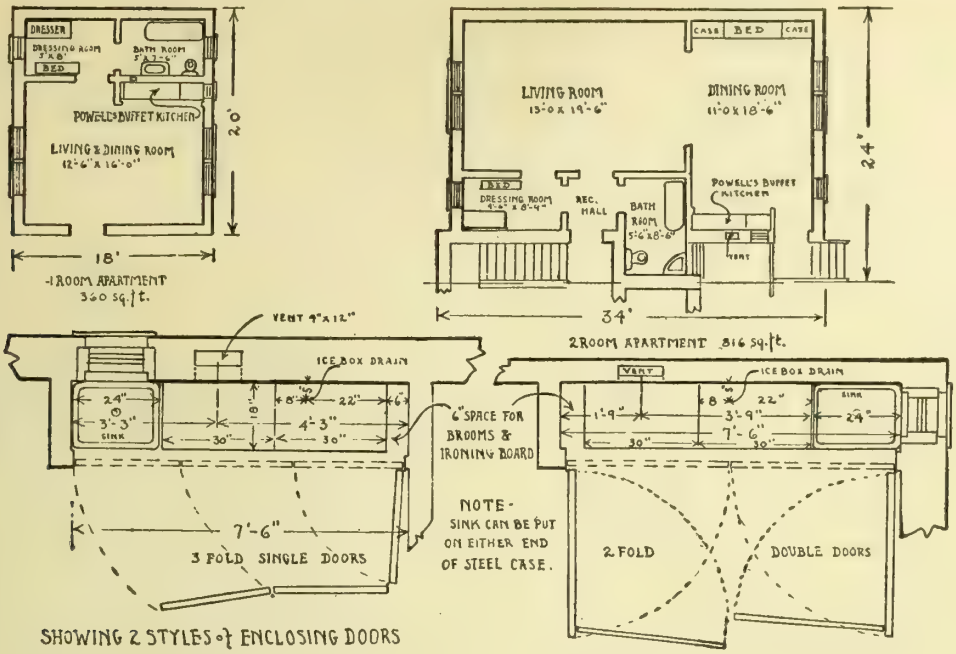


SUGGESTIONS FOR INSTALLATION OF POWELL'S BUFFET KITCHEN

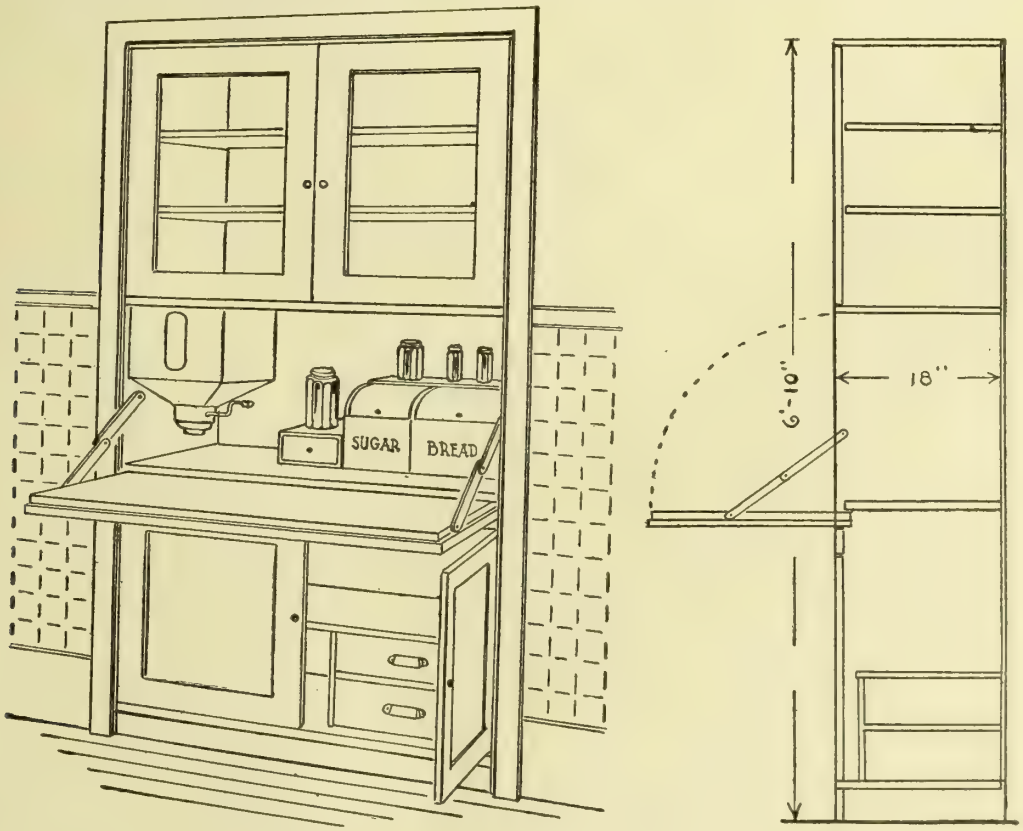
Powell's "Built In" Wall Kitchen Cabinet (Patented).

A completely equipped modern kitchen cabinet with sufficient cupboard space to eliminate the necessity of a pantry. It stands in a recess in the room and when closed is flush with the wall; is the height of the doors and takes the trim of the kitchen.

Construction—Made either of steel, white enameled inside and out; or of birch, with the inside of top white enameled, inside of base clear varnish, and the outside finish natural birch. A trim can be put on the edges to match the trim of the room.

Size—Cabinet saves space and does not project into the room. Eighteen inches deep, forty-two inches wide, six feet ten inches high.

Equipment—Furnished with flour bin and sifter; metal bins with roll top for bread and sugar; metal cutlery drawer; glass coffee, tea, salt and pepper jars.



Front View Side View

POWELL'S "BUILT IN" WALL KITCHEN CABINET

WASMUTH-ENDICOTT CO.

Manufacturers of Built-in Kitchen Cabinets

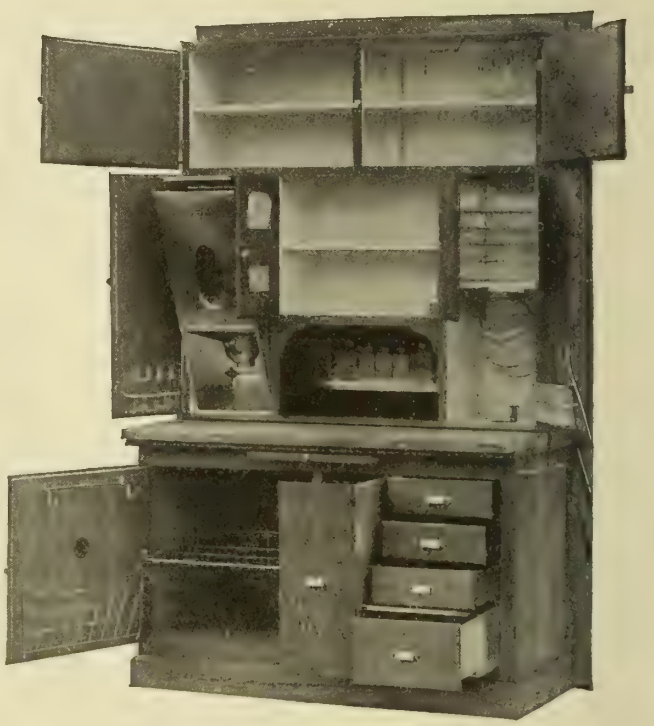
FACTORY AND MAIN OFFICE
ANDREWS, IND.

Products.

The "KITCHEN MAID" BUILT-IN CABINETS, built to suit the Builder in design and to fit the available space in dimensions.

The "KITCHEN MAID" line of modern PORTABLE KITCHEN CABINETS, for which a wall space of 42 inches is necessary.

TRADE-MARK



MODEL K-88 "KITCHEN MAID" CABINET

Advantages of the "Kitchen Maid" Built-In Cabinets.

We build the "Kitchen Maid" to fit any available space, furnishing estimates with blue-prints and working plan on request.

Accompanying view of our K-88 shows a desirable model that can be used either cased up against the wall, placed in the wall or through the wall with the cupboard front flush, as the available space will permit. Elevations show two desirable designs, but these can be varied to suit the space. If floor plans are submitted, we will furnish drawings of cabinet to suit, utilizing our modern conveniences throughout.

The "Kitchen Maid" is built to conserve space and to save labor, by organizing the kitchen equipment, and to make for cleanliness and sanitation with its pure white cornerless cupboards and smooth surfaces over all.

Glass Coffee, Tea, Cereal and Spice Jars; Recipe File, Memo and Pencil Holder; Compartments for Ice, Milk, Bread Tickets, and Change Tray. Complete in every detail.

Submit floor plans, and ask for details.

Specification.

Material—Made of thoroughly kiln-dried white oak. Doors either sanitary, flush five-ply oak (as shown), or built-up with three-ply oak panels.

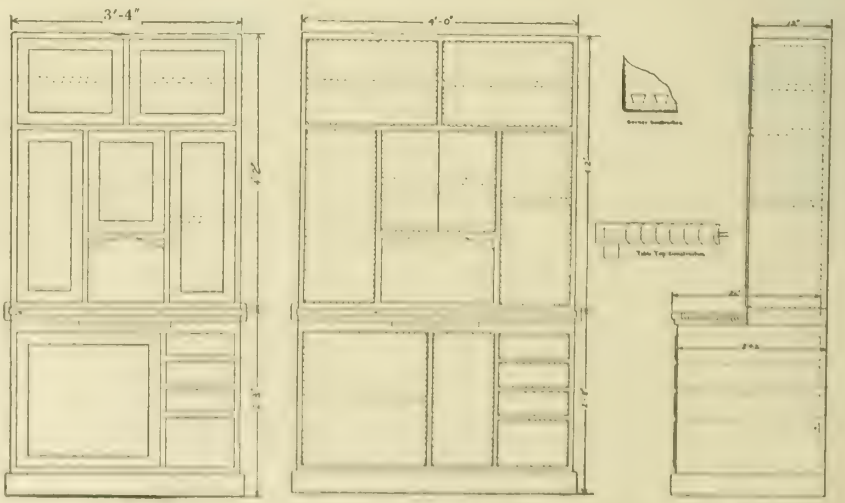
Construction—Top dovetailed at all corners, as detailed. Shelves mortised into ends. Drawers dovetailed at front and back. Base thoroughly glue blocked and rigid. Cupboards have round corners to make cleansing easy.

Hardware—Nickel-plated.

Table Top—White maple 1¼-inch thick. Built of one-inch strips joined and bolted and reinforced with heavy metal (concealed) to prevent warping. No glue joints. Treated with our special waterproof preparation. This heavy sliding top travels on rollers and comes out easily and smoothly. Fully guaranteed.

Finish—Natural oak, varnished with high grade waterproof varnish and hand rubbed or as desired. Cupboards enameled in ivory white.

Equipment—Extra-heavy Silver Tin Flour Bin (tilts forward for filling and is easily removed); Bread Box and Pastry Compartment with tinned wire shelves; Glass Sugar Bin;



Front Model J S | Front Model K S8 | Side Models J S and K-88

ELEVATION AND SIDE VIEWS OF TWO STYLES OF "KITCHEN MAID" CABINETS

ATEN SEWAGE DISPOSAL COMPANY

TELEPHONE CONNECTION

286 Fifth Avenue
NEW YORK, N. Y.

Products and Services.

The ATEN SANITARY SYSTEM OF SEWAGE DISPOSAL, consisting of REINFORCING FORMS for CONCRETE WALLS, CAST IRON MANHOLE COLLAR and COVER, METAL TOP for CONCRETE ROOF, AUTOMATIC SEWAGE SIPHON, CAST IRON DIVERTING GATE CHAMBER, DOUBLE POROUS DISPOSAL TILES, and other Accessories.

TRADE-MARK

ENGINEER for SEWAGE DISPOSAL. Prospective purchasers of this system (complete in every respect) may, upon application, learn, without expense or obligation, exact cost necessarily to be incurred for permanent solution of any sewage problem, by simply stating number of wash stands, bathtubs, toilets, source of water supply, size of plot, character of soil, slope of land and number of users of system, when installed.

Scope of Use.

With an adequate supply of water, the Aten Sewage Disposal System was designed to meet requirements of large and small country homes, clubs, hotels, plants, factories, or institutions, which are not connected with city sewers. It can be applied to single buildings, to groups of buildings, or to each building in a group; and, generally, each case must be treated according to local conditions.

Aten System of Sewage Disposal.

It lasts a lifetime. Sewage is conducted from house plumber's soil pipe into a Bacterial Liquifying or Septic Tank (A) (see diagrams), made of reinforced concrete; contents thereof are subjected to anærobic bacterial action —decomposition of solid matter in bottom of tank—with consequent production of gases and breaking up and partial liquefaction of all "sludge." No chemicals used. Tank and final discharge are absolutely odorless. Sewage remains in tank from twelve to twenty-four hours, owing to local conditions. No operating expense.

Tank overflow (sewage effluent) passes into a concrete Siphon Chamber (B), where a special automatic siphon completely empties the effluent, at intervals, into a concrete Diverting Gate Chamber (C), with gates to deflect fluid into desired subsoil percolation tile field. Gates opened and closed alternately each week.

Disposal Tile Field—Composed of porous double tiles laid in trenches at a grade; "Ys" distribute sewage effluent evenly into various lines of tiling. While one field is drying out, the other is being used, and, in these fields, *bacteria complete final oxidation or purification.*

Installation.

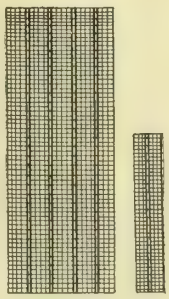
System is simple; installed by unskilled labor.

DATA

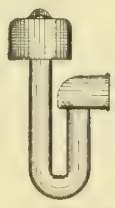
No.	Number of Persons.	Shipping Weight.	Net Price.
	WITH SIPHON OR DIVERTING GATE CHAMBER		
4	1 to 4	350 lbs.	$65.00
5	4 to 8	385 lbs.	75.00
6	8 to 12	425 lbs.	92.00
25	12 to 18	550 lbs.	125.00
26	18 to 25	600 lbs.	150.00
36	25 to 40	800 lbs.	200.00
	DATA, WITHOUT SIPHON OR DIVERTING GATE CHAMBER		
41	2 to 4	150 lbs.	$25.00
51	4 to 8	175 lbs.	35.00
61	8 to 12	200 lbs.	45.00

Catalogues, References, etc.

Write for catalogues, forms, etc. References sent on request.

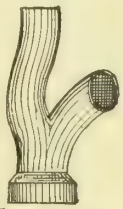


REINFORCING FORMS FOR CONCRETE WALLS

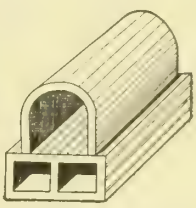


AUTOMATIC SEWAGE SIPHON

DIVERTING GATE CHAMBER



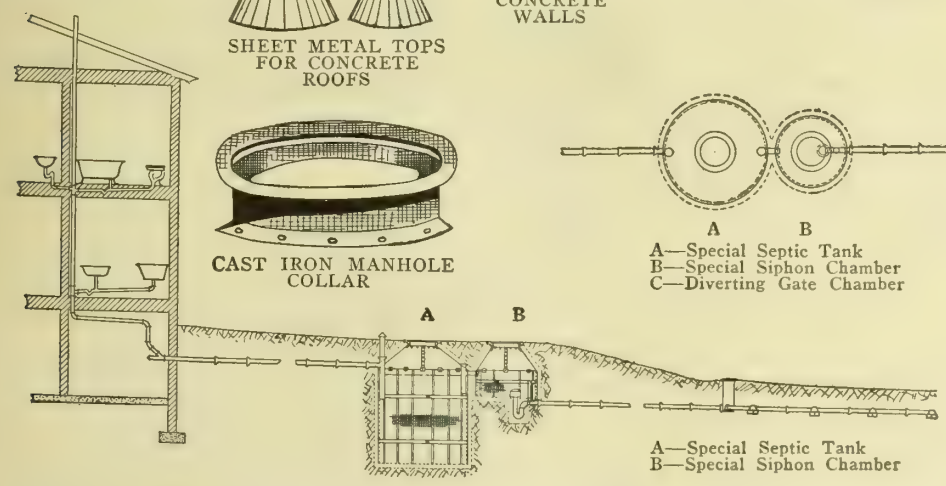
Y-BRANCH TILE



DISPOSAL TILE

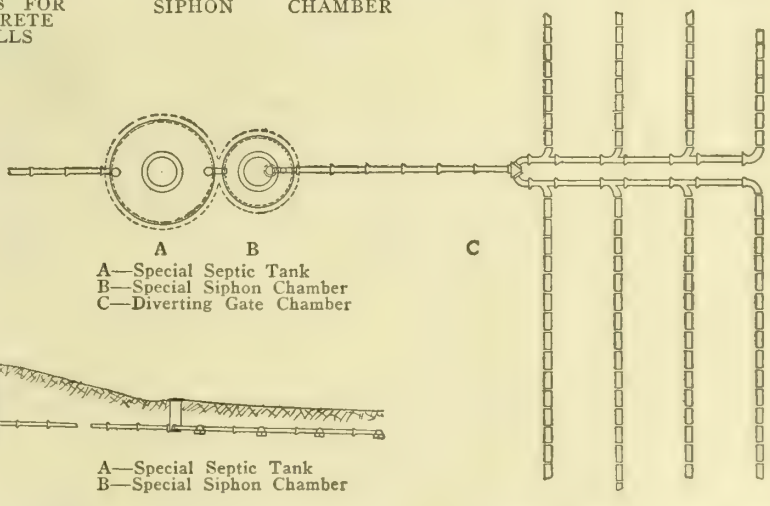
SHEET METAL TOPS FOR CONCRETE ROOFS

CAST IRON MANHOLE COLLAR



A—Special Septic Tank
B—Special Siphon Chamber
C—Diverting Gate Chamber

ELEVATION SHOWING INSTALLATION OF ATEN SANITARY SEWAGE DISPOSAL SYSTEM AND A FEW ACCESSORIES



A—Special Septic Tank
B—Special Siphon Chamber

ARRANGEMENT OF TANKS AND TILE FIELDS

KERNER INCINERATOR CO.

598 Clinton Street

MILWAUKEE, WIS.

AGENCIES IN ALL PRINCIPAL CITIES

Product.

THE KERNER BUILT-IN-THE-CHIMNEY INCINERATOR.

Features of Design and Use.

First—An incinerating chamber built into the base of the chimney, fed through receiving doors from the floors above. This means a maximum convenience and economy of space. The receiving doors are usually located in the kitchen; but in apartment buildings these doors may serve two or more tenants on a floor by being located in a common hall. Each incinerator is designed to fit its own exact location, and is usually constructed according to working plans furnished by us with the metal parts, by the mason contractor when the building is being built.

Second—The incinerating chamber is designed with a Kerner by-pass grate (patented), which insures perfect combustion from the top down, without odors. The by-pass permits oxygen to reach the point of combustion, as shown by the arrows in the illustration. A proper mixture of oxygen with the burning waste and gases is made possible by the Kerner by-pass grate (patented), so that the obnoxious gases usually created by burning garbage are entirely consumed.

Third—All manner of refuse is handled, i.e., waste paper, rubbish, tin cans, kitchen waste, bottles, broken crockery, sweepings, etc. The bottles break, and the tin cans crumble up, and everything else burns to a fine ash. The convenience of being able instantly and permanently to dispose of all household rubbish is as much a point of excellence as is that of disposing of garbage. This is particularly significant in apartments where a large percentage of the janitor's time is employed in collecting waste and emptying and cleaning garbage cans.

Fourth—No gas or other commercial fuel is required. The waste paper, pasteboard, and other dry combustible material are more than sufficient to dry out the kitchen waste, which is itself combustible when dry.

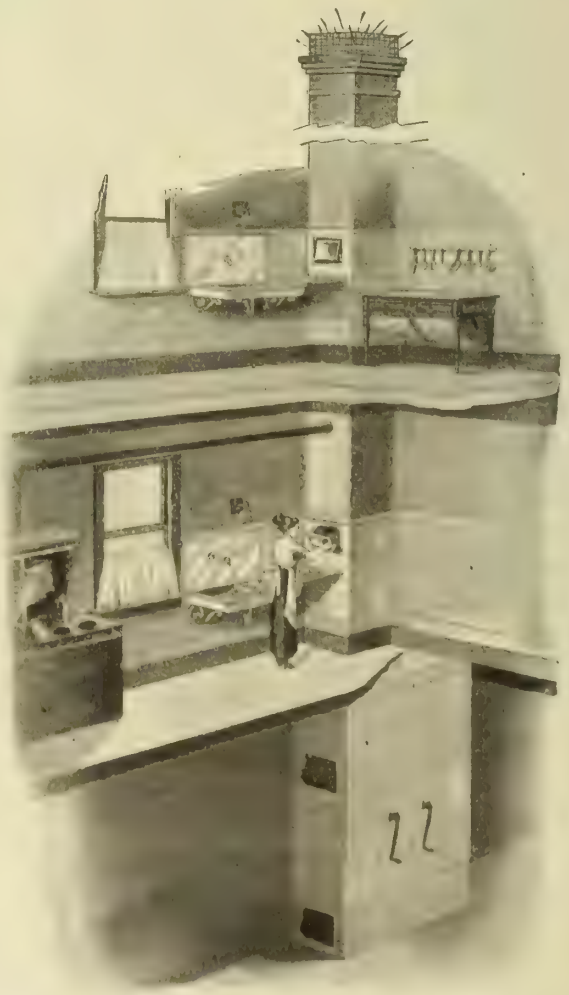
This we have demonstrated by years of experience with the average household, although additional heat by way of extra assurance can usually be had by connecting the smoke-pipe of the laundry stove or heater to the incinerator.

Special Advantages.

The Kerner built-in-the-chimney incinerator differs from all others in many respects.

First—It is not only a garbage destructor, but an omnibus refuse incinerator. It handles waste paper, tin cans, bottles, rags, broken crockery, in fact waste of every description. Household waste is as dangerous as garbage, though not so offensive to the senses.

Second—It occupies no space in the kitchen—merely a receiving door into which anything and everything is dropped. This point is particularly advantageous with reference to apartment buildings where kitchen space is so valuable, and it does away with the necessity for back porches, the usual place for garbage and refuse receptacles.



"BUILT-IN THE-CHIMNEY" INCINERATOR

Continued on next page

Third—It operates without gas or other commercial fuel, so there is no cost of operation.

Fourth—It is built in the chimney and is a permanent part of the building.

Fifth—There are no odors. All obnoxious gases are entirely consumed.

Usually there is an odor when garbage is burned. The reason for this is, that ordinarily oxygen (without which there can be no combustion) passes up through the grates and fire and by the time it reaches the top of the fire it is entirely consumed, so that the inflammable gases and carbon, lacking oxygen, can not burn but go off into the air in the form of obnoxious gases and smoke.

The Kerner patented by-pass flue and by-pass grate feed oxygen into the gases formed at the top of the fire, so there is a proper mixture at this point and the gases and carbon are consumed. It is not unlike a Bunsen burner.

Sixth—No replacement of grates is necessary. The arrangement of the grates is such that they are never subjected to sufficient heat to burn them out.

Seventh—It requires no attention on the part of the operator. The fire is lighted, and the incinerator requires no further attention until the next burning. Grates are dumped once in two months, and ashes removed three times a year.

Eighth—It abolishes garbage and refuse cans.

To Architects.

We have an Engineering Department at your service, which upon receipt of floor plans illustrating conditions immediately surrounding kitchen chimney, including basement and height of basement from floor to ceiling, will make and forward to you complete working drawings and specifications. With these drawings any competent mason can install our incinerator; but it is our policy wherever possible, to superintend, or at least to inspect, the installation as the work progresses.

The following flue areas must be observed:

Number of Floors	Number of Receiving Doors	Minimum Flue Area
1	1	12″ x 12″
2 to 4	1 or more	16″ x 16″
5 to 6	5 or more	17″ x 21″
7 to 8	7 or more	21″ x 21″
9 or more	9 or more	25″ x 25″

Guarantee.

If, within six months after a fair trial of the incinerator, it should be deemed unsatisfactory, the purchaser may return the doors, frames and grates to the Company, and receive in return the purchase price, together with the transportation charges.

This has been our standing guarantee for five years. We have never had an outfit returned.

Kerner incinerators have been in successful operation for several years, and are in daily use by thousands of families. Upon application, we shall be pleased to refer you to users in almost any of the larger cities of the United States.

KERNER "BUILT-IN-THE-CHIMNEY" INCINERATOR. NOTICE THE DRAFT REACHING POINT OF BURNING THROUGH BY-PASS GRATE

THE NIGHTINGALE COMPANY

Ricketts Incinerators

TELEPHONE, Murray Hill 7767

103 Park Avenue
NEW YORK, N. Y.

Products.

Ricketts Incinerators (Patented August 4, 1914; April 27, 1915.

Also, Nightingale Wood-Block Flooring or Parquetry.

Ricketts Incinerator.

The Ricketts Incinerator is a sanitary receptacle and a complete destroyer, in homes, of garbage and other refuse; in institutions, of dressings, sputum boxes, garbage, sweepings and other waste; and in business offices, of canceled documents.

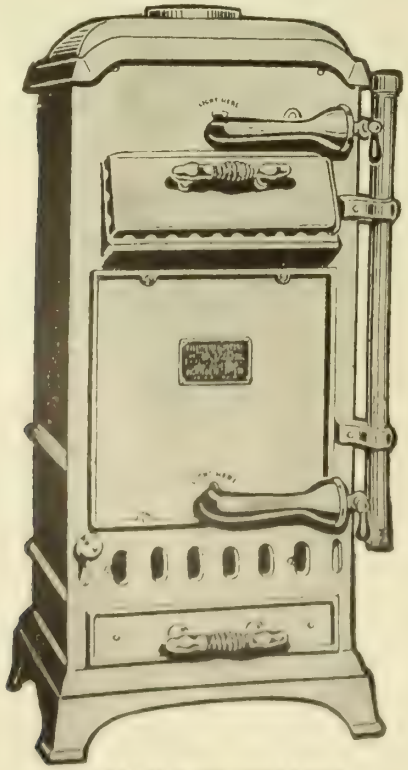
Description.

It consists of a primary combustion chamber, into which is thrown the refuse. Below the grate, forming the bottom of this chamber, and dumped in unison with it, is a trough to catch any drip. Between the grate and the trough is a hooded gas burner.

Above the primary chamber is a secondary combustion chamber with a gas burner, through which all of the products of combustion must pass. Outside each of the side walls of the primary chamber is a fire duct leading from below it into the secondary chamber; and on each side of the fire ducts are air ducts leading from the outer air into the top of the primary chamber.

Outside of the primary and secondary chambers and the ducts are air spaces. The asbestos-lined front plate contains the hopper door, gas connections, air inlets and dampers, and on the other three sides is an asbestos-lined sheet steel covering. Above is the top with flue connection, and below is the base and ash-pan.

It is made throughout of cast iron and sheet steel.



PORTABLE INCINERATOR

Operation.

The Incinerator is preferably placed in the kitchen or as near the source of waste as possible, and the refuse put into it as it accumulates. All odors pass up the chimney, so that ordinary refuse may be left as long as desired.

When the refuse is about even with the hopper door, the lower burner is lighted from the outside by means of the follower. The upper burner may be lighted or not, and is used to increase the draft and to decrease the smoke and odors going into the chimney. In the case of hospital waste it should always be used, as any germs passing up with the products of combustion are there destroyed.

The lower burner being lighted, the flame passes through openings in the grate and impinges itself directly upon the refuse. Dry, easily combustible material soon ignites. Wet refuse allowing a passage through it ignites after the moisture in it has been evaporated.

With very wet, compact refuse, not allowing any passage through it, the heated air passes down through the grate and up through the fire ducts, where the baffle plates, hindering its progress, allow the walls of the primary chamber to extract the heat, thereby hastening the drying of the refuse.

As the moisture evaporates passages are made and the heated air withdraws from the fire ducts and passes

WALL TYPE INCINERATOR

Continued on next page

up through the refuse. In all cases as soon as the refuse is capable of supporting combustion the gas should be turned off. The air ducts leading into the primary chamber provide the necessary oxygen for the combustion of the burning refuse and prevent the formation of carbon mon-oxide gas. All drip is caught in the trough and there evaporated and sterilized. When the refuse is completely incinerated the grate and trough are dumped before putting in any fresh waste.

Advantages.

The Ricketts Incinerator is economical in its consumption of gas and efficient in its destruction of refuse.

It is easy to take apart and is interchangeable throughout.

It does away with garbage cans, collectors, flies, and vermin.

It keeps the garbage off dumb-waiters, and reduces the cost of apartment house operation.

There are no odors indoors during the accumulation or incineration of the garbage.

The flame impinges itself directly upon the bottom of the refuse and not upon the grates.

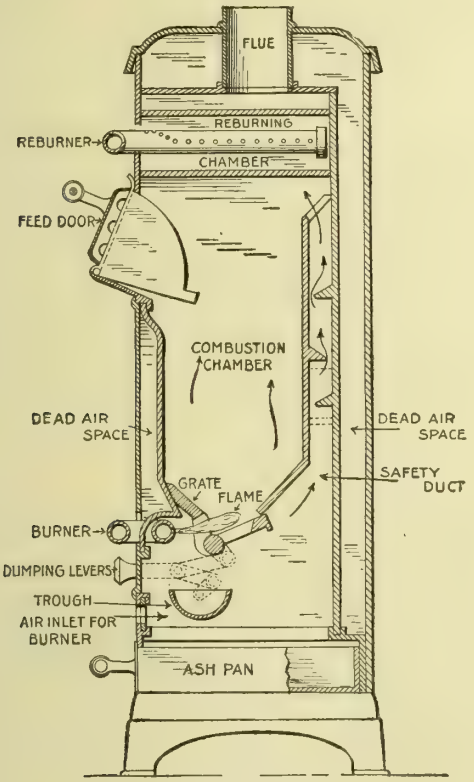
The burner cannot become clogged or the flame smothered by a compact mass of refuse.

There are no dangerous pilot lights, the lighting being done by a follower.

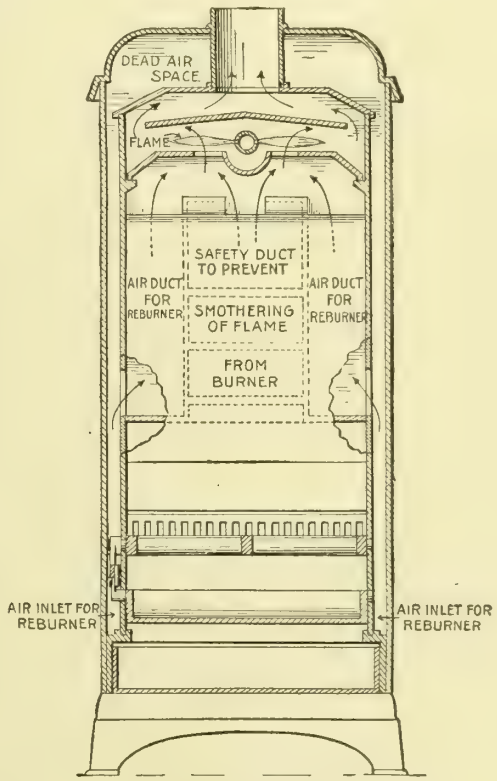
The grates dump away from the burner and trough and cannot be locked.

The air spaces and asbestos lining surrounding the combustion chambers reduce the outside radiation of heat to a minimum.

The Ricketts Incinerator is the most important factor in maintaining sanitary conditions.



Side Section



Front Section

RICKETTS INCINERATORS

PRICES, SIZES AND CAPACITIES OF RICKETTS INCINERATORS

No.	Type	Capacity of Combustion Chamber	Floor Space Occupied	OUTSIDE DIMENSIONS			Weight Crated	Price	
				Width	Depth	Height			
1	Portable	¼ Barrel 1412.5 cu. ins.	17 x 13 in.	15 in.	11 in.	37 in.	250 lbs.	$39.00	For ordinary household and hospital ward use
1	Wall	¼ Barrel 1412.5 cu. ins.		15 in.	11 in.	32 in.	225 lbs.	$39.00	
2	Portable	½ Barrel 2825 cu. ins.	20 x 20 in.	18 in.	18 in.	49 in.	550 lbs.	$60.00	For large households, hospital wards, telephone exchanges, banks, small restaurants, etc.
2	Wall	½ Barrel 2825 cu. ins.		18 in.	18 in.	42 in.	510 lbs.	$60.00	

Order by number and type.

The No. 1 has a single grate, and the No. 2 a double grate.

Full directions for installation and operation are sent with each machine so that any competent workman can install it. All that is needed is a proper flue and at least a ¾-inch gas supply. The lower burner of the No. 1 uses 25 to 30 feet of gas an hour and the lower burner of the No. 2 uses 50 to 60 feet an hour. A half barrel of ordinary household garbage takes about one hour to incinerate completely.

The Portable Type is used for buildings already constructed and is preferably placed in the kitchen or as near the source of accumulation as possible. The Wall Type is usually specified for new buildings, and is set into the chimney brace.

The regular finish is a jet black stove finish with nickeled fittings, but any special finish can be given. Prices upon application.

KEWANEE PRIVATE UTILITIES COMPANY

(FORMERLY KEWANEE WATER SUPPLY CO.)

MANUFACTURERS OF

Systems and Plants for Water Supply, Sewage Disposal, Electric Light, Vacuum Cleaning and Oil Storage

50 Church Street
NEW YORK, N. Y.

KEWANEE, ILL.

1212 Marquette Building
CHICAGO, ILL.

EASTERN FACTORY AND WAREHOUSE, LANCASTER, PA.

Products and Services.

KEWANEE SYSTEMS and PLANTS FOR ISOLATED AND PRIVATE SERVICE, which includes:

WATER SUPPLY SYSTEMS, COMPLETE PUMPING UNITS, and PNEUMATIC TANKS.

SEWAGE DISPOSAL SYSTEMS.

ELECTRIC PLANTS, with or without STORAGE BATTERY, for Light, Heat and Power.

STATIONARY VACUUM CLEANING MACHINES.

TANKS and PUMPS FOR GASOLINE AND OIL STORAGE, for Public and Private Garages, Stores and Factories.

A competent Engineering Department will cooperate with architects in planning and selecting apparatus for each particular requirement, and layouts will be made and submitted free of charge.

TRADE-MARK

In General.

The KEWANEE PRIVATE UTILITIES COMPANY provides high-grade equipment and dependable service for the average man in the out of the way place. They go together without mistake, start without coaxing, run without skilled attention, wear the longest time possible, and can be repaired by the unskilled man without shop tools or conveniences.

The Kewanee Plan.

Country homes should have a plan for complete equipment covering water supply, sewage disposal, electric lighting, heating, and the use of power for all work around the buildings that can be done by machinery; and every machine bought, every addition to buildings or equipment made, should be in accordance with this plan. Anyone who will write for and fill out our information blank will be supplied with such a plan free of charge.

"Elastic" Sub-Base.

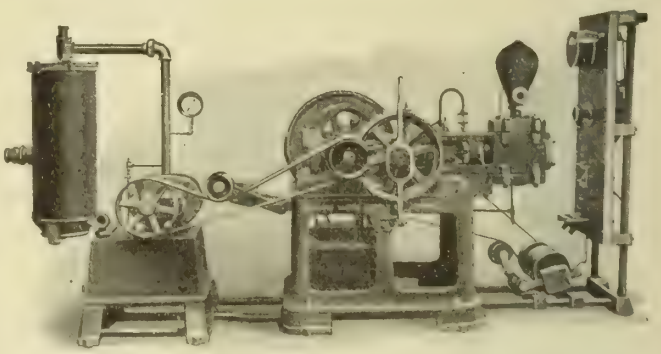
A Kewanee Gasoline Engine is a power plant that is of the greatest possible service; and owing to the method of mounting on the "elastic" sub-base, it not only drives the pumping unit, but other machinery, such as electric lighting plants, vacuum cleaning machines, cream separators, churns, washing machines, feed grinders, bone cutters, emery wheels, grindstones, etc.

The "elastic" features of the sub-base and jack-shaft allow for provision of special needs in each case, as is well shown in illustrations. Machines may be run separately or all together up to the capacity of the engine.

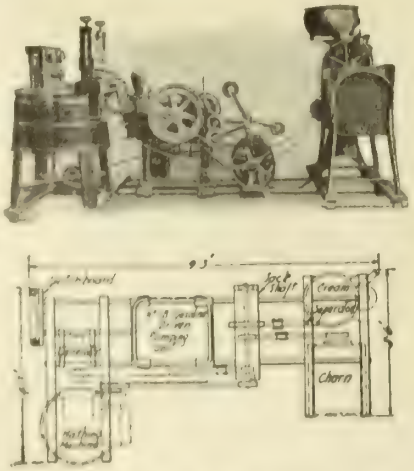
It can be bought all at once, or a piece at a time; no foundations are required, or "lining up" or fastening down. All expert work is done at the factory.

All machines are held off the floor, which can be flushed with water and kept clean and sanitary. No line shafts or countershafts attached to walls or ceilings to carry noise and vibration through the house.

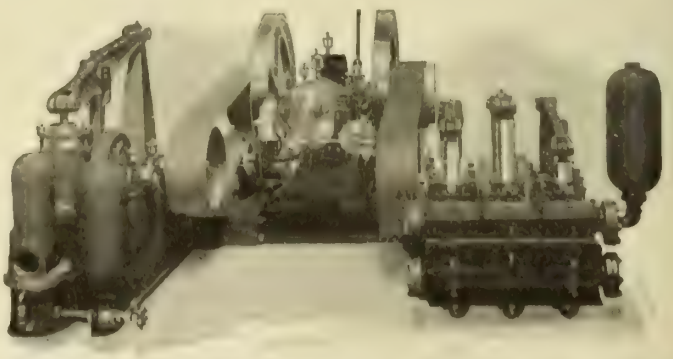
Where electric power is available and a gasoline engine is not required, the same system of mounting can be used for driving all the machines from one motor.



NO. 25 KEWANEE PUMPING UNIT, SUCTION TYPE, VACUUM CLEANING MACHINE, ELECTRIC LIGHTING PLANT



PLAN SHOWING SYSTEM OF KEWANEE MOUNTING



KEWANEE LONG STROKE TRIPLEX SUCTION PUMP, AND DIFFERENTIAL PLUNGER DEEP-WELL WORKING HEAD, DRIVEN BY KEWANEE GASOLINE ENGINE

Each machine mounted on a rigid cast iron sub-base, all bolted together. No lining up, no special foundations or fastening down

Continued on next page

Kewanee Bacterial System of Sewage Disposal.

The Kewanee Bacterial System of Sewage Disposal represents a scientific and highly approved simplification of the sewage problem for residences and other buildings not served by public sewers. It accomplishes its results bacteriologically, and without the use of any chemicals. It converts the sewage into liquid, and distributes it, over a disposal field, as pure, clean, inorganic matter, harmless to life or vegetation.

This system is recommended for installations having capacity requirements of not over twenty-four persons. For these capacities, the system is entirely automatic in operation, and requires no attention whatsoever. It is unaffected by changes in temperature, and is vented through the soil-pipe, all odors and gases being discharged through the soil-pipe stack above the roof.

A few Kewanee operating specialties and installation instructions, together with necessary construction materials purchasable locally, make it possible for any mechanic to properly install this system.

Bacterial Principle Involved.

The principle involved in a bacterial sewage disposal plant is very simple. Certain bacteria, called anaerobes because they thrive only when kept in the dark and out of contact with air, have the power to reduce vegetable and animal solids to liquids and gases. Certain other bacteria, called aerobes because they thrive only when kept in contact with air, have the power to purify this liquid product produced by the anaerobes, by oxydizing it and reducing it to pure water and harmless gases.

The bacteria necessary for this work exist everywhere, and all that is necessary to do in the development of a sewage system is to provide the best conditions for them to live and multiply in, subjecting the sewage, in turn, to each of the two kinds of bacteria.

Brief Description.

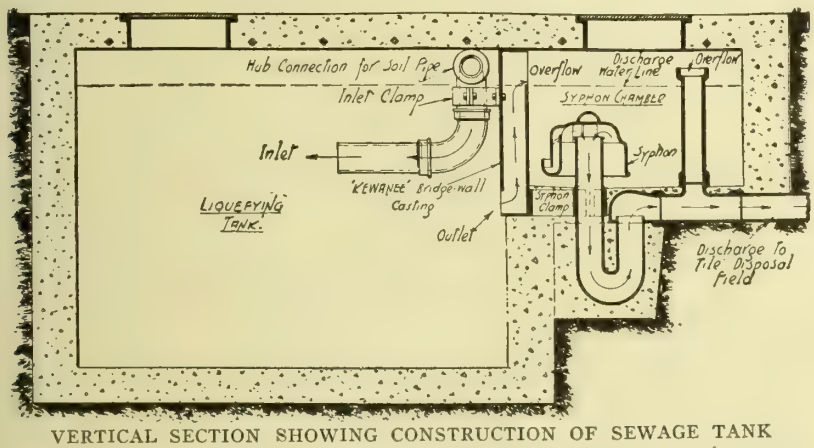
The Kewanee System consists, primarily, of a septic tank, or anaerobian breeding plant, into which the sewage is first passed and in which it is liquefied, and of a sub-surface disposal field through which the liquefied sewage is passed for exposure to air and aerobes, and consequent conversion into clean inorganic gases and pure water.

Fittings Supplied.

Kewanee bridge wall casting, inlet clamps, siphon and all necessary bolts; also two manhole rings and covers, when specified.

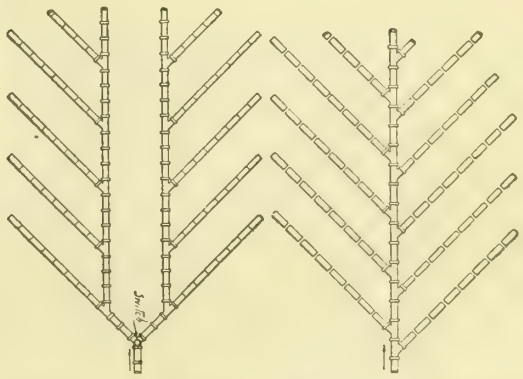
Information Required when Ordering.

(1) Number and kind of buildings; of plumbing fixtures. (2) Number of people using fixtures. Fixtures in basement. (3) Depth of basement floor below ground level. (4) Fall of ground in yard. (5) Is brook, ditch, or drain tile available for purified water? (6) City or private water supply. If private, give description of plant and well. (7) Kind and depth of surface soil; of subsoil. (8) Make rough sketch of buildings and grounds, giving distances. (9) Show direction and amount of fall of ground from buildings. Show location of well. (10) Show preferred location of liquefying tank and tile disposal field.



VERTICAL SECTION SHOWING CONSTRUCTION OF SEWAGE TANK

Tank of concrete and carefully proportioned according to capacity requirements. A simple casting carries inlet, outlet and vent openings, bridge wall and baffle plate between the two chambers, and fixes position of siphon. Entrance to outlet is vertical, and does not collect solid matter. Automatic siphon discharges periodically into the disposal field



Double Tile for large systems or heavy soil — Single Tile for small systems and light soil

DISPOSAL FIELDS

Distributing lines are of 4-inch land tile laid in long or short runs, straight or curved, with ¼-inch spaces between the one-foot lengths of tile

BULLETINS ON PRIVATE UTILITIES

A Complete Handbook of Information on Private Utilities for Country Homes is contained in our set of bulletins which total almost two hundred pages with only the necessary information and details. The complete set of bulletins, in neatly bound form, or any separate bulletins, will be sent to any architect on request.

The complete list of bulletins and the subjects covered are given below:

Bulletin "A"—Private Utilities and details of combination plants.

Bulletin "B"—Complete Kewanee System of Water Supply, giving method of operation and ranges in size.

Bulletin "C"—Kewanee "Indian Brand" Pneumatic Tanks from 140- to 20,000-gallon capacity.

Bulletin "D"—Kewanee Light Service Pumping Machinery with capacities up to 300 gallons per hour.

Bulletin "E"—Kewanee Standard Service Pumping Machinery with capacities from 100 to 1000 gallons per hour.

Bulletin "F"—Kewanee Long Stroke Triplex Pumps with capacities from 1500 to 10,000 gallons per hour, and working pressures from 75 pounds to 200 pounds.

Bulletin "G"—Kewanee Deep Well Working Heads. Capacity from 600 to 9300 gallons per hour. Maximum depth to water 300 feet.

Bulletin "H"—Kewanee Sewage Disposal System, explaining septic tank action and showing method of construction.

Bulletin "I"—Kewanee Gasoline Storage Tanks and Pumps for public and private garages.

Bulletin "J"—Kewanee Gasoline Engines, 1 to 4 horsepower.

Bulletin "K"—Kewanee Gasoline Engines, 4 to 50 horsepower.

Bulletin "L"—Kewanee Isolated Service Storage Battery Electric Plants.

Bulletin "M"—Kewanee Isolated Service Large Electric Plants with or without storage batteries.

Bulletin "N"—Kewanee Windmill Pumps.

Bulletin "O"—Kewanee Centrifugal Pumping Machinery.

Bulletin "P"—Kewanee Stationary Vacuum Cleaning Machinery.

SHONE COMPANY

Manufacturers of Shone Pneumatic Sewage Ejector

231 Institute Place

CHICAGO, ILL.

GENERAL AGENTS, YEOMANS BROTHERS COMPANY (See Pages in General Index)

Product.

The SHONE PNEUMATIC SEWAGE EJECTOR.

Co-operative Service and Specifications.

We will design pneumatic ejector plants for any duty and for all kinds of power, and install them complete in any part of the United States or Canada; or plants can be installed by any intelligent mechanic with the assistance of our printed directions.

All ejectors are tested in the shop before shipment.

Complete specification is given herewith.

Special Features of Shone Ejector.

The Shone Ejector is the oldest, best known and most highly regarded pneumatic sewage ejector in the world.

It has never been equaled for durability and certainty of operation.

There has never been a single failure in forty years of experience.

The ejector will operate for years without attention. Repairs are exceedingly rare and very inexpensive.

A glance at the appended list of buildings where Shone ejectors are used will be the most convincing argument possible.

Capacities and Dimensions.

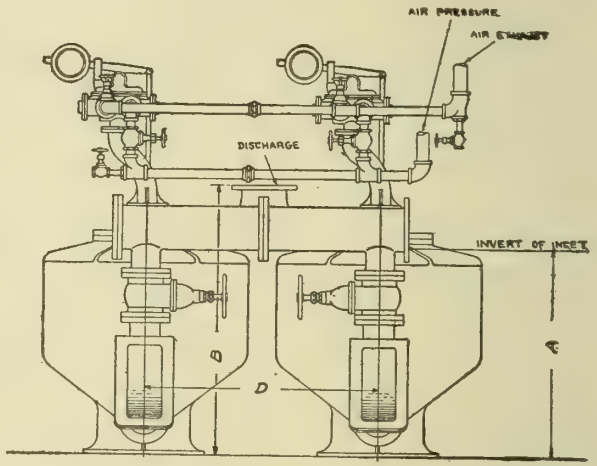
As per table herewith, and as shown in drawing.

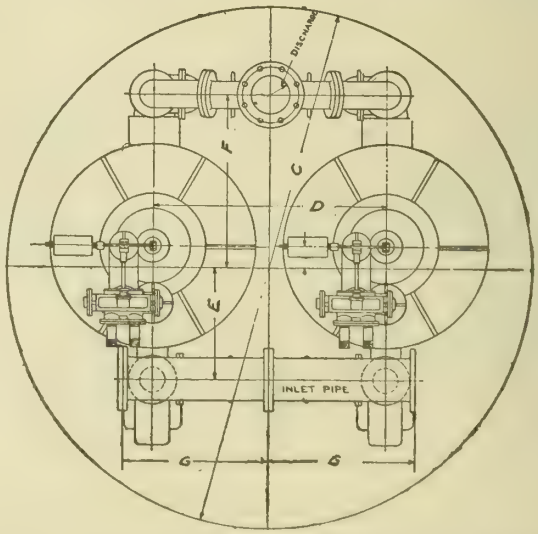
DIMENSIONS AND CAPACITIES

Gallons per Minute, Each Unit	Diameter of Pit, Ft.	Depth of Floor below Invert of Inlet Pipe, Ft. Ins.	Size of Inlet Pipe, Ins.	Size of Discharge Pipe, Ins.
50 Single	6	3 1	6	4
50 Duplex	8	3 1	6	6
100 Single	7	3 7	6	6
100 Duplex	9	3 7	8	8
200 Single	8	5 10	8	8
200 Duplex	11	5 10	8	8
250 Single	8	6 5	8	8
250 Duplex	11	6 5	8	8
500 Duplex	14	8 0	12	12
600 Duplex	14	8 7	12	12
1000 Duplex	16	9 0	16	16

Prices.

Upon request and receipt of necessary data as to head, volume, and character of power to be used.





PLAN AND ELEVATION SHONE PNEUMATIC SEWAGE EJECTOR
100 GALLONS EACH POT

TABLE OF DIMENSIONS

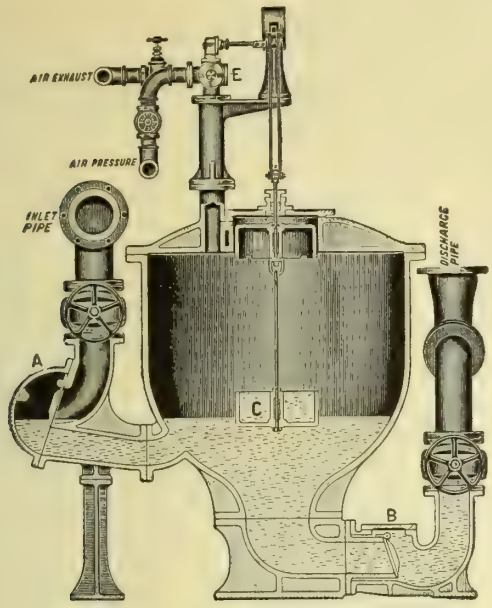
Gallons per Discharge Each Unit	A Ft. Ins.	B Ft. Ins.	C Ft. Ins.	D Ft. Ins.	E Ft. Ins.	F Ft. Ins.	G Ft. Ins.
50	3 1	4 5	8 0	3 4	2 0	2 6	2 2
100	3 7	4 8	9 0	4 0	2 3	3 0	2 6
150	4 5	4 8	9 0	4 0	2 3	3 0	2 6
200	5 10	5 3	11 0	5 6	2 2	3 5	3 5
250	6 5	5 3	11 0	5 6	2 2	3 5	3 5

Ejectors furnished in capacities up to 1000 gallons per minute: dimensions upon application.

Guarantee.

Eighteen months, covering all features supplied by this Company.

Continued on next page



SECTIONAL VIEW OF SHONE PNEUMATIC SEWAGE EJECTOR

Specifications.

This apparatus shall consist of two (2) Shone Hydro-Pneumatic Ejectors, two (2) Air Compressors, two (2) Electric Motors, two (2) sets of automatic starting and stopping apparatus, and one (1) Air Receiver. The ejectors shall be located in the chamber as shown on plans, and the compressors, motors, and other apparatus where directed.

Other parties will furnish a suitable chamber ready for the reception of the ejectors, ... feet internal diameter, with a concrete floor which will finish ..... feet ..... inches below the invert of ..... inch inlet sewer, run the sewage inlet and discharge pipes, and connect them to the corresponding flanged openings on the ejectors.

Electric current of the following description ..... will be furnished for the operation of the motors.

Ejectors—This contractor shall furnish and erect in the position shown on the plans two (2) Shone Hydro-Pneumatic Ejectors, each of a capacity of not less than ..... gallons at each operation, and capable of discharging this quantity at least once per minute. The ejectors shall be complete with all sewage and air pipes connecting them together. The sewage pipes shall terminate with inlet and outlet flanges, to which the plumbing contractor will connect.

Air Compressors—This contractor shall furnish and erect two (2) horizontal crank and fly-wheel air compressors, water jacketed, of approved make. Each compressor shall be capable of supplying air in sufficient quantity and of the requisite density to operate one (1) ejector as above described, continuously, against a total actual head of ..... feet.

They shall be located upon foundations to be built by another contractor in accordance with drawings to be furnished by this contractor.

Motors—There shall be furnished and installed two (2) motors, of an approved make, each to be capable of operating one compressor at its full capacity as specified. They shall be furnished with sliding bases. Foundations will be built by another contractor in accordance with the drawings to be furnished by this contractor.

(For steam-operated compressors, specify locomotive type steam compressors arranged for wall mounting.)

Automatic Air Pressure Regulators—This contractor shall furnish and install two (2) sets of automatic starting and stopping apparatus, and an air pressure gauge, mounted on a Monson slate panel, properly secured to a japanned angle-iron frame. The slate shall be not less than one and one quarter (1¼) inches thick, free from blemishes, and shall be well rubbed down with boiled linseed oil, giving it a dull black finish. It shall be located adjacent to the motors.

—This apparatus shall start and stop the motors within a range of five (5) pounds per square inch air pressure. It shall be cross connected and fitted with all necessary switches and fuses complete, so arranged as to cut the motors out of circuit at any time if current fails. (For steam-operated compressors, omit last sentence.)

Air Receiver—This contractor shall supply and erect, where directed, one air receiver of ample capacity to satisfactorily operate the ejector. It shall be constructed of the best quality flange steel, and tested to one hundred (100) pounds per square inch. It shall be furnished with one (1) pop safety-valve and one (1) blow-off cock.

Electric Wiring—(Omit if steam-operated.) This contractor shall supply wiring diagrams of the switchboard and motors to the electrical contractor, who will connect the switchboard to the wiring system and to the motors.

Connecting Pipes—Other parties will connect the compressors to the air receiver, the air receiver to the ejectors and pressure regulators, also the air exhaust piping from the ejectors, and the water circulation piping around the compressors. This piping to be complete with all necessary valves and fittings and to be in accordance with diagram to be furnished by this contractor.

Test and Acceptance—When completed, this plant may be tested, at the full combined rated capacity of the ejectors, of ..... gallons per minute, for a period of two (2) hours. If satisfactorily accomplished, it shall then be handed over to the architects for such testing within its capacity as they may see fit to do; after which, if found to comply in all respects with the provisions of this specification, it shall be accepted.

Guarantee—This contractor agrees to repair or replace, free of cost, any part in which any material defect may be found or develop within one (1) year of acceptance, provided same is not caused by carelessness or improper treatment.

REFERENCES

NEW YORK

Stock Exchange, Guaranty Trust, Bankers Trust, Bank of Commerce, Flatiron Building, Woolworth Building, Metropolitan Life Building, Whitehall Building, etc.

CHICAGO

Marshall Field & Co., Carson Pirie Scott, The Fair, Rothschild, Congress Hotel, Peoples Gas Building, Auditorium, Federal Building, C. & N. W. Depot, Orchestra Hall, American and United States Express Companies' Stables, etc.

PHILADELPHIA

Land Title Building, Widener Building, Wanamaker's Store, Baily, Banks & Biddle, Bellevue Stratford Hotel, Federal Building, etc.

ST. LOUIS

Union Depot.

CINCINNATI

Union Central Life Building, Hotel Gibson.

BOSTON

Copley Plaza, Fremont Building, Board of Trade.

And ejectors in all the buildings of equal prominence in all the large cities in this country, Europe, and South America.

KAUSTINE COMPANY, INC.

Manufacturers of Private Sewage Disposal Systems, Stationary Type Chemical Closets, Kaustine Germicides

Ellicott Square
BUFFALO, N. Y.

Products and Services.

KAUSTINE, a powerful Germ Destroying Chemical which accomplishes complete purification of sewage matter. The KAUSTINE COMPANY, INC., also manufactures the SYSTEM in which the chemical Kaustine is used, and illustrations on this page show the general plan of construction. For complete details of specifications and setting plans write the Company.

The KAUSTINE COMPANY, INC., supplies plans and estimates without charge for special systems for schools, factories, churches, hotels or wherever multiple or battery systems are required.

Scope of Use.

The Kaustine System, while entirely practical for most all purposes, accomplishing complete purification of sewage matter, or, in other words, ultimate disposal, is not intended to displace water-closets and sewers. It is expressly intended for use in districts suburban and rural where sewers and water supply are not available.

The Chemical Kaustine.

Kaustine is both a resolvent and germicide. Its efficiency is the result of three distinct features.

(1) Its first action is to soften and disintegrate solid portions of sewage, reducing same to a semifluid state, otherwise complete disinfection would be impossible.

(2) It kills all the germs, and all vegetable and animal matter are changed to a pure chemical state, thereby accomplishing complete disinfection and eliminating the odors of organic matter.

(3) It absolutely prevents putrefaction and decomposition; in other words, the sewage matter is changed to a state of preserved purity when it may be disposed of in any convenient place or easily converted into fertilizer.

Kaustine Private Sewage Disposal System.

Construction—The entire system is most substantially built of the best materials obtainable, designed so that liability of the pipes becoming soiled is reduced to a minimum, or on a par with water-closets. A scientifically designed ventilating system effectively carries off all germs and temporary odors. The principal features are the closet bowl, the chemical tank, ventilating system and agitator.

KAUSTINE SYSTEM INSTALLED IN BATTERY

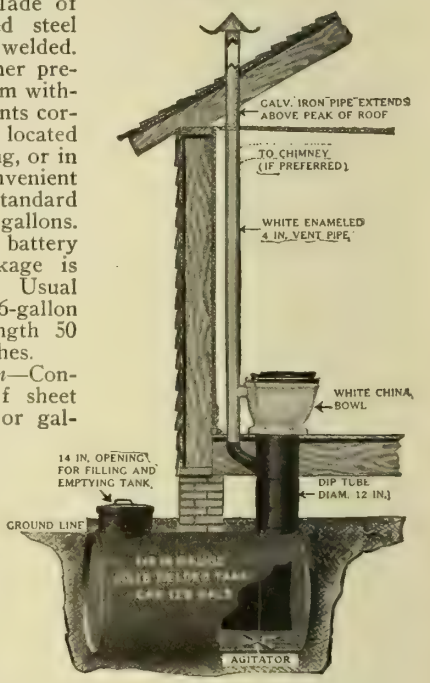
Specifications.

Closet Bowl—Made of earthenware (china) or vitreous enameled cast iron with seat of birch mahogany or oak, as desired, equipped with nickel-plated post hinges.

Chemical Tank—Made of No. 14-gauge coppered steel throughout, all seams welded. Besides the copper, other precautions lessen rust from without; chemical aid prevents corrosion within. Tank is located in ground under building, or in basement or other convenient place. Capacity of standard single-bowl tank, 126 gallons. For all multiple or battery systems standard tankage is 125 gallons per bowl. Usual dimensions of a 126-gallon standard tank are, length 50 inches, diameter 27 inches.

Ventilating System—Consists of pipes made of sheet iron, either enameled or galvanized to suit proposed location or requirements, equipped with vent cowl, roof safe and all necessary connections. The necessary vent area we have standardized at 12½ square inches per closet bowl.

Agitator — Agitator is a mechanical device inside tank, which operates by a rod from a point at rear of seat, agitates contents of tank, assists in liquefaction process, and increases efficiency of Kaustine.



KAUSTINE SEWAGE DISPOSAL SYSTEM

How shipped—Shipping weight of a standard single bowl system is approximately 280 pounds; closet bowl and seat are crated together. Ventilating system is packed inside the tank, Kaustine in separate drum. Shipping point, Perry, N. Y.

Special Kaustine urinals, ventilating, also provided.

Installation.

Kaustine Systems may be installed same as water-closets. Proper ventilating facilities and location for tank must be provided. Tanks may be buried in the ground, placed in cellar, or suspended below floor. In any event tank must be directly under closet bowl.

Method of Operation.

To make outfit ready for use, charge tank with Kaustine according to directions which are furnished. When tank fills, contents may be dipped out, pumped or drained where draining facilities are provided.

Cost of Operation.

The cost of supplying chemical Kaustine is about $5.00 or $6.00 per year for the average family. The average rate per person is greatly lowered with multiple system, depending upon location requirements, etc. Taking into consideration the slight liability to trouble and repairs the Kaustine System is cheaper to operate than a water system. Kaustine is sold to users at ten cents per pound in thirty-pound drums, and this price is permanently guaranteed by the manufacturer. Kaustine is supplied direct to users. In some localities it is handled by dealers.

ESTABLISHED 1895 INCORPORATED 1911

THE DONLEY BROTHERS CO.

Manufacturers of Garbage Receivers and Building Specialties

CLEVELAND, OHIO

DISTRIBUTORS IN PRINCIPAL CITIES

Products.

D-B Sanitary Garbage Receivers and Building Specialties.

For Concrete Inserts and Adjustable Foot Anchors, see our name in General Index.

Description.

D-B Garbage Receivers are sanitary, odorless, fly-proof and dog-proof, and are easily operated.

Can be conveniently placed in the porch floor, in the kitchen wall, in the ground, or in the walk near the back door.

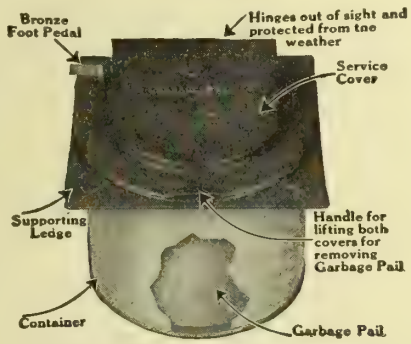
The distinctive D-B design makes it impossible to spill garbage into the container.

In each of the types, excepting the In-Wall, the lid is opened by merely stepping on the foot lever; a wide opening receives the garbage, and the air-tight lid drops when the foot is removed.

A large cover lifts on strong hinges for garbage removal.

D-B Garbage Receivers are simple in construction and practically non-breakable.

The top is made of cast iron, and the outer casing and garbage pail of heavy galvanized iron.

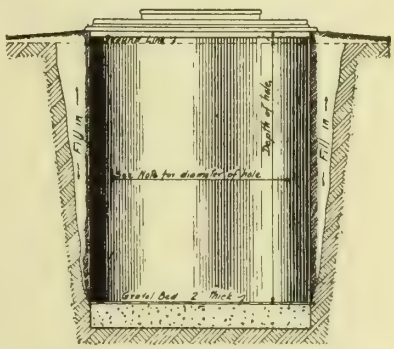


UNDER-FLOOR GARBAGE RECEIVER

A guarantee and an instruction sheet, covering the installation, use and care, are furnished with each D-B Garbage Receiver.

D-B Under-Ground Garbage Receiver.

Especially designed for use in connection with the private residence where for any reason it is not desirable to place receiver in porch floor. So constructed that garbage cannot get into container. No sewer connection is required.

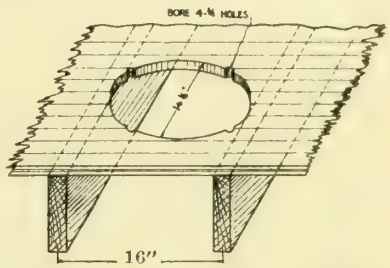

UNDER-GROUND GARBAGE RECEIVER

Data

No.	Capacity, Gals.	Height, Inches	Diam., Inches	Ship. Wt. Lbs.	Price
14-B	14	18	18	55	$9.00
21-B	21	21	18	66	11.50

D-B Under-Floor Garbage Receiver.

Equally suitable for the apartment house and residence; the smaller sizes designed especially for use in the apartment house. Occupies very little floor space and is inconspicuous.



UNDER-FLOOR INSTALLATION

Data

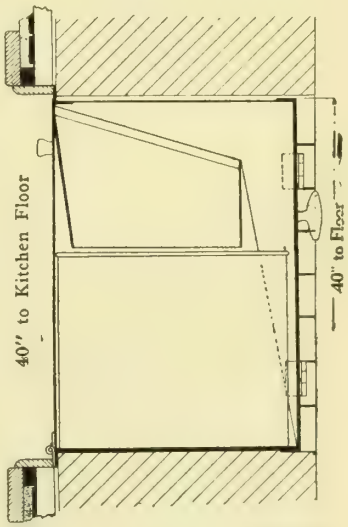
No.	Capacity, Gals.	Height, Inches	Diam., Inches	Ship. Wt. Lbs.	Price
6	6	10	14	30	$6.00
10	10	18	14	33	7.00
14	14	23	14	35	8.00

D-B In-Wall Garbage Receiver.

Built in the wall, filled from inside, emptied from outside, the D-B In-Wall Receiver makes an unusual appeal to the housewife.

It operates like a flour-bin; is so designed as to make it impossible to spill any garbage on the kitchen floor.

The container fits the frame so snugly as to make it air-tight.



IN-WALL GARBAGE RECEIVER

Data

No.	Gals.	Wall Opening, Inches	Ship. Wt., Lbs.	Price
6–A	6	20x14	70	$12.00
14–A	14	30x14	80	15.00

D-B On-Floor Garbage Receiver.

A detachable sanitary garbage receiver that can be fastened to porch floor by screws through the angle irons provided on the bottom rim of the container.

Its general design is the same as that of the Under-Floor type, with the addition of a lever rod to make possible its operation by foot.

Is equally adaptable to the apartment house and the private residence.

ON-FLOOR GARBAGE RECEIVER

Data

No.	Capacity, Gals.	Height, Inches	Diam., Inches	Ship. Wt., Lbs.	Price
6–C	6	10	14	30	$6.50
10–C	10	18	14	33	7.50
14–C	14	23	14	35	8.50

E. C. STEARNS & CO.

Manufacturers of Garbage Incinerators

SYRACUSE, N. Y.

Products.

GARBAGE and WASTE INCINERATORS —many types—for ordinary Household Use, Hospitals, Institutions, Apartment Houses, Department Stores, etc.

The Incinerite — IT SOLVES THE PROBLEM

TRADE-MARK

Construction and Operation.

The Incinerite is the pioneer refuse receptacle and destructor for domestic and other uses. Stores all forms of waste and refuse, abolishing all odor and necessity of handling. Destroys the waste cleanly and completely by incineration, using either natural or artificial gas or gasoline for fuel.

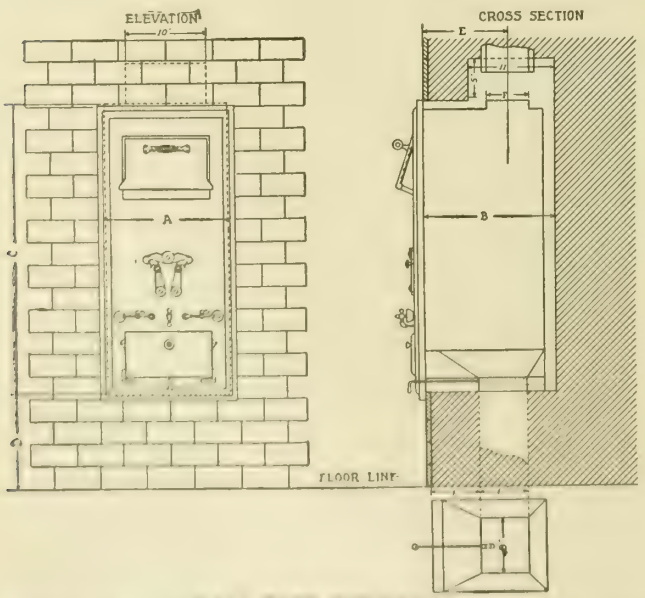
Scientifically constructed of iron and steel. Double gas-burners, protected against clogging. Dumping grates with interchangeable parts. Burns a minimum of gas.

The Wall Type.

This is the type usually specified by architects for new buildings. May be connected with the kitchen range flue without in any way decreasing the efficiency of the flue. Sets within the chimney brace with only its face exposed. Takes up no space whatever.

Inside-Dumping Wall Type.

This is a special type which we have just developed that does away with the need of taking the ashes out into the kitchen. It is provided with a special hopper, so that by pulling a slide, the ashes are dumped directly to a clean-out in the basement. Further particulars and drawings furnished on request.



WALL TYPE INCINERITE

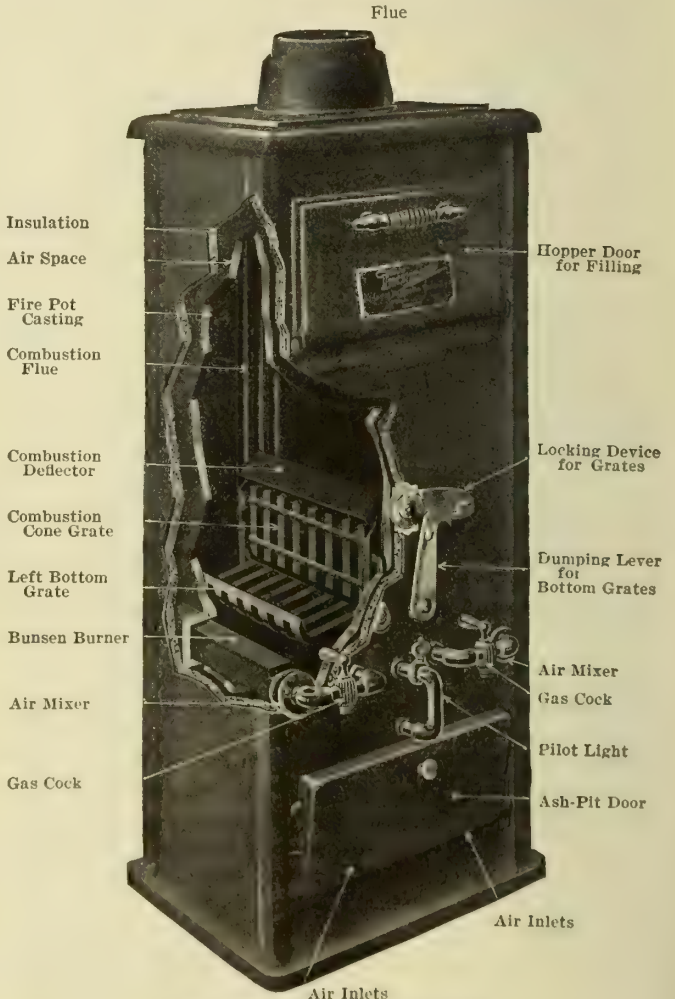
Showing installation and opening to be provided in wall; also dumping device at bottom of hopper on No. 102

TABLE OF DIMENSIONS

No.	A Ins.	B Ins.	C Ins.	D Ins.	E Ins.	F Ins.	Weight, Lbs.	Cap., Bushels	List Price
101	15	15	33½	18	6½	5	340	½	$45
102	17	17	39	12	10¾	6	560	1	55
200	17	17	39	12	10¾	6	560	1	65
103	22	22	51	6	13¼	7	880	1½	125

The Portable Type.

Adapted for use anywhere. Preferably installed in the kitchen, near the kitchen range. The modern ideal method of handling garbage in residences, country estates, apartment buildings, clubs, and restaurants. Indispensable for hospitals, asylums, sanitariums, school buildings, banks and institutions.



PORTABLE TYPE INCINERITE

TABLE OF DIMENSIONS

No.	Width, Inches	Depth, Inches	Height, Inches	Weight, Lbs.	List Price
1	15	15	30	340	$45
2	18	18	40	560	55
3	22	23	52	880	125
4	26	25	59	1415	175

Present Installations.

The Incinerite is successfully used in more than three thousand homes, hospitals, institutions, etc. Complete list on application. For further particulars, discounts, etc., write E. C. STEARNS & Co., Syracuse, N. Y.

New York city inquiries handled at New York office, 30 Church Street; telephone, Cortland 6056; N. R. Marvin, Manager.

THE GENERAL FIREPROOFING COMPANY

"Allsteel" Office Furniture and Filing Devices

YOUNGSTOWN, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 395 Broadway
CHICAGO, ILL., 325 West Madison Street
BOSTON, MASS., 125 Federal Street
WASHINGTON, D. C., 721-722 Woodward Building
SEATTLE, WASH., 1310 Alaska Building

AGENCIES IN ALL PRINCIPAL CITIES

Products.

TRADE-MARK
Reg. U. S. Pat. Office

METAL FURNITURE and FILING EQUIPMENT for Banks, Public Buildings, Libraries, Insurance and Commercial Institutions. This includes Built-to-Design COUNTERS, DESKS, TABLES, PARTITIONS, GRILLES, DOORS and CASINGS, VAULT CASES, LIBRARY SHELVES, OMNIBUSES, WARDROBES and FURNISHINGS.

A full line of STANDARD "ALLSTEEL" FILING CABINETS, DESKS and TABLES, and "ALLSTEEL" ADJUSTABLE SHELVING.

For Concrete Reinforcement and Waterproofings, see our name in General Index.

"Allsteel" Special Work.

The material and workmanship in "Allsteel," built to the architect's design, is of the highest quality. This is the result of our experience in building standard steel filing equipment and office furniture for more than fifteen years.

We want to demonstrate to the architect, in every possible way, the superiority of "Allsteel" construction details, strength, durability, ease and simplicity of operation and finished appearance.

"Allsteel" Standard Filing Equipment.

TRADE-MARK

This line includes sections for every kind and size of correspondence and business records. Large stocks are carried at the factory and by agents in principal cities. "Allsteel" is constructed in units, which intermember so that any amount of space may be purchased at one time and more added later, without interfering with the usefulness of the original purchase.

"Allsteel" is solidly built by electric and acetylene welding, so that it can never come apart. It is unburnable and everlasting. Any of the sections listed can be furnished in Mahogany Grain, Oak Grain or Olive Green Finish:

"Uprights," for letters, bills, legal caps, card indexes, etc.

"Wydesteel" sections, for all kinds of filing, storage and library use.

"U-nette" sections, in the same style as "Wydesteel," but half as wide.

"Allsteel" Office Safes—Fire-retarding and dependable. Four sizes; any interior arrangement.

"Allsteel" Desks and Tables—A full line of roll-top, flat-top and typewriter desks and office tables.

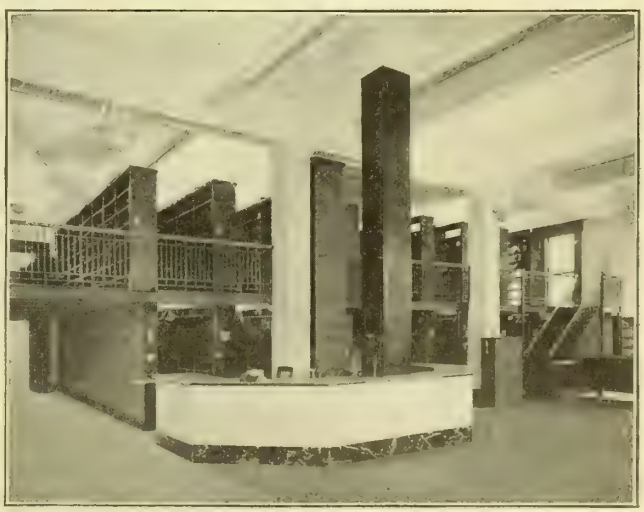
"Allsteel" Adjustable Shelving—Made in standard 30- and 36-inch lengths. Can be set up or taken down without tools, yet is rigid and strong.

A very complete catalogue, covering every piece in the "Allsteel" Standard Line, furnished on request.

Co-operative Service.

Architectural designs will be faithfully reproduced, or should you desire to send the building drawings to us we will design the "Allsteel" equipment as well as furnish an estimate promptly.

EQUIPMENT DESIGNED FOR THE PRUDENTIAL LIFE INSURANCE CO. OF AMERICA, NEWARK, N. J.



MILWAUKEE PUBLIC LIBRARY, MILWAUKEE, WIS.
VAN RYN & DE GELLEKE, Architects, Milwaukee, Wis.

Examples of Installations.

Some recent installations are as follows:

Bank of J. P. Morgan & Co., New York, N. Y., supervised by Thomas Bruce Boyd, Equipment Specialist, and under the direction of Trowbridge & Livingston, Architects, New York, N. Y.

Sacramento County Court House, Sacramento, Cal., R. A. Herold, Architect, Sacramento, Cal.

University of Texas Library, Austin, Tex.

Waterbury City Hall, Waterbury, Conn., Cass Gilbert, Architect, New York, N. Y.

ORGANIZED 1888 CAPITAL, $4,000,000.00

ART METAL CONSTRUCTION CO., INC.

Steel and Bronze Furniture and Fittings

GENERAL OFFICES AND FACTORIES

CABLE ADDRESS, "ARTIE" JAMESTOWN, N. Y.

PRINCIPAL BRANCH OFFICES

NEW YORK, N. Y., 1460 Woolworth Building
PHILADELPHIA, PA., 825 Chestnut Street
BOSTON, MASS., 227 Tremont Street
BALTIMORE, MD., P. O. Box 851, Baltimore
WASHINGTON, D. C., 203 Southern Building
MINNEAPOLIS, MINN., 627 Plymouth Building
KANSAS CITY, MO., 709 Walnut Street
CLEVELAND, OHIO, 307-309 East Ohio Gas Building
CINCINNATI, OHIO, 2003 Union Central Life Building
ST. LOUIS, MO., 1410 Syndicate Trust Building
DALLAS, TEX., 1302 Busch Building
CHICAGO, ILL., 708-710 Republic Building
BIRMINGHAM, ALA., 1020 Jefferson County Bank Building
PITTSBURGH, PA., 436 Oliver Building

Products.

Originators and largest manufacturers of complete INTERIOR FITTINGS and FURNITURE, in STEEL and BRONZE for Public Buildings, Banks, Libraries, Commercial and Insurance Offices, Hospitals, etc., designed and adapted from architects' details and specifications.

BANK FIXTURES and FURNITURE, BOOK-STACKS, LIBRARY FURNITURE, BOOKCASES; CABINET WORK; FILING CABINETS and DEVICES, PLANFILES; CUPBOARDS, WARDROBES; TRANSFER CASES; VESTMENT CASES; CAGES, GRILLES, SCREENS, PARTITIONS, COUNTERS, SHELVING; TRIM, DOORS; BATTLESHIP FURNITURE; TABLES, DESKS; VAULT FITTINGS, OMNIBUSES, VAULT TRUCKS; WASTE BASKETS; STEEL and BRONZE WORK; STAIRWAYS, etc.

Material, Workmanship, etc., Art Metal Furniture and Fittings.

The material chiefly employed is fine steel plates. These are rolled especially for this purpose; are smooth, without scale, and free from buckle. The construction involves a scientific manipulation by improved machinery, the most finished hand work, and a careful assembling of parts by skilled workmen. The mouldings and trim, largely bronze or brass, are manufactured exclusively by ourselves.

All work finished at the factory; several coats of the best baking enamel, each coat carefully baked to insure an elastic and durable finish. Plain colors or hand-grained finishes in perfect representation of any cabinet wood. Hardware and trim suitably electroplated or lacquered.

Bank Interiors in Steel, Bronze and Marble.

Art Metal counter screens are composite fixtures, and combine the shop practices of several trades in one product. Built with metal or marble front, harmonizing in material and finish with the architectural scheme of the lobby. The screen is either wrought or plain and ornamental cast bronze. Backs of screens are usually steel, having mouldings and finish suited to metal partitions and fixtures in working space. Lastly, rear of counters is furnished with metal desks, having suitable working tops and containing labor-saving devices in metal.

We maintain a special department of bank designing to co-operate with architects.

Stock Goods.

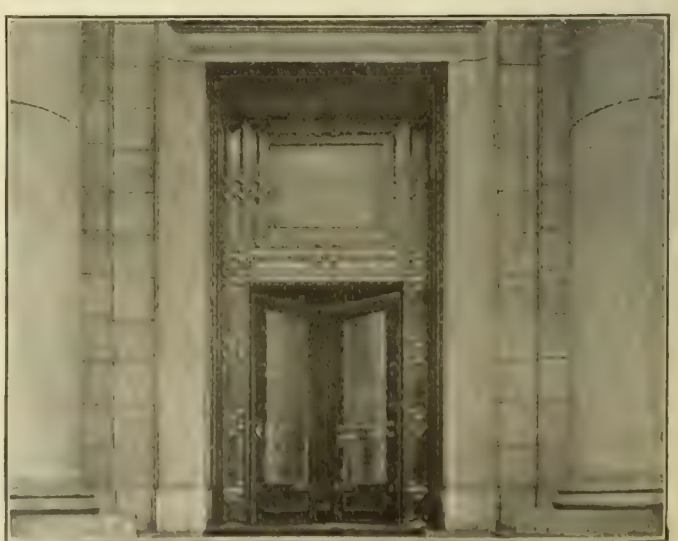
We carry in stock, ready for immediate shipment, the most complete line of sectional and solid steel filing cabinets—upright and horizontal units—office safes, desks, tables, and a wide variety of standard types of office furniture. Stock goods quoted in response to inquiries for Catalogue 758.

Library Stacks and Furniture.

Art Metal adjustable standard and bracket stacks are in use in more than six hundred libraries, and are the recognized standard. Reading room furniture, delivery desks, book-stacks one story and upward, are a specialty with us.

Our service is complete. We manufacture fixtures necessary for outside protection; build the interior framework, with stairs and attached parts; install electric lighting; provide dust shafts, electric lifts, and all features necessary for fireproof, efficient and handsome library equipment.

INTERIOR OF COMMERCIAL TRUST COMPANY, SPRINGFIELD, MASS.
H. L. SPRAGUE, Architect



BRONZE DOOR, GERMAN SAVINGS INSTITUTION, ST. LOUIS, MO.
A. B. GROVES, Architect

Continued on next page

UNIVERSITY OF CALIFORNIA READING ROOM
J. H. P. Atkins, Architect

OFFICES OF THE ROSENBAUM GRAIN COMPANY, CHICAGO, ILL.

Steel Filing Equipment for Vaults and Record Rooms.

Since originating metallic vault fixtures over twenty-eight years ago, we have furnished fully eighty-five per cent of all this equipment in use. On receipt of floor plan, with outline of main requirements, we furnish complete plan, showing how vault space can be utilized best by installing our space- and labor-saving filing devices.

We build to order incombustible furniture and filing equipment for halls of record in accordance with architects' specifications.

Forty-four state capitols, over one thousand municipal buildings and court houses, government buildings at Washington, and many of the largest and finest structures in this country have been completely or partially equipped by this Company.

Commercial and insurance offices furnished complete with the latest improved fireproof furniture and filing cabinets.

Hospital Equipment.

The services of specially trained and expert engineers and designers are used by us to produce hospital furniture which shall in all respects measure up to Art Metal standards of quality. Every installation we have made has received strong approval, not alone for its workmanship and design, but because it was designed and constructed with a knowledge of hospital working conditions and built to fully meet all requirements of such equipment.

This Hospital Department is always at the service of the architect and the Board, and will welcome any opportunity to co-operate with either, or both, to whatever extent may be desired.

Co-operative Service.

The Engineering Department of the Art Metal Construction Company is the largest and most completely equipped in the metal furnishing trade.

We are at all times ready to go into details with architects, make a study of conditions, work out complete plans and designs, and recommend the best interior finish for the purpose.

Architects are invited to avail themselves of our service and long experience in this line.

PARTIAL LIST OF RECENT INSTALLATIONS, WITH NAMES OF ARCHITECTS

Banks

Corn Exchange National Bank, Philadelphia, Pa., Horace Trumbauer
First National Bank of Allegheny, Pittsburgh, Pa., F. U. Osterling
German Savings Institution, St. Louis, Mo., A. B. Groves
Citizens Trust Co., Utica, N. Y., Mowbray & Uffinger
Dime Savings Bank, Detroit, Mich., D. H. Burnham & Co.
Dime Savings Bank, Toledo, Ohio, M. M. Stophlet
First Trust & Savings Bank, Cleveland, Ohio, J. Milton Dyer
Merchants National Bank, Los Angeles, Cal., Wm. Curlett & Son
First National Bank, Los Angeles, Cal., Weary & Alford
London City & Midland Bank, London, Eng.
Wayne County & Home Savings Bank, Detroit, Mich., Donaldson & Meier
Merchants National Bank, St. Paul, Minn., Jarvis Hunt

Libraries

Public Library, Milwaukee, Wis., Van Ryn & De Gelleke
State Historical Society, Madison, Wis., Edw. Tough
John Crerar Library, Chicago, Ill., Shepley, Rutan & Coolidge
Cleveland Public Library, Cleveland, Ohio, Walker & Weeks
State Educational Building, Albany, N. Y., Palmer, Hornbostel & Jones
Connecticut State Law Library, Hartford, Conn., Donn Barber
Carnegie Institute, Pittsburgh, Pa., Alden & Harlow
University of California, Berkeley, Cal., J. H. P. Atkins
National Biblioteca, Rio Janeiro, Brazil
Scottish Rite Temple, Washington, D. C., John Russell Pope

Commercial Institutions

Union Central Life Insurance Company, Cincinnati, Ohio
Stegmaier Brewing Co., Wilkes-Barre, Pa., Chas. Casper
Firemen's Insurance Company, Chicago, Ill.,
Mutual Benefit Life Insurance Co., Newark, N. J., Geo. B. Post & Sons
Metropolitan Life Insurance Co., New York, N. Y., D. Everett Waid
Kansas City Southern Railroad, Kansas City, Mo.
Northern Pacific R. R., St. Paul, Minn.
Thomas A. Edison, Inc., East Orange, N. J.
East Ohio Gas Co., Cleveland, Ohio
Armour Grain Co., Chicago, Ill.
Commonwealth Edison Co., Boston, Mass.

Public Buildings

Cuyahoga County Court House, Cleveland, Ohio, Lehman & Schmitt
Judiciary Building, Honolulu, T. H.
Pretoria Post Office, Pretoria, South Africa
Essex County Court House, Salem, Mass., E. H. Blackall
Rensselaer County Court House, Troy, N. Y., Wm. T. Beardsley
State Capitol, Harrisburg, Pa.
City Hall, Philadelphia, Pa.
City Hall, Boston, Mass., Edw. T. P. Graham
Administration Building, Panama Canal Commission, Balboa Heights, Canal Zone
City Hall, Meridian, Miss.
Albany County Court House, Albany, N. Y., Hoppin & Koens

Battleships

U. S. S. Oklahoma, Nevada, Arkansas, Texas, Pennsylvania, Wyoming, Florida, Utah

CHAS. KAPPES, President A. L. WHITE, Vice-President L. L. TRIBUS, Treasurer CHAS. KAPPES, JR., Secretary

BARNABY FURNITURE CO., INC.

TELEPHONE CONNECTIONS

Fine Business Furniture

JOHN F. NICOL
Factory Superintendent

OFFICE AND FACTORY

STAPLETON, STATEN ISLAND, NEW YORK, N. Y.

Products.

Manufacturers to order of Fine Business Furniture, comprising Complete Outfits for Executive Offices, Directors' Rooms, Banks, Public Buildings, etc., and including Desks, Tables, Directors' Tables, Chairs, Directors' Chairs, Bookcases, Clothes Poles, Umbrella Stands, Waste Baskets, etc.

TRADE-MARK

Designs.

This Company manufactures from architects' designs or from its own designs entire outfits and special pieces for particular requirements. Barnaby products are manufactured in accordance with the best principles known to the cabinet making trade, with fidelity to detail and careful execution of architectural design.

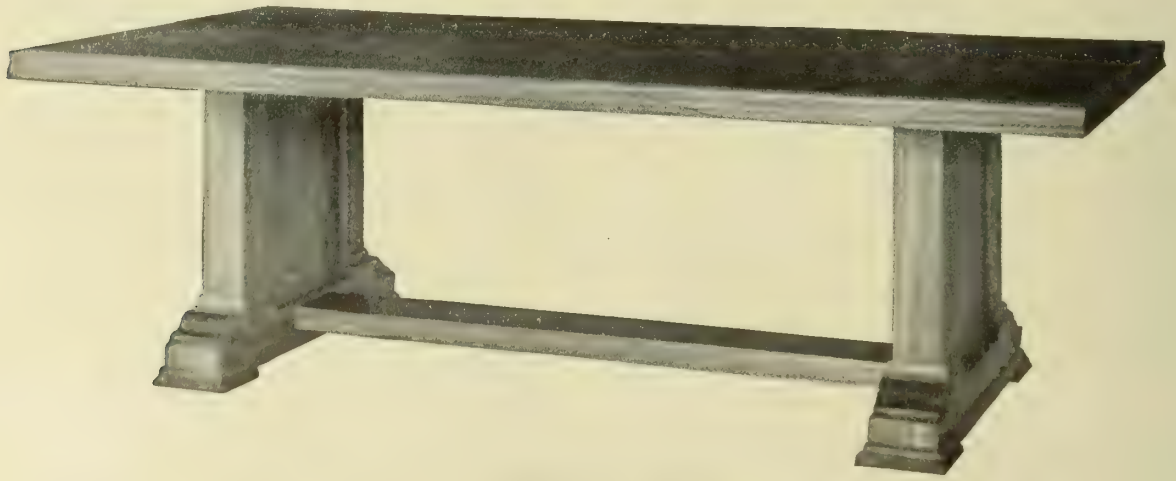
Co-operative Service.

The design department of this organization will gladly co-operate with architects and others in the development of any furnishing problems they may have under consideration.

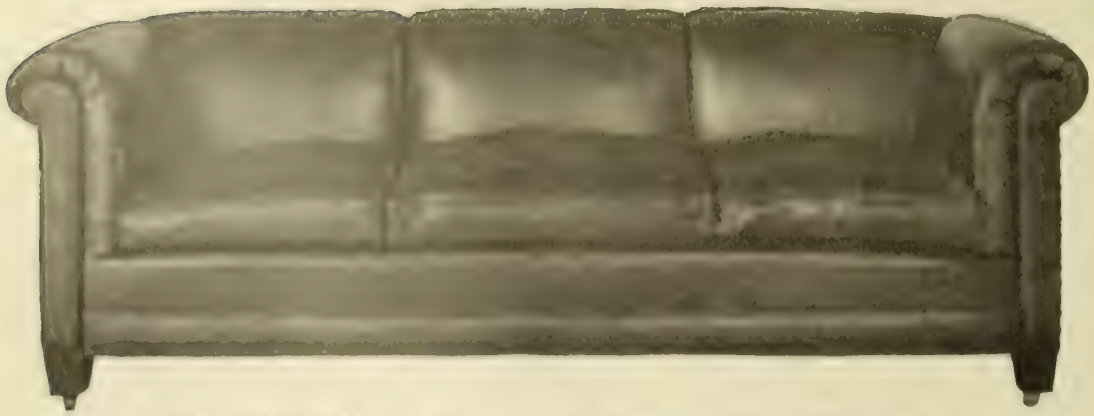
Consultation and questions in regard to any special work are invited. On receipt of details of requirements, estimates and also sketches, when desired, will be promptly submitted.

REFERENCES

Prussian Life Insurance Co., Hartford, Conn.
Rossia Insurance Co., Hartford, Conn.
Castle Gottheil & Overton, New York, N. Y.
American Bankers Association, New York, N. Y.
Niles & Niles, New York, N. Y.
Germania Life Insurance Co., New York, N. Y.
Sidney Spitzer & Co., New York, N. Y.
Williamson & Meade, New York, N. Y.
Linde Air Products Co., New York, N. Y.
White Weld & Co., New York, N. Y.
Union Carbide Co., New York, N. Y.
Davis & Brooks, Hartford, Conn.
Barnet Phillips Co., New York, N. Y.



DIRECTORS' TABLE



EXAMPLE OF BARNABY UPHOLSTERED DAVENPORT CONSTRUCTION
Built to last

UMBRELLA STAND

Continued on next page

DIRECTORS' CHAIR

EXAMPLE OF BARNABY UPHOLSTERED EASY CHAIR

CLOTHES POLE

GENERAL MANAGER'S OFFICE, ROSSIA INSURANCE CO., HARTFORD, CONN.
Furnished with Barnaby Furniture

GENERAL MANAGER'S OFFICE, PRUSSIAN LIFE INSURANCE CO., HARTFORD, CONN.
Furnished with Barnaby Furniture

MAIN OFFICE, ROSSIA INSURANCE CO., HARTFORD, CONN.
Furnished with Barnaby Furniture

MAIN OFFICE, PRUSSIAN LIFE INSURANCE CO., HARTFORD, CONN.
Furnished with Barnaby Furniture

THE CANTON ART METAL COMPANY

MANUFACTURERS OF

Metal Furniture and Filing Equipment

NEW YORK OFFICE
200 FIFTH AVENUE

CANTON, OHIO

CHICAGO OFFICE
14 NORTH DEARBORN STREET

Products.

METAL FURNITURE and FILING EQUIPMENT, for Public Buildings, Banks, Libraries and Corporations, including COUNTERS, in marble, bronze or steel, built to any design; VAULT EQUIPMENT, to meet any requirement; FILING CABINETS, in special and stock designs; DESKS and TABLES.

Material and Workmanship.

The material chiefly employed in the production of metal furniture is especially prepared steel furniture plates. These are rolled especially for this purpose. The construction involves the most scientific manipulation by skilled mechanics and improved machinery and careful assemblage of all parts by skilled workmen.

Finish and Color.

Steel entering into the construction of metal furniture before being finished is treated with a mineral filler to avoid all possibilities of rusting, and then each coat of enamel is baked on separately under a very high degree of heat.

Steel furniture is made in any plain color desired; also, to match any kind of wood, such as Mahogany, Oak, Walnut, etc. The finish is beautiful in design and practically indestructible.

Advantages.

Elimination of Fire Risks—Interior fire risks are entirely eliminated by the use of steel equipment. All records in daily use are safely guarded in fireproof desks and fixtures, and where metal is used it eliminates in a great many cases the necessity of vaults.

Durability—To-day no public building of consequence is built or assembled without the installation of Metal Furniture and Filing Equipment. Steel furniture is not only recognized as the most modern method of safeguarding public records, but is also, from an economical point of view, saving in space and more durable than any other type of equipment produced.

Examples.

THE CANTON ART METAL COMPANY has equipped a great number of public buildings and banks, among which are the following:

Irving National Bank, Woolworth Building, New York, N. Y., Cass Gilbert, Architect
Broadway Trust Company, Woolworth Building, New York, N. Y., Cass Gilbert, Architect
Los Angeles Hall of Records, Los Angeles, Cal.
Delaware County Court, Media, Pa., C. W. Brazer, Architect
Nassau County Court House, Mineola, L. I., W. B. Tubby, Architect
Penn Mutual Life Insurance Company, Philadelphia, Pa.
Glens Falls Life Insurance Company, Glens Falls, N. Y.
Berkshire Life Insurance Company, Pittsfield, Mass.
Sacramento Court House, Sacramento, Cal.
Providence City Hall, Providence, R. I.
City Hall, Springfield, Mass.
New York State Banking Department, Albany, N. Y.
Registrar of Wills Office, Washington, D. C.

PUBLIC LIBRARY, SHOWING STEEL SHELVING

Continued on next page

BANK INTERIOR, SHOWING METAL COUNTER AND STEEL FURNITURE

FILING EQUIPMENT

VAULT EQUIPMENT

FOUNDED 1876

LIBRARY BUREAU

MANUFACTURING DISTRIBUTORS OF

Library, Bank and Office Equipment in Steel and Wood

EXECUTIVE OFFICES

CAMBRIDGE, MASS.

FACTORIES

CAMBRIDGE, MASS. ILION, N. Y. CHICAGO NEW YORK OTTAWA LONDON

SALES OFFICES

BOSTON NEW YORK CHICAGO PHILADELPHIA

OFFICES IN FORTY LEADING CITIES IN THE UNITED STATES, GREAT BRITAIN AND FRANCE

Products.

Makers of:

LIBRARY BUREAU STANDARD BRACKET STACK.
LIBRARY BUREAU SLOTTED UPRIGHT STACK.
NEWSPAPER SHELVING.
UNIT STEEL STORAGE SHELVING.
BRONZE and PLATE GLASS MUSEUM CASES.
STEEL VAULT SHELVING.
STEEL VAULT FITTINGS.
CARD FILING CABINETS, in Wood and Steel.
STEEL and WOOD BOOK TRUCKS.
STEEL and WOOD CARD RECORD TRUCKS.
LIBRARY FURNITURE.
OFFICE FURNITURE.

Material.

The material principally used is open-hearth furniture steel, full cold-rolled, reannealed, full pickled to remove all scale, and patent leveled to insure freedom from warp and buckle; steel square tubing, and extruded bronze. Exterior trim of cabinets is of solid cast bronze, natural finish, with baked lacquer. Handle and label holders are interior bolted to the drawer fronts.

All work is finished in several coats of baked enamel, in either plain colors or special hand grained finishes in imitation of any wood. Each coat is properly baked in specially prepared ovens, the final coat being rubbed in pumice and oil to a dull eggshell gloss.

LIBRARY BUREAU TWO-STORY STANDARD BRACKET STACK, FRANCIS E. BUTTRICK MEMORIAL LIBRARY, WALTHAM, MASS.
View of second story showing marble mezzanine floor

LIBRARY BUREAU FOUR STORY STANDARD BRACKET STACK, TRENTON PUBLIC LIBRARY, TRENTON, NEW JERSEY
View of second story showing marble mezzanine floor

Facilities.

Our steel factory is completely equipped for the manufacture of library bookstack, bronze and plate glass museum cases, unit steel shelving, steel filing cabinets, and bank and office equipment. Our wood working factories are completely equipped for the manufacture of card and filing cabinets, technical library furniture and office equipment.

Catalogues, describing in detail library bookstack, will be mailed on request.

Standards of Steel Bookstack for Libraries.

The following standards give general information in planning stack room installations. As individual conditions, however, must to a certain degree govern such arrangements, specific information will in most cases be necessary. We are pleased to consult with architects and librarians and offer the services of an experienced representative. This service will be rendered without charge or obligation.

Single-story standard bracket stack is made 7 ft.

Continued on next page

8 in. high; multi-story stack 7 ft. 6 in. from floor to floor; double-faced ranges with 8-in. shelves are 17 in., face to face; wall ranges with 8-in. shelves are 10¼ in. from front of shelf to wall. The standard length for shelves is 3 ft. on centers. The standard shelf depths are approximately 8, 10, and 12 in.; the 8-in. depth being regularly furnished as standard.

The width of the main and range aisles of a stack room are controlled somewhat by existing conditions. For open stack rooms the ranges are ordinarily set 4 ft. 6 in. apart on centers, giving a range aisle of approximately 3 feet. Range aisles may be as narrow as 2 ft. 6 in., but this is not advisable where the stack room is in general use. Main aisles should be 3 ft. 6 in. wide if possible, and not less than 3 ft.

Co-operative Service.

Library Bureau offers to all architects its service, based on forty years' experience in filing equipment for banks, insurance companies, public service buildings and commercial houses. Special representatives will co-operate in planning the interior equipment for such buildings.

Shelf Capacity.

In figuring the amount of shelving required to accommodate a certain number of volumes, the following schedule will be of assistance:

	Volumes per shelf foot	Volumes per 3-foot double-faced section
Fiction	9	378
General Literature	8	336
Reference Books	7	294
Law Books	5	210

Catalogues, Booklets and Prints.

Steel Bookstack.
Library Supplies.
Unit Wood Book Shelving.
Museum Cases.
Charging Desks.
Unit Steel Storage Shelving.
Unit Filing Cabinets in Wood.
Unit Bookcases.
L. B. Steel Vertical Unit Cabinets.
L. B. Steel Horizontal Unit Cabinets.
Library, Bank and Office Furniture.

PARTIAL LIST OF INSTALLATIONS OF LIBRARY BUREAU BOOKSTACK

BUILDING	ARCHITECT
University of California	John Galen Howard
University of Chicago Harper Memorial Library	Shepley, Rutan & Coolidge
Geology and Geography Building	Holabird & Roche
New Haven County Law Library	Allen & Williams
Illinois State Library	W. Carbys Zimmerman
Bates College Library, Maine	Herts & Tallant
Newton Free Library, Mass.	Lewis H. Bacon
Smith College Library, Mass.	Lord & Hewlett
Worcester Free Library, Mass.	Earle & Fisher
Chelsea Public Library, Mass.	Guy Lowell & Edward Tilton
John Hay Memorial Library, R. I.	Shepley, Rutan & Coolidge
Clark University Library	Frost, Briggs and Chamberlin
Deborah Cook Sayles Library, R. I.	Cram, Goodhue & Ferguson
Peoples Library, R. I.	Clarke, Howe & Homer
St. Louis Public Library, Mo.	Cass Gilbert
Plainfield Public Library, N. J.	Wilder & White
Charleston Public Library, S. C.	McGoodwin & Hawley
Wentworth Memorial Library	Coolidge & Carlson
N. H. College of Agriculture	George Totten
Trenton Public Library, N. J.	E. L. Tilton
Syracuse University Library, N. Y.	Revels & Hollenbeck
Buffalo Public Library, N. Y.	Esenwein & Johnson
American Institute, New York, N. Y.	
City Public Library, Mexico, F. D.	
Oswaldo Cruz Institute and Library, Rio Janeiro, Brazil	
Waltham Public Library, Mass.	Loring & Leland
Tufts College Library, Mass.	
Wheeler Memorial Library, Mass.	H. M. Francis
St. John's Boston Ecclesiastical Seminary, Mass.	Maginnis & Walsh
Needham Public Library, Mass.	James H. Ritchie
Harvard University, Medical Library, Mass.	Shepley, Rutan & Coolidge
Colby College Library, Maine.	
Massachusetts General Hospital, Mass.	Coolidge & Shattuck
Central Library, Indianapolis, Ind.	Paul P. Cret and Zantzinger, Borie & Medany

COMPLETE FILING EQUIPMENT IN WOOD FOR SCOTTISH UNION AND NATIONAL INSURANCE CO., NORTH AMERICAN BRANCH, HARTFORD, CONN.
Note uniformity in hight of equipment, giving an unobstructed view of entire office. Accomplished by use of counter-hight unit filing cabinets

COMPLETE FILING EQUIPMENT IN STEEL INSTALLED FOR NEW HAMPSHIRE FIRE INSURANCE CO., MANCHESTER, N. H.
By use of counter-hight unit filing cabinets, uniformity in hight of equipment is secured, thereby giving an unobstructed view of entire office

THE MACEY COMPANY

Office, Bank, and Library Equipment and Systems

GRAND RAPIDS, MICH.

BRANCHES AND AGENTS IN THE PRINCIPAL CITIES OF THE UNITED STATES, SOUTH AMERICA, CANADA, GREAT BRITAIN AND EUROPE

Products.

Wood and Metal Filing Equipment of all kinds; Insulated Safes; Office, Vault, and Record Trucks; Vault Interior Equipment; Wood and Metal Sectional Bookcases; Card Index and Filing Supplies; Office and Filing Systems; Plan or Blue-Print Files; Sectional Display Cases; Miscellaneous Trays and Office Equipment.

Macey
TRADE-MARK

Design, Material, and Workmanship.

The quality of Macey workmanship and design is well known. The material best adapted for each product is always used. All Macey construction carries a definite guarantee of satisfaction. Detailed specifications will be supplied on any item designated. Finish samples on request.

Catalogues and Macey Inter Service.

The Macey Inter Service Division is prepared to give competent assistance in making estimates on office equipment, and in working out office systems. Blueprints, detailed specifications, catalogues, and our booklet, "What Macey Inter Service Means," will be supplied on request.

MACEY TUSCAN HELFITE SAFE
Outside Dimensions (as illustrated)
Height 64½ ins., width 40¾ ins., depth 29½ ins.
Walls 3½ ins. thick, insulated with Helfite—our exclusive patented insulation. Heavy angle-iron framework, reinforced walls
Outside dimensions of other safes range from, height 63⅝ ins., width 45 7/16 ins., depth 26 ins., to height 11¼ ins., width 13 ins., depth 18 ins.

MACEY CORPORATION WOOD FILES
(Letter Size)
Outside Dimensions (as illustrated)
Height 57⅝ ins., width 15⅝ ins., depth 27¼ ins. In battery arrangement, width 14⅜ ins.
Complete line in counter and standard heights. Removable ends, single plates between units in battery, metal drawer bodies, progressive side suspension slides, positive locking follower block. All parts standardized

MACEY OLD ENGLISH BOOKCASE
Outside Dimensions (as illustrated)
Height 50½ ins., width 34¼ ins., depth 11⅝ ins.
A sectional bookcase for office or home with three sizes of sections, non-binding doors, and panelled ends. No iron bands on ends of sections. Wide variety of other designs

MACEY METAL UPRIGHT FILES
(Letter Size)
Outside Dimensions (as illustrated)
Height 50⅝ ins., width 15¾ ins., depth 26½ ins.
A complete line. Each file a complete unit. Angle-iron frame construction gives maximum strength and rigidity. All parts standardized

THE MARBLE & SHATTUCK CHAIR CO.

GENERAL OFFICES AND PLANT
CLEVELAND, OHIO

TELEPHONE:
Eddy 129

CABLE ADDRESS, "Chairs"
W. U. and Private Code

BRANCH OFFICES

NEW YORK, A. B. Hunn, 815 Marbridge Building
CHICAGO, H. G. Hunn, 515 Harvester Building
RICHMOND, VA., T. A. Daffron, 1426 Porter Street
SAN FRANCISCO, J. A. Clority

Products.

, Manufacturers of a guaranteed line of high-class "M & S" Special Chairs, Director's and Public Building Chairs, Settees, etc., for Offices, Banks, Libraries, Hospitals and other Public Institutions.

Also various designs of Chairs suitable for Hotels, Cafés, Clubs, Dining Rooms, Bedrooms, etc.

Construction.

"M & S" chairs are constructed from the best grades of lumber, seasoned and selected for strength and beauty of grain. All oak chairs are made of quarter sawn white oak; mahogany chairs, of solid Cuban mahogany—stronger, heavier and more durable than other varieties. All chairs equipped with sliding steel tips.

Upholstery.

All upholstered chairs are regularly supplied with the best No. 1 M. B. leather, in any desired shade. Imitation or split leather never used. If desired, Spanish and H. B. leather can be supplied at additional price.

Workmanship.

All "M & S" chairs are built by workmen of the highest skill; permanent employees of The Marble & Shattuck Chair Co.

TYPE OF SPECIAL CHAIR
For Public Buildings

"M&S" Special Chairs.

For large contracts where original designs are required to harmonize with the interior decorations, sketches and samples of special chairs will be submitted to prospective purchasers.

Prices.

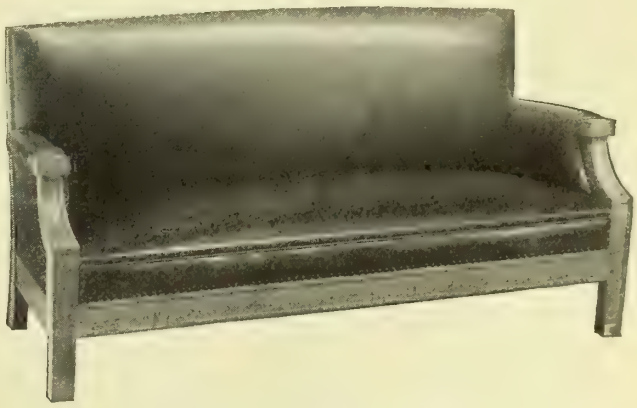
Write for further information and full particulars as to prices, estimates, etc.

Catalogues.

Office and dining room chairs shown in separate catalogues. Either catalogue sent upon request.

Chair No. 2517
Between arms, 20½ ins.
Height of back, 22 ins.

Chair No. 1629½
Between arms, 19½ ins.



Settee No. 2599. Length over all, 72 ins.

Arm Dining Chair No. 717. Queen Anne Reproduction
Mahogany. Leather or Rush Seats
For hotels, etc.

Settee No. 2339. Length 48 ins.
Made with Wood Seat and Superfine Cane Back; Slip Leather Seat and Cane Back; and Overstuffed Leather Seat and Back. Various styles of chairs with Cane Backs, Wood or Leather Seats

HIGH-GRADE FURNITURE FOR PUBLIC BUILDINGS, BANKS AND OTHER INSTITUTIONS

GEO. W. MULLER BANK FIXTURE CO.

MANUFACTURERS OF AND GENERAL CONTRACTORS FOR

Interior Fixtures for Banks, Residences, Offices, Stores, Etc.

ATLANTA, GA.

Products and Service.

Manufacturers and contractors for BANK INTERIORS, including MARBLE, BRONZE, CABINET WORK, PLAIN and ORNAMENTAL PLASTER WORK, MOVABLE FURNITURE; HARDWOOD INTERIOR FINISH for FINE RESIDENCES; OFFICE and STORE INTERIORS and FIXTURES; SPECIAL CABINET WORK and DIMENSION STOCK.

Advantages of Muller Service.

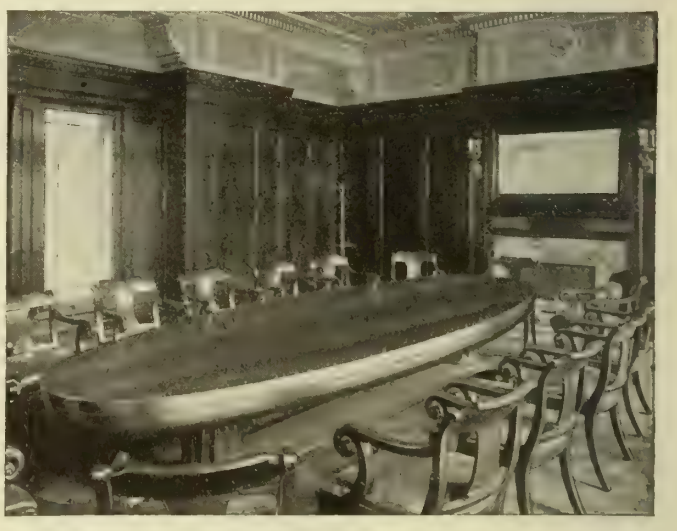
The Muller factory, situated at Atlanta, Ga., covers three acres, and is the largest in the country for this class of work. A specialty of bank interiors is made; the whole job being taken under one contract, including marble, bronze, cabinet work, movable furniture, plain and ornamental plaster work, hardwood and tile floors, plumbing and electrical work, and wiring and decorating. This organization will either associate with architects, working from their drawings, or will supply its own drawings, when preferred, employing for this purpose men whose ideas and skill in this line are unexcelled in this country. It has special facilities for fine residence interiors, staircases, doors, panels, hardwood floors, and, in fact, everything pertaining to the interior of a fine home; only materials being supplied, or the complete job handled under one contract.

This Company also furnishes dimension stock, and handles all foreign and domestic hardwoods and marbles. It has a wide range of experience in all classes of fixtures for jewelry, drug, cigar, department stores, etc.

References.

This Company has been in business twenty-five years. Its work is of the highest possible character. No job too small; none too large. Experience—1500 banks, many fine residences, etc. References—thousands of satisfied customers, bankers and architects.

CITIZENS' BANK & TRUST CO., TAMPA, FLA.
GEO. W. MULLER BANK FIXTURE CO., Designers



ATLANTIC NATIONAL BANK, JACKSONVILLE, FLA.
MOWBRAY & UFFINGER, Architects

HEARD NATIONAL BANK, JACKSONVILLE, FLA.
JOHN K. PEEBLES, Architect

THE SAFE-CABINET COMPANY

ORIGINATORS AND MANUFACTURERS OF

The Safe-Cabinet and Its Equipment

MARIETTA, OHIO, U. S. A.

AGENCIES AND DEALERS EVERYWHERE. (REFER TO TELEPHONE BOOK)

FOREIGN SALES DEPARTMENT, NEW YORK, N. Y., 32 Broadway

Products.

We are the exclusive makers of THE SAFE-CABINET, the highest-grade fire-resisting product for general office and home use, devoting our entire plant to its manufacture.

Description.

THE SAFE-CABINET has double walls of finest sheet steel, with air-chambers between. Interlined throughout with fireproof material that does not deteriorate with age. No heat conducting connections between the walls.

Doors overlap, closing with tongue-and-groove union, independent bar fastenings, improved combination lock. Interior equipment adjustable to all filing requirements.

Construction.

THE SAFE-CABINET is constructed in such a manner that it is practically one-piece throughout. The outer walls are welded together and the inner walls locked and interlocked within these, without the use of bolts, screws or rivets. Construction is fortified to resist concussion or impact.

Finish.

THE SAFE-CABINET is regularly finished in Olive Green, Imitation Oak or Mahogany. The enamel used is thoroughly baked and rubbed and finally appears in dull finish of depth and richness.

Patents.

THE SAFE-CABINET is covered by patents protecting the basic principles of its construction, in this country and in most foreign countries. The name is registered.

Advantages.

THE SAFE-CABINET (S-Cientest Model) furnishes the largest measure of protection for its contents with the least bulk and weight. Under actual fire conditions it has been proved to protect its contents intact for ninety minutes, with an average temperature of 1900 degrees Fahrenheit on all four sides.

THE SAFE-CABINET can be moved like any other piece of furniture, and is free from the objectionable features of old-style safes. It is admirably adapted for modern office buildings, as its interior can be adjusted to suit the requirements of each and every tenant. It is handsome and inexpensive.

Underwriters' Approval.

The S-Cientist Model of THE SAFE-CABINET bears the label of inspection and approval of the Underwriters' Laboratories, Inc., and is the Safe thus standardized among the articles tested and approved by them.

UNDERWRITERS' LABORATORIES, INC.
INSPECTED LIGHT WEIGHT SAFE

Specification.

In order to avoid substitution, specify as follows: "The fire-resisting filing cabinets used in this building shall be those known as THE SAFE-CABINET, manufactured by THE SAFE-CABINET COMPANY of Marietta, Ohio."

Sizes.

THE SAFE-CABINET is made in *Forty-Four styles and sizes.* In dimensions these sizes vary as follows (inside measurements):

Width—From 15 inches to 42 inches
Height—From 21 inches to 72 inches
Depth—From 12 inches to 24 inches

Used by.

United States Government in all departments, including foreign consulates.

Life and Fire Insurance Companies.

Representative banks, bonding houses, public institutions, manufacturing concerns.

THE SAFE-CABINET is supplanting built-in-vaults and old-fashioned safes in many of the great office buildings in this country and abroad.

The "100" and "800" Lines.

No longer is it necessary to sacrifice wood or steel filing equipment to protect records contained therein from fire. Many sizes of THE SAFE-CABINET are now made to exactly contain the filing devices, either wood or steel, made by nearly every manufacturer. Buy THE SAFE-CABINET, then slip your files therein.

THE SAFE-CABINET, SHOWING STEEL FILING DEVICES WITHIN (ADJUSTABLE)

Catalogues.

On request we will send the following catalogues: No. 440-3, descriptive of THE SAFE-CABINET, and also our new booklet, "Written in Letters of Fire," telling some of its achievements under fire; No. 445-1 S-C Equipment, also printed matter relative to The Underwriters' Laboratories' Endorsement, and a folder on The "100" and "800" Lines.

SOUTHERN SEATING & CABINET COMPANY

DESIGNERS AND BUILDERS OF

Bank Fixtures and Furniture, Church and Office Furnishings, Interior Trim and Decorations

FACTORY AND MAIN OFFICE

JACKSON, TENN.

BRANCH AND SALES OFFICES

CHATTANOOGA, TENN., James Building
GREENBORO, N. C., Benbow Arcade
MEMPHIS, TENN., Tennessee Trust Building
ST. LOUIS, MO., Pontiac Building
DALLAS, TEX., North Texas Building
JACKSONVILLE, FLA., Title Building

Products.

WOOD, and METAL FURNITURE (all types), "Made-to-Order," including BANK FIXTURES, of Marble, Bronze, Mahogany, or moderate-priced Wood, etc.; COURT HOUSE FURNITURE; CHURCH, RAILROAD and ASSEMBLY SEATING; CHURCH PEWS, PULPIT, CHANCEL and SANCTUARY FURNISHINGS; STORE FIXTURES.

Co-operative Service.

At each of the above branch and sales offices is an experienced and expert designer. This Company is prepared, on request of architects or other interested persons and prospective purchasers, to send a competent draughtsman and salesman to visit any bank or church building, with a view toward making exact measurements, drawing up suitable floor plans, noting the style of architecture for the consideration of harmonious surroundings, etc. The most suitable arrangements will be suggested, and proper designs offered, to meet the particular requirements in each case. Special designs will be executed according to architects' drawings and specifications.

Bank Fixtures.

During many years, the experience of the Company in designing and building high-grade fixtures and furniture for the practical work of a bank has been wide and varied. Many facilities, modern equipment, skilled artisans, and other advantages guarantee a finished and reliable product.

METROPOLITAN BANK, NEW ORLEANS, LA.
Example of our work in a large city bank. Imported marbles, bronze screens and grilles, etc.

Material—For large city banks, marble, bronze and mahogany equipments are generally selected; for small country banks, simple oak fixtures. Marbles are both imported and domestic; cast and wrought bronze, brass, steel and other metal work are of best workmanship and finish; glass, of flawless American and French plate, Florentine, Syenite, etc., as required. Good hardwoods used are Honduras and San Domingo mahogany, Circassian walnut, quarter-sawed oak, red gum, birch, poplar, chestnut, maple, all being employed in their proper places for exterior or interior construction.

Thoroughly seasoned and kiln-dried lumber only, free from all material defects, is used in the work.

Church Furniture and Conveniences.

The SOUTHERN SEATING & CABINET COMPANY designs and builds special furniture adapted to the architecture of any particular church, and will execute special designs of architects. These products include church seating, pulpits, fonts, altar rails, lecterns, pedestals, tables, chairs, etc.

Material—Stock furniture, made in quartered oak or plain oak; in birch or red gum, when ordered.

Pew End Pew Body Pew End
SAMPLES OF CHURCH PEWS

A FEW REFERENCES

BANK FURNITURE

Metropolitan Bank, New Orleans, La.
South Texas Commercial National Bank, Houston, Tex.
First National Bank, Fort Worth, Tex.
Orlando Bank & Trust Company, Orlando, Fla.
Germania Bank, Memphis, Tenn.
Pennington County Bank, Rapid City, South Dak.
First State & Savings Bank, Abingdon, Ill.
Bank of Tidewater, Portsmouth, Va.

CHURCH FURNITURE

Reynolda Chapel, R. J. Reynold's Estate, Winston-Salem, N. C.
First Methodist Church, Houston, Tex.
First Baptist Church, Orlando, Fla.
First Christian Church, Louisville, Ky.
First Methodist Church, Kansas City, Mo.
First Baptist Church, Waco, Tex.
Church of the Covenant, Greensboro, N. C.
First Presbyterian Church, Chattanooga, Tenn.
Second Church of Christ, Scientist, Los Angeles, Cal.
Jewish Synagogue, Jacksonville, Fla.
Cathedral of the Incarnation, Nashville, Tenn.
First Presbyterian Church, Barrington, N. J.

SETTEES FOR R. R. STATIONS

Memphis Union Station, Memphis, Tenn.
Trans-Mississippi Terminal Station, New Orleans, La.

BUILDING DIRECTORIES, BULLETIN & SIGN CO.

FACTORY AND OFFICE
235 Canal Street
NEW YORK, N. Y.

TELEPHONE, FRANKLIN 1960

Products.

"GREELEY" CHANGEABLE LETTER DIRECTORIES, for Office Buildings, Clubs, Department Stores, Regimental Rosters, Hospitals, Churches, etc.

General Description.

"Greeley" Directories and Bulletin Boards are made in three styles; one is a solid, grooved, broadcloth covered board (Figs. 1 and 3), and the other two consist of unit interchangeable grooved strips which are fitted into the bulletin frame (Figs. 2 and 4). The principle of applying the letters is the same in all styles. (See Figs. 3 and 4.) The letters, having two groove tongues each, can never be set in any but an upright position.

The care of the systems is very simple; and, being sold outright, they involve practically no upkeep cost.

Styles.

Style No. 1 is adapted to most purposes of a directory or announcement board, and is made in an improved manner to prevent warping. It is recommended as neat, efficient and economical.

Styles Nos. 2 and 3 differ only in the fact that the one is covered with broadcloth and the other is not. They are the most perfect and most adaptable bulletin systems devised. With these improved styles a name or line may be made up, upon a unit strip, away from the directory or bulletin, and fitted into its proper position between others already in place, without disarranging the rest of the system.

Letters.

The letters are of one piece (including the groove tongues) and are of half-hard brass covered with four coats of a special ivory white solution. They are made in ¼-, ½-, ¾-, 1- and 1½-inch sizes, and are supplied in any quantity desired.

Broadcloth.

The broadcloth used on Styles Nos. 1 and 2 is of a fine durable quality and can be supplied in black, maroon, dark blue, or green.

SIZES AND CAPACITIES OF "GREELEY" DIRECTORIES

Sight Size	Size of Letters	Capacity of Names: Style No. 1	Capacity of Names: Styles No. 2 and No. 3 in ½" Size Only	Columns
10x22 in.	¼"	40		1
	½"	25	11x22 in.	1
20x30 in.	¼"	75		2
	½"	50	22x22 in.	2
	¾"	25		1
30x36 in.	¼"	200		4
	½"	100	33x30 in.	3
	¾"	50		2
30x50 in.	¼"	300		4
	½"	150	33x44 in.	3
	¾"	75		2
40x54 in.	¼"	400		5
	½"	250	44x54 in.	4
	¾"	125		3
50x62in.	¼"	600		6
	½"	350	55x61 in.	5
	¾"	150		3

Frames.

The various styles of directories and bulletins are furnished with or without frames. "Greeley" frames are made in the best cabinet manner, and may be had in either wood, iron or bronze. Standard types of frames can be modified to harmonize with surroundings.

Sizes, etc.

In all sizes from 30" x 36" the full alphabet is included, and from 30" x 50" upward the title of the building or other heading in 1½-inch letters is applied. Smaller size bulletins will be fitted with headings in appropriate size letters, when required.

The table below gives the data in connection with the usual sizes specified.

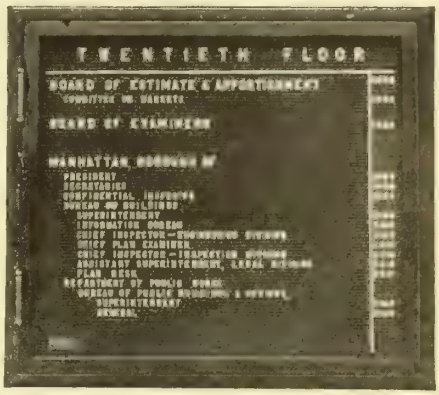


FIG. 1. FLOOR DIRECTORIES IN MUNICIPAL BUILDING, NEW YORK, N. Y. Size over all, 38 x 34 inches

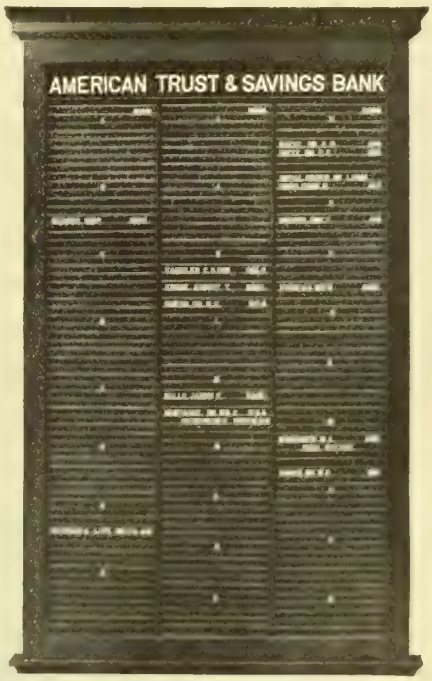


FIG. 2. BULLETIN BOARD (STYLE NO. 3) IN BANK BUILDING, EVANSVILLE, IND.

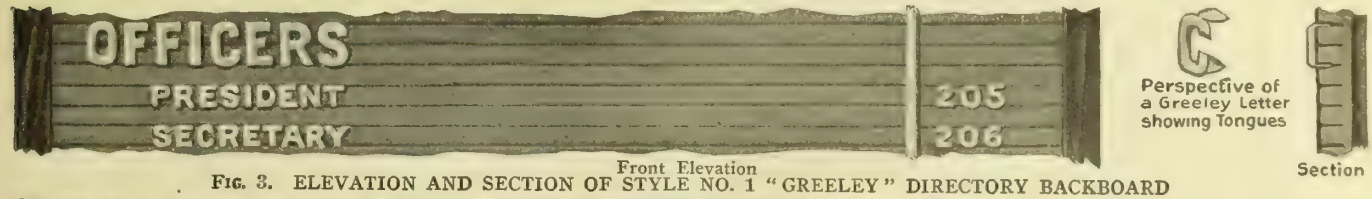


FIG. 3. ELEVATION AND SECTION OF STYLE NO. 1 "GREELEY" DIRECTORY BACKBOARD

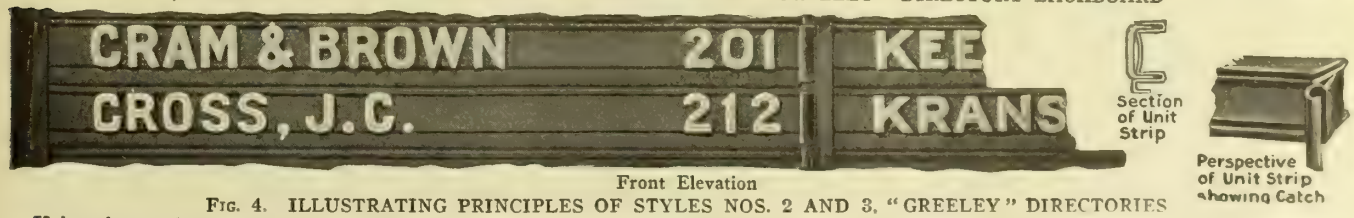


FIG. 4. ILLUSTRATING PRINCIPLES OF STYLES NOS. 2 AND 3, "GREELEY" DIRECTORIES

Unit strips are held in place by spring clips. Style No. 2 differs from Style No. 3 only in the fact that the latter is of a black metal, uncovered (as shown); while the former is of same construction but covered with broadcloth in any one of several standard or special colors

THE TABLET AND TICKET COMPANY

ESTABLISHED 1870

Willson's Office and Loft Building Directories

381-383 Broadway
NEW YORK, N. Y.
TELEPHONE, FRANKLIN 2411

624-630 West Adams Street
CHICAGO, ILL.
TELEPHONE, HAYMARKET 3883

111 New Montgomery Street
SAN FRANCISCO, CAL.
TELEPHONE, DOUGLAS 250

Products.

WILLSON'S PATENT BUILDING DIRECTORIES, for Office and Loft Buildings, also for floors of Large Buildings, Apartment Houses, Club Membership "In" and "Out," Golf Handicap; TELEPHONE CALLS; FIRE ALARM RUNNING CARDS; TIME SCHEDULE for Universities and Schools; CHURCH PEW DIRECTORIES; DEPARTMENT DIRECTORIES for Banks and Institutions.

Also, FLOOR DIRECTORIES.

TRADE-MARK

Advantages.

Willson's Changeable and Alphabetical Directory is the only directory kept alphabetically correct; alignment accurate, letters uniform and correctly spaced. The simplest, most practical and satisfactory; "each name a unit," can at all times be inserted, removed or changed; placed "right" without special efforts or waste of time. Requires less space than any other directory where space is a factor.

Space Required.

The space required for the directory should be provided for in the architect's plans, when expensive marble can be saved and frame inserted; or frame can be placed on marble, when desired.

Frame.

The outside frame is made of ornamental iron; finished in bower-barff, verde green, or electroplated to match the metal work in the building. The sections to hold names are made of steel, bower-barff finished, fitted with beveled plate glass, protecting names, and requires no door that will be in the way when making changes.

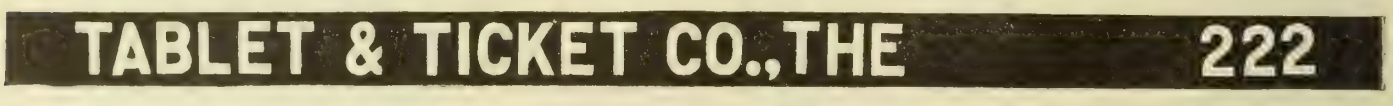
Names.

The names are made with white letters on black strips, which can be easily moved up or down, enabling the operator to insert each name in alphabetical order, and also, when removing names, to take out desired strip, move names together, and fill in vacant space left at bottom with blank strips.

The average number required is two names for each room, which will permit placing the individual names, as well as the names of firms or corporations, that are necessary on the directory. Figure on thirty names to the vertical foot.

Special Frames.

Of ornamental iron or bronze, designed by the architects and provided for in specifications and on



NAME STRIP, ACTUAL SIZE

TYPICAL OFFICE BUILDING DIRECTORY

Continued on next page

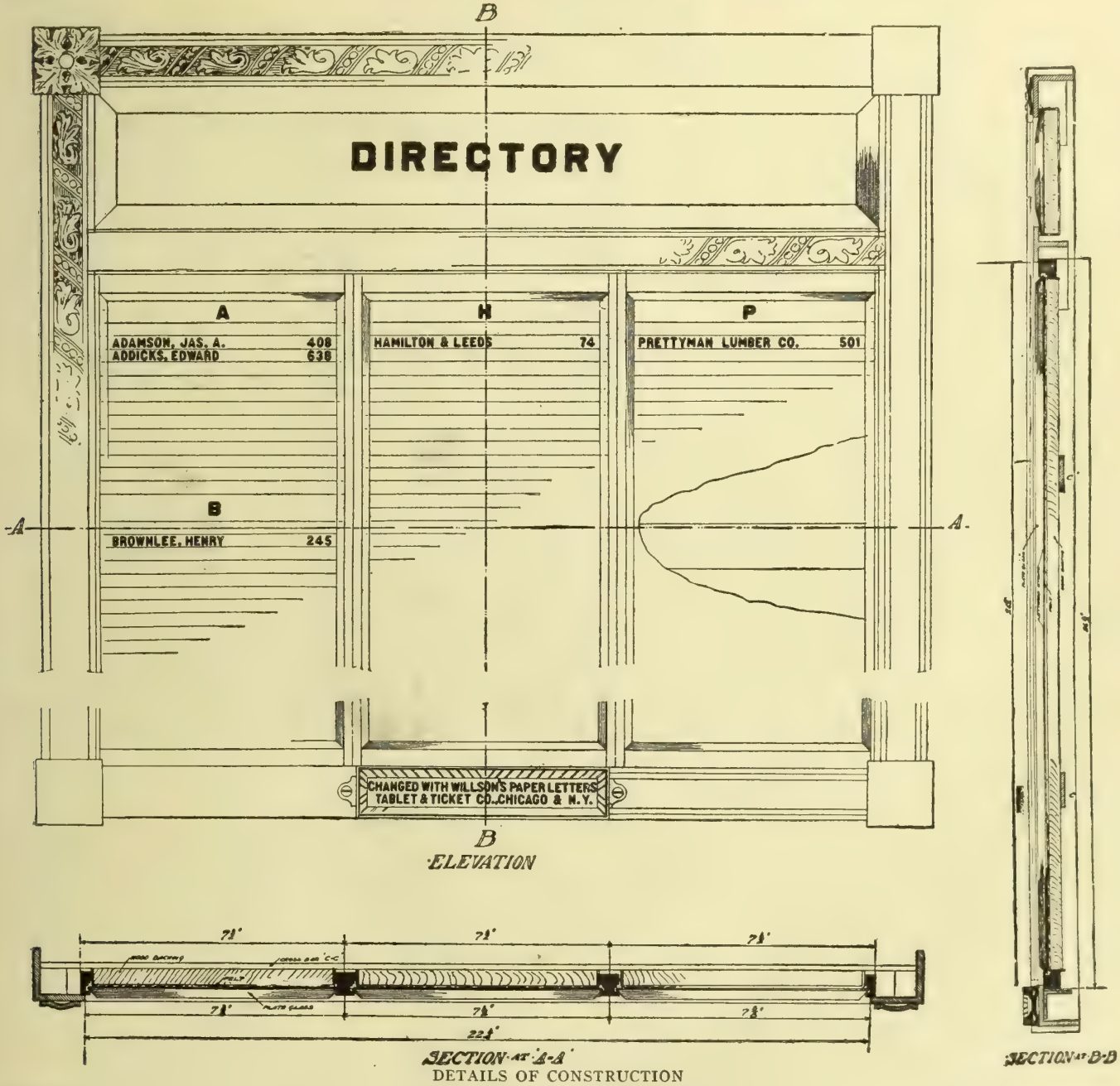
plans, are made by the contractors in accordance with our details, blue-print of which we will furnish.

Heading.

Headings in special frames are usually made of metal, but can be made same as shown on this page, and fitted with beveled plate glass, or omitted, if desired.

Particulars.

On request, we will furnish drawing or blue-prints with exact measurements suitable for any size building or number of rooms, so that architects can arrange for space required; or they can send us sketch and size of space provided for directory, and we will send full details of directory suitable for space.



DETAILS OF CONSTRUCTION

Lettering shows white on a black background

Sections.

Panels or sections are made in the following sizes: 7½ by 18½ in., 7½ by 26⅜ in., 7½ by 32⅞ in., 7½ by 40⅜ in. In order to avoid mistakes in these frames we give here exact size of the sight opening of the frame.

A FEW REFERENCES

Chicago, Ill., Lumber Exchange Building
Detroit, Mich., David Whitney Building
New York, N. Y., Woolworth Building
Pittsburgh, Pa., Oliver and Frick Buildings
Seattle, Wash., L. C. Smith Building
Kansas City, R. A. Long Building
New Orleans, La., Hibernian Building
Birmingham, Ala., Brown-Marx Building
and 2900 others

SIZES OF 26⅜-INCH SECTIONS

Frame Sections	3	4	5	6	7	8	9	10
Height	26	26	26	26	26	26	26	26
Width	22 5/16	29 13/16	37 5/16	44 13/16	52 3/8	59 7/8	67 3/8	74 11/16
Capacity	100	150	200	250	300	400	450	500

SIZES OF 32⅞-INCH SECTIONS

Frame Sections	3	4	5	6	7	8	9	10
Height	32½	32½	32½	32½	32½	32½	32½	32½
Width	22 5/16	29 13/16	37 5/16	44 13/16	52 3/8	59 7/8	67 3/8	74 11/16
Capacity	200	250	300	400	450	500	600	700

Special size sections where actually necessary.

UNITED STATES CHANGEABLE SIGN COMPANY

C. M. KINNEY CO., SUCCESSORS

Manufacturers of Building Directories and Bulletin Boards

3 West Twenty-Ninth Street

TELEPHONE, MADISON SQUARE 5252

NEW YORK, N. Y.

Products.

DIRECTORIES for Office Buildings, ROSTERS for Armories, ANNOUNCEMENT BOARDS for Hotels and Clubs, TIME-TABLES for Tourist Agencies or Railroads, and BULLETINS for every need.

Suggested Uses.

These Directories are particularly suitable for the following uses: Apartments, Churches and Sunday-Schools, City Halls, Clubs (list of officers and members), Dry Goods Stores (special sales), Fire Departments (calls, stations), Golf Clubs (officers, members, handicaps), Hospitals (visiting doctors and house staff), Hotels, Clubs (steamship sailings, theaters, announcements), Office Buildings, Police Department Bulletins (day's instructions), Public Buildings, Public Schools (lecture rooms), Railroad Bulletins (time-tables of special trains), Real Estate Offices (lists of property for rent or sale), Armories and Naval Vessels (rosters), Salesmen's Competitive Bulletins, Steamship Announcements (tours, sailings), Steamship Bulletins (daily log, concerts, wireless reports), Theater Bulletins, Tourist Offices (special railroad and steamship excursions).

Special Features.

This is the original and is still the *only* changeable letter system. No other is free from running expense. With complete equipment there is no further outlay. "First Cost the Only Cost."

The backboard is grooved and covered with cloth. It is made solid, or in interchangeable strips, each strip holding a name or line of matter. The letters, of white durable plastic material, have firmly attached springs fitting into the grooves of the backboard—removable and replaceable with perfect ease.

Interchangeable-Strip Backboard.

A recently invented system of interchangeable units enables the removal and replacement of entire names or lines without rearranging contiguous names. See illustration.

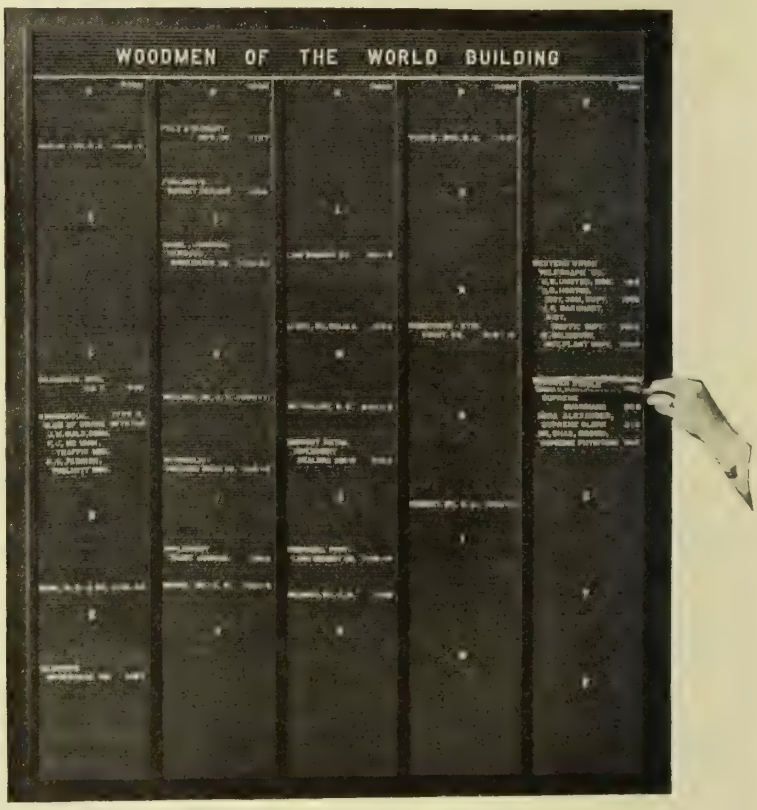
Directory Frames.

Catalogue designs in wood, iron or bronze, as shown. These may be modified to harmonize with surroundings. Architects' and special designs followed, if desired.

The backboard can be adjusted to frames furnished by other manufacturers.

Co-operative Service.

In specifying the U. S. Changeable Directory it is advisable that the architect consult us on essential points, such as space necessary for requisite number of names, etc.



DIRECTORY WITH INTERCHANGEABLE STRIPS

Information to Architects.

Information for calculating space required for backboards of the UNITED STATES CHANGEABLE SIGN COMPANY, C. M. Kinney Co., Successors:

PATENTED SOLID BACKBOARD

Thickness—1½" from the inside face of the glass in the door to the back.

Width—Using ½" letters for the names and room numbers, 12" for each column; using ¼" letters, 10" for each column.

Height—Using ½" letters, ¾" for each line or name; using ¼" letters, ½" for each line or name.

IMPROVED INTERCHANGEABLE-STRIP BACKBOARD

Thickness—1½" from the inside face of the glass in the door to the back.

Width—Using ½" letters for the names and room numbers, 12⅜" for each column.

Using ¼" letters, 10⅜" for each column of names and room numbers.

Height—⅝" for each line or name using either ½" or ¼" letters.

Number of Names—Calculate upon two names to each office, in a building containing 200 offices or less. One and a half names to each office in a building containing over 200 offices.

Quantity of Letters Required—Calculate upon 17 letters to each name, including room number.

Space for Title—If title or name of the building is required to be placed at the top of the backboard, add 3" to the height

THE WOLLAEGER MANUFACTURING CO.

Fine Special Furniture

OFFICES AND FACTORY
28 Juneau Avenue
MILWAUKEE, WIS.

Products.

"FIRST QUALITY ONLY"
TRADE-MARK

Made-to-Order Wood Furniture of the highest grade, in such Combinations with Marble, Bronze, Glass, etc., as special installations may require for Capitols, Court Houses, City Halls, Museums and Libraries. Bank Interiors complete, including Marble, Bronze, Ornamental Plaster, Decorations, etc.; also Laboratory Furniture for Schools and Colleges.

Experience and Facilities.

This factory, established over thirty years ago, devotes its facilities exclusively to the manufacture of Special Public Building Furniture of the highest order. By thus specializing, it has developed an exceptional organization for meeting all the requirements the exacting architect may present in the matters of design, construction, selection of materials, special finishes, hardware, and so on.

The business of this company is of a national character; and it has fitted out the highest class of buildings in nearly every state in the union. (See References).

"First Quality Only."

The product of this concern is genuine cabinet work, as distinguished from machine-fitted methods of manufacture. Its products are uniformly of a definite high standard, which is firmly maintained in all work, regardless of incompleteness or laxity of specifications under which contracts may have been secured.

Co-operative Service.

All work is executed from special working details, made exclusively for the contract in hand. Suggestive designs, photographs, lay-outs and specifications will be gladly supplied by the thoroughly equipped designing and drafting departments.

Distribution.

All business is handled direct from the home office, capable representatives, fully conversant with the business, being sent for conference, without charge, to any part of the country.

School Laboratory Furniture.

This organization is prepared to fit up, ready for use, in schools and colleges, departments for the study of chemistry, biology, physics, domestic science, etc. Consultation is invited.

References.

CAPITOLS AND LIBRARIES

Wisconsin State Capitol, Geo. B. Post & Sons, Architects, New York, N. Y.
Kentucky State Capitol, Frank M. Andrews & Co., Architects, New York, N. Y.
Utah State Capitol, Richard Kletting, Architect, Salt Lake City, Utah
Congressional Library, Washington, D. C., Bernard Green, Supervising Architect
Milwaukee Public Library and Museum, Ferry & Clas, Architects, Milwaukee, Wis.

COURT HOUSES

New Orleans, La., P. Thornton Marye, Architect, Atlanta, Ga.
Wilkes-Barre, Pa., McCormick & French, Architects, Wilkes-Barre, Pa.
Chattanooga, Tenn., R. H. Hunt, Architect, Chattanooga, Tenn.
Kankakee, Ill., Z. T. Davis, Architect, Chicago, Ill.
Pueblo, Colo., Alb. W. Ross, New York, and Geo. W. Roe, Pueblo, Colo., Associates
Grand Forks, N. D., Buechner & Orth, Architects, St. Paul, Minn.
Milbank, S. D., Bell & Bentley, Inc., Architects, Minneapolis, Minn.
Bessemer, Mich., Charlton & Kuenzli, Architects, Milwaukee, Wis., and Marquette, Mich.
Cleveland, Ohio, City Hall., J. Milton Dyer, Architect, Cleveland, Ohio

BANKS

Northwestern National Bank, Portland, Ore.
The First National Bank, Boise, Idaho
The First National Bank, Racine, Wis.
The Knight Trust & Savings Bank, Provo, Utah
Live Stock National Bank, Sioux City, Iowa
Miners' National Bank, Ishpeming, Mich.
Commercial Savings Bank, Adrian, Mich.
Thatcher Bros. Banking Co., Logan, Utah
The First National Bank, Madison, Wis.
Daly Bank & Trust Co., Anaconda, Mont.
Citizens' National Bank, Kokomo, Ind.
First Savings & Loan Co., Massillon, Ohio
Western Reserve National Bank, Warren, Ohio
The Piqua National Bank, Piqua, Ohio

LABORATORIES

High School, Sandusky, Ohio
High School, Highland Park, Mich.

AHNAPEE VENEER & SEATING CO.

ALGOMA, WIS.

Products.

Manufacturers of VENEER SETTEES for Railway Depots, Hospitals, Convention Halls, Asylums, Churches, etc.

Also, large size VENEER PANELS for Interior Finish, and special VENEER DOORS of any native or foreign wood. TAXIDERMIST MOUNTS and SHIELDS.

Facilities.

We carry a complete stock of all styles of Settees in standard lengths, and as we also carry a quantity of ends and woodwork made up we are in a position to fill any ordinary size order for special lengths within five or six days from its receipt.

Co-operative Service.

Our factory is well equipped for building special seating equipment.

We welcome correspondence with architects or builders and will be glad to cooperate in the study of any special problem and to submit estimates and samples of wood. Detailed catalogue on request.

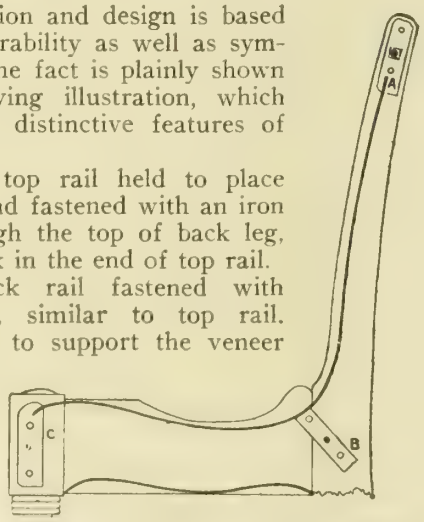
Quality of Construction.

Our construction and design is based on rigidity and durability as well as symmetry of lines. The fact is plainly shown by the accompanying illustration, which shows one of our distinctive features of construction.

A represents top rail held to place with two dowels and fastened with an iron bolt passing through the top of back leg, entering a nut sunk in the end of top rail.

B shows back rail fastened with dowels and bolts, similar to top rail. Placed in position to support the veneer and prevent its working out of the groove in front rail.

C shows front rail bolted same as top and back rail; seat enters the groove on an angle of 45 degrees, which prevents it from either lifting up or pulling out while the top rail is in place.



DETAIL OF SETTEE CONSTRUCTION

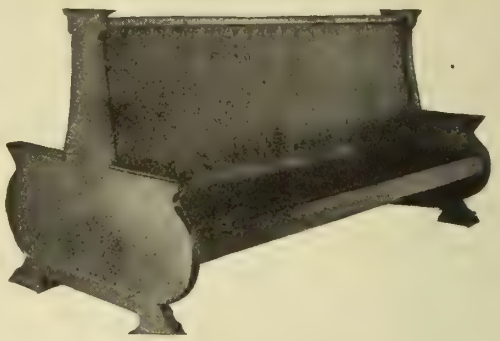
Settees.

We show on this page a few of our many styles of Settees. Five-, six- and eight-foot lengths are carried in stock. Other lengths made up on short notice. Single Settees shown may also be furnished double.

Church Furniture.

We manufacture and carry in stock a complete line of church furniture comprising a variety of distinctive and pleasing patterns. Prices will be submitted on application

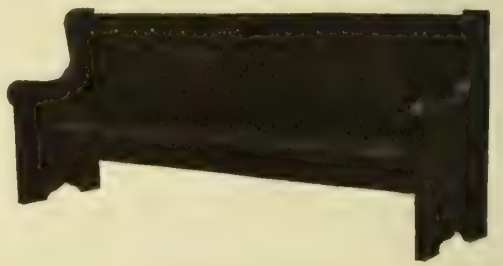
PEW STYLE 18S


SETTEE NO. 172

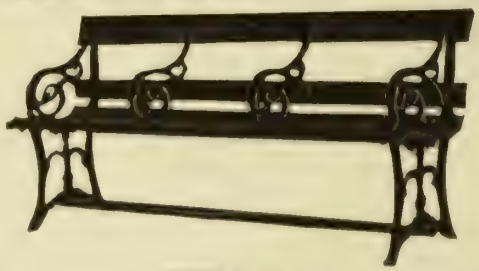
FRAME	PER LINEAL FOOT
Ash	$8.50
Plain Oak, or Birch, Mahogany finish	9.00
Quartered Oak or Mahogany	10.00

SETTEE NO. 273

FRAME	PER LINEAL FOOT
Ash	$4.50
Plain Oak, or Birch, Mahogany finish	4.80
Quartered Oak or Mahogany	5.25


SETTEE NO. 374

FRAME	PER LINEAL FOOT
Ash	$3.50
Plain Oak, or Birch, Mahogany finish	3.75
Quartered Oak or Mahogany	4.00


SETTEE NO. 194

FRAME	PER LINEAL FOOT
Ash	$1.10
Walnut	1.75
Red Birch	1.20
Plain Oak	1.25
Quarter sawed Oak	1.70
Genuine Mahogany	2.00

Special discounts on quantities to dealers

CAXTON SCHOOL SUPPLY CO.

Makers of Composition Blackboards and Schoolroom Equipment

560-570 West Monroe Street
CHICAGO, ILL.

Products.

Caxton Reinforced Blackboards, Lithoplate Blackboards, School Desks, Blackboard Erasers, Adjustable Window Shades and General School Supplies.

Caxton Reinforced Blackboard.

The foundation of the Caxton Reinforced Blackboard is a special composition pressed into a compact firm sheet one quarter inch thick. On this sheet is placed the material of the writing surface, a mixture of ground slate and pulverized carborundum, made plastic by the addition of a special binding ingredient. This surface material is applied with a trowel in four successive coats, providing a "body" that is both strong and lasting.

After the board proper has been completed, as described, it is securely fastened to a jointed frame, made of wooden strips one inch wide and three quarter inch thick.

The finished board is about one inch in thickness and possesses corresponding strength and solidity.

CAXTON REINFORCED BLACKBOARD

Surface.

The writing surface of this blackboard is ideal, as soft as velvet to the touch, yet as hard and lasting as adamant. The ground slate in the mixture gives the board all the good qualities of a slate board; at the same time, the pulverized carborundum contained in it gives a "bite" to the writing surface, that makes this board distinctive.

Chalk takes on this surface with almost no pressure, and without the hideous squeak so common to some blackboards. The surface retains its good qualities indefinitely, with proper use.

Color and Finish.

The Caxton Reinforced Blackboard is regularly supplied in a dark green color that is very restful to the eyes, and in the usual black. If ordered in sufficient quantity, it can be furnished in any desired color to harmonize with the decorations of the room.

Its dull finish precludes the possibility of unpleasant reflection, such as is sometimes experienced with blackboards that have become glossy.

Installation.

Caxton Reinforced Blackboard comes in slabs of standard widths and up to twelve feet in length, and is shipped ready to put in place. Shipments do not regularly include moulding and chalk trough, but these can be supplied, at a moderate extra charge, from regular stock styles.

These boards can be put on the wall over finished plaster, or in new buildings directly against the brick tile or studding. In either case, the method of fastening is simple and the cost is considerably less than slate.

Service and References.

Our Reinforced Blackboards are warranted for ten years. They have been successfully used in many large modern schools and colleges.

We will be glad to give references to Caxton Installations, on request.

Lithoplate.

This blackboard is made the same way and possesses the same advantages as the Caxton Reinforced Type, except that it is not reinforced.

As far as surface, color and finish are concerned there is no difference between these products. Lithoplate, however, is less solid and lasting in construction, due to the absence of the reinforcement.

Lithoplate is intended for installations where rugged permanence has to be sacrificed to reduce initial expense, but where a high quality blackboard is desired. It is supplied in lengths up to twelve feet and in standard widths. In ordering, exact dimensions should be specified, together with the color desired.

LITHOPLATE INSTALLED

Samples.

Samples of Caxton Reinforced or Lithoplate in either green or black will be sent without charge, on request.

References.

A few recent installations of Caxton Reinforced Blackboard as follows:

Wisconsin

Racine, Public Schools.
Madison, Public Schools.
Kenosha, Public Schools.
West Allis, Public Schools.
Fond du Lac, General Bragg School.
Cudahy, Public Schools.

Illinois

Rockford, Public Schools.
Pullman, Free School for Manual Training.
Joliet, St. Cyril's School.
Highland Park, High School.
Kenilworth, New High School.
Great Lakes, U. S. Government Training School.

GRAND RAPIDS SCHOOL EQUIPMENT COMPANY

FORMERLY GRAND RAPIDS HAND SCREW COMPANY

School Equipment and Special Furniture

1417 to 1527 Front Avenue, Northwest
GRAND RAPIDS, MICH.

Products.

High-Grade School Equipment and Special Furniture for Chemistry, Physics, Biology and Lecture Rooms; for Sewing, Cooking and Domestic Art Instruction Rooms; for Drawing, Manual Training and Art Rooms.

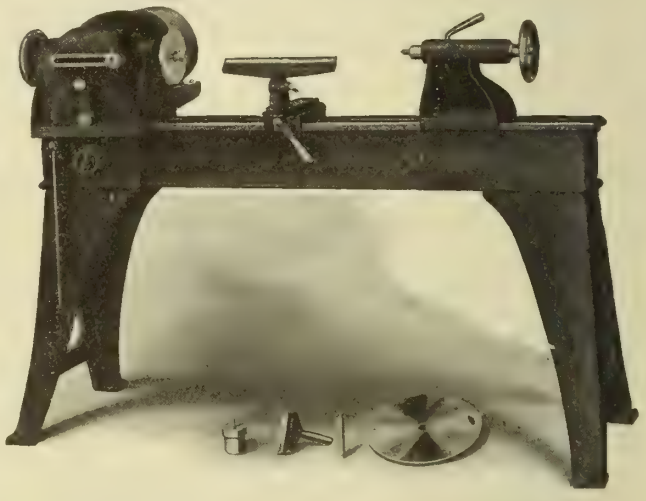
Mechanical Equipment for Forge Shops, Wood Shops and Tool Rooms; Clamps, Hand Screws, Vises, Trucks and General Factory Furnishings.

Experience.

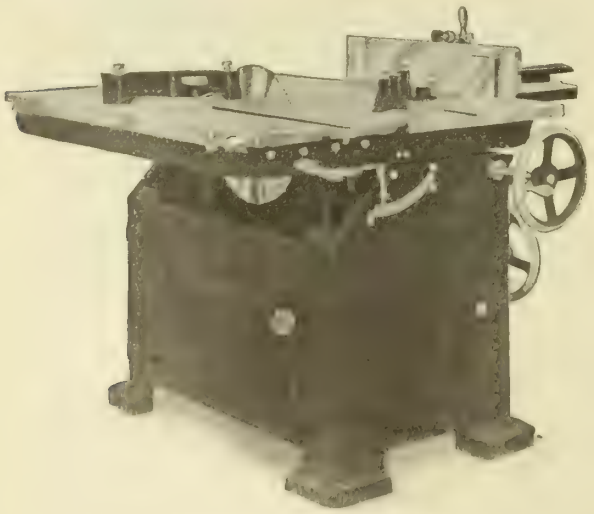
We are the largest manufacturers in the world making school equipment and special furniture, and have had thirty-five years' experience in this line.

Co-operative Service.

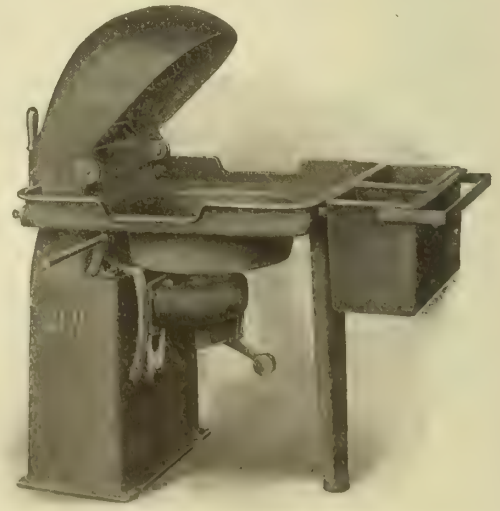
Our Service Department will furnish, gratis, detail drawings covering standard or special equipment for all departments in industrial or vocational education. This department will co-operate with you, and furnish specific information on any problem; also, will supply estimates of cost, detail layouts, plans for special work, together with written specifications showing construction methods approved by leading architects and school boards, without cost. Send the plans and they will be given prompt and careful attention.



"GRAND RAPIDS" NO. 100 WOOD LATHE



"GRAND RAPIDS" NO. 1 UNIVERSAL SAW



"GRAND RAPIDS" NO. 120 DOWN DRAFT FORGE

"GRAND RAPIDS" NO. 852 DOMESTIC SCIENCE TABLE

"GRAND RAPIDS" NO. 1054 INSTRUCTOR'S LABORATORY DESK
Large assortment in stock. Also made to special designs

"GRAND RAPIDS" NO. 525 MANUAL TRAINING BENCH

THE INNER BRACED FURNITURE CO.

ELKHART, IND.

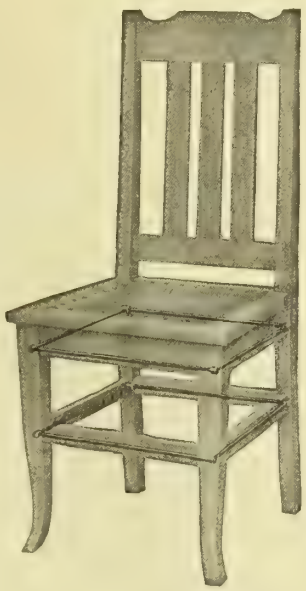
Products.

Ten-year guaranteed Inner Braced Furniture for hard use in Public Service.

We manufacture Room, Lobby, Billiard, Cafe, Office, Tablet Arm and Kindergarten Chairs and Rockers, in wood, leather, cane and tapestry seats; Room and Office Desk Tables and Writing Tables; Cafe, Checker and Library Tables; Settees, Couches and Davenports; Buffets; Bookcases; China Cabinets; Magazine and Newspaper Racks; Library Delivery Desks; Trunk Stands; Stools; Telephone and Lamp Stands; Umbrella Racks; Costumers.

Descripton.

Inner Braced furniture is practically indestructible, because bands of continuous, hidden steel bind the joints together as a whole and they cannot be affected by atmospheric change or the strain of use. Entire strain is on the steel members, not on the wood. Selected wood stock is slowly kiln-dried and hand completed; the best of finishes are hand applied; upholstery is in genuine leather or tapestry, with never-sag box springs.



NO. 20¼. "INNER BRACED" CHAIR
X-ray, showing Steel Reinforcements in place

Construction.

Half-inch steel bushings are driven into ½-inch holes in the corner posts of the frame. This bushing has a side tapered hole and is bored out lengthwise. No. 8 steel wire is threaded at each end and placed longitudinally through the near bushing and screwed permanently into the side hole of the opposite bushing. When the four corner posts are thus continuously connected the burrs are permanently tightened against the bushings, and the ½-inch wood openings are plugged. Spiral wood dowels above and below the bushings assure perfect alignment of members. Broken stretchers are treated separately. Any frame joint will easily withstand 1,000 pounds strain, as against the glue-binder of the common mortise and tenon joint construction.

SPIRAL DOWEL AND STEEL CONSTRUCTION OF "INNER BRACED" FURNITURE

Guarantee.

Inner Braced furniture is marked "U. S. Patented" and has the following unequalled guarantee, or ten years free insurance plainly stamped thereon:

"This furniture has our patented invisible steel bracing. We agree to replace said furniture free of charge should any stretcher or box rail become loose from use within ten years of the purchase date."

Prices.

Based upon direct contact between manufacturer and purchaser, giving the element of positive responsibility and first cost. Catalogue gives list price, subject to 10 per cent discount, 30 days net, f. o. b. cars Elkhart, Indiana, with 5 per cent additional in carlod lot; also 2 per cent in 10 days.

Catalogue.

De Luxe Catalogue of 80 pages sent upon request. *Scope*—Brief general history of furniture construction; strength of hand-made, weakness of machine-made furniture; waste in furniture purchases and remedy. Various plates on Inner Braced construction with explanations; 64 pages of Inner Braced designs, with dimensions, weight and price, showing probably the most comprehensive public line of any factory; a few facsimile testimonials; index.

JOHN S. JACKSON, PRESIDENT

JACKSON-BANGOR SLATE CO.

Blackboards, Structural Slate and Roofing Slate

PEN ARGYL, PA.

Products.

Manufacturers of SLATE BLACKBOARDS, GRAVE VAULTS, STRUCTURAL SLATE for Risers and Treads, Urinals, Stalls, Closet Stalls, Shower Stalls, Sinks, Laundry Tubs, Baseboards, etc.; "DEEP BED" ROOFING SLATE.

TRADE-MARK

Blackboards.

Blackboards are produced from the "Genuine Big Bed" Jackson-Bangor Vein, which is eighteen to twenty feet in length and contains all the necessary qualities for the manufacture of this article, as it is unexcelled by any other one bed yet discovered in any slate producing section. The slate is free from all defects, straight in the split, and unsurpassed in fineness and texture.

Why Use Slate Blackboards?

They are the Best Chalk-Marking Surface in Existence—The structure of the natural slate rock is very dense, hence readily polished to a fine, smooth, non-porous surface.

The Most Easily and Cleanly Erased—Being non-porous, does not hold crayon particles; always presenting a fresh, clean writing surface.

The Most Economical of All Blackboards—A permanent material, not requiring repairs, or replacements, or expense of any kind after installation.

Advantages—Simple to install; cheap in price; does not warp, nor discolor; most hygienic; will wear for years. No scaling or peeling; no uneven surfaces; no resurfacing.

Sizes of Blackboards.

Standard heights, three feet, three feet six inches, four feet, four feet six inches, and five feet, are cut and carried in stock in large quantities.

Other heights must be cut to order, which causes delay in shipping, often cut to waste and result in extra cost. Lengths range from about three to six feet.

Double Tier—A double tier plan has much to commend it. The main board may be a standard three- to four-foot board, and installed above it, separated by a narrow moulding, a twelve to eighteen inch strip. To meet this demand a limited amount of narrow slate is carried in stock.

Prices of Blackboards.

The average price for the first-grade boards is from sixteen to eighteen cents per square foot. To meet price competition where quality is not a factor, cheaper grades of blackboards are produced, for which prices will be quoted on application.

References.

List of buildings using our products and architects specifying them will be furnished upon application.

Specifications for Blackboards.

Architects and School Boards will find the following specification insures good quality slate and proper installation:

Furnish and install, where directed, best quality, hand-finished slate blackboards in accordance with the following specifications and detail:

Frames—Fasten securely to walls of rooms kiln-dried white pine foundation strips 4 by ¾ inch at top and 5 by ¾ inch at bottom of frames. To this foundation nail securely at top and bottom 3¾ by 1¼ inch frame mouldings, carefully plumbed to insure exact level. Fasten 4¾ by 1¼ inch chalk trough securely to bottom frame moulding, and support it with apron, as per detail. Furnish ⅝ by ⅝ inch quarter round moulding to secure blackboards in frames at top and bottom and at ends of spaces.

Finish frames at ends same as at top. Install cove moulding 1¼ by 1¼ inches at top of frame to make finish.

Slate—Furnish best quality, hand-finished natural slate blackboards [state height], ¼ to ⅜ inch thick.

Spaces 5 feet or less to be in one piece, 5 to 10 feet in two pieces, and proceed likewise with larger spaces. Joints to be ground straight and true, to be fitted tight and glued at joints, and after completion of setting to be shaved and scraped to a uniform straight, smooth surface.

Structural Slate.

Sanitary—Slate is recognized as the most sanitary material of which urinal, closet and shower stalls, sinks, laundry tubs, etc., can possibly be constructed. Being absolutely non-absorbent, it is not affected by the chemical action of acids, soaps, etc.

LIST PRICES, JACKSON-BANGOR STRUCTURAL SLATE

Subject to Change

Thickness, Ins.	1	1¼	1½	1¾	2	Notes
Slabs to and including 10 feet	$.24	.28	.32	.38	.44	Slabs over 6 feet long take next higher group of prices
Slabs from 10 to 16 feet inclusive	$.30	.34	.40	.44	.50	Slabs over 7 feet long take next higher group of prices
Slabs from 16 to 22 feet inclusive	$.36	.40	.46	.52	.60	Slabs over 8 feet long, special
Slabs from 22 to 28 feet inclusive	$.44	.48	.52	.60	.68	Slabs over 8 feet long, special
Slabs from 28 to 35 feet inclusive	$.52	.56	.62	.70	.76	Slabs over 8 feet long, or containing over 35 feet special

Prices include rubbing one face and edges. Measurements superficial. No slabs figured at less than 6 inches in width.

NOTE—These list prices apply for both "Clear" and "Ribbon" stock.

Discounts on "Ribbon" Stock larger than on "Clear" stock.

Slabs Over 2 Inches Thick—For every ¼ inch additional, or fraction thereof, add 6c square foot.

Slate Slabs Rubbed Two Faces—16 feet and under, 4c square foot. 16 to 35 feet, 6c square foot.

Crating—For 2 inches thick and under, 4c square foot. Over 2 inches thick, 2c for every additional 1 inch or fraction thereof.

Treads and Platforms—Same price as slate slabs, including ¼ inch nosing on treads and platforms. All other work thereon will be charged for additional.

Irregular Shape Slabs—Measurements as full size slabs. 50 per cent additional for triangle or irregular shape treads and platforms.

Extra Labor—Cutting notches, countersinking, grooving, and all other labor required, additional charge will be made.

SLATE BASE AND BORDER ⅞ INCH OR 1 INCH THICK IN RANDOM LENGTHS

Up to and including 6 ins. in width	$.12 per lineal foot
From 6 ins. in width to and including 8 ins. in width	.16 per lineal foot
From 8 ins. in width to and including 11 ins. in width	.20 per lineal foot

NOTE—A specialty is made of "Clear" stock.

Sweet's CATALOGUE

Continued on next page

Roofing Slate.

TRADE-MARK

No. 1 Clear—The slate is taken from quarries which have been operated for a period of nearly forty years and have reached a depth of over three hundred feet.

Ninety per cent of the output is No. 1 Clear Slate. These slates are made by first-class mechanics, are carefully assorted, and unsurpassed in every particular.

Ribbon Slate—Slate quarried from beds whose length is not sufficiently large to make a strictly No. 1 Clear Slate is utilized by manufacturing it into a slate of an inferior quality, which is called Ribbon Slate. The life of the ingredients of this dark band, called ribbon, is but one third of that of the clear portion of the slate. When exposed on the roof for several years the ribbon portion disintegrates; as a consequence the slate is in two pieces, the portion exposed falls from the roof and makes the up-keep on a roof of this grade very costly, and in time discourages the use of slate as an article that insures roof satisfaction. For this reason we make but a very small percentage of Ribbon Slate; but where the customer demands this grade of material, we supply his wants.

Medium—The same quality as No. 1, but heavier, and not as smooth.

Weights—The estimated weight of No. 1 Slate of ordinary thickness is 650 pounds to the square; of the intermediates, 700 pounds.

Why Slate is the Ideal Roof.

Rust-proof; odorless and hygienic; fireproof; absolutely waterproof; not affected by extremes in temperatures, or destructive acids; does not attract lightning; does not taint water for a cistern.

Does not dry out; does not absorb moisture; does not become water-logged or moss grown; does not collect snow and ice; does not sweat and drip.

The slate roof is the cheapest, because the first cost is the only cost; needs no repairs or painting, and outwears all other roofs. Makes a reduction of ten to fifteen per cent in the rate of insurance on buildings and contents.

Specifications for Slate Roofs.

Rafters—Shall be 2 by 6 inches and 18 feet long, two feet from centers to give necessary strength.

Sheathing Boards—There shall be no lumps or uneven thicknesses in the boards, and they shall be laid solid. Tongue or grooved sheathing or [surface boards from 6 to 10 in. wide].

Valleys, Flashing, etc.—Valley to be 20 inches wide at bottom and 15 inches at top, galvanized iron. Chimneys to have saddle back, step and cloak flash at all intersections around brick work; ridges to be covered with galvanized iron. Eavestrough to be of galvanized material and so hung that the outside edge will be one half inch below run of the roof.

Laying Slate and Felt—Before starting be sure that roof is ready. If felt is used, work ahead by the width of one roll and place headlines on same to serve as a guide and keep slate in straight rows. Care shall be taken in the selecting of slate while punching; slate with corners off or defective otherwise shall be punched to bring imperfect part at head of slate when laid. To be selected in two thicknesses, thick ones used at eaves and thin at top of roof. Finishers shall always be thick and perfect slate.

Nails to be driven down even with slate, but not tight enough to crack slate.

Give a 3-inch lap in punching.

SIZES OF SLATE, EXPOSURE WHEN LAID, QUANTITY OF NAILS TO LAY, ETC., JACKSON-BANGOR SLATE

Size of Slate, Ins.	Number in each Square	Exposed when Laid, and Distance of Lath	Nails to Square 3d Gal.	Size of Slate, Ins.	Number in each Square	Exposed when Laid, and Distance of Lath	Nails to Square 3d Gal.
			Lbs. Ozs.				Lbs. Ozs.
24 x 14	98	10⅛ in.	1 0	16 x 10	222	6½ in.	2 3
24 x 12	115	10½ "	1 2	16 x 9	247	6½ "	2 7
22 x 12	127	9½ "	1 4	16 x 8	277	6½ "	2 12
22 x 11	138	9½ "	1 6	14 x 10	262	5½ "	2 9
20 x 12	142	8½ "	1 6	14 x 8	328	5½ "	3 3
20 x 10	170	8½ "	1 11	14 x 7	374	5½ "	3 11
18 x 12	160	7½ "	1 9	12 x 8	400	4½ "	3 15
18 x 10	192	7½ "	1 14	12 x 7	457	4½ "	4 8
18 x 9	214	7½ "	2 1	12 x 6	534	4½ "	5 4
16 x 12	185	6½ "	1 13				

One square of slate will cover 100 sq. ft. of surface.

PRICES, JACKSON-BANGOR "DEEP BED" ROOFING SLATE

GENUINE NO. 1 JACKSON-BANGOR

14 x 7, 12 x 8, 12 x 7, 12 x 6 ..$4.00

24 x 14, 24 x 12, 14 x 10, 14 x 8 ..$4.25

20 x 10, 18 x 10, 18 x 9 ..$4.75

22 x 12, 22 x 11, 20 x 12, 18 x 12, 16 x 12, 16 x 10, 16 x 8 ..$4.50

SPECIAL SIZES

18 x 18, 16 x 16, 14 x 14, 12 x 12 ..$6.00

GENUINE NO. 1 JACKSON-BANGOR RIBBON

20 x 10, 18 x 9, 16 x 8 ....$4.00

GENUINE MEDIUM JACKSON-BANGOR

24 x 12, 22 x 11 ..$3.75

16 x 10, 16 x 8, 14 x 10 ..$4.00

20 x 10, 18 x 10, 18 x 9 ..$4.00

GENUINE NO. 2 JACKSON-BANGOR

20 x 10, 18 x 9, 16 x 8 ....$3.50

GENUINE NO. 1 JACKSON-BANGOR GREY SLATE

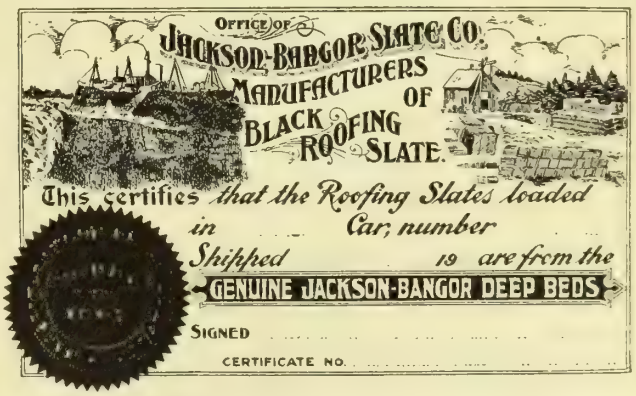
24 x 12 ..$4.50

14 x 8, 14 x 7 ..$4.75

20 x 10, 18 x 9, 16 x 8 ..$5.25

22 x 11 $5.00

Subject to change without notice.



FACSIMILE JACKSON-BANGOR SLATE CO. CERTIFICATE

Shipping Certificate.

To protect patrons and architects we issue with each shipment of Jackson-Bangor "Deep Bed" Roofing Slate a Certificate. It will show our Corporate Seal, Secretary's signature, the number and the initials of the car.

Every crate of Blackboards shipped by us carries the trade-mark on the back.

Miscellaneously distributed throughout every shipment of No. 1 Genuine Jackson-Bangor Slate you will find slate carrying on the back our trade-mark.

If same cannot be furnished you are not getting the Genuine Jackson-Bangor "Deep Bed" Roofing Slate or their first grade of Blackboards.

L. E. KNOTT APPARATUS COMPANY

Manufacturers of Science Laboratory Furniture, Special Hardware for Laboratory Use and Scientific Instruments

FACTORY AND MAIN OFFICE
TELEPHONE, CAMBRIDGE 4700
79-83 Amherst Street
CAMBRIDGE, MASS.
BRANCH OFFICE: NEW YORK, 70 Fifth Avenue—Telephone Connection

Products.

LABORATORY FURNITURE, for use in all Science Branches.

For Sanitary Drinking Fountains and Special Hardware for Laboratory Use, see our rame in General Index.

Description.

The Knott Laboratory Furniture, evolved during twenty years' careful study of educational needs, is de signed to meet the peculiar require ments in different Science Branches. High-grade cabinet work constructed by expert cabinet makers.

Designs—The latest approved and up-to-date designs resulting from long experience. No freak designs.

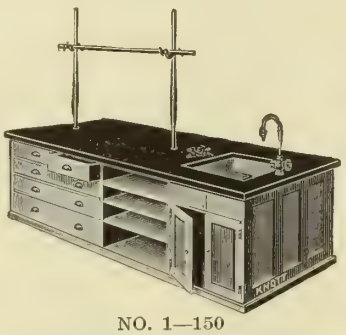
Material—Selected kiln-dried oak. Tops, of maple, built up of narrow strips of straight grained stock machined to a tongue, matched and glued in a manner to prevent warping.

Hardware—For hardware, see our name in General Index.

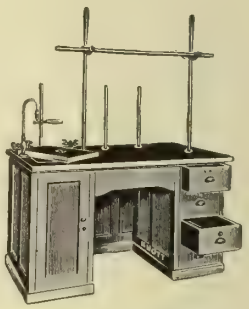
Finish—Tops treated, hardened, carbonized and acidproofed. Body filled, stained and shellacked to best accentuate the grain. Rubbed to a dull finish, the most harmonious and durable for science laboratories.

References.

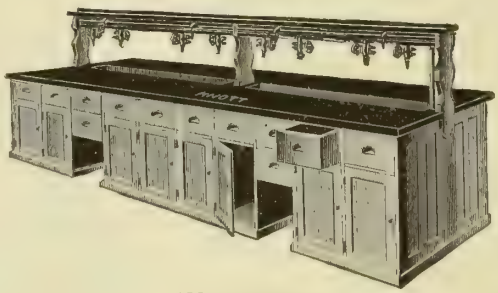
We have equipped many laboratories in every state east of the Rocky Mountains and have installed a number of large equipments in Pacific coast States.



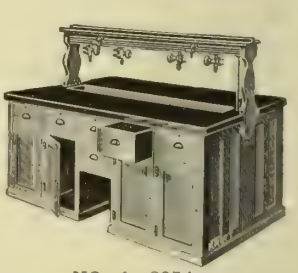
NO. 1—150
STANDARD LECTURE TABLE
Length, 8 feet. Width, 3 feet. Height, 34 inches
Front and ends, panelled. Back has four open shelves, three large and two small drawers, commodious cupboard. Pneumatic sink, lined with sheet lead, 18 by 16 inches, with pneumatic shelf. Knott Gooseneck Triple Interchangeable Nozzle Water Faucet, Knott Four-way Turret Gas Cocks, and Nickel-plated Supports with Flush Plates, all as illustrated.
Price, f.o.b. factory, $103.00



NO. 1—200
INSTRUCTOR'S TABLE
Length, 5 feet. Width, 2½ feet. Height, 34 inches
Front and ends, panelled. Back has four drawers and commodious cupboard. Pneumatic sink, lined with sheet lead, size 16 by 10 inches by 9 inches deep. Knott Gooseneck Triple Interchangeable Nozzle Water Faucets, the Knott Two-way Turret Gas Cock, and Nickel-plated Supports with Flush Plates, all as illustrated.
Price, f.o.b. factory, $67.50



NO. 1—225C
STANDARD CHEMISTRY TABLES
Length, 12 feet. Width, 3½ feet. Height, 34 inches
Each pupil supplied with one drawer, one cupboard, and has use of second drawer and waste jar space in common with another pupil. Knott Triple Nozzle Straight Water Faucet and the Knott Lever-Handle Serrated End Gas Cock supplied, one for each pupil.
Accommodates sixteen students, in groups of eight.
Price, f.o.b. factory, $174.50



NO. 1—225A
Length, 6 feet. Width, 3½ feet. Height, 34 inches
This table is one half the length of No. 1—225C and has the same characteristic features.
Accommodates eight students, in groups of four.
Price, f.o.b. factory, $96.00

NO. 1—120
PHYSICS TABLES
Length, 6 feet. Width, 4 feet. Height, 34 inches
With adjustable and detachable nickel-plated metal uprights.
Accommodates four pupils.
Price, f.o.b. factory, $76.75

No. 1—125 Physics Table, same as No. 1—120, but without supports.
Price, f.o.b. factory, $71.00

NO. 1—100
Length, 6 feet. Width, 4 feet. Height, 34 inches
With fixed uprights and adjustable crossbar.
Supplied with four drawers, two on each side.
Accommodates four pupils.
Price, f.o.b. factory, $29.75

THE THEODOR KUNDTZ COMPANY

MANUFACTURERS OF

Church, School, Theater and Auditorium Furniture

CLEVELAND, OHIO

Products.

CHURCH, SCHOOL, THEATER and AUDITORIUM FURNITURE.

Church Furniture.

Where an architect has submitted designs, we prefer to figure from same; but if no design has been prepared, estimates will be given on any article of furniture, whether it is for the sanctuary, chancel, choir, pulpit platform, nave or auditorium, that may be required in any church. On request designs will be forwarded and estimate submitted for consideration.

School Desks.

We also manufacture several styles of school desks made of steel or cast iron, and are prepared to meet any requirements for schoolroom furniture. Desks are made both adjustable and non-adjustable, with combination style of seating and the independent style of seating, consisting of chair and desk, or settee and desk. Write for School Desk Catalogue.

Portable Chairs.

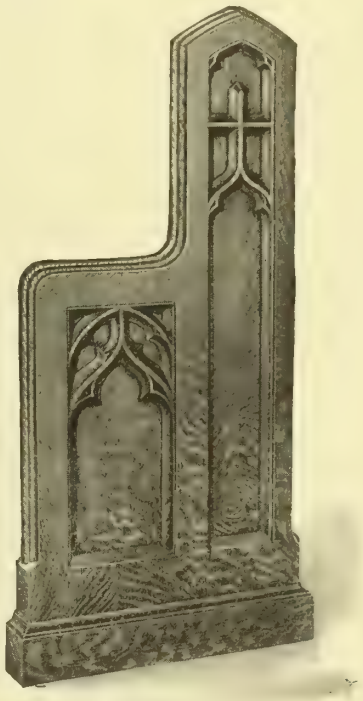
We manufacture a line of portable chairs, consisting of built-up back and seat; also solid back and seat.

Facilities.

We have the largest completely equipped cabinet shop in the United States, employing three thousand men, and filled with skilled designers, carvers, cabinet-makers and wood workers. As we cut our own lumber from the log, we are admirably situated to execute faithfully any commissions that may be entrusted to us.

Information.

Write for catalogues describing our products. Address all communications direct to THE THEODOR KUNDTZ COMPANY.



END OF CHURCH PEW

SCHOOL DESK
Showing combination style of seating

PORTABLE CHAIRS

LANGSLOW, FOWLER COMPANY

MANUFACTURERS OF

Movable and Adjustable School Desks

ROCHESTER, N. Y.

Products.

MOULTHROP MOVABLE and ADJUSTABLE DESKS.

Advantages.

There are twelve reasons for regarding these desks as a new standard for school efficiency.

Seating—They permit flexibility in seating arrangement, facilitating group teaching.

Position—They assure the correct upright position.

Sanitation—They promote the highest possible degree of sanitation.

Modernity—They remove the limitation of the old-style fixed seats, not in accord with the development of modern tendencies toward the cultivation of individual initiative.

Efficiency—They contribute to increased efficiency on the part of teacher and pupil.

Individualization—They provide a chair individualized in height, depth of seat, and hygienic back support for each pupil.

Simplicity—They simplify the school furniture, combining in one unit both seat and desk.

Social—They help to "socialize" the school.

Elasticity—They permit clearing of the floor, removing the prohibitive limitations placed upon school exercise and entertainments by fixed seats, and invite the broadest use of the school building.

Accessibility—They make available for convenient use all blackboard space, wherever located.

Advancement—They exemplify advanced thought in modern education.

MODEL "B," TYPE "X"
MOULTHROP MOVABLE AND ADJUSTABLE SCHOOL DESK

Manufacture—They represent the highest degree of ingenuity and stability in specialized manufacturing.

NOTE—These desks are of special interest to architects, due to their adaptability to one floor (overhead lighting) school buildings, and to increased use of composition flooring for sanitary and structural reasons.

New Models.

Investigation of new low-priced models is solicited.

Prices and Details.

Catalogues containing full details and prices of all models of the Moulthrop movable and adjustable school desk gladly sent on application.

FOUNDED 1865

NEW YORK SILICATE BOOK SLATE COMPANY

TELEPHONE, CORTLAND 3789

20-24 Vesey Street
NEW YORK, N. Y.

FACTORY
HOBOKEN, N. J.

Products.

Manufacturers of SILICATE VENEER PLATE, WALL and REVOLVING BLACKBOARDS, BOOK SLATES, BLACKBOARD CLOTH, IVORINE SHEETS, BLACK SHEETS, BLACKBOARD PAPER, and SILICATE LIQUID BLACK DIAMOND SLATING; also STONE SLATE BLACKBOARDS.

Silicate Veneer Plate Blackboards.

These Blackboards are composed of the best grades of wood pulp, the four veneers firmly united under great pressure. The marking surface is Silicate Black Diamond Slating. Can be put on any wall.

Blackboards come in sizes 3, 3½ and 4 feet wide up to 12 feet long, at 14 cents a square foot for black, and 15 cents for green.

Write for discounts.

FOUR-PLY SILICATE VENEER PLATE BLACKBOARD

Specifications—Architects should specify Silicate Veneer Plate Blackboard made by the NEW YORK SILICATE BOOK SLATE CO.

PRICES, SIZES AND COVERING CAPACITY, BLACK DIAMOND SLATING

Size of Can	Covering Capacity, One Coat	List Price
¼ pint	12½ sq. ft.	$0.30
½ pint	25 sq. ft.	.55
1 pint	50 sq. ft.	1.00
1 quart	100 sq. ft.	1.75
½ gallon	200 sq. ft.	3.25
1 gallon	400 sq. ft.	6.00
50 gallon barrels, special price		

Write for discounts

Silicate Wall Blackboards.

Ready made; standard sizes from 1½ by 2 feet to 4 by 8 feet, finished both sides.

Frames are of oak, made of the best material, thoroughly seasoned, allowing for shrinkage or swelling. The marking surface is Black Diamond Slating.

PRICES AND DIMENSIONS

No.	Feet	List Price	No.	Feet	List Price
0	1½ x 2	$1.75	5	3½ x 4½	$9.50
½	1⅔ x 2½	2.25	6	3 x 6	11.00
1	2 x 3	3.00	7	4 x 5	12.00
2	2½ x 3½	5.25	8	4 x 6	14.40
3	3 x 4	7.00	9	4 x 7	16.80
4	3 x 5	9.00	10	4 x 8	19.20

Write for discounts

Stone Slate Blackboards.

Made of best quality natural slate, finished on both sides; with varnished oak frames. Sizes 18 by 24 inches to 4 by 6 feet.

PRICES AND DIMENSIONS

No.	Feet	List Price	No.	Feet	List Price
0	1½ x 2	$3.00	4	3 x 5	$11.80
½	1⅔ x 2½	4.00	5	3½ x 4½	12.50
1	2 x 3	5.00	6	3 x 6	14.00
2	2½ x 3½	7.00	7	4 x 5	15.50
3	3 x 4	9.70	8	4 x 6	19.00

Write for discounts

Silicate Revolving Blackboards.

Support is made of nicely finished oak, put together with screw eye-bolts, and stands firmly. Made to fit all sizes of boards in regular stock.

Blackboards are of six-ply silicate, with marking surface of Black Diamond Slating, both sides.

REVOLVING BLACKBOARDS

No.	Feet	List Price
0½	2½ x 3½	$11.25
1½	3 x 4	13.00
2½	3½ x 4½	15.50
3½	4 x 5	18.00
4½	4 x 6	20.00
5½	3 x 5	15.00
6½	3 x 6	17.00

Support only $6.00

Write for discounts

Slated Cloth.

A flexible Silicate Blackboard for lecturers, teachers, stores, etc. Marks finely, erases quickly. Rolls tightly, without injury to design or surface. Fastened with tacks or thin paste to wall or wood.

SLATED CLOTH

DIMENSIONS AND PRICES SLATED CLOTH

Width, inches	Rolls of 12 yards Marking Surface	List Price, yard
36	1	$1.25
48	1	1.60
36	2	1.67
48	2	2.00

Supplied any length desired

Write for discounts

References.

The Boards of Education of New York and Philadelphia have been supplied with Silicate products for thirty-eight years, and eighty-three Boards of Education in other cities have also been supplied for varying lengths of time. The United States Government has been supplied for twenty-eight years.

Many of the schools in Havana, Cuba, and Porto Rico, and Manila in the Philippines have also been supplied; and goods have been shipped to all parts of the world.

American News Co., 9-15 Park Place, New York, N. Y.

Tower Mfg. & Novelty Co., 326-330 Broadway, New York, N. Y.

Henry Bainbridge & Co., 99-101 William Street, New York, N. Y.

FEDERAL STEEL FIXTURE COMPANY

4545 West Homer Street
CHICAGO, ILL.

SALES OFFICE
CHICAGO, ILL., Security Building

Products.

METAL FURNITURE; FILING CABINETS; STEEL SHELVING, RACKS, BINS, BOXES; STEEL LOCKERS; WARDROBES, CUPBOARDS, BENCHES, TABLES, DESKS; and SPECIAL STEEL EQUIPMENT.

TRADE-MARK

FEDERAL INSERTED TYPE WALL LOCKERS
The Ventilating of this entire building is done through the lockers

Federal Unit Steel Lockers.

The Federal Locker has a body of No. 20 U. S. gauge and a door of No. 16 U. S. gauge, re-rolled, stretcher levelled, double annealed sheet steel, all free from rust or scale, and entirely supported with angle steel frames; 1 by 1 by ⅛ inch, welded, for the fronts and ¾ by ¾ by ⅛ inch, riveted, for the backs and for the reinforcing door panels.

Oxy-Acetylene Welded Frame—The oxy-acetylene welded front frame, the angle framed back and the unit construction with angle frame bolted to angle frame throughout the entire height of the locker; these features of the "Federal" locker provide a lasting squareness, rigidity and bridgelike strength which assures against sagging, swaying frames and binding doors.

Reinforced Door—The door, overlapping the locker frame and reinforced with complete supporting panels of ¾ by ¾ by ⅛-inch angle steel makes a neat, close fit, with ample clearance between locker frame and door frame. "Federal" locker doors cannot bind.

STANDARD TYPE SINGLE TIER LOCKER

Hardware—The hooks are two-prong of special design with sherardized rustless finish. The legs are adjustable. The hinges are 2½-inch, heavy, of known strength, with flanges concealed. The locking device, three-way, large, strong, silent in operation.

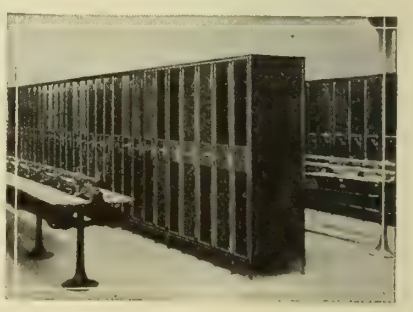
Perforation—Either the embossed louver perforation, as illustrated, or an expanded metal type of door is furnished.

Ventilation.

The problem of ventilation for lockers, and also for an entire room, has had our careful study; and we have developed four ventilating systems, each designed for a different condition.

Baked Enamel Finish.

Absolutely the most durable and best rust-resistant that can be applied to steel. For our black enamel we use only a pure carbon black; the base of the color enamels is zinc white. Both of these pigments cost decidedly more than others that could be used, but these have been selected because of their very marked superiority.



FEDERAL EXPANDED METAL LOCKERS, FAIRBANKS, MORSE & CO., BELOIT, WIS.

Standard Sizes.

The standard locker may be had in any combination of

12 inches wide, 12 inches deep, 36 inches high, on 6 inch legs.
15 inches wide, 15 inches deep, 42 inches high, on 6 inch legs.
18 inches wide, 18 inches deep, 48 inches high, on 6 inch legs.
20 inches deep, 60 inches high, on 6 inch legs.
72 inches high, on 6 inch legs.

The 36- and 42-inch sizes are made two lockers in height

FEDERAL LOCKERS ON SOLID BASE, VENTILATOR, Y. M. C. A. TRAIN ING SCHOOL, CHICAGO, ILL.

FEDERAL SLANT TOP LOCKERS, BOYS' HIGH SCHOOL, LOUISVILLE, KY.

FEDERAL DOUBLE TIER LOCKERS, IRVING PARK FIELD HOUSE, CHICAGO, ILL.

Continued on next page

Federal Adjustable Steel Shelving.

Federal steel shelving is designed for "carrying strength." A maximum load-increased capacity; elimination of unnecessary, non-weight carrying rack material.

Strength of Design.

Federal steel shelving and racks centralize their carrying strength at the vital points.

The verticals have their maximum strength at the shelf corners.

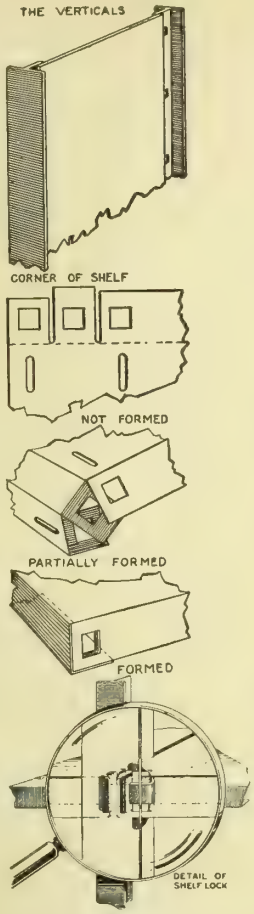
The shelves, specially formed, have triple strength in the front and rear flanges and at the corners.

The shelves are locked to the upright members by an ingenious attachment, providing for instant adjustment and increased strength.

Our specially formed and locked No. 18 U. S. gauge shelf has a carrying strength in excess of the conventional No. 16 U. S. gauge shelf, lacking our construction.

The intermediate verticals, etc., have no raw, exposed, tearing edges.

The open type rack, the closed shelving, the bin members, the box compartment, or the hinged or sliding door members, all build up from the initial units, consisting of vertical tee irons and shelves.



FEATURES OF CONSTRUCTION OF FEDERAL SHELVING
(Patent pending)

Specifications.

Our standard shelving has uprights of 1½ by 1½ by ⅛-inch tees, with No. 20 U. S. gauge sheet steel sides, backs and intermediate verticals.

The shelves and bin fronts are of No. 18 U. S. gauge steel.

FEDERAL ADJUSTABLE STEEL SHELVING, EQUIPPED WITH BIN FRONTS AND SHELF DIVIDERS

Baked Enamel Finish.

Only the best rust-resisting pigments are used—carbon black, rather than black asphaltum japan; zinc white, rather than lithophone, white lead, etc.

The enamel is applied to perfectly cleaned surfaces, after all the operations of manufacture are done, thus leaving no raw, exposed, unenameled edges. It is such details which make for perfectness.

Stock Sizes.

SHELVES.
Length, 18, 24, 30, 36, 42, 48 and 54 inches.
Depth, 9, 12, 15, 18, 21, 24, 27, 30 and 36 inches.
VERTICALS.
Depth, 9, 12, 15, 18, 21, 24, 27, 30 and 36 inches.
Height, any multiple of 3 inches.
BACKS.
Length, 18, 24, 30, 36, 42, 48 and 54 inches.
Height, any multiple of 3 inches.
BIN FRONTS.
Length, 18, 24, 30, 36, 42, 48 and 54 inches.
Height, 3, 4 and 6 inches.
SHELF DIVIDERS.
Depth, 9, 12, 15, 18, 21, 24, 27, 30 and 36 inches.
Height, 6, 9, 12, 15, 18, 21 and 24 inches.

FEDERAL ADJUSTABLE SHELVING, WITH SHELF DIVIDERS

FEDERAL ADJUSTABLE STEEL SHELVING, BINS, BOXES AND SPECIAL EQUIPMENT

Federal Metal Furniture.

Federal metal furniture—desks, omnibuses, filing cabinets, etc.—is of the highest type of construction, workmanship and material.

We use the modern flush front, square lined construction, and a three-coat, gold striped, hand rubbed, baked enamel finish.

Special cabinets for special purposes receive individual consideration by our systems specialists.

CARD FILE

DOCUMENT FILE

FEDERAL OMNIBUS

FEDERAL VERTICAL LETTER FILE

HESS WARMING & VENTILATING CO.

"Hess" Sanitary Steel Lockers

1206B Tacoma Building
CHICAGO, ILL.

Products.

Manufacturers of "Hess" Steel Clothing Lockers of all sizes and styles, in sheet steel, steel and expanded metal, or all expanded metal; also, Enameled Steel Medicine Cabinets.

Also, Standardized Hospital Equipment of white steel; Shelving, Cabinets, Cases, etc.; Grain Dryers and Hot-Air Furnaces; Family Dish Washers (Hand and Electric).

Steel Lockers.

Our Lockers are made of the best quality annealed, cold-rolled locker steel of any gauge required. The parts are trimmed, punched and formed by automatic machinery of the best grade, and guaranteed to be absolutely interchangeable.

Construction.

Our Steel Lockers embody the best features possible in locker construction. The corners are formed as a part of the side sheets and are exceedingly rigid and firm. No framework is required. The top is pitched or flat.

The Welded Tubular Door.

Our patented welded tubular paneled door marks a departure in steel-locker construction and puts the Hess Lockers in a class by themselves. This door (see illustration) is blanked from a single sheet of steel and is pressed into form. It has $\frac{7}{16}$-inch recessed panel, hollow side and end stiles.

The sides each form an oblong tube welded at all seams, thus forming an exceedingly strong and rigid construction.

Not a bolt nor rivet is used in the make-up of this door, and its beautiful appearance and finish make it suitable for the best grade of furnishing, while the price is low enough to meet all requirements. We use, unless otherwise ordered, the full cabinet base, which is far preferable to legs, for nothing can get under it, and the troublesome sweeping around legs and under lockers is avoided. The louver system of ventilation permits free circulation of air, yet excludes dust perfectly, renders all contents invisible to peeping eyes, and prevents entrance of sparks in case of fire. This is the only locker ventilation approved by Fire Underwriters.

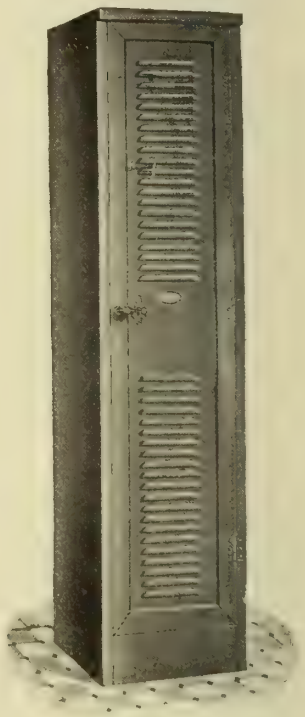
We modify the construction so as to produce several styles, suitable to the best surroundings. A full line of sizes, both double and single tier, with a variety of locks, is illustrated in our 32 page booklet, which is sent free on request. Ask for a copy.

Official Adoption.

Over 18,000 lockers have been supplied to the United States War Department.

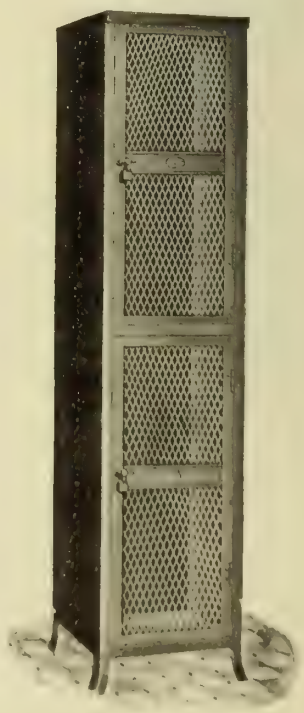
Schools and institutions all over the United States are equipped with them.

OUR WELDED TUBULAR PANELED DOOR
(Patented)



LOCKER, STYLE B

LOCKER, STYLE B2



LOCKER, STYLE DB

Continued on next page

Hess Steel Medicine Cabinet, Snow White.

The Hess Steel Medicine Cabinet is made of smooth, soft steel, enameled inside and out with best baked enamel, snow-white, everlasting. The mirrors are best American A plate glass, beveled or plain; the door closes flush with the front in a rabbeted opening, and is furnished with brass nickel-plated hinges and turn catch; steel shelves, white enameled and adjustable at any desired height. Polished plate-glass shelves also are supplied at an additional charge. We ship direct from factory and guarantee safe delivery.

We supply these in the finished enamel; also *unfinished,* with one priming coat only, to be painted with enamel after installing. The latter style are offered at a price much lower than the finished cabinets.

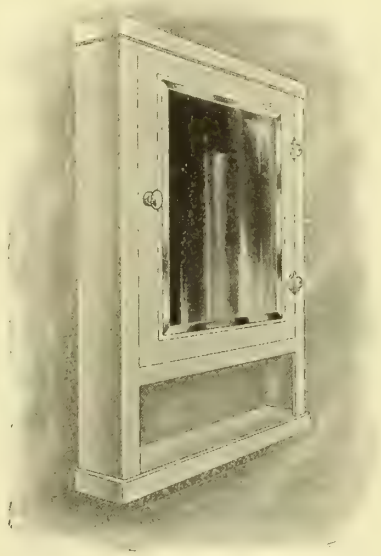
This steel Cabinet is far preferable to wood and costs no more. It may be washed with soap and water and is easily kept clean. It is germ and vermin proof, and is close-fitting, to exclude dust. In style and finish it is suitable for the finest bathrooms.

STYLE E MEDICINE CABINET
To recess

STYLE H MEDICINE CABINET
To hang on wall

The Recessed Cabinet, Styles E and F.

The Recessed Cabinet (styles E and F) recesses 4¼ inches back of the finished face of the plaster and projects 1¼ inches. It is attached by four screws to the sides of the framing, resting upon the bottom crosspiece. The plaster grounds on the sides should be narrow, not over ½ inch, as the locker extends but ¾ inch upon the plaster, which should, therefore, be brought smooth and true up to the grounds. The framing should be accurately made of 2 x 4 studding, and straight, and of the sizes indicated below. Styles G and H do not recess but are attached by four screws to the face of the wall. All sizes indicated are carried regularly in stock, ready for immediate shipment. Illustrated booklet on request.



STYLE G MEDICINE CABINET
To hang on wall

PRICES AND SIZES OF STEEL CABINETS

Prices, June 1, 1913, f.o.b. Chicago. Subject to change, without notice

No.	Extreme Outside Dimensions, Inches	Size of Mirror, Inches	Inside Dimensions, Inches	Size of Open Shelf, Inches	Framed Opening Required 4¼ inch deep	Price with Enameled Shelves	With Polished Plate-Glass Shelves add	Plain Door, Without Mirror, deduct	Shipping Weight, lbs.
	Style E: To recess in wall, with open shelf below								
20	21½x33½	14x18	18¾x21	5¾x17½	19x30	$10.00	$2.50	$1.50	68
21	23½x35½	16x20	20¾x23	5¾x19½	21x32	12.00	2.75	2.00	77
22	25½x37½	18x22	22¾x25	5¾x21½	23x34	14.00	3.00	2.50	85
23	27½x39½	20x24	24¾x27	5¾x23½	25x36	16.00	3.50	3.00	100
	Style F: To recess, without open shelf below								
30	21½x25½	14x18	18¾x21		19x22	8.00	2.50	1.50	59
31	23½x27½	16x20	20¾x23		21x24	10.00	2.75	2.00	68
32	25½x29½	18x22	22¾x25		23x26	12.00	3.00	2.50	75
33	27½x31½	20x24	24¾x27		25x28	14.00	3.50	3.00	90
	Style G: To screw to face of wall, with open shelf below								
40	21½x32	14x18	20½x23	5½x20½		10.00	2.75	1.50	70
41	23½x34	16x20	22½x25	5½x22½		12.00	3.00	2.00	79
	Style H: To screw to face of wall, without open shelf below								
50	21½x24½	14x18	20½x23			8.00	2.75	1.50	62
51	23½x26½	16x20	22½x25			10.00	3.00	2.00	71

All Lockers listed are right-hand. Left-hand Lockers, 50 cents extra. Lock and key, 50 cents extra

STYLE F MEDICINE CABINET
To recess

EDWARD DARBY & SONS COMPANY, INC.

"Pen-Dar" Metal Lockers, Window Guards, Iron Railings, etc.

233-235 Arch Street
PHILADELPHIA, PA.

Products.

Manufacturers of "Pen-Dar" Metal Lockers, Furniture, Shelving, Tool Racks, etc.

Also, Wrought Iron and Wire Products.

Advantages "Pen-Dar" Metal Furniture and Lockers.

"Pen-Dar" lockers are especially adapted for manufactories. When made entirely of open mesh, they are well ventilated and sanitary. They are germ-proof, fire-proof and economical in space, and encourage neatness and cleanliness. Can be easily fumigated, and contents can be thoroughly inspected without removing.

Long experience, and an up-to-date locker department, enable this organization to produce metal lockers that for style, workmanship and durability cannot be excelled.

Construction.

A heavy wrought steel angle-frame construction is used throughout, and the open mesh filling is securely held in place by a ½-inch No. 14 steel band, well riveted to angle frame. This band is not a series of small pieces, but one continuous strip, and entirely covers all edges of filling. This construction does not apply to lockers made entirely of sheet steel.

Equipment.

Each locker, whether open mesh or sheet steel, is equipped with one shelf (except two-tier lockers, which have no shelves unless specified), three nickel- or brass-plated coat-hooks, individual brass number-plates, and our special three-point locking device, which securely fastens the door at top, center and bottom with a single turn of handle. This is operated in connection with either our combination keyless dead-spring bolt-rim lock or brass padlock.

Locks.

We advocate use of dead-spring bolt-rim key lock, but can furnish keyless combination locks or padlocks according to requirements. Key locks are fitted with two flat non-changeable keys and master-keyed.

Finish.

"Pen-Dar" lockers are finished in Olive Green or Black Enamel, baked in a temperature of two hundred and fifty degrees. Other finishes at a slight advance in price.

Sizes.

Lockers made in sizes to specifications. The following are standard sizes, installed either double row back to back or single row against wall, as many tiers high as practical:

Single Tier Lockers—12 x 12 x 60 inches high, 12 x 12 x 72 inches high, and 12 x 18 x 72 inches high.

Double Tier Lockers—12 x 12 x 36 inches high, 12 x 12 x 42 inches high, and 12 x 12 x 48 inches high.

Note—Above are locker sizes. Legs are 6 inches or more extra.

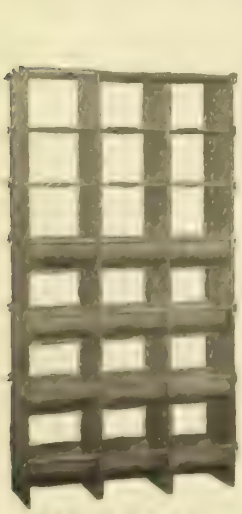
New "Pen-Dar" Expanded Metal Locker.

The new "Pen-Dar" Expanded Metal Locker, No. 230, is especially worthy of attention. It is doubtless the best locker of its kind on the market. Expanded metal used in its construction is made by an entirely new process, patented under date of April 25, 1905. This metal is made from a sheet of planished steel plate, cut, expanded, and then rolled in such a manner that it presents a smooth, even surface, entirely free from rough edges or corners. It lies perfectly flat, gives better results, and has a neater appearance than the ordinary expanded metal sheet.

Steel Equipment.

We specialize in designing and manufacturing interior steel equipment, consisting of Book Racks, Shelving, Tables, Partitions, Filing Cabinets, etc. These are made in such a variety of designs that it is impossible to adopt any one style as standard, consequently they are manufactured according to specifications.

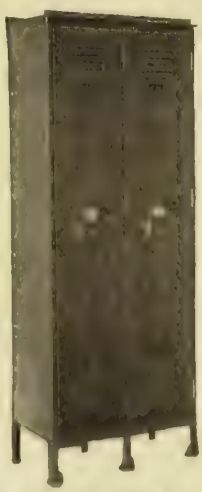
Estimates or special designs furnished on request



DESIGN NO. 525

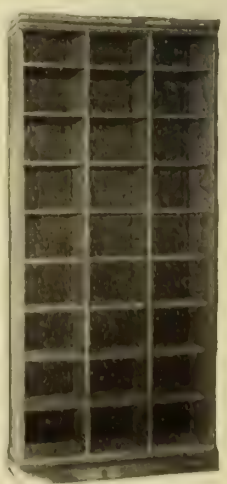
DESIGN NO. 725

DESIGN NO. 1000



DESIGN NO. 500

DESIGN NO. 230



DESIGN NO. 700

THE HART & HUTCHINSON COMPANY

Steel Lockers and Shelving
NEW BRITAIN, CONN.

BRANCH OFFICES AND WAREHOUSES

BOSTON, MASS. NEW YORK, N. Y. CHICAGO, ILL. PHILADELPHIA, PA.

Products.

STEEL LOCKERS.
STEEL SHELVING.

H. & H. Unit Locking Device for Type "D-C" Locker.

The predominant features of the new "D-C" type locker are the unit lock and concealed three-way locking mechanism. The lock and locking bars are mounted between the inner and outer steel door rails.

The key slot is centered in the door knob itself. The turning of the key withdraws the lock bolt and allows the locking bars to be withdrawn by a turn of the door knob. Movement of the knob to the left throws the center latching hook outward into the opening in the locker wall, the hook thus locking the door at the center firmly and securely. The same movement of the knob forces upward a rod securing the top of the door to the upper framing, while a second rod plunges downward, securing the bottom of the door to the base of the locker.

Simply turning the knob to the right lifts the hook away from and free of engagement, the hook returning within the door stile, and the upper and lower rods, by cam connection being withdrawn from the upper and lower locking points.

The lock is securely mounted within the door rails, and only the knob is exposed. The inner side of door is free from all projections.

H. & H. UNIT LOCKING DEVICE

Brief Form of Specification.

Material and Gauge—All sheet steel entering into construction is to be of best grade of cold-rolled stock, free from scale and buckle. Wherever gauge is mentioned it is understood to be U. S. Standard. Partitions (both intermediate sides and ends), tops, shelves, and bottoms to be of sheet steel of not less than No. 21-gauge. Backs (also door stiles and rails on Type "D-C") to be of No. 20-gauge. Door frames and doors to be of No. 14-gauge (approximately $\frac{3}{32}$ inch thick).

Construction—Door frames are to be made from one solid sheet of No. 14-gauge, cold-rolled steel, flanged one inch on both outside edges, and formed at bottom to provide 6-inch legs. Backs are to be made of one piece, flanged one inch on both edges, extending from top to floor of locker and supported by 6-inch legs. Sides are to be securely bolted to the front and back. The top member to project over and lock on to the front, to give a finished appearance. Bottoms are to be formed so as to act as additional stop for door. The locking device to engage door frame at three points, top, center and bottom.

Type "D-C" Doors—To be made of No. 14-gauge steel, flanged for reinforcement on all four sides by a hollow stile of No. 20-gauge steel 2¼ inches wide and ⅜ inch deep. Doors are to be hung to door frame with three 2-inch fast pin butts, secured inside of door. Doors to be louvered with six openings top and bottom. Strike side of door frame to be reinforced with a "Z"-plate, welded on to form additional stop for door.

Lock and all locking mechanism to be concealed within stile of door. A hollow steel brass-plated door knob is to be provided with the center of the knob shank protruding through the lock barrel. Locks are to be fitted with flat keys, two keys to each lock, each lock different, and master key for each installation.

TYPE "D-C" H. & H. STEEL LOCKER

Continued on next page

Type "B-C" Doors—To be made of No. 14-gauge steel, reinforced with steel of channel construction, and hung to the door frame with three solid 2-inch fast pin butts. To be louvered with six openings at top and bottom. The three-way locking device is to be so arranged that when lock is thrown it will be impossible to manipulate latch. There is also to be provided a rustproof T-shaped handle, and locks are to be of flat key type, two keys to a lock, with master key for each installation.

Type "A-C" Doors—Construction to be same as Type "B-C," except that instead of being louvered, they are to be perforated with 5/8-inch square holes on 1-inch centers, with suitable border all around.

Equipment.

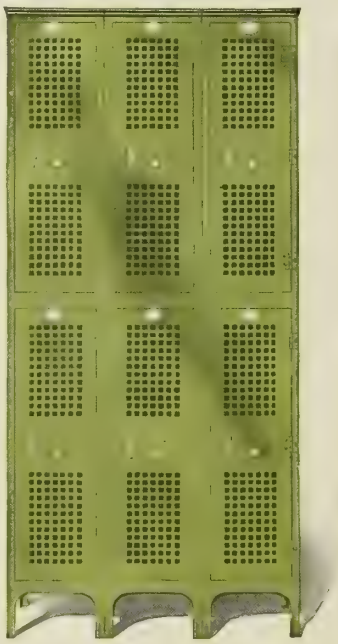
Each single tier locker is provided with one shelf, having front edge nicely rounded and with suitable number of two-prong ramshorn rust-proof coat and hat hooks. Also, one solid brass number plate with numerals at least ½ inch high, depressed in the surface, and depression filled with black japan. Each leg is supplied with positive machine screw adjustment, to take care of inequalities of floors.

Finish.

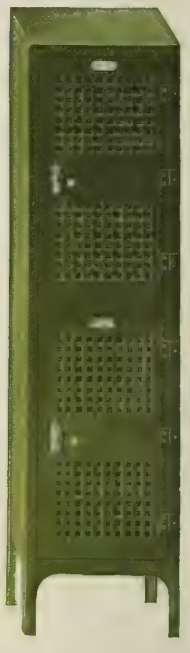
Standard colors are olive green or black. All parts are cleaned free from oil and dirt before enameling, and each coat of japan is oven baked at high temperature, and guaranteed to be free from cracks, runs, etc.

Type "B-C," Single Row

Type "B-C," Double Row



Type "A-C," Double Row



Type "A-C," Single Unit, Double Row

Type "A-C," Single Row

X Ray Illustration
Locker Construction Coat and Hat Locker

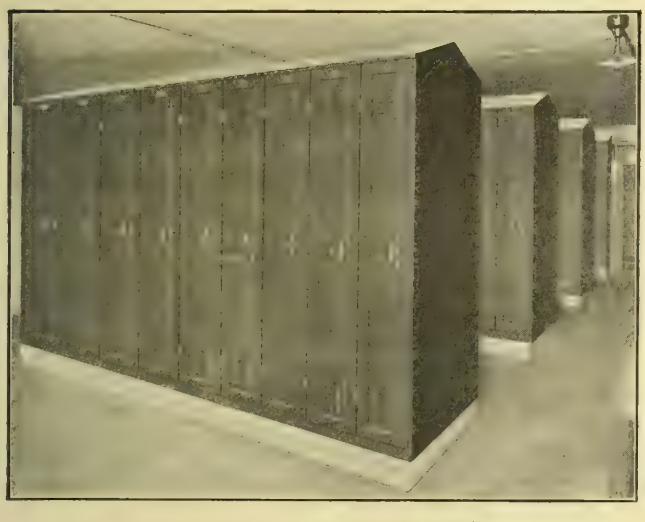
X Ray Illustration
Type "B-C," Single Unit

H. & H. TYPE "C" STEEL LOCKERS

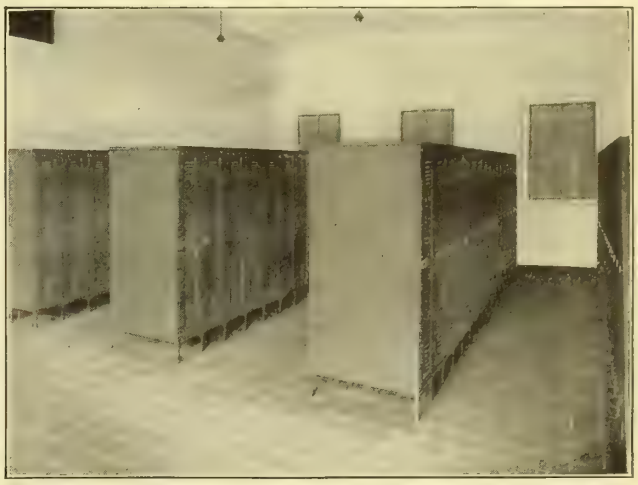
Continued on next page

Cincinnati Bell Telephone Co.

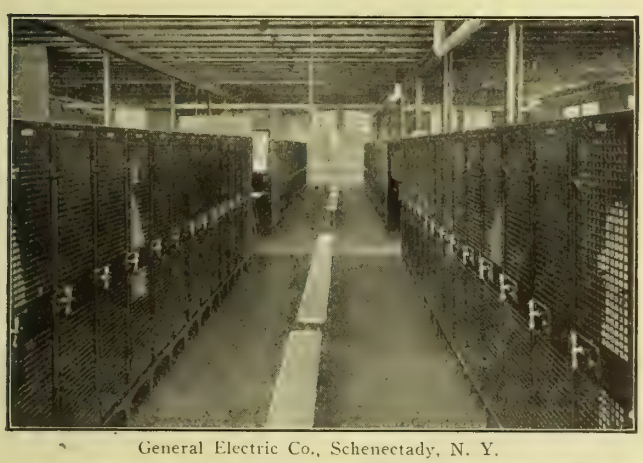
Sleepy Hollow Country Club



United Electric Light & Power Co., New York, N. Y.

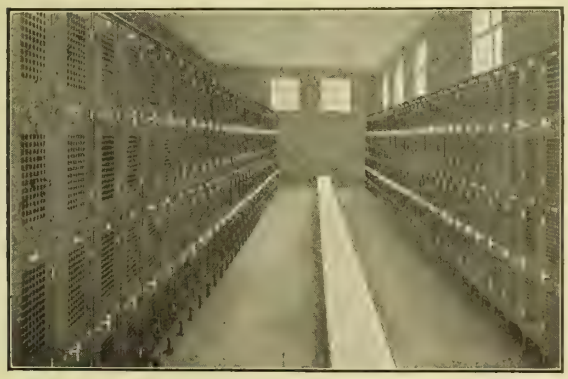


Doremus Memorial Gymnasium, Washington and Lee University

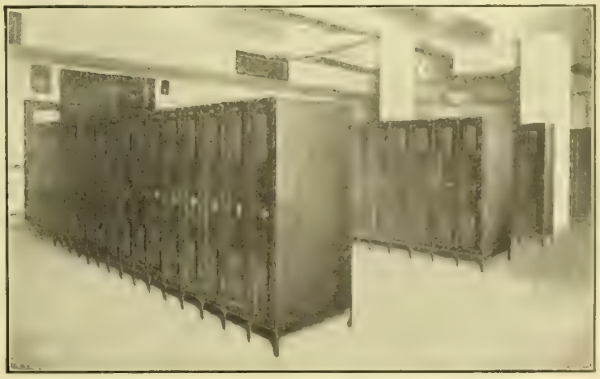


General Electric Co., Schenectady, N. Y.

Bedford Branch, Y. M. C. A., Brooklyn, N. Y.



High School, Oakland, Cal.



Commercial and Manual Training High School, Newark, N. J.

SOME TYPICAL H. & H. STEEL LOCKER INSTALLATIONS

LYON METALLIC MFG. CO.

Manufacturers of Steel Shelving and Steel Lockers

GENERAL OFFICES AND WORKS

AURORA, ILL.

CHICAGO OFFICE	NEW YORK OFFICE	DETROIT OFFICE	PITTSBURGH OFFICE
835 Peoples Gas Building	1567 Hudson Terminal Building	1801 Ford Building	629 Oliver Building

Products.

ADJUSTABLE and EXTENSIBLE STEEL SHELVING and STORAGE RACKS for carrying every kind of material and merchandise storable on shelves and in bins.

LYON STEEL PRODUCTS TRADE-MARK

STEEL CABINETS, including BLUE-PRINT and STATIONERY CABINETS; STEEL ENCLOSURE PANELS; STEEL EQUIPMENT for the handling and storage of practically every kind of material and merchandise.

STEEL LOCKERS for every purpose.

Standardization of Shelving and Racks.

Lyon Shelving and Racks are thoroughly standardized in every particular. All parts and attachments are interchangeable, reversible and adjustable, and the racks are easily rearranged to meet changing conditions.

Styles.

Every style of shelving, such as the "Closed" or Standard Type and the "Open" or Skeleton Type, is assembled from the same parts, no special construction being needed for any style.

Construction.

Lyon Standard Shelving is built on the principle of putting shelves under compression.

Each shelf is placed on two ⅞-inch diameter rods which are threaded at one end and tapped at the other. The threaded ends of these rods pass through the face strips of the upright partition into tapped ends of the next rods, the rods shouldering against the face strips so that, when drawn up, the shelf is put rigidly under compression. Thus, every shelf increases, instead of decreases, the rigidity of the rack.

Lyon Shelving will support heavier loads per weight of metal used than any other design of rack made. A Standard Shelf will support from 200 to 350 pounds per square foot, depending upon its area, with an ample factor of safety.

Co-operative Service.

Our Sales Engineering Department is ready at all times to go into details, make a study of conditions, work out complete plans and designs, and furnish estimates.

You are invited to avail yourselves of this service without obligation.

Patents.

Construction and designs of Lyon Steel Shelving are protected under patents as follows:

Patented, 10—29—'07	Patented, 4—30—'12
Patented, 1—19—'09	Patented, 3—18—'13
Patented, 1—26—'09	Patented, 5—27—'13
Patented, 3— 9—'09	Patented, 10—14—'13
Patented, 7—27—'09	Patented, 5—25—'15
Patented, 3— 8—'10	Patented, 12—28—'15
Patented, 10— 4—'10	

Lyon Steel Equipment for Garages.

Includes a specially designed rack for the storage of motor car repair parts, racks for the storage and display of tires, and such standard equipment as steel shelving, lockers, etc., mentioned above.

A Standardized Specialty Department.

A department of ample and strictly modern facilities maintained entirely separate from all other departments, for the design and manufacture of *economical equipment* for the handling and storage of raw and finished material, and of special sheet metal products.

GENERAL STOCK ROOM, WESTERN ELECTRIC CO., CINCINNATI, OHIO

Shows Lyon Commercial Type Shelving with Mezzanine Floor

GENERAL STOREROOM, ANHEUSER BUSCH BREWING ASSOCIATION, ST. LOUIS, MO.

Shows Lyon Standard Shelving with Standard Bin Fronts and Crosswise Shelf Dividers

Sweet's Catalogue

Continued on next page

Description.

Uprights (*Part No. 1*)—Reversible and built with two Lyon Special Face Strips; each face strip being formed from a strip of No. 12-gauge steel, rolled into a ⅞-inch tube with a 1½-inch lip (a formation stronger than pipe, angles or bolted light sheet metal). A sheet of No. 20-gauge steel is placed between the lips of these face strips and welded to them to form the upright partition. Either edge of the upright may be used at the front of the rack. The uprights are punched on 3-inch centers for adjustment of shelves, no *special* end uprights being needed.

Shelves (*Part No. 2*)—Made of No. 16-gauge steel, reversible and interchangeable, and have the same square tubular formation for reinforcing at both front and back. Shelves are punched for dividers every 3 inches and for label holders on both edges. Shelf includes patented compression tie rods complete.

Label Holders (*Part No. 15*)—Are ⅞-inch wide and 2 inches wide (for use on Bin Fronts), the length being determined by width of shelf. Fastened to shelves without use of bolts.

Backs (*Part No. 34*)—Are built in standard sizes and are optional. They are not necessary for rigidity of the rack structure; can be attached at any time.

Removable and Adjustable Dividers (*Part Nos. 4 and 42*) *and Bin Front Attachments* (*Part No. 5*)—Built in standard sizes, and may be attached at any time.

Extension Attachments for Shelves and Uprights, Bracket Shelf Attachments, Center and Back Box Stops—Are standard and furnished as desired. Standard Shelves and Uprights punched to receive same.

Standard Doors—May be furnished for every width of shelf and height of upright.

Finish.

Standard finish is either Lyon drab or black enamel, baked on at a temperature to secure maximum toughness and durability.

Stock Sizes.

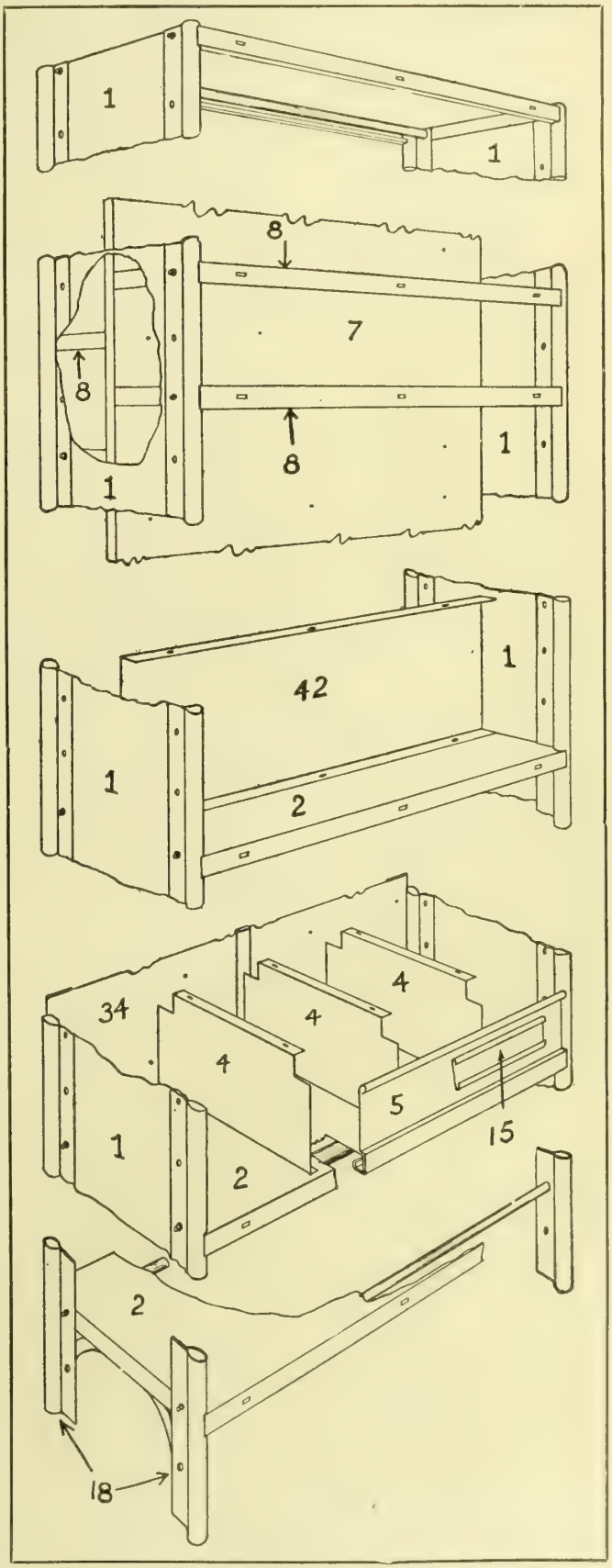
Many standard sizes of shelves and uprights with corresponding sizes of attachments and parts of Lyon Standard Shelving are carried in stock ready for immediate shipment. All shelving is shipped knocked down, a complete set of directions for erection being sent with each shipment.

SIZES OF LYON STANDARD RACK PARTS

Part No.	Name	
1	Upright Partitions	Heights—48″–54″–60″–66″–72″–78″–84″–90″–96″–102″–108″–114″–120″–126″–132″–144″–156″–168″–180″–192″–216″–240″ Depths—12″–15″–18″–24″–30″–36″–42″–48″
18	Skeleton Uprights	Heights—48″–54″–60″–66″–72″–78″–84″–90″–96″–102″–108″–114″–120″–126″–132″–144″–156″–168″–180″–192″–216″–240″ Depths—12″–15″–18″–24″–30″–36″–42″–48″
2	Shelves	Widths—18″–24″–30″–36″–42″–48″ Depths—12″–15″–18″–24″–30″–36″–42″–48″
34	Backs	Heights—Same as Upright Partitions Widths—18″–24″–30″–36″–42″–48″
4	Crosswise Dividers	Heights—5″–8″–11″–14″–17″–20″–23″ Depths—12″–15″–18″–24″–30″–36″–42″–48″
42	Lengthwise Dividers	Heights—5″–8″–11″–14″–17″–20″–23″ Widths—18″–24″–30″–36″–42″–48″
5	Bin Fronts	Heights—2″–3″–4″–5″–6″–8″ Widths—18″–24″–30″–36″–42″–48″
8	Half Shelves	Widths—18″–24″–30″–36″–42″–48″ Depths—12″–15″–18″–24″
7	Dividing Backs	Heights—48″–54″–60″–66″–72″–78″–84″–90″–96″–102″–108″–114″–120″ Widths—18″–24″–30″–36″–42″–48″
15	Label Holders	Heights—⅞″–2″ Widths—18″–24″–30″–36″–42″–48″

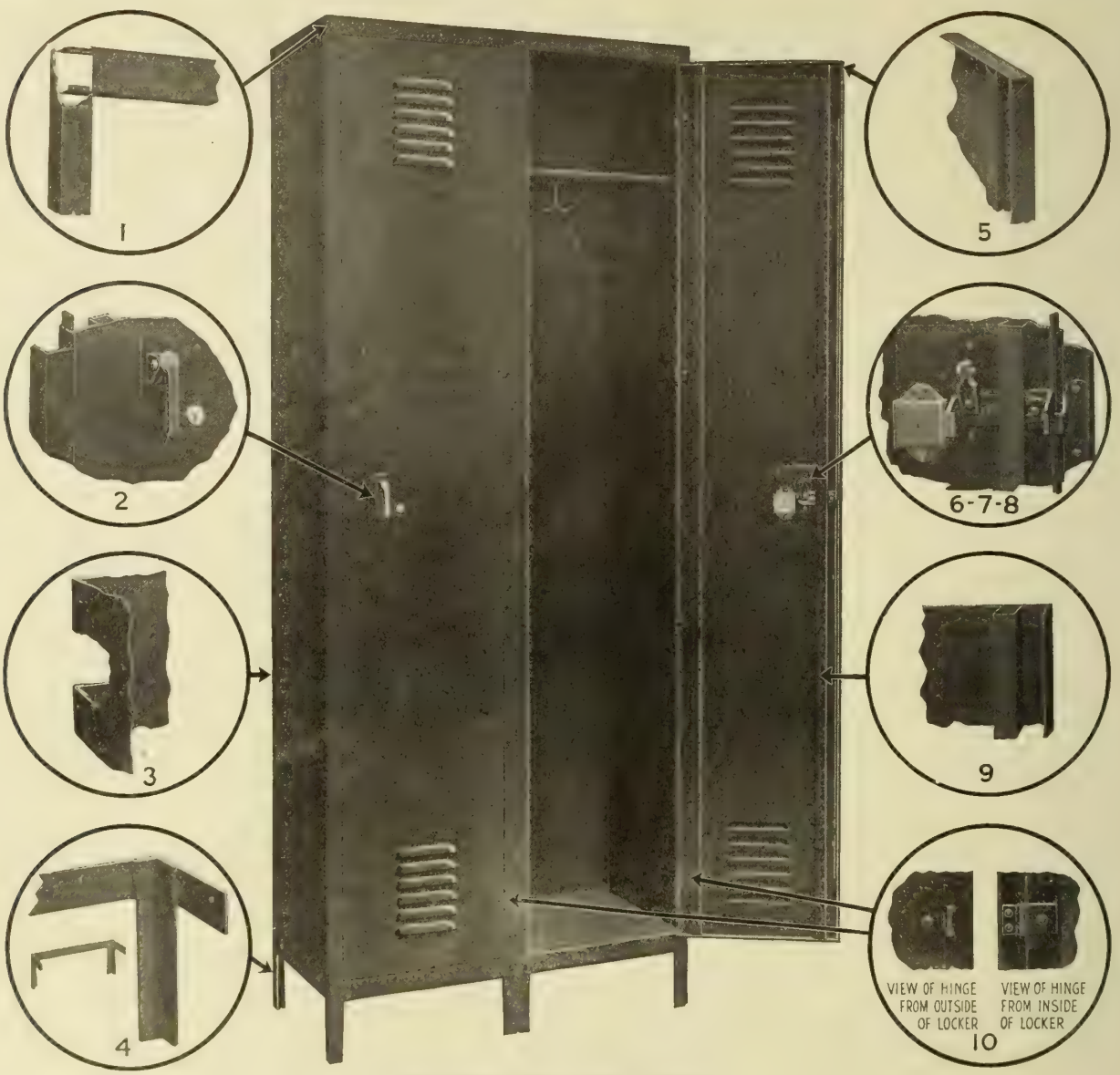
Lyon Shelving Installations.

Space does not permit giving a list of Lyon Shelving installations. There are more than a score of installations, each over $25,000, which have been furnished prominent corporations in this country. Lyon Equipment can be found in practically every locality in the United States and Canada. We will gladly refer inquirers to complete installations in any particular locality or in any special line of business, upon request.



LYON STANDARD RACK PARTS, CONSTRUCTIVE VIEW

Continued on next page



THE NEW LYON STEEL LOCKER

Exclusive Features of the New Lyon Steel Locker.*

(1) Door opening always true and square; reinforced one-piece door frame with welded corners.

(2) Easily operated locking device; forward pull operates locking device and opens door.

(3) All corner joints have double overlapping flanges.

(4) Back legs strengthen and stiffen entire locker base.

(5) Overlapping flanges at door corners.

(6) Door will always shut and latch properly.

(7) Gravity actuated locking device; engages automatically by merely pushing door shut; simple, strong and secure.

(8) Impossible to pry open door; three locking fingers and three door jambs interlock.

(9) Locker door, by rigid reinforcing, will not get out of alignment.

(10) Hinge cannot be forced; securely riveted in position.

(11) Sloping tops easily attached; interchangeable with flat tops.

* The figures in each of the detail illustrations correspond to the numbers preceding the feature.

Specifications and Equipment.

Body

Backs—Full pickled, cold-rolled steel .025 inch thick, flanged four sides. Reversible and interchangeable with others of same size.

Sides—Full pickled, cold-rolled steel .025 inch thick, flanged four sides. Reversible and interchangeable with others of same size.

Top—Full pickled, cold-rolled steel .025 inch thick. Either flat or sloping top can be attached at any time without drilling or fitting. Tops are interchangeable with others of same size. Flat tops and bottoms of same sizes are interchangeable.

Bottom—Full pickled, cold-rolled steel .025 inch thick. Bottom offset to fit inside and flush with top of cross channel. Bottoms are interchangeable with others of same size. Bottoms and flat tops of same sizes are interchangeable.

Legs—1 x 1 x ⅛ inch hard steel angle, 6 inches long, adjustable, have feet punched for securing to floor.

Door

Full pickled, cold-rolled furniture steel .0375 inch thick; double thickness of metal where hinges, locking device, lock and handle are attached. Tubular reinforcement, as shown in illustration.

Hinges—Double butt hinge riveted to both door and angle door frame. Number of hinges to be determined by height of door as follows:

72 inches high to have four hinges
60 inches high to have three hinges
42 inches high to have two hinges
36 inches high to have two hinges

Continued on next page

Locking Device—Gravity actuated, controlled by special pivot handle and locked with either flat key, master keyed Yale & Towne lock, or ordinary padlock. Number of locking points to be determined by height of door as follows:

72 inches high to have three locking points
60 inches high to have three locking points
42 inches high to have two locking points
36 inches high to have two locking points

Upright member 1 x 1 x ⅛ inch hard steel angles. Horizontal member 1½ x ¾ x 5/64 inch hard steel channels. All joints are butt and lap welded.

EQUIPMENT

Hat Shelf—In single tier lockers only, placed 10½ inches from top.

Hooks—All lockers have one double prong ceiling hook. Lockers 12 inches wide to have one single prong hook on back and one on each side. Lockers over 12 inches wide to have two single prong hooks on back and one on each side.

FINISH

Two coats of olive green or black enamel baked on at a temperature to secure maximum toughness and durability.

NUMBERING

Each locker to be numbered by means of an etched aluminum plate with black enameled sunken figures.

Shipment.

A large quantity of all parts of standard size lockers is carried in stock ready for immediate shipment. Lockers shipped either set up or knocked down.

Standard Sizes.

Any combination of the following sizes make up a Standard Locker:

Single Tier			Double Tier		
Depth	Width	Height	Depth	Width	Height
12 inches	12 inches	60 inches	12 inches	12 inches	36 inches
15 inches	15 inches	72 inches	15 inches	15 inches	42 inches
18 inches	18 inches		18 inches	18 inches	

Height does not include 6-inch legs.

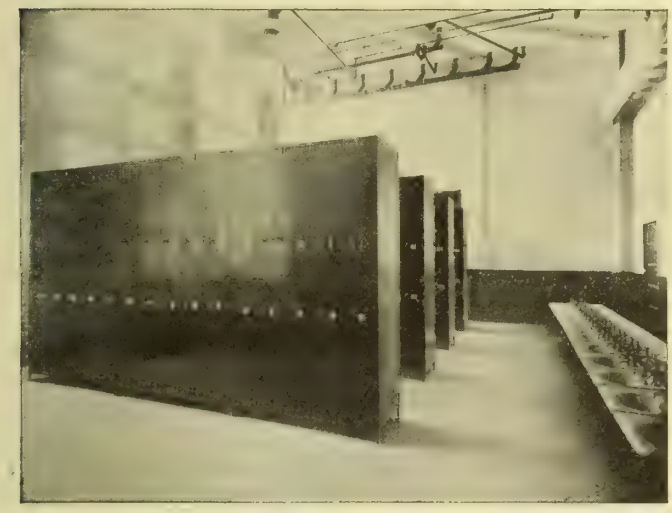
Special Sizes.

While we make special sizes of lockers to meet certain particular requirements, we do not recommend their use unless absolutely necessary, on account of the cost being invariably higher than that of standard sized lockers.

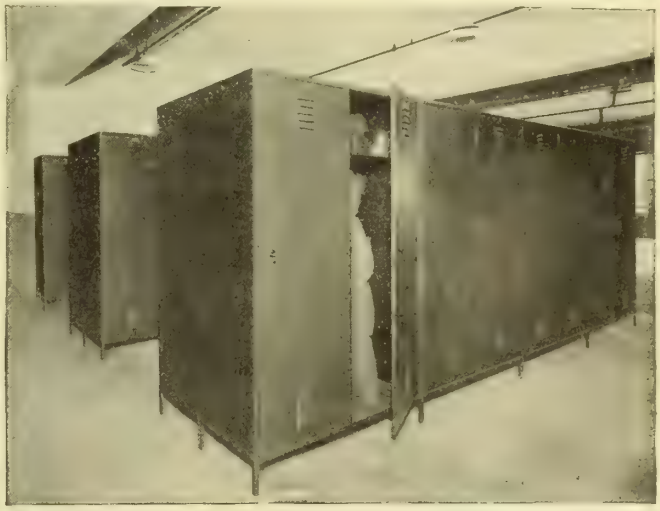
Better service and lower price can be given on standard sized lockers, because they are made in large quantities and our stock is maintained, as near as possible, to take care of practically all requirements.

A FEW INSTALLATIONS OF LYON STANDARD LOCKERS EACH AMOUNTING TO OVER $5000

American Radiator Co., Various Plants and Branches
American Steel & Wire Co., Various Plants and Branches
Bethlehem Steel Co., South Bethlehem, Pa.
Borough of Brooklyn, N. Y., for Coney Island Bathhouse
Chicago Telephone Co., Chicago, Ill.
Chicago & Northwestern Ry. Co., Chicago, Ill.
General Electric Co., Various Plants and Branches
State of Illinois, for Armories
Illinois Central R. R. Co., Chicago, Ill.
Minneapolis Public Schools, Minneapolis, Minn.
New Jersey National Guard, Red Bank, N. J.
William Penn Hotel, Pittsburgh, Pa.
Statler Hotels, Various Cities
High School, Spokane, Wash.



INSTALLATION OF LYON STANDARD DOUBLE TIER LOCKERS



INSTALLATION OF LYON STANDARD SINGLE TIER LOCKERS

MANUFACTURING EQUIPMENT AND ENGINEERING CO.

Metal Sanitary and Fireproof Equipment

136 Federal Street
BOSTON, MASS.

Products and Services.

METAL LOCKERS; STOCK and STORAGE RACKS; METAL SHELVING, METAL VAULT FIXTURES, METAL BINS, BLUE-PRINT CABINETS, etc.

Also, ALL-STEEL STOOLS and CHAIRS; STEEL STOOLS and CHAIRS with INSET WOOD SEATS; IMPROVED SODA KETTLES; WATER-HEATERS and INSTANTANEOUS MIXERS; WORK BENCHES, BENCH LEGS, etc.

Metal Clothes Lockers, Cabinets, etc.

All standard types and to any specification desired; knocked down or erected in place.

Sizes—Some common standards are:

SINGLE TIER	DOUBLE TIER
12 x 12 x 60 in.	12 x 12 x 36 in.
12 x 15 x 72 in.	12 x 12 x 42 in.
15 x 15 x 72 in.	12 x 15 x 36 in.
15 x 18 x 72 in.	12 x 15 x 42 in.
20 x 24 x 72 in.	
20 x 24 x 78 in.	

FIG. 201
SINGLE TIER LOCKER
LOUVRED PANEL

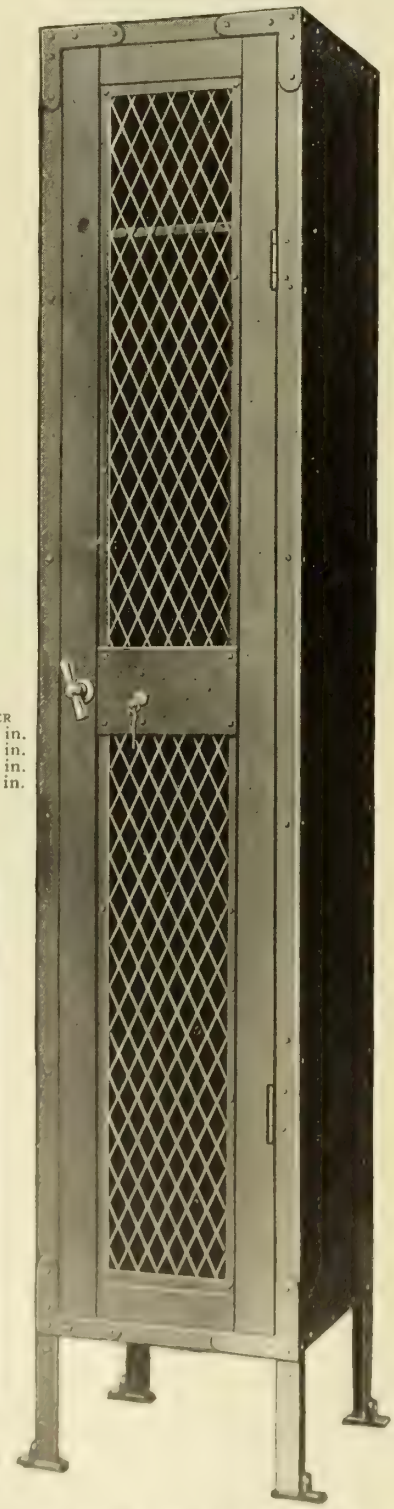
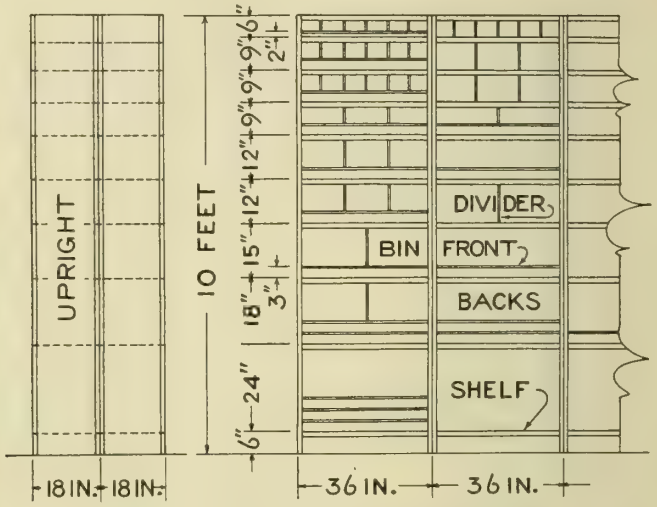


FIG. 202 SINGLE TIER LOCKER
EXPANDED METAL PANEL



DETAILS OF UNIT RACKS AND SHELVES

Special Lockers.

Special lockers for Armories, Railroads and School Buildings are made.

Metal Shelving.

Metal stock and pattern storage racks, metal shelving, vault fixtures, blue-print cabinets and other metal specialties are made to meet all requirements.

Inquiries.

In writing for quotations the following information should be given:

(1) Space to be used.

(2) Articles to be stored.

(3) Weight to be carried per shelf foot.

(4) Whether to be used from one or both sides.

(5) A rough sketch showing special arrangement required.

TYPICAL INSTALLATIONS OF METAL SHELVING RACKS AND BINS

REFERENCES

Pratt & Whitney, Providence, R. I.
Yale & Towne, Stamford, Conn.
Boston & Maine Railroad, Boston, Mass.
Fore River Shipbuilding Corporation, Quincy, Mass.

FRED MEDART MANUFACTURING CO.

Steel Lockers, Steel Shelving and Racks; Gymnasium Outfitters

Potomac and DeKalb Streets
ST. LOUIS, MO.

Products.

STEEL LOCKERS, STEEL SHELVING and RACKS, GYMNASIUM APPARATUS, OUTDOOR PLAYGROUND APPARATUS.

Locker Specifications.

The door and frame made of No. 16 U. S. gauge, pickled, re-rolled and leveled sheet steel; balance of locker, No. 20 gauge. Door frames are formed into shape and welded by the oxy-acetylene process, forming a one-piece frame. Doors are flanged and beaded for rigidity and stiffness, with corners electrically welded.

All doors equipped with noiseless sliding rod, three-point locking device, controlled by rotating handle. Doors furnished either louvred or perforated for ventilation.

All lockers are equipped with screw adjustable legs, elevating the bottom of the locker seven inches above the floor.

Lockers finished in olive green or black enamel, two coats baked on.

All lockers equipped with three double-prong coat hooks, number plates, hat shelves (for single tier lockers), and any style of key or combination locks.

STANDARD SIZES OF LOCKERS

DOUBLE TIER

12″ wide x 12″ deep 12″ wide x 15″ deep 15″ wide x 12″ deep 15″ wide x 15″ deep 15″ wide x 18″ deep	36″ or 42″ high.

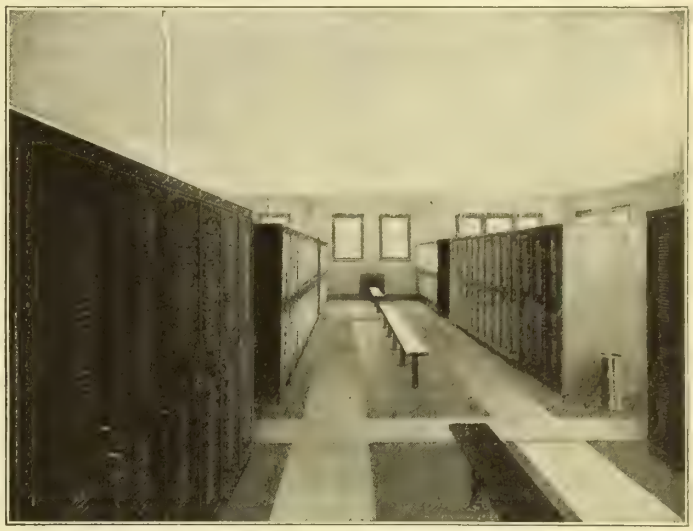
SINGLE TIER

12″ wide x 12″ deep 12″ wide x 15″ deep 12″ wide x 18″ deep 15″ wide x 12″ deep 15″ wide x 15″ deep 15″ wide x 18″ deep 18″ wide x 15″ deep 18″ wide x 18″ deep 18″ wide x 24″ deep 24″ wide x 18″ deep	60″ or 72″ high.

Heights specified do not include legs.

Steel Shelving,

Shelving and racks are adjustable and extensible, all parts being standard and interchangeable. Shelving built to suit individual requirements, and complete plans and details furnished upon application.



STEEL LOCKER EQUIPMENT

Catalogues and Information.

Catalogues descriptive of lockers or shelving sent on request.

Our Engineering Department is at the disposal of architects and their clients, and information given is of an accurate and reliable nature.

Gymnasium and Playground Outfits.

Our book for architects, "The Planning of a Gymnasium," with Catalogue K, descriptive of gymnastic apparatus, and Catalogue W, descriptive of playground apparatus, will be sent on request.

STEEL SHELVING EQUIPMENT

MILLER LOCK COMPANY

PHILADELPHIA, PA.

Products.

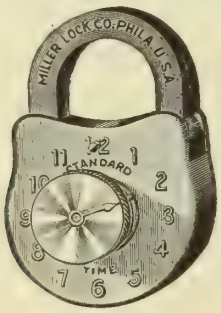
Manufacturers of KEYED and KEYLESS LOCKS and PADLOCKS (including "STANDARD TIME" LOCKS and PADLOCKS) for Lockers, Cupboards, Closets, Wardrobes, Drawers, School Desks, etc.

Also, KEYLESS POST OFFICE BOXES, KEYLESS APARTMENT HOUSE LETTER BOXES, R. R. SWITCH LOCKS, NIGHT LATCHES, etc.

Illustrations.

The illustrations shown are half size.

"STANDARD TIME" KEYLESS PADLOCKS, FOR WOOD OR METAL LOCKERS



Size, 2 inches

Number	Material	Finish	Shackle	Changes Available
34	Steel	Japanned	Malleable Nickel-Plated	3,300
340	Brass	Sand Blast	Brass	3,300

Brass interior parts. Can be opened in the dark.
Positively non-pickable. Rust- and dust-proof. Self-locking.
Guaranteed against everything except fire and abuse.
Can be furnished with chain attached.

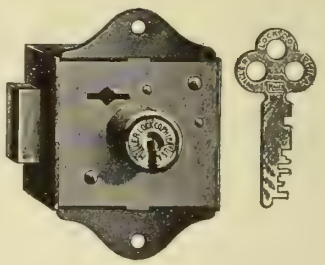
KEYED PADLOCK FOR WOOD OR METAL LOCKERS AND DESKS

Size, 1¾ inches

Number	Material	Finish	Shackle	Tumblers	Changes	Changes with Master Key
50	Steel	Japanned	Malleable Nickel Plated	5	Unlimited	6,000
51	Brass	Japanned	Bronze Buffed	5	Unlimited	6,000
51	Brass	Sand Blast	Malleable Unfinished	5	Unlimited	6,000

Brass interior parts. Positively non-pickable.
Can be furnished with chain attached. Self-locking.

KEYED LOCK FOR METAL LOCKERS, CUPBOARDS AND CLOSETS



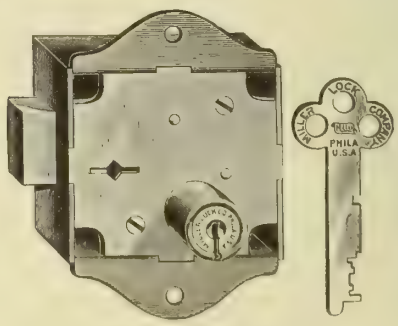
Size, 2½ x 1 11/16 inches

Number	Material	Finish	Selvedge to Center of Cylinder	Tumblers	Changes	Changes with Master Key
L353J	Steel	Japanned	⅞ inch	8	Unlimited	3,000
L353B	Steel	Brass-Plated	⅞ inch	8	Unlimited	3,000

Brass interior parts. Can be furnished alike, different, different and master keyed, or in sets master keyed.

Can be furnished for any thickness of metal or wood.

KEYED LOCK FOR METAL LOCKERS, CUPBOARDS AND CLOSETS



Size, 3¼ x 2¼ inches

Number	Material	Finish	Selvedge to Center of Cylinder	Tumblers	Changes	Changes with Master Key
L381J	Steel	Japanned	1 5/16 inch	8	Unlimited	10,000
L381B	Steel	Brass-Plated	1 5/16 inch	8	Unlimited	10,000
*L3851J	Steel	Japanned	1 5/16 inch	8	Unlimited	10,000
*L3851JB	Steel	Brass-Plated	1 5/16 inch	8	Unlimited	10,000

* Made with beveled latch bolt.

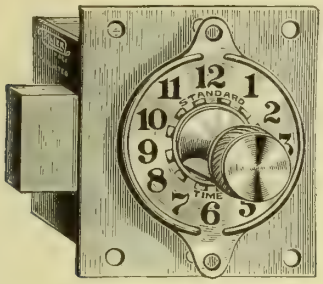
Brass interior parts. Master keying is genuine, i. e., the master key, as well as the change key, operates every tumbler in the lock. Key cannot be removed until bolt is thrown in locked position.

Can be furnished alike, different, different and master keyed, or in sets master keyed.

Can be furnished for any thickness of metal or wood.

Continued on next page

"STANDARD TIME" KEYLESS LOCKS FOR WOOD AND METAL LOCKERS, WARDROBES, DRAWERS, DESKS AND CUPBOARDS

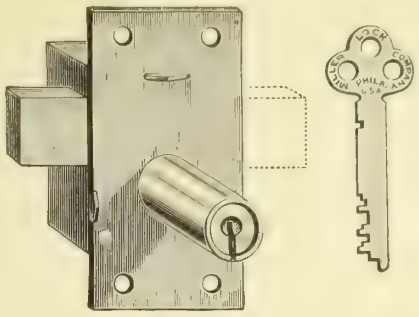


Size, $2^{13}/_{16}$ x $2\frac{1}{8}$ inches

Number	Type	Material	Finish	Selvedge to Center of Cylinder	Changes Available
3332	Cupboard, Locker, Wardrobe	Brass	Dipped	1½ inch	3,300
3332B	Cupboard, Locker, Wardrobe	Steel	Japanned	1½ inch	3,300
3360	Drawer, Desk	Brass	Dipped	1½ inch	3,300
3360B	Drawer, Desk	Steel	Japanned	1½ inch	3,300

Brass interior parts. Can be opened in the dark.
Combinations easily changed. Positively non-pickable.
Guaranteed against everything except fire and abuse.
Made for any thickness of wood or metal, either right or left hand.

LOCK FOR WOOD LOCKERS, CLOSETS AND WARDROBES

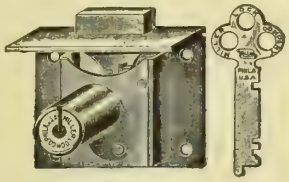


Size, 3⅛ x 1⅝ inches

Number	Material	Finish	Selvedge to Center of Cylinder	Tumblers	Changes Available with Master Key
W24	Steel	Bright	1 inch	5	560
WB24	Brass	Dipped	1 inch	5	560

2700 key changes available.
Bolt, tube and interior parts are brass.
Can be made for any thickness of wood.
Long bolt especially adapted to wooden doors or lockers.

LOCK FOR DRAWERS AND DESKS

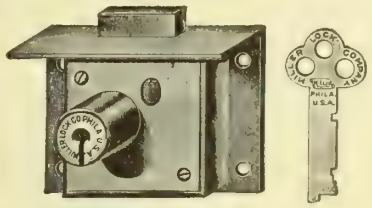


Size, 1¾ x 1½ inches

Number	Material	Finish	Selvedge to Center of Cylinder	Tumblers	Changes Available with Master Key
D271	Steel	Bright	¾ inch	2	1,300
DB271	Brass	Buffed	¾ inch	2	1,300
*DB271½	Brass	Buffed	¾ inch	2	300
*D271½	Steel	Bright	¾ inch	2	300

7000 key changes available in D271 and DB271 and 3000 in D271½ and DB271½, by increasing number of tumblers.
* Made with beveled latch bolt.
Bolt, tube and interior parts are brass.
Can be made for any thickness of wood.
Tube cut for cupboard as well as drawer.

LOCK FOR DRAWERS, DESKS AND CUPBOARDS



Size, 2¼ x 1¾ inches

Number	Material	Finish	Selvedge to Center of Cylinder	Tumblers	Changes Available with Master Key
D281P	Steel	Polished	⅞ inch	3	1,500
DB281P	Brass	Polished	⅞ inch	3	1,500
*DB280½P	Brass	Polished	⅞ inch	3	1,200
*D280½P	Steel	Polished	⅞ inch	3	1,200

7000 key changes available in D281P and DB281P and 3000 in D280½P and DB280½P, by increasing number of tumblers.
* Made with beveled latch bolt.
Bolt, tube and interior parts are brass.
Can be made for any thickness of wood.
Tube cut for cupboard or wardrobe as well as drawer.

References.

The following are a few of the many buildings in which "Miller" Locks and Padlocks have been installed:

Detroit Y. M. C. A.
Boston Y. M. C. A.
Louisville Y. M. C. A.
University of Wisconsin
Northwestern University
Pratt Institute (Brooklyn, N.Y.)
Princeton University
Toledo High Schools
Pittsburgh High Schools
Washington and Lee University
Detroit (Mich.) Schools
Newark (N. J.) High Schools
Saskatoon Y. M. C. A.
Edmonton Y. M. C. A.
Washington (D. C.) Y. M. C. A.
West Side, New York, Y. M. C. A.
U. S. Navy
U. S. P. O. Department
U. S. Treasury Department
Denver Y. M. C. A.
University of Chicago
Union South Africa P. O. Department
Cornell University
Dallas (Tex.) Y. M. C. A.
Toronto Y. M. C. A.
Duluth Y. M. C. A.
Minneapolis Public Schools
Pittsburgh Y. M. C. A.
Baltimore Y. M. C. A.
University of Pennsylvania
University of California
2nd Regiment Armory, N.G. Pa.
Wilmington (N. C.) Y.M.C.A.
Providence Y. M. C. A.
Western Union Telegraph Co.
Iowa State College
Massachusetts Institute of Technology
And practically all large Railroads

FOUNDED IN 1849

THE SNEAD & CO. IRON WORKS, INC.

Manufacturers of Metal Bookstacks and Shelving

MAIN OFFICE AND WORKS
Foot of Pine Street
JERSEY CITY, N. J.

TELEPHONES:
5097 Rector, New York City
1185-1186 Bergen, Jersey City

CABLE ADDRESS:
"Snead, Jersey City"

BRANCH OFFICE: TORONTO, CANADA

Products.

Sole makers of the "Snead Standard Stack," "Green-Snead Bookstack," Snead Newspaper Stack, Bracket Bookstacks, Metal Shelving for all purposes, Metal and Glass Museum Cases and Exhibit Equipment, Architectural and Ornamental Iron and Bronze Work, Elevator Enclosures, Store Fronts, Lamps, Marquees.

For Iron Castings, Floor Plates, Trench Covers, "Macdonald Roller Ramming Moulding Machines," Pattern Drawing Machines, Foundry Equipment, Railings and Grilles, see our name in General Index.

Facilities.

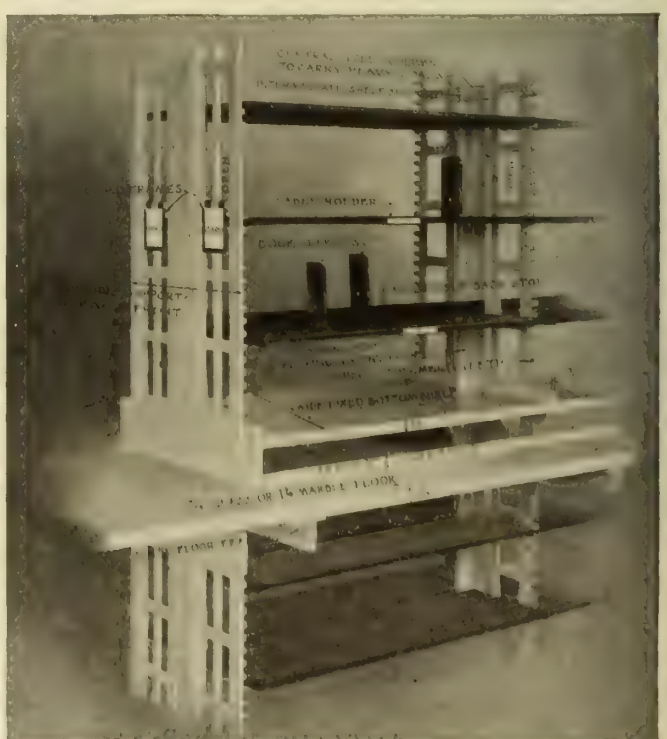
We were the pioneer manufacturers of library bookstacks. Our experienced Stack Designers are at the service of architects planning stack installations. Catalogue of bookstack and library construction giving many plans and illustrations of libraries sent on request; technical information also furnished free.

Description.

The Snead Standard Stack is installed throughout the Library of Congress at Washington and the New York Public Library. The simple construction fits it for use not only in large but also in smaller libraries with but a single or a few stack tiers (stories), and for offices and private libraries requiring only plain wall shelving. The interchangeability of parts and the adaptable construction allows the stack, in case of remodeling, to be reset and extended both horizontally and vertically. Stack consists of solid or openwork cast-iron and steel uprights extending full width of ranges, and spaced shelf length apart by fixed shelves at top and bottom. The adjustable shelves may be of the ordinary solid plate type, or preferably of the special open bar construction, light, strong, resilient, and with dust collecting surfaces reduced to a minimum. The uprights are each the height of one tier, and may be bolted one above the other to obtain a stack of any number of stories. The uprights (in section) occupy no available book room, and have no space-wasting, dirt- and rust-collecting hollow members. Deck floors or galleries between tiers give direct access to all shelves. The distance between the main floors of the building should be an even multiple of the stack tier height (preferably 7 ft. or 7 ft. 6 in.), so as to line up the main building floors with stack deck floors. The deck-floor construction is carried by the uprights and firmly anchored to the walls of the stack room. Floors of rooms above (without concentrated loads) are economically carried on stack construction. Cover plates at top protect books from dust and injury, and cornice gives a neat finish. Openwork construction of uprights and shelves, and slits in the deck floors, allow stack to be heated and ventilated as one great room. The system can be adapted to meet any requirement of architectural plan and design.

Adjustable shelves are completely finished at shop with baked rubber japan. Fixed metal parts are preferably finished after erection with air-drying enamel; baked enamel is unsuitable, as it cannot be renewed in place. Maximum distribution of light is obtained by using openwork construction where possible, and finishing fixed parts in white, which avoids the dark cheerless "shut-in" effects common to ordinary stack rooms.

SNEAD STANDARD STACK
10-inch double-faced range with [illegible] Designed to receive future record [illegible] by modified wall [illegible] any size required also supplied



PERSPECTIVE DETAIL OF SNEAD STANDARD STACK, WITH WIDE FIXED BOTTOM SHELVES AND PROTECTED DECK SLIT

Continued on next page

SNEAD STANDARD STACK, NEW YORK PUBLIC LIBRARY, PATENTS ROOM
CARRÈRE & HASTINGS, Architects

Prices.

Cost of stacks depends largely upon arrangement, and varies from 50 cents to $1.00 or more per lineal foot of shelving. Specifications, drawings and estimates furnished free on request. Bookstacks are built on contract. Four or five months should be allowed for the completion of an ordinary stack of about 100,000 volumes' capacity.

BOOK CAPACITIES
Average per lineal foot of Shelf

U. S. Patent Specifications	2 volumes
Law, Public Documents, Bound Periodicals	6 volumes
Medicine and Science	7 volumes
Reference and General Literature	8 volumes
Economics and Fiction	9 volumes
Circulating Books	9 to 10 volumes

STANDARD STACK DIMENSIONS
Special sizes built to order if quantity warrants
Shelf widths—For books, 8″, 9″, 10″ and 12″; newspapers, 18″ and 22″
Shelf lengths—3′ 0″ usual—varied to suit conditions

SNEAD STEEL TREASURE ROOM CASES, WIDENER MEMORIAL LIBRARY, HARVARD UNIVERSITY
HORACE TRUMBAUER, Architect

SNEAD STANDARD STACK, WIDENER MEMORIAL LIBRARY, HARVARD UNIVERSITY
HORACE TRUMBAUER, Architect

Tier heights—7′ 0″ and 7′ 6″
Aisle widths—Main, 2′ 6″ to 5′ 0″; minor, about 28″ minimum; 30″ to 36″ average

STANDARD STACK WEIGHTS

Uprights and shelves	7 to 10 lbs. per cu. ft. of range
Books	20 to 25 lbs. per cu. ft. of range
Deck framing	5 lbs. per sq. ft.
Deck flooring, ¾″ glass	10 lbs. per sq. ft.
Deck flooring, 1¼″ marble	18 lbs. per sq. ft.

Metal Shelving.

Our products cover shelving for special requirements and conditions, and for all purposes where fireproof storage convenience and durability are essential.

Exhibit Cases and Museum Equipment.

Built from stock, or special designs, of steel or bronze and glass. Sizes and devices to meet architects' requirements. Our designs embody the modern principle of providing maximum glass area by making structural members substantial and compact. Special attention given to making cases dust- and insect-proof and to attaining a graceful architectural appearance. Our types include sloping top, flat top or upright cases, with solid or sanitary base, hinged or sliding doors, removable panels or lids. Write for particulars.

TYPICAL BOOKSTACK INSTALLATIONS

BUILDING	ARCHITECT
Library of Congress	E. P. Casey, B. R. Green, Eng.
New York Public Library	Carrère & Hastings
Widener Library, Harvard	Horace Trumbauer
Columbia University Library	McKim, Mead & White
Springfield City Library	Edward L. Tilton
Wisconsin State Capitol	George B. Post & Sons
Arkansas State Capitol	Cass Gilbert
Portland Public Library	Doyle, Patterson & Beach
Ohio State University Library	Allen & Collins
Brookline Public Library	R. Clipston Sturgis
Phila. College of Physicians	Cope & Stewardson
University of Chicago Library	Shepley, Rutan & Coolidge
Denver Public Library	Albert R. Ross
Michigan University Library	Albert Kahn
Gary Public Library	Henry D. Whitfield
New Hampshire Hist. Society	Guy Lowell
Boston Athenæum	Bigelow & Wadsworth
Johns Hopkins Univ. Library	Parker, Thomas & Rice
Am. Museum, Natural History	Trowbridge & Livingston
St. Charles Semi., Overbrook	Harris & Richards
Sage Foundation Building	Grosvenor Atterbury
St. Paul Public Library	Electus D. Litchfield
San Francisco Public Library	Geo. W. Kelham

TERRELL'S EQUIPMENT CO.

Manufacturers of Sectional Steel Fixtures, Lockers, etc.

GRAND RAPIDS, MICH.

Products.

STEEL CUPBOARDS, WARDROBES, LOCKERS, and SECTIONAL STEEL FIXTURES.

Terrell's Steel Cupboards and Wardrobes.

Cupboards—Particularly suitable for storing records, supplies and articles of value requiring compartments of various sizes.

Shelf adjustment of 1-inch centers. Adjustment of vertical dividers on 2-inch centers without bolts.

Wardrobes—These are of the same design as the cupboards, and differ only in the interior equipment.

Regular equipment for wardrobe comprises a hat shelf, four two-prong hooks, and rod for hangers.

Locks—Masterkeyed flat key locks or combination keyless locks; also masterkeyed padlocks can be furnished.

Construction—The framework consists of drawn metal angles, especially designed to insure maximum strength and rigidity. Corner joints are acetylene-welded. Tops and ends have slip joints, so that only a few bolts are used in the assembling.

Doors are made of No. 18-gauge steel, U. S. S., and are reinforced with frames of drawn metal channels. No. 20-gauge steel, U. S. S., is used for the ends. Two strips of No. 16-gauge steel are welded to each end. These strips serve as a reinforcement, and are provided with special stamped lips, spaced on 1-inch centers, which engage the shelf supports for the shelf adjustment. Shelves are formed from No. 18-gauge steel.

All material used is high-grade throughout.

Can be packed K. D. flat for shipment, or shipped assembled, if preferred.

TYPE CBLL CASE

Assembly combining regular standard cupboards and open front shelving, showing manner in which standard heights can be stacked

STANDARD SIZES CUPBOARDS AND WARDROBES

For over-all height add 6¾ inches

Width, Inches	Depth, Inches	Height, Inches
24	15	36, 42, 60 and 72
24	18	36, 42, 60 and 72
24	24	36, 42, 60 and 72
30	15	36, 42, 60 and 72
30	18	36, 42, 60 and 72
30	24	36, 42, 60 and 72
36	15	36, 42, 60 and 72
36	18	36, 42, 60 and 72
36	24	36, 42, 60 and 72

TYPE NC-D CUPBOARD

Material Specifications of Lockers.

All lockers are built on the unit principle.

Frames—The supporting frames are made of special drawn steel angles, 1 by 1 inch, of not less than No. 14-gauge, U. S. S., steel. The corners are mitred and acetylene-welded.

Bodies—High-grade steel with smooth surface of not less than No. 24-gauge, U. S. S., or No. 22-gauge, B. & S. S.

Ends—Reinforced with two flange strips of No. 20-gauge steel, welded inside of panel.

Tops and Bottoms—Reinforced with flanges on all sides.

Hat Shelves—Rounded edge across front, and flanged at both sides and rear.

Backs—The backs have a flange on all sides.

Doors—No. 18-gauge, U. S. S., or No. 16-gauge, B. & S. S., high-grade steel with smooth surface. Reinforced with special channels drawn from strip steel. Panels are welded to the frames.

TYPE DP LOCKER

Legs—Special design formed from No. 16-gauge steel, with a practical adjustment which works on a thread. Height, 6 inches.

Hinges—Bright wrought steel, size 2 inches, with a tight pin $\frac{3}{16}$ inch in diameter, fastened so that the hub only is exposed.

Hooks—Made of steel, fitted with two prongs.

Locking Device—All doors fitted with three-way locking device, which is operated by the door handle.

Finish and Color—Baked enamel, black or olive green.

Standard Sizes—Width, 12, 15 and 18 inches. Depth, 12, 15, 18 and 24 inches. Height, Double Tier—36 and 42 inches; Single Tier—60 and 72 inches.

NOTE—The height of the lockers is listed exclusive of legs.

THE ARMOR-CLAD MANUFACTURING CO.

Manufacturers of Metal Cabinets, Safes, Etc.

CANTON, OHIO

Products.

Enameled Steel Bathroom and Medicine Cabinets for Office and Home, and special Enameled Steel Kitchen Equipment.

Also, "Armor-Clad" Light Weight Fireproof Safes and Special Steel Furniture Equipment for Banks, etc.

Recess Cabinets.

These cabinets are constructed of heavy sheet steel and are finished with a baked-on white enamel, which assures a most durable and sanitary cabinet.

MODEL G ARMOR-CLAD RECESS CABINET

Model G
Outside dimensions, 21 x 27 ins.
Inside dimensions, 17¾ x 23¾ x 4½ ins.
Wall opening required, 18 x 24 x 4¾ ins.
Bevel plate mirror, 12 x 18 ins.
Three glass shelves, 4⅜ x 17½ ins.
Price, White Enamel, $14.00.

Model H
Outside dimensions, 24 x 28 ins.
Inside dimensions, 20¾ x 24¾ x 4½ ins.
Wall opening required, 21 x 25 x 4¾ ins.
Bevel plate mirror, 16 x 20 ins.
Three glass shelves, adjustable, 4⅜ x 20⅝ ins.
Price, White Enamel, $17.00.

Plain mirror if desired.
Flange projects ½ in. from face of wall.
Doors right hand.
Left-hand doors, or locks and keys furnished, at additional price.
Imitation wood finish, $1.00 net extra.
Packed f.o.b. Canton, Ohio.

All cabinets are guaranteed perfect in workmanship and finish.

Imitation wood finish additional.

Any size made to order.

Steel Cupboards.

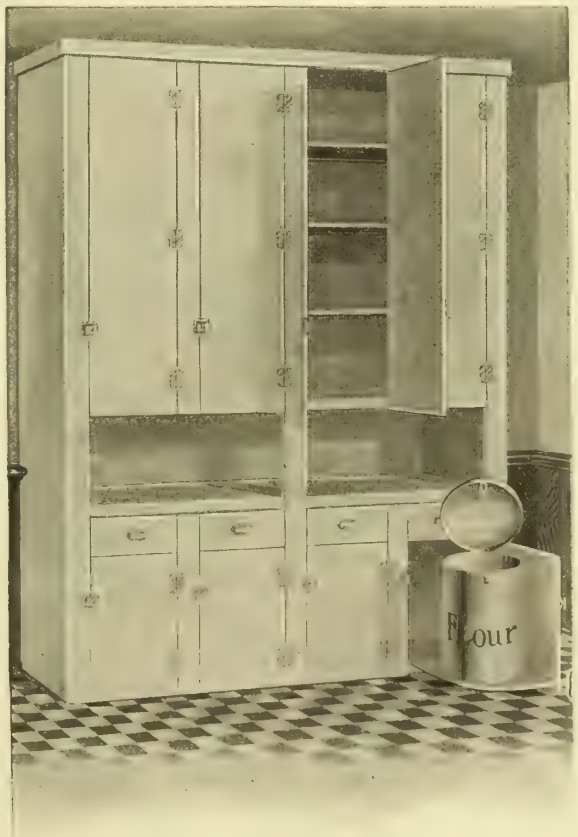
Enameled white, or to match trim for apartment houses, kitchens and butlers' pantries. Made in any size.

The cupboard shown is seven feet wide, seventeen inches deep and nine feet high.

These cabinets can be made to fit any space in the kitchen or pantry, and are absolutely sanitary because vermin will not live in them. Odors cannot be absorbed.

Armor-Clad enameled cupboards are the last word in kitchen equipment.

Estimates readily given on architects' plans.



ARMOR-CLAD STEEL CUPBOARD

Butlers' Pantry Cases.

Butlers' pantry cases, with glazed doors and linen closet cases, made to order.

FRANK H. GRAF MFG. CO.

Sanitary Metal Medicine Cabinets

322 Seventh Avenue
NEW YORK, N. Y.

TELEPHONE CONNECTION

Products.

Manufacturers of High-Class Sanitary Metal Medicine Cabinets; Nickel-Plated Brass and Plate Glass Doors for Shower Baths.

Also, Open Fireplace Fixtures of Brass, Bronze and Wrought Iron.

Description of Metal Medicine Cabinets.

Our Metal Medicine Cabinets are constructed with a cast-iron back, white porcelain enameled. The frame and door are made of brass, nickel-plated. They can also be made of German silver.

Each cabinet is supplied with our own special sliding shelf supports, which permit the shelves to be set at any desired height (see illustration). These cabinets can be made 4 and 4½ inches in depth.

The interior corners, being rounded, cabinets can be easily cleaned and are perfectly sanitary.

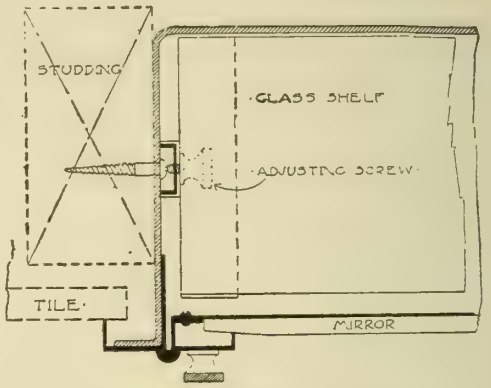
Cabinets are fitted with best grade of highly polished beveled French plate mirror, and polished plate glass shelves.

Cabinets can be had from any of the mantle and tile dealers, also plumbers.

Owing to their construction, they should be installed after all tile work is finished and cleaned.

Nickel-Plated Brass and Plate Glass Doors for Shower Baths.

Detailed information sent on request.



METHOD OF SECURING MEDICINE CABINET TO WALL

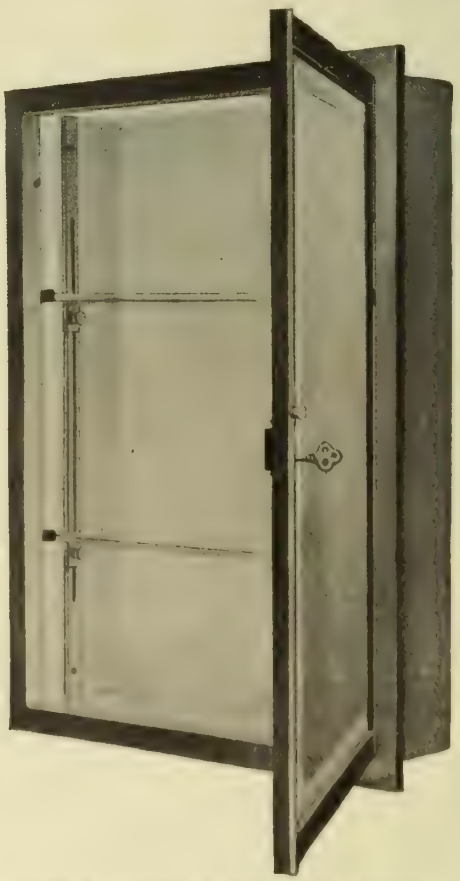
Catalogue.

Write for Catalogue.

DIMENSIONS OF MEDICINE CABINETS

Brass Nickel-Plated	Wall Space, Inches	Metal Back, Inches	Tile Opening, Inches	Depth to Frame, Inches	Inside Depths, Inches	Mirror
No. 10	21⅞x27¾	20¼x25¾	20¾x26¼	4½	5	17⅜x23¼
No. 20	25⅞x31¾	24¼x30	24¾x30½	4½	5	21½x27½

Cabinet Closed



Perspective, Showing Adjustable Shelf Supports

SANITARY METAL MEDICINE CABINET

MARSHALL & STEARNS CO.

Manufacturers of Oscillating Portal Wall Beds

EXECUTIVE OFFICE
Phelan Building
SAN FRANCISCO, CAL.

FACTORIES
SAN FRANCISCO, CAL.
KENOSHA, WIS
TORONTO, ONT., CAN

AGENTS

CHICAGO, ILL., W. L. Van Dame, 58 East Washington Street
INDIANAPOLIS, IND., Philip Voorhees & Son, 419 Hume-Mansur Building
BOSTON, MASS., H. E. Holbrook Co., 444 John Hancock Building
DETROIT, MICH., Portal Wall Bed Co. of Michigan, Kresge Building
SEATTLE, WASH., Joseph Leibly, 69 Marion Street Viaduct
CLEVELAND, OHIO, R. M. Burr, 1001 Leader-News Building

Products.

Wall Beds; Disappearing Beds.

Description.

Designed on an Oscillating principle, which works on two eccentric arms, resting on an adjustable floor plate. This allows a full-sized, double bed to be completely revolved in the small space of twenty-two inches, or about sixteen inches inside of the partition.

The adjustable floor plate enables the bed to be raised or lowered with ease, should it become necessary in case of extra thickness of carpets or shrinkage of the floor joists.

When the bed is not in use it is turned out of the way into the closet, and the room is transformed from a bedroom into a dining-room, parlor, or other room, as the user may desire.

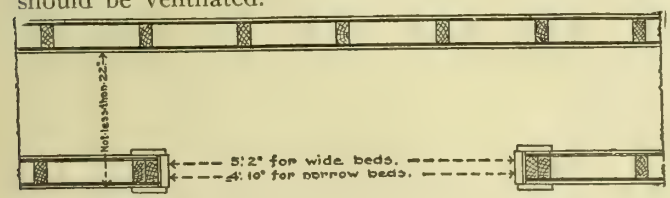
How the Bed Works.

When bed is lowered the coverings are all intact, just as it was made up in the morning. The bed clothes lie on top of the mattress in the usual manner, and are held by clamps at the foot.

The bed stays in this position naturally, being thrown off the center of gravity, and does not need to be locked or held. By lifting the foot rail the bed goes up against the door, and is perfectly balanced.

When the bed is down it is a comfortable, full-sized, standard-height bed of handsome and inviting appearance.

Note that the opening behind the bed is entirely closed, shutting off the unsightly appearance of the closet, and preventing any drafts on the occupants of the bed. This makes it possible to have a sanitary bed in a thoroughly ventilated closet. Wall Bed closets should be ventilated.



INSTALLATION DETAILS, SHOWING MINIMUM DEPTH OF CLOSET AND WIDTH OF OPENING

Specifications.

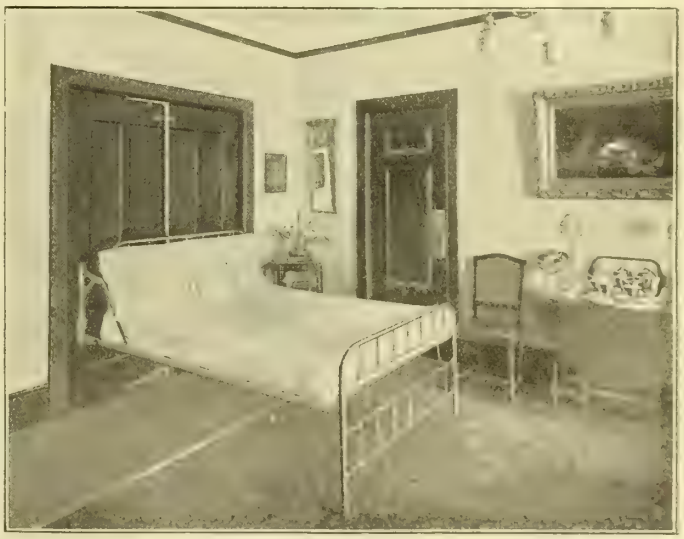
Opening—Opening for Beds, jambs and casings around same, to be put in by contractor. Use jambs not less than 4 inches in width. Head casings inside of closet to be plain square casings. Opening must be plumb and true and perfectly square.

For wide bed the width between finished jambs must be 5 feet 2 inches. For narrow bed the width between finished jambs must be 4 feet 10 inches. The height of finished head jamb must be 7 feet ½ inch.

Closet Door—If furniture is used on front of bed, closet door should be provided. When furniture is not used, closet door may be omitted.

Depth of Closet—The depth of the closet must be 22 inches, measuring from the back of the front casing. The bed requires 22 inches, but the closet may be as much deeper as desired.

LIVING ROOM, SHOWING OSCILLATING PORTAL WALL BED CLOSED, WITH MIRROR FRONT



BED LOWERED, SHOWING DINING-ROOM CONVERTED INTO BED ROOM

Awarded Gold Medal.

Marshall & Stearns Wall Beds were awarded the Highest Award Gold Medal at the Panama Pacific International Exposition.

Plans.

Send for Catalogue, "Floor Plan Units for Apartments and Hotels," and special book of Bungalow Plans.

DIEBOLD SAFE & LOCK COMPANY

Manufacturers of Fireproof Safe and Vault Equipment

MAIN OFFICE AND FACTORY

CANTON, OHIO.

BRANCH OFFICES

NEW YORK, N. Y., 372 Broadway BOSTON, MASS., 108 Sudbury Street ST. PAUL, MINN., 389 Jackson Street

CHICAGO, ILL., 122 South Fifth Avenue CLEVELAND, OHIO, 2172 East 9th Street

Products.

FIREPROOF VAULT DOORS.

POST OFFICE VAULT and CLOSET DOORS.

FIREPROOF SAFES—Fifty sizes, from 12 by 8 by 10 inches to 70 by 50 by 20 inches inside dimensions.

ALTAR SAFES, MESSENGER BOXES, CHESTS, SHELL SAFES, SILVER SAFES.

STEEL-LINED SAFES; SAFE DEPOSIT SAFES, for Hotels.

COMPLETE BANK and SAFE DEPOSIT VAULTS.

SAFE DEPOSIT BOXES.

BURGLAR-PROOF BANK VAULT DOORS (round and square).

"TISCO" MANGANESE STEEL BANK SAFES.

GRILLE PARTITIONS and GATES for VAULTS.

DIEBOLD PATENT PUNCHED PLATE JAIL CELLS, JAIL BUNKS, WINDOW GUARDS.

Fireproof Vault Door, Style R.

Single outer door; folding inner doors. Wall opening required, 78 inches high by 32 inches wide. Depth of vestibule, 20 inches; minimum depth (to have inner doors pocket), 16 inches. Clear opening in outer jambs, 75¼ inches high by 28¼ inches wide. Front and rear frames constructed of 4 by $\frac{3}{16}$ inch steel bars, strengthened with $\frac{5}{16}$ inch bars and 1½ by 1½ by $\frac{3}{16}$ inch angles; vestibule constructed of No. 16

FIREPROOF VAULT DOOR, STYLE R

steel, riveted to 1" by 1" by $\frac{3}{16}$ inch angles at front and rear. Outer door constructed of $\frac{3}{16}$ inch steel, reinforced on all edges by 2 by 1½ by $\frac{3}{16}$ inch angles forming bolt frames, and by 5 by $\frac{3}{16}$ inch lock-rail across center. Outer door hung on heavy pin hinges and locked by four horizontal and two vertical bolts 1 inch diameter; bolts thrown by a lever handle and locked by four-tumbler Diebold combination lock. Inner doors constructed of $\frac{1}{8}$ inch steel, locked by flat bolt work and six-tumbler key lock.

Doors and vestibule painted black, neatly decorated in gold; carrying bars plated antique copper; locking bolts, handles, dial, tips, etc., nickel plated.

Styles O, U, and V Fireproof Vault Doors have single outer and folding inner doors and are heavier than Style R. Standard size to fit wall opening 81 inches high by 34½ inches wide. All standard doors carried in stock right-hand swing; left swing doors built to order.

All Diebold Fireproof Vault Doors are designed with removable rear frame, and can be quickly and easily placed after all masonry is completed.

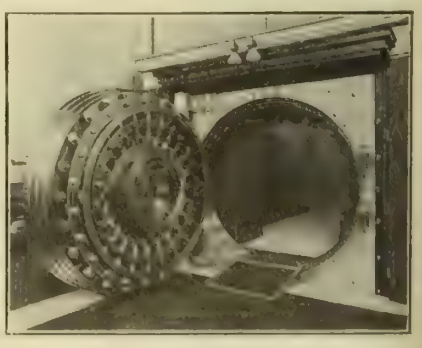
Fireproof Vault Door, Style W.

Folding outer doors; folding inner doors. Designed to provide the widest clear opening for the minimum floor space. Wall opening required 81 inches high by 40½ inches wide; depth of vestibule 20 inches. Clear opening in outer jambs 78 inches high by 36 inches wide. Finished automobile gray, decorated in gold; trimmings, plated antique copper and nickel.

FIREPROOF VAULT DOOR, STYLE W

Diebold Bank Vault Outfits.

Complete Diebold Bank Vault Outfits are in use in some of the largest banks in the United States. We build all styles, from the simplest to the most elaborate. A floor-plan sketch and description of your requirements will enable us to submit, promptly, estimates on suitable equipment. Correspondence invited.



DIEBOLD BANK VAULT

Co-operative Service.

Our Engineering Department is at your service, and we are always pleased to furnish, without charge, sketches and estimates on special work as well as stock designs.

Facilities.

Our factory is the oldest and largest Safe and Vault Factory in the world, and is so situated and equipped that we can fill and deliver orders promptly.

THE HALL'S SAFE CO.

CABLE ADDRESS, "HALL'S SAFE, N. Y."

P. O. Box 846
CINCINNATI, OHIO

SALESROOM: NEW YORK, N. Y., THE WALKER-KEENAN CO., INC., 368 Broadway

Products.

Sole manufacturers of HALL'S PATENT (April 3, 1906) FIREPROOF SAFES, including SQUARE and SCREW-DOOR FIREPROOF BANK SAFES; PATENT MANGANESE STEEL BANK SAFES with TIME LOCK and AUTOMATIC BOLTS; BANK VAULTS; DEPOSIT BOXES; FIREPROOF WALL SAFES for Residence and Apartment Houses; VAULT FRONTS, VAULT LININGS, etc.

TRADE-MARK

Co-operative Service.

This company maintains a department for co-operating with architects or clients in solving problems encountered in selecting and installing safes. Prices and estimates will be promptly furnished upon application.

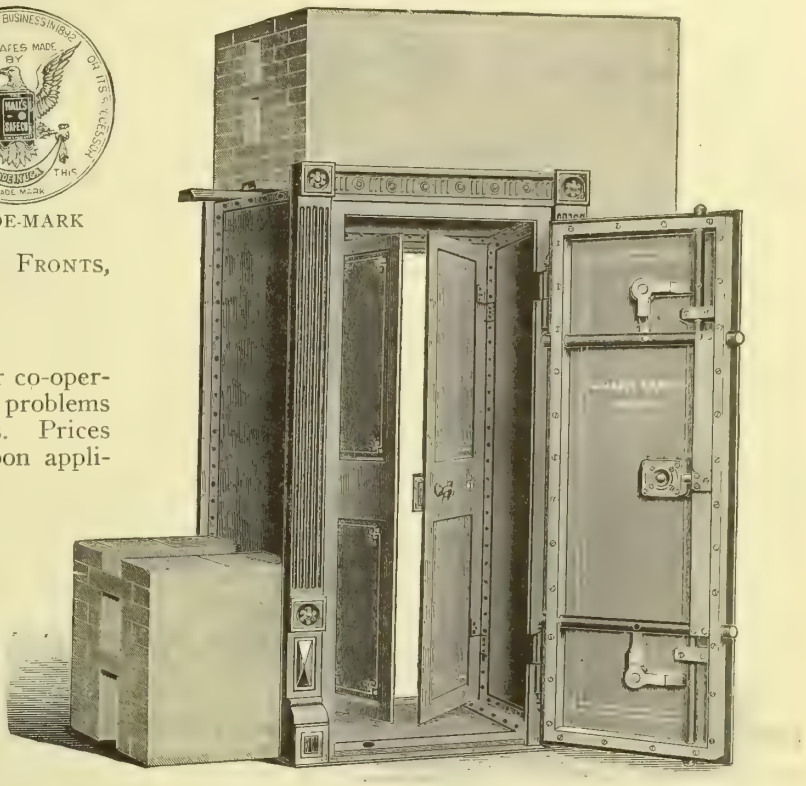
Fireproof Safes.

Hall's safes are constructed of the highest grade of fire-resisting materials, combining maximum strength with lightness and excellence in finish. They are built with a special patent filling, which is made up of hermetically sealed cement tubes in conjunction with our special cement filling. The tubes are made in our own works, under our formula, and on forms of our own design. These are placed within the space between the outer and inner shells, and in the doors between the outside plate and the inside cap, after which the special cement filling is poured in around them, thereby making a safe with cement filling in addition to air space in the filling, giving a double security in case of fire, as illustrated.

By the use of these tubes, we make a stronger and lighter safe; one free from dampness, with no possibility of swelling, which heretofore for years has been the great problem of safe makers.

Fireproof Vaults.

The upper illustration shows a sectional plan of a fireproof vault with an iron lining and air chamber. This mode of construction is advocated as the best, and recommended to all parties who contemplate building vaults. It is not only an absolute protection against dampness, caused by condensation, but a positive protection against fire, as frequently the walls will crack through the intensity of the heat.



DETAIL SHOWING APPROVED METHOD OF FIREPROOF VAULT CONSTRUCTION

HALL'S SINGLE DOOR FIREPROOF SAFE, SHOWING PATENT FILLING WITH HERMETICALLY SEALED CEMENT TUBES

ESTABLISHED 1882

YORK SAFE AND LOCK CO.

FACTORY AND GENERAL OFFICE

YORK, PA.

BRANCH OFFICES AND SALES ROOMS IN ALL PRINCIPAL CITIES

Products.

We are designers and manufacturers of BANKERS' SAFES and CHESTS; FIRE- and BURGLAR-PROOF SAFES, with Steel-lined Outer Doors; BANK and SAFE DEPOSIT VAULTS and DOORS.

Also, MANGANESE STEEL BANK SAFES, SAFE DEPOSIT BOXES, FIREPROOF VAULT DOORS, SPECIAL SAFES for Fireproof Buildings, etc.

The York Safe.

The ordinary system of building fireproof safes has been completely revolutionized by the new construction and materials used by this Company only.

Construction—All these safes are made of the best fire-resisting materials known. The mode of construction showing latest improvements may be observed by reference to Fig. 1 and the explanatory texts thereunder.

The York Improved Filling (patented) radiates heat instead of conducting it, is perfectly dry, extremely light and pliable in texture, indestructible, and, unlike the cement-filling in other safes, it never deteriorates through evaporation. This Silicious Fireproof Compound is a combination of the best known fire resistants, namely, electro vulcan, asbestos and magnesian talc. Ordinary fireproof safes are made in many sizes and styles, with single or double doors, interior arrangements as required, etc. (Figs. 1 and 2).

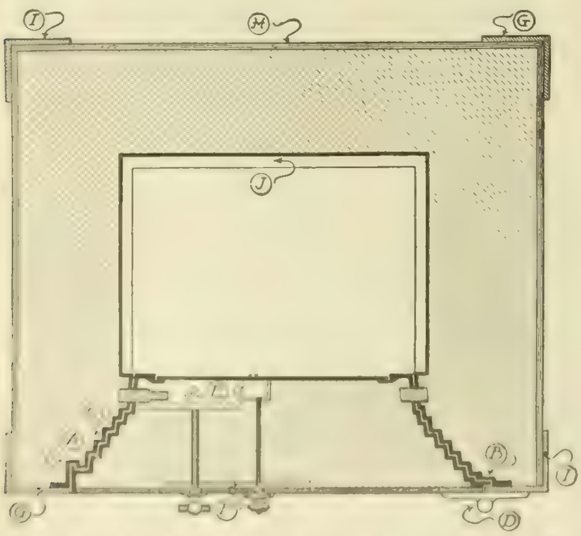


FIG. 1. CROSS SECTION OF YORK FIREPROOF SAFE

[illegible] E, continuous vertical projecting bolt or flange on hinge side of door, holding door firmly in place. C, [illegible] J, inside case or lining, made of light sheet iron and wood, wood being a non-conductor of heat when air is removed.

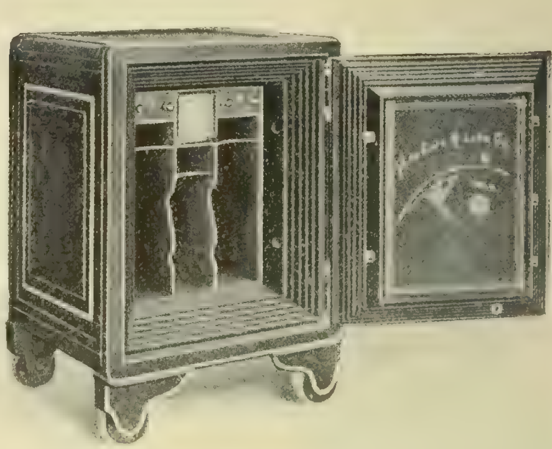


FIG. 2. SEVEN-FLANGE, SINGLE DOOR, FIREPROOF SAFE

Vaults and Vault Doors.

We build many styles of vaults and vault doors, from the simplest and cheapest to the heaviest and most expensive. Plans and specifications furnished free of cost. Send exact requirements, measurements of ground space, elevation and position in building, etc., for full information and cost of erection (Figs. 3 and 4).

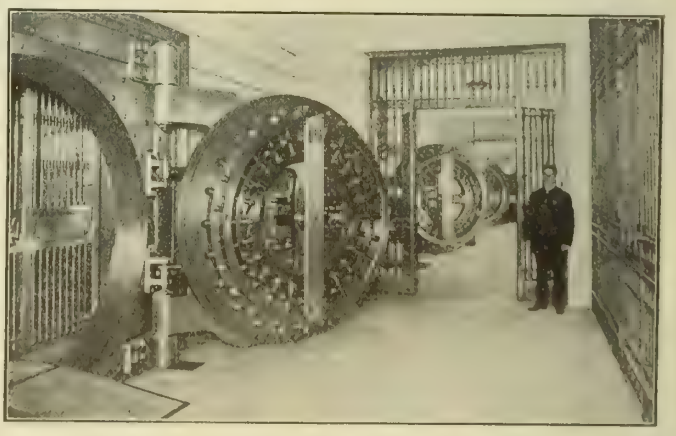


FIG. 3. VAULT DOORS, AMERICAN SAVINGS AND TRUST CO., CHICAGO, ILL.

FIG. 4. INTERIOR OF NEW YORK STOCK EXCHANGE VAULT

AMERICAN MAILING DEVICE CORPORATION

Manufacturers of Non-Clogging Mail Chutes

EXECUTIVE OFFICES
103 Park Avenue
NEW YORK, N. Y.

TELEPHONE, MURRAY HILL 6827

FACTORY
Marcy Avenue and Walton Street
BROOKLYN, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 231 Insurance Exchange
ST. LOUIS, MO., 16th and O'Fallon Streets
ATLANTA, GA., Healey Building
SAN FRANCISCO, CAL., 320 California Street
DENVER, COLO., 1534 Blake Street
MINNEAPOLIS, MINN., Soo Line Building
SEATTLE, WASH., Globe Building
TACOMA, WASH., 1005 A Street
SPOKANE, WASH., 164 South Madison Street
LOS ANGELES, CAL., Higgins Building
PORTLAND, ORE., Portland Trust Building
WASHINGTON, D. C., 520 13th Street
BOSTON, MASS., 27 Purchase Street
PITTSBURGH, PA., First National Bank Building
KANSAS CITY, MO. 323 Reliance Building

Products.

MAIL CHUTES and MAIL BOXES for United States Free Collection Service for all classes of buildings.

Patents.

Owners of United States Patents for its products.

Authorization.

Use of the company's products authorized by special Act of Congress under the Rules and Regulations of the Post Office Department.

American Mailing System.

The only successful non-clogging mail chute manufactured.

Construction.

Made in one type only, of any required finish or color in solid bronze and planished steel.

Installation.

We furnish and install this equipment in any part of the world.

Boxes.

Made from a large stock of standard designs and special designs of architects.

Approvals.

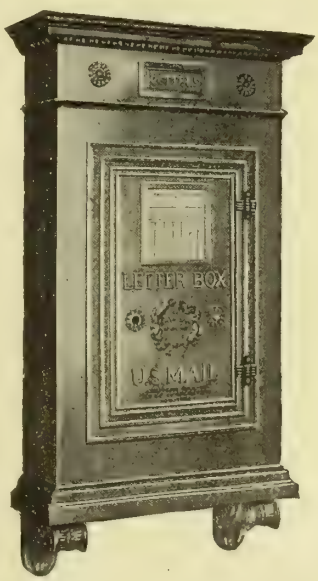
United States Post Office Department, Treasury Department, and Building Data League.

Prizes.

Gold Medal—Panama-Pacific Exposition.

First Prize — Northwest Building Material Exhibit, Minneapolis, Minn.

First Prize — Permanent Building Exhibit, Chicago, Ill.



STANDARD LETTER BOX

NON-CLOGGING MAIL CHUTE

ESTABLISHED 1883 INCORPORATED 1909

CUTLER MAIL CHUTE CO.

GENERAL OFFICES
Cutler Building
ROCHESTER, N. Y.
AGENCIES IN ALL PRINCIPAL CITIES

NEW YORK SHOP
27 Thames Street

FACTORY
Anderson Avenue
ROCHESTER, N. Y.

Products and Service.

Manufacturers of and Contractors for the "CUTLER PATENT MAILING SYSTEM," including MODELS "C," and "F" for Public Buildings, Hotels and Apartment Houses; U. S. MAIL CHUTES, PRIVATE MAIL CHUTES and U. S. MAIL BOXES.

Patents and Authorization.

The Cutler Mail Chutes are protected by United States and Foreign patents and their use is authorized by formal order of the Postmaster General under the provision of an act of Congress. They are a part of the receiving box, under the exclusive care and custody of the Post Office Department. Letters deposited therein are legally "mailed."

NOTE—It should be remembered that the basic patents on Mail Chutes are owned by this company; and that after litigation in the United States Circuit Court for the Eastern District of Missouri, an injunction order was issued holding that all the claims sued on, under Patent No. 758,128, were valid and infringed. Copies of the injunction order in this case, and Department Regulations in full, will be furnished to architects on request.

Infringers are being prosecuted.

Cutler Mailing System.

This System is now perfected, as developed in more than thirty years of successful business. It consists, primarily, of Mail Chutes extending vertically through building (singly or in pairs) and discharging into Mail Boxes in ground story; such boxes must be not further than fifty feet from main entrance (Post Office Department Regulations).

Interior of Chutes must be readily accessible to authorized persons, this requirement being covered in the two models by somewhat different means (Post Office Department Regulations).

Model "C"—This model is designed for highest-grade installations and is more heavily built than Model "F." Entire length is provided with plate-glazed front doors, hinged at one side and secured at the other by simple and effective locks. Experience has proven this model less liable to accident than any other type of Chute construction.

Model "F"—In this model, the plate glass front panels are set into Chute channel so that edges are covered by a protecting flange; this makes tampering with Chute impossible. Panel fronts are locked at ends, a single lock controlling two sections in which an ordinary story is divided. This permits a person, standing on floor and using official key, to remove entire front in one operation.

Panels are interchangeable, size for size, and locks are of Yale manufacture, especially designed for the Cutler system.

Both models are fitted with hooded mailing pockets, opening or closing of which is controlled by simple movement of a concealed lever, operated from inside when front has been opened.

Mail Box Designs—For work of the usual character, Cutler stock Mail Boxes (see illustrations on next page) are entirely satisfactory and suitable for the average building. These boxes are finished in electro-bronze plated steel, unless specially designated to be of bronze. Cast bronze work of highest order is also supplied from special designs furnished by this Company, and subject to the architect's approval, or from the architect's own special design.

FIG. 1. MODEL "C"

FIG. 2. MODEL "F"

Semi-Special Work—Where design of a building demands special consideration in its equipment, and expense of special design and modeling is too great, special Mail Boxes are made at only slightly increased cost over stock work by the use of stock patterns. Designs for such work will be submitted on request.

Finishes.

Black Finish—Where it is desirable to match bower-barff finish (which cannot be applied to sheet metal) black finish is furnished, using steel mouldings and Swedish iron fittings with an improved rustless black finish. This finish is somewhat less expensive than the usual or standard finish, in which the Chute body is black japanned and baked and trimmings are of real bronze. The Mail Box usually furnished for small office buildings or for hotels or apartment houses, where amount of mail is not large, is stock design 1165; where larger capacity is required, stock designs 1570 or 1820 may be used.

Bronze Finish—For those large buildings where elegance as well as the highest mechanical excellence is required, the Mail Chutes are made with body of Chute as well as fittings, of bronze, and, under such conditions, something very special in the way of a Mail Box is usually called for. This all bronze finish is frequently used with a bronze Box in ground story, with standard finish in stories above.

Continued on next page

Stock Design 2110
In dead black only
Size over all, 36" x 21" x 11"

Stock Design 1165
In bronze or electro-bronze
Size over all, 36" x 21½" x 11¼"

Stock Design 1635
Bronze only
Size over all, exclusive of consoles, 33" x 21" x 9½"

Stock Design 1590
Electro-bronze or bronze
Size over all, exclusive of consoles, 36" x 21½" x 9¾"

FIG. 3. SPECIAL U. S. MAIL BOXES

Installation.

Entire work of installation is done by the manufacturers to secure best results and exact compliance with regulations of the Post Office Department, in respect of which the company is under bond; and much trouble and expense are avoided by consulting with regard to any special conditions in advance of determining location of apparatus and the exact form of specification.

Preparatory Work—This consists of finishing openings in floors, furnishing and erecting of supports for Mail Chute and Box. Openings in floors, especially in concrete and arch construction, should, however, also be provided for in general contract; rough openings 5½ by 11 inches for Model "C" and 6 by 12 inches for Model "F" are required. The general contract should also cover patching and repairing of plaster which is not included in Mail Chute contract. Full-size detail drawings of various forms of preparatory work with steel angles or wood casing (Fig. 4) will be furnished on application without charge, and also specification forms for each type.

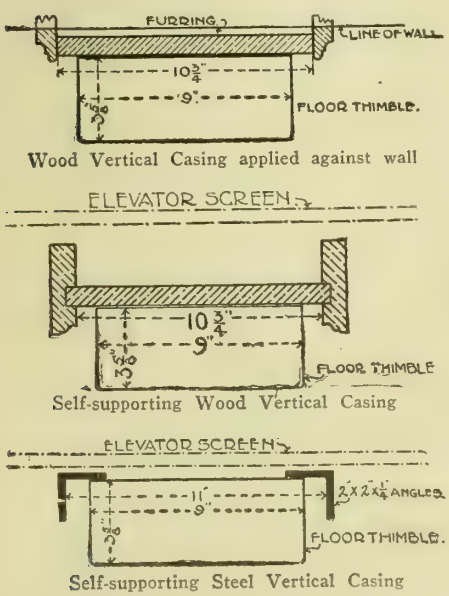


FIG. 4. HORIZONTAL SECTIONS SHOWING TYPES OF VERTICAL CASING CONSTRUCTION

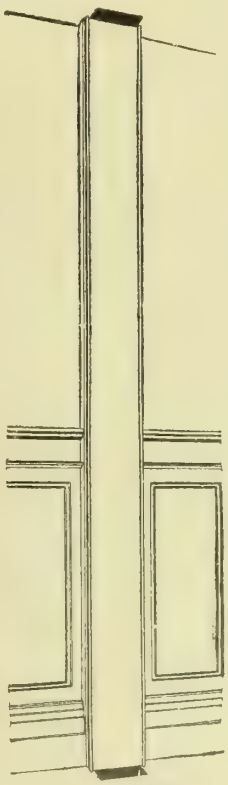


FIG. 5. PREPARATORY WORK COMPLETE

When Mail Chute is to be located in front of an elevator screen (it cannot be placed behind it—Post Office Department Regulations), preparatory work must stand rigidly and be fastened only at floor and ceiling. In this position the casing, if wood, has side pieces and is in section like an "I" beam; or, preferably, it is constructed of steel angles (see Fig. 4). Space required to receive standard Mail Box under ordinary conditions is twenty-two inches in width and thirty-seven inches in height for Design 1165.

Co-operation.

The designing and estimating department will furnish estimating blanks, specification forms, working details and other information which prospective users of Cutler Mail Chutes may desire, sending an expert for conference, or replying promptly to any inquiries by mail.

References.

The Cutler Mail Chutes have been in use for over thirty years and are now to be found in all important high-class office buildings, hotels and apartment houses in the principal cities of the United States and Canada, England, Sandwich Islands, Transvaal, Cape Town and the Argentine Republic.

Notable installations of recent date are the new Equitable Building, Bankers Trust Co., City Investing, Fifth Avenue Building, Metropolitan Tower, Singer Building, Woolworth Building, and very many others in New York City; Continental-Commercial Bank Building, Chicago; L. C. Smith Building, Seattle; Union Central, Cincinnati; Washington Trust, Los Angeles; Monward Building, St. Louis; Healey Building, Atlanta; U. S. Custom House, Boston; First National Soo Line, Minneapolis; Hobart Building, San Francisco, and many hundred more.

DETROIT SHOW CASE CO.

MANUFACTURERS OF
Show Cases and Interior Store Construction
DETROIT, MICH.

Products.

ALL GLASS and WOOD FRAME SHOW CASES, for every purpose; JEWELERS' WALL CASES; CIGAR STORE FIXTURES; DRUGGISTS' FIXTURES; COUNTER CASES; TRIPLICATE and CHEVAL MIRRORS; NOVELTY CASES; PLATE GLASS DISPLAY TABLES, etc.

TRADE-MARK

For Store Front Construction, see our name in General Index.

Description.

These products have been on the market during many years under the "Silent Salesman" trade-mark, which means the *very best quality* in store fixtures and show cases. The material is carefully selected and put together in the most workmanlike manner.

Guarantee—The quality of all the above mentioned high grade fixtures is absolutely *guaranteed.*

Special Catalogues—The "Silent Salesman" line of high-grade show cases and other products are individually illustrated and described in special catalogues and folders, any one or more of which will be sent on request.

Illustrations.

The interior of store of Levy Bros. Dry Goods Co., Houston, Tex., is a fair sample of work executed by us in show case construction to meet the plans and specifications of the architect.

Requests for details as to arrangements, rearrangements or remodeling of interior store construction supplied free of charge by our estimating department.

We devote special attention to drug store fixtures, cigar store fixtures and jewelers' fixtures.

A Few References.

May Co., Denver, Colo.
Sperry & Hutchinson Co., New York, N. Y.
United Cigar Stores, Detroit, Mich.
Kline's, Detroit, Mich.
J. L. Hudson Co., Detroit, Mich.
Carson, Pirie, Scott & Co., Chicago, Ill.
Elliott-Taylor-Wooltenden Co., Detroit, Mich.
And many others.

INTERIOR OF STORE OF LEVY BROS. DRY GOODS CO., HOUSTON, TEX.
TAUSSIG & FLESCH, Architects, Chicago, Ill.

NEWMAN CLOCK COMPANY

ESTABLISHED 1872

Manufacturers of Watchman's Clocks

178 Fulton Street
NEW YORK, N. Y.

565 W. Washington Boulevard
CHICAGO, ILL.

ASSOCIATED COMPANIES
NEWMAN-MUNDERLOH CLOCK CO., LTD., 51 Victoria Square, MONTREAL, CANADA
NEWMAN CLOCK CO., LTD., 2 Whitechapel Road, LONDON, ENGLAND
NEW CIE. DES MONTRES DE CONTROLE, SOC. ANONYME, GENÈVE, SUISSE

Products and Services.

WATCHMAN'S PORTABLE CLOCKS for Office Buildings, Hotels, Hospitals, Stores and Factory Plants.

Manufacturers of Watchman's Clocks for *forty years.*

Our extensive experience in Watch Clock Installations is at the service of architects. On request we furnish detail specifications of installations to meet requirements of any particular proposal.

Description.

Outfits complete consist of watch, leather pouch with carrying strap, key boxes or stations with marking keys attached, patrol box, seals and one-year's supply of dials. Standard model key boxes furnished unless otherwise specified.

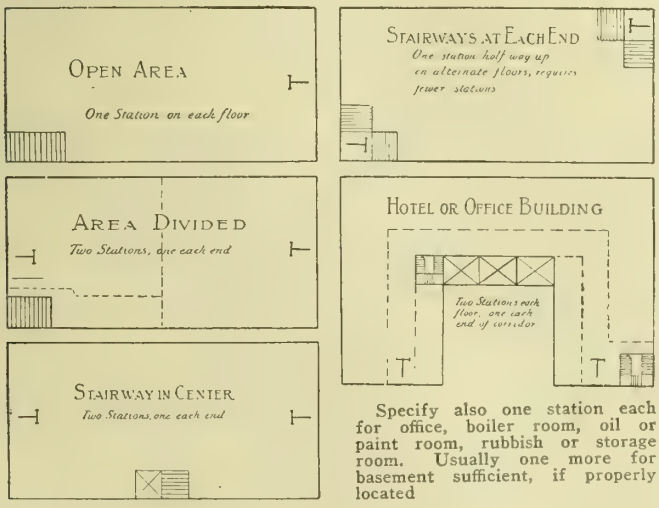
Regular sizes with capacities of 6, 9, 12, 16, 25, and 35 stations.

Larger sizes to meet requirements.

GRILLE MODEL

Advantages.

Provides an accurate check upon watchman. Inefficiency at once detected. Tampering impossible without detection. Carries highest rebate in insurance rates allowed for this class of devise. Initial cost low. Maintenance slight. Eliminates wiring and electrical troubles.



Specify also one station each for office, boiler room, oil or paint room, rubbish or storage room. Usually one more for basement sufficient, if properly located

TYPICAL FLOOR PLANS SHOWING LOCATIONS OF STATIONS

Underwriters' Approval.

The Newman System is approved by the National Fire Protection Association for use under the rules and requirements of the National Board of Fire Underwriters, and by all Mutuals. It reduces fire insurance rates.

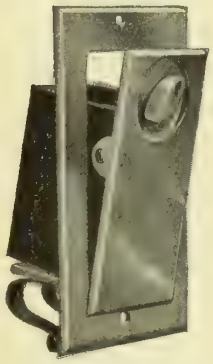
Specification.

To specify, write as follows:

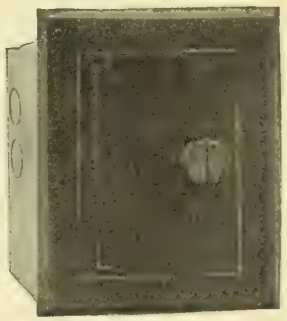
Furnish .... Newman Grille Model Watchman's Clock[s] having a capacity of .... stations with .... key boxes .... model. Install at locations as marked on plans.

STANDARD MODEL BOX
Lift Cover, Iron, with aluminum finish

P. R. R. MODEL BOX WITH BACK PLATE
Iron, with bronzed finish



RITZ-CARLTON MODEL BOX, FLUSH TYPE



TEMPLE MODEL BOX, FLUSH TYPE

Key Boxes finished to match hardware trimmings

REPRESENTATIVE INSTALLATIONS

Aeolian Hall, New York
Architects Building, New York
J. P. Morgan & Co., Bank Building, New York
Ritz-Carlton Hotel, New York
Underwriters' Building, New York
Underwriters' Salvage Corps Building, New York
Pennsylvania Terminal, New York
Pan-American Union (Carnegie), Washington
United States Naval Observatory, Washington
Blackstone Hotel, Chicago
La Salle Hotel, Chicago
Underwriters' Laboratories, Chicago
Pennsylvania State Capitol, Harrisburg
Bank of Toronto, Toronto, Can.
Bank of England, London, Eng.
Utah State Capitol, Salt Lake City
Oklahoma State Capitol, Oklahoma City
Missouri State Capitol, Jefferson City

THE E. HOWARD CLOCK CO.

373 Washington Street
BOSTON, MASS.
TELEPHONE, Main 643

NEW YORK OFFICE: 67 MAIDEN LANE
Telephone, 3148 John

CHICAGO OFFICE: 31 NORTH STATE STREET
Telephone Connection

Products.

Makers of Tower Clocks; Magneto Watchman Clocks; Electric Clock Systems for Public Buildings; Program Clocks for ringing bells at stated intervals; Post and Bracket Clocks; Astronomical Clocks for Observatories; Westminster Chiming Clocks for Private Estates; Library, Church and Banking Room Clocks; Hall, School and Office Clocks, and specially designed Clocks from Architects' drawings.

Tower Clocks.

Description and Materials—Our clocks are made of the highest grade materials, the wheels of hard hammered brass with teeth accurately cut, and arbors and pinions of best open-hearth steel. The escapements are the Graham Dead Beat or the Denison Gravity. The frame and supports are of cast iron and bearings of bronze metal. The striking part is a repeater, making it impossible for the clock to strike wrong. A simple device is provided, so that the large hands on the tower can be easily and accurately set at the clock movement. The pendulum rod is of wood, or of iron compensated with zinc. Clocks may be made to strike the halves and quarters of the hour, either on the same or on different bells from those on which the hours are struck.

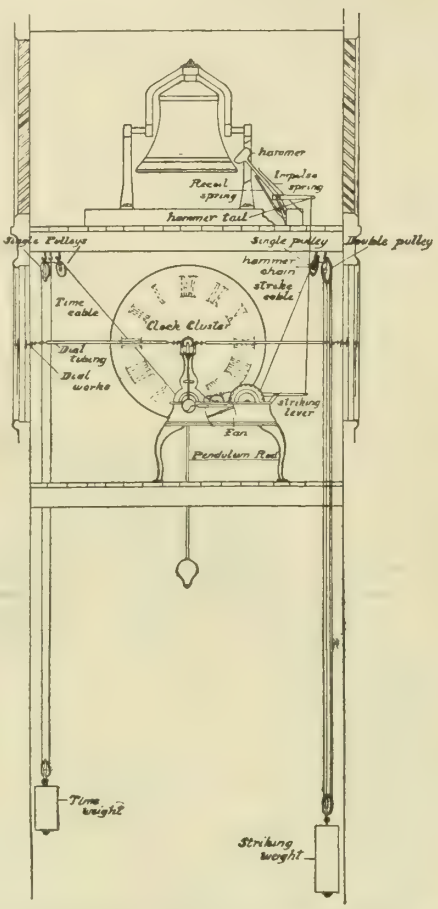


DIAGRAM SHOWING RECOMMENDED RELATIVE POSITION IN TOWER CLOCKS OF DIAL, CLOCK MECHANISM AND BELL

CUPOLA OF CITY HALL, PORTLAND, ME.
Carrère & Hastings, New York, Architects
John Calvin Stevens and John Howard Stevens, Portland, Associate Architects

Installation.

We contract for these clocks delivered and put up, as we prefer to do the work ourselves, having trained men for that purpose.

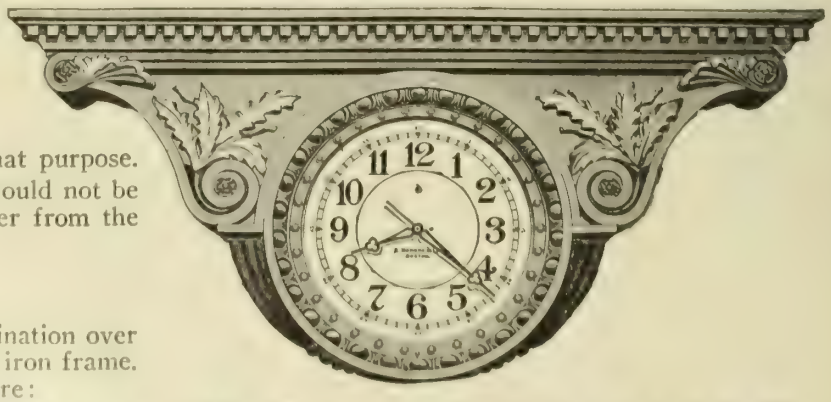
Caution—The diameter of the dial should not be less than a tenth of the height of its center from the ground.

Illuminated Dials.

We recommend that all dials for illumination over 36 inches in diameter be made with skeleton iron frame.

The advantages of such construction are:

First—Should any one section of the glass become broken it can be replaced at small cost, and any accident that would break a section would, of course, if a whole plate had been used, destroy the entire dial.



CLOCK NO. 141. FOR GALLERIES, BANK VAULTS, ETC.
Dial 24 inches; length, 7 feet 2 inches; height, 38 inches.
May be used as a hanging clock affixed to the ceiling, a ceiling beam or under a gallery railing, or may be reversed, to be set on a partition bank vault, or any other such structural feature

Continued on next page

Second—When figures are painted on the glass or fastened to it with cement they are quite short-lived, because storms and extremes of heat and cold soon wear them off; and when they are fastened on by drilling holes in the glass the glass is very materially weakened and will break much easier. On our sectional dials when figures and hands need repainting it is only necessary to remove one or more of the section glasses.

Stock patterns for illuminated dials advance in sizes by multiples of six inches, commencing at three feet six inches diameter.

Automatic Illumination Regulators.

We make in several sizes Automatic Illumination Regulators, for governing gas jets or electric lights; time for lighting and extinguishing being made adjustable to conform to varying hours of darkness.

Patent Self-Oiling Escape Wheel.

Once filled with oil, it does not require re-oiling for four or five years; whereas, in the case of ordinary form of escape wheel, the oil dries up or becomes gummy unless wheel is frequently oiled, thereby causing a great increase in the friction, a change in the rating of the clock, and injury to the pallets by cutting.

Accurate and Long-Lived.

Our clocks do not vary more than twenty to thirty seconds in a month. A first-class clock, properly made, will last fifty years with little or no expense. Lawrence Hall Tower, at Toronto, Canada, has a clock made by us that has been running for sixty years and is still in excellent condition.

Co-operative Service.

We are ready at all times to conform to the ideas of the purchaser, and to submit special designs to meet requirements.

Cost.

We have prepared a question blank which, when properly filled out, will enable us to give quickly and accurately the desired quotation.

Gallery, Partition, Bank, Vault and Ceiling Clocks.

These can be furnished single or double faced. Cases are of oak, mahogany, walnut or other wood to match interior trim.

Dials may be of fine marble or onyx; of metal finished in gold, silver, and bronze; of glass, or of carved wood, and are always in harmony with, and appropriate to, the design and surroundings. Figures on dials may be painted on or made in metal and attached. They may be finished in gold or oxidized silver, various bronzes or steel blue.

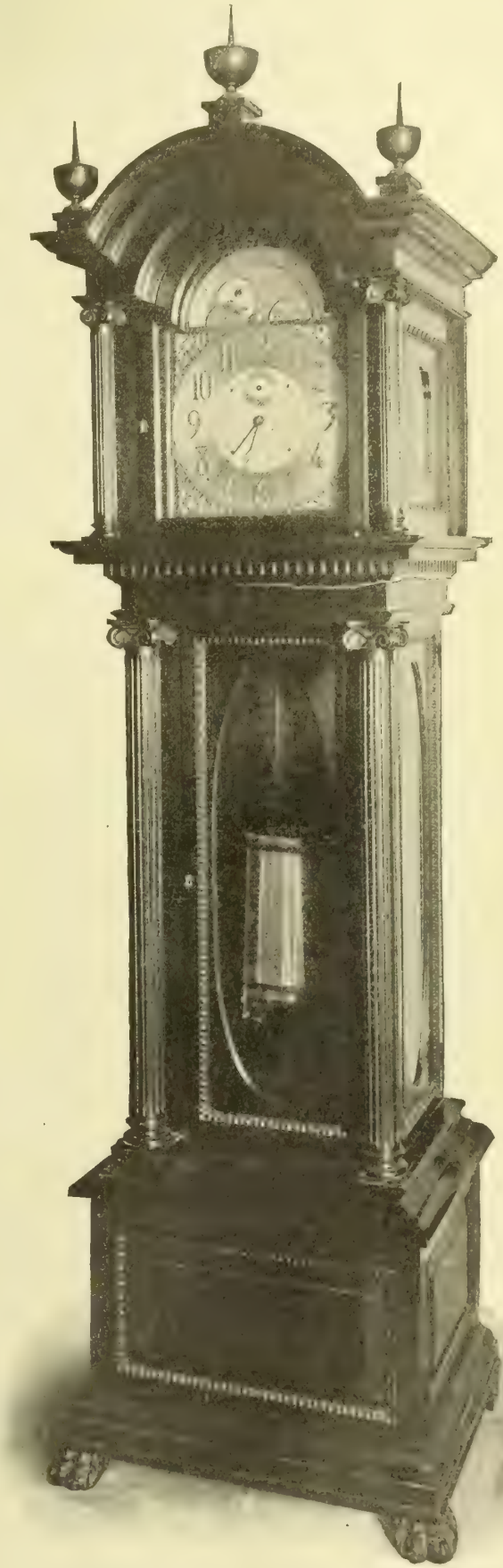
Guarantee.

We warrant our clocks to be first-class in every respect and free from all original defects, for five years.

References.

Thousands of our clocks are in use all over the United States, in municipal, public and private buildings. Among others, we supplied:

Geo. W. Vanderbilt's Mansion at Biltmore, a Tower Clock and twenty-two secondary Electric Clocks; the Prudential Insurance Company's Building, Newark, N. J., a Master Clock and thirty-six secondary Electric Clocks; the Lick Observatory's Astronomical Regulator; the New York Life Insurance Company's Building, New York, a four-dial Tower Clock and secondary Electric Clocks throughout the Building; the Union Depot and Ferry House, San Francisco, one of the largest four-dial Tower Clocks in the United States.



MASTER CLOCK IN HOTEL McALPIN, NEW YORK
Operates 62 clocks scattered through this large hotel. Beautiful Hall Clock Case suggests a club or a fine residence

SETH THOMAS CLOCK COMPANY

ESTABLISHED 1813

215 W. Randolph Street
CHICAGO, ILL.

15 Maiden Lane
NEW YORK, N. Y.
TELEPHONE, CORTLAND 8274

140 Geary Street
SAN FRANCISCO, CAL.

104 High Holborn
LONDON, ENG.

FACTORIES
THOMASTON, CONN.

Products.

Manufacturers of TOWER CLOCKS of every description for Public Buildings, Churches, Factories, Schools, Private Estates, etc.; ELECTRIC SECONDARY CLOCK SYSTEMS; SELF-WINDING CLOCKS.

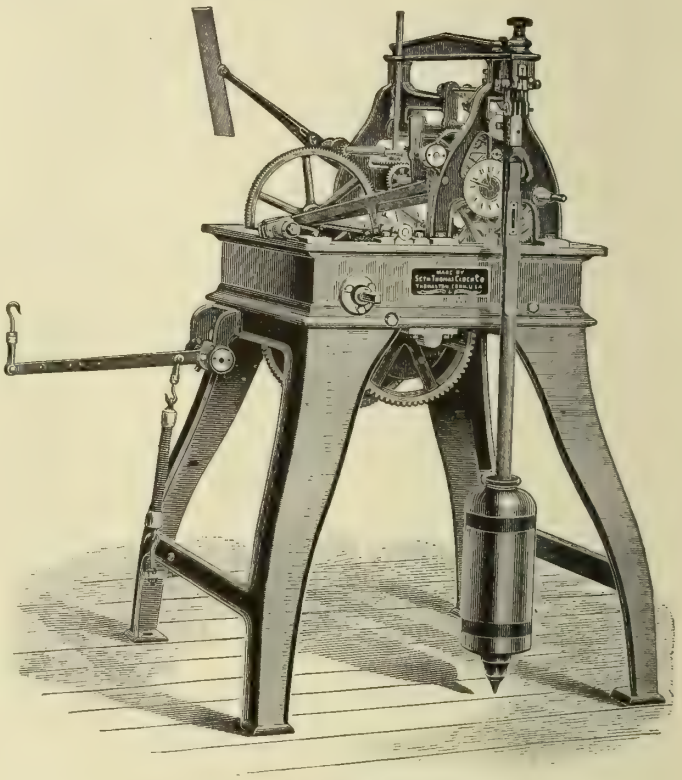
Also MARBLE DIAL CLOCKS for Banks, Libraries, Halls, etc.; MARINE CHRONOMETERS and SHIPS' BELL CLOCKS for Marine Service and Engine Rooms.

HOUSE CLOCKS for every purpose; REGULATORS and CALENDAR CLOCKS for Offices, Hotels, Stables, etc.; SIDEWALK and BRACKET CLOCKS; PRECISION CLOCKS for Observatories; SPECIALLY DESIGNED CLOCKS.

Tower Clocks.

These clocks are constructed upon the rules of the highest authorities in horology, and are made as timepieces only, or to strike the hours or half hours; also the quarters on two or three bells, and the Westminster Chime on four or five bells; or the "Angelus."

In the case of a time clock it is advisable that the movement be placed either opposite or below the dials. The best arrangement in the case of a striking movement is to place the movement *below* the bell where there is a minimum of vibration.



TOWER CLOCK STRIKE MOVEMENT

Description.

The mechanism is held in place by a cast-iron frame. The wheels are of bronze, pinions of steel (hardened) and gears machine cut. On the clock is a small dial to indicate the position of the hands on the outside dial (s); also, a seconds' dial for close regulation and comparison purposes; a safety catch to prevent the fall and breakage of the pendulum rod should the suspension spring break.

Our movements are fitted with either Graham's Dead Beat, the pendulum rod of mahogany, or Dennison's Double Three-Legged Gravity Escapement, the pendulum of zinc and steel to insure accurate compensation.

Silencing Devices.

We can fit an automatic attachment which will silence and release the striking train for whatever hours desired; also, a hand switch to silence the clock for special occasions.

Dials.

To look well and show plainly, a dial should be one foot in diameter for every ten feet of elevation, and be set out flush with or close to the line of building or tower.

Wood—The boards are tongued and grooved, one-half inch thick, in two layers, with grain crossed to prevent shrinkage; the surface is painted and smalted; the numerals and minute marks are of type metal (not wood) and, together with hands, are covered with the best of gold leaf or painted black.

Iron—These are of heavy galvanized iron, with a wood backing one and one half inches thick. The finish and numerals are the same as for wood dials.

Skeleton Metal—These may be varied in design and made of different metals. They are made with Arabic figures (minute dots omitted) or Roman numerals, placed not more than two or three inches from the face of the wall, for a background is required to show to advantage. The color of the dials and hands should be considered in connection with the color of the wall, with a view of obtaining the contrast desired.

Whole Plate—These may be furnished with safety up to four feet six inches in diameter. The numerals and minute marks are lettered on the surface in black or gold leaf of a durable finish.

Continued on next page

Sectional Dials—The openings for this design should be made in the multiple of six inches. The numerals, diamonds and minute marks are made of iron or bronze; the frame rebated in the back to receive the glass and fastened together with brass clamps; the joints filled with lead, making the dials water-tight when installed. The numerals, etc., are painted black and smalted or covered with gold leaf.

Glass.

The glass is three eighths of an inch thick, ground on both sides. For the sectional iron pattern the center light and outer segments are of the same thickness and quality throughout, which insures an even diffusion of the light.

Automatic Light Switch.

Our automatic light switch is controlled by the Tower Clock which will turn on and off the lights used to illuminate the dials, and is adjustable to suit the different seasons.

Self-winding Attachment.

Where the fall for the weights is limited, or where it is desired to have an automatic equipment, we furnish motors to wind the weights.

Co-operative Service.

We will gladly mail our Tower Clock Catalogue, which illustrates many styles, gives dimensions, weights, and shows plans for installing clocks with and without bells. It gives many valuable suggestions which are of importance to the architect when drawing plans for a building in which a clock is to be installed.

We shall be pleased to enter into correspondence with any one, using our one hundred years' experience to assist the buyer to secure a clock which shall be suited for his purpose.

Estimates.

As each clock is made to order, it is impossible to issue a price list. It is, therefore, necessary for us to know whether it is a time or strike movement, the number and diameter of the dials and what style of dials is required.

Guarantee.

Our Tower Clocks are guaranteed to be free from mechanical defects for five years; when fitted with Graham's Escapement, to run within a variation of thirty seconds per month, or with Dennison's Double Three-Legged Gravity, ten seconds per month, if properly cared for.

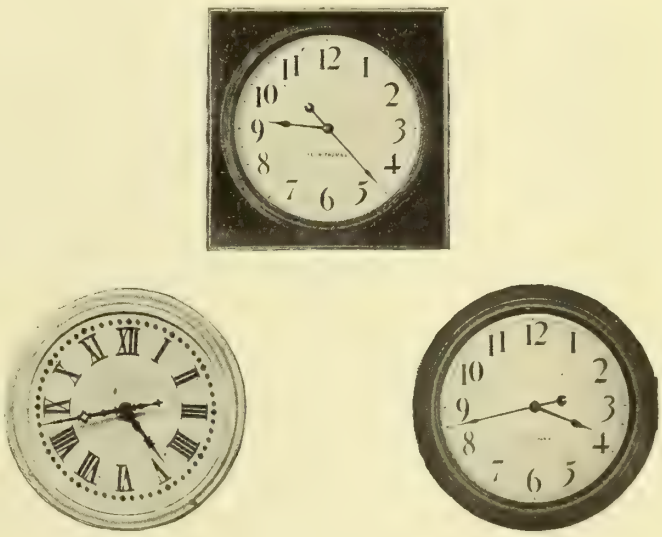
Secondary Clock Systems.

Master Clock—We have many designs of the wall and hall clock cases. The circuit closers are of the single arm oscillating type, which gives the desired rubbing and self-cleaning effect without retarding the movement, thus leaving it with a free running train regardless of whether the secondaries are operated or not. A Tower Clock can also be used as a Master Clock. All Master Clocks can be self-winding.

Secondary Movements—Our secondary is positively locked against disturbance or vibration, making it an impossibility for the hands to move except by the impulse sent out by the Master Clock or operated from the control board. It is not affected by temperature changes, nor does it require oiling.

The plates are of brass nickel-plated, with steel cut pinions. The magnets are silk wound and any residual magnetism is provided for by a fixed magnetic gap. The discharge from the magnet coils is cared for by a high-resistance, non-inductive coil, shunt-connected.

Secondary Cases—The wood cases are made to match the interior woodwork, either round or square. The dials for these designs range from eight to thirty inches. The cases open from the front so that the mechanism is easy of access.



DESIGNS OF SECONDARY CLOCKS

Special Designs.

We make a specialty of constructing cases from architects' designs.

References.

Our Tower Clocks have received the highest premiums and awards at every exposition in this country and in Europe where we have competed. The many thousands throughout this country testify as to their reliability.

The largest clock in the world was made by us for Colgate & Co., Jersey City, N. J.; four dials twenty-four feet in diameter for the Bromo Seltzer Building, Baltimore, Md. Others in prominent buildings, namely: New York City Hall, N. Y.; Independence Hall, Philadelphia, Pa.; Nassau Hall, Princeton, N. J.; City Hall, Lowell, Mass.; Court House, Fort Worth, Tex.; Elgin Watch Factory, Elgin, Ill.; Great Northern R. R. Depot, Spokane, Wash.; Daniels & Fisher Building, Denver, Colo.; Maryland Casualty Co., Baltimore, Md.

TIME SYSTEMS COMPANY

SOLE MANUFACTURERS OF

"Hahl" Automatic Time Systems

208 South La Salle Street
CHICAGO, ILL.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products and Services.

"Hahl" Automatic Time Systems, including Master Clocks, Secondary Clocks, Program Clocks, Time Recorders, Time Stamps, and Tower Clocks.

"Hahl" Time Systems will be installed by this Company, or shipped, with full directions, ready for installation by any local mechanic or electrician.

"Hahl" Automatic Time Systems.

The most essential feature of the "Hahl" Time Systems is the fact that the media of operation—air and gravity—are, in relation to the system, constant and invariable. The "Hahl" systems are not subject to eccentricities characteristic of electrically controlled devices; they are particularly preferable in this sense, when it is remembered that the slightest cessation from constant operation defeats the purposes of a time system.

Description of Systems.

The systems consist of the necessary number of secondary clocks (also, according to installation, of program clocks, time recorders, tower clocks and time stamps), located at desirable points throughout the building, and connected with a high-grade master clock by means of small air-conveying tubing. The clocks connected with the master clock are provided with small diaphragms. These diaphragms are alternately inflated by an impulse of air sent through the connecting tubing by a simple bellows and air release valve mechanism in the master clock, and are released by this mechanism at one minute intervals, the motive power being furnished by weights. Through proper gearing each action moves the perfectly balanced hands of the dials exactly one minute, with unfailing certainty. The tubing being open to the atmosphere every other minute, any disturbance from expansion or contraction due to changes of temperature is positively and effectively eliminated.

Advantages.

Because of their basic operating principle—air and gravity — the "Hahl" systems are positively the most accurate and dependable; they are the most easily maintained at lowest cost and at no real operating expense.

"Hahl" systems are not disturbed by vibration, jarring or dust. They have no delicate or intricate mechanism to get out of order, to fuss with or to worry about. No auxiliary apparatus or electric current is required. The care required for the operation of the entire system is no more than that required for one ordinary clock; i. e., weekly winding of the master clock.

Master Clock.

A highest grade clock with self-contained power device to operate the secondary system. Has dead-beat escapement, sixty-beat compensating pendulum and independent time train.

Secondary Clocks.

Movements rust-proof, noiseless, positive in action, and not disturbed by vibration, jarring or dust. Hands perfectly balanced. Dials four inches to five feet in diameter.

Program Clocks.

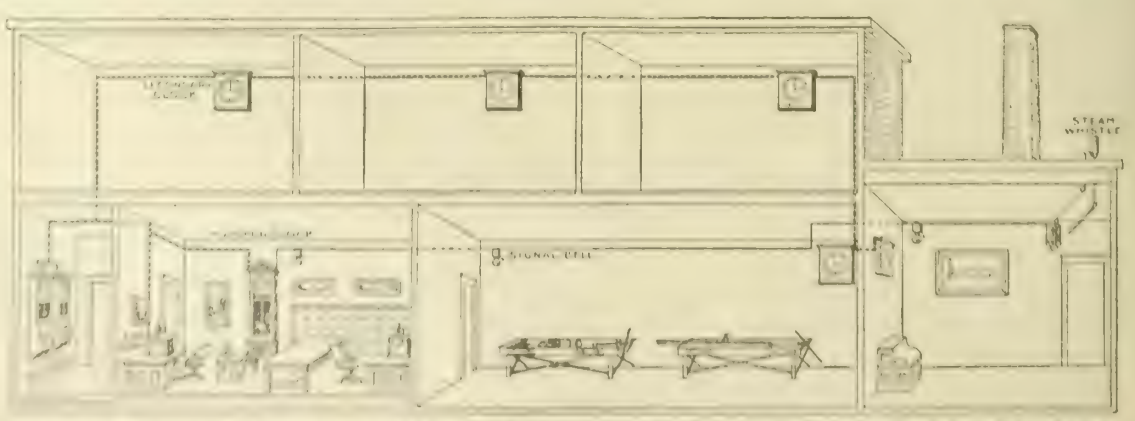
Program apparatus, gear-driven from master clock, is arranged to make contacts for ringing bells at one minute intervals, on one or more programs. The apparatus is attached to main frame of master clock and located in the same housing. Automatic silencer eliminates signals during any given hour or day of the week. The program is easily set, and permits changes at any time when required.

Tower Clocks.

Eight-day or motor-wound weight movements with "Hahl" automatic escapement synchronized by master clock. These movements are proof against vibration and weather conditions, and positive time-keeping is assured by the control of the master clock, which preferably is located in the lower and more substantial part of the building.

Time Stamps.

Prints and records automatically, the year, month, day, hour, minute, A.M. and P.M. Movement is contained in stationary part of the stamp and is not disturbed by hard usage. Stamp is operated through same tubing as clocks.



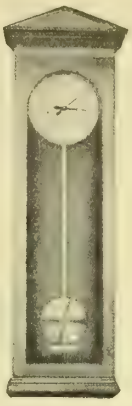
SECTIONAL PERSPECTIVE SHOWING SERVICE POSSIBILITIES OF "HAHL" AUTOMATIC TIME SYSTEMS

Sweet's Catalogue

Continued on next page

Master Clock Case, Style 1
8′ 5″ high
2′ 1″ wide
1′ 4″ deep
14″ dial
Quartered Oak or Birch Mahogany

Master Clock Case, Style 6
8′ 4″ high
2′ 2″ wide
1′ 5″ deep
Quartered Oak or Birch Mahogany



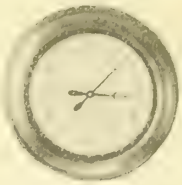
Master Clock Case, Style 601
5′ 5″ high
1′ 8¾″ wide
8¼″ deep
12″ dial
Quartered Oak or Mahogany

Master Clock Case, Style 881
2′ 11½″ high
1′ 4½″ wide
7½″ deep
10″ dial
Quartered Oak or Mahogany

Secondary Clock, Style 01

Front..	15½″	17½″	20½″	24″	29″ Sq.
Depth	4¼″	4¼″	4¼″	4¼″	6½″
Dial..	10″	12″	15″	18″	24″

Quartered Oak or Birch Mahogany



Secondary Clock, Style 02

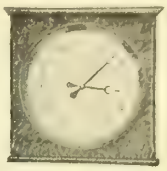
Case...	18″	20½″	23½″	24″	
Depth..	4¼″	4¼″	4¼″	4¼″	
Dial....	12″	15″	18″	24″	

Spun Brass; Black Copper sash and bezel

Secondary Clock, Style 03

Front..	10½″	13″	16½″	25½″ Sq.
Dial...	9″	12″	15″	24″

Recess 7″ x 7″ x 2½″ for flush White Italian Marble



Secondary Clock, Style 05

Height...	16″	17½″	20½″
Width....	15½″	17″	20″
Depth....	4½″	4½″	4½″
Dial.....	10″	12″	15″

Quartered Oak or Birch Mahogany

Secondary Clock Style 06

Case...	18″	21¼″	24″	29″
Depth..	4¼″	4¼″	4¼″	4¾″
Dial....	12″	15″	18″	24″

Quartered Oak or Birch Mahogany

Secondary Clock, Style 012

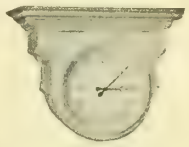
Case...	15″	19″	22″	29″
Depth..	1½″	1½″	1½″	2″
Dial....	12″	15″	18″	24″

Recess 7″ x 7″ x 2½″ for movement
Gun-metal

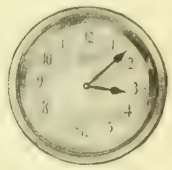
Secondary Clock, Style 015
Furnished for ceiling suspension or for mounting on coping. Also double faced

High.....	22″	25″
Wide.....	50½″	60″
Dial.....	15″	18″

Oak or Mahogany



Secondary Clock, Style 016
Double faced. Hardwood case, any finish
Base, 37″; height, 30″; circular part, 24″; dial, 18″; 12″ and 15″ dials in proportion



Secondary Clock, Style 08
Dial, 5½″, 7½″, 10″, 12″, 15″, 18″
Bezel brush brass. Projects ½″ from wall

STANDARD CLOCK DESIGNS FOR TIME SYSTEMS
Special designs made to order

Time Recorder Synchronizer.

Is attached to any make of time recorder or cost keeping machine. An ingenious device, which synchronizes these machines pneumatically with master clock in a thoroughly dependable manner.

Piping.

Piping for clocks run same as for gas or water, ¼-inch black wrought iron pipe for mains and ⅛-inch for branches. No return pipe. Flexible ¼-inch brass tubing used in finished buildings, and may also be pulled through conduit, same as wire.

Information Required in Ordering.

In ordering or requesting estimates please supply the following information together with sketch of building layout or blue-prints:

Size of building (area).....No. of floors.....
Is building old or new?.....
No. of clocks.....Time Recorder?.....Time Stamp?.....Program Device?.....

Note—Are all bells to be rung simultaneously, or do you require more than one circuit

Co-operative Service.

On receipt of particulars this organization will gladly and promptly co-operate with users of this book in the careful study of time system problems. Full layout for installation and specifications will be supplied free of charge, and without obligating inquirer in any way.

Installations.

From our list of thousands of installations we give the following list of firms for whom we have installed systems of from ten to two hundred clocks in capacity.

References.

U. S. Supreme Court Building, Washington, D. C.
Lee Rubber Co., Conshohocken, Pa.
Union Theological Seminary, New York, N. Y.
City Hospital, Blackwell's Island, New York, N. Y.
Habicht, Braun & Co., New York, N. Y.
American Bank Note Co., New York, N. Y.
Pawling School, Pawling, N. Y.
Middletown State Hospital, Middletown, N. Y.
Drum Hill High School, Peekskill, N. Y.
Industrial Arts School, Mt. Vernon, N. Y.
High School, Northampton, Pa.
Kensington Trust Co., Philadelphia, Pa.
Gilman Country School, Baltimore, Md.
Rennert Hotel, Baltimore, Md.
Postal Telegraph Co., Chicago, Ill.
Chicago Telephone Co., Chicago, Ill.
Sears, Roebuck & Co., Chicago, Ill.
Simonds Mfg. Co., Chicago, Ill.
W. C. Ritchie Co., Chicago, Ill.
Chas. Emmerich & Co., Chicago, Ill.
Western Bank Note & Engraving Co., Chicago, Ill
Sprague, Warner & Co., Chicago, Ill.
Heath & Milligan Mfg. Co., Chicago, Ill.
Mandel Brothers, Chicago, Ill.
Marshall Field & Co., Chicago, Ill.
Siegel, Cooper Co., Chicago, Ill.
Herpolsheimer Co., Grand Rapids, Mich.
Ohio National Bank, Columbus, Ohio
Blackstone Hotel, Chicago, Ill.
Maryland Hotel, St. Louis, Mo.
People's Gas Building, Chicago, Ill.
United States Post Office, Chicago, Ill.
Cook County Court House, Chicago, Ill.
Douglas County Court House, Omaha, Neb
Wisconsin State Capitol, Madison, Wis.
St. Luke's Hospital, Chicago, Ill.
State Normal School, Milwaukee, Wis.
State Normal School, De Kalb, Ill.
United States Post Office, Atlanta, Ga.

STROMBERG ELECTRIC COMPANY

Manufacturers of Electrically Operated Clock and Time Systems

606 South Michigan Avenue

CHICAGO, ILL.

BRANCH OFFICES OR REPRESENTATIVES AT ALL IMPORTANT CENTERS

Products.

"Stromberg" Automatic Electrical Time Recording Systems; Self-Winding Master and Secondary Clocks; Employees' (In and Out) Recorders; Cost-Keeping Recorders; Programme Instruments (electrically operated instruments for the blowing of whistles and the ringing of bells in sub-stations at stated times, for use in Schools, Factories, Institutions, etc.); Time Stamps, Relay Panels, etc.

Description.

A "Stromberg" Electric Time Recording System contemplates and includes the synchronous maintenance, on a single electrical circuit, of every possible device for the correct keeping and recording of time.

Master Clocks—The heart of the system is a "Stromberg" Master Clock, a high-grade mechanical timekeeper, located wherever convenient, but usually in the office or a place where the greatest freedom from vibration, dust and dirt is to be found.

The "Stromberg" Master Clock, at one minute intervals, transmits electrical impulses that operate any or all of the following devices when installed in Factory, Warehouse, Department Store, School, Hotel, or Institution of any character:

Secondary Clocks—From which time may be observed.

Programme Instruments—That automatically ring bells or blow whistles to announce the beginning and ending of working periods, or give signals for other purposes.

Cost-Keeping Recorders—Furnish records of time used in manufacturing operations.

Employees' Recorders—Make records of the exact time that employees arrive and depart.

General Office Stamps—Record time of receipt and dispatch of orders, letters, telegrams, etc.

A "Stromberg" System may operate one, or two, or an unlimited number of machines.

Master Clocks.

The "Stromberg" Master Clock is automatically wound by current from the same source that supplies the entire system of time recorders.

Self Winding Master Clock movements are furnished in "Stromberg" standard cases, or may be fitted to cases after Architect's or Period designs for either wall or floor purposes.

Secondary Clocks.

Simplicity and durability mark "Stromberg" Secondary Clocks, in whose construction the unique mechanical feature is a worm-gear that alone does all the work of the locking-dogs, pawls and springs that usually weaken and complicate secondary clock construction.

Movements are in standard stock cases, or can be fitted to any style of case desired.

In addition to Secondary Clocks in regular sizes, we manufacture what we believe to be the only successful Secondary Clocks of large sizes, above twenty-four inches and up to sixty inches in diameter.

Relay Panels.

With each installation of a "Stromberg" Time System we furnish one or more relays, the number depending upon the number of circuits and the amount of secondary apparatus connected. These relays insure perfect and continuous operation of the system, and are actuated by very small volumes of current controlled by contacts in the Master Clock.

All connections betwen the circuits, the Master Clock and the source of current, are made by us on the Relay Panel, which is furnished completely wired and ready for installation.

Programme Instruments.

These are used in connection with various manufacturing processes, and for the automatic operation of some of the special features of our Cost-Keeping Recorders and Employees' In and Out Recorders.

In school buildings these instruments are used for the automatic operation of signals to announce the times for beginning and ending of classes, recesses, etc., and for the automatic closing and opening of electric circuits for any purpose, at any time or times desired.

Cost-Keeping Recorders.

Installed in conjunction with any "Stromberg" System, operating cost neglible (ten to twenty-five cents annually per machine), and making an imprint of the exact time on any paper, card, or work ticket that may at any time be inserted in the machine.

Employees' In and Out Time Recorders.

For employees' use, making exact record of times of arrival and departure. Located at main entrance or at entrance to departments, usually the latter for greater efficiency. Employee records his own card for pay-roll period and pay-roll is prepared from record thereon.

General Office Time Stamps.

Applicable for use wherever a check on time is desired in the operation of any business, locating responsibility and adding to efficiency.

Co-operative Service.

We invite correspondence, and will be pleased to furnish estimates for these machines to meet any requirements. Our engineering department is at your service to furnish specifications, suggestions, and detailed information.

WALTHAM CLOCK COMPANY

A DEPARTMENT OF THE WALTHAM WATCH COMPANY

WALTHAM, MASS.

Products.

WALTHAM EIGHT-DAY CLOCKS, including:
MARBLE FACE BALCONY CLOCKS
MARBLE DIAL WALL CLOCKS
HALL CLOCKS
REGULATORS
BANJO OR WILLARD CLOCKS

Marble Face Balcony Clocks.

These clocks can be supplied with one or two dials, the two-dial clocks being used on partitions or suspended so the time can be seen from both directions. They can have either Arabic or Roman figures and fancy or plain hands. The dials can be from twenty to thirty-six inches in diameter. The clock lends itself to a variety of styles of mounting, elaborately carved wood or ornamental metal or marble to match the finish that is used in the building or room. For a one-dial clock, the minimum thickness is five inches; for a two-dial clock, ten and one half inches. All the parts that go into these clocks are manufactured in our own factory, and they represent the highest possible quality in workmanship and finish, and are fully guaranteed. These clocks can be wound from the face or back or from the bottom. They are pendulum clocks and operated by weight.

No. 2 No. 22 No. 22
EXAMPLES OF BALCONY AND SCREEN CLOCKS
Supplied in Mahogany, Oak or Special Woods, with Single or Double Dials

Hall Clocks.

Waltham hall clock movements are the best that are made in the world. Every part is fully up to Waltham standard of construction and finish, and is fully guaranteed. The cases are made only by high class manufacturers and maintain in every particular the traditions of the "Grandfather Clock." Our Waltham tubular chimes are unsurpassed for quality of tone. They will play the Whittington, Westminster, St. Michael and other chimes.

Hall clocks in cases that are shorter than ordinary, sometimes known as Bungalow Clocks, can be supplied, thus meeting the demand for a clock of this character for low studded rooms.

HALL CLOCK
CASE NO. 122
8 Ft. High

Marble Dial Wall Clocks.

Especially adapted for banks and hotels and public buildings. They are cased square, round and octagon, with or without the base section showing the pendulum.

Banjo or Willard Clocks.

These movements and cases are made of the very finest and highest grade of selected material, and there is offered a variety of designs from stock patterns, every one of which is in good taste.

Architects may submit special designs in clock cases. Modifications from stock patterns can be made when occasion requires.

26 Ins. Square, 5 Ins. Deep

3 Ft. High, 18 Ins. Wide
TWO STYLES OF MARBLE WALL CLOCKS

WILLARD CLOCK NO. 41
With either Mahogany or Gold Leaf Base

Regulators.

Waltham regulators have Dennison gravity or Graham dead beat escapement, run by weight and beat seconds. Every Waltham regulator embodies many special features not found in any other clocks, which make them extremely accurate and reliable.

WALTHAM REGULATOR NO. 13

Waltham Installations.

This Company has recently supplied clocks for:

The Middletown Public Library, Middletown, Ohio.
Waltham Trust Co., Waltham, Mass.
Exchange Club, Boston, Mass.
Cambridge Court House, Cambridge, Mass.
New Waltham Public Library, Waltham, Mass.
First National Bank, Honolulu.

Numerous Waltham clocks are constantly being installed by jewelers and other contractors, of which this Company can have no direct record; but wherever and by whomsoever installed, the Waltham clock has the standard Waltham guarantee of accuracy and long service.

McSHANE BELL FOUNDRY CO.

Bell Founders

ESTABLISHED 1856
BY HENRY McSHANE

MAIN OFFICE AND FOUNDRY
Harford Avenue and B. & O. R. R.
BALTIMORE, MD.

INCORPORATED 1904

BRANCH OFFICES
CHICAGO, ILL., 154 West Randolph Street
SAN FRANCISCO, CAL., 461 Market Street

Products.

Founders of CHURCH BELLS, CHIMES, PEAL and CHAPEL BELLS; FIRE-ALARM, COURT-HOUSE and TOWER-CLOCK BELLS; also, WESTMINSTER CLOCK CHIMES, and SCHOOLHOUSE BELLS.

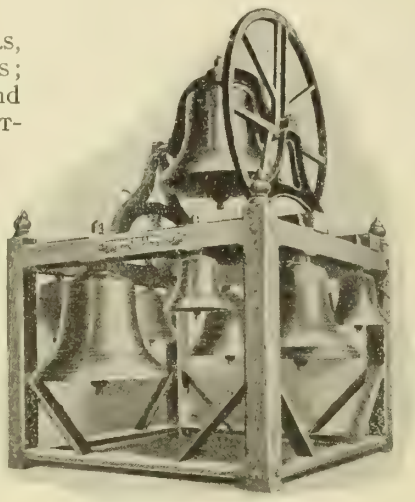
Specialties.

We specialize in the building of Musical Bells of the highest standard, Chimes for Churches and Tower Clocks.

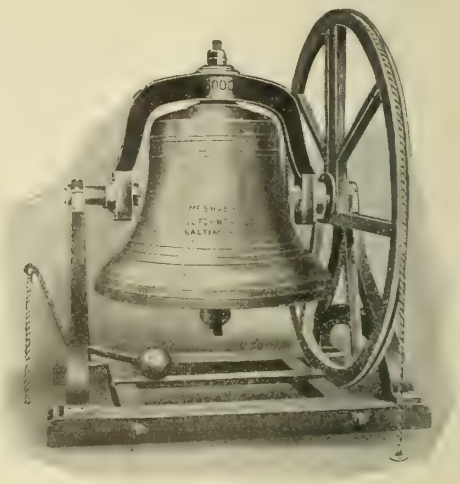
Description and Guarantee.

We make exclusively genuine Bell-Metal Composition Bells which are fully warranted and guaranteed to be satisfactory. We ship bells to all parts of the world and have cast nearly 40,000 in a half century.

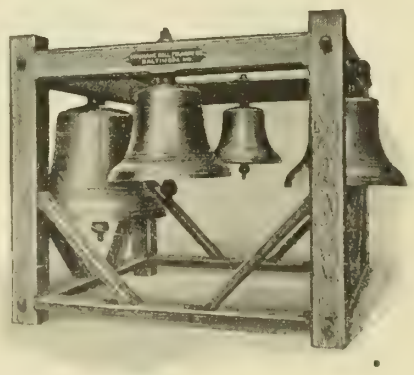
They can be installed by any first-class carpenter or contractor, full instructions being furnished for the purpose.



CHIME BELLS



CHURCH BELL



WESTMINSTER CLOCK CHIMES

FIRE-ALARM AND COURT-HOUSE BELL

Suggestions for Construction of Belfries.

Best results are obtained when floor of bell deck is on a level with comb of roof of the building.

Place windows, which should be 12 to 16 feet high, on a level with belfry floor and a ceiling just above top of windows. See that windows are as large and open as possible, and if louvers are used see that they be pitched so as not to obstruct entirely the carrying of the tone.

The average church bell measures from three to five feet across the mouth. Make provisions for admission of bell.

References.

A few churches recently supplied with Chimes:

Christ Protestant Episcopal Church, Baltimore, Md.
St. Paul's Protestant Episcopal Church, Chattanooga, Tenn.
Church of the Saviour, Philadelphia, Pa.
Taylor Street Presbyterian Church, Fort Worth, Tex.
St. Andrew's Presbyterian Church, Sydney, Nova Scotia
Westminster Presbyterian Church, Wilmington, Del.
First Methodist Episcopal Church, Decatur, Ill.
Zion Lutheran Church, Niagara Falls, N. Y.
St. Joseph's Church, Middletown, N. Y.
Chapel of St. Mary-of-the-Wood, St. Mary's, Ind.
Holy Trinity Cathedral, Kingston, Jamaica
Immaculate Conception Cathedral, Denver, Colo.
Corpus Christi Church, Baltimore, Md.
Church of the Good Shepherd, Rosemont, Pa.
Christ Protestant Episcopal Church, Niagara Falls, Can.
St. Giles' Presbyterian Church, Hamilton, Can.
St. Luke's Methodist Episcopal Church, Dubuque, Iowa

PEAL BELLS

Facilities.

The most modern facilities and new inventions for tempering and tuning bells secure absolute accuracy.

Co-operative Service.

Specifications and information supplied for memorials.

CHAPEL AND SCHOOL BELL

MENEELY BELL CO.

Manufacturers of Bells

TELEPHONE, CORTLAND 1749
177 Broadway
NEW YORK, N. Y.

22-26 River Street
TROY, N. Y.
TELEPHONE TROY 525

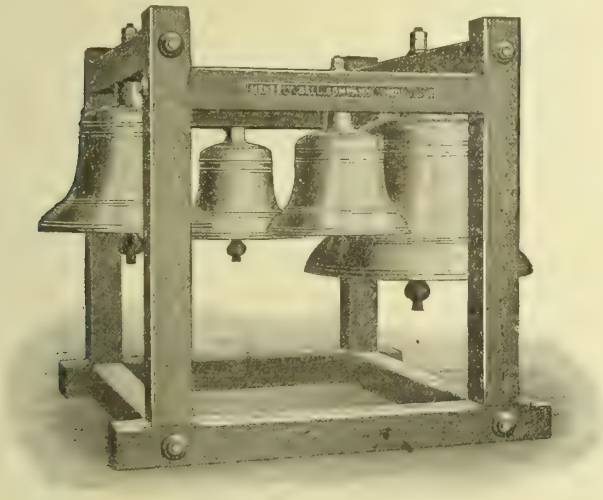
Products.

Manufacturers of BELLS: CHURCH, CHIME, PEAL, ANGELUS, SCHOOL, TOWER-CLOCK, WESTMINSTER, FIRE-ALARM, FOG-SIGNAL, SHIP, FARM, and other BELLS.

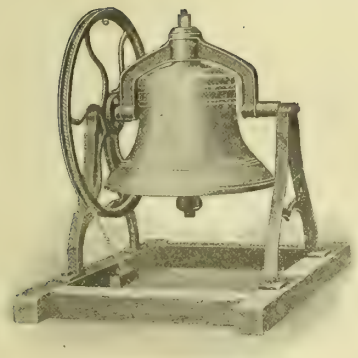
Illustrations.

The following illustrations show a few of the principal bells that we manufacture.

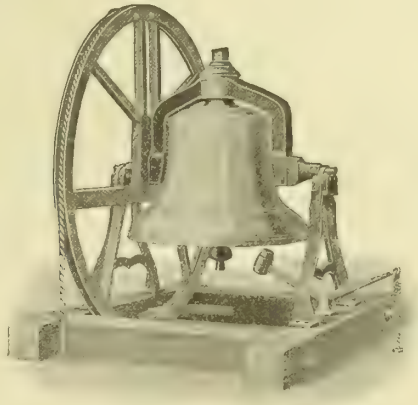
TOWER-CLOCK BELL



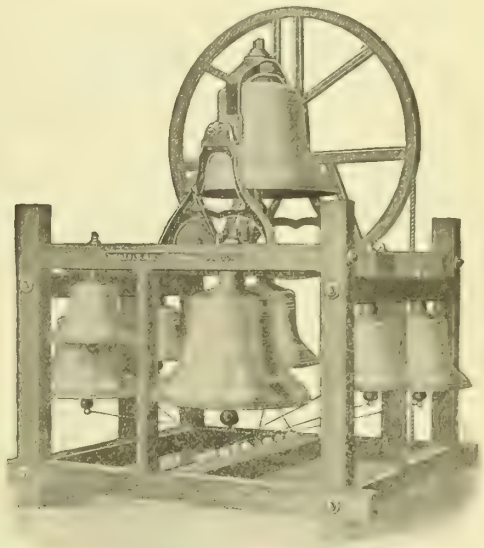
PEAL BELLS



SCHOOL BELL



CHURCH BELL



CHIME BELLS

Details of Church Bells.

WEIGHTS, TONES AND SIZES OF CHURCH BELLS

BELL			MOUNTINGS		BELL			MOUNTINGS	
Weight Lbs.	Medium Tone	Diameter Inches	Size of Frame Outside Ft. In. Ft. In.	Diameter of Wheel Ft. In.	Weight Lbs.	Medium Tone	Diameter Inches	Size of Frame Outside Ft. In. Ft. In.	Diameter of Wheel Ft. In.
400	D	27	3 6 x 3 6	4 4	1800	F sharp	45	5 5 x 5 8	7 0
450	C sharp	28	3 6 x 3 6	4 4	2000	F	47	5 5 x 5 8	7 0
500	C	29	3 9 x 3 11	4 4	2500	E	50	5 10 x 6 0	7 6
600	B	31	3 9 x 3 11	4 9	3000	E flat	53	6 2 x 6 6	8 0
700	B	33	4 0 x 4 0	4 9	3500	D	56	6 2 x 6 6	8 6
800	B flat	34	4 0 x 4 0	5 6	4000	C sharp	58	6 6 x 6 9	8 6
900	A	36	4 6 x 4 6	5 9	4500	C	61	6 6 x 6 9	9 0
1000	A	37	4 6 x 4 6	5 9	5000	C	63	7 0 x 7 0	9 0
1200	A flat	39	4 8 x 4 11	6 3	6000	B	67	7 0 x 7 0	9 0
1500	G	42	5 0 x 5 0	6 6	7000	B flat	69	8 5 x 7 6	9 6

ADAMS & ELTING CO.

Ad-El-Ite Paint and Varnish Products

716-726 Washington Boulevard
CHICAGO, ILL.
TELEPHONE, Monroe 3000

222 Yonge Street
TORONTO, CAN.
TELEPHONE, Main 6212

Woolworth Building
NEW YORK, N. Y.
TELEPHONE, Barclay 7758

Products.

Manufacturers of Ad-El-Ite Paint and Varnish Products, a special article to meet the specific demands of every purpose in the Paint Specialty and Wood Finishing Material Line.

These include: Ad-El-Ite Waterproof Cement and Brick Coating; Amel-ite Enamel; Naples Velvet Finish; Ad-El-Ite Paste Wood Fillers; Hygienic Kalsomine and Decorative Colors; Ad-El-Ite Floor Paint; Ad-El-Ite Paint and Varnish Remover; "Ad-El-Ite 24"; Ad-El-Ite Varnishes: Spar Varnish No. 100, Inside Spar Varnish, Ad-El-Ite Kauri Varnish No. 102, Floor Varnish, White Maple Polishing Varnish No. 104, Flat-Var No. 105, Spar-ite Print-Proof Varnish; Ad-El-Ite Stains: Penetrating Oil Stains, Acid Stains, Shingle Stains; Ad-El-Ite One-Coat Mission Finishes; Period Finishes; Ad-El-Ite Plastic Surfacer; Hy-Pol; Ad-El-Ite Finishing Waxes; Ad-El-Ite Metal Paints.

TRADE-MARK

Reliability.

Our special Ad-El-Ite architectural finishes give real service of value to architects. The claims made are exactly what the goods will do, and the foundation for such assertions is that we know the products in every stage of manufacture, and are justified in such claims by the results obtained by leading architects, contractors, etc.

TRADE-MARKS

Cement Coating.

Ad-El-Ite Waterproof Cement and Brick Coating is for use on exterior and interior concrete, stucco, new plaster, cement floors, Kellastone and similar surfaces.

Specifications for Cement Coating.

Outside Work—Before proceeding with the work see that the cement is as dry as possible. Apply two coats of Ad-El-Ite Cement Coating (color selected), being careful to use simply what material is necessary to enter and fill pores of the cement.

Floors—Apply three thin coats of Ad-El-Ite Cement Coating (color selected), being careful to work the coating well into the pores of the cement so that the finishing coat will produce a smooth finished surface.

See our Architectural Specification Book, pages 83, 84, 85 and 87.

Enamel.

Amel-ite is the highest grade enamel for wood or wall finishing. Made in high gloss and eggshell or flat finish. White and all colors. *The white stays white.*

Specifications for Amel-ite.

For Finishing Woodwork

Preparatory—The woodwork must be cleaned thoroughly, all cracks and crevices filled with Ad-El-Ite Plastic Surfacer and the entire surface sanded perfectly smooth.

Application—(First) Apply a coat of Amel-ite Undercoating, let dry about 36 hours and sand lightly with 2-0 sandpaper.

(Second) Apply a second coat of Amel-ite Undercoating, let stand about 36 hours and rub down with curled hair or fine steel wool No. 0.

(Third) Apply a coat of Amel-ite (eggshell or gloss) and let stand for about 36 hours and rub down with curled hair or fine steel wool No. 0.

(Fourth) Apply a finishing coat of Amel-ite (gloss or eggshell), and leave as applied by the brush.

Note—For hand-polishing, rub the final coat with a piece of felt and FFF pumice stone and water, and then polish with White Tripol and Hy-Pol, or rottenstone and Hy-Pol.

For Finishing Walls

Preparatory—Fill all holes, cracks and uneven places with Ad-El-Ite Plastic Surfacer. Apply one coat Ad-El-Ite XX First Coater, brushing well into the wall.

Application—Apply one coat of Amel-ite Undercoating (white or tinted to the desired shade) to the wall, letting about 36 hours lapse between coats.

Apply one coat of (Gloss) (Satyntone) Amel-ite (white or tint selected) and leave as applied by the brush.

See our "Architectural Specification Book," pages 77, 79 and 81.

Naples Velvet Finish.

Naples Velvet Finish is a durable, washable, flat interior finish.

Specifications for Naples Velvet Finish.

For Finishing Walls

Preparatory—Fill all holes, cracks and uneven places with Ad-El-Ite Plastic Surfacer. Apply one coat of Ad-El-Ite XX First Coater, brushing well into the wall.

Application—(First) Apply one coat of Naples Velvet Finish (white or colors selected), reduced with about one half pint of turpentine or boiled oil to the gallon. Let dry thoroughly.

(Second) Apply a second coat of Naples Velvet Finish (colors selected), as it comes from the can. Leave as applied by the brush.

For Finishing Woodwork

Preparatory—Fill all holes, cracks and uneven places with Ad-El-Ite Plastic Surfacer.

Application—(First) Apply one coat of Naples Velvet Finish (white or shades selected), reduced with about one half pint of turpentine to the gallon. Let dry thoroughly.

(Second) Apply a second coat of Naples Velvet Finish (white or shades selected), as it comes from the can. Leave as applied by the brush.

See our "Architectural Specification Book," pages 94, 95, 97 and 99.

Paste Wood Fillers.

Ad-El-Ite Paste Wood Fillers fill with satisfaction, dry like stone, and do not settle nor shrink in pores. Special Fillers and Stains to harmonize with special decorations.

See our "Architectural Specification Book," pages 6, 7, 9, 11, 19, 27, 35, 47 and 53.

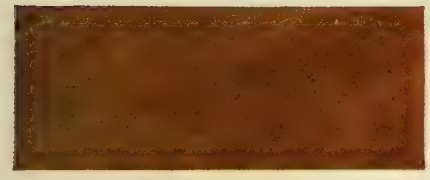
Hygienic Kalsomine and Decorative Colors.

An inexpensive wall decoration for residential and industrial work, schools, hospitals, etc. Will not check, peel nor rub off. It is germproof and sanitary.

TRADE MARK

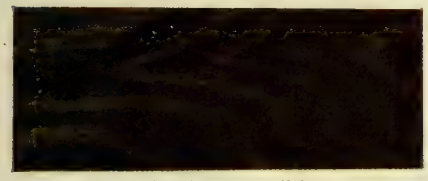
Continued on next page

STAINS AND FILLERS


2765 Circassian Walnut

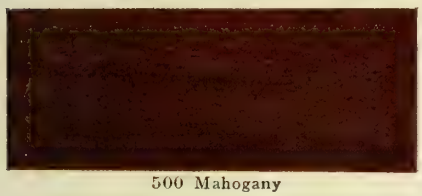
001 Silver Gray

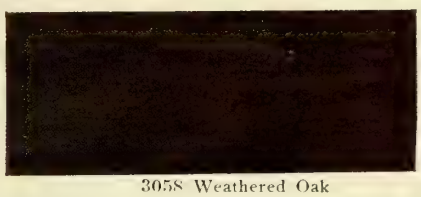
3950 Fumed Oak


3425 Early English

521 Malachite

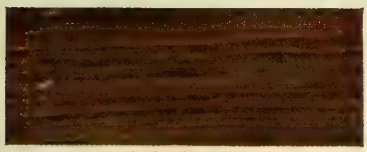
634 Natural Filler


500 Mahogany

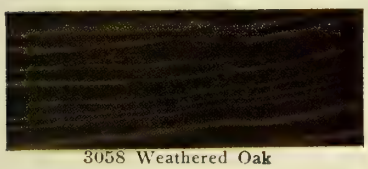

3058 Weathered Oak

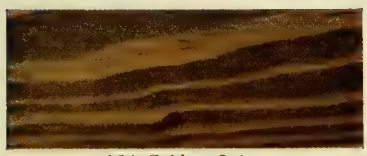
4336 Mahogany

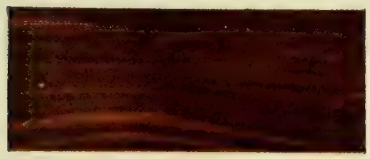
AD-EL-ITE PENETRATING OIL STAINS

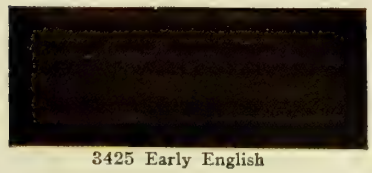

162 Golden Oak

3590 Fumed Oak


3058 Weathered Oak


164 Golden Oak


500 Mahogany


3425 Early English

AD-EL-ITE WATERPROOF CEMENT AND BRICK COATING

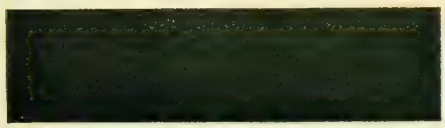
3878 Concrete White

T-3880 Tan

3874 French Gray

3875 Bedford Stone

3884 Cherry


3879 Willow Green

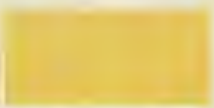
NAPLES VELVET FINISH

5152 Cream

5179 Tan

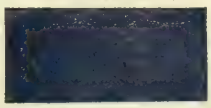
5209 Pink

5141 Silver Gray


5154 Light Yellow

5155 Light Brown

5156 Pale Green


5184 Delft Blue

5143 Buff

5210 Cocoanut Brown

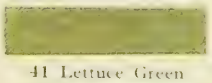
5158 Light Blue

5174 Dark Green

AD-EL-ITE ENAMELS, WHITE AND TINTS

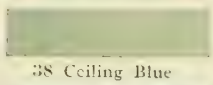
32 Colonial Yellow

31 Pink


41 Lettuce Green

34 Brown

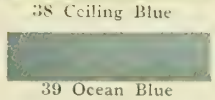
33 Deep Yellow

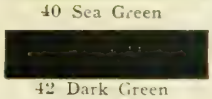

38 Ceiling Blue

40 Sea Green

36 Red

29 Light Gray


39 Ocean Blue


42 Dark Green

37 Royal Blue

AD-EL-ITE FILLERS, STAINS, ENAMELS, AND CEMENT AND BRICK COATING MANUFACTURED BY ADAMS & ELTING CO.

Continued on next page

POST OFFICE, WASHINGTON, D. C.
Hygienic Kalsomine used

CITY HALL AND COURT HOUSE, CHICAGO
Naples Velvet Finish used

NEW ILLINOIS CENTRAL HOSPITAL
Many Ad-El-Ite Paint Specialties used

RAILWAY EXCHANGE BUILDING, ST. LOUIS
Hygienic Kalsomine, Hygienic Kalsize, and Ad-El-Ite Waterproof Cement and Brick Coating used

MARSHALL FIELD & CO. BUILDING, CHICAGO
Amel-ite (the enamel that stays white) used

COLONIAL AND COMMERCIAL
NATIONAL BANK BUILDING, CHICAGO
Ad-El-Ite Varnishes used

UNIVERSITY CLUB BUILDING, CHICAGO
Ad-El-Ite Stains used

Continued on next page

Specifications for Hygienic Kalsomine.

Preparatory—Fill all holes, cracks and uneven places with Ad-El-Ite Plastic Surfacer. Size the wall with Hygienic Kalsize, mixed with water, according to directions.

NOTE—If old work, previously kalsomined, wash off the old kalsomine and prepare the same as new walls.

Application—Apply one coat of Hygienic Kalsomine, mixed according to direction (tints selected).

See our "Architectural Specification Book," pages 102, 103, 104, 105, 106, 107 and 108.

Floor Paint.

Ad-El-Ite Floor Paint withstands severest wear. Waterproof.

See our "Architectural Specification Book," page 114.

Paint and Varnish Remover.

Ad-El-Ite Paint and Varnish Remover (regular liquid), a big saver on all repair work. Contains no alkalies or injurious acids. Will not raise the grain of the wood.

"Ad-El-Ite 24" is in heavy liquid form for upright, overhead surfaces, panel work, etc. Will not run, and stays soft 24 hours.

Varnishes.

Ad-El-Ite Varnishes of special character to meet the demand of individual purposes and conditions and to fulfill every service required.

See our "Architectural Specification Book," pages 64, 65, 66, 67, 68, 69, 71 and 73.

Ad-El-Ite Spar Varnish No. 100—Very elastic, pale colored, heavy bodied, specially adapted for marine work, front doors, etc. Weatherproof.

Ad-El-Ite Inside Spar Varnish, No. 112—

Ad-El-Ite Kauri Varnish No. 102—Hard drying, brilliant varnish. For fine residences, schools, apartments, churches, etc. Made to stand sanding machinery for large contract work. May be rubbed.

Ad-El-Ite Floor Varnish, No. 103, "Hobnail Proof"—Stands severe wear, is medium bodied, pale in color, very tough and elastic, stands hot and cold water, does not turn white.

Ad-El-Ite White Maple Polishing Varnish No. 104—Especially made for finishing all light colored woods without changing their natural beauty. Is pale colored and clear toned. Can be rubbed to a dull finish or takes a high polish.

Ad-El-Ite Flat-Var No. 105—Requires no rubbing. Is a specially hard drying, tough, flat finish, producing a matte effect without the expense of actual rubbing. Can be varnished over if change of finish is desired. May be used over colored woods or stains without in any way affecting the most delicate colors.

Spar-Ite Print-Proof Varnish, No. 4848—Stands all tests. For exterior and interior use. Stands hot and cold water, liquors, etc., and *will not print* under most trying conditions.

Stains.

Ad-El-Ite Penetrating Oil Stains—Very clear and rich in tone. Made from most transparent colors and dissolved in special penetrating oils, insuring the greatest penetrating power. Will not wipe up under ordinary conditions.

Ad-El-Ite Acid Stains—Would particularly recommend Nos. 514 and 516 Fast Red and Fast Brown Mahogany Stains, soluble in water. Absolutely fast color, producing a deep stain on birch that is an excellent imitation of mahogany.

Shingle Stains.

Ad-El-Ite Creosote Shingle Stains are made in ten beautiful, permanent shades. Stop moisture from causing dry rot. Prevent injury from insects and worms.

Specifications, Shingle Stains.

New Work—Before laying, dip the shingles two thirds their length in Ad-El-Ite Creosote Shingle Stain (color selected).

NOTE—If shingles cannot be dipped before laying, apply a heavy coat with the brush.

Old Work—Give the shingles two good brush coats of Ad-El-Ite Creosote Shingle Stain (color selected), allowing about 24 hours between coats, so as to give the first coat time to penetrate the wood. Work the stain up under the edge of the shingles as much as possible so as to get under where the edge laps over.

NOTE—Never specify for use over old painted shingles.

See our "Architectural Specification Book," pages 117 and 119.

One-Coat Mission Finishes.

Ad-El-Ite One-Coat Mission Finishes are the original Mission Finishes and in a class by themselves from the standpoint of results. Accentuate the natural grain beauty of either hard or soft wood; a stain and finish complete in one coat. Ten beautiful shades.

Specifications, One-Coat Mission Finishes.

Preparatory—The woodwork must be thoroughly cleaned and then sanded to a perfectly smooth surface.

NOTE—If old work, the finish must be removed with Ad-El-Ite Paint and Varnish Remover.

Application—Apply one coat of Ad-El-Ite One-Coat Dull Finish (shade selected), to the natural wood, with a soft hair brush. Let stand for 10 or 20 minutes (see exceptions). Rub briskly with a soft cloth until a velvety satin finish is obtained.

NOTE—On floors or any surface exposed to hard usage, apply a thin coat of Ad-El-Ite Orange Shellac Varnish, or a coat of Ad-El-Ite Liquid Wax.

Exceptions—(No. 1) M-8 and M-9, if selected, must be wiped up with soft cloth immediately. (No. 2) No. 437 must be left as applied by the brush. Do not wipe.

See our "Architectural Specification Book," pages 61 and 63.

Waxes.

Ad-El-Ite Finishing Waxes do not become lumpy or ball by usage. One pound can covers about five thousand square feet.

Metal Paints.

Ad-El-Ite Metal Paints, protective paints for structural iron and metal surfaces. See our special booklet "Ad-El-Ite Metal Paints," which shows colors and gives detailed information.

"Architectural Specification Book."

This is an extensive work prepared by us, giving detailed information, specifications, and actual samples on wood panels, to aid the architect in making specifications for Ad-El-Ite products. Large finished panels of Stains, Varnishes, etc., and Color Chips are shown of all our prominent goods. An invaluable aid to architects.

Our Architectural Department is at your service. No problem can be too difficult for us to solve. We therefore expect to be of service to you.

BELKNAP-MORAN-ALLEN CO.

Special Putties, Roofing Cement, Paint, Etc.

5 Ainslie Street

BROOKLYN, N. Y.

Products.

"Belknap's" Lead and Zinc Putty, for Wood Sash, etc.

"Holdfast" Putty, for Metal Sash, etc.

"Elastico" Roofing Cement.

"Elastico" Exterior Oil Paint.

"New-Tynt" Interior Oil Paint.

"Konkreto," a Concrete Wall and Floor Waterproofing and Dustproofing Coating.

Facilities, etc.

This Company is the oldest and largest putty manufacturing concern in the United States. Capacity is 28,000 pounds every nine hours.

With its large modern facilities and its many years of experience it is in a position to offer the building world a line of products of distinctive merit. These products should not only be *specified*, where quality service is required, but they should also be *insisted* upon afterwards.

"Belknap's" Lead and Zinc Putty.

This putty, for wood sash, skylights, etc., is a combination of pure white lead-zinc oxide and whiting, mixed by machine to the proper consistency. After hardening, it holds the glass firmly in position, but with a flexibility which prevents disintegration at any time.

"Belknap's" Lead and Zinc Putty is warranted to give long and efficient service, under all conditions. Price is a little higher than that of the regular linseed oil putties.

"Holdfast" Metal Sash Putty.

This putty is made from a formula which is the result of long research for a putty that is fire-resistant and will meet all other requisites for metal-sash service at a low cost.

It works as easily and smoothly as ordinary putty, reducing the cost to the metal-sash glazing contractor. It adheres firmly to the sash without shrinking and hardens quickly without sagging or wrinkling.

Price is no more than ordinary putty; yet "Holdfast" is warranted efficient and durable under all types of service.

"Holdfast" is used very extensively by largest contractors.

"Elastico" Roofing Cement.

This is an elastic cement especially adapted for tile and slate roofs. It is composed of non-drying special oils and remains elastic for years. Not affected by fumes from industrial buildings. Guaranteed waterproof and weatherproof.

"Elastico" Exterior Oil Paint.

This is an elastic protective coating, scientifically composed of inert pigments, carefully and uniformly ground with pure linseed oil and high-grade asphalt gums. It is alkali- and acid-proof and is particularly adapted for service, on wood or metal, where resistance to moisture and industrial gases is essential.

"Elastico" does not require priming with any other paint, and is warranted to remain elastic for five years.

Spreading capacity on structural steel, 500 to 600 square feet per gallon, one coat.

"New-Tynt" Sanitary Interior Oil Paint.

A modern, sanitary, light-reflecting paint for plaster and brick walls, wood trim and metal work. It produces a rich, velvety surface that will not fade or turn yellow and that can be freely washed with soap and water. Recommended for use in residences, schools, offices, factories, auditoriums, etc.

"New-Tynt" produces a satisfactory finish with two coats, and is warranted not to peel, chalk or blister when properly applied.

Covering capacity 500 square feet per gallon, one coat; 300 square feet per gallon, two coats.

"Konkreto."

A tough, waterproofing and wearproofing oil paint for concrete wall and floor surfaces. Dries with a glossy surface which will not stain from oils and can be readily cleaned with soap and water. Will give long wear under the hardest traffic, protecting concrete floors from dusting and disintegrating.

Made regularly in maroon, chocolate brown, steel gray, and white; also, in any other desired shade on order.

Covering capacity, per gallon, 500 square feet, one coat.

References.

The following are a few of the many buildings in which "Holdfast" Putty was specified and used:

Ford Motor Co., Long Island City, N. Y.
Printers Building, New York, N. Y.
Howe Rubber Co., New Brunswick, N. J.

CARTER WHITE LEAD COMPANY

MANUFACTURERS OF

Strictly Pure White Lead, Red Lead, and Litharge

CHICAGO, ILL.

FACTORIES

CHICAGO, ILL. OMAHA, NEB.

DISTRIBUTING POINTS

NEW YORK, N. Y.
PHILADELPHIA, PA.
BUFFALO, N. Y.
CLEVELAND, OHIO
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DALLAS, TEX.
PITTSBURGH, PA.
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ST. LOUIS, MO.
NEW ORLEANS, LA.
KANSAS CITY, MO.
BOSTON, MASS.
JACKSONVILLE, FLA.
CINCINNATI, OHIO
MEMPHIS, TENN.
SAVANNAH, GA.
NEWARK, N. J.
SAN FRANCISCO, CAL.
NASHVILLE, TENN.
DULUTH, MINN.
MINNEAPOLIS, MINN.
ALBANY, N. Y.
MILWAUKEE, WIS.
HOUSTON, TEX.

Products.

STRICTLY PURE WHITE LEAD, RED LEAD, and LITHARGE.

Carter White Lead.

Carter White Lead is a high-grade and standard product, noted for its extreme whiteness, fineness, superior body, uniformity and great durability, because perfectly corroded by the only modern and scientific process in the white lead industry.

Architects should not fail to specify "Carter" when white paint or soft, clear tints are desired.

Carter Coach and Car Lead.

Carter Coach and Car Lead is a particularly high-grade product, especially ground in bleached oil with reference to interior work. It is extremely white and fine. It flats well. Equally good for exterior work.

Red Lead.

Carter Red Lead is guaranteed to run 94 per cent or over true red lead and to conform to government specifications.

Distribution.

Carter White Lead is widely distributed through jobbers, and can be purchased of dealers in every locality.

Carter Lead is the only brand obtainable in every state and territory. Architects in New York, Chicago, Philadelphia, etc., may specify "Carter" to be used on a building in California or anywhere else, and the contractor can secure it.

Prices.

Prices are governed by the fluctuations of the metal market. Carter Lead is sold for about the same price as other standard brands.

Specifications.

WHITE LEAD FOR EXTERIOR

Before any paint is applied, woodwork to be thoroughly dry. Apply no paint when raining or snowing. All knots and sappy places to be varnished with best grain-alcohol shellac.

Priming Coat to be a thin coat of Carter Strictly Pure White Lead, linseed oil and turpentine, properly brushed into the pores.

All nail-holes and other defects in surface to be puttied thoroughly after priming coat is dry.

Second and Third Coats to be Carter Pure White Lead, pure, well-settled linseed oil, pure turpentine and drier, mixed to proper consistency and colored to suit.

WHITE LEAD FOR INTERIOR

Surface to be put in proper condition for paint; all dust, dirt, loose paint, etc., removed; all knots and sappy places to be varnished with pure grain-alcohol shellac varnish.

Priming Coat to be a thin coat of Carter White Lead (Coach and Car preferred), pure turpentine and white turpentine japan drier, thoroughly mixed and properly applied.

Putty all nail-holes, cracks, and other defects with linseed oil putty, composed of equal parts of Carter Lead and Whiting, after priming coat is thoroughly dry.

Second and Third Coats (gloss finish, flat, eggshell gloss—architect to specify finish desired). Paint to be Carter Lead (Coach and Car preferred), pure, well-settled linseed oil, pure turpentine and pure turpentine white drier, colored to suit; paint to be carefully strained and brushed.

Important to Architects.

We recommend letting the painting contract separate from the general contract, and that estimates be asked only from competent and reliable contracting painters.

In order to insure the carrying out of your specifications we have stamped the name "Carter" on the side of every keg. When the head is removed, your superintendent can still identify the package.

TRADE-MARK

Guarantee.

Carter White Lead is sold under the following guarantee, which is printed on every package:

This package contains 8 per cent linseed oil, 92 per cent carbonate of lead. The CARTER WHITE LEAD COMPANY will pay $100 if adulterant is found in this package.

Useful Information.

Every architect should have "The Paint Beautiful," a portfolio of modern color schemes for suburban homes, and "The Carter Paint Calculator." Sent on request.

HAMPDEN PAINT & CHEMICAL CO.

Manufacturers of Paints, Varnishes and Paint Specialties

MAIN OFFICE AND WORKS

SPRINGFIELD, MASS.

DISTRIBUTING AGENCIES

BOSTON, MASS., 6 Beacon Street NEW YORK, N. Y., 17 Battery Place

Address all correspondence to main office

Products.

"HAMPDEN" PERMANENT COATINGS as follows:

"HAMPDEN" MILL WHITE, for Mill and Factory Walls and Ceilings of Wood, Brick or Concrete.

"HAMPDEN" INTERIOR FLAT FINISH for Hospitals, Offices and Public Buildings.

"HAMPDEN" CEMENT FLOOR COATING.

"HAMPDEN" MILL ENAMEL for Interior Mill Trim.

"REGAL" WALL COATING, a cold-water paint.

"HAMPDEN" PIPE ENAMEL for Hot and Cold Interior Piping Systems.

"HAMPDEN" VARNISHES for all Classes of Work —Exterior or Interior.

"HAMPDEN" STRUCTURAL PAINT for the Protection of Structural Iron and Steel.

"HAMPDEN" READY MIXED PAINT for Exterior Use.

"HAMPDEN" PERMANENT GREEN for all Exterior Work.

"RUBERCOAT" ELASTIC CARBON PAINT for Waterproofing Roofs and all Walls below grade.

TRADE-MARK

"Hampden" Mill White.

This paint is particularly adapted for new and old interiors of mill, factory and industrial plants; for walls and ceilings of wood, brick, and concrete. It is a permanent paint; will not chip or scale; is washable, and possesses the greatest light reflecting properties. "Hampden" Mill White is available in three finishes:

Mill White Gloss—Adaptable for use in rooms free from moisture. Insures a permanent high gloss. Exceptional ease of spread and covering capacity.

Mill White Eggshell—Is a pleasing finish between that of the flat and the gloss. A finish popular with many large consumers. Great covering capacity, and opaqueness combined with ease of spread.

Mill White Flat—Adapted particularly for interior use where moisture and steamy conditions exist. A permanent, velvety finish, pleasing to the eye.

SPECIFICATIONS

For New Surfaces—Surfaces must be thoroughly dry and brushed free of all loose particles. All knots and sappy places in woodwork are to be given one coat of pure orange shellac of good body.

For Old Surfaces—All surfaces to be thoroughly dry, brushed and cleaned of all loose particles.

Previous applications of white wash and similar coatings to be removed with scrapers and wire brushes and washed off with washing powder, sapolio, etc.

Grease and oil stains to be removed with gasoline and given one coat of pure orange shellac of good body.

First Coat—All concrete, brickwork, and plastered surfaces to be given one thorough coat of "Hampden" Concrete Primer. This to be brushed well into the pores and allowed to dry thoroughly with a minimum drying time of twenty-four hours.

All unpainted galvanized surfaces to be given one coat of "Hampden" Galvanized Iron Primer.

All woodwork to be given one coat of "Hampden" Mill White Flat.

Allow at least forty-eight hours so as to dry thoroughly.

Second Coat—Apply one coat of "Hampden" Mill White Flat and allow to dry thoroughly, with a minimum drying time of forty-eight hours.

Third Coat—Apply one coat of "Hampden" Mill White—flat, eggshell or gloss finish, as desired.

Consistency of all paints to be made workable by addition of "Hampden" Mill White Thinners, but in no greater proportion than 20 per cent.

The "Hampden" Paints specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass.

NOTE—The second coat of "Hampden" Mill White Flat may be omitted if a two-coat job is required; but it is not advised, unless the surface was previously painted, and this paint is in good condition.

CONSERVATIVE COVERING CAPACITY OVER PRIMED SURFACES

Flat on Wood	50 sq. yds. to gallon.
Gloss on Wood over Flat	50 sq. yds. to gallon.
Flat on Wood over Flat	50 sq. yds. to gallon.
Flat on Brick	30 sq. yds. to gallon.
Gloss on Brick over Flat	30 sq. yds. to gallon.
Flat on Brick over Flat	30 sq. yds. to gallon.
Flat on Concrete	25 sq. yds. to gallon.
Gloss on Concrete over Flat	25 sq. yds. to gallon.
Flat on Concrete over Flat	25 sq. yds. to gallon.

Eggshell Gloss, in all cases approximately the same as the Gloss.

Hampden "Interior Flat Finish."

"Hampden" Interior Flat Finish is an unexcelled sanitary, washable flat finish for old and new plastered surfaces, metal ceilings, composition board and woodwork. Particularly adapted for interiors of hospitals, offices and public buildings. Made in ten standard shades, and also black and white, and special shades when the quantity warrants. This is a slow setting paint, which permits ease of application, and prevents the appearance of brush marks on finished surface. Will cover approximately 500 to 700 square feet, one coat, according to the surface to be painted.

SPECIFICATIONS

Preparation and First Coat—All new woodwork must be thoroughly dry and clean. Apply priming coat of "Hampden" Ready Mixed Paint of light shade. Thin with pure spirits of turpentine, but not in greater proportion than 20 per cent. Allow minimum drying time of forty-eight hours. Putty all nail holes; after this, coat with "Hampden" White Lead Putty and sandpaper where necessary.

All new brick and concrete surfaces must be thoroughly dry. Apply first one coat of "Hampden" Concrete Primer. Allowing a minimum drying time of twenty-four hours.

All new plaster surfaces must be thoroughly dry. All holes and cracks to be filled in a workmanlike manner with plaster of paris, which is to be allowed to set hard. Apply one coat of "Hampden" Interior Flat Finish mixed with equal parts of "Hampden" Sealing Compound. Allow a minimum drying time of twenty-four hours.

Continued on next page

All metal surfaces must be thoroughly dry and cleaned to remove all loose particles, grease, etc. Galvanized surfaces to be treated with one coat of "Hampden" Galvanized Iron Primer.

Second Coat—Apply one coat of "Hampden" Interior Flat Finish (color to be selected by owner).

Third Coat—Apply one coat of "Hampden" Interior Flat Finish (same shade as first coat). This to be flowed on with as little brushing out as possible. Paint to be thinned to good working consistency with pure spirits of turpentine, but not in greater proportion than 25 per cent.

The "Hampden" Paints specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass.

"Hampden" Cement Floor Coating.

This paint makes a sanitary finish for cement floors, making them waterproof, dustproof and oilproof; and easy to clean. Furnished in four colors, and in special shades when quantity warrants.

SPECIFICATIONS

Preparation—Surfaces to be coated shall be thoroughly dry, and all loose particles and dust to be removed with a stiff brush or broom, and all oil and grease be removed with aid of gasoline. All floors laid on ground, or exposed to conditions to absorb moisture from their surroundings, to be given one thorough coat "Hampden" Concrete Primer. Allow to dry thoroughly with a minimum drying time of twenty-four hours.

First Coat—Apply one coat "Hampden" Cement Floor Coating (color to be selected by owner), brushing well into pores with a good solid brush to insure a substantial hold, and a minimum time of forty-eight hours to be allowed for this coat to dry thoroughly.

Second Coat—Apply second coat of "Hampden" Cement Floor Coating, allowing at least forty-eight hours for thorough drying.

Third Coat—Apply third coat of "Hampden" Cement Floor Coating, allowing forty-eight hours before surface is used, and one week before surface is exposed to severe usage.

The "Hampden" Paints specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass.

"Hampden" Mill Enamel.

This enamel is used for mill trim where neatness is desired, and where white walls and posts are liable to become soiled by contact. Furnished in shades of highest quality for the painting of dados, etc.

SPECIFICATIONS

Preparation—After overhead painting has been completed in so far as is possible, all walls, posts, partitions and stair runs are to have a dado six feet high. The top line must be even and true. Surfaces to be thoroughly dry, and all loose particles to be removed with scrapers and stiff wire brushes. All grease and oil stains to be removed as well as is possible with gasoline.

Priming—Apply one coat of "Hampden" Concrete Primer to all brick and concrete work, brushing well into pores, and allow at least twenty-four hours for thorough drying.

First Coat—Apply one coat of "Hampden" Mill Enamel (color to be selected by owner). Allow at least forty-eight hours for thorough drying.

Second Coat—Apply finishing coat of "Hampden" Mill Enamel which is to be same as previous coat.

Consistency of all paints to be made workable by the addition of "Hampden" Mill White Thinners, but in no greater proportion than 20 per cent.

The "Hampden" Paints specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass.

"Regal" Wall Coating.

This is a cold-water paint which forms a velvety appearing surface, pleasing to the eye. Does not scale or peel off. Approximate covering capacity: On brick, 300 square feet to 10 pounds; on wood, 400 square feet to 10 pounds; on metal, 500 square feet to 10 pounds.

"Hampden" Pipe Enamel.

This enamel is adapted for hot or cold interior piping, and forms a permanent coating for the preservation of metal pipe. Made in shades adopted by the American Society of Mechanical Engineers.

"Hampden" Varnishes.

"Hampden" Varnishes are made for all classes of work, exterior or interior, and fulfil every service required.

"Hampden" Structural Paint.

This structural paint forms a permanent coating to protect structural iron and steel, a most efficient rust inhibitor. Made in five colors, and in special shades when quantity warrants.

SPECIFICATIONS

Shop Work—All metal surfaces must be thoroughly scraped and cleaned of all rust, mill scale, dirt and dust, either with sand blast or steel scrapers and stiff wire brushes. All grease to be removed by use of gasoline; then surface to be painted is to be dusted with a stiff bristle brush. After cleaning, apply one heavy coat of "Hampden" Structural Gray No. 502. This may be thinned, if necessary, by addition of pure spirits of turpentine, but in no greater proportion than 10 per cent. All inaccessible surfaces shall receive two coats of same paint before assembling.

Erection—After erection, all rust spots and places where the paint is rubbed off shall be thoroughly cleaned. All edges, rivets, nuts and bolt heads to receive an extra coating of above paint. All bolts to be dipped thoroughly before placing.

Finishing—Apply two coats of "Hampden" Structural Paint (of same shade or of shade as selected). Allow from three to five days for previous coat to dry thoroughly. Nothing but strictly pure settled linseed oil shall be used in reducing, and in no greater proportion than 20 per cent.

The "Hampden" Paints specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass.

"Hampden" Ready Mixed Paints.

These ready mixed paints are a pure linseed oil paint, durable, beautiful and economical. They are suitable for exterior use, and are furnished in forty-seven shades, and special shades when the quantity warrants.

"Hampden" Permanent Greens.

"Hampden" Permanent Greens are made expressly for blinds, shutters and all exposed surfaces. They are bright, non-fading colors, and possess a covering power that is not only economical but time-saving. Made in chrome and bronze shades.

"Rubercoat" Elastic Carbon Paint.

For the waterproofing of all kinds of roofs and walls below grade, and for the protection of metals. Will not crack, run, blister or scale; is not affected by acids, cold, salt air or water. It affords a surface which is proof against sparks or red hot cinders.

Packages.

Paints in quantities are shipped in barrels equipped with mechanical agitators.

Prices and Information.

Address main office at Springfield, Mass.

Publications.

Bulletins and pamphlets, published covering the different paints, will be gladly sent on request. A book of specifications for painting is offered with the idea that it may prove of assistance to the busy architect and engineer, and may be had upon application.

THE R. F. JOHNSTON PAINT CO.

224-228 Main Street

CINCINNATI, OHIO

Product.

JOHNSTON'S WASHABLE "DULL KOTE" PAINT and JOHNSTON'S CEMENT FINISHES.

Johnston's Washable "Dull Kote" Paint.

A modern sanitary flat paint for interior painting, producing a smooth, velvety, flat finish.

Beautiful to look upon, restful to the eye, marvelous in wearing power, simple of application, remarkable in its covering capacity, economical and satisfying in every way, are the manifold attributes which are possessed and made possible in the use of Johnston's Washable "Dull Kote" Paint.

For decorating walls, ceilings, woodwork, etc., in public buildings, churches, theaters, office buildings and hotels, and for all interior work.

Surpassing all other finishes in beauty, durability and economy; also, producing beautiful effects not obtainable with any other material.

"Dull Kote" Paint contains no lead or other poisonous pigments.

It flows freely and possesses the maximum covering power, both as to opacity and amount of surface it will cover; therefore it is more economical than enamel paints, oil or varnish paints.

"Dull Kote" Paint takes care of itself, levels out and flats perfectly, remains elastic; therefore will not crack, peel or flake off.

It can be applied over painted surfaces, wall paper, kalsomine, frescoed walls, varnish and cement.

Its colors and tints are permanent and will not fade, as they are made from the best and most durable pigments.

"Dull Kote" Paint is neither a varnish nor an oil paint, but a perfect combination of both.

It has a finish that combines the soft restfulness of kalsomine or water paints with the sanitary and really washable qualities of oil, varnish, or enamel paint, without the disadvantage of showing laps or brush marks.

Looks like Kalsomine, Washes like Tile.

If it becomes stained or soiled it can be washed with soap and water, the same as any varnished or painted surface, without in any way diminishing the quality of the finish.

"Dull Kote" Paint is made in twenty beautiful tints and colors, White, Tinting White, Black, and Sealer or Surfacer.

It is put up in five-gallon kits, one gallon, half gallon, quart, and pint tins.

Further Information.

The R. F. JOHNSTON PAINT CO. issue a handsomely illustrated Magazine, replete with information as concerns Interior Finishing of walls and ceilings, which they are anxious to send you. Please write for it on a postal card or otherwise.

Color card and color schemes free upon request.

BUCKET OF
JOHNSTON'S "DULL KOTE" PAINT

Specifications for the Use of Johnston's Washable "Dull Kote" Paint.

The tables below give as nearly as possible the covering capacity of "Dull Kote" Paints and the number of coats required in finishing over the different surfaces.

Should an additional coat be required on some kind of walls the cost would stand in the same relation as if lead or other decorative paints were used, for it is a fact that "Dull Kote" Paints are of equal or greater covering power than any other similar finishes, as one coat of this Paint is equal in opacity to two coats of lead.

Over Plaster Wall Work (New), First—Fill up cracks and uneven places with plaster of paris, or crack and crevice filler. Allow it to dry thoroughly.

Second—Apply one coat of "Dull Kote" Sealer or any suitable size. Do not use gloss oil, as it softens up under "Dull Kote" and causes the same to gloss in spots, and it is also liable to crack and peel off.

If you can not get our Sealer, use a hard drying varnish reduced about one third with benzine. Allow this coat fully twenty-four hours to dry.

If any spots burn through, touch up these places with Sealer and allow it to dry before starting with "Dull Kote" Paint.

A small quantity of "Dull Kote" of shade to be used added to the Sealer or first coat, is an advantage.

Third—Apply "Dull Kote"; allow it to dry twenty-four hours.

Fourth—Apply second coat of "Dull Kote."

"Dull Kote" Paints will cover as follows on plaster walls over size: Smooth surface walls, from 500 to 600 square feet, one coat. Medium sand-finish walls, from 400 to 500 square feet, one coat. Rough sand-finish walls, from 300 to 400 square feet, one coat.

Over Old Painted Walls, First—Fill up cracks with plaster of paris or crack filler. Let it dry and size these spots with varnish size or Sealer.

Second—If wall is in good condition and no air cracks show, apply "Dull Kote" Paint of shade desired.

Continued on next page

Third—If air cracks show, apply glue or varnish size.

Fourth—Apply finish coat of "Dull Kote" Paint.

You can figure about 500 square feet to the gallon on previously painted walls.

Over Metal Surfaces—Scrape off or remove all rust. Apply "Dull Kote" Paint direct to metal.

One or two coats will cover perfectly. One gallon will cover between 500 to 600 square feet.

Over Burlap—Fill the burlap with a good oil paint and proceed the same as on plaster walls.

Over Kalsomine, First—Fill all cracks with plaster of paris or crack filler.

Second—Apply one coat of "Dull Kote" Sealer. Let it dry for twenty-four hours.

Third—Apply coat "Dull Kote" and allow to dry twenty-four hours.

Fourth—Apply second coat of "Dull Kote."

Over Concrete or Cement, First—Apply our Special Cement Sealer, to which add one pint of "Dull Kote" of shade to be used.

Second—Proceed the same as on plaster walls.

Over Composition Board—Fill up all joints with crack filler. Sand filler when dry to perfectly smooth surfaces.

Apply "Dull Kote" Special Composition Board Sealer tinted to shade desired with "Dull Kote"; or size as on new plaster walls.

Apply two coats "Dull Kote," allowing fully twenty-four hours between coats to dry.

For Wood Work, First—Sand surface absolutely smooth.

Second—Apply "Dull Kote" Paint of shade desired, to which add one fourth gallon of raw linseed oil. Allow it to dry for twenty-four hours.

Third—Apply one or two coats of "Dull Kote" Paint without reducing.

Fourth—If gloss finish is desired add from one quart to one half gallon of enamel varnish or use an enamel of shade desired. The enamel should be of same shade as the "Dull Kote."

Fifth—For finest work use double-thick fitch-hair flowing brush.

Sixth—One gallon of "Dull Kote" will cover about 500 square feet, one coat, on woodwork.

"Dull Kote" Sealer—Will cover with one coat approximately as follows:

Smooth walls, 600 to 700 square feet to the gallon.

Medium sand-finish walls, 500 to 600 square feet to the gallon.

Rough sand-finish walls, 400 to 500 square feet to the gallon.

Over wall paper, 400 to 500 square feet to the gallon.

Thin "Dull Kote" Paints, if they are too thick, with pure turpentine or turpentine substitute.

Johnston's Cement Finishes.

Johnston's Cement Finish protects, preserves and beautifies.

A waterproof coating of proved adaptability for finishing and beautifying exterior concrete, stucco, stone, brick or wood surfaces where a flat lusterless finish is desired.

Johnston's Cement Finishes are alkali- and acid-proof, thus preventing any chemical changes in the coating, caused by free alkali or acids in the surface to which it is applied; also resists action of sulphur or acid fumes from without.

Imparts remarkable beauty to surfaces painted. Artistic, lasting and economical.

It waterproofs and produces a uniform flat, dull-toned color, imitating closely Bedford Stone, Sandstone, Tile or Terra Cotta, also the various shades of pressed and artistic brick.

Cement or Concrete, characterized, as it is, by intense power of absorption, is not a fit surface for treatment with lead and linseed oil or any ordinary paint. Such will quickly "disintegrate" and "flake" and "crack off."

Johnston's special liquid waterproof coatings and finishes for cement are the outcome of careful observation and tests, as applied to this particular description of construction economy.

Chemical exactness as concerns the relative affinity of cement or concrete surfaces to pigments and thinners is positively assured.

Unusual powers of penetration and adhesion are established and maintained.

Its covering capacity and opacity is the greatest; the shades are permanent and will not fade.

The R. F. Johnston Paint Co. are pioneers in the marketing of durable flat finishes, and have made exhaustive investigation and chemical research as to the physical properties of cement and the requirements for an impervious, durable finish for same.

Dries within twenty-four hours equally as hard as the surface to which it is applied.

Naturally, climatic and weather conditions should be favorable at time of application.

The various shades of Johnston's "Dull Kote" Paint can be used over our Cement Finishes for general interior decoration.

Colors—Johnston's Exterior Cement Finishes are made in ten adaptable and artistic colors.

CEMENT FINISH

Johnston's Gloss Cement Floor Finishes are prepared in several serviceable shades, and will give long-wearing, satisfying results.

Covering Capacity—One gallon of Johnston's Cement Waterproof Paint will cover 150 to 200 square feet of surface, one coat.

How Sold—Put up in half-gallon cans, one-gallon cans, five-gallon kits, half barrels and barrels.

Directions for Applying.

Surfaces should be dry and free from dampness.

Clean off with wire brush to remove dust or dirt which may have accumulated.

Apply carefully with four- or five-inch paint brush. See that the surface is perfectly and uniformly coated. Allow to dry forty-eight hours or more. It is always best to apply two coats.

Old or previously treated or painted surfaces should be cleaned with wire brush to remove any loose or scaling paint, dirt, etc. Greasy spots should be washed with benzine or gasoline.

Before starting to apply the paint, same should be stirred thoroughly. The best plan is to pour off all the liquid in the can and stir up the thick portion in bottom, then gradually stir in the thinner. This saves much time and insures perfect uniformity.

It is advisable to stir the paint occasionally during use, in order to develop perfect working and covering qualities.

The paint is prepared in proper consistency for use. However, if too thick, reduce with turpentine or benzine.

ESTABLISHED 1900

DE SOTO PAINT MFG. CO.

FACTORY AND GENERAL OFFICES
MEMPHIS, TENN.

BRANCH OFFICES
DALLAS, TEX., 409-417 North Lamar Street MOBILE, ALA., Dauphin and Water Streets

Products.

MEMPHI FRESCO PAINT; MEMPHI OIL STAINS; MEMPHI VARNISHES; LILLY WHITE ENAMELS; MEMPHI SHINGLE STAINS; MEMPHI CONCRETE WATERPROOF COATING, for Brick, Cement, etc.

Memphi TRADE-MARK

Also, Several Varieties of STRUCTURAL VARNISHES and STAINS, WALL and FLOOR COATINGS and FINISHES, WASHABLE PAINTS, ENAMEL PAINTS, STUCCO MIXTURES, FILLERS, SIZINE, PRESERVATIVES for Wood, Brick, etc.

Memphi Fresco Paint.

A pure linseed oil, flat wall finish, absolutely free from acids, alkalies or varnish gums. Finishes with soft velvet luster of a water color Fresco; is washable, durable, unfading and sanitary.

BUCKET OF MEMPHI FRESCO PAINT

Specifications for First-Class Work.

First, on plastered walls apply one coat Memphi Fresco Paint, thinned liberally with Sizine or boiled linseed oil.

Second, apply one coat Memphi Fresco Sizine. (This is an alkali-proof size.)

Third, apply one coat Memphi Fresco Paint thinned with one pint turpentine for flat work, or thinned with one quart boiled linseed oil where egg shell gloss is desired.

Where patching is necessary, it should be done before the first coat is applied, and all holes and cracks should be sized with Sizine, and then should be filled with strictly pure putty (whiting and linseed oil). Patches that are made in this way will not burn through.

Memphi Oil Stains.

A durable, penetrating stain for new work where a finishing coat of varnish is to be used.

Advantage—We have adopted, and use, the only one-color standard generally recognized in the finishing of furniture and mantels, viz: the standard of the Grand Rapids Furniture Manufacturers' Association, which, when applied to window and door frames and other inside trim, affords a perfect match for all kinds of interior decoration. All natural wood color effects are obtained by the specification and use of Memphi Oil Stains.

Specifications.

For Structural Hardwood—For open-grain woods such as Oak, Ash, Walnut and Mahogany, fill with a suitable paste filler. Apply one coat Memphi Oil Stain of desired shade, and wipe lightly to bring out beauty of grain.

After twenty-four hours, apply thin coat of Orange Shellac.

After twenty-four hours, when dry, apply first coat of Memphi Brilliant Interior, reduced 10 per cent with turpentine.

After twenty-four hours, apply second coat of Memphi Brilliant Interior.

After forty-eight hours, rub with rubbed hair, and apply third coat of Memphi Brilliant Interior.

After seventy-two hours, for egg shell gloss, rub with burlap, pumice stone and oil.

For polished finish, rub with felt, pumice stone and water; and polish with rotten stone and water.

For Finest Work, Exterior—Specify Memphi Outside Spar.

For close-grain woods omit the paste filler; otherwise proceed as above.

For Floors—For open-grain woods fill with a suitable paste filler. Apply one coat Memphi Oil Stain of desired shade, and wipe lightly to bring out beauty of grain.

After twenty-four hours, apply first coat of Memphi Floor Varnish, reduced 10 per cent with turpentine.

After twelve to twenty-four hours, apply second coat of Memphi Floor Varnish, full body.

After twelve to twenty-four hours, apply third coat of Memphi Floor Varnish, full body.

After forty-eight hours, for egg shell gloss, rub with burlap, pumice stone and oil.

For Waxed Floors—Fill with a suitable paste filler, and apply a mixture composed of equal parts Memphi Floor Varnish and turpentine. Sand lightly with fine sandpaper, then wax and polish.

Lilly White Enamel.

New System of Enameling—We have perfected a System for white enameling on wood, which has reduced the cost of white enamel for interior wood-work, so that it is possible now for the painter to obtain results with four coats on bare wood (even yellow pine) where, heretofore, from six to eight coats were necessary.

Specifications.

First coat, apply Memphi Fillac (an oil shellac); second coat, Lilly White Flat; third coat, Lilly White Flat; sand lightly with 00 sandpaper; fourth coat, Lilly White Enamel.

If a rubbed effect is desired, use a coat of Lilly White Flat in place of Lilly White Enamel.

Memphi Concrete Waterproof Coating.

A strictly monolithic combination paint and waterproof coating for concrete or cement work. It is made to dry either flat or with a gloss. It can be used on stone or stucco with equally good results. On concrete floors the gloss finish gives a beautiful tile-like effect. It is especially fine for stucco and concrete block houses, because of its durability and water-resisting features.

Uses—It can be used on floor either gloss or flat. It is sanitary; it keeps cement dust from rising; prevents water, oil, grease and other stains from penetrating and staining the concrete. It makes rooms lighter and brighter. It reduces vibration, noise and underfoot resistance. It prevents wear, and, when disintegration of cement has set in, it gives reinforcement. Where used for outside work when a flat finish is desired, it produces beautiful ornamental effects, and waterproofs and preserves the work.

References.

Notable buildings on which Memphi Fresco Paint has been specified: Municipal Building, Eagle Building, Adams Express Company, and Hotel Astor, New York; Third National Bank Building, Candler Coca-Cola Building, Atlanta; American Savings Bank & Trust Co., L. & N. Depot, Empire Building, Birmingham; New Union Depot, Southern Express Building, New Country Club, Falls Building, Bank of Commerce & Trust Co., Memphis; Patton Hotel, Chattanooga; Belmont College and Maxwell Hotel, Nashville; Grunewald and St. Charles Hotels, New Orleans.

ESTABLISHED 1889

H. B. FRED KUHLS

MANUFACTURER OF

Architectural Elastic Paints and Glazing Compositions

OFFICE AND FACTORY

TELEPHONE, Sunset 2867

3rd Avenue and 65th Street
BROOKLYN, N. Y.

Products.

Elastic Glazing Composition and Elastic Seam Paint.

Also, Elastic Flat Yacht White, Elastic Gloss Yacht White, Elastic Seam Composition, Elastic Kuhls' Spar Varnish, Elastic Copper Paints, Elastic White Trowel Cement, Elastic Gray Trowel Cement.

Elastic Glazing Composition.

Uses—For bedding and glazing, in general, skylights, conservatories, calking of window frames, etc.; in fact, in all places where a tight joint is required.

Elastic Glazing Composition adheres readily to galvanized and raw iron, steel, wood, glass, stone, concrete, etc. Never becomes very hard, always remaining elastic and flexible, and prevents glass from cracking.

Has been thoroughly tried and found satisfactory for pointing up all kinds of brick, stone, artificial stone, etc. The use of Elastic Seam Paint is recommended in connection with above work, as it prevents the absorbing of the oily matter out of the Elastic Glazing Composition, and so from becoming brittle.

Color—Stock color is light gray; but can be made in any shade.

Covering Capacity—One pound of Elastic Glazing Composition will spread ten feet for bedding and glazing on a half-inch margin. For bedding of skylights one pound will spread eleven feet.

How Shipped—Is put up in 12½-, 25- or 50-pound kegs, and in barrels of about 800 pounds.

Prices.

Elastic Glazing Composition:

12 cents per pound in kegs.
11½ cents per pound in barrels.
15 cents per pound in 1-, 2- and 5-pound cans.
3 cents per pound extra for special colors when less than 500 pounds; over 500 pounds, same price as for light gray.

Elastic Seam Paint:

$2.00 per gallon.
1.10 per one-half gallon.
.60 per one-quarter gallon.
.40 per one-eighth gallon.

Other Products:

Elastic Flat Yacht White, per gallon, $3.00; half gallon, $1.50; quarter gallon, $.75.

Elastic Gloss Yacht White, per gallon, $4.00; half gallon, $2.00; quarter gallon, $1.00.

Kuhls' Elastic Spar, per gallon, $4.00; half gallon, $2.00; quarter gallon, $1.00.

Elastic Copper Paints, bright green and red, per gallon, $3.00; half gallon, $1.50; quarter gallon, $.75.

Elastic Trowel Cement, white per gallon, $3.50; gray per gallon, $3.00.

Elastic Seam Composition, white, gray, yellow and black, 12½-, 25- or 50-pound kegs, 16 cents per pound. 1-, 2- and 5-pound cans, 20 cents per pound.

Special colors less than 500 pounds, 3 cents per pound extra.

Testimonials.

1123 Broadway, New York,
Feb. 9, 1913.

Gentlemen:

We have used your Elastic Glazing Composition for calking of window frames and brick walls and have found same very satisfactory.

Yours truly,
Chas. A. Cowen & Co.,
Building Contractors.

15 West 38th St., New York, Mar. 22, 1913.

Gentlemen:

Referring to our order No. 2868 of June 22, 1912, for 500 pounds of Elastic Glazing Composition for use at Laurel, Miss., we used this material for setting plate and window glass and for setting skylight glass under very trying conditions. It has proven very satisfactory, the results even exceeding our expectations. The workmen who applied it praised it highly.

Yours very truly,
Benjamin A. Howes,
Engineer and Contractor Unburnable Construction.

References and Further Information.

Extensive lists of satisfied users of the above mentioned products will be mailed, on application, to architects and other interested persons; and requests for additional information will receive prompt and careful attention.

ESTABLISHED 1862 ORGANIZED 1872, BY HENRY C. AND HOUSTON LOWE

THE LOWE BROTHERS COMPANY

Paints, Varnishes, Enamels, Stains, Japans

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SERVICE OFFICE: NEW YORK, N. Y., 101 Park Avenue

Products.

PAINTS, VARNISHES, ENAMELS, CONCRETE and CEMENT COATINGS, STAINS, and METAL PRESERVATIVES for every requirement of architect, builder, and engineer. They include: "HIGH STANDARD" LIQUID PAINT, "RICH-TONE" SHINGLE STAIN, MARINE PAINT, "MELLOTONE" FLAT WALL PAINT, "MILL WHITE" INTERIOR PAINT, "RED LEAD LUTE," "METALCOTE," ALUMINUM PAINT, GRAPHITE PAINT and other METALLIC and TECHNICAL PAINTS, ELASTIC CEMENT FLOOR FINISH, CONCRETE and CEMENT COATING, etc.

"LINDURO" EXTERIOR and INTERIOR ENAMEL, "VERNICOL" ENAMEL WHITE, DECORATIVE INTERIOR ENAMELS in colors; "LITTLE BLUE FLAG" VARNISHES, "VERNICOL" FLOOR and VARNISH STAIN, NON-FADING OIL STAIN, FILLERS, "SEALCOTE" WALL SIZE, etc.

TRADE-MARK

General Information.

Catalogues cover details fully, explaining uses and giving colors in a way that can not be reproduced here.

Lowe Brothers "High Standard" Paint and Varnish products have been known for more than a third of a century for their uniform excellence. They may be found on sale in all parts of the United States. Name of local dealer given on request.

Lowe Brothers metal coatings are used by leading railroads and construction companies as standards for the protection and preservation of bridges, steel structures, cars, etc. They have been tried under most difficult conditions with uniformly complete success.

Because of the care in the selection of materials and the special method of manufacture, Lowe Brothers products have unusual spreading and covering power, as well as durability and excellence of wear. These qualities make them the most economical of paint and varnish products.

They are put up only in sealed packages of convenient sizes.

Special Qualities.

Lowe Brothers "High Standard" Paint and Varnish products are known among architects and builders for their uniform high quality, meeting all requirements They are the result of many years of scientific research into the qualities and characteristics of woods and other surfaces to which paint, stain, enamel, or varnish is applied, as well as a study of materials for best meeting conditions.

"HIGH STANDARD" PAINT
For Exterior and Interior

The *"Little Blue Flag"* trade-mark on a paint or varnish can is your protection, the assurance of quality.

Service.

We are prepared, through the samples of finished panels displayed in the rooms of the Architects Samples Company, 101 Park Ave., New York, and by the personal attention of experts in our office on the third floor of the same building, to render a service of unique value to architects and their clients. Kindly call or write for information or suggestions for handling any specific decorative problem.

Suggestions for Specifications.

FOR EXTERIORS OF BUILDINGS:

"High Standard" Liquid Paint—Sixty colors, highest quality, for all coats. Special colors when desired.

Porch Floor Paint—Eight colors, durable, practical.

Flat Brick Colors—Three colors: Reds and Milwaukee brick.

"Linduro" Exterior Enamel—Of highest efficiency, durable, economical. Nothing better in Europe or America. Suitable for all surfaces, including metal, wood, concrete and brick. Natural white, blue white, cream and ivory.

Standard Metallic Paint—Four colors. Good grade for roofs, barns and outbuildings.

"Rich-Tone" Shingle Stain—A penetrating, preservative stain of proven efficiency. Fourteen standard colors.

VARNISH FOR PORCHES, DOORS AND EXPOSED SURFACES:

"Little Blue Flag" Spar—The very best for salt air, spray, and severe usage.

"Little Blue Flag" Elastic General Purpose—Very durable for outside and inside uses.

FOR INTERIOR WOODWORK—ENAMELS AND PAINTS:

"Linduro," an Enduring Enamel for Exterior or Interior—The highest quality for finest work. May be rubbed and polished.

"Vernicol" Enamel White—Very high grade Enamel for gloss or rubbed finish. Very white and durable.

Extra White Enamel—A good quality of enamel for gloss or rubbed finish. Dries very hard; is glossy, blue-white.

Lowe's Catalogue

Continued on next page

Interior Enamel Colors—Sixteen colors. Medium price, durable. Especially for bedrooms, hospitals, kitchens, public buildings, etc.

"Mellotone"—See "For Walls."

FOR INTERIOR WOODWORK—STAINS AND FILLERS:

Non-Fading Oil Stain—Twelve colors, non-fading pigments, reproducing various wood finishes. Will not raise the grain.

Mahogany Glaze—For use over mahogany or walnut oil stain, saving one coat of varnish. Permanent and non-fading; produces a depth of luster and beauty of color closely approximating old mahogany. The most beautiful finish for finest work.

Prepared Wood Filler—Paste form. For open-grained woods. Light, dark and golden oak. Other colors as desired.

"LITTLE BLUE FLAG" VARNISH

FOR INTERIOR WOODWORK—VARNISHES:

Transparent Varnish Primer—A liquid filler for close-grained woods. Remarkably good.

Mission Finishing—Mission Finishing is designed to produce a dull or mission effect with one coat. It is not a flat varnish, and is without defects inherent in flat varnishes, as the finished surface is clear, instead of cloudy, and will not spot or turn white.

"Little Blue Flag" Varnishes—All high quality.

Elastic General Purpose—Very pale. To be used where great durability is desired.

Elastic Interior—Medium drying. Very pale. High gloss. Water resisting.

Quick Action House No. 64—Hard drying. Pale color and good luster.

Inside Rubbing Varnish—Quick, hard drying. Takes beautiful finish.

Crystal Finish—Extremely pale. For use over light woods or white enamel.

FOR FLOORS:

Prepared Wood Filler—Paste form. For hard woods. Light, dark, and golden oak.

"Little Blue Flag" Durable Floor Varnish—Pale, hard drying, very tough. Does not spot white. May be used on hard or soft wood.

Hard Drying Floor Paint—Fourteen colors. A varnish paint giving fine, hard, glossy finish.

FOR WALLS AND CEILINGS, CEMENT OR PLASTERED, WALL-BOARD, BATHROOMS, HOSPITALS, ETC.:

"Linduro"—The highest grade of durable enamel for waterproofing, preserving and decorating concrete, plaster, wood, metal, etc.

"Mellotone"—Interior flat colors. Seven tints, nine positive colors, black and white. A durable, practical, economical flat liquid paint for plaster or concrete walls, steel ceilings, woodwork, burlap, wall-board, etc. Easily used; washable, sanitary.

"Sealcote"—A special wall size for first coat on plaster, burlap, etc., under "Mellotone" and similar products.

"MELLOTONE" FLAT WALL COLOR

Interior Enamel Colors—For wood, metal, concrete, or plaster surfaces, particularly for hospitals, public buildings, kitchens, etc.

Distemper Colors—For fresco work. Colors as desired.

Mill White—Gloss or flat. A high-class paint for factory interiors, made to give a solid, durable covering with the least number of coats.

FOR CONCRETE AND CEMENT SURFACES:

Concrete and Cement Coating—Fourteen colors. A practical, durable coating for all concrete buildings, exterior or interior. Waterproof and alkali-proof. Prevents discoloration; easily cleaned; economical.

Elastic Cement Floor Finish—Ten attractive colors. A high-class varnish finish for floors of public buildings, hotels and factories. Easily cleaned; prevents dust. To be used over priming coat of Concrete and Cement coating.

FOR IRON AND METAL SURFACES:

Aluminum Paint—For steam and gas fixtures, radiators, etc.

Auto-Carriage Gloss—Nine colors and a clear varnish. For heated surfaces, fences, etc., where high gloss is desired. Will stand high degree of heat.

"High Standard" Flat Black—For ornamental iron. (See also "Metal Surfaces" below.)

FOR METAL SURFACES, IRON AND STEEL CONSTRUCTION, BOATS, ETC.:

Red Lead Lute—A special red lead preservative paint of highest character. Ready for use. Does not settle in the can. Two colors. For first coating on exposed surfaces or both coatings on steel structures. A remarkably good product, the standard for large structures.

"Metalcote"—The best protective coating for steel that we know how to produce. One color, black, to be used over Red Lead Lute.

Galvanized Iron Primer—Gray color. A special color which will not only adhere to galvanized iron, but presents a suitable surface for re-coating. Durable and easy working.

Graphite Paint—Liquid form. Made of best quality graphite. Highest grade. For bridges, tin and steel roofs, etc.

Standard Metallic Paint—Four colors. For roofs, bridges, etc. Medium price.

"LINDURO" ENAMEL
For Exterior and Interior

Number of Coats and Method of Using.

In view of the extreme thinness of a film of paint or varnish, the manufacturers recommend that not less than three coats be specified for all new work.

For wood surfaces the first or priming coat of paint should be of white or a light tint of "High Standard," thinned with ½ gallon of raw linseed oil to one gallon of paint. In no case should a primer be allowed to be made from ochre or mineral, or with slow-drying oils. The second coat should be of same color as finishing coat, reduced with ½ pint spirits of turpentine to each gallon of paint. For third coat the paint should be used as it comes from the container.

For interior enamels the under-coats, of whatever number, should be built up of "High Standard" Flat White or similar product, the last two coats being of the enamel.

For metal surfaces use Red Lead Lute, or similar metal coating, for first coats; the selected kind for the last. (See "Hints to Architects.")

For concrete surfaces specify coatings as above "used according to makers' directions." In view of the extended lines manufactured, complete forms for specifications for all kinds of work will be found in "High Standard Paint Specifications," sent on application.

Publications and Co-operation.

"High Standard Paint Specifications" (a book of forms), "Paint and Painting," "Hints to Architects," "Metal Preservative and Protective Coatings," General Catalogue, Varnish Catalogue, "Common Sense About Interiors," "The House—Outside and Inside," and other valuable pamphlets, together with handsome color cards, giving details of the best methods of usage, are especially prepared for architects, mechanical engineers, and builders. Sent on application.

Specimens of wood finished with Paints, Enamels, Stains or Varnishes may be found at any Lowe Brothers agency, or at the Architects Samples Co., 101 Park Avenue, New York, N. Y.; and special samples will be sent when required.

PYROLIN PRODUCTS CO., INC.

Manufacturers of Fire-Resisting Linseed Oil Paints, Etc.

FORT DODGE, IOWA

SALES COMPANIES

MILWAUKEE, WIS., Pyrolin Products Sales Co. of Wisconsin, 207 Second Street
CHICAGO, ILL., Pyrolin Products Sales Co. of Illinois, 231 Insurance Exchange Building

Products.

Pyrolin Fireproofing Liquid, Fire-Resisting Best Grade House Paint, Fire-Resisting Second Grade House Paint, Fire-Resisting No. 1 Oxide Paint, Fire-Resisting House Oxide Paint, Fire-Resisting Floor Paint, Fire-Resisting White Spray, Fire-Resisting Factory Interior White.

Also, Fire-Resisting Lubricating Oil, Fire-Resisting Black Roof Paint, Fire- and Heat-Resisting Armature Winding Varnish; McCloskey Waterproof Varnishes, Fillers and Japans.

For Fire-Resisting Shingle Stains see our name in General Index.

Pyrolin Fire-Resisting Paints.

These paints not only protect from fire, but preserve the wood; go further and last longer than other first class paints, yet may be purchased at the same price as any of the standard paints on the market. Pyrolin is the result of nearly twenty years of constant research devoted to the discovery of a product that when applied to wood or any burnable material would make it absolutely and permanently fire-resisting.

Pyrolin.

Pyrolin is a clear transparent liquid, absolutely non-poisonous, and will not injure the hands or the most delicate fabric. In paint it takes the place of turpentine and renders the surfaces to which it is applied fire-retardant. The application of Pyrolin on surfaces which it is not desired to paint renders them absolutely fire-resisting without affecting their appearance. Hardwood floors or interior trim, which it is desired simply to stain or finish with oil, may first be treated, as may wooden walls that are exposed to heat from stoves and furnaces, and thus made as safe as if built of brick or concrete.

Tests of Fire-Resisting Qualities.

A severe test, made by the United States Department of Agriculture Forest Service at the Forest Service Laboratory, Madison, Wis., the principal object of which was to determine, if possible, the most practical methods of rendering wood fire-resistant, gave proof conclusive that Pyrolin is the greatest liquid fire-resistant known, and that it does stop fire from spreading.

The apparatus used consisted of a chamber made of asbestos board, twenty-two inches long, ten inches wide and seven inches thick.

Three cypress boards were painted with one coat of Pyrolin factory interior white, and three with two coats of white lead paint. In the case of the white lead, the first coat was allowed to dry for three days before the second coat was applied.

The specimens painted with white lead were allowed to season in the laboratory for approximately forty-five days before testing.

The specimens painted with Pyrolin factory interior white were tested twenty-four hours after the painting.

Sufficient electric current was passed through the heating coil to give the plates a temperature of approximately 325° C.

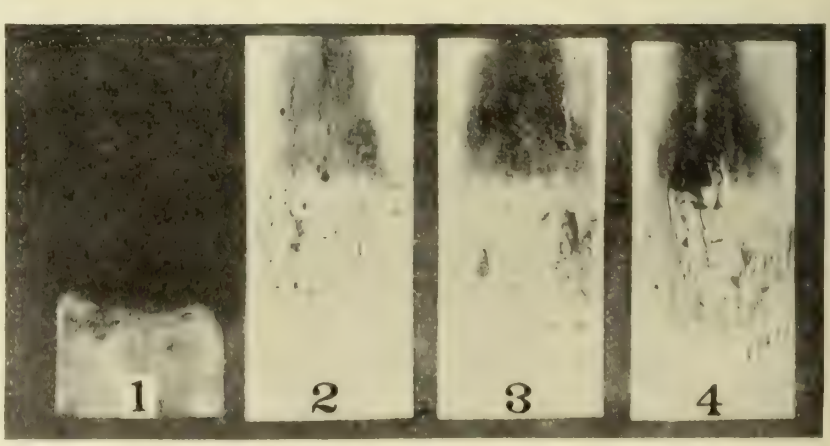
The radiated heat caused a distillation of the wood, or the giving off of volatile inflammable gases. To ignite these gases the pilot light was flashed up past the face of the specimen at intervals of five seconds.

Their official report, a copy of which will be sent on request, shows that Pyrolin factory interior white proved very effective in retarding the ignition specimens used in the test.

The first specimen was allowed to remain in the apparatus exposed to the heating plate for thirty minutes. No ignition occurred during that time, and the specimen was not charred through.

The second specimen was exposed to the heating plate forty minutes without igniting, and upon examination was found to be charred through.

The third specimen ignited after eight minutes exposure, and burned poorly for eleven minutes, when it went out, and could not be ignited again.



PHOTOGRAPH OF SPECIMENS AFTER TESTS WERE MADE

No. 1. Natural specimen of cypress (not treated with Pyrolin). Upper portion consumed in 9 minutes.
No. 2. Cypress board painted with Pyrolin Factory Interior White. 30 minutes, no ignition
No. 3. Cypress board painted with Pyrolin Factory Interior White. 40 minutes, no ignition
No. 4. Cypress board painted with Pyrolin Factory Interior White. Ignited in 8 minutes, but poor combustion

Continued on next page

Plumber's Blow Torch Test.

Further proof of the fire-resisting qualities of Pyrolin is given in a test conducted with a plumber's blow torch. This is a simple test that may be made by anyone.

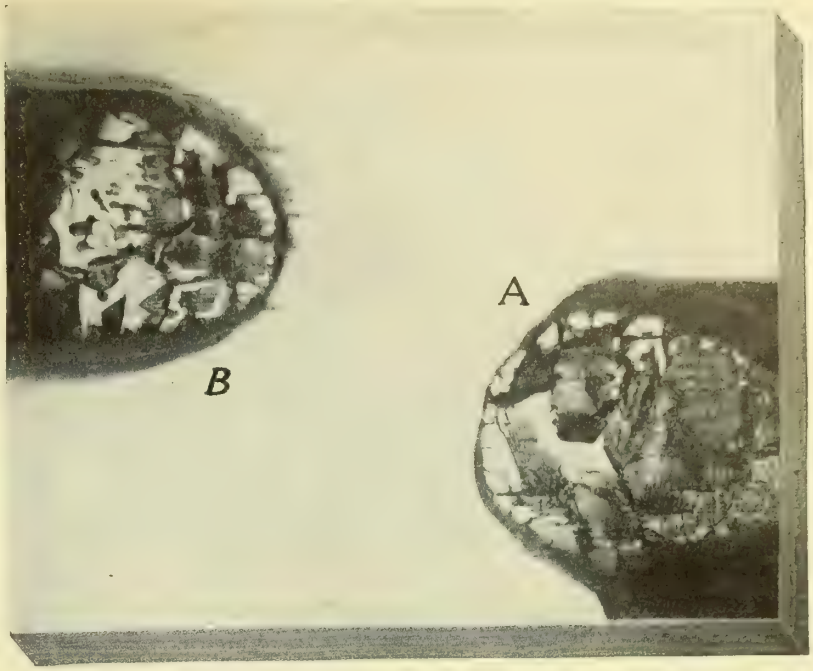
The illustration represents an ordinary piece of cypress wood painted with one coat of Pyrolin factory interior white.

A plumber's blow torch generating 2100 degrees of heat was applied at point "A" for one hour. At the expiration of that period a hole was charred through the wood, as shown.

At point "B" the same torch was applied for fifteen minutes, only charring the outside surface.

The board did not catch fire and burn in either case.

We are able to state with absolute assurance that any surface thoroughly coated with Pyrolin products, in accordance with our instructions, is rendered a positive and permanent resistant to spread of flames; and the longer applied, the better the fire-resisting qualities.



ILLUSTRATING PLUMBER'S BLOW TORCH TEST

Uses of Various Pyrolin Products.

Pyrolin Best Grade Linseed Oil House Paint—For the outside of all frame buildings. This is also true of our second grade, which is just as fire-resisting in its nature as the best grade house paint, but is not made of such high-grade material. These paints become more effective in their fire-resisting quality the longer they are applied, and after a period of from three to six months, are proof against the spread of flames.

Pyrolin Fire-Resisting House-Oxide—An excellent grade of paint and of great fire-resisting quality. It is made to compete in price with other high-grade paints on the market. In dark colors only. Note guarantee on this paint.

Pyrolin Fire-Resisting No. 1 Oxide—Beyond question the best paint ever placed on the market for exterior purposes, for barns, sheds and other rough work. Its *fire-resisting quality* is fully equal to that of the best grade, but of course it contains no lead or zinc pigments. Pyrolin floor paint dries in from twelve to fourteen hours, and is the only paint of the kind ever made which renders the floor to which applied proof against the spread of flames from hot coals, or sparks, so often the cause of fire. This article is ten years ahead of any competitor.

Pyrolin Fire-Resisting White Spray—A white spray for the interior of mill constructed buildings, sheds, barns, warehouses, etc., and the longer applied the greater its fire-resisting quality. After being applied for a period of thirty to sixty days the outside pigments of this spray could all be scraped off, but the woodwork would retain its fire-resisting quality. Largely in use by railways.

Pyrolin Interior Factory White—The only paint of the kind ever placed on the market. It can be applied only to bare clean woodwork, and will dry hard in one hour after application, and make the woodwork proof against almost any kind of blaze that may be applied to it. One coat is sufficient, and its action in resisting fire is immediate. Its name indicates that it is made in white; but it may also be had in gray or black, as desired. It is the paint on which tests were made by the Government. This factory white should be used on all bare woodwork in basements around furnaces, in every home, factory and warehouse, and other buildings where there is the slightest exposure.

Pyrolin Fire-Resisting Shingle Stain—A creosote linseed oil stain combined with the Pyrolin liquid, which when applied to shingles either by dipping or by a spray pump, or by a brush, will in the course of sixty to one hundred and twenty days render the shingles proof against two thousand one hundred degrees of flame; and the longer this stain is applied, the more effective becomes the fire-resisting quality, which is practically permanent.

Pyrolin Liquid and Pyrolin Products—Are preservatives; will not rot nor destroy fabrics or textiles of the most delicate nature, nor will colors run.

Pyrolin Fire Proofing Liquid—Should be applied to all fabrics such as curtains, children's dresses, burlaps on walls, theater curtains, and all woodwork where paint is not desired.

Pyrolin Guarantee.

We guarantee that Pyrolin paint, when properly applied, will not crack, chalk or flake off, and will cover, gallon for gallon, as much surface as any first-quality paint on the market. In addition to its fireproofing quality, we guarantee this to be a strictly pure linseed oil, lead and zinc paint.

We further guarantee that the longer this paint has been applied the stronger becomes the fire-resisting quality.

Made in all colors. Color cards on request.

PHELAN-FAUST PAINT MFG. COMPANY

Manufacturers of Metal-Kote Protective Paint

OFFICES AND SALESROOMS
1008-1010 Pine Street
ST. LOUIS, MO.

FACTORY
EAST ST. LOUIS, ILL.

Products.

METAL-KOTE MAGNETIC OXIDE PAINT.

Also, FAUSTONE FLAT WALL FINISH, DUXBAK CONCRETE-KOTE, COLUMBIA HOUSE PAINT, BRIGHTLAC FINISHES, DAMP-PROOF ENAMELS.

Metal-Kote.

A perfect protective, magnetic oxide paint, for structural steel.

Colors.

Maroon, bronze green, brown, and black.

Uses.

Superior for structural steel, steel cars, bridges, water-tanks (both inside and outside), corrugated iron, metal roofs, cornices, pipes, gas holders, steel stacks, boilers, fences, galvanized iron or tin plate, fire-escapes, or for any other place where iron or steel is used in construction work.

Analyses of Pigments.

	Metal-Kote Magnetic Black Oxide Per Cent	Metal-Kote Magnetic Maroon Oxide Per Cent
Iron, calculated as (Fe_3O_4) Magnetic Oxide	95.07	
Iron, calculated as (Fe_2O_3) Ferric Oxide		94.83
Silica (SiO_2)	2.88	4.80
Alumina (Al_2O_3)	2.39	None
Lime (Ca O)	Trace	None
Moisture	Trace	.20

The brown is a mixture of maroon and black. The black is used as a base for the green.

Liquid Analysis.

The best known combination of raw linseed oil and ten per cent of long-oil varnish (which approximates two per cent of gum).

Physical Properties.

Metal-Kote is of uniform texture, elastic, and dries hard enough to give a maximum amount of wear. Because of its elasticity it readily expands and contracts, making it impervious to heat or cold. This elasticity is lasting. Due to the spongy nature of the pigment and to the gum in the oil, there is no danger of elastic and cohesive linoleic acid changing into brittle linoxin, which is the cause of the final destruction of paint film.

Colors Without Adulteration.

Magnetic oxide of iron paint is the only protective paint which is manufactured in three colors without the addition of adulterants. It has good covering properties, works well under the brush, and is equally practicable for spraying (barrels are equipped with agitators which keep pigment in suspension, preventing clogging). Metal-Kote produces a paint film free from voids, and dries quickly as a hard, cohesive skin, adhering to the surface with remarkable lasting qualities. It produces a coat free from porosity, never before attainable.

Metal-Kote pigments are different from all other iron pigments in that they are amorphous or spongy, not crystalline, as are the latter, making it possible to thoroughly incorporate them with oil. This spongy nature more thoroughly stops up the pores in the linseed oil than is the case when crystalline pigments are used.

Special Qualities.

Metal-Kote is inhibitive and rust-retarding, whereas carbon and graphite paints, when used on steel, stimulate corrosion. Metal-Kote is inert, having no detrimental effect upon linseed oil. Metal-Kote is unaffected by gases and, being opaque, thoroughly covers surfaces to which it is applied.

Record.

Metal-Kote and other magnetic oxide paints have been on the market for more than seven years and have withstood the most severe conditions, such as salty atmosphere along the coast, the alkalies and acids in gas holders, and locomotive fumes on railroad bridges and in train sheds.

Cost.

Metal-Kote is less expensive than red lead. Metal-Kote is far superior to the hard coat produced by red lead, which has a tendency to crack and peel, and in cases has shown unmistakable evidence of alligatoring. (See Cushman and Carter, "Report on Atlantic City Test.")

How to Specify.

Shop Coat—All metal must be thoroughly cleaned free from dirt, grease, scale, and moisture, and given one coat of Metal-Kote Maroon Protective Paint. All places which are to be enclosed, or in contact, must receive a coat of Metal-Kote before assembling.

Field Coat—Wherever the shop coat has been injured, such places must be repainted. The entire surface must be repainted with one or two coats of Metal-Kote Protective Paint. Each coat must be of a different color, and must thoroughly dry before applying another coat.

All materials, cleaning and painting shall be subject to the inspection of the purchaser or his representative. The head of the paint package must be removed and the paint thoroughly stirred. No adulterating oils or thinners shall be used. The paint must be well brushed in. Metal-Kote must be furnished at the shop and on the field in original packages, prepared ready for use, as manufactured by the PHELAN-FAUST PAINT MFG. COMPANY, St. Louis, Mo.

Correspondence Invited.

With architects, civil and mechanical engineers, builders, and all others interested in the protection of construction work. Complete booklet and color cards mailed on request.

TROPICAL PAINT & OIL CO.

MANUFACTURERS OF

Structural, Decorative, and Technical Paints of Scientific Reliability

GENERAL OFFICE AND FACTORIES

CLEVELAND, OHIO

Products.

Exterior products, including ELASTIKOTE, an Exterior Protective Paint, TROPICAL FINEST OUTSIDE GLOSS WHITE, NO-DE-KA SHINGLE STAIN, CEMENTKOTE, ENGLISH STRUCTURAL PAINT, etc.

Interior products, including FLOORKOTE, TOCOTONE, ALPINE WHITE ENAMEL, TOCO MILL WHITE, TOCONAMEL, etc.

Elastikote.

A high standard protective and preservative paint, made in strong positive colors, designed for general use on all exterior surfaces exposed to severe weather where solid, substantial, durable paint protection is required. In the manufacture of Elastikote certain defects in ordinary keg lead and linseed oil paints, as well as in ordinary prepared paints, have been overcome, and a resulting product far superior in actual durability and elasticity has been produced. Elastikote contains a certain percentage of a specially prepared natural, hardened gum. This gum is scientifically fused and blended with the usual paint pigments, and the resulting combination, thoroughly ground and mixed in pure linseed oil, forms the basis of Elastikote, to which are added only the purest and most durable tinting colors.

Elastikote, applied to wood, metal, brick, stone, cement, etc., is probably the only paint made that possesses the necessary elasticity, toughness, adhesiveness, waterproofing and weather-resisting qualities necessary to conform to the various conditions met with in treating the several surfaces mentioned, and from which dependable results can be obtained.

Tropical Finest Outside Gloss White.

This product, gotten out originally for private use only, is the essence of perfection in exterior paint. Made in white only. Is unaffected by sulphur fumes, gases, etc., and produces a solid, durable and beautiful finish. Is a pure white; spreads and covers economically, and will last longer than other exterior white paints.

English Structural Paint.

The protection of metal against rust, corrosion and electrolysis is a waterproofing problem, and its solution can be accomplished only by the use of a continuous impervious insulation that will protect it from contact with moisture. English structural paint is a product composed of materials that experience has shown will meet the conditions of metal painting and waterproofing most successfully; and is far superior to ordinary oxide, red lead, or graphite and other mixtures frequently used for the purpose.

Cementkote.

A preservative and decorative paint for exterior dampproofing of cement, brick or stone walls above ground. Dries with a dull finish, and is proof against alkaline conditions always met with in treating surfaces of this kind.

Floorkote.

A durable, alkaliproof, waterproof concrete floor finish, designed primarily to overcome the characteristic defects of concrete. Dries hard, with a high tile-like gloss; resists wear, and is easily cleaned.

Tocotone.

A durable, non-absorbent, washable and highly decorative interior flat wall paint. Tocotone can be used upon all interior plaster surfaces—rough, smooth, pebbled; also upon composition wall board, metal ceilings, wood trim, and upon burlap and other fabric wall coverings. From a decorative standpoint, a dull, smooth, clean tinted finish on plaster walls and ceilings is far more preferable to fading wall paper or glaring gloss paints. Tocotone is designed for the finest work, but its moderate cost and unusual durability permit of its being used on all interior work.

Alpine White Enamel.

The finest domestic enamel that can possibly be secured. Equal in whiteness, spreading qualities and durability to the best imported brands.

Toco Mill White.

A solid body, white paint in dull or gloss finish, designed expressly for mill work and other large surfaces. Stays white.

Toconamel.

A hard service enamel, in white and colors, intended for all interior use. Withstands washing. Taintless, odorless, and nonpoisonous.

U. S. GUTTA PERCHA PAINT CO.

Manufacturers of Paint and Varnish

PROVIDENCE, R. I.

Products.

Manufacturers of RICE'S PAINT SPECIALTIES: RICE'S MILL WHITE—Gloss, Egg Shell or Flat—for Mill and Factory Ceilings and Walls of wood, brick and concrete; FLAT MILL WHITE for Office Use; CHEMIC-ENAMEL; FLAT WALL COATING; GRANOLITH CONCRETE COATING; RICE'S REINFORCED PAINT for Outside Use; GLOSS-O-LITE; FLOW-ON; CHINALINE; and other PAINTS and ENAMELS for Interior and Exterior Finish, Structural and Metal Protection; CEMENT FLOOR PAINTS; DAMP-RESISTING and WATERPROOFING PAINTS and COMPOUNDS; TECHNICAL PAINTS; GUTTA PERCHA PAINT; ERIC STRUCTURAL PAINT; "SPECIAL PAINTS for Special Uses."

Rice's Mill White—Gloss.

Rice's Gloss Mill White is the *original* light-reflecting permanent paint for mill and factory ceilings and walls. It will not craze nor crack, because the gloss does not depend upon varnish, but on an exclusive process of treating the oil. This insures a durable result and a free flowing paint. All other gloss paints are of necessity made from varnish.

The glossy surface can be washed and kept clean. Rice's Mill White has the whiteness of French zinc; more body or opacity than white lead; produces an enamel gloss; flows as freely as ordinary oil paint. Stays white longer than any other gloss paint possibly can. A fair estimate for covering is about 400 square feet to the gallon, each coat, on woodwork. See Specifications on this page.

Price, January, 1916: $1.75 per gallon in barrels, f.o.b. Providence.

Rice's Mill White—Egg Shell.

Rice's Egg Shell Mill White is like Rice's Gloss Mill White in all respects except gloss. Gives a finish which has just enough "shimmer" or "surface film" to shed dust and dirt and withstand occasional washing. See Specifications on this page.

Price, January, 1916: $1.75 per gallon in barrels, f.o.b. Providence.

Rice's Mill White Undercoat.

Rice's Mill White Undercoat is used for priming under Rice's Mill White. It is made to improve the adverse conditions which the paint is called upon to meet when lumber is sappy and unseasoned. See Specifications on this page.

Price, January, 1916: $1.50 per gallon in barrels, f.o.b. Providence.

Rice's Flat Mill White, Office Use.

Rice's Flat Mill White produces a velvet-like, dull, or flat finish. Even though flat, it withstands occasional washings, flows freely, leaving no brush marks or streaks. Has intense opacity. See Specifications on this page.

Price, January, 1916: $1.75 per gallon in barrels, f.o.b. Providence.

Chemic-Enamel.

Chemic Enamel is for laboratories, bakeries, dye and bleach houses and other places where chemical fumes, excessive heat, steam or other discoloring agents may be prevalent. It has all the physical qualities of Rice's Mill White in its intense whiteness and brilliant luster, and, in addition, resists the action of discoloring agents better than does any other paint or enamel.

Price, January, 1916: $2.00 per gallon in barrels, f.o.b. Providence.

Rice's Granolith for Walls and Ceilings.

Rice's Granolith is a concrete, cement, and brick coating. It retards dampness. Sometimes a single coat only is applied. Its largest use is as an undercoat on concrete, cement and brick for finishing coat or coats of Rice's Mill White. See Specifications on this page.

Price, January, 1916: $1.50 per gallon in barrels, f.o.b. Providence.

Granolith for Cement Floors.

Granolith, for cement floors, stops the forming of dust which is constantly wearing from cement floors. It penetrates sufficiently to bind well and become a part of the cement surface. It gives a more uniform and sightly appearance to cement floors and allows of keeping them clean. Especially suited for hospitals, schools and other public institutions and for modern factories and stores.

Price, January, 1916: $1.50 per gallon in barrels, f.o.b. Providence.

Specifications.

FOR FACTORY AND MILL USE

THREE-COAT WORK

First Coat—Rice's Mill White Undercoat. Let this stand as long as practicable before applying the second coat.

Second Coat—If knots or sappy spots show through priming coat, shellac these spots well and then apply a second coat of *Rice's Mill White Undercoat.*

Third Coat—Rice's Mill White (Gloss or "Egg Shell").

TWO-COAT WORK

Where the surface is well dried out and economy desired, it will be found possible with one coat each *Rice's Mill White Undercoat* and *Rice's Mill White* to secure satisfactory results heretofore impossible to obtain with two coats of any other white paint.

CONCRETE AND BRICK

First Coat—Rice's Granolith.
Second Coat—Rice's Granolith.
Third Coat—Rice's Mill White (Gloss or "Egg Shell").

FOR OFFICE USE, AND OTHER INTERIOR WORK REQUIRING A FLAT FINISH

PLASTER WALLS

First Coat—Rice's Flat Mill White—Office Use. This coat to be thinned down in the proportion of one gallon of the Paint to a half gallon Raw Linseed Oil and one quarter pint good Liquid Dryer.

Second Coat—Rice's Flat Mill White—Office Use.
Third Coat—Rice's Flat Mill White—Office Use.

WOOD WORK

First Coat—Rice's Flat Mill White—Office Use. This coat to be thinned slightly with about one quarter pint each Linseed Oil and Turpentine.

Second Coat—Rice's Flat Mill White—Office Use.
Third Coat—Rice's Flat Mill White—Office Use.

All the above to be delivered on the job in the original packages bearing the name of the manufacturers, U. S. GUTTA PERCHA PAINT CO., Providence, R. I.

All paints to be used as received from the manufacturers, except that if any thinning is required a very little pure turpentine may be used (unless as otherwise specified).

Continued on next page

Rice's Reinforced Paint, Exterior.

Rice's Reinforced Paint is a scientifically machine-made paint designed in the interest of consumers. Durability is the chief feature. The formula is the result of years of practical tests and experiments conducted by the makers, and these tests have been confirmed by the elaborate scientific tests of the American Society for Testing Materials and the Paint Manufacturers' Association, at Atlantic City, N. J.; Pittsburgh, Pa.; Nashville, Tenn., and Fargo, N. D.

Rice's Reinforced Paint contains the proper percentage of lead, enough zinc to prevent chalking, enough additional reinforcing pigments to insure the most resistant coating, and pure linseed oil treated by a process that removes all objectionable constituents. These components are thoroughly and intimately blended by special machinery, insuring absolute uniformity.

Price fluctuates according to linseed oil market.

A brief booklet outlining the good qualities, viewed from the standpoint of engineers and architects, has recently been published.

Gloss-O-Lite, Interior.

Gloss-O-Lite, "The Paint that floods rooms with Light," produces a hard enamel gloss finish with fewer coats than is possible with any other enamel. It flows very freely, and in this respect, and because of its intense body or opacity, it is more like a paint than an enamel. It is pure white and will withstand frequent washing, such as is customary in hospitals, breweries, dairies, laundries, stores, hotels and cold storage plants.

Gloss-O-Lite is similar to Rice's Mill White (see preceding page) as to whiteness, gloss and covering properties, but it is made to dry harder so as to better withstand the constant cleaning and "hard knocks" associated with such places as are named above. Also furnished in Egg Shell and Flat. See Specifications following.

Price, January, 1916: $2.00 per gallon in barrels, f.o.b. Providence.

Chinaline, Interior and Exterior.

Chinaline is the finest enamel possible to make. It is superior to all domestic and imported enamels because it holds its pure white color better. The finish is like porcelain, for there are no brush marks or laps. Chinaline contains no lead and is sanitary, non-poisonous and germproof, making it especially adaptable for hospitals and other institutions. The finish is a beautiful luster. It can be rubbed and polished; but to save this labor Chinaline is made also in Flat or Egg Shell Finish. See Specifications following.

Price, January, 1916: $5.00 per gallon in barrels, f.o.b. Providence.

Flow-On.

Flow-On is an interior oil paint in semi-paste condition, capable of producing a flat, washable finish when thinned. It contains no varnish nor China wood oil. It flows freely and eliminates all brush marks and streaks even on large wall surfaces. Being in semi-paste form, it can be reduced with reference to the number of coats to be used and the kind of surface on which it is to be applied. Used largely in tints for offices. See Specifications following:

Price, in semi-paste form, January, 1916: $1.75 per gallon in barrels, f.o.b. Providence.

Eric Structural Paint.

Eric Structural Paint is for iron and steel construction work. Made from a combination of pigments which are practically indestructible, and combined with a vehicle which is specially treated to be durable and to dry properly. Made in Black, Olive Green and Maroon.

Price, January, 1916: $1.50 per gallon in barrels, f.o.b. Providence.

Specifications for Interior Painting of Hospitals and Other Institutions.

PLASTER SURFACES

First Coat—Size all surfaces with a priming coat made of 25 pounds of pure White Lead, well mixed with three gallons of best quality of pure Linseed Oil, containing sufficient Turpentine Dryer to set the coat thoroughly hard.

Second Coat—When this coat is thoroughly dry, apply *Rice's Flow-On* (Semi-paste form) as made by the U. S. GUTTA PERCHA PAINT CO. of Providence, R. I. This to be thinned in the proportion of one quart of pure Turpentine to one gallon of *Flow-On*.

*Third and Fourth Coats—Rice's Chinaline** (Gloss or "Egg Shell").

WOOD WORK

First—Shellac all knots and sap spots.

First Coat—Rice's Flow-On (Semi-paste form). This coat to be thinned with about a quart of a mixture of Turpentine and Linseed Oil of the proper proportion.

Putty all nail holes, etc.

Second Coat—Rice's Flow-On (Semi-paste form). This coat to be thinned with about a quart of Turpentine to the gallon.

*Third Coat—Rice's Chinaline** (Gloss or "Egg Shell").

BRICK, CONCRETE AND CEMENT

First Coat—Rice's Granolith Concrete Coating (Ready for use).

Second Coat—Rice's Flow-On (Semi-paste form). This coat to be thinned with about a quart of Turpentine to the gallon.

*Third Coat—Rice's Chinaline** (Gloss or "Egg Shell").

*For a less expensive finish which may be used for certain work, substitute *Rice's Gloss-O-Lite* for *Rice's Chinaline*. Descriptions, showing the difference in grade of these two finishing enamels, are given above.

IN GENERAL

For best results with any paint, time should be allowed for plaster, concrete, cement and unseasoned lumber to become as dry as possible.

The various coats of paint must be carefully spread with full, clean brushes and worked out smooth or even, so that no spots, clouds or brush marks show.

At least forty-eight (48) hours must be allowed between all coats.

Testimonials and Samples.

Partial lists of users, samples and circulars describing all the above in detail can be had for the asking.

Samples filed with Architects Samples Co., 101 Park Avenue, New York, N. Y.

Specification Forms.

Engineers and architects will be furnished with specification forms on application if they will mention the finish in which they are interested. The specifications will name the proper primers and give recommendations for the proper "building up" of a surface preparatory to receiving paints or enamels.

Packages.

All paints and enamels are shipped in automix barrels. These barrels are equipped with churns so that by simply turning the crank, which is furnished with the apparatus without charge, the contents are kept thoroughly agitated and uniform results are assured.

Sales; Prices.

All sales direct to users; not sold through dealers. One price to all. Prices subject to change due to fluctuation in cost of raw materials.

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Products.

PAINTS, COATINGS and ENAMELS, including "BAY STATE" BRICK and CEMENT COATING, a Sanitary, Damp- and Fire-Resisting Finish Coating for cement, concrete, brick, plaster, and wood; "BAY STATE" DULTINT, a Flat Oil Paint with Water-color Effect, giving a washable surface; "BAY STATE" ENAMELS No. 2 and No. 3, for applications where Gloss or Eggshell Finish respectively is desired; WAHCO ENAMEL for Mill Work.

TRADE-MARK
Reg. U. S. Pat. Off.

"Bay State" Brick and Cement Coating.

This coating is composed of carefully selected pigments, carried in a volatile liquid which evaporates upon application, and when applied to concrete, cement, brick, plaster or wood incorporates itself as a part of the material, resisting dampness, and thus affording protection to the surface upon which it is applied. It contains no lead, glue, caseine or water and resists the attacks of alkalies, acid fumes, gases, steam, and extremes of temperature. It dries with a dull uniform finish, and is made in white and in several soft, rich color-tones.

"Bay State" Brick and Cement Coating is the only permanent paint or coating which bears the National Board of Fire Underwriters' label. The superiority of this, the original of all cement coatings, is also indicated in the facts that it is applicable to nearly all surfaces, even when somewhat moist, and that it will not turn yellow from exposure.

Scope of Use.

"Bay State" Brick and Cement Coating is supplied in several modifications to particularly suit it for the services indicated below:

For Exterior and Interior Cement, Concrete, Porous Brick and Plaster Surfaces—In these applications "Bay State" Coating serves both as decoration and protection. It prevents exposed surfaces from absorbing and showing dampness after storms. Has been effectively applied in cases of factories, hospitals, laboratories, laundries, mills, dwellings, light-shafts, cold storage and packing houses, office buildings, hotels, etc.

For Cement Floors—"Bay State" Coating overcomes the annoyance and damage occasioned by the dusting of cement floors. It provides a surface of exceptional wearing and sanitary qualities. Prevents staining and absorption and reduces traction noise. Can be readily washed with soap and hot water. Made in several special colors, and in first and second coats.

For Mill Work, etc.—Its sanitary and fire-resisting qualities find effective application in mill and factory interiors and in boiler and engine rooms. "Bay State" Coating for mill work protects the surface against disintegration and scaling, a feature valuable in the preservation of intricate machinery. Its flat velvety water-color finish reflects light very effectively. Can be washed with soap and water.

For Damp-proofing Above Grade—In this use on exterior surfaces "Bay State" Coating is characteristically effective. A sure bar against exterior moisture and will prevent hair-cracking on exterior cement surfaces.

For Interior Woodwork—Can be used on interior woodwork by itself as a dull finish, and over such surfaces it serves as an Underwriters' approved fire-retardant. Can also be used as an undercoat for "Bay State" No. 2 or Wahco Enamels.

Comparative Cost.

"Bay State" Brick and Cement Coating costs less per gallon than lead and oil paint. While it covers slightly less surface in area, one coat covers better than two and frequently better than three coats of lead and oil or other paints, showing a reduction in cost of material, with a great saving of labor and time. It being a permanent finish, it is not in the class with water paints which show rapid disintegration.

"Bay State" Dultint.

Dultint is a durable interior oil paint, giving a dull or soft, flat, artistic appearance so much desired now on interior walls, ceilings, etc., such as hospitals, schools, public buildings and private dwellings. It is easily washed and can be applied to all interior finish, such as wood, plaster, burlap, canvas, iron, beaver board, paper, metal ceilings, etc. It has great covering capacity, working easily under the brush, and does not show laps and streaks. Dries over night.

Samples—Booklet and color card are free for the asking; also, samples of coating on small bricks or

Buyer's Guidebook

Continued on next page

cakes of cement, etc. When sending for such samples, state whether they are wanted on brick, cement, wood, or plaster. Working samples for demonstration to architects or owners free on application.

Enamel Finish.

First Coat for Enamel Finish—Many surfaces of brick, cement, iron and wood, on interiors, are desired in a glossy enamel finish and "Bay State" Brick and Cement Coating, Wahco Flat or Dultint forms an ideal first coat for such work, drying hard and perfectly flat.

"Bay State" Enamels No. 2 and No. 3.

For Finishing Coats—"Bay State" Enamel No. 2 is made for enamel interior finish over "Bay State" Brick and Cement Coating or Dultint, and is adapted for use in office buildings, hospitals, engine-rooms, bathrooms, kitchens, laboratories, etc. It can be washed without injury, and is a most durable enamel. It may be left full gloss, or rubbed with pumice and water to a porcelain finish. Made in colors if desired. Samples on application.

Bay State Enamel No. 3, a high-grade enamel for interior use, dries with an eggshell gloss, dispensing with the labor of rubbing.

Wahco Enamel.

For Mill Work—Wahco, a special enamel of less price than "Bay State" Enamel No. 2, which is specially adapted to factories and mill work. Samples on application. Made in first (flat) and second (gloss) coats.

The amount of light reflected from the walls and ceilings prepared with these twin whites will more than pay for the labor and material used.

Orders, Shipments and Payment.

Order from nearest office, store or agent. Immediate shipment can be made. Terms, 60 days, less two per cent 10 days. Satisfactory rating or references required.

Application Data.

Brick, cement, concrete, stucco and wood, unless excessively rough, porous and weather-beaten, will ordinarily require but one coat of "Bay State" Brick and Cement Coating. Interior plaster will require two or three coats of "Bay State" Brick and Cement Coating or Dultint. The following table shows requirements for first coat, under different conditions:

"Bay State" Brick and Cement Coating—On brick or concrete hard finish, one gallon to cover not over 18 square yards.

On brick, concrete, rough or porous or exterior rough plaster, stucco, one gallon to cover not over 15 square yards.

On plaster, interior, hard finish (over first coat), one gallon to cover not over 30 square yards.

"Bay State" Enamel No. 2—Over undercoat of "Bay State" Brick and Cement Coating or Dultint, one gallon to cover not over 30 square yards.

Specifications.

Clean off all loose particles from all surfaces before priming.

New Interior Plaster Walls:

Coat No. 1—Apply one coat of "Bay State" Brick and Cement Coating for Plaster, thinned with *pure* spirits of turpentine, not over one pint to a gallon of coating.

Coat No. 2—Apply one good, flowing coat of Special Plaster Cement Coating for Plaster, as taken from the original package.

Coat No. 3—If third coat is necessary, apply same as Coat No. 2.

Exterior Brick, Concrete, Cement and Stucco:

Coat No. 1—Apply one flowing coat of Cement Coating with a wide wall brush, as taken from the original package.

NOTE—This one coat should cover sufficiently well to give a good finish. If a more dense surface is desired an extra coat may be applied, allowing twenty-four to forty-eight hours between coats.

Interior Brick, Concrete or Cement:

Same as foregoing.

Cement Floors—Two coats *must* be applied; the "First Coat" as a priming coat, which insures a proper foundation for the "Finish Coat." "First Coat" (a liquid of neutral color) to be tinted with a small quantity of the "Finish Coat" (about ¼ gallon to 1 gallon).

General Interior Finish:

Priming Note—"Bay State" Brick and Cement Coating, Wahco Flat or Dultint will make an excellent ground coat for "Bay State" Enamel No. 2 or No. 3 or Wahco Enamel, as either dry perfectly flat and hard. Allow 24 hours for drying.

Enamel Finish—Sandpaper the primed surface (see Priming Note above) thoroughly and apply a good flowing coat of "Bay State" Enamel No. 2 [or No. 3 or Wahco Enamel]. Do not apply on surfaces which contain any dampness, as moisture will cause blisters and peeling.

Woodwork—Sandpaper the priming surface (see Priming Note above) thoroughly and apply one or two heavy coats of "Bay State" Enamel No. 2 [or No. 3 or Wahco Enamel]. (If two coats of enamel are used, sandpaper lightly the first coat.)

NOTE—Do not use "Bay State" Brick and Cement Coating on vitrified, granolithic or any other non-absorbent surface, nor over a surface that has been smoothed up with neat cement.

REFERENCES

OWNER, LOCATION, AND ARCHITECT OR ENGINEER

Beverly Hills Hotel, Beverly Hills, Cal., Elmer Grey
First Church of Christ, Scientist, San Diego, Cal., Irving H. Gill
H. C. Merritt, Pasadena, Cal., William F. Thompson
Rear Admiral Uriel Sebree, Residence, Coronado, Cal.
Tampa City Hall, Tampa, Fla., Bonfoey & Elliott
Western Reserve Club, Cleveland, Ohio, Ferd. W. Striehinger
McLaughlin Estate Building, San Francisco, Cal., William Koenig
Sears, Roebuck & Co.'s Warehouse, Seattle, Wash.
Cincinnati Post, Cincinnati, Ohio, Moser & Son
Idaho Capitol, Boise, Ida., Tourtellotte & Hummel
American School of Classical Studies, Athens, Greece, W. S. Thompson
Knickerbocker Club, New York, N. Y., Delano & Aldrich
National Cold Storage Co., Brooklyn, N. Y., David I. Davis
Orthopædic Hospital, 59th Street, New York, N. Y., York & Sawyer
Pasadena High School, Pasadena, Cal., Norman F. Marsh
Eureka High School, Eureka, Cal., W. H. Weeks
Craft Museum, Harvard College, Cambridge, Mass.
California Fruit Growers' Association Building, San Francisco, Cal., Santa Marina Estate Co., Owners
Dartmouth College, Hanover, N. H., H. A. Wells, Superintendent
Interior Ford Motor Co., Assembling Plant, Houston, Tex.
Bryant Fleming, Residence, 4 Penhurst Park, Buffalo, N. Y., Townsend & Fleming
Le Fever Residence, 915 South Orange and Grove Avenues, Pasadena, Cal., Buchanan & Brockway
Mrs. Ernest Allis, Residence, Louisville, Ky., Lewis Colt Albro
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Lord & Taylor Store, 5th Avenue, New York, N. Y., Starrett & Van Vleck
Y. M. C. A. Building, Brooklyn, N. Y., Trowbridge & Ackerman
Elmer Grey, Residence, Oak Knoll, Pasadena, Cal., Elmer Grey
Sanborn Flats, 809 St. Vaumont Avenue, Los Angeles, Cal., Ley Bros.
Geo. Faeber, Residence, Cleveland, Ohio, Gus Bohm
Van Nuys High School, Van Nuys, Cal., Allison & Allison
Colonial Country Club, Memphis, Tenn., John Gaisford
Bonney-Watson Co.'s Undertaking Parlors, Seattle, Wash., Saunders & Lawton
J. B. Chess, Jr., Residence, Beechwood Boulevard, Pittsburgh, Pa., E. B. Lee
H. B. Jackson, Residence, Houston, Texas, F. J. Marett
Henry Leiman, Residence, Tampa, Fla., Bonfoey & Elliott
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Kyanize KY-AN-IZE TRADE-MARK

Kyanize Spar Finish.

An absolutely waterproof varnish that will stand the most severe exposure, and remain under water for weeks without turning white or blue. It is not affected by salt air, heat, cold, sun, wind and rain. It is light in color, dries quickly and is very tough and elastic. Can be washed with hot or cold water, and will not crack, check, nor peel.

KYANIZE SPAR FINISH CAN

The most durable varnish for all exposed work, such as outside doors, store fronts, piazza floors, porch furniture and all marine work. Put up in distinctive triangular shaped cans for your protection.

Kyanize Floor Finish.

A durable tough elastic varnish, especially made to stand the scuff and tread of heavy shoes. It dries overnight with a good luster, and will wear longer on floors and stairs than any other varnish.

While especially made for floors, it is equally suitable for all interior standing finish that is to be left in the gloss.

Can be washed with hot or cold water without injury, and will not check, crack nor peel. Made in natural, and eight permanent colors, and sold only in sealed cans with our Gold Dome label.

KYANIZE FLOOR FINISH CAN

Rubbing and Polishing Varnishes.

This Company makes a complete line of rubbing and polishing varnishes for the high-grade architectural furniture and piano trade. Samples and prices sent free on request.

Sweet's Catalogue

Kyanize Cabinet Rubbing Varnish.

This varnish is especially recommended for high-grade interior work. Can be coated every forty-eight hours and rubbed in four days.

It flows freely, is very light in color and has extra good body.

We specially recommend this varnish for furnishing interior of churches, and for use on pews and seats; for all furniture and interior finish.

Samples of this varnish and panels of oak, mahogany or any kind of wood desired will be furnished free on request.

KYANIZE CABINET RUBBING VARNISH CAN

Kyanize Semi-Gloss Finish.

A most satisfactory finish for interior work where it is desired to get the rubbed effect without the labor and expense of rubbing.

It dries quickly with a velvety surface, and by the admixture of Kyanize Floor Finish any desired degree of dull surface can be obtained.

Can be tinted to any desired shade by mixing with pure colors.

KYANIZE SEMI-GLOSS VARNISH FINISH CAN

Kyanize Semi-Gloss Finish contains no wax and can be used in any climate; will dry hard without sticking. Can be used on new work, or over old varnish if the surface is clean and smooth, one coat over any filled or varnished surface making a splendid finish.

Specifications, Samples, Etc.

Specifications for using any of our varnishes, and sample panels showing the actual finish on different woods, also samples of the varnishes and any further information about the goods, will be furnished free to reliable architects on application for the same.

Continued on next page

Kyanize White Enamel.

The most durable enamel you can get. Will stand outside exposure without checking, cracking or peeling.

Suitable for highest grade work on wood, metal or plaster.

Flows very freely, dries with a waterproof film, and covers double the surface of ordinary enamel. Can be washed with hot or cold water without injury to the surface.

This is the enamel for very finest work on hospitals, public buildings and fine residences, steamships and all marine work.

Sample panel and book of specifications on request.

Kyanize enamel can be used on any surface—wood, metal, plaster, or brick—either interior or exterior, with satisfactory results, providing the undercoats have been properly applied. The greatest care should be used in building up the undercoats. Kyanize enamel is the finishing coat. It stands exposure, and is not affected by the weather or climatic changes, but it cannot be responsible for mistakes made in building up the undercoats.

Kyanize enamel is made in the gloss, eggshell, or dead flat, and any intermediate luster can be secured by intermixing gloss and flat.

Kyanize enamel can be furnished to match any desired light color.

Kyanize enamel will flow out perfectly smooth, and not show any brush marks made in applying the enamel, but it cannot smooth out specks or brush marks left on the undercoats.

Kyanize enamel should be applied at a temperature not less than seventy degrees.

It is put up ready for use, and should be used as taken from the can in all cases when one coat is applied; but if two coats are to be used, first coat should be thinned with half a pint of turpentine to the gallon.

CAUTION—Do not undertake to thin Kyanize enamel with varnish, oil or any other thinner except strictly pure turpentine, and then use turpentine only as specified.

IMPORTANT—It is absolutely necessary, in order to get a good job, to have each undercoat thoroughly rubbed with fine sandpaper or steel wool, so as to be sure to remove all brush marks or other imperfections, and leave a perfectly smooth surface for the application of Kyanize enamel.

Samples—Samples of Kyanize White Enamel either in the gloss, eggshell or flat finish, also sample panels of these different enamels, and any further information regarding these enamels will be cheerfully furnished on request.

SPECIFICATIONS, KYANIZE WHITE ENAMEL

FOR CLOSE-GRAINED WOODS

First Coat—Should be pure white lead ground in oil, thinned with one half raw linseed oil and one half pure turpentine, with small quantity of good japan dryer.

After applying this coat, putty all nail holes with white lead putty; sandpaper surface with fine sandpaper, and then give whole surface a coat of strictly pure white shellac, and sandpaper again before applying second coat.

Second Coat—One half pure white lead in oil and one half pure French zinc ground in oil; same to be thinned with one half pint of raw linseed oil to one gallon of turpentine.

Third Coat—One half pure white lead ground in oil, one half pure French zinc ground in oil, thinned with strictly pure turpentine only.

Fourth Coat—Kyanize enamel thinned with one half pint of turpentine to the gallon.

Fifth Coat—Kyanize enamel as taken from the can well flowed on.

For exterior work, above specifications are correct except that we recommend all pure white lead for the undercoats in place of part lead and part zinc.

GROUP OF KYANIZE WHITE ENAMEL CANS

FOR OPEN-GRAINED WOODS

Open-grained woods should first be filled with good paste filler well rubbed in. After this is dry and hard, sandpaper lightly, and give the whole surface a coat of strictly pure white shellac. Then lightly sandpaper again and finish as above.

PLASTERED WALLS

A thin sizing coat should first be applied to prevent suction, seal up the surface and prevent cracking. For this coat we recommend Kyanize Pigment Wall Sizing.

Then apply strictly pure white lead ground in oil.

First Coat—To be thinned with one quarter boiled linseed oil and three quarters turpentine.

Second Coat—To be thinned with pure turpentine, adding about half pint linseed oil to the gallon of turpentine.

Third Coat—To be strictly pure white lead thinned with pure turpentine only.

Fourth Coat—To be Kyanize enamel thinned with one half pint pure turpentine to the gallon.

Finishing Coat—To be Kyanize enamel as taken from the can.

We issue a Specification Booklet giving full information in regard to using Kyanize Enamel on metal surfaces, concrete, Portland cement and brickwork, which we will gladly furnish on request.

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Experience and Facilities.

For many years this organization has done experimental and pioneer work, with a view not only toward introducing new shades, but also toward studying the properties of different woods, and making all the finishes thoroughly practical and easy of duplication.

The rule not to recommend a finish which it does not honestly know to be the best for the purpose has made it necessary for this Company to develop a very complete line of finishes and to constantly keep its manufacturing facilities entirely up-to-date.

VIEW OF WOOD FINISHES DISPLAY ROOM, PERMANENT SERVICE DEPARTMENT, NEW YORK

Special Co-operative Service.

In connection with its regular co-operative mail service, this concern has established a Permanent Service and Display Office on the seventh floor of the Permanent Home Builders' Exposition, 6 East 39th Street, New York City. Here are exhibited over one thousand finishes on sections of real trim (with surface conditions as they are apt to occur in actual construction), embracing practically every desirable effect, and adapted to all types of buildings—from the million dollar hotel down to the modest cottage or bungalow.

A duplicate of this Service Department can also be found at the Chicago office, 78 West Lake Street, as well as at the Boston office, 8 Portland Street. In addition similar Service Departments, on a slightly smaller scale, are being established with representative distributors, centrally located in each American city.

It has been truly said that some of the finishes shown are a revelation in this field of decorative art. The very latest ideas and creations in treatment for woodwork and walls are on display, each being labelled with complete specifications. Discriminating architects who have already seen these exhibits pronounce them masterpieces of completeness and practicability.

Architects and others are invited to make free use of these special Service Departments in solving their wood finishing problems; to bring their clients to them and there work out their color plans and finishing treatments, alone, or in conjunction with a finishing expert of this company. Whenever impracticable to call, a telephone message for co-operative help will bring a quick, personal response.

Architects in other cities should make it a point to visit these exhibits when in New York, Chicago or Boston, as they are very centrally located.

Samples.

A large range of sample finishes is also on display at the Architects Samples Co., 101 Park Avenue, New York.

Continued on next page

Wood Finishing.

Principle—The correct principle in finishing all varieties of wood is to produce an even, smooth, elastic and durable finish with the use of as little varnish, wax or other finishing material as possible; i.e., to bring out or develop the beauty of figure and grain as simply and directly as feasible.

To follow this principle and assure clear and permanent results has been the basic idea back of Bridgeport Standard Wood Finishes since 1876. Their constantly increasing use among the most important residences and large buildings in this country proves that Bridgeport Standard Wood Finishes produce these results.

Possibilities—The variety of effects that can be obtained on both hard and soft woods is very extensive. But while many architects are familiar with the more usual finishes that can be produced on woods like oak, mahogany, birch and ash, comparatively few are really aware of the many newer, refined tonal possibilities of these woods, or fully realize what attractive and artistic finishes can be economically obtained on the less expensive woods, like pine, cypress and chestnut.

Wheeler's Silex Wood Filler.

The base of Wheeler's Wood Filler is a peculiar form of silex, specially prepared from rock crystal quartz. The silex used in Wheeler's Filler is exceptionally hard, and, in its finely pulverized form, consists of very small diamond-shaped crystals. These needle-pointed particles penetrate into the pores of the wood; and, when combined with a specially prepared binder of oils and japans, form a finishing foundation which is absolutely unchangeable, non-absorbent and non-shrinking.

Wheeler's Filler is easily applied, works readily, and dries hard and firm to the bottom of every pore. It takes varnish or wax so perfectly, yet economically, that it reduces the number of finishing coats. This saves the cost of extra materials and labor in applying, and assures, besides, more beautiful and more lasting results.

No silver white, gypsum, whiting, corn starch, western silex or other amorphous or round, soft, absorbent, shrinkable or deteriorating materials are used in Wheeler's Wood Filler.

Features of Wheeler's Filler.

(1) Varnish finds a firmer foundation on Wheeler's Filler, and will not shrink or pit as over other fillers.

(2) Woodwork properly finished with Wheeler's Wood Filler will remain permanently lively and bright. The filler will not darken the wood, nor will the finish become dim and dingy.

(3) With Wheeler's Filler for a foundation, less varnish or wax is required to cover a given surface than when other fillers are used.

(4) One coat of varnish applied over Wheeler's Wood Filler will stand out better and lie more even than over other fillers.

(5) Wheeler's Wood Filler covers more surface per pound than other fillers. (See "Covering Capacity.")

Form, Color and Price, Wheeler's Wood Filler.

Wheeler's Silex Wood Filler is supplied in paste and liquid form. The paste form should be used on all floors and on open-grained woods, such as oak, ash, chestnut, walnut and mahogany. Liquid filler is best adapted for close-grained woods, such as pine, cypress, whitewood and gumwood.

Wheeler's Paste Wood Filler is regularly made in the following shades. Special colors will be made to order.

No. 1—Natural or Transparent No. 3—Antique Oak or Walnut Golden Oak No. 7—Mahogany No. 10—Ebony	In 25-pound cans, price, per pound, $ .14 In 100-pound cans, price, per pound, $ .12

Liquid filler is carried only in transparent. Special shades made to order.

Transparent—In 1-gallon cans, price, each, $1.75.

How to Specify.

See "Application," on page following.

Stains.

In order to obtain the darker effects or tints without clouding the figure of the wood, it is necessary to stain the wood, before applying the filler.

Bridgeport Standard Stains are made in the following forms, each offering a special range of color possibilities.

Bridgeport Standard Penetrating Stains.

These stains penetrate deeply, and hold their color well. They do not lap nor raise the grain of the wood. Made in the following rich shades:

Dark Mahogany Penetrating Stain, for Mahogany effects of a rich red tone Brown Mahogany Penetrating Stain, for Browner Mahogany effects Early English Oak Penetrating Stain, for producing the Early English effect so much used on furniture No. 530 Mission Green Penetrating Stain	1-gallon cans, price, Mahogany shades, $3.50; other shades, $3.00.

Bridgeport Standard Penetrating Stain and Waxed Finish.

Used to produce various shades of mission finishes. Penetrates the wood deeply, and does not raise its grain or show laps. Can be used as one-coat finish, producing rich flat or waxed finish in one operation.

Continued on next page

Can also be filled over, and then finished with varnish, shellac or wax.

Prepared in seven shades:

Weathered Oak
Light Weathered Oak
Green Weathered Oak
Brown Oak
English Oak
Flemish Oak
Golden Oak

1-gallon cans, price, each, $3.00.

Bridgeport Standard (Breinig's) Acid Stains.

Made in several shades, for producing on wood peculiar and distinctive tones or effects not possible to obtain otherwise.

Supplied in:

Fumed Oak—all standard shades
No. 300 A Mahogany—a rich brown shade
Dark Mahogany—a rich red shade
Silver Gray
Standard Gray
Pearl Gray

1-gallon cans, price, each, $2.00.

Bridgeport Standard Wonder Lac.

A colorless liquid for use as a finishing coat over the popular brown and gray acid stains. Gives a delightful, soft finish without body or gloss, and is being specified on some of the finest work in the country. Being waterproof it thoroughly protects the wood.

Supplied in all sized packages on the basis of $3.00 in gallon cans.

Bridgeport Standard Prepared Wax.

This wax works easily, and dries with a hard, durable lustrous finish. Gives that velvet sheen or luster now so much desired for certain classes of work. Put up in full net weight packages.

In 1- and 2-lb. cans, price, per pound, $ .60.

Bridgeport Standard Wheeler's Architectural Varnishes.

These varnishes are manufactured by the same Company that has for years produced Wheeler's Wood Filler, which, from the first, was made so good that, solely on its merits, it became the standard of the world. Wheeler's Architectural Varnishes are guaranteed to be of the same quality in varnishes that Wheeler's Filler is in wood fillers.

They are just as safe to specify as Wheeler's Filler.

Made in the following types:

Interior, one-gallon cans, $3.00.
Floor, one-gallon cans, $3.00.
Spar, one gallon cans, $4.00
Flat, one-gallon cans, $3.25.

Covering Capacities.

One pound of Wheeler's Paste Filler will cover from 50 to 75 square feet; Liquid Filler, about 600 square feet to the gallon; Bridgeport Standard Stain, 500 to 600 square feet to the gallon; Bridgeport Standard Prepared Wax, about 300 square feet to the pound; Varnishes, over woodwork filled with Wheeler's Filler, about 350 to 400 square feet, one coat, to the gallon.

Area covered varies according to nature of surface material is applied to.

Application.

STAINS

Bridgeport Standard Penetrating Stain and Waxed Finish used as a one-coat finish—

Apply freely with a brush to the smoothly sanded wood. Allow to remain on the surface three to five minutes, after which wipe off the surplus and rub the work briskly with a cloth to a finish.

NOTE—Mahogany Stains are never used as a one-coat finish. They must be further protected. Allow all Mahogany Penetrating Stains to dry forty-eight hours; then apply one full coat of Bridgeport Standard Mahogany Quick Drying Primer. Allow same at least ten hours to dry, and sandpaper lightly with No. 00 sandpaper.

Bridgeport Standard Penetrating Stains—As distinguished from our "Penetrating Stain and Waxed Finish," these are not intended as a one-coat finish.

After wood has been stained with Penetrating Stains, the finish may be completed by several methods.

After staining open-grained woods like oak, ash or chestnut, fill with Wheeler's Paste Wood Filler of desired color, then finish with varnish, or shellac and wax, as desired.

Waxed effects may be best obtained by applying over the Penetrating Stains a thin coat of shellac, followed by two coats of Bridgeport Standard Prepared Wax.

For obtaining mahogany effects, use Mahogany Penetrating Stain of shade desired, and on close-grained woods, such as birch, pine or cypress, apply one coat of Bridgeport Standard Mahogany Primer and finish with varnish preferred.

Over Mahogany Penetrating Stains, best results are obtained with Mahogany Primer, which is especially made for use over these Penetrating Stains.

Bridgeport Standard Acid Stains—These stains are made in several shades for producing on wood peculiar and distinctive tones or effects not possible to obtain with Penetrating Stain.

The stain should be applied to the wood with a cloth, sponge or brush. After it has dried, lightly sandpaper to a smooth surface with No. 00 sandpaper, give a thin wash of shellac and finish with Bridgeport Standard Prepared Wax. For a varnish finish, after staining, fill with the proper shade of Wheeler's Filler and then varnish.

The newest and most popular type of finish is to apply two coats of Bridgeport Standard Wonder Lac directly over the Acid Stain.

Continued on next page

WHEELER'S PASTE WOOD FILLER

When properly reduced, apply filler with a brush, and allow to stand three to five minutes, or until it has set, and rub in across grain with sea-grass or waste, freeing the wood of any excess filler, leaving the surface clean. Allow at least forty-eight hours to dry; sandpaper lightly with No. oo sandpaper before applying finishing coats.

On Chestnut—Must be reduced with turpentine or benzine, about fourteen pounds to the gallon of liquid.

On Oak, Ash, Walnut, Mahogany and Woods of Equal Texture—Must be reduced with turpentine or benzine, about twelve pounds to the gallon of liquid.

On Birch, or Woods of Equal Texture—Must be reduced about ten pounds to the gallon of liquid.

On Maple, Pine and Woods of Equal Texture—Must be reduced about eight pounds to the gallon of liquid.

WHEELER'S SILEX LIQUID WOOD FILLER

Must be applied as it is found in the package, with a clean brush. Use only on close-grained woods, such as pine, cypress or woods of equal texture. Allow twenty-four hours to dry, and sandpaper lightly with No. oo sandpaper before applying future finishing coats.

BRIDGEPORT STANDARD PREPARED WAX

Apply with a cloth, in a thin, even coat, as it is found in the package. Care must be taken to lay off with the grain of the wood. Allow at least thirty minutes to set; then rub, alternately across and with the grain of the wood, with carpet or a weighted brush, to a polish. Finish the rubbing with the grain of the wood.

BRIDGEPORT STANDARD WONDER LAC

Apply with a brush. Allow to dry three or four hours, then apply second coat. Two coats can be applied the same day.

NOTE—Wonder Lac is intended for use only over Acid Stains.

Special Stained Effects.

Golden Oak Finish—There are two processes for obtaining a Golden Oak finish. Golden Oak Wheeler's Filler not only fills the pores of the wood, but stains it to a Golden Oak shade in one operation.

This can be used on almost any wood; it is particularly adapted, however, for straight oak, ash, chestnut and pine.

While Wheeler's Golden Oak Filler can be used on quartered oak, we recommend our Golden Oak Penetrating Stain and Waxed Finish in connection with No. 3 Wheeler's Filler; this combination, bringing out the flakes in contrast to the dark pores, presents a very rich effect.

For softer woods, like pine and cypress, we also recommend Golden Oak Penetrating Stain and Waxed Finish. Over this stain Wheeler's Silex Liquid Filler, and shellac, varnish or wax may be used, as desired.

Fumed Oak Effect—Fumed Oak Finish is a peculiar shade of light brown, heretofore generally obtained by subjecting oak to the fumes of ammonia in a "fuming box." This peculiar shade, however, can be obtained by applying freely, to oak, any of our standard shades of Bridgeport Standard Fumed Oak Acid Stain. When dry, sandpaper lightly, and then finish with two coats of Bridgeport Standard Wonder Lac, or a thin coat of orange shellac, and finish with Bridgeport Standard Prepared Wax.

Bridgeport Standard Gray Acid Stain—For producing a peculiar light gray effect on various woods.

White Pores in Wood—Open-grained woods, like oak, ash and chestnut, may be given very peculiar and artistic effects by staining with our Acid Stain, then filling with Special White Wheeler's Filler and finishing with Bridgeport Standard Prepared Wax. The result is wood with a tinted or dark undertone and a white pore, the grain standing out very conspicuously and presenting an unusual and artistic effect.

Further Service Information.

On receipt of samples of the actual trim to be used in a building and particulars as to effects preferred, the samples will be finished as desired and promptly returned, together with complete specifications, explaining how to obtain the illustrated effects. The many years' experience of the experts of this company guarantee that the solutions to such problems will be not only most artistic, but also most practical.

If, in accepting the specifications thus supplied, the architect will make sure that exact materials recommended are correctly used, good results are positively assured.

A standard set of up-to-date finishes for architects' use will be gladly furnished on request.

Recommendations regarding the use of the other products listed in the "Products" paragraph, such as the highly indorsed "Washotint" flat washable wall paint, will also be made when desired.

References.

The following are a few of the thousands of instances, among larger structures, in which Bridgeport products have been used:

New Railway Exchange Building, St. Louis, the largest in the world.
Biltmore Hotel, New York
Ritz-Carlton Hotel, New York
Hotel Astor, New York
New York Stock Exchange
Rockefeller Building, Cleveland
Carnegie Building, Pittsburgh
Stratfield Hotel, Bridgeport
New Municipal Buildings, Springfield
New Miami Hotel, Dayton
Statler Hotel, Detroit
William Penn Hotel, Pittsburgh

ESTABLISHED 1850

EMIL CALMAN & CO.

MANUFACTURERS OF

Highest-Grade Varnishes and Enamels, and Damp-Resisting Paints

100 William Street
NEW YORK, N. Y.

234 West Lake Street
CHICAGO, ILL.

FACTORY: LONG ISLAND CITY, N. Y.

Products and Services.

We manufacture a full line of high-grade VARNISHES, ENAMELS and FILLERS. The following are the leading architectural specialties: ENAMOLIN; ELASTIC SPAR VARNISH; ALL IN ONE VARNISH; INTERIOR SPAR VARNISH; NAMLAC FLOOR FINISH; FLAT-LAC; FLOOR FLAT-LAC; TERPOLAC; CALMAN'S SILEX PASTE WOOD FILLER.

A large wood-finishing department is maintained which is always at the architect's command, and we will gladly finish up special boards to order, carrying out original ideas of the architects in regard to wood finishes, color schemes, etc.

Enamolin.

The highest grade of white enamel manufactured in the United States or Europe. It is the whitest and most durable enamel in the market, and will not check, crack, peel nor flake on indoor or outdoor work. It is made in gloss, eggshell and flat; also, cream, ivory and colors. List price, $6.00 per gallon.

Enamolin

TRADE MARK

Specify—Three coats of lead and oil, one coat Calman's Flat Enamolin, one coat Calman's Gloss Enamolin.

Interior Spar.

The most durable interior finish on the market. It may be scrubbed with soap and water or ammonia and water without injuring it in the slightest degree. It will not check, scratch nor mar white. Interior Spar may be rubbed to a dull finish or polished if desired. List price, $3.00 per gallon.

Specify—On open grained woods fill with Calman's Silex Paste Filler, then apply three coats of Calman's Interior Spar.

On close-grained woods omit paste filler and apply Interior Spar direct to the wood.

Namlac Floor Finish.

The toughest and most durable floor finish. It is especially adapted for parquetry and natural wood floors, as it possesses greater elasticity and wearing properties than any other floor finish. It will not show scratches nor heel marks. It is absolutely waterproof and may be washed as often as is necessary. List price, $3.00 per gallon.

Namlac FLOOR FINISH

TRADE-MARK

Specify—On open-grained woods fill with Calman's Silex Paste Filler; then apply three coats of Calman's Namlac Floor Finish.

On close-grained woods use no filler or shellac. Apply three coats direct to the wood.

Flat-Lac.

When applied over a varnished surface it produces the exact effect of a rubbed varnish without the expense of rubbing. It is very elastic, durable and waterproof. It will not scratch nor mar white like wax preparations. One coat of Flat-Lac over stain makes a perfect Flemish Finish. List price, $3.00 per gallon.

Flat-Lac

TRADE MARK

Specify—On open-grained woods fill with Calman's Silex Paste Filler; then apply two coats of Interior Spar and a finishing coat of Calman's Flat-Lac.

On close grained woods apply one coat of Terpolac, two coats Interior Spar, one coat Flat-Lac.

Continued on next page

Floor Flat-Lac.

When applied over two coats of Calman's Namlac Floor Finish, produces the same effect as a shellacked and waxed floor, without having the dangerous slipperiness of wax. It is absolutely waterproof and will not scratch nor mar white. It is also excellent for standing work, either natural or strained, where a quicker drying and heavier-bodied article than our regular Flat-Lac is desired. List price, $3.00 per gallon.

Floor Flat-Lac

TRADE-MARK

Specify—On open-grained woods fill with Calman's Silex Paste Filler; apply two coats of Calman's Namlac Floor Finish, and a finishing coat of Calman's Floor Flat-Lac.

On close-grained woods use no filler or shellac (on floors), but apply two coats of Calman's Namlac Floor Finish and a finishing coat of Floor Flat-Lac.

All In One Varnish.

For all exterior and interior work. It will not scratch nor mar white, and is absolutely waterproof. It is not affected by ammonia or alcohol, and will not check nor crack on indoor or outdoor work. It will not turn white. List price, $4.00 per gallon.

Specify—On open-grained woods fill with Calman's Silex Paste Filler; then apply three coats of All In One Varnish.

On close-grained woods, apply three coats direct to the wood, using no filler or shellac.

Terpolac.

A perfect primer or first coater for hard or soft woods. It is very pale and will not discolor the lightest woods. Terpolac forms an elastic and non-porous coating that holds up the varnish coats better than any filler in the market. List price, $1.70 per gallon.

Terpolac

TRADE-MARK

Specify—One coat on birch, cypress, gum wood, pine, and poplar, as a filler and first coater. Not intended for exterior use or for floors.

No-Damp.

This remarkable article is a heavy, elastic black compound, which, when applied to the interior of exposed walls, hermetically seals the pores of the brick and prevents moisture from coming through. No-Damp has more penetrating power than any article of a similar nature on the market, and remains "tacky" very much longer. It leaves on the surface of the brick or cement a tenacious elastic covering, which firmly holds the plaster applied over the same. Lathing and furring are entirely dispensed with where this article is employed, thus saving considerable floor space. The air space, which is a menace in case of fire, and which is the home of mice and other vermin, is done away with. No-Damp is a perfect insulator, and makes a building cooler in summer and warmer in winter. One coat of No-Damp applied to the brick is all that is necessary.

Price-list on application.

NO-DAMP

TRADE-MARK

Calman's Silex Paste Wood Filler.

Made from pure needle silex ground impalpably fine. It thoroughly fills the pores of all open-grained woods, and being absolutely unshrinkable it will not loosen in the pores of the wood, thereby destroying the finish. It is made in light or natural oak, dark or antique oak, golden oak, antwerp oak, black oak, fumed oak, white oak, forest green, special green, mahogany. Samples and price-list sent on application.

Specify—On all open-grained woods.

Specifications.

The above condensed specifications are merely suggestive. On request we would be delighted to send a handsomely bound set of specifications, complete in every detail, for all classes of finish and for all kinds of work.

Samples.

A case of magnificently finished samples will be sent to any architect desiring the same. These samples show the effects that can be produced by using really high-grade varnishes and enamels.

Deliveries.

These specialties are now being used by the leading decorators in every large city of the United States. We also have agents in each city, carrying our varnishes and enamels in stock; so prompt deliveries can always be had.

Catalogues and Testimonials.

Send for descriptive catalogues, containing facsimile reproductions of testimonial letters from the leading decorators of the United States.

ESTABLISHED 1865

CHICAGO VARNISH COMPANY

Manufacturers of Varnish, Enamels and Stains

2100 Elston Avenue
CHICAGO, ILL.

TELEPHONE, HAYMARKET 900

NEW YORK, N. Y.: HUDSON TERMINAL BUILDING, 50 CHURCH STREET

Products.

Manufacturers of WOOD FINISHES in great variety, including "SHIPOLEUM," "SUPREMIS FLOOR FINISH," "CHI-VO," "FLORSATIN," "NO. 6 RUBBING," "ARCHITECTURAL COACH," "HYPERION FINISH," "DEAD-LAC," "WOOD-TINTS," "EXTERIOR OAK," "NAVALITE," "WHITE ENAMELITE," "FLO-WHITE," "EGGSHEL-WHITE," "FLAT-LEAD," "SUPREME YACHT WHITE," "SILEX PASTE FILLER," and "FLAT WALL-PAYNT."

Description.

Our products mentioned above are brands many of which we have been manufacturing continuously for nearly thirty years. They embody the knowledge and experience gained in fifty years in the varnish business and are specified by architects throughout the country who appreciate their high quality and durable finish.

We give below the purpose for which each product is intended and, on the opposite page, proper specifications for their use.

"Shipoleum"—The ideal varnish for interior finish on standing woodwork, enduring the hard wear and rough usage remarkably well. For this reason it is especially adapted not only for the finest residences, but for hospitals, public buildings, bathrooms, etc.

"Supremis Floor Finish"—The first varnish put on the market especially for floors, and, by reason of its great durability, freedom from scratching and marring, it has continuously held the lead of all floor varnishes.

"Chi-Vo"—This is a varnish made by a new process and contains no wax. It dries with a rubbed effect of remarkable beauty and gives a tough, durable finish which is not affected by water. Where a rubbed effect is desired, "Chi-Vo" will give this result and save all the labor and expense of rubbing. It is intended for use on standing woodwork, or for other interior purposes.

"Florsatin"—A floor varnish drying with a soft, eggshell effect resembling a waxed finish, but being far more durable.

"No. 6 Rubbing" and "Architectural Coach"—They are also for interior standing woodwork and have fine wearing properties.

"Hyperion Finish"—Especially adapted for use on mantels and fine furniture and, as it dries thoroughly hard, it should be specified for use on church seats, etc.

"Dead-Lac"—A special varnish for standing woodwork, drying with a soft, dead finish and saving the labor and cost of rubbing the varnish to a dull finish. This gives the dead effect which is so much desired on interior standing woodwork. It contains no wax, and work finished with "Dead-Lac" may be varnished over later. Being made of the best materials, it is far ahead of any of its many imitators and will be found to be very economical.

"Wood-Tints"—These are oil stains bringing out the beauty of the grain of the wood and producing the most exquisite effects. They do not raise the grain, have great covering capacity and are very easily applied. The different shades are shown in the specifications on the next page. Finished wood panels will be sent to any architect upon request.

"Exterior Oak" and "Navalite"—These are made especially for outside use on front doors, verandas and other exposed situations, being made of such materials that they have remarkable durability for this purpose.

"White-Enamelite"—A gloss enamel for high-quality work on interiors.

"Eggshel-White"—An enamel for interiors which dries with a soft, eggshell luster, requiring no rubbing.

"Flo-White" and "Supreme Yacht White"—Gloss white enamels especially prepared for outside use, and they may also be used for interiors.

"Flat-Lead"—Especially prepared for undercoats for white enamel work and insures a durable foundation.

"Flat Wall-Paynt"—A flat drying paint for plaster walls or woodwork. May be washed with soap and water. Made in white and twenty-one beautiful tints.

Booklet.

Our booklet, "Architectural Finishes," giving a complete description of these materials, together with specifications for their use, will be sent upon application.

Continued on next page

Prices.

The prices of our products are as follows:

"Shipoleum"	$3.00 per gal.
"Supremis Floor Finish"	3.00 per gal.
"Chi-Vo"	3.00 per gal.
"Florsatin"	3.25 per gal.
"No. 6 Rubbing"	2.75 per gal.
"Architectural Coach"	2.50 per gal.
"Hyperion Finish"	3.00 per gal.
"Dead-Lac"	3.75 per gal.
"Wood-Tints" (see specification)	$2.50 & 3.50 per gal.
"Exterior Oak"	$4.00 per gal.
"Navalite"	4.50 per gal.
"White Enamelite"	5.50 per gal.
"Flo-White"	5.50 per gal.
"Eggshel-White"	5.00 per gal.
"Flat-Lead"	3.00 per gal.
"Supreme Yacht White"	4.00 per gal.
"Supreme Mahogany Glaze"	4.00 per gal.

Specifications—Interior Standing Woodwork.

For Natural Finish—Specify two or three coats of Chicago Varnish Company's "Shipoleum" Varnish. If the wood is open-grain (such as oak, ash, etc.), specify one coat Silex Paste Filler to be put on before the varnish is applied. The last coat may be rubbed if desired.

For an imitation rubbed effect where it is desired to save the labor of rubbing, substitute Chicago Varnish Company's "Chi-Vo" for the last coat of "Shipoleum."

For "No. 6 Rubbing," "Architectural Coach" and "Hyperion Finish," specify same as for "Shipoleum."

For Stained Finish: Rubbed Effect—For "Wood-Tints" Nos. 250, 251, 252, 253, 254, 325, 350, 220, 320, 330, 335, 336 and 360, specify one coat of any of these numbers of "Wood-Tints," one coat White Shellac, one coat of "Shipoleum" and one coat of "Chi-Vo." See Note.

For "Wood-Tints" Nos. 310 and 312, specify same as above, substituting Orange Shellac for the White Shellac.

For a Permanent Mahogany Effect—Specify Chicago Varnish Company's System of Mahogany Finish, which consists of one coat each of No. 300 Dark Mahogany Wood Tint, Orange Shellac, "Supreme Mahogany Glaze," "Shipoleum" Varnish (rubbed).

For a Light Mahogany Effect—Specify the same as above, substituting No. 305 Light Mahogany Wood Tint for the No. 300 Dark Mahogany Wood Tint.

For Stained Finish: Dead Effect—Specify same as above, substituting "Dead-Lac" for the coat of "Chi-Vo."

NOTE—On open-grain woods (such as oak, ash, etc.) if a filled surface is desired, specify one coat of stain and a "wash coat" of shellac, one coat of Silex Paste Filler colored to the correct shade, one coat of "Shipoleum" and one coat of "Chi-Vo" (or "Dead-Lac," if desired).

Gloss or Rubbed Varnish Finish—Specify same as above, substituting for the "Chi-Vo" or the "Dead-Lac" a second coat of "Shipoleum" Varnish, rubbing the last coat if a rubbed finish is desired.

Exterior Standing Woodwork.

Specify for open-grain woods (such as oak, ash, etc.), fill the pores with Chicago Varnish Company's Silex Paste Filler and apply three coats of Chicago Varnish Company's "Exterior Oak" or "Navalite." Close-grain woods (such as maple, pine, birch, etc.) require no filler.

Enamels, Interior.

Specify three coats Chicago Varnish Company's "Flat Lead" and finish with two coats of Chicago Varnish Company's "Eggshel-White" ("White Enamelite" or "Flo-White," as desired), applied according to directions on can label.

Enamels, Exterior.

Specify three to four coats of keg lead and oil for a suitable undercoating, and finish with two coats of Chicago Varnish Company's "Flo-White" (or "Supreme Yacht White" Enamel, as desired), applied according to directions on can label.

Floors.

For "Supremis"—Specify for open-grain woods (such as oak, ash, etc.), fill the pores with Silex Paste Filler and apply two or three coats of "Supremis Floor Finish."

For close-grain woods (such as maple, pine, etc.) use no filler.

For "Florsatin"—Specify, same as above, substituting "Florsatin" for the last coat of "Supremis."

N.B.—*Never use Shellac or Liquid Fillers as an undercoat on floors.*

Walls.

"Flat Wall-Paynt"—Specify for new plaster walls, for first coat, four parts "Flat Wall-Paynt Size" and one part "Flat Wall-Paynt," and then two coats "Flat Wall-Paynt."

For new woodwork specify, for first coat, four parts "Flat Wall-Paynt" and one part Linseed Oil, and then two coats "Flat Wall-Paynt."

ESTABLISHED 1863

MOLLER & SCHUMANN COMPANY

MANUFACTURERS OF

Varnishes, Enamels, Fillers and Japans

SAN FRANCISCO, CAL. BROOKLYN, N. Y. CHICAGO, ILL.

Products.

"Hilo" Varnishes, including Marine Spar, Floor Finish, Cabinet Finish, Flat Finish, Interior Spar, Triproof Spar.

"Hilo" Enamels, including Molmanite, White Enamels for Interior, Compo Coating, Flat Finish for Interior, Concrete Floor Enamels, Stains and Wood Fillers.

TRADE-MARK

Quality.

"Hilo" Varnishes, whether for interior or exterior work, floors, doors, woodwork, or furniture, are perfectly fitted for the work for which they are intended.

The special fitness of each Hilo Varnish or Enamel for the particular purpose mentioned in the description is due to the application of the knowledge gained through our fifty-two years of study in developing good varnish for finishing woodwork.

"Hilo" Marine Spar.

"Hilo" Marine Spar is intended for the highest-grade exterior work. Resists the most trying atmospheric changes. Used on yachts, outside doors, window casings and store fronts. Free flowing, lustrous, extremely elastic.

This varnish is made like the highest type carriage varnishes and assumes a slight bluish tinge when exposed to continued rain for several days (this is a proof of elasticity). It resumes its normal brightness as soon as dry. Price per gallon, $4.50.

Specify—Fill open-grained woods with Paste Wood Filler, and let stand for 24 hours before varnishing.

On close-grain work apply the varnish direct.

Sand smooth and apply three coats "Hilo" Marine Spar as it comes in the can, brushing out well to insure a thin, even coat.

Sand lightly between coats.

"Hilo" Floor Finish.

"Hilo" Floor Finish makes a durable tough coating that preserves the natural beauty of the wood. It does not mar white.

It is unaffected by water from leaky radiators, flower pots or wet umbrellas.

This is a pale varnish, and it stays pale on the work. It has a fair luster that does not dim with age. It sets free from dust in a few hours, and can be walked on after drying over night. Price per gallon, $3.00.

Specify—Fill open-grain woods with Paste Wood Filler and let dry 24 hours.

Close-grain woods require no filler.

Sand smooth all surfaces and apply two coats "Hilo" Floor Finish as it comes in the can, brush out well; thin even coats will insure a better wearing surface.

"Hilo" Cabinet Finish.

For use in finishing the finest interior woodwork and cabinet trim; also used extensively on very fine furniture. It preserves the natural beauty of the wood indefinitely.

It gives to the interior woodwork of the home an appearance equal to that of the finest furniture. It dries with a fullness that allows close rubbing. It is extremely durable; will not check nor crack and is not affected by spilled water, coffee, etc. Dries free from dust in two hours and may be rubbed in thirty-six. Price per gallon, $3.00.

Specify—Stain as selected, and allow 24 hours to dry.

On open-grain woods, fill with Paste Wood Filler as selected. Allow 24 hours to dry. On close-grain woods apply the varnish direct, or over the stain.

Sand surface smooth and apply three coats "Hilo" Cabinet Finish as it comes in the can, full even coats, allow 33 to 48 hours between coats. Sand each coat lightly except the last.

The last coat may be rubbed with pumice and water, and then let stand for 24 hours before polishing. For eggshell effect rub with pumice and oil instead of pumice and water.

"Hilo" Flat Varnish.

This varnish is unequalled for use on interior woodwork where a dull rich finish is desired without the expense of rubbing. It is a high-grade rubbing-varnish; is absolutely free from wax to soften, and every drop dries with the same rich, velvety dullness. It is of the same uniform body from top to bottom of the can, no matter whether it is one week or one year old.

"Hilo" Flat Finish may be used over natural wood, stain, wood filler, shellac, varnish, or painted surfaces, and dries over night. Price per gallon, $3.00.

Specify—For Mission work, one coat of stain as selected, and one coat of "Hilo" Flat Finish.

For an extremely fine finish, specify one coat of stain as selected, one coat of shellac, one coat of "Hilo" Cabinet Finish, and one coat of "Hilo" Flat Finish.

"Hilo" Interior Spar.

"Hilo" Interior Spar produces a highly lustrous finish. It differs from "Hilo" Cabinet only in the fact that it dries with a high luster instead of the duller finish, which is characteristic of the latter. It is a most durable, high-class varnish for all interior woodwork, doors, trim, wainscoting, etc. It can be rubbed; is extremely hard and will not mar nor scratch white. Price per gallon, $2.50.

Specify—Stain as selected, and allow 24 hours to dry.

On open-grain woods, fill with Paste Wood Filler, as selected. Allow 24 hours to dry. On close-grain woods apply the varnish direct or over the stain.

Sand surface smooth and apply two coats "Hilo" Interior Spar as it comes in the can, full even coats, allow 30 to 48 hours between coats. Sand each coat lightly except the last.

Continued on next page

"Hilo" Triproof Spar.

This is a general utility varnish that combines the virtues of many varnishes. It may be used on front doors, window sills, floors, woodwork, tables, autos, motor boats, etc. No matter where applied, inside or outside, it will give absolute protection; and its beauty of finish is lasting.

Water, boiling hot or icy cold, will not injure it. Ammonia, soaps, etc., used in cleaning, and alcohol, in perfumes, hair tonics, liquors, etc., do not affect it.

"Hilo" Triproof Spar sets dust-free in two hours, and dries hard overnight. It may be rubbed to a very dull finish. Price per gallon, $4.00.

Specify—Fill open-grain woods with Paste Wood Filler and let stand 24 hours before varnishing.

On close-grain woods apply the varnish direct.

Sand smooth and apply two coats "Hilo" Triproof Spar as it comes in the can, brushing out well to insure an even, thin coat.

"Hilo" Molmanite.

A most durable high-grade white enamel for finest exterior and interior surfaces.

The pure white color and full deep luster of Molmanite give it a richness like that of old porcelain.

Molmanite has remarkable elasticity, which makes it very good for exterior use, as sudden changes of temperature have no effect upon it.

Warm water and soap, and the best known disinfectants, have no injurious effect upon Molmanite.

Molmanite may be used with very satisfactory results on public buildings, hospitals, hotels, steamships, yachts; for doors, windows, bathrooms, etc., and for all exterior and exposed surfaces where a durable enamel is required. Price per gallon, $8.00.

Specify—Surfaces to be coated should be clean and dry, and sanded perfectly smooth. All knots in woodwork should be killed with Pure Orange Shellac.

Exterior: First prime with white lead in oil reduced with linseed oil to a good brushing consistency; then apply one or two coats of Exterior Enamel Undercoat followed by two or three coats of Molmanite.

Interior: First prime with white lead in oil reduced with linseed oil and turpentine; then apply one or two coats of Compo Coating and two or three coats of Molmanite.

Allow two days between undercoats, and two or three days between Molmanite coats.

Sand each coat except the last. For an exceptionally smooth finish, rub all the Molmanite coats except the last.

Molmanite may be rubbed to an eggshell finish.

"Hilo" Gloss White, Eggshell White and Flat White Enamel.

These represent the highest quality of interior white enamels, and are to be preferred in all places not subject to extreme temperature changes.

Their color holds longer than is possible with any other type of enamel. Price per gallon, $6.00.

"Hilo" White Enamels are especially recommended for use where a rich, durable finish is wanted —a finish that will not be dimmed by moisture. They dry dust-free in two hours instead of eight and a second coat can be applied in twenty-four. These enamels are not recommended for use in exposed or exterior places.

Specify—On new work, first prime with white lead and oil. Then apply one or two coats of Enamel Undercoat, and two or more coats of this Enamel. Allow 24 hours between coats. Sand each coat lightly, and for an exceptionally fine finish rub all the enamel coats except the last.

"Hilo" Compo Coating.

An enamel for producing a flat finish on interior walls, and ceilings of wood, metal or plaster.

It holds to the surface without flaking, and it does not powder off. It dries with a hard surface that can be washed without taking off the color and without affecting the appearance of the surface.

"Hilo" Compo Coating gives the walls that uniform soft tone, so restful to the eyes.

Standard Shades: White, Light Gray, Cream, Light Buff, Citrus. Price per gallon, $4.00.

Specify—All wood and plaster surfaces should be primed or sized with lead and oil paint to stop suction. Brush on two full coats as taken from the can.

"Hilo" Concrete Floor Enamel.

This enamel is made especially for cement floors and other concrete surfaces in public buildings, offices, warehouses, etc.

It fills the pores of the surface and binds the particles together in a hard, tough, smooth surface that neither chips nor flakes off. It eliminates that hard, gritty dust which is so injurious to machinery, etc.

"Hilo" Concrete Floor Enamel is sanitary; is unaffected by water or oil, and can be washed with soap and water.

Standard Shades: Gray, Drab, Buff, Terra Cotta, Brownstone, Slate. Price per gallon, $4.00.

Specify—Have cement or concrete clean and dry.

Apply two coats of "Hilo" Concrete Floor Enamel as it comes in the can, using a fairly stiff brush and working the enamel well into the pores.

"Hilo" Paste Woodfillers.

These paste woodfillers are made from the finest pigments and pure colors, combined with a specially prepared and elastic varnish. They fill the pores of the wood completely, and leave the wood clear toned and entirely free from all smeared or muddy appearance.

"Hilo" Woodfillers dry hard and prevent the varnish coats from sinking into the pores.

Standard Shades: Antique, Oak, Walnut, Chestnut, Natural Oak, Mahogany, Golden Oak. Price per pound, 12 cents.

Co-operative Service.

We are prepared to co-operate in preparing complete specifications for architects, for any particular project, and to furnish liquid and finished samples showing results obtained with our Varnishes, Enamels, Stains, and Fillers.

REFERENCES

Hotel Bossert, Brooklyn, N. Y., Palmer, Hornbostel & Jones, New York, Architects

Jewish Memorial Hospital, Philadelphia, Pa.

Homeopathic Hospital, Camden, N. J.

Proctor Theater, Newark, N. J., James W. Merrow, Architect

Leader Chemical Building, Wilkes-Barre, Pa., A. J. Lothrop Co., Architects

Manor Hall Apartments, New York, N. Y., Moore & Landsiedel, New York, Architects

Oak Park Country Club, River Forest, Ill., Patton, Holmes & Flinn, Architects

Stumpf Memorial Hospital, Kearny, N. J.

Masonic Temple, Arlington, N. J.

ESTABLISHED 1858

BERRY BROTHERS

INCORPORATED

Varnishes, Architectural Finishes, Shingle Stains, etc.

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DETROIT, MICH.

CANADIAN FACTORY: WALKERVILLE, ONT. PACIFIC COAST FACTORY: SAN FRANCISCO, CAL.

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Products.

Manufacturers of Wood Finishes: Floor Finish, Liquid Granite, Luxeberry Wood Finish, Elastic Interior Finish, Luxeberry Spar Varnish, Lacklustre, Dulgloss, Luxeberry White Enamel, Shingletint.

Liquid Granite.

The Varnish for Floors. The most durable floor varnish made, combining the three principal requisites —elasticity, durability and appearance. It has stood actual test of severe service for over thirty years and is recognized by master painters as the best article of its kind. It has never been equalled, and there is more Liquid Granite in use today than any other floor varnish.

Specify—Two coats of Liquid Granite applied over one coat of Berry Brothers' Paste Filler on open-grained woods; on close-grained woods omit the filler. Eliminate the use of shellac and liquid wood fillers on all floor work.

Luxeberry Wood Finish, Light.

Of the same high quality as Luxeberry Wood Finish "White," only not so pale in color, but can be used on the majority of woods without discoloring them in the least.

Note—"Luxeberry Wood Finish" is the registered trade-mark name used to designate the finish long and favorably known as Berry Brothers' Hard Oil Finish. This name was changed to protect the public against the many cheap imitations sold as so-called "hard oil finishes."

Specify—One coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Filler, one coat of Berry Brothers' S. D. C. Shellac and three coats of Luxeberry Wood Finish. On close-grained woods omit the filler.

Elastic Interior Finish.

For Interior Trim subjected to severe usage. It possesses great elasticity and durability, and will resist the action of hot water, soap, etc., to a greater degree than any other varnish.

Specify—On open-grained woods, one coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Wood Filler, one coat of Berry Brothers' S. D. C. Shellac, and two coats of Elastic Interior. On close-grained woods omit the filler.

Luxeberry Spar Varnish.

For Front Doors, Store Fronts and Such Exterior Work as is subjected to severe exposure and changing weather conditions. The standard of quality with a reputation of fifty-five years. Made especially for use on all types of marine architecture, wherever a durable and lasting finish is desired. It can be used as both an exterior and interior varnish, as it is made to withstand severe wind, weather and water exposure and does not turn white.

Specify—Two coats of Luxeberry Spar Varnish, over one coat of Berry Brothers' Paste Wood Filler on open-grained woods. Omit the filler on close-grained woods.

Lacklustre.

For General Interior Work where economy in labor is a consideration. This ideal one-coat finish accomplishes with one coat what heretofore necessitated a coat of stain and a coat of wax. The method of application is easy—apply with a rag and wipe off with a clean piece of cheesecloth, producing a soft and almost lusterless finish, as it contains no wax and has none of the disadvantages of a waxed finish. It will not collect dust, neither will it spot white, and varnish can be applied over it without the necessity of preparing the surface as in the case of wax.

Manufactured in the following colors:

Green Flemish	Mission	Golden
Brown Flemish	Light Weathered	Antwerp
Black Flemish	Dark Weathered	Forest Green
Silver Gray	Filipino	Bog

Special shades furnished upon request.

Dulgloss.

For Interior Trim Work where a flat varnish is desirable. Produces in one coat an imitation rubbed effect over a shellacked or varnished surface. It is light in color, flows freely under the brush, dries dust-free in about an hour, and hardens in twelve hours with a soft velvety finish so much in demand.

Specify—For Imitation Waxed Effect, one coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Wood Filler, one coat of Berry Brothers' S. D. C. Shellac and one coat of Dulgloss.

For Imitation Rubbed Effect, one coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Wood Filler, one coat of Berry Brothers' S. D. C. Shellac, two coats of Luxeberry Wood Finish and one coat of Dulgloss. On close-grained woods omit the filler.

Luxeberry White Enamel.

For Bathrooms and Bedrooms. Especially designed for the practical finisher and decorator. It possesses full body, flows very freely, and dries without showing brush marks. It will rub perfectly in three to four days, and can be polished on the fifth day to a piano finish. It can be used on the finest interior or furniture work. It is pure white in color and stays white.

Note—We can also furnish ivory white and pearl white tints, when desired. If an egg-shell gloss or imitation rubbed effect is desired, we will furnish it at the same price as the high gloss goods.

Specify—Two coats of Luxeberry White Enamel applied over two coats of Luxeberry White Enamel Primer.

Shingletint.

For Half-Timbered Work or Shingle Stain specify "Shingletint," which represents the highest results attained in the manufacture of shingle stains. It possesses great penetrative and preservative qualities, being a scientific combination of colors finely ground in pure linseed oil, creosote oil and the necessary drying agents. It prolongs the life of the shingles by retarding decay, at the same time imparting to them a very artistic finish.

MURPHY VARNISH COMPANY

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NEWARK, N. J.

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ASSOCIATED WITH DOUGALL VARNISH COMPANY, LIMITED, MONTREAL, CANADA

Products.

TRANSPARENT WOOD FINISH, INTERIOR; TRANSPARENT FLOOR VARNISH; MARINE VARNISH, INTERIOR; SPAR VARNISH, INTERIOR.

TRANSPARENT WOOD FINISH, EXTERIOR; SPAR VARNISH, EXTERIOR; MARINE VARNISH, EXTERIOR.

UNIVERNISH.

ALSO, Q AND E FLAT VARNISH; VELVET FLOOR FINISH; BEST HARD CHURCH OAK VARNISH.

SHELLACQUER; CYPRESS SEALER.

MURPHY KONKRETO.

FINEST WHITE ENAMEL VARNISH; FINE PALE MAHOGANY VARNISH; FINE PALE MAPLE VARNISH; CIRCASSIAN WALNUT VARNISH.

Q AND E ENAMEL UNDERCOATING; Q AND E WHITE ENAMEL.

PASTE FILLERS and LIQUID FILLERS.

FINEST COLORS in JAPAN and in OIL.

Architectural Varnishes.

Our Transparent Finishes have been the standard for a generation:

Transparent Wood Finish, Interior—Stands years and years of washing down without losing its life or luster. Used extensively in hospitals and public buildings. $3.00.

Transparent Wood Finish, Exterior—An old-time and present-time favorite with those who want an outside finish that *stays* handsome. $4.00.

Transparent Floor Varnish—Its value has been demonstrated in thousands of fine homes and hotels and busy office buildings. $3.00.

Velvet Floor Finish—A final coat of this on floors, where a rubbed effect is desired, gives that appearance without the labor of rubbing. Shows a beautiful wax surface, but is not slippery.

Q and E Flat Varnish—Gives the rubbed effect without the labor of rubbing. May be used as a final coat over Transparent Wood Finish, Interior, or alone. If it is used alone, the proper number of coats should be given. Should never be used on exterior work.

Q and E Enamel Undercoating—Dense covering, flat drying. Is used for foundation coats for our Q and E White Enamel. More suitable than lead and oil for this work.

Q and E White Enamel—Dries hard, so that it can be used indoors; but wears wonderfully well outdoors. Can be tinted, of course. Use two or three coats over two or three coats of Q and E Enamel Undercoating.

Univernish—The one varnish for all uses. Some customers, having employed it in diverse ways, think Univernish the most efficient varnish ever made. $4.00.

For inside and outside work and for floors.

Proof against hot and cold water, salt water, steam, hot dishes, alkali, alcohol, ammonia, etc.

Nothing turns it white.

Rubs to a splendid dull effect, and *keeps* the effect through numberless cleanings.

Stands the extremes of weather better than any other varnish we know of.

Is practically uncrackable.

Does not thicken in the can.

Does not clog the painter's brush.

Works easily and flows out smooth.

The Way to Specify Varnish.

Name the varnish and the varnish maker, and omit " or equal," or " its equivalent."

Put it so if you want our varnish used, and write us that you have done so. We will help you to make certain it is used.

That will assure the finish which protects your expensive materials, completes the beauty of your designs, greatly increases the renting and selling value, crowns the owner's pleasure, and makes good your professional reputation.

Complete Finishing Specifications.

We have them all ready for your clerks to copy; and shall take pleasure in sending them to you, free of charge, if you will just drop us a post card, making the request.

Marine Work.

Marine architects and boat builders find that our finishing materials have the *ease* of *working* which pleases painters, and the *service* and the *elegance* which delight owners, their families and their guests.

PRICE LIST OF MARINE PRODUCTS

Spar Varnish, Interior	$2.50
Spar Varnish, Exterior	3.50
Marine Interior	3.00
Marine Exterior	4.00
Univernish, for inside and outside, and deck and hull	4.00

Booklets.

Free but useful booklets on request:

" Architectural List," " Beautiful Floors," " Konkreto," " Marine Varnishes," " Quality and Economy in Varnish and Varnishing," " Univernish."

PITCAIRN VARNISH CO.

Manufacturers of Varnishes, Enamels, Stains, Fillers and Surfacers

MILWAUKEE, WIS.

BRANCH WORKS AND OFFICE, NEWARK, N. J.

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Products.

Manufacturers of Varnishes, Enamels, Stains, Fillers and Surfacers for all purposes.

Our Leaders are:

Pitcairn Aged Mast Spar, for Exposed Work;

Pitcairn Aged Finishing Spar, for Fine Interiors;

Pitcairn Aged Floor Spar, for Fine Floors;

Pitcairn Aged Church Pew and Seat Finish, for Church and School Seats, Desks, Chairs, etc.;

Pitcairn Wood Stains, for all Wood Tinting;

Pitcairn Banzai Enamel, for all White Work.

TRADE-MARK
Reg. U. S. Pat. Off.

Distinctive Finishes.

These sealed packages bear our label and trade-mark for your protection. They guarantee for you *quality as represented* and insure the economical securing of results that will be most satisfactory and creditable to all concerned.

THE PITCAIRN PACKAGE

Description.

No painstaking care or expense has been spared in bringing these wood finishes to their present state of perfection. We vouch for their excellence. They are freely used by a large part of the most critical architects and contractors in America on some of the finest structures. Below is a brief description of each; and on the opposite page, specifications will be found.

Pitcairn Aged Mast Spar.

Possesses the maximum of durability obtainable in exterior finishing varnish. Use on all surfaces subjected to severest exposure, whether marine finishing, outside doors, window casings, signs, etc. New or old work. Has great elasticity and wear resisting qualities. Will not scratch or mar white, dries dust-free in ten to twelve hours and hardens in forty-eight hours.

Covers 550 to 600 square feet to gallon.

Pitcairn Aged Finishing Spar.

For finest interiors. Rich and lasting. Use on new or old work, whether full gloss, rubbed dull or polished. Unexcelled in brilliance, body, working qualities and durability. Insures style and individuality to the work. Dries dust-free in eight to ten hours, hardens in two days and may be rubbed the third day.

Covers 550 to 600 square feet to the gallon.

Pitcairn Aged Floor Spar.

For finest floor finishing. Withstands severest wear. Use on new or old work. Has wonderfully free, easy working qualities, extraordinary permanence, toughness, brilliance and elasticity. Dries dust-free in six to eight hours and hardens in twenty-four hours.

Covers 550 to 600 square feet to gallon.

Pitcairn Aged Flat Finish.

For artistic interior work, producing rich, silky, dull rubbed effect. Use for mission finish and in place of hand rubbing. This varnish dries with an even flat finish that has the appearance of being rubbed. Has the body of gloss varnish, protects perfectly the surface to which it is applied, and may be used on either new or old work. One coat is sufficient to produce a dull rubbed effect on old work or over an undercoater of gloss varnish for new work. Two coats applied to new wood over filler will produce a silky, soft, mission effect. Works nicely under the brush; flows out well. Dries dust-free in two hours and hardens in twenty-four hours. Contains no paraffin or beeswax, and therefore may be coated with a gloss varnish, or as many coats may be applied as are necessary.

Covers 650 to 700 square feet to gallon.

Continued on next page

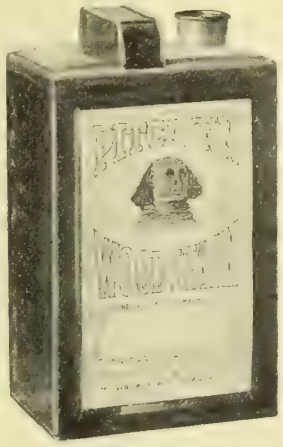
Pitcairn Aged Church Pew and Seat Finish.

An exceedingly hard-drying varnish which will not soften nor become tacky under the heat of the body. Very tough; dries dust-free in six hours and hardens in twenty-four. The best varnish made for use on church and school seats, chairs, desks, table tops, etc. Dries with brilliant gloss, rubs well and takes fine polish. Can be rubbed in two days.

Covers 550 to 600 square feet to gallon.

NOTE—We will gladly prepare for you *special panels,* finished with any Pitcairn varnish and in accordance with your ideas or specifications. State the kind of wood, color of stain and style of finish. We employ practical wood finishers to do this work for those who desire to see effects obtained from the use of our varnishes, stains or enamels upon any wood, plaster, or metal surfaces.

Pitcairn Wood Stains.



WOODSTAIN CAN

Excel in penetrating qualities, clearness and richness. Use on all kinds of wood whether soft, spongy or the hardest close-grain. They produce beautiful, deep, rich, soft, visual effects. They bring out the high lights and beauty of wood without obscuring the grain or causing cloudiness. They lend tone and impart an air of refinement to the surroundings. They do not raise the grain of wood nor affect thin veneers, being free from water, acid or alcohol. They may be mixed with the filler for tinting, or be reduced with turpentine or benzine. They set slowly, thus admitting of the surplus being removed from the surface with a cloth or sponge without showing cloudiness or laps. The work may be finished with wax or varnish as desired. Fourteen beautiful colors in imitation of all popular woods and shades.

Covers from 800 to 1,000 square feet to the gallon.

NOTE—Stain set, consisting of twenty wood panels, mounted on cloth, showing the color of Pitcairn wood stains on various kinds of wood, will be sent to all architects and their clients or to painters upon request.

Pitcairn Banzai Enamel.

BANZAI ENAMEL CAN

Rich and permanent. Use for all white work whether natural gloss, rubbed dull, polished, or flat enamel finish. It is marvelously tough and elastic, approximately fifty per cent more durable than ordinary enamels. Will not chip or crack, is stable in color and retains its immaculate, grainless surface regardless of frequency of washing or method of house heating. The free flowing qualities of Banzai Enamel enable the work to be accomplished about twenty-five per cent faster than with ordinary enamels. Its splendid hiding qualities in many instances save the cost of work and time of an extra coat. Its great covering capacity and labor-saving characteristics make it more economical to use than the cheaper ordinary enamels—not to consider its greater durability. Banzai Enamel furnishes a safety factor for the architect who demands flawless work, gives the decorator protection against blemishes, and reduces the labor costs, while the building owner gets a far greater durability than with the use of ordinary enamels. Dries dust-free in six hours, and hardens in forty-eight hours.

Covers approximately 500 square feet to gallon.

NOTE—Portfolio showing reproductions of thirty modern white enamel interiors will be sent to architects or their clients on request.

General Specifications for New Work.

FILLERS

Open-Grained Woods—Oak, ash, chestnut, mahogany, etc. First fill with Silex Paste Wood Filler. When dry, putty all nail-holes, matching color of wood.

Close-Grained Woods—Maple, birch, Georgia pine, whitewood, poplar, pine, cypress, redwood, gum wood, sycamore. Require no filling. Apply varnish direct to wood. After first coat, putty all nail-holes, match color of wood.

NOTE—All knots and sappy places should be coated with shellac to "kill" the pitch.

VARNISHES

Exterior or Exposed Surfaces—When in condition to receive varnish, and after puttying nail-holes, apply three coats Pitcairn Aged Mast Spar. Rub first and second coats when dry with curled hair.

Interior Finishing, Cabinet Work, etc.—After filling open-grained woods and puttying nail-holes, for regular work apply two coats Pitcairn Aged Finishing Spar; for extra finish three coats. Last coat natural gloss, rubbed dull or polished as desired. If dull rubbed effect is desired without the expense of rubbing, apply Pitcairn Flat Finish in place of last coat of varnish.

NOTE—For use on seats, pews, chairs, desks, etc., specify Pitcairn Aged Church Pew and Seat Finish.

Floors, Hard or Soft Wood—After filling open-grained woods and puttying all nail-holes, apply three coats Pitcairn Aged Floor Spar. Sand lightly between coats. Leave natural gloss or rub dull, as desired.

NOTE—Do not use liquid fillers, shellac or shellac substitutes on floors.

WOOD STAINS

Close-Grained Wood—Apply Pitcairn Wood Stain, the shade desired, properly wiped after sufficient time has been allowed for stain to penetrate. After twenty-four hours, apply thin coat shellac and proceed with varnish coats.

Open-Grained Wood—Apply one coat of Pitcairn Wood Stain, the shade desired, properly wiped after sufficient time has been allowed for it to penetrate. After twenty-four hours, apply paste wood filler tinted with the stain to match. Apply thin coat shellac and proceed with varnish coats.

MISSION OR DULL FINISH

Apply one coat Pitcairn Wood Stain, one coat white shellac for light tints and orange shellac for dark, two coats Pitcairn Flat Finish. Finish window seats and sills with two coats Pitcairn Aged Mast Spar. After forty-eight hours, rub to dull finish.

WHITE ENAMEL FINISH

Wood, Plaster and Stone Surfaces, Interior or Exterior—Priming coat: Shellac knots, add one pint linseed oil to gallon Banzai Undercoater and brush well when applying.

Second and Third Coats: Banzai Undercoater as it comes in can.

Fourth Coat: Banzai Gloss or Flat Enamel.

Fifth Coat: Banzai Gloss or Flat Enamel, as desired.

NOTE—Allow forty-eight hours between coats, and sandpaper lightly between coats. Semi-gloss Finish may be obtained by mixing one third Gloss Enamel and two thirds Flat Enamel. If Enamel or Undercoater is too heavy, thin with turpentine.

Where Purchased.

These goods may be purchased from dealers everywhere.

PRATT & LAMBERT, INC.

Varnish Makers

NEW YORK
185 Madison Avenue

BUFFALO
75-97 Tonawanda Street

CHICAGO
320-330 West 26th Street

FOREIGN FACTORIES

LONDON PARIS HAMBURG BRIDGEBURG, CANADA

Products.

"61" Floor Varnish, "38" Preservative Varnish, "110" Cabinet Varnish, Palest Interior Varnish, Dulkote, Alcolac, P. & L. Spar Finishing Varnish, Hygienic Gloss Finish, Oil Stains, Acid Stains, Vitralite, Eggshell Vitralite, Vitralite Enamel Undercoating, Paste Wood Fillers, Vitralite Cement Coating.

Experience.

In the following specifications we have embodied the fruits of over sixty-seven years' experience in studying wood finishing conditions and working out materials and methods to best fulfil the requirements. That we have been successful is evident from the use of Pratt & Lambert Varnishes in finishing some of the world's best known buildings.

Co-operative Service.

Sample panels showing standard effects obtainable with Pratt & Lambert stains, fillers and varnishes will be sent on request. If you have some distinctive finish in mind, tell us the wood to be used and the general color required, and we will try to carry out your ideas on specially made up sample panels. Should information be desired on any wood finishing problem, we would welcome the opportunity to be of service. Address letters to the Architectural Service Department, at Buffalo—a special department in the P. & L. organization devoted entirely to the interests of architects.

Complete Specification Book.

Most of your wood finishing problems you will find solved in the Pratt & Lambert Specification Book, which gives complete specifications for every kind of finish, and contains thorough, reliable treatises which cover the entire field of wood finishing. A request to the Architectural Service Department will bring it gratis.

The following products, embodied in the specifications on the opposite page, include a varnish, stain, filler or enamel for every architectural purpose; each the perfected result of sixty-seven years of successful varnish making experience.

"61" Floor Varnish.

The only varnish we make for floors, as we consider only the most durable finish we know of how to make good enough for the purpose. "61" is marproof, heelproof and waterproof.

"38" Preservative Varnish.

A pale, transparent varnish for use on interior trim, whether of open- or close-grain wood. It gives a smooth, even, natural gloss finish that does not grow dull; may be rubbed to a dull finish that will not sweat back to a gloss; takes and retains a high hand-polished finish.

"110" Cabinet Varnish.

Similar to "38," but not quite as light in color, hence not as expensive. Specify it for ordinary interior trim work, or for any interior trim work where price is a prime consideration. Dries in a high gloss finish and may be rubbed to a dull finish.

Pratt & Lambert Palest Interior Varnish.

Intended for interior trim work where only the palest varnish is permissible, such as for use over delicate shades of fillers and stains, and exceedingly pale woods for the natural finish as of bird's-eye maple. May be rubbed to a dull finish and is susceptible of an unusually high polish.

Dulkote.

A dull, flat-drying varnish for interior trim that will not gloss up. Gives a dull finish without rubbing. As it contains no wax it may be finished over with gloss varnish, if at any time this is desired.

Alcolac.

A first coater for interior trim of close-grain wood, having a fuller body than a regular coat of varnish.

Pratt & Lambert Spar Finishing Varnish.

A weather-resisting varnish for exterior work, such as front doors, porch ceilings, etc., and for interior work subject to moisture or frequent exposure. The most important weather tests made by master painter associations in recent years proved this spar varnish to outlast all other exterior varnishes.

Hygienic Gloss Finish.

Although Hygienic Gloss Finish is not specified on opposite page, it should be used as final coat with any of the varnish specifications where a finish that possesses an unusually high luster, washable qualities, resistance to fumes of disinfectants and other extreme conditions is desired. Ideal for hospitals and like purposes. Used for final coat only.

Oil Stains.

These non-fading oil stains give best results on the softer woods, such as pine and cypress, but may be used on any close-grain wood. The Forest Green and Weathered Oak are also used on open-grain woods. They are made in the following colors: Light Oak, Dark Oak, Walnut, Cherry, Rosewood, Forest Green, Mahogany, Dark Mahogany, Golden Oak, Weathered Oak, No. 21 Antique.

Continued on next page

Paste Wood Fillers.

Used for filling open-grain woods to give a smooth foundation over which to apply varnish and to impart the desired color either alone or in conjunction with acid stains. They are made in the following colors: Light Oak, Dark Oak, Golden Oak, Antwerp Oak, Black, Fumed, White, Forest Green and Mahogany. As they are made from finely ground silex, they adhere to the wood and do not crumble, powder nor perish. The colors are permanent.

Acid Stains.

The ideal stains for all hard close-grain woods and open-grain woods, as they in no way cloud or hide the grain of the wood. They, however, are not suitable for soft woods, as they raise the grain of such woods, making it difficult to get a smooth varnish surface. These stains are made in the following colors: Silver Gray, Fumed, Brier Green, Pale Green, Early English, Antwerp Oak, English Oak, Flemish Oak, Mahogany, Dark Mahogany, Antique Mahogany.

Vitralite.

The Long-Life White Enamel that lasts longer than paint outside or inside, on wood, metal, concrete, plaster, brick or stone. Will not turn yellow. May be rubbed to a dull finish.

Eggshell Vitralite.

For a dull white enamel finish without rubbing on interior work.

Vitralite Enamel Undercoating.

An undercoating for Vitralite on wood or metal surfaces, which gives a smooth, opaque foundation in the fewest possible coats, and holds out the finishing coats of enamel in full, rich body. Has no tendency to turn the finishing coats of enamel yellow, like lead and oil.

Vitralite Cement Coating.

An *alkali-resisting* flat coating for cement, concrete, plaster, stucco, brick and stone, interior or exterior surfaces, and for wood and metal exterior surfaces. Unexcelled for use as an undercoating for Vitralite, the Long-Life White Enamel, on these surfaces.

SPECIFICATIONS

Exterior Work

Open-Grained Woods—One coat of Paste Wood Filler of desired color. One coat of "61" Floor Varnish. Two coats of Spar Finishing Varnish.

Close-Grained Woods—One coat of Pratt & Lambert Oil Stain of the desired shade, if stained finish is desired. If not, stain is not required. One coat of "61" Floor Varnish. Two coats of Spar Finishing Varnish.

Fine Interior Work—Natural

Open-Grained Woods—One coat of Paste Wood Filler. Three coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Close-Grained Woods—One coat of Alcolac. Two coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Regular Run of Interior Work—Natural

Open-Grained Woods—One coat of Paste Wood Filler. Two coats of "110" Cabinet Varnish, rubbed dull or left in gloss.

Close-Grained Woods—One coat of Alcolac. Two coats of "110" Cabinet Varnish, rubbed dull or left in gloss.

One-Tone Color Effects

Close-Grained Woods—One coat of Acid or Oil Stain. Over acid stain, one coat of pure shellac. Over oil stain, one coat of Pratt & Lambert Alcolac. Two coats of Pratt & Lambert "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Open-Grained Woods—One coat of Pratt & Lambert Paste Wood Filler of the required shade. If desired depth of color can not be obtained with the colored paste wood filler, a coat of Pratt & Lambert Acid Stain should be applied before the filler, followed when dry with a coat of paste wood filler of the same color. Over acid stain and paste wood filler, one coat of pure shellac and two coats of Pratt & Lambert "38" Preservative Varnish, left in the gloss, rubbed dull or polished. Over paste wood filler only, three coats of Pratt & Lambert "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Two-Tone Color Effects

One coat of Acid Stain. One coat of Shellac. One coat of Paste Wood Filler, of a different color than the acid stain. One coat of Shellac. Two coats of P. & L. Palest Interior or "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Note—*Two-Tone Effects* can be procured on open-grained woods, such as oak, etc., only, and are produced by the combination of acid stains and a white or tinted paste wood filler of a different color. *Example:* For instance, the Pratt & Lambert Wood Finish Effect No. 7220 is a combination of a dark brown, English Oak Acid Stain and Pratt & Lambert Special Green Paste Wood Filler. A thin coat of white shellac is applied over the acid stain, which is applied first. After this the green filler is applied. This coat of shellac allows the filler to "take" only in the porous parts of the wood and the result is a beautiful combination of the brown and green.

Interior Work, Dull Finish, No Rubbing

Dull Finish Without Rubbing—Use the foregoing suggestions for specifications; substituting, however, one coat of Dulkote in every case where "38" Preservative, Palest Interior or "110" Cabinet Varnish is specified, and omit rubbing.

Enamel Work

Interior Work (Wood)—One coat of lead and oil. Two coats of Vitralite Enamel Undercoating. Two coats of Vitralite, left in the gloss or rubbed.

Eggshell or Dull Finish, Without Rubbing (Wood)—One coat of lead and oil. Two coats of Vitralite Enamel Undercoating. One or two coats of Eggshell Vitralite Enamel.

Note—For metal work omit the coat of lead and oil.

Note—Although Vitralite is made only in the white, it may be brought to any tint by mixing in thoroughly the necessary quantity of the desired color ground in japan.

Exterior Work (Wood, Metal)—One coat of lead and oil. One coat of Vitralite Cement Coating. Two coats of Vitralite.

Interior or Exterior Work (Plaster, Cement, etc.)—One or two coats of Vitralite Cement Coating. One or two coats of Vitralite.

Floors

Oak and All Open-Grained Woods—One coat of Paste Wood Filler, natural or of desired color. Two or three coats of "61" Floor Varnish.

Maple, Pine and All Close-Grained Woods—If stain finish is desired, coat of Pratt & Lambert Oil Stain of desired shade. For natural finish, omit stain. Two or three coats of "61" Floor Varnish.

A FEW WELL-KNOWN BUILDINGS ON WHICH PRATT & LAMBERT PRODUCTS HAVE BEEN USED

White House, Washington, D. C.
Kaufmann's Department Store, Pittsburgh, Pa.
North American Building, Chicago, Ill.
Merritt Building, Los Angeles, Cal.
Tutweiler Hotel, Birmingham, Ala.
New York State Educational Building, Albany, N. Y.
Newhouse Hotel, Salt Lake City, Utah
Kansas City Union Station, Kansas City, Mo.
Insurance Exchange Building, Chicago, Ill.
Traymore Hotel, Atlantic City, N. J.

STANDARD VARNISH WORKS

Staten Island 2600 Federal Street 113 Front Street 27 Bevis Marks
NEW YORK, N. Y. CHICAGO, ILL. SAN FRANCISCO, CAL. LONDON, E. C., ENG.
BERLIN PARIS BRUSSELS MELBOURNE
TORONTO, CAN. INTERNATIONAL VARNISH CO., LTD.

Products and Services.

ENAMEL: "SATINETTE" ENAMEL—WHITE, GLOSS, RUBBED EFFECT, FLAT ($7.00); ENAMEL UNDERCOATINGS: "SATINETTE" UNDERCOAT ($3.00), "SATINETTE" CEMENT UNDERCOAT ($3.50); FILLERS: "KLEARTONE" PASTE WOOD FILLER, made in a variety of shades; FLOOR VARNISH: "ELASTICA" FLOOR FINISH ($3.00); SHELLACS and COATERS: "KLEARTONE" WHITE SHELLAC ($2.25), "KLEARTONE" ORANGE SHELLAC ($2.15), "KLEARTONE" MAHOGANY COATER ($2.15), "KLEARTONE" SILVER GRAY COATER ($2.00); STAINS: "KLEARTONE" OIL STAINS ($2.25 and $2.75), "KLEARTONE" ACID STAINS ($2.00); EXTERIOR VARNISHES: "ELASTICA" NO. 1 ($4.25); INTERIOR VARNISHES: "ELASTICA" NO. 2 ($3.00), "ELASTICA" CABINET FINISH ($3.00), WHITE POLISHING VARNISH ($4.00); VARNISH for RUBBED EFFECT: "KLEARTONE" FLAT VARNISH ($3.00); VARNISH for a FLAT or MISSION FINISH: "FLATTINE" CABINET FINISH ($3.00); INSULATING VARNISHES, COMPOUNDS, etc: STANDARD SPECIALTIES; MARINE VARNISHES: "ELASTICA" NO. 1 ($4.25), OCEANA MARINE SPAR ($3.50); WAX-LIKE FINISH: "STANVAR" ($4.00), "STANVAR" UNDERCOAT ($3.50).

Our Products cover the entire field of Architectural Finishes, Stains and Enamels, and comprise a special product, "time tested and approved" for each specific purpose, and each individual product is the best it is possible to produce for the purpose for which it is intended.

Co-operative Services.

We maintain an Architectural Service Department through which you can secure samples and expert information in regard to your finishing problems. We will be pleased to have you take advantage of it to the fullest extent, without any obligation on your part whatsoever. Refer to our Architectural Hand Book for complete data. A copy will be supplied on request.

The One Perfect Floor Varnish.

ELASTICA Floor Finish

"Elastica" Floor Finish combines quick and hard drying properties without sacrificing elasticity and durability in any degree, and protects the floors under severest wear and frequent washing. Does not mar, scratch white or spot. Works easily, dries dust-free in four to six hours, hardens over night and can be rubbed. On grained, painted or old floors, linoleum or oilcloth, one coat is sufficient. Remove all grease and dirt from floors before applying. Reduce with turpentine when necessary. Do not apply "Elastica" Floor Finish over shellacs, liquid fillers, or patent "first coaters."

SPECIFICATIONS

[illegible]

For All Exterior Work—"Elastica" No. 1.

ELASTICA —No 1—

For finishing front doors and all woodwork exposed to the weather, where greatest durability is requisite. Dries free from dust in eight to ten hours. Hardens sufficiently in about five days to admit of being rubbed. Possesses the maximum elasticity attainable in any varnish. Produces a beautiful luster over natural, painted or grained woods, and may be rubbed with pumice-stone and water to a dull finish. "Elastica" Number 1 excels all other finishes or varnishes on the market for use on steamships, yachts, boats, canoes, spars, etc., effectually resisting the action of both fresh and salt water. Does not scratch or mar white, resists atmospheric influences better than any other varnish, is waterproof and unaffected by hot or cold water.

SPECIFICATIONS

Natural Finish for Open-Grain Woods, such as Chestnut, Mahogany, Oak, Walnut, Ash—

Fill with "Kleartone" Paste Wood Filler of suitable shade. After forty-eight hours: First coat "Elastica" No. 1, reduced 10 per cent with turpentine. After forty-eight hours: Sandpaper with 00 sandpaper; second coat "Elastica" No. 1. After forty-eight hours: Sandpaper with 00 sandpaper; third coat "Elastica" No. 1. After five days: Rub with pumice-stone and oil.

For Polished Finish—Rub with pumice-stone and water. Polish with rottenstone and water.

For Close-Grain Woods—Beech, Birch, Cypress, Gumwood, Redwood, Yellow Pine, Hazel, Sycamore, White Pine, Poplar, Whitewood, Maple, British Columbia Fir, see specifications for Open-Grain Woods, as above, omitting Paste Filler.

For Stained Finish—

Stain with "Kleartone" Stain. When dry, apply coat of "Kleartone" Shellac or Coater.

For Open-Grain Woods—Fill with "Kleartone" Paste Wood Filler of suitable shade, and proceed with specifications as given above.

For Close-Grain Woods—See specifications as given above, omitting Paste Filler.

NOTE—Over Cherry, Mahogany, Walnut or Dark Brown Stain, use "Kleartone" Mahogany Coater instead of Shellac.

For Finest Interior Work—"Elastica" No. 2.

ELASTICA —No 2—

Extreme paleness and durability are distinguishing features of this varnish. It works with surprising freedom, covers the maximum surface area, and produces a brilliant, permanent gloss finish. Dries free from dust in four to six hours. May be rubbed to a dull finish in from three to four days.

Especially recommended and intended for finishing finest woodwork in palatial residences, apartments, bank, office and hotel buildings.

SPECIFICATIONS

Natural Finish for Open-Grain Woods—

[illegible] "Elastica" No. 2. After forty-eight hours: Sandpaper with 00 sandpaper; third coat "Elastica" No. 2. After [illegible] Shellac; when dry, sandpaper lightly with 00 sandpaper

Continued on next page

First coat "Elastica" No. 2. Proceed with work as specified above.

For Stained Finish—

Stain with "Kleartone" Stain. When dry, follow with coat of "Kleartone" Shellac, or Coater.

For Close-Grain Woods—See specifications as given above.

For Open-Grain Woods—Fill with "Kleartone" Paste Wood Filler of suitable color, and follow specifications as given above.

NOTE—Over Cherry, Mahogany, Walnut and Dark Brown Stains, use "Kleartone" Mahogany Coater instead of Shellac.

"Elastica" Cabinet Finish.

TRADE ELASTICA MARK
Cabinet Finish

For use where a high-grade piano rubbed or polished effect is desired. This varnish is the highest quality that can be produced from the purest and best adapted materials, by the employment of scientific methods of manufacture.

It produces a beautiful finish of great durability. Dries free from dust in four hours, and can be rubbed within three days, and given a brilliant piano polish, if desired.

"Elastica" Cabinet Finish does not sweat or gloss up after rubbing, as is the case with most of high-grade architectural varnishes.

SPECIFICATIONS

Natural Finish for Open-Grain Woods—

Fill with "Kleartone" Paste Wood Filler of suitable shade. After forty-eight hours: First coat "Elastica" Cabinet Finish, reduced 10 per cent with turpentine. After forty-eight hours: Sandpaper with 00 sandpaper; second coat "Elastica" Cabinet Finish. After forty-eight hours: Sandpaper with 00 sandpaper; third coat "Elastica" Cabinet Finish. After seventy-two hours: For Egg-Shell Finish—Rub with burlap, pumice-stone and oil.

For Polished Wood Finish—Rub with felt, pumice-stone and water. Polish with rottenstone and water.

For Close-Grain Woods—One coat "Kleartone" White Shellac, in place of Paste Filler. When dry, sandpaper lightly with 00 sandpaper. First coat "Elastica" Cabinet Finish. Proceed with work as specified above.

For Stained Finish—

Stain with "Kleartone" Stain. When dry, follow with coat of "Kleartone" Shellac or Coater.

For Close-Grain Woods—See specifications given above.

For Open-Grain Woods—Fill with "Kleartone" Paste Wood Filler, of suitable shade, and follow specifications as given above.

NOTE—Over Cherry, Mahogany, Walnut and Dark Brown Stains, use "Kleartone" Mahogany Coater instead of Shellac.

White Polishing Varnish for Interior Work.

White polishing Varnish is an interior rubbing and polishing varnish of the highest grade. It is extremely light in color, being intended for use over light colored woods in residences, public buildings, etc., where an exceptionally pale varnish is desired.

Dries dust-free in four hours, and can be rubbed and polished in from three to four days.

SPECIFICATIONS

Natural Finish for Open-Grain Woods—

Fill with "Kleartone" Paste Wood Filler of suitable shade. After forty-eight hours: First coat of White Polishing Varnish, reduced 10 per cent with turpentine. After forty-eight hours: Sandpaper with 00 sandpaper; second coat of White Polishing Varnish. After forty-eight hours: Sandpaper with 00 sandpaper; third coat of White Polishing Varnish.

After three to four days: For Egg-Shell Finish—Rub with burlap, pumice-stone and oil.

For Polished Finish—Rub with felt, pumice-stone and water. Polish with rottenstone and water.

For Close-Grain Woods—One coat of "Kleartone" White Shellac; when dry, sandpaper lightly with 00 sandpaper. First coat of White Polishing Varnish. Proceed with work as specified above.

For Stained Finish—

Stain with "Kleartone" Stain. When dry, follow with coat of "Kleartone" Shellac or Coater.

For Open-Grain Woods—Fill with "Kleartone" Paste Wood Filler and follow specifications as given above.

For Close-Grain Woods—See specifications given above.

NOTE—Over Cherry, Mahogany, Walnut and Dark Brown Stains, use "Kleartone" Mahogany Coater instead of Shellac.

Varnish for a Rubbed Effect.

KLEARTONE
Flat Varnish
TRADE-MARK

Use "Kleartone" Flat Varnish as a final coat where a rubbed effect is desired without the labor and cost of rubbing. Is used over natural or stained woods, and produces a finish closely resembling a gloss varnish, rubbed. Particularly recommended for use over mahogany or mahogany stained woods, as it does not cloud same. "Kleartone" Flat Varnish applied as a final coat over "Elastica" Number 2 will produce an exceptionally good finish.

"Kleartone" Flat Varnish is unaffected by water and,unlike most flat varnishes, does not contain wax or pigment. It does not need stirring and is exceptionally tough and elastic.

SPECIFICATIONS

Natural Finish for Open-Grain Woods—

Fill with "Kleartone" Paste Wood Filler of suitable shade. After forty-eight hours: First coat "Elastica" No. 2, reduced 10 per cent with turpentine. After forty-eight hours: Sandpaper lightly with 00 sandpaper; second coat "Elastica" No. 2. After forty-eight hours: Sandpaper lightly with 00 sandpaper; third coat "Kleartone" Flat Varnish.

For Close-Grain Woods—One coat of "Kleartone" White Shellac. When dry, sandpaper lightly with 00 sandpaper. First coat "Elastica" No. 2. Proceed with work as specified above.

For Stained Finish—

Stain with "Kleartone" Stain. When dry, follow with coat of "Kleartone" Shellac or Coater.

For Open-Grain Woods—Fill with "Kleartone" Paste Wood Filler, and follow specifications as given above.

For Close-Grain Woods—See specifications given above.

NOTE—Over Cherry, Mahogany, Walnut and Dark Brown Stains, use "Kleartone" Mahogany Coater in place of Shellac.

Varnish for Flat or Mission Finish.

FLATTINE
Cabinet Finish

"Flattine" Cabinet Finish is the one satisfactory pigment flat varnish. It dries hard over night, contains no wax, surfaces well, and produces an even Flat or Mission finish without rubbing.

"Flattine" Cabinet Finish has proved a very popular finish and is highly recommended, for use where a Dead Flat or Mission effect is desired.

This product is a pigment varnish, and must be thoroughly agitated before applying; the pigment will settle, and care must be used to see that this goods is properly agitated until the container is empty.

SPECIFICATIONS

For Mission Finish for Open- and Close-Grain Woods—

Stain with "Kleartone" Stain, as per shade selected. After twelve hours: One coat of "Kleartone" Shellac or Coater. When dry, sandpaper lightly with 00 sandpaper. First coat Flattine Cabinet Finish. After twenty-four hours: Second coat Flattine Cabinet Finish.

"Satinette" Enamel.

Satinette
Enamel
TRADE MARK

Is the immaculate finish of refinement, time tested and approved since 1834. It works freely under the brush, is quick drying, does not settle or harden in the can, and will not skin; it is unequaled for obtaining a perfect enamel finish.

Continued on next page

A surface finished with "Satinette" Enamel can be repeatedly washed, without injury to the finish.

"Satinette" Enamel is made under the original formula of Pinchin, Johnson & Co., Ltd., London, E. C., England. Established 1834.

STANDARD VARNISH WORKS, sole Licensee for United States of America.

White (Gloss) for Exterior or Interior Work.

Intended for use as final coats over a foundation surface prepared with "Satinette" Undercoat or "Satinette" Cement Undercoat. It will not turn yellow, does not settle or harden in the can, and will not skin.

"Satinette" Enamel White (Gloss) produces a perfect gloss finish, which may be rubbed with pumice-stone and water to produce a semigloss finish.

White (Rubbed Effect) for Interior Work.

Produces the pleasing soft effect of a perfect rubbed job, without the labor and expense of rubbing with pumice-stone and water. It is very durable, will not turn yellow, settle or harden in the can, or skin.

It is intended for use as final coats over a foundation surface prepared with "Satinette" Undercoat or "Satinette" Enamel Undercoat.

White (Flat) for Interior Work.

Produces a durable and smooth flat white enamel finish. Works freely under the brush, hardens quickly and does not turn yellow, settle or harden in the can, or skin.

It is intended for use as final coats over a foundation surface properly prepared with "Satinette" Undercoat or "Satinette" Cement Undercoat.

"Satinette" Undercoat.

Is used for the foundation coats on work to be finished with "Satinette" White Enamel. Its covering capacity is remarkable, and it flows out with surprising freedom, producing a satin-like surface which requires only light sandpapering.

It dries quickly, hard and tough, and does not show brush marks. "Satinette" Undercoat is much superior to white lead in oil, as it will not affect the succeeding enamel coats. The success of an enamel finish depends upon the proportion of the foundation surface.

"Satinette" Cement Undercoat.

This material is a scientifically prepared product, solely for the purpose of preparing a suitable foundation on cement, concrete, stucco, Keene's cement plaster, brick or stone upon which to apply "Satinette" Enamel, an enamel finish being so desirable on these surfaces in hotels, public buildings, hospitals and similar structures, both from the economical and sanitary standpoints.

"Satinette" Cement Undercoat is the result of exhaustive laboratory research, weather tests, and practical experience. It effectually overcomes the disadvantage of other products used for this purpose, in that it has a neutralizing effect and resists chemical action.

It has splendid working qualities and covering capacity. A gallon covers approximately three hundred square feet, depending upon the porosity of the surface.

SPECIFICATIONS FOR FINISHING WOOD WORK

First or Priming Coat—For soft woods, such as Pine and Whitewood, and when undercoating exterior surfaces and such exposed interior surfaces as window sashes, linings and sills, to one gallon of "Satinette" Undercoat add one pint of raw linseed oil.

For hard woods, such as Birch and Cherry, to one gallon of "Satinette" Undercoat add one pint of spirits of turpentine.

Stir thoroughly and brush well into the surface. Allow forty-eight hours for drying. Sandpaper lightly with No. 00 sandpaper or rub with fine steel wool.

Second Coat—"Satinette" Undercoat full body, as it comes from the can. Allow forty-eight hours for drying. Sandpaper lightly with No. 00 sandpaper or rub with fine steel wool.

Third Coat—"Satinette" Undercoat full body, as it comes from the can. Allow forty-eight hours for drying. Sandpaper lightly with No. 00 sandpaper or rub with fine steel wool.

NOTES—By adding to the last coat of "Satinette" Undercoat twenty-five per cent of "Satinette" White Enamel, an extraordinary result is obtained.

Under ordinary conditions three undercoats are sufficient, but should they not cover the work evenly, additional coats should be applied.

Fourth Coat—"Satinette" White Enamel Gloss, Flat or Rubbed Effect, as desired. Allow forty-eight hours for drying. Sandpaper lightly with No. 00 sandpaper or rub with fine steel wool.

Fifth Coat—"Satinette" White Enamel Gloss, Flat or Rubbed Effect, as desired.

For Semi-Gloss Finish—After allowing seventy-two hours for drying, rub the final coat of Gloss "Satinette" Enamel with pumice-stone and water.

NOTES—It is essential, in order to obtain the best results, that each coat be thoroughly dry before the succeeding coat is applied.

If the "Satinette" White Enamel or Undercoat is too heavy, reduce only with pure spirits of turpentine.

In order to properly finish Yellow Pine and pitchy woods, it is well to apply a thin coat of White Shellac over the priming coat of "Satinette" Undercoat. This will effectually prevent the pitch from coming through and discoloring the subsequent coats of Undercoat and Enamel.

Open-grain woods, such as Oak or Chestnut, should first be paste filled before applying coats of "Satinette" Undercoat and Enamel.

SPECIFICATIONS FOR FINISHING CEMENT, CONCRETE, STUCCO, KEENE'S CEMENT, PLASTER, BRICK OR STONE

First or Priming Coat—"Satinette" Cement Undercoat thinned ten to twenty-five per cent with pure spirits of turpentine. Flow it on with a good, clean, wide brush, but do not brush it out for the purpose of extending it, merely to settle it into place. Allow three to four days for drying.

Second Coat—When first coat is thoroughly dry, apply "Satinette" Cement Undercoat, full body, as it comes from the can. Allow forty-eight hours for drying.

NOTES—While two coats of "Satinette" Cement Undercoat are recommended, the condition of the surface may demand more, which should be applied full body as it comes from the can.

On some surfaces one coat is sufficient, and where only one coat is applied, it should not be thinned but applied full body as it comes from the can.

By adding to the last coat of "Satinette" Cement Undercoat twenty-five per cent of "Satinette" White Enamel, an extraordinary result is obtained.

Third Coat—"Satinette" White Enamel Gloss, Flat or Rubbed Effect, as desired. Allow forty-eight hours for drying. Sandpaper lightly with No. 00 sandpaper or rub with fine steel wool.

Fourth Coat—"Satinette" White Enamel Gloss, Flat or Rubbed Effect, as desired.

For Semi-Gloss Finish—After allowing 72 hours for drying, rub the final coat of Gloss "Satinette" Enamel with pumice-stone and water.

NOTES—When applied over an old finished surface, all loose paint should be removed. The surface must be clean and free from dust and dirt. Where a wash coating of cement has been applied, the surface should be wire brushed and thoroughly dry.

It is essential in order to obtain the best results that each coat be thoroughly dry before the succeeding coat is applied.

If the "Satinette" Enamel or Cement Undercoat is too heavy, reduce only with pure spirits of turpentine.

"Kleartone" Oil Stains.

Oil Stains

"Kleartone" Oil Stains are labor saving stains, requiring only one brushing operation. They penetrate as deeply as acid stains, but, unlike acid stains, do not require that the wood be sponged first or sandpapered after staining.

"Kleartone" Oil Stains do not require wiping; are soluble, transparent, non-pigment stains, dry rapidly, are absolutely uniform in shade, and non-fading, if applied in accordance with directions.

Continued on next page

The shades are: Light Mahogany, Dark Mahogany, Extra Dark Mahogany, Brown Mahogany, Cherry, Walnut, Olive Green, Sage Green, Dark Forest Green, Light Brown, Dark Brown, Flemish Oak, Early English, Circassian Walnut, Dark Fumed, Light Fumed, Bog Oak, Dark Oak, Light Oak, Pollard Oak, English Oak, Golden Oak, Weathered Oak.

NOTE—Any special shades can be matched, if sample be furnished for our guidance.

SPECIFICATIONS

Brush the Stain on the unfilled wood and allow twelve hours to dry. Do not wipe. Allow twenty-four to thirty hours for Cherry, Mahogany, Dark Brown and Walnut shades to dry, as these shades require a longer time to penetrate and dry up for first coating.

Allow plenty of time and do not wipe.

"Kleartone" Acid Stains.

KLEARTONE TRADE MARK Acid Stains

"Kleartone" Acid Stains are used to produce certain stained effects which are only obtainable with an acid stain. They are the most perfect of their kind, the colors being absolutely fast, and not injurious to the woods or succeeding finishing coats. The shades are: Silver Gray, Holland Blue, Light Fumed Oak, Dark Fumed Oak, Light Mahogany, Dark Mahogany, Extra Dark Mahogany.

SPECIFICATIONS

It is not necessary to sponge the wood before applying these stains.

Brush Stain on unfilled wood and when thoroughly dry, sand smooth with 00 sandpaper.

NOTE—Unique effects can be obtained by using different colored fillers on porous woods, stained with "Kleartone" Acid Stains.

"Kleartone" Coaters.

KLEARTONE TRADE MARK Coaters

"Kleartone" Mahogany Coater should be used over "Kleartone" Mahogany, Walnut, Dark Brown and Cherry Stains.

It is a thin alcohol coater which enriches the color of the stain and positively prevents fading. By the use of the above mentioned stains and "Kleartone" Mahogany Coater, an effect is produced that is matchless and permanent.

"Kleartone" Silver Gray Coater is a thin, gray, spirit coater which is especially intended for use over our "Kleartone" Silver Gray Acid Stain. It prevents the yellowness of the wood from showing through. It works easily, dries quickly, and can be sandpapered in a few hours.

SPECIFICATIONS

Mahogany Coater—For use over Cherry, Walnut, Mahogany and Dark Brown Stains.

Apply as First Coater over above Stains.

After five to eight hours: Sand smooth with 00 sandpaper and proceed with succeeding Varnish coats.

Silver Gray Coater—For use over Silver Gray Acid Stain.

The use of Silver Gray Coater in connection with Silver Gray Stain is necessary to secure the proper silver gray effect.

Apply as First Coater over Silver Gray Acid Stain.

After five to eight hours: Sand smooth with 00 sandpaper and proceed with succeeding Varnish Coats.

"Kleartone" Shellacs.

KLEARTONE TRADE MARK Shellacs

"Kleartone" White and Orange Shellacs are prepared especially for use over "Kleartone" Stains. They are manufactured from absolutely pure shellac gum and alcohol, and are of the proper body to insure correct results. "Kleartone" Shellacs are of the highest possible quality.

"Kleartone" White Shellac should be used over the following shades of "Kleartone" Stains: Olive Green, Sage Green, Dark Forest Green, Light Fumed, Dark Fumed, Holland Blue, Flemish Oak, Early English, Bog Oak, Pollard Oak, English Oak, Weathered Oak, Circassian Walnut.

"Kleartone" Orange Shellac should be used over the following shades of "Kleartone" Stains: Dark Oak, Light Oak, Golden Oak and Light Brown.

SPECIFICATIONS

For use as First Coaters over "Kleartone" Stains.

Apply as First Coaters in the usual way.

After ten hours: Sand with 00 sandpaper and proceed with succeeding Varnish Coats.

For reducing, use best grade of denatured alcohol.

"Kleartone" Paste Wood Fillers.

KLEARTONE TRADE MARK Paste Wood Fillers TRADE-MARK

These Fillers are recommended for the filling of woodwork and flooring in public and private buildings, where open-grain woods are used. They are made in a wide variety of shades, of the best and most adaptable raw materials, by experts in this line.

"Kleartone" Paste Wood Fillers will not shrink, and the finish applied over them will not "pit." They produce a perfect foundation for the following coats of varnish: Antique, Antwerp, Fumed, Forest Green, Golden Oak, Mahogany, Natural, Philippine Mahogany, White.

"Stanvar"—The Wax-Like Wood Finish.

STANVAR TRADE-MARK

"Stanvar," a wax-like wood finish, is superior to wax for wood finishing, inasmuch as it comes in liquid form and is easily applied with a cloth.

It requires no polishing with a weighted brush, and produces a beautiful, wax-like finish. It does not have the dangerous slipperiness which is so evident on floors that are waxed, and is not affected by water as is wax.

SPECIFICATIONS

Natural Finish for Open-Grain Woods—This product is not a Varnish, but an Oil Finish for use in place of wax.

Fill with "Kleartone" Paste Wood Filler natural.

After twelve to twenty-four hours: One coat "Stanvar" Undercoat. After five hours: First coat of "Stanvar" applied with a rag in accordance with directions on package. After six to twelve hours: Second coat of "Stanvar" applied exactly like the preceding coat. After six to twelve hours: Third coat of "Stanvar" applied exactly like the preceding coats.

For Close-Grain Woods—Maple, Beech, Yellow Pine, Oregon Pine.

Same specifications as above, only omit Paste Filler.

Stained Finish for Open- or Close-Grain Woods—Stain with "Kleartone" Stain, and specify above.

"Stanvar" must be applied with a cloth; cheese-cloth being preferable, due to being free of lint.

NOTE—When used on floors, it is best to use "Stanvar" Undercoat as a first coat.

"Stanvar" Undercoat—For New Work Only.

STANVAR UNDERCOAT TRADE-MARK

"Stanvar" Undercoat is a spirit coater used in place of shellac as a priming coat on new floors and woodwork which are to be finished with "Stanvar."

"Stanvar" Undercoat is applied with a brush (not with a cloth), dries hard in a few hours, and can be sandpapered readily.

While possessing approximately the same drying qualities as shellac, "Stanvar" Undercoat does not have the undesirable brittleness of shellac.

SPECIFICATIONS

Apply as First Coater over stained and filled work for stained effect.

Over Paste Filler on Open-Grained Woods for Natural Finish.

Over Raw Wood on Close-Grain Woods for Natural Finish.

After twelve hours: Sand with 00 sandpaper. Apply succeeding coats of "Stanvar."

THE O'BRIEN VARNISH COMPANY

MANUFACTURER OF

Varnishes, Japans, Enamels and Stains

GENERAL OFFICES AND FACTORY

SOUTH BEND, IND.

Products.

O'Brien's Master Varnish; Pyramid Brand of Natural Wood Finishes; Flexico Enamel, Liquid Velvet, Egg-Shell White Enamel, South Bend White Enamel, Q. D. Flat Oil Finish, Adamantean Surfacer, Wood-O-Lac and Stains.

TRADE-MARK

O'Brien's Master Varnish.

A lasting preservative and beautifier for all surfaces subjected to the weather or to the attacks of water, such as vessels, automobiles, outside doors, signs, etc., or for all interior surfaces, floors, bathrooms, etc., where the usage is severe.

O'Brien's Master Varnish is the universal finish for all surfaces requiring a varnish. Hot water will not hurt it, and it is impervious to cleaning compounds or to the fumes of products used in fumigation. Price, $4.50 per gallon.

Pyramid Brand of Natural Wood Finishes.

The Pyramid Finish Exterior—For outside doors, window casings, and all surfaces exposed to the sun or weather. It possesses great durability and is adapted to atmospheric changes. Should be applied directly to the wood, using no shellac. Price, $4.50 per gallon.

The Pyramid Finish Interior—This finish is made from the choicest materials and is intended for the highest grade of interior woodwork in residences, hotels, schools, hospitals, public buildings, etc. It yields a perfectly smooth film unexcelled for its elasticity and durability. It dries with a brilliant luster, rubs easily, and is susceptible to a high polish. Price, $3.00 per gallon.

The Pyramid Floor Finish—For beautifying and preserving floors, linoleums, etc. It is made to withstand hard usage, such as the constant pounding of shoe heels and the moving of furniture. Its use affords an elastic, durable and waterproof finish. Price, $3.00 per gallon.

Flexico Enamel.

Flexico Enamel is a flexible white enamel coating intended for outside or inside work. Its working and covering qualities, its durability and its pureness of color are as yet unexcelled. Made in white and a wide range of colors. Price, $6.00 per gallon.

South Bend White Enamel.

The very highest grade of enamel for interior work exclusively. It may be rubbed and is susceptible to a polish. It is unsurpassed for its purpose. Price, $5.00 per gallon.

White Enamel Undercoat.

White Enamel Undercoat is an undercoating for white enameled work. Price, $3.00 per gallon.

Liquid Velvet.

Liquid Velvet is the washable flat wall enamel for any kind of wall, plaster, cement, metal or burlap work. Made in white and a wide range of colors. Adapted for use in residences, hotels, schools, hospitals, sanitariums, public buildings, mills, factories, etc. It is washable, sanitary and unexcelled in working and wearing qualities.

Color card and booklet, "Why Architects Specify O'Brien's Liquid Velvet," sent on request. Price, $2.60 per gallon.

Q. D. Flat Oil Finish.

Q. D. Flat Oil Finish dries with a smooth, dead finish. It protects the surface, brings out the grain of the wood, and produces that dull effect which is usually attained by rubbing. Price, $3.00 per gallon.

Adamantean Surfacer.

Adamantean Surfacer is a pigment first coater of the greatest merit. Very light colored and quick drying. A splendid liquid filler. Price, $1.60 per gallon.

Wood-O-Lac.

Wood-O-Lac is a substitute for spirit shellac. Price, $1.80 per gallon.

Paste Oil Stains.

For beauty and permanency of color these stains are unexcelled. They are put up in paste form and are to be thinned down with benzine. Directions for their use will be found on each can. Prices on application.

PASTE OIL STAINS

No. 1 Dark or Weathered Oak	No. 16 Fumed Oak, Light
No. 3 Light Oak	No. 17 Forest Green
No. 6 Antique Oak	No. 18 Moss Green
No. 7 Golden Oak	No. 19 Dark Green
No. 8 Walnut	No. 20 Brown
No. 9 Cherry	No. 24 Deep Mahogany
No. 13 Fumed Oak, Dark	No. 680 Silver Gray
No. 14 Mahogany	

Quality.

O'Brien's Varnishes, Enamels, Stains, etc., are made on a high-quality basis, with the cost considered as of secondary importance.

Co-operation.

It is desired to cooperate at all times with the architectural profession. Therefore, panels, descriptive literature and special information will be sent to those interested, on request.

Samples are filed with the Architects Samples Co., 101 Park Avenue, New York.

THOMSON WOOD FINISHING COMPANY

Enamels, Varnishes and Paints

ESTABLISHED 1874

829-835 North Third Street
PHILADELPHIA, PA.

INCORPORATED 1889

AGENCIES IN PRINCIPAL CITIES

Products.

Inventors and Manufacturers of PORCELITE ENAMEL and UNDERCOATS, SANATONE FLAT WALL FINISH, ZANZIBOLIO VARNISHES, WOOD FILLERS, TECHNICAL ENAMELS.

Technical Enamels.

During thirty years of experimentation and specialization we have manufactured enamels—especially white—for every purpose. This includes baking, air drying, dipping, spraying, and brushing enamels for use on various metals, wood, leather, concrete, etc.

If you desire any information, address Department T. E.

Porcelite Enamel.

Porcelite Enamel was the first high-grade enamel made in this country. Since 1883 it has been admittedly the standard for enamel finishing. Porcelite dries by oxidation to a degree of hardness never attained by damar, long oil or imported enamels. A durable porcelain-like surface is obtained by the use of Porcelite, which can be rubbed to a dull finish or polished to a mirror-like surface. It is impervious to steam, soap, acids and antiseptic solutions. Porcelite does not yellow with age, but retains its unexcelled whiteness indefinitely. It will not crack, chip or craze.

Capacity—Porcelite covers from 500 to 600 square feet to the gallon.

Advantages and Uses of Porcelite Enamel.

Porcelite is sanitary, beautiful, durable. It can be used to advantage on dwellings and public institutions. Because it does not turn yellow, and withstands the most severe conditions, it has been used on such homes as Carnegie's and Gould's; on the New York Central Railroad, the Carnegie Steel Works, the United States Capitol, the Biltmore Hotel, the Vancouver Hospital, and innumerable other buildings.

Porcelite Varieties.

No one enamel can fill all requirements. To meet the following conditions we manufacture various kinds of Porcelite:

PURPOSE	MATERIAL
Interior Gloss (rubbing)	Porcelite White
Imitation rubbed effect	Porcelite Matte
Soft Colonial color	Porcelite Special White
Exterior	Porcelite Exterior
Undercoat enamel	Porcelite Undercoat

Specifications for Porcelite.

Woodwork—Cover knot holes with pure white shellac. Fill all holes, etc., with white lead putty. Apply three coats of Porcelite Undercoat (sandpapering lightly), then two coats of Porcelite.

Rubbed Work—Last coat to be rubbed with pumice stone and water.

Polished Work—Last coat to be rubbed with rotten stone and water.

Plaster, Brick or Concrete—Dust down thoroughly, apply two or three coats of Porcelite Undercoat and two coats of Porcelite, following same directions as for wood.

Metal—Two coats of Porcelite Undercoat and two coats of Porcelite, same specifications as for woodwork. Remove all grease before finishing.

Porcelite Matte—The same specifications, except specify "Porcelite Matte."

Zanzibolio Varnishes.

Zanzibolio Exterior—A tough elastic Varnish for finishing store fronts, verandas, vestibules and all exposed places. It dries as rapidly as is consistent with great elasticity and durability. It can be rubbed after thoroughly dry and hard.

Zanzibolio Interior—An exceedingly durable varnish made from the finest materials and used largely for all surfaces for interior finishing. It will not crack nor mar white, and can be rubbed and polished.

Zanzibolio Floor—Quick-drying, tough and elastic, it dries dust-free in five hours, and may be walked on in twelve. Does not mar nor show scratches, can be rubbed or polished, and is water white.

Sanatone.

Sanatone is a washable, flat wall finish. It dries with a soft velvety luster. Can be used on any surface. When dry is thoroughly hard. More sanitary than wall paper, or calcimine. Made in twenty tints.

Sanatone for Schoolroom Walls—We have made a particular study of color combinations best fitted for the schoolroom from the standpoint of light reflection and color psychology.

Capacity—Sanatone covers approximately 700 square feet to the gallon.

Literature and Samples.

Handsome booklets, specifications, or samples of Porcelite, Zanzibolio Varnishes, and Sanatone will be forwarded on request to any architect or owner.

References.

The character of our products may be judged by the reputation they have maintained for so many years and by the type of buildings on which they have been successfully used throughout the United States. If so desired, we will advise you of the buildings in your locality which you can thereupon examine.

MONTEFIORE HOME, NEW YORK, N. Y.
5,000 Gallons of Sanatone and Porcelite used on walls in this home

VALENTINE & COMPANY

Architectural and Railway Varnishes, Enamels and Colors

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Products.

A complete line of ARCHITECTURAL FINISHES, including VALENTINE'S "VALSPAR" VARNISH; "VALSPAR" ENAMELS; "VAL-ENAMEL"; "VAL-ENAMEL" UNDERCOATING; "CELOX" PRIMERS and FILLERS; COLORS IN OIL and VALENTINE'S SUPERFINE JAPAN COLORS.

VALENTINE'S VALSPAR The Varnish That Won't Turn White
TRADE-MARK

"Valspar."

The absolutely waterproof varnish. There are many varnishes which will stand a slight incidental wetting without turning white; but "Valspar" is the only varnish on which water, hot or cold, soapy or clear, has absolutely no chemical or physical effect.

"Valspar" is an original invention, entirely different from any other varnish and not successfully duplicated by any other manufacturer.

The unique waterproofness of "Valspar" has not been attained at the cost of any other varnish virtue. On the contrary, "Valspar" being a long oil varnish is more durable, tough and elastic than any interior varnish heretofore made. It is, in fact, the only long oil varnish which is quick-drying enough to be used indoors. "Valspar" dries dust-free in two hours and hard in twenty-four, regardless of the weather.

"Valspar" is ideally pale, easy flowing and of good body.

"Valspar" is the only varnish fit for kitchens, bathrooms, laundries and pantries, being the only one which will not develop shabby spots under the water exposure. Its waterproofness is also of importance for floors and wainscoting generally; wet feet in the hallway or vestibule, rain or snow from an open window, boiling water from a leaky radiator will do it no harm.

Its astonishing durability compels its use in many places where the use of other varnishes is entirely impracticable.

"Valspar" can be kept in condition by simply washing, and without resort to special oils.

Exacting Tests Successfully Met by "Valspar."

For Office Buildings—The new J. P. Morgan Building, New York, and the Curtis Publishing Company Building, Philadelphia, two of the most prominent office buildings, have used "Valspar" extensively.

Hotels, Apartments, Private Residences innumerable have adopted "Valspar."

On Store Fronts—The Woolworth stores use it exclusively on their fronts and signs. So do many of the United Cigar stores.

In Department Stores—Macy's and Lord & Taylor's in New York are typical examples of great stores which use "Valspar" for their floors, trim, show cases, etc.

On Steel Cars and Locomotives—Over 150 railroads use "Valspar" on their equipment, inside and outside.

SPECIFICATIONS VARNISH SHOULD MEET FOR FLOOR WORK

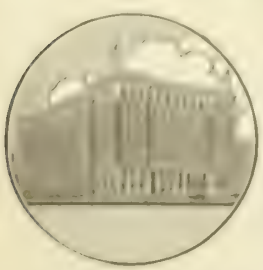
(1) Must be sufficiently pale in color not to discolor maple flooring. (2) Must work freely and flow out smooth. (3) Must dry free from dust in from two to three hours. (4) Must dry hard enough in twenty-four hours to receive the next coat. (5) Must dry hard enough in twenty-four hours to put in use. (6) Must be waterproof—not injured by frequent washing or by hot water from a leaky radiator. (7) Must have sufficient toughness not to scratch white or chip, even after being on the floor for one year. (8) Must dry hard enough to be rubbed down for a flat finish in forty-eight hours, and when rubbed must not sweat out. (9) Must dry out clear and bright after twenty minutes' immersion in boiling water or ten minutes' immersion in standard soap solution (one half ounce Ivory soap dissolved in one gallon warm water).

SPECIFICATIONS VARNISH SHOULD MEET FOR EXTERIOR WORK

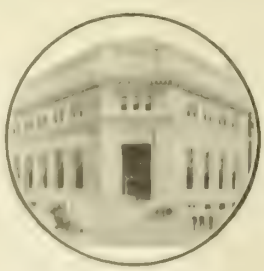
(1) Must be sufficiently pale not to discolor light woods or colors. (2) Must dry free from dust in two to four hours. (3) Must dry hard enough in twenty-four hours to receive next coat. (4) Must be waterproof—not injured by dew or rain, no matter how long continued. Panel coated with the varnish must stand immersion in water for one week without turning white (test to be made over black surface). (5) Must dry hard enough in forty-eight hours to be rubbed down to a flat finish, and when rubbed must not sweat out. (6) When dry must be free from tackiness. (7) Must have sufficient elasticity and durability to stand at least one year's exposure.

SPECIFICATIONS VARNISH SHOULD MEET FOR INTERIOR WOODWORK

(1) Must be sufficiently pale not to discolor light woods. (2) Must work freely and flow out smooth. (3) Must dry free from dust in two to three hours. (4) Must dry hard enough in twenty-four hours to receive next coat. (5) Must be hard and free from tackiness, when dry. (6) Must be waterproof—must not be injured by frequent washing and must not turn white when wet. Panel coated with the varnish must stand one week's immersion without turning white (test to be made over black surface). (7) Must dry hard enough in forty-eight hours to be rubbed down to a flat finish, and when rubbed must not sweat out. (8) Must dry hard enough to be polished in from four to six days. (9) Must have sufficient toughness not to scratch white or show white when marred. (10) Must have elasticity and durability enough not to crack under changes in temperature.



Curtis Publishing Co. Building, Philadelphia



J. P. Morgan & Co.'s New Building, New York

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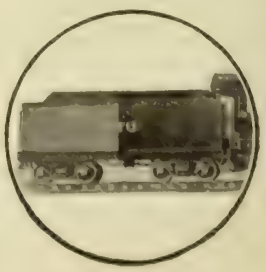
Lord & Taylor's Building, New York

Hudson Terminal Building, New York



Railroads, Cars and Tenders

NOTABLE ESTABLISHMENTS IN WHICH "VALSPAR" HAS BEEN SUCCESSFULLY USED

Continued on next page

Working Specifications for "Valspar" for Interior and Exterior Work, Floors, etc.

Caution—Shellac or other so-called first coaters should never be used as a primer or filler for surfaces exposed to the weather, or on floors.

Ordinary shellac contains a large percentage of water which penetrates the wood and is liable to be brought out by a hot sun in the form of steam that will raise the best varnish into unsightly blisters.

Before varnishing, see that surface is perfectly clean and free from oil, grease, or moisture.

NATURAL FINISH

(1) *Open-grain Woods: Oak, Ash, Walnut, Mahogany*—Sandpaper smooth; putty-stop all nail holes in best manner, using putty colored to match wood. Fill thoroughly with Valentine's "Celox" Wood Filler; allow filler to set for a few minutes, then rub off clean, rubbing across grain. Allow twenty-four hours to harden, then sandpaper lightly with No. 00 sandpaper.

(1A) *Close-grain Woods: Cherry, Birch, White Wood, Maple, Pine, Cypress*—Sandpaper smooth; putty-stop all nail holes in best manner, using putty colored to match wood. Use no primer, filler or shellac.

(2) Then apply three coats of Valentine's "Valspar" Varnish, giving full, flowing coats. Allow at least twenty-four hours between coats. Rub first and second coats with curled hair or moss. Then apply the final coat of "Valspar." This will give a bright gloss finish.

(3) If an eggshell gloss or dull finish is desired, forty-eight hours after the final coat is applied, rub with powdered pumice and water.

(4) For a polished finish, after six days polish final coat with rotten stone and oil.

STAIN AND VARNISH FINISH

If staining is to be done, apply stain to bare wood, before filler, in case of open-grained woods, coloring filler to match stain.

If water stain is used, allow twenty-four hours for water to dry out of wood. If oil stain is used, see that it is thoroughly dry and hard before varnishing.

OLD WORK

On Old Woodwork—If surface is in good condition, sandpaper down and apply "Valspar" direct; if in poor condition, scrape or burn off, apply a light coat of Valentine's "Celox" Wood Primer, and proceed with "Valspar." For best results all previous coats should be removed.

On Metal Work—The process is same as for wood, except substitute Valentine's "Celox" Metal Primer for "Celox" Wood Filler.

Prices and Covering Capacity "Valspar."

Retail price of "Valspar" is $4.50 a gallon. "Valspar" covers about 450 feet to a gallon, one coat.

"Valspar" Enamels.

These enamels, composed of pigments finely ground in "Valspar," possess all the desirable qualities of "Valspar" itself, for exterior and interior work. Should be used just as they come from the can, after thorough stirring. Apply with flat bristle varnish brush and lay off like a finishing varnish. Air-dry hard over night. Flat White requires no rubbing to bring out a full flat finish.

"Val-Enamel."

"Val-Enamel" is the highest grade of white enamel, which will retain its whiteness under all conditions of interior or exterior service. It works freely under the brush, allowing ample time for the painter to lay off his work on large wall surfaces. It flows out round and full, free from brush marks and sags. If applied in too heavy a coat it will not wrinkle.

"Val-Enamel" is perfectly sanitary; it presents a non-porous surface that may be washed with hot or cold water. It will wear to better advantage than any other enamel, and stays white.

VALENTINE'S Val-Enamel

TRADE-MARK

Practical Test—The best practical test of the superiority of "Val-Enamel" over all others is to bring up a panel in the following way:

First divide the panel into three vertical sections; give each section the same undercoatings of flat white, and then apply a coat of "Val-Enamel" in the center. Having selected what you consider to be the two best white enamels hitherto made, which we will call respectively "A" and "B," apply a coat of the "A" on the right-hand section, and a coat of the "B" enamel on the left-hand section. Allow three days for drying and apply second coats of the three enamels. When they are all thoroughly dry, divide the panel in half lengthwise. One half should now be exposed to the weather, and the other half kept indoors for comparison.

In a very short time the "Val-Enamel" on the exposed section will appear whiter, and the enamels on the ends will take on a pink cast, which in time will turn to a brown tinge that will bring the "Val-Enamel" out in white relief.

Enamel Specfications, Interior and Exterior Work.

(1) *Open-grain woods: Oak, Ash, Walnut, Mahogany*—Sandpaper smooth; putty-stop all nail holes in best manner. See that surface is perfectly clean and free from oil, grease, or moisture.

Apply one coat of Valentine's "Val-Enamel" Primer-Filler, allowing at least twenty-four hours to dry.

(1A) *Close-grain Woods: Cherry, Birch, White Wood, Maple, Pine, Cypress*—Omit Primer-Filler, as called for above.

(2) If necessary, sandpaper with No. 00 sandpaper.

(3) Apply three coats of Valentine's "Val-Enamel" Undercoating, allowing at least twenty-four hours between coats.

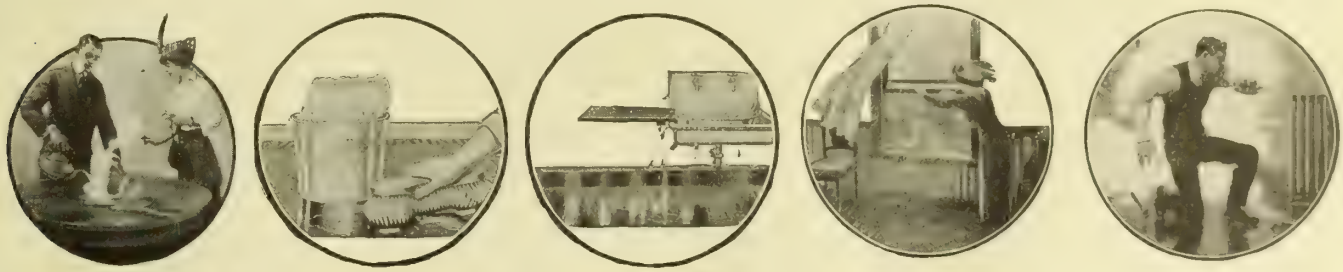
(4) Apply two coats of Valentine's "Val-Enamel," allowing three days between coats.

(5) For a rubbed finish, allow at least one week for drying, then rub with pumice and water.

NOTE—If a rubbed effect is desired, specify "Val-Enamel" Eggshell Gloss. If a flat effect is desired, specify "Val-Enamel" Mat.

Samples.

Samples and literature of our products on file at Architects Samples Co., 101 Park Avenue, New York, N. Y., or sent to any architect for tests on request.



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TESTS THAT "VALSPAR" SUCCESSFULLY MEETS

TWIN CITY VARNISH COMPANY

MANUFACTURERS OF

High-Grade Varnishes and Japans

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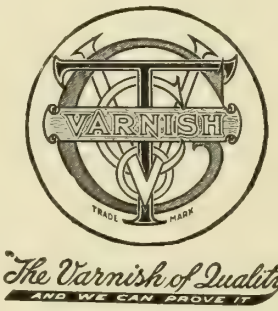
MINNEAPOLIS, MINN. ST. PAUL, MINN. CHICAGO, ILL.

WAREHOUSES

PORTLAND, ORE. SEATTLE, WASH. SAN DIEGO, CAL. LOS ANGELES, CAL. SAN FRANCISCO, CAL.

Products.

VARNISHES for every purpose, including WEARETTE, O. M. F., VELVETTE, FLOORETTE, TWIN CITY SPAR and other High-Grade Varnishes for Architectural Purposes.



TRADE-MARKS

Wearette.

A pale, heavy-bodied, durable and brilliant varnish, unequaled for finishing the finest interior woodwork. Has superior wearing qualities; is extremely elastic, flows well; is not affected by hot or cold water; will not crack, blister or turn white. It may be left in the gloss or rubbed and polished. List price, $3.00 per gallon.

Wearette
THE IDEAL
INTERIOR VARNISH
TRADE-MARK

Specify—All open grain woods to be thoroughly filled with a good paste filler. On all close grain woods apply first coat of Kwick Lac, allowing sufficient time to thoroughly dry. If three coats of varnish are wanted, sandpaper first and second coats with 00 sandpaper. The third coat should be flowed on evenly. If dull finish is desired, rub with pumice stone and water.

O. M. F.

Next in quality to our Wearette. Intended for ordinary interior work. Pale in color and works easy under the brush. Gives a high and lasting luster. May be rubbed if desired. List price, $2.30 per gallon.

OMF
OUR MODERN FINISH
TRADE-MARK

Specify—Same as for Wearette.

Velvette.

A flat varnish, differing entirely from other so-called flat varnishes in that it is an absolutely pure, high-grade gum varnish, flatted by a scientific but natural process, which does not affect its durability. It is pale in color, dries perfectly in 12 hours, and begins to flat as soon as applied. List price, $3.00 per gallon.

Velvette
THE PERFECT
FLAT VARNISH
TRADE-MARK

Specify—The same as for Wearette except rubbing and sandpapering.

Floorette.

Manufactured especially for the treatment of floors, whether in the natural color of the wood or stained to desired shade. A superior, elastic floor varnish, impervious to water; will not mar and withstands the hard usage to which floors are subjected. It may be left in the gloss or rubbed and polished. It also makes an excellent finish for oilcloth or linoleum. List price, $3.00 per gallon.

Floorette
THE PERFECT
FLOOR VARNISH
TRADE-MARK

Specify—All open grain woods to be thoroughly filled with a good paste filler, properly cleaned off with excelsior wiped across the grain and finished with a rag. On all close grain woods apply first coat of three parts raw oil and one part turpentine. Allow 24 hours or more to dry, sandpaper lightly, and apply first coat of Floorette, allowing 24 hours to dry, and finishing with two or three coats of Floorette. Positively never use any liquid fillers, shellac, hard oil, or any of the so-called first coaters on floors. The last coat may be rubbed or left in the gloss.

Spar.

Intended for all exposed work, such as porch ceilings, outside doors, window sills, bathrooms and kitchens. It is not affected by salt or fresh water and will withstand alternate sun and rain. Very elastic and durable. List price, $4.00 per gallon.

Spar
WATERPROOF
VARNISH
TRADE-MARK

Specify—On open grain woods use a good paste filler and apply three coats of Twin City Spar Varnish. On close grain woods use three coats of Twin City Spar Varnish. For best work rub down with pumice stone and water before applying last coat.

Government Interior.

This is a high-grade Interior Varnish intended for Public Buildings, and will conform to Government Specifications. Works freely and will dry free from dust in six hours; dries hard in 36 hours. List price, $3.50 per gallon.

GOVERNMENT
Interior Finish
TRADE-MARK

DENNY, HILBORN & ROSENBACH

Manufacturers of Enamels and Paints

230-232 North Twelfth Street
PHILADELPHIA, PA.
CHICAGO OFFICE: 628 McCormick Building

Products.

Manufacturers of HESTERITE, FLOWETTE, TRIOLITE, CAMEO FLAT WHITE, and SAMURAI ENAMELS. All registered in U. S. Patent Office.

Also, SAMURAI CEMENT AND BRICK COATING, and SAMURAI GLOSS FACTORY WHITE.

Hesterite Enamel.

The aristocrat of enamel is Hesterite. Tested seven years before offered to the public. Used exclusively on the Childs Restaurants, the whitest stores in the world.

Specifications—Interior Gloss—After killing all knots and sap with shellac, give three coats Cameo Undercoat and two coats Hesterite Interior Gloss, allowing sufficient time between coats.

For Matte or Rubbed Finish—Kill all knots and sap, then give two coats Cameo Undercoat and two coats Hesterite Matte Finish.

Exterior Gloss—Kill all knots and sap, and apply three coats Cameo Undercoat and two coats Hesterite Exterior.

Flowette Enamel.

In every way better than the finest imported enamel and sold subject to such warranty. The freest flowing, easiest working enamel made. Flowette Enamel is a beautiful white, drying in a reasonable time with a high lustre; and the surprising paint body of Flowette, notwithstanding its beautiful gloss, makes it the most economical enamel to use, as it takes fewer coats and less labor to make a perfect job.

Flowette's lustrous gloss stands sea air, tropical climate, the ammoniacal fumes of a laboratory, the antiseptic washing of a hospital, and the soap and water cleansing in the home.

Specifications—Interior Work—Shellac all knots and sap, then apply two coats Cameo Undercoat and two coats Flowette Enamel.

Exterior Work—Shellac knots and sap, give three coats Cameo Undercoat and two coats Flowette Enamel.

Triolite Enamel.

An enamel that readily conforms to the skill of the master decorator in reproducing the exquisite effects of the Renaissance, French or Colonial periods of decoration, either in the subdued effect produced by hand rubbing or when left in its natural gloss.

To obtain the soft, mellow tones of Ivory and Colonial White, Triolite is absolutely necessary, as it yields more readily to the tinting color and in also producing the desired effects in French and Silvery Grays and delicate Blue.

Specifications—Interior Work, High Gloss—Shellac all knots and sap and apply three coats Cameo Undercoat and two coats Triolite Gloss Enamel.

Interior Work, Matte or Rubbed Finish—Shellac all knots and sap, then apply three coats Cameo Undercoat and two coats Triolite Matte Enamel.

Cameo Flat White.

Cameo White is a perfect Flat White which, by an entirely new process of manufacture, causes it absolutely to flow out and show no brush marks, streaks or laps, thus saving much time and labor usually spent in sanding.

Cameo White is positively permanent to light and exposure; flows out at a heavier consistency than any other flat white, giving better results with fewer coats and less labor.

Specifications—For Flat Finish on Wood and Plaster—Give three coats Cameo White flowed on, thinning first coat on new work with a small quantity of linseed oil. Finishing coats to be applied as received in original packages.

For Metal—Two coats to be applied, as received in original packages. On special work apply three coats, according to condition of surface to be covered.

As an Undercoat for Enamel—Apply two or three coats Cameo White, depending on condition of surface to be finished.

Samurai Cement and Brick Coating.

Meets the requirements of the architect, engineer and owner for a preservative and decorative coating on cement, brick or plaster, not only on all interior work, but one that can also be used to the best advantage on all exterior work of cement, concrete or brick construction which must be protected from exposure to the elements.

Specifications—On Smooth Cement Surface Interior, Gloss or Enamel Finish—One or two coats Samurai Cement and Brick Coating, and one coat Samurai Gloss Factory White.

On Rough Cement Finish, Exterior—One coat Samurai Cement and Brick Coating and applied freely with brush.

On Hard Finish Plaster—One coat Samurai Primer for plaster, and two coats Samurai Cement and Brick Coating flowed on.

For Gloss or Enamel Finish on Plaster—One coat Samurai Primer for plaster, one coat Samurai Cement and Brick Coating and one coat Samurai Gloss Factory White.

For Brick Work, Interior and Exterior—One coat Samurai Cement and Brick Coating, applied same as for cement.

F. O. PIERCE COMPANY

Manufacturers of Fine Paints and Varnishes

12 West Broadway
NEW YORK, N. Y.

FACTORIES: BROOKLYN, N. Y.; DUNELLEN, N. J.

Products.

HY-GE-KOTE; SEAL-TITE; SEAL-TITE STAINS; GLAZETITE.

Hy-Ge-Kote.

Gives a hard-drying, rubbed enamel surface, equal to the best grades of rubbed enamels on the market, at a comparatively moderate cost, and has the added property of sealing the surface to a marked degree. Hy-Ge-Kote possesses wonderful free flowing, covering, and working properties, leveling to a perfectly smooth rubbed enamel surface, and showing no brush marks.

Hy-Ge-Kote, owing to its sealing properties, can be used in the majority of cases for direct application without necessity for any sizing coat; but where more than one coat is required, we recommend an undercoat of Seal-Tite.

Hy-Ge-Kote or Seal-Tite can be tinted to any desired shade by additions of oil color.

Seal-Tite.

Seal-Tite is a further development of the principles embodied in Hy-Ge-Kote. One coat over a wall usually gives a fine finish. No ceiling varnish necessary on walls as a primer; no shellac necessary over knots and sappy places.

Another remarkable property of Seal-Tite is that two coats may be applied in one day, if necessary, with perfect results.

Seal-Tite is a remarkable finish, giving the effect of a perfectly flat finish; but viewed from a side light, it proves to be a high gloss enamel that will not hold dust.

Seal-Tite Stains.

Seal-Tite stains embody the same principle applied to stains; an entirely new departure in this class of finish. Seals the wood absolutely, and gives a washable, durable, wax finish in one coat, by rubbing with a soft cloth when dry.

Seal-Tite stains contain no wax, therefore they may be varnished or finished in any way desired.

Quality.

The products described above are the development of an entirely new principle, which enables us to produce finishes equal to any of the highest grade enamels and stains at a moderate cost, with the added property of sealing the surface.

No lead or poisonous pigments are used in these products.

Attention is called also to their covering power when properly applied, as compared to other enamels or finishes.

Demonstration.

A practical demonstration of our products may be seen at the Country Life Exhibition in the Grand Central Station, New York City, where the North Carolina Pine Bungalow is shown decorated with these finishes.

Glazetite.

Architects, contractors, property owners, glaziers and master painters will readily appreciate the economic and durable characteristics of Glazetite.

Glazetite is a satisfactory glazing compound; not a putty, but an improvement on putty—the result of absolute necessity for a product of a putty character, from which has been eliminated all the disagreeable and objectionable features of putty, yet retaining all the primary qualities for which putty was originally conceived.

Putty invariably hardens on the sash, and, owing to the oxidization and evaporation of the oils, leaves only a skeleton of pigment and oxidized oils, which cakes and hardens to such an extreme degree that, upon expansion or contraction of sash, the solidified putty cracks, and the slightest subsequent vibration causes it to break and fall off.

With Glazetite this is impossible, owing to the permanent conservation of the oils, which is its life.

The use of Glazetite results in a tight sash, which prevents drafts. It is also absolutely waterproof.

Glazetite becomes an integral part of the sash; reglazing will not be necessary, as the assured life of the oils used in its manufacture, and its consequent elasticity, practically guarantee no cracking or breaking from the inevitable expansion and contraction.

Glazetite can be easily removed when necessary.

While the first cost of glazing with Glazetite may be greater than with putty, it is readily apparent that it is far more economical in the end.

By taking equal portions of putty and Glazetite, from the original packages as a test, and allowing them to remain exposed for a day, or longer, you will immediately observe the advantages of Glazetite. At the end of this period, the putty will have become dry, hard and powdery, whereas Glazetite will have retained its original condition.

Glazetite is composed of selected materials combined with especially prepared oils which, immediately after application, form a protective and elastic surface-film, thus preserving the valuable properties of the oils.

Paint may be applied immediately over Glazetite without danger of staining.

Glazetite is of the same consistency as putty, and is used in identically the same manner.

Samples will gladly be furnished on request.

SAMUEL CABOT, INC.

Manufacturing Chemists

NEW YORK, N. Y.
1133 BROADWAY

141 Milk Street
BOSTON, MASS.

CHICAGO, ILL.
24 W. KINZIE STREET

PRINCIPAL AGENCIES

ATLANTA, GA., Sciple Sons
BALTIMORE, MD., National Building Supply Co.
BIRMINGHAM, ALA., Moore-Handley Hardware Co.
BUFFALO, N. Y., M. A. Reeb
CINCINNATI, OHIO, L. Mendenhall Co.
CLEVELAND, OHIO, Cleveland Builders' Supply Co.
COLUMBUS, OHIO, Columbus Macadam Co.
DALLAS, TEX., Sumner & McCreight Co.
DAYTON, OHIO, Delscamp & Roemhildt Co.
DENVER, COL., Colorado Builders' Supply Co.
DETROIT, MICH., United Fuel & Supply Co.
DULUTH, MINN., Thomson & Stewart
GRAND RAPIDS, MICH., W. P. Williams
HOUSTON, TEX., W. L. Macatee & Sons
INDIANAPOLIS, IND., Builders' Supply Corporation
JACKSONVILLE, FLA., Gill & Mulholland
KANSAS CITY, MO., Day K. Smith
KNOXVILLE, TENN., W. W. Woodruff & Sons
LITTLE ROCK, ARK., W. L. Clippard
LOS ANGELES, CAL. (Stains), Matthews Paint Co.; (Other goods), Waterhouse & Price Co.
LOUISVILLE, KY., National Roofing & Supply Co.
MEMPHIS, TENN., Fischer Lime & Cement Co.
MINNEAPOLIS, MINN., Johnson, Jackson & Corning Co.
NEW ORLEANS, LA., Zimmermann's Building Specialties Co.
OMAHA, NEB. (Stains), Pioneer Glass & Paint Co.; (Quilt), McCaffrey Bros. Co.
PHILADELPHIA, PA., Samuel H. French & Co.
PITTSBURGH, PA., Houston Brothers Co.
PORTLAND, ORE., Timms, Cress & Co.
ROCHESTER, N. Y., W. Stuart Smith Co.
ST. LOUIS, MO., Whitelaw Brothers Chemical Co.
SAN ANTONIO, TEX., West End Lumber Co.
SAN FRANCISCO, CAL., Pacific Building Materials Co.
SEATTLE, WASH, S. W. R. Dally
SIOUX CITY, IOWA, Hansen Glass & Paint Co.
SYRACUSE, N. Y., Alex. Grant's Sons
TAMPA, FLA., Knight & Wall Co.
TOLEDO, OHIO, Toledo Builders' Supply Co.
WACO, TEX., Nash-Robinson Co.
WASHINGTON, D. C., John H. Corning

Products.

Cabot's "Creosote" Shingle Stains; Old Virginia White; Waterproof Cement Stains; Waterproof Brick Stains; "Conservo" Wood Preservative; Damp-Proofing; Protective Paints; Mortar Colors; Sheathing and Deafening "Quilt."

Cabot's "Creosote" Shingle Stains.

Cabot's "Creosote" Shingle Stains are the original shingle stains, invented by Samuel Cabot over thirty years ago.

Uses—Although at first used only upon rough wood, like shingles, boards, undressed siding, etc., they are now widely used on dressed lumber of all kinds, especially half-timbering, cornice and trimmings of cement houses, and dressed siding.

Coloring Effects—They are made of the finest and strongest pigments, ground impalpably fine in pure linseed oil and suspended in a vehicle of specially refined creosote. The coloring effects are therefore soft and rich, and also transparent, so that the wood is beautifully colored without covering the grain. The colors are guaranteed fast.

Wood Preservation—The Creosote penetrates the wood and thoroughly preserves it against decay or insects.

"Creosote is the best wood preservative known."—Trautwein.

"Wood treated with it is not subject to dry rot or other decay."—Century Dictionary.

Imitations—Can be recognized by coarse pigments; tawdry, opaque colors, and the smell of kerosene, benzine, or similar cheapener. Cabot's Stains contain no petroleum distillate or other adulterant.

Application—Shingles may be dipped before laying; or dipped, and brushed once after laying (the most thorough method), or merely brush-coated twice after laying. The coloring effect is the same, but dipping preserves the shingles better. Other woodwork is stained with the brush. Two coats should always be used, and three coats are advisable on smooth wood.

Covering Capacity—One gallon covers 100 square feet, two coats, on rough wood, or 200 to 250 square feet on smooth wood; 2½ to 2¾ gallons will dip 1,000 shingles two-thirds their length, three gallons will dip and brush coat.

RESIDENCE OF RALPH PETERS, PRESIDENT L. I. R. R. CO.

Shingles Stained with Cabot's Creosote Stains; Cement Stucco Stained with Cabot's Waterproof Cement Stains. Walls Lined with Cabot's Quilt for Warmth

Aymar Embury, II, Architect, New York, N. Y.

Samples—Samples of stained wood, showing the colors on cedar, will be furnished on request.

Special Colors—Special colors and shades will be made for architects who wish to produce special effects and will send samples to match or suggestions to follow.

Specification—Specify: "Cabot's Creosote Shingle Stains, in original packages bearing Cabot's trade-mark. Color to be selected by architect or owner." State whether work is to be dipped or brush-coated, or both, and that stains must be thoroughly stirred and be applied without dilution or adulteration, to dry wood only. This will insure uniform color and durability.

Continued on next page

WALLS FINISHED WITH CABOT'S OLD VIRGINIA WHITE; ROOF FINISHED WITH NO. 346 DARK GRAY CREOSOTE STAIN

WALTER BOSCHEN, Architect, St. Louis, Mo.

Cabot's Old Virginia White.

Gives a clean, brilliant "whitewash effect," combining the soft, cool whiteness of whitewash with the wearing qualities of paint; but it is not opaque and heavy like paint. It is more transparent, covering the surface as a good coat of whitewash covers it, and not with the hard, veneering surface that paint forms. It faithfully reproduces the peculiarly desirable qualities of whitewash; but is finer in tone and texture, simple and easy to apply, clean and lasting. Many attempts have been made to obtain this result with paint, but without success, because the hard, cold "paintiness" of paint is so essentially different from the soft brilliancy of whitewash.

Adaptability—The best effects are obtained on shingles, sawn siding and other undressed lumber; but fine results are also had on all kinds of dressed lumber, excepting the most impervious resinous woods. Use extra coats on dressed lumber, where heavier results are desired.

Application—One gallon covers 125 to 150 square feet, two coats, on shingles and other undressed wood, and it goes about twice as far on smooth wood. Apply with a brush only. If dipping is desired for the first coat, use White Stain No. 1166 for the dip coat, followed by two coats of Old Virginia White.

Cabot's Waterproof Cement Stains.

These Stains enter and seal the pores of cement plaster, or concrete, making them rainproof and producing beautiful coloring effects without weakening the

STAINED WITH CABOT'S WATERPROOF CEMENT STAIN

HERBERT A. PRESCOTT, Architect, Boston, Mass.

cement. They sink into the surface, and form no skin, so that they cannot chalk or peel like paints and other coatings. Being transparent, they show the variations of texture, tone and density of the concrete almost as perfectly as in its uncolored state.

Made in all colors, and colorless. One gallon covers from 100 to 250 square feet, two coats, depending upon the surface.

Cabot's Waterproof Brick Stains.

Make brickwork permanently waterproof and color it in natural tones with no "painty" effect. For evening-up off-colored and mismatched brick, or restoring

NORTH GERMAN LLOYD PIERS, HOBOKEN, N. J.
Waterproofed with Cabot's Colorless Brick Waterproofing

the color of old, faded and discolored walls, they are unequaled.

One gallon covers about 200 square feet, two coats, on the average brick. Made in all colors, and colorless.

Cabot's "Conservo" Wood Preservative.

For preserving all kinds of woodwork from decay, worms, and insects.

At a cost of two or three cents per stick, "Conservo" will almost double the life of piles, posts, sills; bridge, mine, wharf and dam timbers, and all kinds of planking. It is as perfect a preservative as can be made with the present scientific knowledge of the subject. It gives a butternut-brown tone.

One gallon covers about 200 square feet of dressed lumber with two coats. Apply with a brush, as heavily as possible, or dip the lumber before using.

Cabot's Damp-proofing.

For direct plastering on brick and concrete walls and to prevent staining of marble and other delicate stones. A permanently waterproof and adhesive coating that forms a perfect bond between the plaster and the wall, making furring and lathing unnecessary. Plasterbond penetrates both plaster and wall, knitting them firmly and permanently together.

One gallon covers 80 to 100 square feet, two coats. The first coat should stand 24 hours before the second is applied, and the second should stand 24 hours before the plaster is applied. This insures perfect adhesion and a complete bonding.

Cabot's Protective Paint.

A chemically pure pitch paint, thoroughly clarified and refined, which forms an elastic, non-oxidizable bituminous coating that permanently protects iron and steel from rust, electrolysis and corrosion. Linseed oil paints will not last on metal construction, because oxidation and electrolytic action destroy them. Cabot's Protective Paint will not oxidize, is not affected by acids or electrolysis, will not crack nor peel. It is permanent and a perfect protection, and costs only half as much as linseed oil paint.

One gallon covers 300 to 400 square feet, two coats.

Continued on next page

Cabot's "Quilt."

Purposes—For lining houses, stables, factories, etc., to make them warm in winter and cool in summer; for insulating cold storage and ice houses, breweries, refrigerators, etc., and for deadening sound in floors and partitions of schools, apartments, hospitals, lodges, etc.

Description—"Quilt" is a matting of cured eel-grass stitched between two layers of very strong, tough paper. It is so strong that a web of the "Quilt" will sustain a weight of almost nine hundred pounds. The ribbons of eel-grass cross each other at every angle and form innumerable small cells of "dead" air, so that the "Quilt" is a cushion of these air spaces.

It is therefore not a mere felt or paper, but a scientifically built structure similar to the plumage of a bird and gives the most perfect conditions for isolating heat and deadening sound. The "dead" air cannot circulate, so that heat conduction is prevented; and the sound-waves are broken up and absorbed. "Quilt" is made in a continuous web 3 feet wide, which can be divided into narrower strips if desired, and is shipped in rolls containing 250 square feet each.

Grades—"Quilt" is regularly made in five grades, as follows:

	Thickness	Weight (Per roll of 250 sq. ft.)
Single-ply	⅛"	40 pounds
Double-ply	¼"	65 "
Triple-ply	¾"	90 "
Asbestos (Fireproof)	½"	90 "
Waterproof	½"	80 "

Efficiency—Actual scientific tests show that one layer of single-ply "Quilt" is equal to twenty-eight layers of common, cheap building paper. The double-ply is better than forty layers. It is warmer and more permanent and much cheaper than back-plastering. As a sound-deadener, the most exhaustive tests ever made (by Professor Norton for the New England Conservatory of Music) proved it to be far superior to all other methods, and also much cheaper, lighter, and more adaptable.

Why Eel-Grass?—"Quilt" is made of eel-grass because of the really wonderful qualities of this salt-water plant, which no other fiber possesses, to wit: (1) It has a long, flat fiber, which, when matted in "Quilt," makes the "dead" air spaces (a round fiber like straw would make air circulation easy); (2) it is indestructible by decay*; (3) it repels moths and other insects and vermin; (4) it is almost non-inflammable, because it contains silicon in place of the carbon that is present in plants that grow in the air, and it is therefore an effective fire retardant; (5) it is very tough, and never loses its elasticity.

Application—"Quilt" can be applied in any way that any common felt or paper can be, and with vastly better results. The drawings shown here are merely suggestions of a few methods. Figs. 1 and 3 show methods of heat insulation in dwellings, etc., and Figs. 2, 4 and 5 methods of sound-deadening in floors and partitions.

Adaptability—Single-ply is sufficient for lining houses and for all other ordinary heat insulation; double-ply is for sound-deadening, cold storage and similar insulation where the conditions are more severe; triple-ply is for cold storage and other work where unusual conditions prevail.

Asbestos "Quilt" is for work where fireproofing as well as insulation and deadening are required. It is the only deadener that is fireproof, and the only fireproofing that is an efficient deadener.

Waterproof "Quilt" is double-ply with waterproof paper.

ROLLS OF "QUILT"

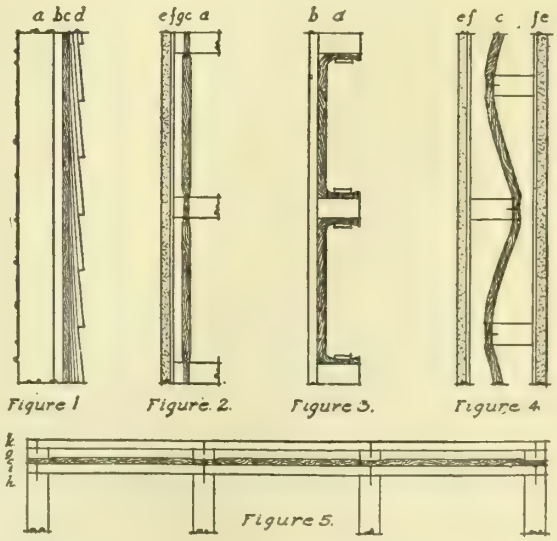
OLD PIERCE HOUSE, DORCHESTER, MASS.

Built about 1635

* The walls of the old Pierce House, Dorchester, Mass., were stuffed with eel-grass when the house was built, about 1635, and the grass is still in a perfect state of preservation. We have a sample of this 275-year-old eel-grass in our office, as here shown.

Exact Extract from the Pierce House Dorchester in 1893. The house was built about 1635 and the bark has never been disturbed. — Gen. Francis Peirce, Ord. Ass. Jones,

FACSIMILE OF LABEL ON BOTTLE SHOWN ABOVE



METHODS OF SOUND DEADENING WITH "QUILT"

a a—Studding. *b b*—Boards. *c c*—"Quilt." *d*—Shingles. *e e*—Plaster. *f f*—Laths. *g g*—Furring Strips. *h h*—Floor Timbers. *i*—First Flooring. *k*—Finish Flooring.

Specification—Specify Cabot's "Quilt," and state what grade shall be used.

Samples.

Samples of all of our materials, with full information, promptly furnished by us or our agents.

PYROLIN PRODUCTS CO., INC.

Manufacturers of Fire-Resisting Shingle Stains, Paints, Etc.

FORT DODGE, IOWA

SALES COMPANIES

MILWAUKEE, WIS., Pyrolin Products Sales Co. of Wisconsin, 207 Second Street

CHICAGO, ILL., Pyrolin Products Sales Co. of Illinois, 231 Insurance Exchange Building

Products.

Pyrolin Fire-Resisting Shingle Stains.

For full list of products see our catalogue under Fire-Resisting Paints.

PYROLIN
TRADE-MARK

Pyrolin Fire-Resisting Shingle Stain.

Like Pyrolin paints and other products, Pyrolin Fire-Resisting Shingle Stain possesses fire-resisting qualities of the highest order. These stains are made from pure, strong and lasting pigments; are the only stains on the market containing linseed oil, creosote and fireproofing, and when thoroughly applied to shingles in accordance with directions, make them absolutely proof against the spread of fire.

In addition to its absolute protection from fire, shingles treated with Pyrolin Shingle Stain will last more than five times as long as when painted with any other shingle stain (or unpainted), as Pyrolin protects not only from fire but from the elements as well.

How Applied.

Pyrolin Fire-Resisting Shingle Stain is applied to shingles either by dipping or by a spray pump, or by a brush and will in the course of sixty to one hundred and twenty days, render the shingles proof against two thousand one hundred degrees of flame, and the longer the stain is applied the more effective becomes the fire-resisting quality, which is practically permanent.

About four hundred shingles can be stained with a gallon of Pyrolin Shingle Stain, or from one hundred and fifty to two hundred feet per gallon when applied with a brush.

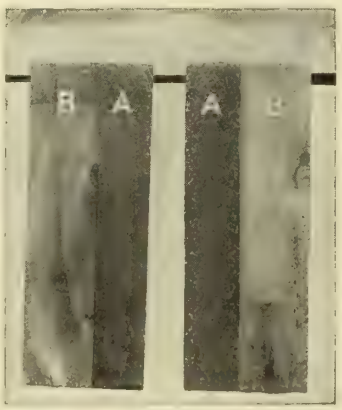
Colors.

Pyrolin Shingle Stains are made in six standard colors, Ash Green, Vesuvius Red, Weathered Brown, Moss Green, Olive and Brown; but any desired shade can be duplicated. Color cards furnished on request.

Actual Service Test.

The tests Pyrolin has been put to in actual use by fire and the elements during the six years it has been made and sold have demonstrated it to be absolutely fire-retardant, good and durable. Following is given one of many examples of these facts:

In May, 1913, while the Armstrong Apartments, Fort Dodge, Iowa, were being remodeled the White Transfer Company's Warehouses were burned. All houses and buildings in the vicinity caught fire from burning cinders, except the Armstrong building. The roof of this building had just been finished with shingles treated with Pyrolin Shingle Stain. The Fire Chief (Mr. F. B. Trusty) said that he saw burning pieces as big as a man's head drop on the roof, but there was not the slightest sign of the roof catching fire. In a letter to the Mayor of Fort Dodge, after this fire, Mr. Trusty said: "If the shingle roofs in Fort Dodge were treated with Pyrolin there would be a large saving in property loss and in calls for the department."



Group of Cedar Shingles. The two inside ones (AA) were dipped in Pyrolin Red Shingle Stain. The outside ones (BB) were plain, untreated shingles

After the fire on the untreated shingles was put out; shingles dipped in Pyrolin did not ignite, and were only slightly charred on the edges

FIRE TEST ON SHINGLES DIPPED IN PYROLIN

ARMSTRONG APARTMENTS, SAVED FROM FIRE BY PYROLIN SHINGLE STAIN

In order that architects, builders and others may personally test the fire-retardant quality of Pyrolin Shingle Stain, we will send on request a Pyrolin treated shingle which can be tested by allowing a plumber's blow torch flame to play against it for thirty minutes or more, when it will be found that the shingle will not flare up or burn.

THE LOOKOUT PAINT MANUFACTURING CO.

Makers of Mortar Colors and Mineral Paints

CHATTANOOGA, TENN.

Products.

"Lookout" Mortar Colors.
Also, Dry Mineral Paint.

"Lookout" Mortar Colors.

These are a line of insoluble pigments for use with either lime or cement, to impart a fast color to the mortar used in brickwork.

Materials.

"Lookout" mortar colors are manufactured at the source of supply. Our mills are located in the center of immense ore fields, from which our mineral coloring materials are obtained. Clinton hematite and the hydrated brown oxides furnish an unlimited supply of raw material. The hard black mineral, used in "Lookout" blacks, is found only at this point.

Processing.

The ores are hand cobbled, both at the mines and in the dry house, thus absolutely preventing any inferior material entering the mills.

The whole process, after the ores are selected by hand, is carried on by machinery, insuring a mechanical perfection and uniformity that is obtainable in no other way.

Our pigment ores are ground to pass a 200 mesh screen, and then air floated to remove any dirt that may be present and also any inert coloring matter in the form of lumps or grit.

The finished product is packed either in 100-pound, waterproof cloth bags, or in tight-coopered, paper-lined barrels.

"Lookout" colors are furnished in either the dry or the paste form.

Inspection.

Each batch of raw material is inspected before manufacture, and each run of the finished product goes through the laboratory and must receive the stamp of standard quality, before it can be used.

Features.

"Lookout" colors are absolutely uniform in texture and consistency, and every ounce of them is available for coloring purposes.

They are insoluble in water, and depend entirely for their effect upon their fineness and complete suspension in the mortar mixture. Because they are insoluble, weathering does not affect them in any way.

The nature and properties of these pigments allow them to enter the spaces between grains of sand, and so produce a harder, more compact and enduring mortar.

Application.

The proper proportions for mortar colored with "Lookout" colors are one pound of color to every four pounds of lime or cement, or of a lime and cement mixture, as the case may be. This will approximate 2¾ tons of color per hundred thousand brick, using Dutch bond and ⅝-inch joints.

Have lime perfectly slaked. Use plenty of good cement and sharp sand. Use screened grit in the wide joints.

Be accurate in the measurement of materials. Mix them thoroughly.

Specification.

In order to make sure of complete and permanent satisfaction of architect, builder and owner, specify "'Lookout' colors, manufactured only by The Lookout Paint Manufacturing Co., Chattanooga, Tenn., U. S. A."

Quotations.

Quotations and specific references furnished on request.

ESTABLISHED 1862 BY SMITH BOWEN INCORPORATED 1911

PECORA PAINT COMPANY, INC.

Pecora Calking Compound, or Glazing Composition

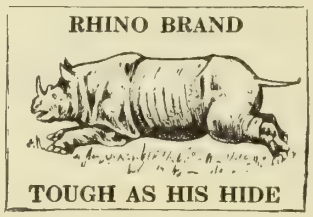
Fourth Street and Erie Avenue
PHILADELPHIA, PA.

Products.

PECORA CALKING COMPOUND, or GLAZING COMPOSITION.

Description.

Pecora Calking Compound has been produced for calking window frames, to keep out air, dust, soot, etc.



TRADE-MARK
(Reg. U. S. Pat. Office 1914)

On new buildings, those in course of construction, oakum is generally stuffed in the openings back of the window frames and between masonry and frame. But owing to the settling of the building, the frames no longer set flush with masonry, unsightly openings appear, admitting draughts, dust and soot, and causing excessive coal consumption, ruination of finish around inside of window frames, curtains, hangings, etc., and an ugly, gaping aperture is seen from the outside.

If a layer of Pecora Calking Compound is applied over the oakum and run between frame and masonry, these conditions will *never exist* as long as the building stands. The compound attaches itself to both window frame and masonry; and while forming a tough hide or skin on the surface, remains soft underneath, giving with every movement, yet never breaking away, or cracking, drying and falling out of the joint. It seals the opening between frame and masonry permanently and absolutely.

The slight cost of calking is saved in one season by the saving in fuel.

Scope of Use.

Besides being adapted for calking windows in buildings under course of construction, Pecora Calking Compound is also invaluable in many other ways, such as bedding and glazing skylights, conservatories, railroad train sheds, pointing up stone work, setting tile, calking the joints of terra cotta cornices, etc. It will adhere to iron, steel, wood, glass, stone or concrete.

For office buildings, hotels, hospitals and residences which have been erected for some time, there is nothing which will give the occupants such a degree of comfort and warmth, such freedom from the expense of refinishing and redecorating made necessary by the damage of dust, soot, etc., as calking with Pecora Calking Compound.

Application to Terra Cotta Cornices.

Pecora Calking Compound is well adapted for calking the joints of terra cotta cornices.

All operators and builders have difficulty in getting a cement mortar that will stand in these joints. As a rule the cement cracks, causing leakage; if it does not crack, it becomes moss-grown, which causes a leaky joint. To overcome this we recommend as follows:

For Entirely New Work—Set the terra cotta or tile in Portland cement; when hard, rake the joint back underneath for about a half inch, and fill in with Pecora Calking Compound.

For Old Work—Where the terra cotta does not have to be reset entirely, clean the joint of all loose particles of dirt and cement, and grout the joint with Pecora Calking Compound.

Directions for Calking.

For Buildings in Process of Erection—After frame is set in place with masonry all around, push oakum into cracks around frame from the front with putty knife or trowel. Then plaster over with the compound, being careful to push it well down on top of the oakum, putting enough in to bring it flush with the edge of the frame. Then cut the edges so as to make a neat job. This work can be done with a small trowel; though if the trowel is cut down so that it is not more than one-half inch wide and six inches long, pointed on the end, the job will be more effective and of neater appearance.

For Old Buildings—Follow the same general directions as above. More oakum will have to be used, as it should be stuffed tightly into the cracks. Use a liberal quantity of Calking Compound to insure best results.

For Ordinary Glazing Work—Apply same as ordinary putty. Owing to the sticky nature of Pecora Calking Compound, it is advisable to carry a small bag of whiting into which the hands can be dipped from time to time.

Packing.

Packed in 5-pound, 12½-pound and 25-pound pails, 100-pound kegs, half-barrels (400 pounds) and barrels (800 pounds).

Quantities.

For new buildings figure two and one half pounds to a 7- by 3-foot opening, if compound is put in one quarter inch wide by one half inch deep.

For old buildings more will be necessary, according to size of opening.

Samples.

A sample, or a quantity sufficient for a small experimental job, supplied gratis.

ESTABLISHED 1862 BY SMITH BOWEN INCORPORATED 1911

PECORA PAINT COMPANY, INC.

Mortar Stains

Fourth Street and Erie Avenue
PHILADELPHIA, PA.

Products.

PECORA MORTAR STAINS.

Also, ENAMELS; FLAT WALL FINISHES; MILL WHITE.

Description.

The most durable, permanent, best and cheapest stain for the coloring of mortar, differing in every way from ordinary coloring mediums. It is made in a heavy pulp form, as in that shape it can be more thoroughly and easily mixed in with the mortar.

TRADE-MARK
Registered

Properties of Pecora Mortar Stain.

It is a fast *stain or dye* which mixes readily and forms chemical union with the mortar. It contains nothing injurious to workman or mortar, and does not shorten or set the mortar quicker than if unstained. Pecora makes clean, clear shades, free from streaks or spots; will not run, bleach nor stain the brick. It can never fade.

Being 75 to 150 per cent stronger than any mere coloring material, paste or dry, it is much less costly. Used according to specifications, it strengthens rather than weakens the mortar joint.

Colors.

Shades below are always in stock:

Black	Windsor	Fern Green
Brown	Amber	Colonial Drab
Seal	Buff	French Grey
Red	Salmon	Terra Cotta

Special shades to order.

Directions for Use.

Mortar must be cold before mixing in stain. To secure a uniform and smooth shade, "hoe in" stain thoroughly.

For very fine press-brick work strain the stained mortar through a coarse sieve.

Keep soft in package by covering with water. Pour this off before using. Do not allow stain to freeze.

Proportions.

By Weight—For staining mortar for 1,000 bricks ⅛-inch joint use:

50 pounds Red, Windsor, Terra Cotta, Amber, Seal, Fern Green, Salmon.

40 pounds Buff, Brown, Colonial Drab, French Grey.

25 pounds Black.

For larger joints more stain must be used in proportion.

By Measure—One bucket of Pecora to seven buckets of mortar for ⅛-inch joint.

Packages.

Colors put up in casks, barrels, half barrels and kegs, all, except Black and Buff, weighing:

	Casks	Barrels	One Half Barrel
	900 lbs.	550 lbs.	375 lbs.
Buff	700 lbs.	450 lbs.	300 lbs.
Black		450 lbs.	275 lbs.

How to Specify.

Be particularly careful, whether architect, builder or owner, to specify in full, naming the desired color, as follows:

"All mortar to be colored or stained with Pecora Mortar Stain manufactured by PECORA PAINT COMPANY, INC., Philadelphia, Pa., using by measure 1 bucket of Stain to 7 buckets of white front mortar for ⅛-inch joint."

Booklet.

"Bucketsful of Information on Mortar Stains" will be sent free on application.

Testimonials.

PHILADELPHIA, PA., January 1, 1915.

We have used Pecora Mortar Stains in all our operations for several years, and are glad to endorse our letter of 1889, and reiterate that all the operations in which we have used them are monuments of their staying and non-bleaching qualities.

ROYDHOUSE, AREY & CO.

NASHVILLE, TENN., January 1, 1915.

We use your Pecora Mortar Stain on all our jobs, having used it in the best residences in town, viz., those of

Geo. Moore, Jr.	Robert Elliott
Maj. C. T. Cheek	L. Jonas
Ed. Lindsley	T. Tobias
Leslie Cheek	John W. Blair

as well as in a great many smaller residences; also in the Y. W. C. A. and Y. M. C. A. Buildings and the Russell Street Presbyterian Church.

T. L. HERBERT & SONS

BALTIMORE, MD., January 1, 1915.

We wish to advise that among the large operations in this city for which we have furnished Pecora Mortar Stain within the past few years are:

The Sewage Pumping Station
Safe Deposit and Trust Building
Washington, Baltimore and Annapolis Electric Terminal
Baltimore and Ohio Power House

as well as numerous other jobs. All the leading architects here specify Pecora Mortar Stain.

MARYLAND LIME & CEMENT CO.

References.

Thousands of buildings of every degree, all over this continent, stand to-day with clean walls, unfaded and intact mortar, as monuments to Pecora Mortar Stains. A few are given below:

BUILDING AND LOCATION	ARCHITECT OR CONTRACTOR
Garfinkle Building, Washington, D. C.	Henry Hull
Broad Street Station, Pennsylvania R. R., Philadelphia, Pa.	Furness, Evans & Co.
Tuskegee Institute, Dining Hall, Tuskegee, Ala.	R. R. Taylor
Public School, No. 49, Indianapolis, Ind.	R. P. Daggett & Co.
First Presbyterian Church, Atlantic City, N. J.	Seymour & Paul A. Davis
Hazeltine & Perkins Drug Co., Grand Rapids, Mich.	Hauser-Owen-Ames Co.
Borden's Condensed Milk Co., Randolph, N. Y.	Frank Rogers
James Stillman, Stable	Hiss & Weekes
Mercy Hospital, Baltimore, Md.	John Waters
High School, Springfield, Ohio	Buckeye Churn Co.
Wisconsin Central Station, Chicago, Ill.	S. S. Beman

ESTABLISHED 1879

THE ARCO COMPANY

Paints, Enamels, Varnishes, Waterproofing Specialties, Etc.

GENERAL OFFICES
Euclid Avenue and East 65th Street
CLEVELAND, OHIO
FACTORIES AND LABORATORIES: PENN. RY. AND EAST 79TH STREET, CLEVELAND, OHIO
BRANCH OFFICES IN PRINCIPAL CITIES

Products.

"Arco" Underground Coating; "Arco" Increte Coating; "Arco" Inhibitive Coating; "Arco" XX Graphite Paint; "Arco" Mazda White; "Arco" Interlight; Arcotone; "Arco" GAa White; "Arco" N. B. Wall Primer; "Arco" Pasteurette Enamel; Permano Enamel; "Arco" Spar Varnish; "Arco" Interior Varnish; "Arco" Rub-Not Finish; "Arco" Floor Varnish; "Arco" Dul-Floor Varnish; "Arco" Paste Wood Filler.

"Arco" Integral Waterproofing (Concentrated) "Arco" Bonding Coat; "Arco" Foundation Coat; Arco-Kote; "Arco" Transparent Damproofing; "Arco" Stone Backing.

"Arco" Solidizer; "Arco" Vitrograin · "Arco" Floorcote.

Specifications.

We have prepared a series of folders containing full data concerning each of our products, including a manufacturers' "Standard Specification" for the use and application of each. These will be distributed to architects and all others interested, and additional copies of one or all may be obtained upon application.

"Arco" Underground Coating.

Uses—It is particularly adapted for protecting iron and steel that is to be laid under earth covering, in conduits, subways, etc.

Description—It dries with an unusually tough, durable, and elastic film. This feature, in conjunction with its high rust-inhibitive qualities, makes it a perfect insulation against all the conditions that are to be found in underground work.

Covering Capacity—One gallon will cover approximately 500 square feet.

"Arco" Increte Coating.

Uses—For the protection of iron and steel that is to be imbedded in concrete.

Description—Under these conditions iron and steel must possess the rust-inhibitive quality and in addition thereto must resist the action of alkali that is present in all forms of concrete construction. We have made a very close study of this condition and recommend "Arco" Increte Coating as being unusually well fitted for this type of work.

Covering Capacity—One gallon will cover approximately 500 square feet.

"Arco" Inhibitive Coating.

Uses—A rust inhibitive coating for the protection of exposed structural iron and steel surfaces.

Description—The pigments and liquids used in the formation of "Arco" Inhibitive Coating were selected after the most exhaustive practical tests in our laboratories and also in the field. It is a positive non-corrosive or antirust steel and iron coating.

Covering Capacity—One gallon will cover approximately 500 square feet.

"Arco" XX Graphite Paint.

Uses—For use on structural steel, iron bridges, viaducts, etc.

Description—The use of graphite paint in connection with iron and steel structural work has been long practiced by the engineering profession. "Arco" XX Graphite Paint is manufactured to meet requirements of this character. It is made from genuine air floated graphite, prepared in oils of exceptional durability and is unaffected when subjected to either contraction or expansion. It can be depended upon to give excellent service even under unusual conditions of exposure.

Covering Capacity—One gallon will cover approximately 600 square feet. This estimate will vary, of course, according to the general conditions of the surface.

"Arco" Mazda White.

Uses—It is particularly fitted for use in breweries, packing houses, laundries, creameries, food factories, and similar places, where an unusually high standard of sanitary conditions is required.

Description—It is a light reflecting white enamel that dries with an eggshell finish, for use under conditions of exposure such as would be too severe for the average grade of factory interior white.

Covering Capacity—One gallon will cover approximately 400 square feet.

"Arco" GAa White.

Uses—Fitted for use in rubber factories, dye works, and manufacturing establishments of like character, where resistance against acids, alkali and gases is a highly important consideration.

Description—The gas-resisting and acid-resisting qualities of "Arco" GAa White have been developed to the very highest degree. It is an interior white that dries with an eggshell finish and will retain its whiteness for a longer period of time than any other similar product now on the market.

Covering Capacity—One gallon will cover approximately 400 square feet.

"Arco" Interlight.

Uses—For use in factories, warehouses and places of similar character.

Description—Its light reflecting qualities add greatly to its value in that it throws the light directly upon the machinery and into the dark corners, making it possible to utilize, for operating purposes, space that would otherwise be of little, if any, value. "Arco" Interlight stays white longer than any other factory or mill white on the market.

Covering Capacity—One gallon will cover approximately 400 square feet.

Continued on next page

Arcotone.

Uses—For use in the decoration of walls constructed from plaster, brick, cement, wood, burlap, metal, beaver board and compositions of similar character, with equally good results.

Description—Arcotone produces a beautiful soft flat finish on interior walls and ceilings. It flows and flats perfectly, and, when used in conjunction with "Arco" N. B. Wall Primer, does not show lime spots and other discolorations. By reason of its easy spreading qualities and excellent covering power will show a lower cost per square yard than any other high-grade flat wall finish now on the market.

Covering Capacity—One gallon will cover approximately 500 square feet.

"Arco" N. B. Wall Primer.

Uses—It is recommended under certain conditions of use where it provides a perfect base for the finishing coat, whether Mazda White, Interlight, or Arcotone.

Description—It insures an even, uniform flat surface. In addition to this, it provides an alkali-resisting film that prevents the free lime from burning through and spotting the outer surface.

Covering Capacity—The covering capacity is approximately 300 square feet to the gallon.

"Arco" Pasteurette Enamel.

Uses—A pure white enamel, made expressly for interior use in hospitals, dispensaries, bacteriological laboratories and places of like character.

Description—It dries with an unusually hard vitreous finish that is washable and sanitary and will retain its finish and color even though subject to the continuous exposure of antiseptic gases and disinfecting solutions. "Arco" Pasteurette Undercoat is an especially prepared undercoat to be used in connection with "Arco" Pasteurette Enamel.

Covering Capacity—One gallon will cover approximately 500 square feet when applied over "Arco" Pasteurette Undercoat.

"Arco" Permano Enamel.

Uses—For the enameling of interior and exterior surfaces where the highest quality of white enamel finish is desired.

Description—It produces a finish as smooth as porcelain, flows perfectly, levels off without showing laps or brush marks. Can be used on wood, metal or plaster. It is tough and elastic, will never crack, check nor peel and retains its brilliant finish indefinitely. It will appeal particularly to the architectural profession, as it never fails to command the admiration of all who know and appreciate the true value of enamels as one of the essential elements in the development of a genuinely artistic interior. "Arco" Permano Undercoat is used as an undercoating for "Arco" Permano Enamel.

Covering Capacity—A gallon will cover approximately 500 square feet when applied over "Arco" Permano Undercoat.

"Arco" Spar Varnish.

Uses—For store fronts, front doors and all exterior work subjected to severe exposure and changing climatic conditions.

Description—It was primarily a durable varnish made especially for all marine purposes, but the demand for a durable outside varnish for general all-round work has made "Arco" Spar Varnish a utility varnish, being used as both an exterior and interior varnish on all surfaces exposed to the elements and subjected to severe wear. On open-grained woods first use "Arco" Paste Wood Filler under Spar Varnish.

Covering Capacity—A gallon will cover approximately 600 square feet, one coat.

"Arco" Interior Varnish.

Uses—An interior varnish of the highest quality and should be used on all operations where the finest possible finish is desired.

Description—It is very light in color, has excellent body, flows perfectly, and dries out with a full, rich and durable finish.

Covering Capacity—One gallon will cover approximately 600 square feet, one coat.

"Arco" Rub-Not.

Uses—For use where an imitation rubbed effect is desired.

Description—"Arco" Rub-Not Finish is a quality varnish which gives a perfect imitation rubbed effect, drying out with a semi-gloss, thereby saving the cost and labor of rubbing down with powdered pumice and oil. It is applied in the same manner as any other varnish and dries out with a smooth, velvety finish.

Covering Capacity—One gallon will cover approximately 600 square feet, one coat.

"Arco" Floor Varnish.

Uses—For use on floors where varnish possessing unusual tenacity, elasticity and toughness is desired.

Description—It is light in color, has good body, works easily under the brush, dries hard but is not brittle. On account of its wear resisting qualities and ability to stand continual washing, "Arco" Floor Varnish is considered by practical painters and finishers to be the most durable floor varnish made. On open-grained woods first use "Arco" Paste Filler.

Covering Capacity—A gallon will cover approximately 600 square feet, one coat.

"Arco" Dul-Floor Varnish.

Uses—For the production of a dull, wax-finished floor.

Description—Produces a beautiful and most durable dull finish, giving the appearance of a varnished floor that has been waxed. It possesses all of the good qualities of a durable floor varnish and does not possess any of the undesirable features of a waxed surface.

Covering Capacity—A gallon will cover approximately 600 square feet, one coat.

"Arco" Paste Wood Filler.

Uses—For use on all open-grained woods, such as oak, walnut, mahogany, brick, etc.

Description—A strictly high-grade silica filler that will work easily, fill the pores perfectly and can be depended upon not to pit or shrink.

Covering Capacity—From 6 to 8 pounds made up to the volume of one gallon will cover approximately 300 square feet of surface.

"Arco" Integral Waterproofing (Concentrated).

Uses—For waterproofing mass concrete by means of the integral method; for waterproofing by means of a waterproof plaster coat; and for the waterproofing of stucco.

Description—By merely adding "Arco" Integral Waterproofing (concentrated) to the gauging water, according to the manufacturers' directions, an assured

Continued on next page

waterproofing result can always be obtained. This concentrated liquid, by reason of its exceptional strength, will show a lower cost per square yard than any other similar material upon the market.

Quantities—It will require approximately ¾ of a gallon for each cubic yard of mass concrete to be waterproofed; and approximately ¾ of a gallon for each 100 square feet of surface to be waterproofed. These estimates will vary somewhat according to the general conditions.

"Arco" Bonding Coat.

Uses—A black bonding coat of unusual permanency, tenacity and toughness which furnishes a tacky surface upon which the plaster coat may readily be applied, with the full knowledge that it will remain there indefinitely without cracking or falling off. It is also to be used as a dampproofing on exposed interior walls.

Description—It is a plasterbond which is very economical, in that it eliminates the necessity of furring and lathing and requires less space than either.

Covering Capacity—One gallon will cover approximately 100 square feet.

"Arco" Foundation Coat.

Uses—For the dampproofing of masonry that comes in contact with earth filling. To be used under conditions where seepage pressure is slight.

Description—It is a bituminous coating, manufactured for use as a dampproofing for foundations and other types of underground masonry where hydrostatic pressures are so slight as to make a more elaborate and complicated system of waterproofing unnecessary.

Covering Capacity—One gallon will cover approximately 100 square feet. This estimate will, of course, be subject to such variation as may arise on account of unusual surface conditions.

"Arco" Stone Backing.

Uses—For use in dampproofing the unexposed sides of cut stone.

Description—"Arco" Stone Backing is a black coating providing a perfect dampproofing and alkali-resisting coat for all the unexposed sides of granite, marble or other cut stone. All cut stone, being porous, has a tendency to absorb moisture. This moisture is charged with free lime and alkali, accumulated by reason of contact with the masonry, and unless preventive measures are taken, it will invariably spot and stain the stone. It forms an impermeable film on all sides of the stone so exposed, with the result that spotting and staining are positively prevented.

Covering Capacity—One gallon will cover approximately 125 square feet. This estimate will, of course, be subject to such variation as may arise on account of unusual surface conditions.

"Arco" Transparent Dampproofing.

Uses—For use on concrete, stucco and other porous surfaces.

Description—It is designed to meet the demand for a dampproofing material when it is desired to retain the present appearance of the structure. It is particularly adapted for service on cement, concrete, stucco and masonry walls and such other porous surfaces as are erected above the grade line. It is applied with a brush, and upon being worked into the pores fills them with a permanent moisture repellant, thus eliminating any further possibility of moisture absorption.

Covering Capacity—One gallon will cover approximately 200 square feet. This estimate will, of course, be subject to such variation as may arise on account of unusual surface conditions.

Arco-Kote.

Uses—For decorating and dampproofing exterior concrete, stucco, brick and other exposed masonry surfaces.

Description—It dries with an attractive flat finish and when used in connection with "Arco" Cement First Coater will produce a permanent moisture-resisting surface. "Arco" Cement First Coater is an insoluble water-resisting compound that hermetically seals the pores, providing a perfect non-absorbing base for the finishing coat. It also acts as an insulating coat that prevents the lime spots from burning through to the outer surface. The combination of these two materials insures an alkali- and gas-resisting surface that will not crack, check chip, nor scale off.

Covering Capacity—One gallon will cover approximately 300 square feet when applied over "Arco" Cement First Coater.

"Arco" Solidizer.

Uses—A metallic hardener for use in laying of dustproof and wearproof concrete floors.

Description—It is a finely divided metal which is troweled into concrete floors during the laying and, being many times harder than any of the ingredients used in concrete, takes up and bears the wear which would otherwise fall upon the sand and cement.

Covering Capacity—Fifteen to thirty-five pounds required for each 100 feet of floor to be covered, according to specification.

"Arco" Vitrograin.

Uses—For use in the hardening and dustproofing of all concrete floors already laid.

Description—It is a chemical compound which, when applied to concrete, reacts with the free lime, causing hardening. This method is wholly scientific in its operation, with the result that the porosity of the concrete is greatly reduced. As a consequence, the dusting is greatly decreased, while the wearing properties of the floor are materially increased.

Covering Capacity—One gallon will cover from 100 to 125 square feet of surface for the complete treatment, variation depending upon the porosity and general condition of the floor.

"Arco" Floorcote.

Uses—For the decoration and dustproofing of concrete floors in office buildings, hospitals, engine rooms, schools, hotels, and other places of similar character.

Description—When used with the undercoating as recommended, it overcomes the porosity of cement floors, greatly increasing their wearing qualities and at the same time lessens their tendency to dust. A floor coated with "Arco" Floorcote will not stain upon coming in contact with oil and grease, and can be washed as often as need be without injuring the finish.

Acts as an insulating coat, and, as such, prevents the free lime in the cement from burning through to the outer surface and destroying the paint film. In addition "Arco" Floorcote Undercoat serves as a filler for the pores, reducing the porosity of the concrete and thus aiding to a large degree in dustproofing the floor.

Covering Capacity—One gallon will cover approximately 300 square feet over "Arco" Floorcote Undercoat. The covering capacity of "Arco" Floorcote Undercoat will of course depend upon the porosity of the surface to which it is applied.

CLINTON METALLIC PAINT COMPANY

MANUFACTURERS OF

Mortar and Cement Colors, Protective Paints and Cements

100 Clinton Road

CLINTON, N. Y.

Products.

"Clinton" Mortar and Cement Colors, in Dry and in Pulp forms, "Clinton" Iron Oxide Protective Paints, "Clinton" Silk Fibre Roof Cement, "Clinton" Asbestos Furnace Cement, "Clinton" Stove Putty and "Clinton" Putty Cement.

"Clinton" Mortar Colors.

Made in various shades of red, brown, buff, purple and black, from richest and purest ores obtainable, and mixed and carefully sorted under our own supervision. The ores are passed through a special process of drying, grinding and air-floating, and come out reduced to a very high degree of fineness and purity, having great staining power and permanence.

Quality in Mortar Colors—Colors made from shale or rock, silicious in nature, possess little staining power; and those made from by-products of acid manufacture are almost certain to weaken mortar or to cause efflorescence. Fine grinding gives a color greater staining power, even though finer grades look lighter than coarser kinds.

Since color is usually bought by the pound but mixed in bulk, and since a shovelful of coarse color weighs about half as much again as a shovelful of properly ground color, it is clearly evident that a finely ground color, like the "Clinton," is far more economical to use than the weak staining coarse grades.

Quantity Required—Coloring mortar for 1000 brick ⅛-inch joint requires approximately as follows:

Dry Colors: 25 pounds Red
30 pounds Brown, Buff, Double Strength Black, Purple

Pulp Colors: 35 pounds Red
40 pounds Brown, Buff, Double Strength Black, Purple

For wider joints use proportionately more color.

The quantity of color necessary depends of course upon the shade desired, but the figures given represent amounts required under fair average conditions.

Mixing Colors—Colors should first be uniformly mixed with dry sand. Slaked lime should then be added and thoroughly incorporated. The more thorough the mixing the less color is required.

Mortar Colors should *never be mixed with hot lime.*

How to Specify—To protect himself against substitution, the architect should always specify "Genuine 'Clinton' Mortar Color, manufactured by Clinton Metallic Paint Company, of Clinton, N. Y., and bearing their 'Little Yellow Side-Label.'"

Write for our Mortar Color Booklet.

"Clinton" Metallic and Magnetic Iron Oxide Paints.

These are guaranteed pure linseed oil paints, in which only pure and completely oxidized iron oxides are used as pigments. On account of superior protective and rust-inhibitive properties, greater covering capacity and durability, they are preferred for a variety of purposes to lead, zinc and other paints. They produce a hard, but elastic surface, which dries rapidly and evenly throughout, and which will receive any finishing coat without the tendency to crack or check. For protecting iron and steel against corrosion they are superior to lead and zinc paints.

Field of Uses—"Clinton" Metallic and Magnetic Iron Oxide Paints will perfectly protect from corrosion or decay iron tanks and gas-holders, roofs, girders, iron or wooden buildings, freight cars, tin or wooden roofs, iron or wooden bridges, ship bottoms, pier timbers, and all surfaces exposed to direct action of water, either fresh or salt.

Covering Capacity—Their covering capacity is about 600 square feet per gallon on wood and 700 square feet per gallon on metal, single coat. Area covered per gallon depends necessarily upon condition and nature of surface to be painted—the above figures representing fair averages.

How to Apply—Employ a good painter.

Use our metallic paint for both first and second coats. For first coat on wood add one and one half pints of pure raw linseed oil to each gallon of paint.

See that the surface is perfectly dry. Moisture causes blistering, cracking and scaling.

See that the surface is clean and free from grease. If it has been painted previously and is scaling, peeling or cracking, burn or scrape off all the old paint.

Be sure that paint is stirred thoroughly before using.

Before applying second coat see that the first coat is thoroughly dry.

"Clinton" Silk Fibre Roof Cement.

This is a tough, elastic, rubberlike cement with permanent adhesive qualities. For weather tightening joints in metal, cement, tile, slate or glass construction it has no equal. It does not become hard or brittle, even after long exposure to the air and the elements; neither does it become so soft that it will run. It can be used with equal success in all climates and is, therefore, the only universal roofing cement in the market. It contains no drying oils; its constituent elements are the best obtainable.

How Supplied—Made in five colors: red, slate, brown, black and green. Furnished in 1- and 3-pound cans, 5-, 10- and 25-pound pails, and in 125-pound tubs.

For special work the consistency of the cement can be modified to suit requirements.

For using cement where the surfaces are wet, ask for our No. 5 Cement.

"Clinton" Asbestos Furnace Cement.

Is guaranteed to be the very best furnace cement on the market. Iron and fire brick will not stand the high temperature which our furnace cement will.

Field of Uses—Used for laying fire brick in furnaces and under boilers, for setting furnaces, for making joints gas-tight, for lining or repairing any surface subjected to extremely high temperatures.

How Supplied—Put up in cans, tubs and barrels. Send for free sample and prices.

"Clinton" Putty Cement.

Quality of Putty—This is a new product. It is a plastic oil putty, and is *the only stove putty made which will set hard and not crumble after it has been subjected to heat.* It will set as hard and firm as fire brick and will make a tight and solid joint that is absolutely permanent.

Field of Uses—For lining and setting up stoves and furnaces; for making joints gas-tight and for making repairs in stoves and furnaces.

How Supplied—Put up in cans, tubs and barrels. Send for free sample and prices.

Costs.

Costs on all our products are dependent on fluctuations in prices of raw materials. Prices gladly furnished on application.

DETROIT GRAPHITE COMPANY

Paint Makers

DETROIT, MICH.

BRANCH OFFICES

BIRMINGHAM BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND
NEW YORK PHILADELPHIA ST. LOUIS SPARTANBURG, S. C. KANSAS CITY

Products.

Superior Graphite Paint, for all Metal Surfaces; Degraco Paints, for Building Exteriors; Degraco-Tone, a Flat Wall Finish for Interiors; Concrete Paints, for both Interior and Exterior Application; Flat Black and Ornamental Finish Paints; Sta-White, for Factory Interiors; Degraco-Lite, an Enamel for Wood or Metal Trim; Degraco Concrete Coating; Anti-Aqua, a Damp-proof Coating for Stone, Concrete, or Brick Walls and Foundations; Degraco Wood Preservative; Degraco Floor Hardener.

Superior Graphite Paint.

The most durable paint for the protection of all metal surfaces in buildings of any kind. Superior Graphite Paint prevents rust on structural steel, fire-escapes, standpipes, steel window sash, frames, and all surfaces exposed to corrosion.

This paint is unaffected by exposure to the atmosphere, to smoke or gases. Because of its known durability, Superior Graphite Paint is chosen by leading architects to successfully meet unusual conditions of exposure, climatic conditions, and special requirements.

Degraco Paint.

Degraco Paints are made from pure materials ground and mixed by special machinery, and give unusual durability under most trying conditions. There are records of over nine years of service on homes and cottages for Degraco paint.

Degraco Paints are specially prepared to meet local climatic and atmospheric conditions, and give universal satisfaction. These paints will not peel, blister, chip nor fade. Made in a complete assortment of colors and shades to suit all conditions, and to harmonize with all surroundings.

Degraco Paints save money, time and trouble, because they do away with the need of constant repainting.

Degraco-Tone.

Degraco-Tone can be used with excellent results on practically all interior surfaces, such as smooth plaster or sand-finished walls and ceilings, woodwork, radiators, burlap, metal ceilings, wall-paper, and window shades.

Degraco-Tone is an oil paint in flat finish. It is sanitary; can be washed without injury; is permanent in color, and will not chip, crack nor peel.

Used effectively in private residences, office buildings, public buildings, hotels, churches, and hospitals.

Special colors can be matched.

Degraco-Lite.

An enamel white for wood or metal trim. Suitable for both exterior and interior work where a high-grade white enamel finish is desired. Degraco-Lite holds its gloss, will not turn yellow, and may be washed readily without affecting its excellent finish. It gives splendid service on doors, cabinets, bathroom walls and exposed porch surfaces.

Degraco Concrete Coating.

Degraco Concrete Coating is a permanent brick and cement paint for interior and exterior use; gives excellent service on brick, stucco, terra cotta and concrete surfaces and walls. It is damp-proof and alkali-resisting, and withstands successfully the most severe requirements. Scientifically designed for work on cement and brick walls and floors, it protects surfaces and prevents dusting, sweating and absorption of light.

Degraco Concrete Floor Paints are also furnished, specially prepared to protect concrete floors from abrasion and dusting. They are not stained by oil or dirt; may be washed without injury, and are unaffected by tracking or walking.

A very complete assortment of colors, to match any shade, is offered.

Sta-White.

This product is highly recommended for use in industrial interiors where the highest degree of light reflecting efficiency is desired. It is a liquid paint product, pure snow white, permanent in tone and service. Unlike cold-water paints, Sta-White will not flake, disintegrate, chip nor peel. It is hygienic, washable, durable and light reflecting, and resists fumes and moisture.

Sta-White increases plant efficiency, cuts down lighting costs, and is recommended for interiors of mills, factories, offices, public buildings, schools, hospitals, theaters, hotels, restaurants, etc.

To be applied on wood, metal, brick, concrete or plaster surfaces. Furnished in gloss, semigloss, or flat, as preferred.

Damp-proof Coating.

Anti-Aqua No. 826 is a waterproofing and damp-proofing paint especially recommended as a coating on interior of stone and concrete walls to exclude dampness, and on exterior of stone, brick and concrete foundations to prevent seepage of water. An effective resistant of hydrostatic pressure; also recommended as a coating for unexposed surfaces of marble, granite, or other fine stone used in building, to prevent seepage and staining.

Anti-Aqua bonds perfectly to the surface. As a bond between the exterior surface of brick and concrete walls, and finishing coat of cement, it saves repainting walls to hold finish coat, and insures a perfect bond between the two surfaces.

Plaster, cold-water paints, kalsomine and whitewash can be applied directly upon Anti-Aqua after it has dried, and they will not be discolored.

Can be used instead of furring and lathing, and greatly reduces construction cost and expense. It unites so thoroughly with the wall, that plaster may be applied directly upon it without danger of cleaving off.

Wood Preservative, Etc.

Degraco Wood Preservative prevents decay of timber. Degraco Floor Hardener will make concrete floors wearproof. The plant is amply equipped to make special paints to meet special conditions. Over twenty-five years of intelligent paint-making experience. Write for complete information, booklets, prices, etc.

NATIONAL LEAD COMPANY

Paint Materials

NEW YORK BOSTON BUFFALO CHICAGO
CINCINNATI CLEVELAND ST. LOUIS SAN FRANCISCO
PHILADELPHIA (John T. Lewis & Bros. Co.) PITTSBURGH (National Lead & Oil Co.)

Products.

PAINT MATERIALS for Iron, Steel, Galvanized Iron, Metal Roofs, Concrete, Brick, Wood and General House Painting; RED LEAD, WHITE LEAD, LINSEED OIL.

Also, Lead Pipe and other Building Materials as described elsewhere in this Catalogue, for which see our name in General Index.

TRADE-MARK

Painting Metallic Surfaces.

A true protective paint should dry hard and insoluble, adhere firmly to the surface, have great durability, be an inhibitor of corrosion and a non-conductor of electricity. Numerous tests, modern and ancient, have proved that red lead fulfills these qualifications better than any other medium.

Red Lead in Its Most Usable Form.

NATIONAL LEAD COMPANY now supplies high-grade red lead in pure-linseed-oil paste form. Dutch Boy Red Lead-in-Oil, as paste red lead is called, stays soft indefinitely, and spreads smoothly and easily under the brush like white lead-in-oil. The secret of this great step in advance, and we believe no architect will dispute its importance, is a more thorough oxidation. The red lead and the linseed oil are not doctored in any way.

Colors Available.

When a color other than the natural color of red lead is required, Dutch Boy Red Lead-in-Oil may be shaded. Greens and browns (and even black) are obtainable by the addition of tinting matter. A set of steel strips showing colors, and giving formulas on back, will be sent upon request.

Specifications for Steel and Iron Work.

Before Erection—Before it leaves the shops all steel and iron work shall be thoroughly cleaned of all mill scale, dirt, rust and oil, and shall receive one (1) coat of red-lead paint mixed according to the following formula:

First Coat—
Dutch Boy Red Lead-in-Oil.....40 pounds
Pure Raw Linseed Oil (measured).....1 gallon

NOTE 1—If genuine boiled linseed oil is available, such as our own Dutch Boy Linseed Oil, we advise the use, wherever pure raw linseed oil is specified, of one third boiled oil and two thirds raw oil. If raw oil is used, add one half pint turpentine japan drier to every gallon of paint.

Surfaces which will be inaccessible after structure is erected shall receive two (2) coats of red-lead paint before erection. Paint for the first coat shall be mixed according to the formula above, and paint for the second coat shall contain in addition 4 ounces of lampblack to the gallon of oil.

After Erection—All structural iron work shall be cleaned after erection and all abrasions in first coat of paint brushed clean with a stiff brush and repainted. All surfaces shall then receive one (1) additional coat of red lead paint prepared according to the following formula, darkened by the addition of 4 ounces of lampblack to the gallon of oil:
Dutch Boy Red Lead-in-Oil.....38 pounds
*Pure Raw Linseed Oil (measured).....1 gallon
* See Note 1 above.

All pipes, including automatic sprinklers, steam and hot-water radiators, conducting pipes and interior exposed structural metal work, shall receive two (2) coats as above. Fire-escapes, smoke-stacks, gutters, down-spouts, and all other exterior metal work shall receive three (3) coats of above with 4 pounds of pure lampblack, ground in oil, added to every 38 pounds of red lead used in the third coat.

Subsequent coats on exposed metal work shall be of National Lead Co.'s strictly pure white lead and linseed oil, tinted according to the color scheme employed in the building.

Paint shall not be applied until paint previously applied is thoroughly dry. No painting shall be done in wet or freezing weather.

Specifications for Metal Roofs, Cornices, etc.

New Work—All new metal, tin, galvanized iron, iron or steel, used for roofing, cornices, valleys, gutters, down-spouts, iron railings, gratings, etc., shall be painted according to the following specifications:

Before Painting—All surfaces shall be carefully cleaned by scrubbing with sand, soap and water, and thoroughly dried before paint is applied. Only when this is done will the paint adhere properly to the metal. This is very important.

FORMULA
Dutch Boy Red Lead-in-Oil.....40 pounds
*Pure Raw Linseed Oil (measured).....1 gallon
* See Note 1 above.

Mixing—The materials must be thoroughly mixed before application, to insure a paint of uniform consistency throughout.

Application—All surfaces shall receive two coats, as above; the second coat darkened by the addition of 4 ounces of lampblack to the gallon of oil. When necessary to follow color scheme, finishing coats of National Lead Co.'s pure white lead and linseed oil, tinted to suit, shall be applied over these coats. Each coat shall dry thoroughly before the next coat is applied. Paint on under side of roofing shall dry before roofing is laid.

Old Work—Metal surfaces not new shall be thoroughly cleaned with wire brush, removing all loose paint and particles, and then painted as above.

Printed Specifications Furnished.

To any architect who desires we will supply printed specifications, legal cap size, containing full directions for the proper use of red lead in the painting of metals, and of white lead in the painting of wood, concrete, brick, etc.

Publications.

A practical handbook, of unusual value to those interested in the painting of steel and iron to prevent corrosion, is our "Protection of Structural Metal." The book discusses the causes of corrosion and remedies for it, besides giving formulas and going into detail on the subject of painting metallic surfaces. A request will bring a copy from our nearest branch office, together with pamphlet, "Red Lead in Paste Form," giving the advantages of Dutch Boy Red Lead-in-Oil.

We also publish a text-book on interior and exterior house paint, illustrated by twelve colored inserts, showing color combinations. This book, "Painting, Protective and Decorative," may be had by writing to our nearest branch.

How to Specify Our Paint Materials.

Architects may be assured of securing the guaranteed product of NATIONAL LEAD COMPANY, if they will specify as follows: "Dutch Boy Red Lead-in-Oil and Dutch Boy Linseed Oil," or "Dutch Boy White Lead and Dutch Boy Linseed Oil."

RINALD BROS.

Technical Paints and Specialties

1142-1146 North Hancock Street
PHILADELPHIA, PA.

Products.

BESSEMER RUSTPROOF PAINT, PORCELAIN ENAMEL PAINT (Indoors), FLAT UNICOAT WALL PAINT, GALVANIZED IRON PRIMER, OUTSIDE ENAMEL (Weatherproof); CEMENT and CONCRETE ENAMEL; OUTSIDE UNICOAT; ALLAROUND VARNISH; PROTECTIVE PAINTS made to order to meet requirements.

Special Notice.

Perfect protection and lasting decorative effects can not be obtained on varying materials under various exposure and in various localities with any one given grade of paint or varnish, no matter how excellent. We devote our energies to the making of special preparations in the paint, varnish and chemical line. The list given above partly enumerates those of our goods which are particularly well adapted for the uses designated.

Bessemer Rustproof Paint.

Bessemer Paint (Reg. U. S. Pat. Off.) effectually resists the chemical, atmospheric and electrical influences to which a metal surface is generally exposed. Such liquids as water (free or in combination), benzine, turpentine, and other volatile thinners, do not enter into the composition of the vehicle, nor do we use oxides of iron, lead, zinc or other metals as pigments. Contains no asphaltum, tar, or derivatives of either.

Where paint more durable than Red Lead, Graphite, or Metallic Paints is wanted, years of actual use have proved that Bessemer Paint prevents rusting after other paints have failed. If you want to inquire into the chemical and physical reasons why Bessemer Paint outlasts other paints, write for our treatise: "Data on Bessemer Paint." It will be sent gratis.

Bessemer Paint is recommended particularly for use on structural steel and bridge work where the metal is to be protected against dampness saturated with fumes from locomotives or from manufacturing establishments. It is also well adapted for use on smokestacks, steel poles, lamp-posts, corrugated roofing and siding, galvanized iron, boilers, trolley poles, tin roofs, iron fences, sprinkler pipes, gutters, leaders, spouts, etc.

Specification Form.

Thoroughly remove dirt, grease, oil and rust. Paint metal before it leaves the shop one solid coat of Bessemer Paint made by Rinald Bros., 1142-1146 North Hancock Street, Philadelphia. Allow not less than three days between painting and shipping. After erection, clean and paint thoroughly all bare or scratched spots and all joints with Bessemer Paint. Allow two days between this "touching up" and the application of a second and final coat of Rinald Bros. Bessemer Paint.

Galvanized Iron—To prevent peeling, specify: "First coat, Rinald Bros. Galvanized Iron Primer; second and third coats, Rinald Bros. Bessemer Paint." All to be applied in conformity with manufacturer's instructions.

Porcelain Enamel Paint.

Porcelain Enamel Paint (Reg. U. S. Pat. Off.) is a paint only in so far as it is applied like one. In fact, it is liquid porcelain, a tiling in liquid form, which, after application, wears and looks like porcelain on wood, plaster, metal, brick or stone. It is thoroughly waterproof, steamproof and germproof, and is the only aseptic enamel paint made. It is not a varnish enamel, being entirely free from oil and lead, both of which are found in varnish and in other enamel paints. It is as durable and as impervious as glass and may be cleaned with soap or antiseptic solution.

Porcelain Enamel Paint, after it has become thoroughly dry, will be found, upon analysis, to differ in no material point from the glazing on tiles and enameled brick. When carefully applied to a smooth surface it can not be distinguished, except by an expert, from enameled brick and tile.

Specification Forms.

New Plastered Walls and Ceilings—Enamel to be brought to the job in original sealed packages and to be applied without the addition of varnish, oil, turpentine or benzine and strictly in accordance with manufacturer's directions. When the plaster is sufficiently hard and dry apply a priming coat of Rinald Bros. Unicoat Primer followed by a heavy coat of Rinald Bros. Flat Unicoat. Sandpaper when dry and follow up with two coats of Rinald Bros. Porcelain Enamel Paint, applied in compliance with manufacturer's directions on package.

Painted Plastered Walls and Ceilings—Repair and touch up where necessary and give to the whole surface one heavy coat of Rinald Bros. Unicoat; sandpaper when dry. Apply two coats of Rinald Bros. Porcelain Enamel Paint.

New Woodwork—Fill and prime in the usual manner, and give priming coat of lead, sandpaper and follow up with one heavy coat of Flat Unicoat, to be sandpapered and followed by three well brushed out coats of Porcelain Enamel Paint.

Furniture, Shelves, etc.—Be sure to specify "Quick Hardening Porcelain Enamel," where shelves, window seats, tables and furniture are concerned, unless you can give them several weeks in which to harden. The "Quick-Hardening" is applied over our Unicoat priming in the same manner and sold at the same price as the regular grade.

Extra Fine Work—Where a particularly fine surface without the slightest blemish is wanted, the specifications should be as above, but should call for four or five coats instead of three, and for rubbing with pumice-stone and water between coats.

Continued on next page

Interior Brick Work—Apply two coats of Unicoat Primer and one heavy coat of Unicoat. Follow with two coats of Rinald Bros. Philadelphia Porcelain Enamel Paint, according to their directions.

Galvanized Iron Primer.

Our Galvanized Iron Primer changes the mechanical bond between the zinc and the iron into a chemical one, thus producing a stronger and more intimate union between the metals. Furthermore, Galvanized Iron Primer acts on the surface of the " galvanizing " in such a manner that the paint takes a firm hold at once and can not peel. This makes it easy for the painter to spread his paint thoroughly and to cover more surface with a given number of gallons than he could have done had the Primer not been used. Directions on every package.

Price, etc.—$1.00 per bottle, packed in separate box. Each bottle contains enough concentrated galvanized iron primer to make a solution of proper strength by diluting it with from one to two gallons of water. The correct strength must be decided in each instance by a simple test on the painter's part, described on the label.

Flat Unicoat Paint, for Walls, Ceilings, etc.

Flat Unicoat Paint (Reg. U. S. Pat. Off.) is a unique coating, of which often one coat is sufficient for a finished job. It is the only paint ever devised which combines " dull finish " with whiteness and binding power superior to flat lead. It is unique, furthermore, on account of its hard, waterproof and washable surface.

Flat Unicoat does not possess any of the disadvantages of calcimine or similar finishes, such as cold-water paints and other flat paints, in all of which lime is present in its various calcium combinations; e. g., Chalk (carbonate of lime), Paris White, Gypsum, Plaster of Paris, etc. Neither is it poisonous or injurious to health. It is a clean, wholesome preparation; spreads readily without showing laps, and hardens overnight into an opaque surface from which copying-pencil marks, grease, stains and dirt are easily removed with water and soap. Flat Unicoat is adapted for use on woodwork, plaster, stone or brick walls, and metal ceilings. Shades matched without extra charge.

Specify: " One heavy coat (two coats over fire-cracks) of Unicoat Primer, to be followed when thoroughly dry and hard by a heavy coat of Rinald Bros. Flat Unicoat, to be brought to the job in original barrels or sealed and stamped cans. An additional heavy coat to be given wherever the architect may deem it necessary."

Outside Enamel.

For preserving and enameling wood, plaster or brick exposed to the weather, our Outside Enamel, labeled " O. & I. Scotch Enamel," is unsurpassed. It is an enamel paint of great elasticity and more opaque than white lead when preceded by two coats of Outside Unicoat. It looks, wears and lasts better than white lead, reflects light perfectly, and easily keeps clean on account of its hard, smooth finish. It is particularly well adapted for light courts, brick walls, and for boats.

Specification Form.

First and second coats, Rinald Bros. Outside Unicoat; third coat, Rinald Bros. Outside Enamel.

Cement and Concrete Enamel.

This preparation, originally gotten up for the protection of cement and concrete floors, combines the qualities of a priming coat which sinks into the surface and closes its pores or ducts, with those of a finishing enamel which furnishes the required paint film when applied in one or, if necessary, two coats. On walls and ceilings it will last for years; while on floors the top coat must be renewed more or less frequently, the necessity of such renewal being governed by the kind of use to which the floors are subjected. Cement or Concrete exposed to the weather should be given not less than two coats.

Specification Form.

Let the surface dry out as much as possible and clean dry with stiff brushes. Apply heavy with a stiff brush. Each coat must be allowed to dry hard to the touch before the next one is given.

Specialties.

More than twenty-five years ago we started making special paints and varnishes to resist conditions under which the average paint and varnish would speedily perish. We have made a success of this and shall be pleased to put our knowledge and experience at your service.

ESTABLISHED 1848

TOCH BROTHERS

Inventors and Manufacturers of "R.I.W." Technical and Scientific Paints, Waterproofing Compounds, Enamels, Varnishes, Colors, etc.

320 Fifth Avenue
NEW YORK, N. Y.

DISTRIBUTING AGENCIES IN THE WORLD'S PRINCIPAL CITIES
WORKS: LONG ISLAND CITY, N. Y., LONDON, ENGLAND, AND TORONTO, CANADA

Products.

STEEL PROTECTIVE PAINTS: "R.I.W. TOCKOLITH" (THE PATENTED CEMENT PAINT); "RED OXIDE" PAINT; "R.I.W." DAMP-RESISTING PAINTS; "R.I.W." ACID-PROOF PAINT.

DAMP-PROOFING COATINGS: "R.I.W." PAINT. INTEGRAL WATERPROOFING: "R.I.W. TOXEMENT" (Patented). MEMBRANE WATERPROOFING: "R.I.W." SELF-HEALING BRIDGE CEMENT, and "R.I.W." MARINE CEMENT.

DECORATIVE PAINTS for all purposes; INSULATING PAINT; MACHINERY ENAMEL; SMOKESTACK PAINT; ROOFING PAINT; CEMENT FLOOR COATINGS; ENAMELS; and MORTAR, CEMENT and PLASTER COLORS.

Steel Protection Against Corrosion or Electrolytic Action.

"R.I.W. Tockolith" (patented). The cement paint, ready for use, for the priming coat on iron, steel or metal. Prevents chemical or electrolytic corrosion. This material should always be second-coated with one of Toch's "R. I. W." Damp-Resisting Paints—the finish coat depending upon the conditions to which the steel or metal will be subjected.

TRADE-MARK

Steel Protective Paint for Grillage and Foundation Beams.

"R. I. W." No. 110. Recommended for the second coat on grillage and foundation beams because of its insulating properties. It is also waterproof, and withstands the action of all destructive gases.

Steel Protective Paint for Structural Steel to be Encased in Masonry.

"R. I. W." No. 112. This material is recommended for the second coat on structural steel work above the street level. It is similar to "R. I. W." No. 110, but has the additional quality of withstanding exposure to the elements during erection of the steel.

Is also used for painting brine and condenser pipes and interior iron and woodwork.

For Corroded Copper Effect.

"R. I. W. Verte Antique" is made in two qualities, one for interior and the other for exterior use. It can be applied to metal or wood to produce a corroded copper effect.

Steel Protective Paints for Extreme Exposure.

"R. I. W." No. 49. A black paint which, when used over "Tockolith," furnishes a perfect protection against the action of locomotive gases, acids and other fumes to which railroad bridges and viaducts are subjected. It is also an ideal material for fire-escapes, lined stacks, and other exposed metal surfaces.

"R. I. W." No. 48. A reddish-brown paint intended for extreme exposure. It performs the same function as "R. I. W." No. 49. Is acid-proof, but not alkali-proof.

"R. I. W." No. 1379. A maroon colored paint which withstands extreme exposure, and is generally applied as a second coat over "Tockolith."

Surface Coatings for Rendering Cement Floors Dustless; also to Prevent Penetration of Water, Oil or Grease.

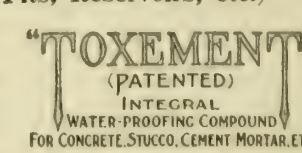
"R. I. W." Cement Filler and Cement Floor Paint (patented as to Portland Cement, Feb. 27, 1906). The use to which cement floors are subjected causes fine particles of silica and lime to float through the air and injure merchandise or machinery with which they come in contact. We were the *first* to discover that an organic acid resin (not a rosin), applied to cement floors or cement structures, combines with the free calcium hydrate and forms a true calcium resinate. Inside of twenty-four hours this combination is complete, and the floor is then treated with another coat of the same material containing an inert pigment ("R. I. W." Cement Floor Paint). The combined use of these materials prevents cement floors from dusting up, and at the same time renders them oil-proof and waterproof.

We warn consumers against imitations, as the improper fatty acids which they contain do harm to cement floors.

"R. I. W." Dustop (Trade-Mark Registered). A transparent preservative for floors of concrete or cement. Stops "dusting," crumbling and distintegration.

Waterproofing Against Pressure. (Foundation Walls, Boiler and Elevator Pits, Reservoirs, etc.)

"R. I. W. Toxement" (patented). A chemical compound, in powder form, which, when used in the proportion of from two to three per cent of the amount of neat Portland cement in the cement mortar or concrete, will produce water-tight results.



TRADE-MARK

Especially recommended for waterproofing foundation walls, boiler and elevator pits, reservoirs, stucco, etc.

Continued on next page

Insulating Paint for Armatures, etc.

"R. I. W." Insulectric No. 5. A quick-drying paint for all kinds of electrical insulating—armatures, transformers, storage batteries, etc.

"R. I. W." REMEMBER IT'S WATERPROOF TRADE-MARK

Is also used by traction companies as a hand-rail, fender, and trolley-pole paint.

Acid-Proofing Paint for Tanks, etc.

"R. I. W." No. 44. An acid-proof paint which is especially adapted for use on the interior of tanks of either metal or wood. Acids or chemicals stored in tanks coated with this material are not affected by the paint.

Acid-Proofing Paint for Subways, Sugar Refineries, etc.

"R. I. W." No. 1375. This is a cherry red paint which is acid-proof, moderately alkali-proof, and under all conditions steam- and water-proof. Is largely used in sugar refineries, paper mills, breweries, subways and places where paint is subjected to the continued fumes of chemical gases, and to moisture.

Exposed Metal Work Paint for Roofs, Cornices, etc.

No. 137 Red Oxide Paint. A bright red paint which is largely used for exterior work, such as tin roofs, cornices, fire-escapes, etc. Is also used in chemical manufactories, as a coating for steel, to prevent disintegration from acid fumes.

Paint for Smokestacks and Other Hot Surfaces.

"R. I. W." Smokestack paint. This material stands heat up to the point of carbonization, and is excellent for painting the stacks of ferryboats and factories, boiler fronts, etc.

Stain-Proofing Granite, Marble, etc.

"R. I. W." No. 110. This material is intended for the backing of limestone, granite, marble and all cut stone, to prevent stain and exclude dampness. When "R. I. W." No. 110 is used it is unnecessary to use a non-staining cement.

Damp-Proofing Walls Above Grade (Interior).

"R. I. W." No. 232. For application to the interior of exterior walls to which plaster is to be directly applied. Saves the cost of furring and lathing, and renders walls moisture-, stain- and vermin-proof.

Damp-Proofing Walls Below Grade (Exterior).

"R. I. W." Marine Cement. This should be used in connection with waterproof felt paper for damp-proofing the exterior of foundation walls. Is also used for waterproofing between decks of ferryboats, and between floors of railroad cars; for paying seams, coating underside of stable floors, etc.

Damp-Proofing Walls Above Grade (Exterior).

"R. I. W. Liquid Konkerit Primer" and "Liquid Konkerit" (patented as to Portland Cement, Feb. 27, 1906). Cement paints, ready for use, for damp-proofing and beautifying brick, stone, cement or concrete walls. Also used on interior of such walls as a decorative finish. White; also any color desired.

Damp-Proofing Walls Above Grade (Exterior).

"Toxloxpore" (copyrighted). A transparent liquid which can be applied to brick, stone, cement or concrete construction.

Damp-Proofing Cement or Concrete Construction.

"Anhydrosol No. 1." A colorless varnish containing no wax or fat. Used on brick, stone, cement or wood, to prevent rain absorption. Can be painted over.

"Anhydrosol No. 2." A waxy, colorless waterproofing for brick, cement or concrete walls.

"R. I. W. De Luxe" Enamel.

The architect's realization of a perfect quality enamel. Rich, lustrous, velvety. "De Luxe" Enamels are the acme of perfect taste in furniture and interior decoration. An enamel invention surpassing all foreign and domestic makes. Flat, satin or gloss finishes. Supplied in officially sealed containers.

"R. I. W. Wonder-Koat" Enamel.

This enamel is flexible, waterproof and elastic, and presents a satin-like surface which does not collect dust. May be washed with hot or cold water as often as required. This is the highest grade of exterior enamel ever produced.

"R. I. W." Hospital and Laboratory Enamel.

This enamel is sulphur-, acid-, water-, and fume-proof, and is largely used in chemical laboratories, hospitals, breweries, factories, private dwellings, and in places where a durable enamel is needed. A wall or ceiling coated with this material can be washed with hot or cold water and always kept in a perfectly sanitary condition.

"R. I. W. Snow White" Enamel.

This is an easy-flowing, heavy bodied white enamel for all interior purposes. Will rub and polish. An exceedingly fine enamel for all-around work.

"R. I. W. Everlite Koating."

A semi-enamel paint which has an appearance similar to a high gloss enamel. Is used on wood, plaster, concrete, brick or metal. Rooms painted with this material are much lighter and more sanitary than those painted with ordinary paints.

"R. I. W." Factory Enamel.

This is intended for warehouses, apartments, cellar walls and places not subjected to chemical fumes, but to ordinary conditions of interior atmosphere. It remains white under these conditions, and can be washed with any neutral soap as often as necessary.

"R. I.W. Edinburgh" Mortar and Plaster Colors, and Dry Cement Colors.

Made in a large variety of attractive colors for incorporation in lime mortar, plaster or cement to produce the richest shades in mortar joints, wall plaster, fountains, stucco, statues, swimming pools, etc. They are permanent "Body Colorings."

ALABASTINE COMPANY

MANUFACTURERS OF

Sanitary Water-Color Wall Coatings

886 S. D. Grandville Road
GRAND RAPIDS, MICH.

Products.

ALABASTINE, the beautiful WALL TINT; ALABASCO, the FLAT WALL PAINT for Homes, Apartment Buildings, Hotels, Clubs, Schools, Hospitals, Churches, Libraries, Offices, Stores, etc.; ALBA-LITE, the COLD-WATER PAINT for Factories, Warehouses, etc.

Alabastine—Sanitary Water-Color Wall Coating.

Materials on which Alabastine may be used—Alabastine can be successfully applied over smooth or rough plaster, smooth or rough board walls, canvas, wall board, plaster board, lining felt, lining paper, adobe, burlap and like fabrics, cement, brick walls and steel ceilings.

Preparation—Alabastine comes in dry powder form, all ready to be mixed with cold or warm water. It is applied with a seven- or eight-inch wall brush. It has excellent brushing qualities. In redecorating, the second coat may be placed directly over the first, or the first may be readily washed from the wall, as desired.

Colors—Alabastine colors are of two classes: the soft-hued tints and the deep colors; in addition there is a brilliant white.

There are sixteen soft-hued tints which cover the whole color-gamut in the tints. They may be applied singly, lightened with white, or combined with one another to secure any desired effect. Frequently colors left over from different rooms can be utilized, if in the dry powder form, by intermixing them to form a new tint. These softer tints are intended for surface-covering uses primarily, rather than for border and panel effects. They come in five-pound packages. Full directions on the package.

The more intense colors are designed for fresco decorating, lining, stenciling, and all purposes where a strong color effect is desired. There are eighteen different colors in this class, which, either singly or by intermixing, yield the whole color-gamut in the stronger colors. These intense colors are packed in one-pound cartons and also in four-pound cartons.

Specifications for the Use of Alabastine.

All plastered Walls, Ceilings and Steel Ceilings throughout the building in the following rooms:

.....

.....

to be given one or two coats of Alabastine as necessary to produce a satisfactory job and as per the following specifications and instructions:

Preparation of Surface—All plaster on walls and ceiling must be perfectly dry before decorating. If any cracks or holes exist in the plaster, the loose plaster must be removed with a putty knife and dampened by applying water to the crack or hole with a small brush. For filling cracks and holes, use one half stucco and one half Alabastine mixed. Care must be taken to fill the hole or crack flush so as to produce an even, smooth surface.

Sizing—All plaster throughout the building must be sized with hard oil—two thirds hard oil and one third turpentine—and in each gallon of size a handful of fine stucco or dry Alabastine should be used. After the sizing is dry, should any flat spots appear on ceiling or walls, these spots must be touched up with a coat of shellac (one half shellac and one half wood alcohol). Flat spots here mean "lime spots" or where the cracks or defects in plaster have been refilled. A varnish size may be used in place of hard oil, provided a good quality of varnish, not a rosin varnish, be used. All sized walls to stand twenty-four hours.

Application of Alabastine—A good seven- or eight-inch wall brush is suitable for applying Alabastine. Printed directions as to mixing and the quantity of water to be used must be observed.

THE BLACKSTONE HOTEL, CHICAGO, ILL.
One of the world's famous hotels uses Alabastine

Stippling—If a stippled effect is desired, mix somewhat thicker than for regular wall work and use an ordinary wall stippler.

Steel Ceilings—Any steel ceiling that has been properly dipped, or given a priming coat of paint, can be successfully treated with Alabastine tints.

Do not use Alabastine on raw steel until it has been painted or properly prepared. Observe general directions on this work as to mixing and spreading.

CAUTION—Alabastine must be delivered on the job in original sealed packages with the manufacturer's label thereon. No whiting, glue or kalsomine must be mixed with the Alabastine.

NOTICE—On ordinary side walls and ceilings properly sized, one coat will produce a perfect surface in a great many cases, and under those conditions no second coat is required.

Stencils.

The ALABASTINE COMPANY manufactures a large variety of artistic stencils, supplied for Alabastine decoration. Stencil Books will be mailed on request.

Information.

Further information regarding the use of Alabastine sent on request.

M. EWING FOX CO.

MANUFACTURERS OF

Calcimines, Fresco Colors and Water Paints

136th Street and Rider Avenue
NEW YORK, N. Y.

1501 South Peoria Street
CHICAGO, ILL.

Products.

CALCIMINES, COLORS, and PAINTS for tinting, decorating and whitening Ceilings and Walls.

"MURALITE" and "PERMANITE."

SURFACERS and SIZES for preparing walls and ceilings for calcimine, oilpaint, varnish and wallpaper: "STONOL," SHELLAC, DECORATORS' and PAPERHANGERS' SIZES.

"Muralite."

TRADE-MARK

A modern high-grade calcimine; glutinous in character. Meant for tinting and decorating ceilings and walls of residences, offices, schools, institutions, churches and theaters. Adheres to smooth plaster, sandfinish, wallboard, wood, canvas, paper, hollow tile, oilpaint, varnish and shellac. Covers perfectly with one coat, but most new surfaces require priming or sizing. Will not fade, rub nor chip off, but may be removed with sponge and water, if necessary. Suitable for all kinds of work. Popular among painters. Furnished in white and tinted powder form, ready for use when mixed with water. Can be applied rapidly with large brush. Dries quickly with pleasant odor. Produces beautiful soft, velvety effects, and is both sanitary and fireproof. Price, 5 to 10 cents per pound, depending on color and quantity. Covering capacity—smooth surfaces, about 50 square feet to the pound; rough surfaces, about 35 square feet, one coat. Cost of application, about one cent a square foot.

"Muralite" Fresco Colors.

Deep, permanent colors meant for decorating walls and ceilings. They adhere to rough or smooth plaster, wallboard wood, canvas, paper, hollow tile, oilpaint and varnish. Cover perfectly with one coat, dry quickly and without unpleasant odor. Will not fade, rub off nor chip. May be removed with sponge and water if necessary. "Muralite" Fresco Colors are similar in character to "Muralite" Tints, but are much deeper in shade, richer and more expensive. They are particularly recommended for decorating surfaces which do not receive hard usage—surfaces like those above the wainscot in churches, theaters, libraries, halls, clubs, cottages and bungalows. Furnished in powder form, ready for use when mixed with water. Price, 15 to 50 cents per pound, according to the particular color and quantity. Covering capacity—smooth, hard-finished plaster, about 50 square feet to the pound; or rough sandfinish, about 35 square feet, one coat. Cost of application, about one cent per square foot.

"Permanite."

TRADE-MARK

A genuine water-paint of the very best kind. Caseinous in character. Is not a calcimine and not intended for decorative purposes. Made for whitening, coloring and fireproofing the ceilings, walls and pillars of factories, mills, warehouses, garages, sheds and stables. Adheres to cement, concrete, brick, hollow tile, sandfinish, wood, wallboard, canvas, paper and raw iron, but will not adhere to oilpaint, varnish, shellac or whitewash. Covers well with one coat, but perfectly with two. No priming or sizing necessary. Easy to use and dries rapidly with flat finish. Will not rub nor chip off and will not rust nor turn yellowish with age. Good fire-retardant and approved by Fire Underwriters. Not intended for outside work, except under certain favorable conditions. Two kinds of "Permanite" are made: one called "I. N.," which may be applied by spray as well as brush, and the other, called "X. X.," which should only be applied by brush. The latter is the harder and better for walls and pillars. "Permanite" is furnished in dry, condensed powder form, ready for use when mixed with water. Price, 5 to 10 cents per pound, depending on quantity. Covering capacity—rough surfaces, about 25 square feet; and smooth surfaces, about 40 square feet, one coat. Cost of application, about one cent a square foot.

"Stonol."

A cement-like oil for priming and preparing ceilings and walls. Goes right in and hardens like stone. Overcomes all imperfections, and makes ideal surfaces upon which to calcimine or paint. Only one coat necessary. Covering capacity—smooth plaster, about 700 square feet to the gallon; or rough, sandfinish, about 500 square feet. Price, $1.00 to $1.50 per gallon, depending on quantity. Cost of application about a half cent a square foot.

General Information.

All plastered and sandfinished surfaces should be free from dampness, and properly sized or primed before any of the "Muralite" products are applied. "Stonol" is the best material for this purpose. All brick and cement surfaces should be thoroughly dry and free from frost before "Permanite" is applied. Neither material should ever be used where there is danger of freezing before drying, nor in damp places like vaults, cellars, refrigerating rooms, etc.

Specifications and sample-cards upon request.

Materials sold in most of the large cities of the United States and well known to painters.

CARBOLINEUM WOOD PRESERVING COMPANY

MILWAUKEE, WIS., 519 Prairie Street — 184 Franklin Street NEW YORK, N. Y. — PORTLAND, ORE., 164 Front Street

BRANCH OFFICES AND WAREHOUSES EVERYWHERE

Products and Services.

Avenarius Carbolineum
PRESERVES WOOD EVERYWHERE
TRADE-MARK

Avenarius Carbolineum Wood Preservative. A general line of Wood Preserving Materials, Shingle Stain and Treated Timber and all necessary Accessories, such as Heating Tanks, Thermometers, Brushes, Spray Outfits, etc.

Services include Chemical Analyses, Inspections, Reports, and all matters pertaining to consulting practice on the subject of Timber Preservation.

Upon receipt of details of requirements and conditions, suggested specifications will be prepared for any wood preserving problem.

Technical Description.

Avenarius Carbolineum is a non-volatile heavy oil derived from the highest boiling distillate of coal tar. Its constituents belong to the anthracene group, the permanent antiseptic properties of which are generally acknowledged. After filtration and refining, the oil is chemically treated to improve its character and to increase its efficiency. It readily penetrates wood, imparting a durable nut-brown color, and is highly toxic.

CHEMICAL SPECIFICATION

Specific gravity at 38° C	1.10 minimum, 1.115 maximum
Flashing point	140° C. minimum
Burning point	165° C. minimum
Distillate up to 250° C	2% maximum
250°-300°	15% maximum
300°-350°	35% minimum, 60% maximum
Color of all distillation fractions	red brown
Character of residue	Soft at 20° C.
Tar Acids (% of total distillate)	10% maximum
Liquid at	21° C.
Sulphonation residue	0.25 c. c. maximum
Insoluble in benzol	0.25 of 1% by weight
Viscosity (Engler)	10. minimum
Chlorine test (qualitative) on distillate 330° to 350° C. by ignition with lime	
Water	none
Color—thin film	red brown

Specification.

The wood preservative to be used shall be a chlorinated distillate of coal tar and shall, on analysis, be equal in all respects to the material known as Avenarius Carbolineum as manufactured by the Carbolineum Wood Preserving Co., of New York.

METHODS OF APPLICATION
For details see Circular 59

Factors to be Considered.

Factor and Summary

(1) Use—To prevent the decay of wood
(2) Ultimate value—Doubles the life of wood
(3) Adaptability—To all wood preserving requirements
(4) Cost—From ½ cent to 2 cents per square foot or $5.00 to $12.00 per thousand feet B. M. including labor charge and equipment
(5) Methods of application—Brush, spray or open tank
(6) Ease of handling—Simple under all service conditions
(7) Labor required—Unskilled
(8) Practicability—No mixing; always ready for use
(9) Covering capacity—Greater than that of paint
(10) Color—Durable and pleasing nut brown stain
(11) Deterioration—None; does not harden or dry up
(12) Availability—Depots everywhere
(13) Comparative value—Best in every comparable test
(14) Waterproofing qualities—Within 3 per cent to 10 per cent, according to wood and treatment given
(15) Effect on strength of timber—By reducing moisture increases strength
(16) Warping, checking and splitting—Retarded and greatly reduced
(17) Insulating value—Very high; tested to 50,000 volts
(18) Corrosive action—None; prevents rust
(19) Acid resistance—Efficient against vapors and dilute acids
(20) Combustibility of treated wood—Slight; does not increase the fire risk
(21) Inflammability—None; not explosive nor dangerous
(22) Antiseptic efficiency—High and permanent
(23) Fungicidal properties—Arrest decay
(24) Vermicidal qualities—Prevent insect attack and destroy parasites
(25) Taste—Pungent; prevents gnawing of wood-work by animals and borers
(26) Sanitary effect—Antiseptic deodorizer and disinfectant
(27) Character—A manufactured coal tar product
(28) Composition—Distilled, filtered and chemically treated anthracene oil
(29) Chemical standard—Unvarying since 1876
(30) Poisonous—Non-poisonous; safe to handle and use
(31) Penetrability—Very satisfactory
(32) Absorption—Regulated to the desired limit of expense
(33) Volatility—Negligible
(34) Solubility—Very slight
(35) Fluidity—Fluid at all ordinary temperatures
(36) Viscosity—High; essential for brush or spray treatments
(37) Odor—Tarry; not unpleasant or lasting
(38) Economy—Makes possible the use of less durable timber
(39) Permanence—Amply demonstrated by results
(40) Service to users—Excellent; insures satisfaction
(41) Endorsements—Highest, both technical and commercial
(42) Experience—Continuous for 40 years
(43) Results—Most excellent and certain

What It Covers.

Average figures for estimating on contracts:

5 gallons per 1000 ft. B. M. for one brush coat
8 gallons per 1000 ft. B. M. for two brush coats
12 gallons per 1000 ft. B. M. for an immersion

For estimating according to surface measurement:

One gallon covers 350 sq. ft. on dressed lumber
One gallon covers 250 sq. ft. on rough lumber
One gallon covers 100 sq. ft. on shingle roof

One third the quantity required for second coat.

Conclusion.

Successful wood preservation is a matter of experience. Laboratory deductions are often misleading, as the timber itself offers so many variables that it is impossible to change but one factor at a time.

THE NATIONAL ROOFING CO.

Manufacturers of Preservative Paints, Waterproofings and Roof Coatings

FACTORIES AND GENERAL OFFICES

TONAWANDA, N. Y.

PITTSBURGH OFFICE
607 PUBLICATION BUILDING

BALTIMORE OFFICE
548 MONUMENT STREET, EAST

DISTRIBUTORS

BALTIMORE, MD., Clarke Asphalt Roofing & Paint Co., 546 Monument Street, East
BINGHAMTON, N. Y., Gillett-Barnes Co., 91 State Street
BUFFALO, N. Y., Cordes, Ayrault & Co., Inc., 51 Broadway
CLEVELAND, OHIO, National Roofing & Supply Co., 6318 Kinsman Road
DETROIT, MICH., National Supply Co., 301 Penobscot Building
LOUISVILLE, KY., Central Paint & Roofing Co., 314 West Main Street
MILWAUKEE, WIS., Cream City Roofing & Paint Mfg. Co.
NEW ORLEANS, LA., Kracke & Flanders Co., 715-717 Perdido Street
PROVIDENCE, R. I., Narragansett Supply Co., 830 Eddy Street
SYRACUSE, N. Y., Onondaga Builders Supply Co., 569 South Clinton Street

Products.

"Asphaltus Roof Coating"; "Natroco," "Corporation" and "Egyptian" Ready Mixed Paints; "Natroco Interior Hard-Drying Floor Paint"; "Natroco (Washable) Flat Wall Finish"; "N. R. C. Protective Paint," for Iron and Steel; "Factrolite," an Interior Factory Paint; "Hydrolox"; "Retaw Proofing"; "Phlorkote"; "Stuckote"; "National Bondkote"; "National XX Graphite Paint"; "National Creosote Shingle Stains."

Also, "National Asphalt Varnish"; "Protec-Stac"; "Minrubite Proofing"; "Kalsolite"; "Black Chief Paint."

For Roofings, see our name in General Index.

TRADE-MARK

"Asphaltus Roof Coating."

For renewing, preserving and beautifying felt, rubber and other composition roofing. Made from pure natural mineral asphalt, which reinforces and protects the weather surface. "Asphaltus" is in a class by itself. Made in colors: Black, Red, Green, Brown, and Terra Cotta. Color card upon request.

"Natroco Ready-Mixed Paint."

A high-grade paint for use upon exterior or interior of residences, buildings, etc. Prepared from white lead, zinc oxide, pure linseed oil and turpentine japan dryer. Made in thirty-five attractive and durable colors. Color card upon request.

"Natroco (Washable) Flat Wall Finish."

A durable and artistic mode of wall covering to be used for interior decoration. The soft tones of "Natroco Flat Wall Finish" are restful to the eye, and harmonize with any scheme of decoration. An oil paint prepared from specially treated linseed oil and non-poisonous pigments free from lead. Made in eighteen colors. Color card upon request.

"N. R. C. Protective Paint."

Highest grade protective paint for the preservation of iron and steel against rust and corrosion. Pigment is composed of magnetic oxide of iron, zinc chromate and prepared linseed oil vehicle. A scientific paint actually inhibitive or rust preventing. Produced in Black, Maroon and Bronze-Green. Color card upon request.

"Factrolite."

An intense white, high-gloss linseed oil paint of brilliant reflecting properties, giving a maximum of lighting efficiency. Made expressly for factory interiors, free from lead pigments and absolutely nonpoisonous.

"Hydrolox."

Is a concentrated liquid waterproofing. When mixed in the proportion of one gallon "Hydrolox" to fourteen parts of water it produces a liquid solvent, which when used in mixing concrete dissolves the mineral glues, filling the voids, waterproofing the aggregate, increasing its crushing and tensile strength.

"Retaw Proofing."

This is a stainless, liquid waterproofing of dependable efficiency for stucco, concrete, brick and porous building stone. It is easily applied with a brush, penetrating deeply. It is proof against atmospheric action and is not affected by natural extremes of heat and cold.

"Phlorkote."

A floor enamel for the waterproofing or dust-proofing of a concrete or cement floor. Will adhere firmly to the surface, and is very durable. "Phlorkote" permits the decoration of concrete floors in many desirable shades.

"Stuckote."

Waterproofs and decorates exterior surfaces of concrete and brick structures. Successfully resists action of the elements. Made in fourteen durable and attractive colors. Color card upon request.

"National Bondkote."

A damp-proof coating and plaster-bond. Produced from mineral asphalts, refined and manipulated by our own special process. For use upon the exterior or interior of concrete, brick, or other buildings above or below ground level to prevent seepage of moisture through the structure; also, as a backing to prevent discoloration of high-grade marble or stone, etc. As a plaster bond it does away with the necessity of furring and lath.

Additional Information.

In addition to the above, we manufacture "Corporation," a ready-mixed paint for house and general use, prepared expressly for large users. Color card upon request. "Egyptian," a medium priced paint for barns, metal roofs, etc. "National XX Graphite Paint" for structural iron. "National Shingle Stain," made in nineteen attractive staining colors, containing linseed oil and creosote of proved efficiency for the preservation of wood against rot and decay.

ESTABLISHED 1867 INCORPORATED 1911

THE NORTHEASTERN COMPANY

MANUFACTURERS OF

Letteney Wood Preservative

6 Beacon Street

BOSTON, MASS.

Products.

LETTENEY WOOD PRESERVATIVE (a carbolineum of the highest quality such as is produced and known in European countries).

Also, ANTHRACENE OIL and DEAD OIL of COAL TAR (to specifications).

LETTENEY
Reg. U. S. Pat. Off.
Wood Preservative

TRADE-MARK

Packages.

Letteney Wood Preservative is put up *ready for use* in the following sizes: 5-gallon cans; 10-gallon cans; 50-gallon barrels, and half barrels.

Experience.

"Letteney" has an unsurpassed record of forty-nine years of efficient brush treatment of timber.

Description of "Letteney."

"Letteney" is a liquid compound manufactured from by-products of wholly bituminous coal tar. Guaranteed to contain at least 99.5 per cent pure coal tar oil. Distills only at high temperatures and contains no light volatile matter.

"Letteney" is not a surface coating, but penetrates the wood and remains there permanently. It is a powerful antiseptic, prevents decay, and prolongs the life of the wood. Not soluble in water and will not wash out; it maintains the tough fibrous condition of the wood and prevents splitting and splintering.

Permanent color is dark red-brown.

GRADUATE SCHOOL, PRINCETON, N. J.
CRAM, GOODHUE & FERGUSON, Architects
Wooden Floor Screeds treated with "Letteney"

Application of "Letteney."

It is easily applied to wood by the brush or open-tank methods.

Too much importance can not be placed on having the wood, before treating, dry and as well seasoned as possible. Posts, poles, ties, piles, etc., should have all bark removed before being treated.

Brush Treatment—When the wood is dry, thoroughly apply Letteney Wood Preservative with a broad, flat, stiff bristle brush and brush in well, by two applications, the second after the first has dried in.

All season checks, knots, ends of timbers, gains, mortises and cuts of any description should be well slushed.

Open-Tank Treatment—By this method, after the wood is dry, it is thoroughly treated by dipping and soaking for from five to twenty minutes in tanks about half filled with Letteney Wood Preservative.

For brush and open-tank treatments Letteney Wood Preservative may be used either hot or cold. When used in very cold weather, best results are obtained by heating to a temperature of from 175 to 210 degrees Fahr.

On request, complete specifications for treatment will be furnished in accordance with conditions.

WEST SHORE RAILROAD PIER NO. 5, WEEHAWKEN, N. J.
PHOENIX CONSTRUCTION CO., Contractors
Timbers and Planking treated with "Letteney"

Uses.

"Letteney" should be used on all woodwork that comes in, on, or near the ground, in damp or poorly ventilated locations, as for bridges, piers, wharves, railroad ties, telephone and telegraph poles, cross arms, fence posts and piles; flooring of freight houses, mills and warehouses; mine timbers; conduits; nailing strips in concrete, etc.

Prices.

Delivered prices to all freight stations furnished promptly on application.

References.

Letteney Wood Preservative has shown its value in preserving the timbers of the following old structures:

Meriden Street Bridge, East Boston, Mass., 1867
Dover Street Bridge, Boston, Mass., 1876
Chelsea Bridges, Boston, Mass., 1877
Malden Bridge, Charlestown, Mass., 1875
and many others.

THE BUTCHER POLISH CO.

Manufacturers of Floor Polish and Floor Wax

356 Atlantic Avenue
BOSTON, MASS.

Products.

We are manufacturers of BUTCHER'S BOSTON FLOOR POLISH, or FLOOR WAX, BUTCHER'S LIQUID POLISH, and BUTCHER'S No. 3 REVIVER, for floors, interior woodwork and furniture; BUTCHER'S WEIGHTED FLOOR-FINISHING BRUSHES.

Butcher's Boston Floor Polish.

Butcher's Boston Floor Polish is a perfectly transparent finish for floors, interior woodwork, and furniture.

It preserves the natural color and beauty of the wood, and as it is not brittle it will not scratch or deface like shellac or varnish, nor will it become soft and sticky like beeswax.

It has the reputation of being the best floor polish made and the only one without objectional features, and is especially adapted for hardwood floors, bowling alleys and linoleum carpets.

Application.

Application—To apply Butcher's Boston Floor Polish to floors or woodwork of oak, black walnut, mahogany or other open-grained woods, they should first be properly filled with some good wood filler, after which the surface should be cleaned with cloth or excelsior, and allowed to stand until the filling is dry and hard—twenty-four hours or more.

After the filling is thoroughly dry put on a coat of the polish evenly with a cloth, and leave it to dry, which will take about half an hour. Polish with a long-handled stiff brush (preferably one of our weighted ones), rubbing across the grain first and then with the grain; then place a piece of dry, soft cloth, felt or carpet under the brush to give the finishing gloss.

New floors should be finished with the filler and one coat of Butcher's Boston Floor Polish as soon as they are laid, thus preventing the dust and dirt from getting into the grain of the wood.

The second coat of polish should be applied just before the rooms are to be occupied.

Covering Capacity.

Covering Capacity—One pound of Butcher's Boston Floor Polish will cover 300 square feet of surface after it has been properly filled.

Butcher's Liquid Polish.

Butcher's Liquid Polish is used for repolishing floors or furniture. After the floors or other woodwork have been properly finished with Butcher's Boston Floor Polish, and require freshening up, dampen a cloth with Butcher's Liquid Polish, rub over the surface and polish at once by rubbing with a dry, soft cloth.

Butcher's No. 3 Reviver.

Floors of hard pine, maple, or other close-grained woods will not take a filler. For such floors apply a coat of Butcher's No. 3 Reviver, which will give a warm and even color to the wood. It should be left overnight to dry and then treated with the Boston Floor Polish according to the directions given above.

To restore the color of the parts of the floor where the finish is worn off and the wood looks gray and bleached, dampen a cloth with the Reviver and rub over the defaced portions; let it remain ten or twelve hours to dry; then polish with Butcher's Boston Floor Polish according to directions.

For kitchen, store, and piazza floors that need to be washed often, lay on a thin coat of Butcher's No. 3 Reviver, with an ordinary varnish brush, or dampen a cloth and go over as directed above, rubbing off well before leaving to dry. Repeat when the wood begins to look gray and worn. One gallon will cover about 1200 square feet of surface.

Prices and Territory.

Butcher's products are for sale in all the large cities, by dealers in Painters' Supplies.

Butcher's Boston Floor Polish is put up in cans as follows: One lb., 60 cents; two lbs., $1.20; four lbs., $2.40; eight lbs., $4.80. List prices as per price current.

Butcher's Liquid Polish and No. 3 Reviver are sold at 70 cents per quart, or $2.50 per gallon; other sizes in proportion. List prices as per price current.

Brushes, weighted, $2.50; not weighted, $1. List prices as per price current.

JOHN MARX

Manufacturer of Fire-Resistant Putty, Galvanized Iron Paint, Etc.

54-56 Paterson Avenue
HOBOKEN, N. J.

Products.

JOHN MARX UNDERWRITERS' APPROVED FIRE-RESISTANT PUTTY for Glazing in Fireproof Construction; and "BEST-ON-EARTH" GALVANIZED IRON PAINT.

Also, XXX GLAZIERS PUTTY, ROOF PAINTS, ROOF CEMENTS, METAL PROTECTIVE PAINTS, etc.

John Marx Underwriters' Approved Fire-Resistant Putty.

John Marx fire-resistant putty resists, for an indefinite period, all conditions of actual service; withstands exposure to high temperatures, and remains in the grooves after exposure to severe fire and after subjection to action of fire hose streams.

It is made of carefully tested and accurately proportioned highest grade whiting and American flaxseed linseed oil, chemically treated, which are thoroughly mixed by modern machinery, under the supervision of skilled workmen. The finished product is invariably uniform in quality, and is packed in metal cans and in barrels, ready for use.

It is a long stringing putty, readily workable without sticking to the hands. The putty will adhere to the sash members sufficiently to permit the installation of the glass, and is soft enough to permit the glass to be pressed into proper position. After hardening, it adheres to the sash members and the glass, but retains sufficient flexibility to prevent the cracking of the glass as a result of expansion and contraction, and stresses due to the operation of the sash.

If properly installed, it will remain securely in position and prevent the passage of fire and smoke around the edges of the wired glass, thus reducing smoke losses.

John Marx fire-resistant putty will not dry out, crack, crumble or disintegrate after it has been installed, nor lose its value as a putty, and will not corrode or injure the sash members in connection with which it is used.

It may be used for glazing, without special preparation, for many months after its manufacture; and, when applied, will give effective service for fully twenty years.

John Marx fire-resistant putty is also highly recommended, because of its efficiency and durability, for ordinary non-fireproof sash, skylights, vault lights, wall tiling, etc.

John Marx "Best-on-Earth" Galvanized Iron Paint.

This galvanized iron paint is scientifically designed to neutralize all surface oils and acids so characteristic of galvanized iron. It can be simply and directly applied to that material, without preliminary use of chemicals and other washes, and with the absolute assurance that the paint will neither peel off nor crack.

"Best-on-Earth" galvanized iron paint is not a new product, but has stood the test for years, being highly indorsed by prominent users throughout the United States.

It is made in any color desired, and may be applied in as many coats as required finish may demand, or as a priming coat for some other finishing paint.

REFERENCES

A few recent users of John Marx Fire-Resistant Putty:

S. H. Pomeroy & Co., Inc., New York, N. Y.
Westinghouse, Church, Kerr & Co., New York, N. Y.
Leonard Sheet Metal Works, Hoboken, N. J.
Turner Construction Co., New York, N. Y.
Knoburn Co., Hoboken, N. J.
W. J. Burton Co., Detroit, Mich.
Harrison Construction Co., Hopewell, Vt.

Some of the Buildings Supplied with John Marx Fire-Resistant Putty:

NEW YORK, N. Y.

Charles Brogan Building, 35 West 20th St.
Bliss Building, 304 East 23d St.
Fiss, Doer & Carroll, 304 East 23d St.
Alder & Kock Building, 8-10 West 19th St.
G. Knoche, 516 East 72d St.
List & Rose Building, 16-18 East 16th St.
Chas. Brendon & Co. Building, 120 West 18th St.
National Biscuit Co., 16th St., between 9th and 10th Aves.
McNulty Bros. Building, 62d St., near 11th Ave.
New York Transportation Stables, West 40th St.
Frammore Building, 217 West 24th St.
Metropolitan St. R. R. Co. Carhouse, 42d St. and North River
Koch Bros. Warehouse, 124th St., between Lenox and 7th Aves.
Schwartzchild & Sulzberger, 42d St. and North River
Packard Garage Building, Broadway and 61st St.
Monolith Building, 43 West 34th St.
Columbia Building, 35-41 West 24th St.
Isaac Hopper Co., Green St. and Waverly Place
Bruch Warehouse, 130 East 12th St.
Bliss Building, 304 East 23d St.
Boldt Garage Building, 62d St. and Broadway
New Building, 12-14 West 21st St.
New Building, 18-20 West 21st St.
Rogers & Pyatt Building, 35 Fletcher St.
Wales Lines Co., Pelham, N. Y.

BROOKLYN AND LONG ISLAND CITY

Bush Terminal Co., Foot 36th St., Brooklyn
Model Factory No. 1, Foot 37th St., Brooklyn
Kenyon Building, Pacific St. and Carlton Ave.
Bohnet, Beyers & Mazenhoff Building, Forest St. and Bushwick Ave.
Kirkman's Soap Factory, 215 Water St.
Thompson & Norris Building, Prince and Concord Sts.
Gretsch Building, 109 South 5th St.
Cousins Shoe Factory, Grand and DeKalb Aves.
New Building, Court and Livingston Sts.
Robert Gair & Co., Washington and Water Sts.
McClure Building, Orchard and Jackson Aves.
Long Island City Factory, Vernon Ave. and 10th St.

NEW JERSEY, ETC.

Keuffel & Esser New Building, 3d and Jefferson Sts., Hoboken, N. J.
Colgate & Co., New Building, Hudson and Grand Sts., Jersey City
Murphy Varnish Works, Newark, N. J.
Wales Lines Co., Rahway, N. J.
St. Joseph's Factories, Rahway, N. J.
Manufacturers' Construction Co., 10th and Market Sts., Wilmington, Del.
Philadelphia Electric Co., Broad and Washington Sts., Philadelphia, Pa.
Grant Telephone Co., Pittsburgh, Pa.
Underwriters' Laboratories, Inc., Grate Model Fireproof Building, Chicago, Ill.
British American Tobacco Co., Petersburg, Va.
Parkway Telephone Building, Philadelphia, Pa.
Stevens Institute of Technology, Hoboken, N. J.
And many others too numerous to mention, the list of whom can be had on application.

W. H. S. LLOYD COMPANY

Importers of Wall Papers, etc.

529 South Wabash Avenue
CHICAGO, ILL.

105 West 40th Street
NEW YORK, N. Y.

Products.

WALL PAPERS, from English, French and German Markets; JAPANESE LEATHERS, GRASS CLOTHS and SPECIAL BLENDS with FRIEZES or detached BORDERS; exclusive CRETONNES and other FABRICS.

ANAGLYPTA, a Decorative Relief for Ceilings, Friezes, Dados, etc.

PARIPAN ENAMELS in Glossy, Semi-Gloss and Flat.

Service.

The LLOYD Co. will be pleased to show every attention to the architect and his client. Many years of association with fine things have given its salesmen taste and a sympathetic knowledge of architects' requirements.

Their full experience will be united with every effort to interpret the wishes of architects and their clientele.

A written description of any particular requirement will receive the same careful study and attention as a personal request.

Wall Papers, etc.

The following are some of the Wall Hangings imported solely by this concern:

Sanderson & Sons, London, England, the most famous wall papers in the world.

Latest ideas in French and German productions;

Prize designs in Japanese leathers;

Special weaves in grass cloth;

Friezes in fresco—no repeat;

Rich blends with friezes and borders, for decoration on large and small scale.

Anaglypta.

This is not an imitation of any ornamental material. It is an artistic and permanent relief made from plastic pulp, having distinguishing qualities in design, utility and durability, from plaster relief or compo ornament.

Anaglypta is applied with paste and brads, is permanently free from action, is impervious to moisture, and will not warp, buckle, crack or scale.

As a permanent decorative treatment for ceilings, friezes, dados and walls, in residences, apartment houses, club rooms, auditoriums and churches, it will be found very valuable because of its rich sculptured effect, ease of application and comparative low cost.

Advantages.

(1) Quick, easy application with paste and brads.

(2) Most correct period designs, and the best productions of modern artists.

(3) Eighty per cent lighter than plaster relief.

(4) Fifty to seventy per cent cheaper than plaster relief.

Designs.

The 1200 to 1400 available Anaglypta designs are a gradual development of patterns specially prepared for well-known English architects and craftsmen.

Old English	Early English
Elizabethan	Jacobean
Georgian	Tudor
Italian	Italian Renaissance
Renaissance	Gothic
Adam	Chippendale

And others.

Dimensions.

Units range from 20 to 48 inches square, and work from 2- to 12-foot centers. Projection of relief is from ¼ inch to 3½ inches.

Exhibits.

Finished examples of Anaglypta can be seen at the Lloyd Co.'s showrooms, or at the Architects Samples Co.'s rooms, 101 Park Avenue, New York, N. Y.

Specialties.

This Company specializes in hand block designs, colored to selection.

Friezes in leather—illuminated.

New effects in stenciled grass cloth.

Samples.

Architects will be gladly supplied with samples of the Lloyd products, on receipt of request indicating exact requirements both in color and general character of design.

Paripan Enamel.

A superfine, pure white enamel of unequaled body-surface depth and spreading power, made in glossy, flat and semi-gloss.

The finest materials obtainable are carefully and scientifically compounded and blended into a highly elastic, durable coating, which is equally efficient on wood, metal or plaster.

Cost—The Paripan process—two coats Paripan Filler and two coats Paripan Glossy or Flat Enamel—averages sixteen cents per square yard for the four full coats.

Covering Capacity—Each gallon tin of Paripan will cover 810 square feet.

EXAMPLE OF ANAGLYPTA FRIEZE DESIGN

LINCRUSTA WORKS "PALLAS," INC.

GENERAL OFFICES FOR UNITED STATES, CANADA AND MEXICO

121-123 East 24th St.

NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., Atlas Block, Cor. Wabash Avenue and Randolph Street

PHILADELPHIA, PA., Denckla Building, Cor. 11th and Market Streets

FOREIGN OFFICES

BERLIN VIENNA LONDON PARIS PETROGRAD BUENOS AYRES

FACTORIES

STAMFORD, CONN. HOECHST A/M GERMANY

Products.

LINCRUSTA "PALLAS" and LINCRUSTA "WALTON" Solid Relief Decorations; WALL COVERINGS, WAINSCOTINGS and PANELING, intended for application to plaster walls and ceilings, woodwork, or any permanent wall or ceiling finish.

EFFECTS in WOOD, GRAININGS, VENEERS, LEATHER and BURLAP.

Description.

Lincrusta "Pallas" and Lincrusta "Walton" are solid plastic materials made in varying styles of ornaments, either in sharp relief, or in delicately modeled effects. Extremely pliable; therefore can be handled as easily as wall-paper.

Wainscotings.

A marked feature of Lincrusta "Pallas" and Lincrusta "Walton" is the large collection of patterns intended for wainscotings, many of the styles running horizontally, and as wide as forty-two inches; which, in combination with an eighteen inch section, also supplied to match, gives a five foot width.

Wood Effects.

The effects of carved woods with the natural grain and finish, is a feature of the wainscoting designs.

Designs.

Many designs are shown in correct reproductions of the Gothic, Romanesque, Rococo, Adams or Morris periods, and in various modern original combinations.

Colors.

Lincrusta "Pallas" and Lincrusta "Walton" are supplied in natural buffs, browns, grays, cream white, greens, and reds. Any other shade can be made to order. Colors are solid throughout, not surface shades only. They will be shown decorated in ivory, and in metallic or leather effects, ready for immediate application.

Decorators often desire to finish the Lincrusta "Pallas" and Lincrusta "Walton" on the wall to tone with the environment, as they lend themselves to any color scheme.

Adaptability.

Owing to their durability, Lincrusta "Pallas" and Lincrusta "Walton" are the finest and most economical decorative materials known for foyers, hallways, cafés, hotels, and apartment houses, or for any public rooms where permanence is essential.

Lincrusta "Pallas" and Lincrusta "Walton" are made in designs suited to the decoration of walls and ceilings in private residences; also in tile effects, plain and enameled, for bathrooms and kitchens.

For ornamenting the walls of theaters and assembly halls, they are more attractive and serviceable than any other form of decoration.

Lincrusta "Pallas" and Lincrusta "Walton" resist dampness and are unequaled as decorative mediums for the cabins, smoking or dining rooms of steamships or yachts, or for any place where moisture injures ordinary fabrics.

Durability.

Lincrusta "Pallas" and Lincrusta "Walton" do not fade, and they can be changed in color, or can be decorated in several tints at any time, to suit individual taste or any new style of interior treatment. They are practically indestructible, and once they are properly applied, will last as long as the building.

They never crack, and they cover permanently all cracks in plaster walls of old or new buildings.

They are of solid relief, and elastic, and are not injured by blows or pressure.

Pliability.

Lincrusta "Pallas" and Lincrusta "Walton" are noted throughout the world for their extreme and lasting pliability.

They are made of the finest materials obtainable, and are easily applied to any smooth surface, adapting themselves to any angle or curve.

Facilities.

The LINCRUSTA WORKS "PALLAS," INC., are the largest manufacturers of Lincrusta in the world, and the only manufacturers of Lincrusta "Walton" in the United States.

Catalogue and Samples.

Catalogue of our complete line, and samples of materials sent free of charge on request.

Exhibit and Co-operation.

Architects, Builders and Decorators are invited to visit our salesrooms in New York City, Chicago, and Philadelphia, or to correspond with us relative to any work they have on hand.

A complete line of samples is exhibited at the rooms of the Architects Samples Co., Inc., 101 Park Avenue, New York, N. Y.

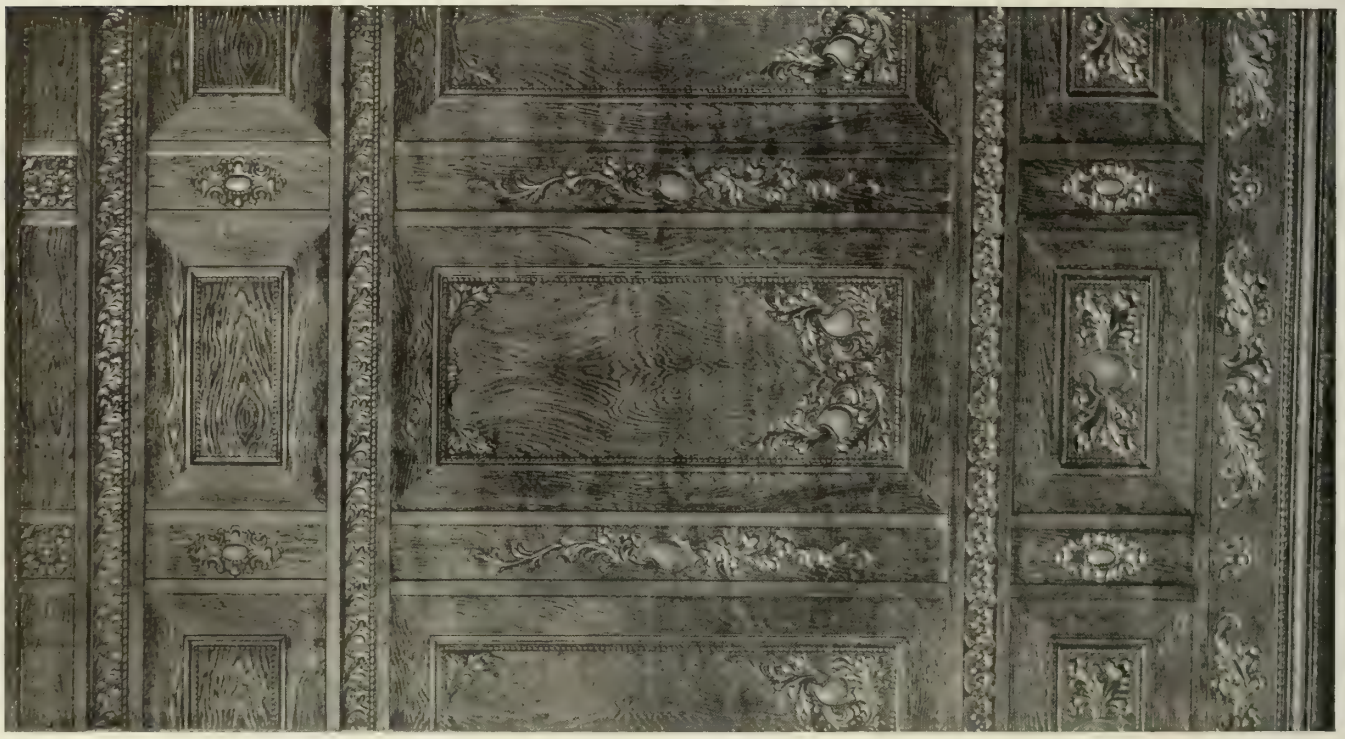
Continued on next page

SECTIONAL WAINSCOTING Nos. 298-299-300. TOTAL HEIGHT 60 INCHES. EACH SECTION 19¾ INCHES

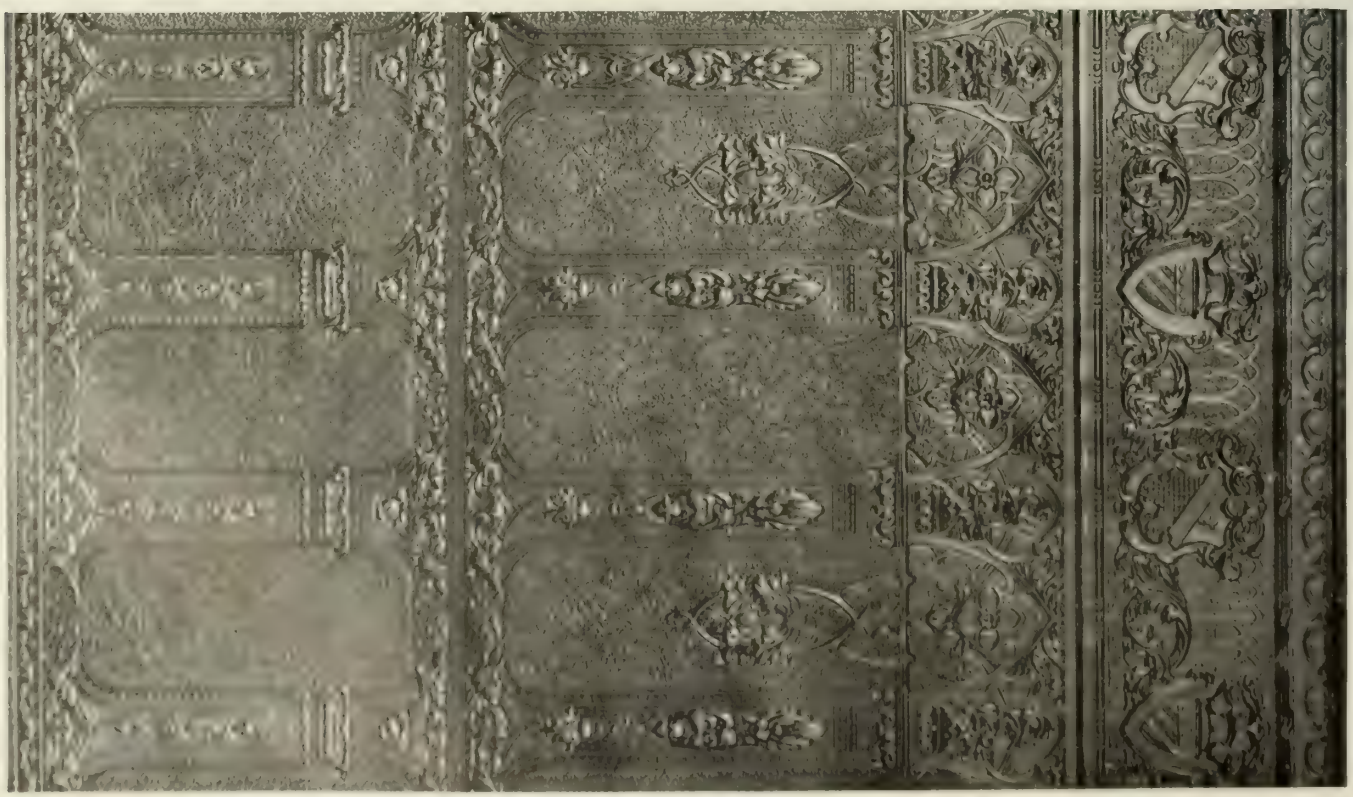
No. 337
19¼"

No. 336
20"

No. 335
19¼"



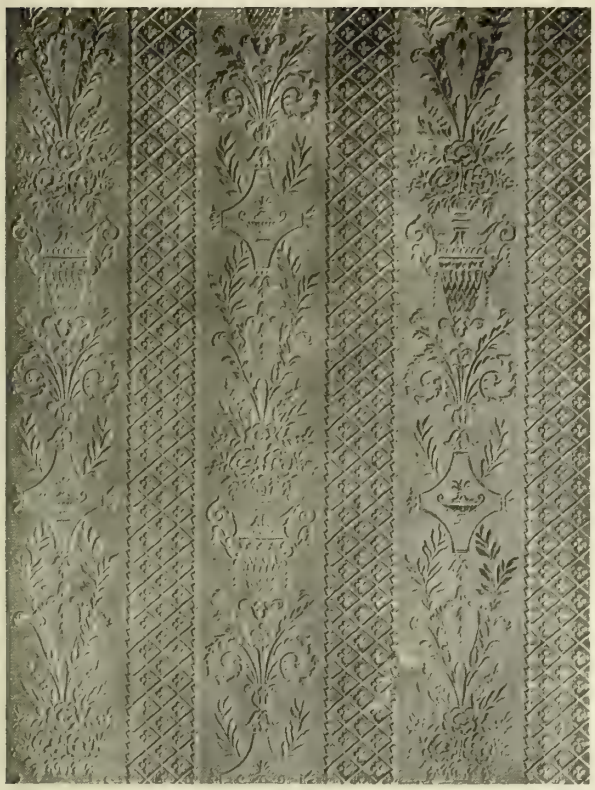
SECTIONAL WAINSCOTING Nos. 335-336-337. TOTAL HEIGHT 70 INCHES



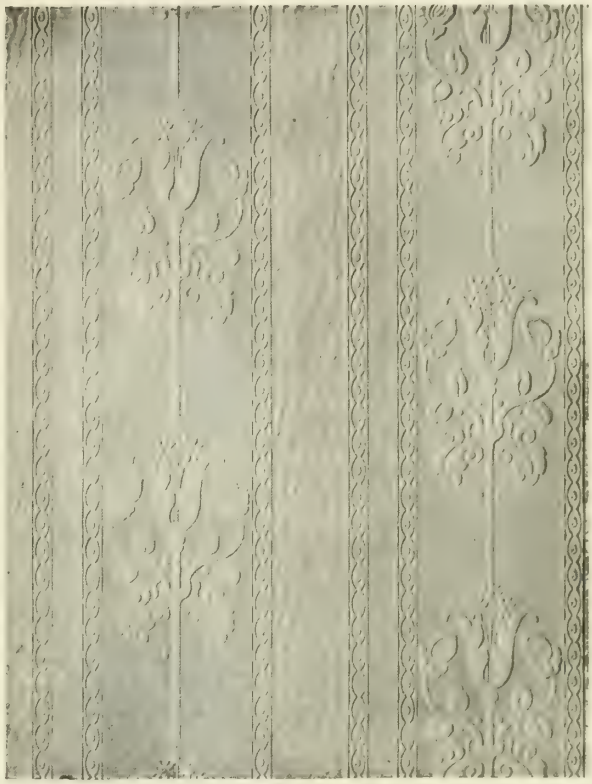
SECTIONAL WAINSCOTING Nos. [illegible]. TOTAL HEIGHT 40 INCHES

No. 124
19¼"

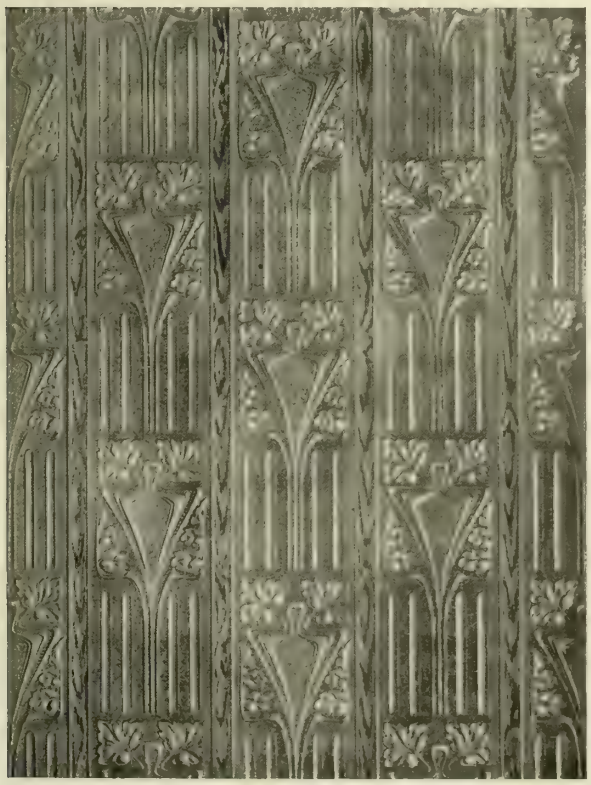
Continued on next page



PATTERN No. 332. 19¾" WIDE



PATTERN No. 477. 19¾" WIDE



PATTERN No. 535. 19¾" WIDE

PATTERN No. 282. 19¾" WIDE

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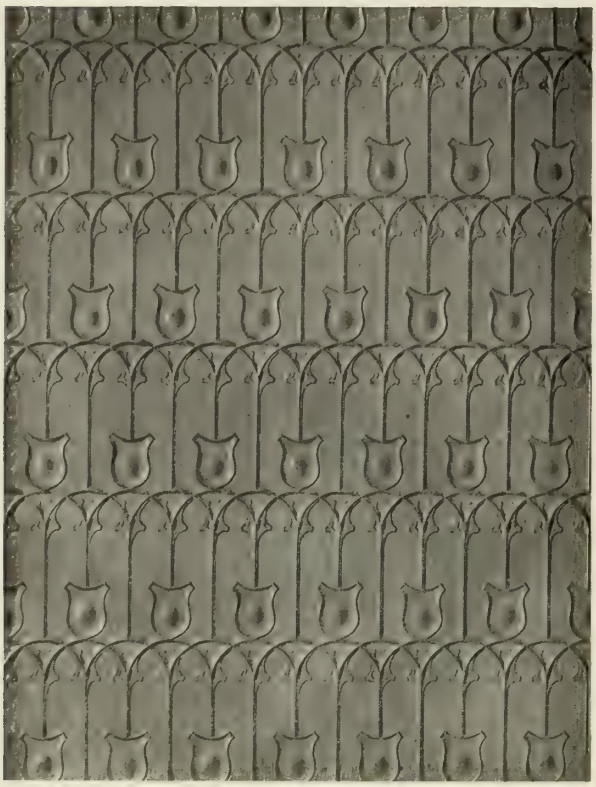
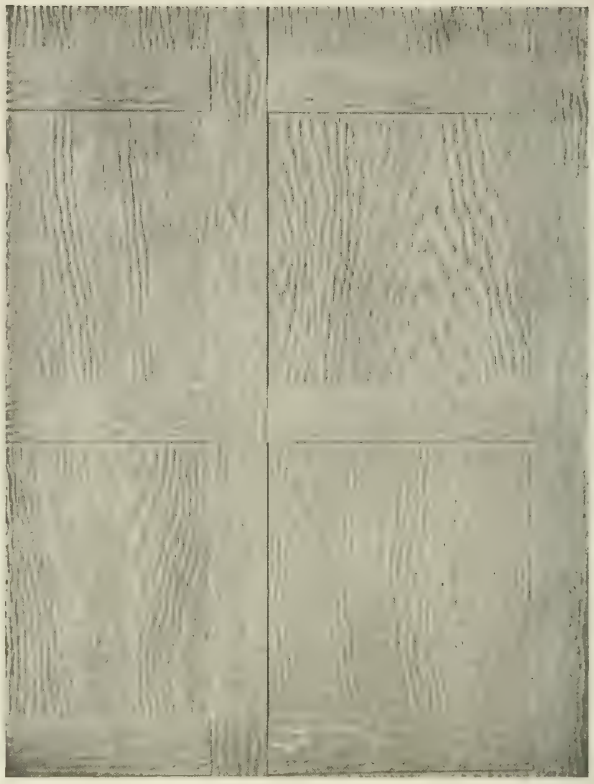
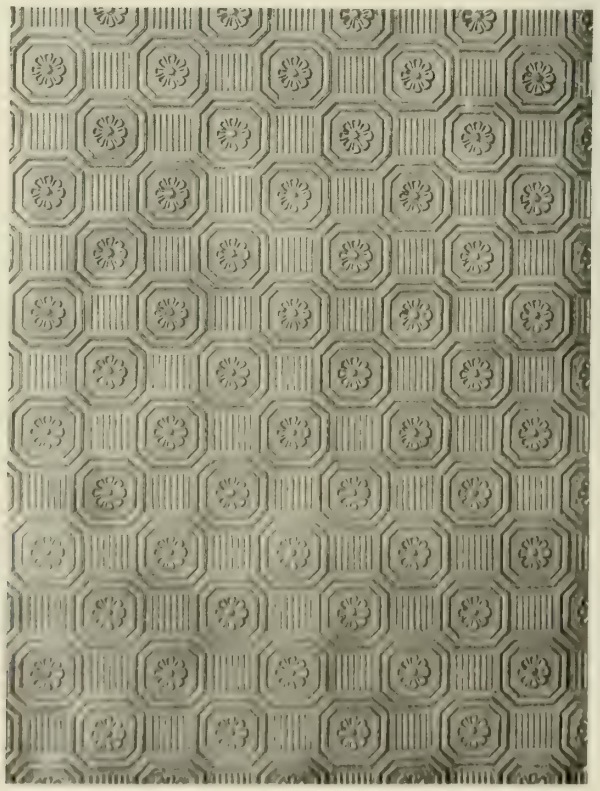


PATTERN No. 593. 19¾" WIDE



PATTERN No. 319. 19¾" WIDE

PATTERN No. [illegible] 19¾" WIDE. [illegible] HORIZONTAL



PATTERN No. 476. 19¾" WIDE

RICHTER MANUFACTURING CO.

MANUFACTURERS OF

Tapestrolea Treatments of Burlap, Canvases, Etc.

MAIN OFFICE AND WORKS

TENAFLY, N. J.

SALESROOMS: NEW YORK, N. Y., 131 East 23rd Street

Products.

BURLAP, Sized (Tapestrolea)
BURLAP, Soft
BUCKRAM
BUCKRAM, Bookcloths
CANVAS, Artists'—Linen, Jute, and Cotton
CANVAS, Ceiling
CANVAS, Prepared
CANVAS, Decorators'
CHEVIOT
METALLIC FINISHES ON FABRICS
ALUMINUM LEAF WORK
DUTCH METAL WORK
MUSLIN, Prepared
SCREENS, Motion Picture
FIREPROOFING, to order
DYEING

Description.

Tapestrolea is Burlap treated according to our special process, and tinted and stenciled to our own designs or to specifications.

Serviceable Textiles, when finished by us after the Tapestrolea process, make enduring, sanitary and artistic wall and ceiling hangings.

Advantages of Tapestrolea.

Tapestrolea is more durable than wall paper, yet may be hung as readily. When properly hung it will not change in any way, since it has been thoroughly shrunk. The back surface is sized, giving a fine body to the goods and preventing paste from interfering with the front when being hung, or at any time thereafter. Sizing allows the goods to be furnished trimmed, affords a perfect joint and allows Tapestrolea to butt as smoothly and evenly as veneering.

Tapestrolea can be removed and rehung without damage, if the occasion requires it.

Tapestrolea is not subject to cracking, even in new buildings where the walls may settle; the resistance of the textile material is such that the cracks do not come through.

Tapestrolea may be hung plain, and certain finishes may—at any future time—be painted over, and, afterwards, this painted surface may be washed down and thoroughly cleansed without damage to the material.

Application

Artists and decorators will find Tapestrolea fabrics of unique advantage in mural decorations, especially for large effects in churches or theatres.

The application of Tapestrolea is indicated in the home—from living-room to den—by its high artistic values and its enduring qualities.

Infinite variations of decorative treatment are possible and necessary in every house; individual fancies and traits may be widely expressed in furnishings and hangings—in colors and general effects—but simplicity and good taste go hand in hand.

Tapestrolea in its every tint and shade and material possesses both, in combination. If simplicity be the key note of a living room, for instance, a flat wall treatment with Tapestrolea in a plain red or green, tinted or shaded in accord with the lighting facilities is suggested, or Tapestrolea may be applied in its natural color and then painted or stenciled to taste, with or without a frieze.

The entrance hall can be made to harmonize with woodwork and furniture and hangings, by a judicious selection of Tapestrolea.

Widths of Fabrics.

Burlaps, 36 inches to 278 inches.
Linen Canvases, 48 inches to 144 inches.
Burlap Canvases, 36 inches to 278 inches.
Cotton Canvases, 36 inches to 150 inches.

Co-operative Service.

Architects, artists, and builders will be supplied, on request, with liberal samples of the many Tapestrolea materials, together with their prices.

This Company has issued and will send, on request, "Tapestrolea," a descriptive booklet illustrating many stenciled and other effects of Tapestrolea in the home.

H. B. WIGGIN'S SONS CO.

Manufacturers of Fab-Rik-O-Na Woven Wall Coverings

233 Arch Street
BLOOMFIELD, N. J.
BRANCH OFFICE: CHICAGO, ILL., 160 Jackson Boulevard

Products.

Dyed Tapestry Burlaps; Fab-Rik-O-Na Dyed Burlaps with Metallic Effects; Pearl Ko-Na; Kord Ko-Na; Art Ko-Na Cloth; Kraft Ko-Na Cloth; Shadow Ko-Na; Studio Hand-Decorated Friezes and Bands; Fab-Rik-O-Na Interwovens.

Also, the following for Painting or Kalsomining: Shel Ko-Na, Prepared Burlaps, Lining Burlaps, Painted Burlaps, Prepared Canvas, Lining Ko-Na (Muslin), Oil Ko-Na (Muslin), Prepared Sheeting Ko-Na Canvas and Prepared Muslin.

Also, Kling Ko-Na Size for painted or varnished walls, and Ko-Na Colors for dyeing fabrics on wall.

Description.

Dyed Tapestry Burlaps embrace fifty colors, including lustrous and metallic finish, 36 inches wide; the more popular shades made also in 54- and 72-inch widths.

Metallic Surface Effects, regular Fab-Rik-O-Na Dyed Burlaps with metallic surface effects.

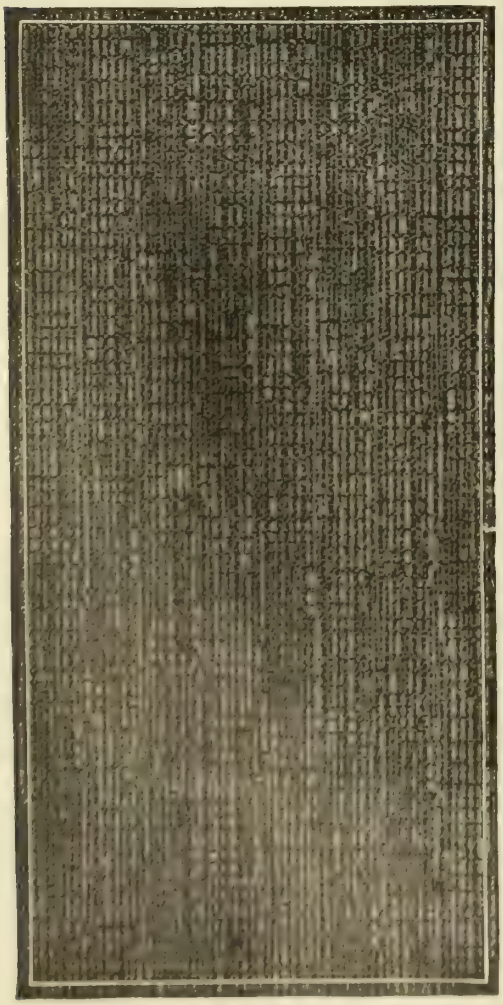
Pearl Ko-Na, a material of bold texture and delicate pastel tones, with silk-like finish, in plain colors and gold-thread effect.

Kord Ko-Na, a Dyed Tapestry Burlap, with unique corded surface effect; 36-inch width only.

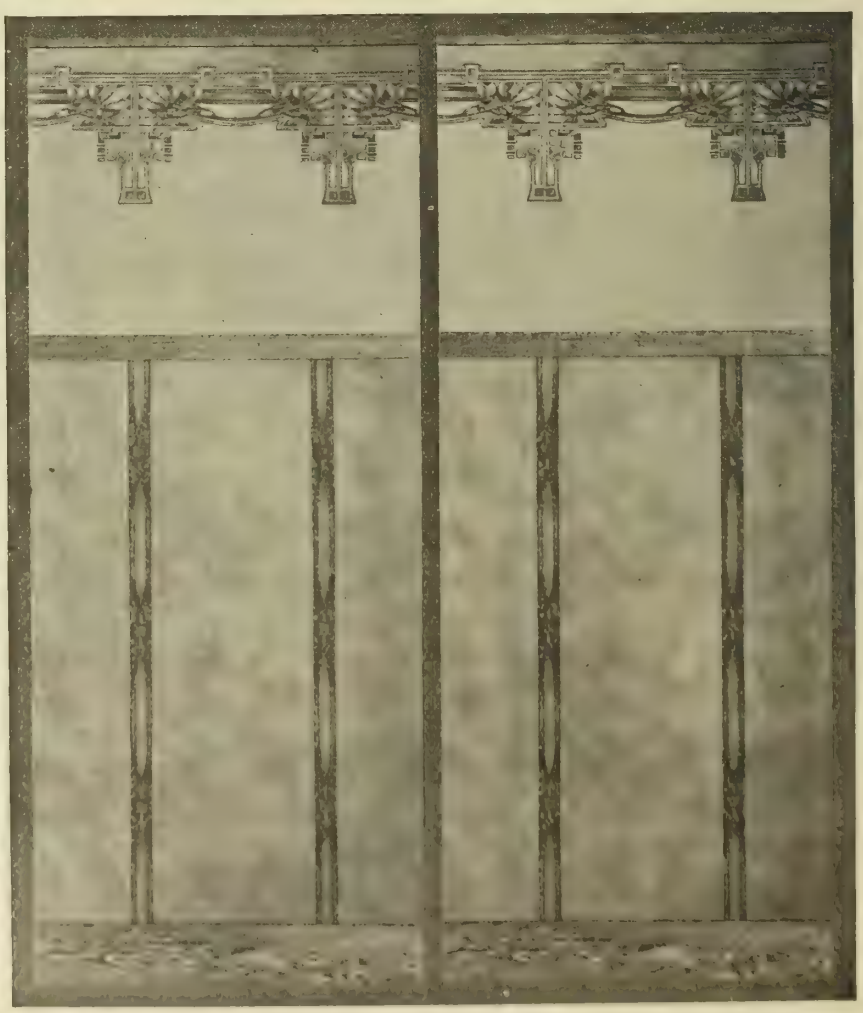
Art Ko-Na Cloth, of fine texture and delicate color tone, including one- and two-tone effects and metallic finish. Made in 36-inch width only.

Kraft Ko-Na Cloth, similar to Art Ko-Na Cloth, but in bolder effects. Made in two tones and metallic finish, in 35-inch widths only.

Shadow Ko-Na, a fabric of rich, soft and artistic shaded appearance, showing a glint of gold on the surface. Made in 36-inch width only.



ART KO-NA CLOTH



STUDIO DESIGNS USED OVER A SHADOW KO-NA BACKGROUND

Continued on next page

Fab-Rik-O-Na Hand-Decorated Friezes and Bands executed on Pearl Ko-Na and Shadow Ko-Na, to be used for upper thirds, friezes, paneling, etc.

Fab-Rik-O-Na Interwovens, a fabric showing a unique cross pattern in the weft threads; 30 inches wide only.

Goods for Painting or Kalsomining.

Shel Ko-Na, 36-, 54-, 72- and 108-inch widths.

Prepared Burlaps, 36-, 54-, 75- and 108-inch widths.

Lining Burlaps, 36-inch width only.

Painted Burlaps, 36-, 48-, 54- and 72-inch widths.

Prepared Canvas, 36-inch width only.

Lining Ko-Na (Muslin), 36-inch width only.

Oil Ko-Na (Muslin), 36-inch width only.

Prepared Sheeting, 82-inch width only.

Ko-Na Canvas, 36-inch width only.

Fab-Rik-O-Na Prepared Muslin, 36-inch width only.

Sizing.

We make Kling-Ko-Na Size for general use. It is invaluable on painted or varnished walls. No paint remover required.

Makes an ideal foundation for paint work on plastered surfaces.

Ko-Na Colors.

Ko-Na Colors are the best water-colors for redyeing fabrics on the wall. Can be used for restaining Fab-Rik-O-Na Burlaps when they grow dust-dimmed and lusterless, and are used largely for wood staining.

Trade-Mark.

To protect our customers against substitution we print on the back of every yard of 36-inch Fab-Rik-O-Na goods our trade-mark.

See that your specifications call for Fab-Rik-O-Na materials and that the trade-mark is on the goods that are used.

Practical Advantages.

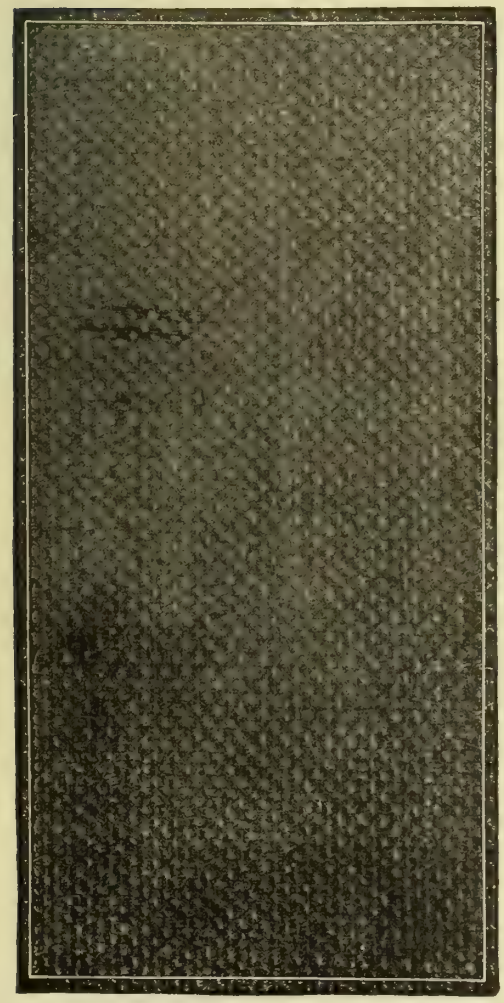
All these goods have the Fab-Rik-O-Na backing, which causes them, when pasted, to adhere firmly to the wall. They are shrunk in manufacture and will not shrink on the wall. The dyed goods are dyed with the fastest colors known. All protect the walls and furnish a durable, beautiful and economical decorative material not to be surpassed at any price.

Claim.

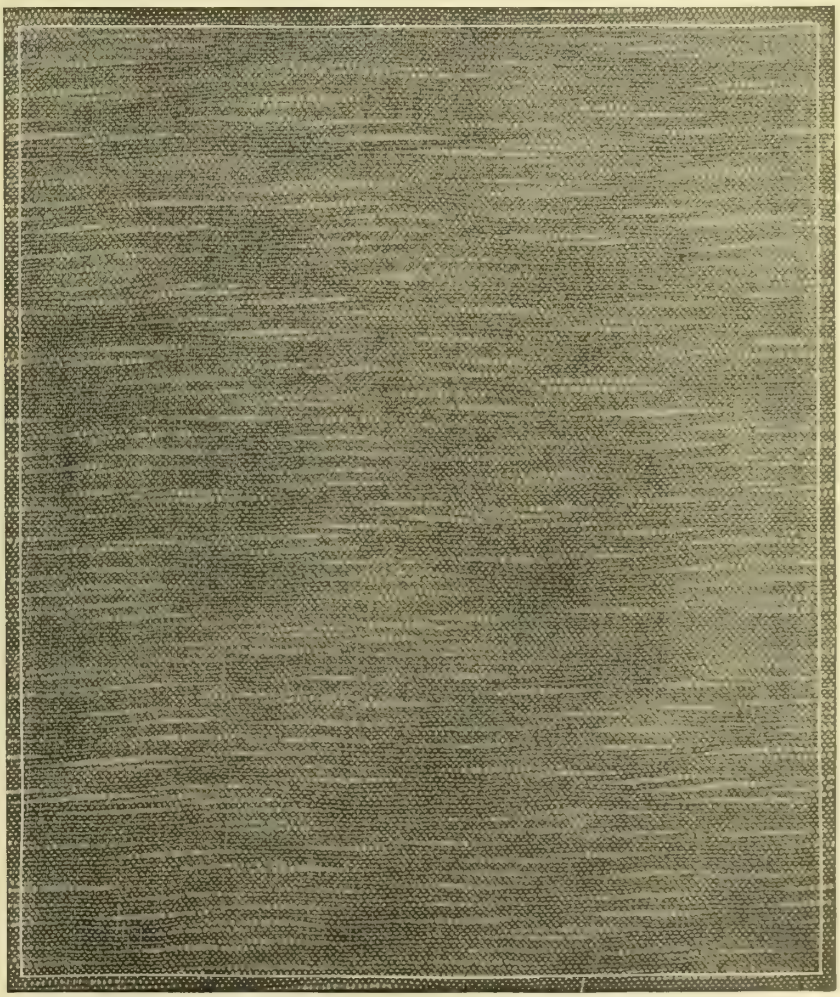
Fab-Rik-O-Na Woven Wall Coverings are the Standard of Quality in fabric, color and workmanship. Colors are fast to sunlight.

Samples, etc.

Samples and information freely furnished.



DYED TAPESTRY BURLAP



FAB-RIK-O-NA INTERWOVENS

THE BEAVER BOARD COMPANIES

Beaver Board, Beaver Board Tile and Beaver Blackboard

CABLE ADDRESS:
"BEAVER, BUFFALO"

ADMINISTRATION OFFICES
BUFFALO, N. Y.

PLANTS
BUFFALO AND BEAVER FALLS, N. Y.
THOROLD AND OTTAWA, ONT., CAN.

BRANCHES

BOSTON, 612 Oliver Building
NEW YORK, 420 Forty-second Street Building
PHILADELPHIA, 1121 Land Title Building
BALTIMORE, 1033 Calvert Building
CLEVELAND, 611 Williamson Building
DETROIT, 1014 Dime Bank Building
INDIANAPOLIS, 522 Merchants Bank Building
CHICAGO, 1303 Lumber Exchange
MINNEAPOLIS, 549-550 Plymouth Building
KANSAS CITY, 302 R. A. Long Building
OMAHA, 1426 Woodmen-of-the-World Building
SAN FRANCISCO, 520 Rialto Building
LOS ANGELES, 529 Van Nuys Building

CANADIAN OFFICES
OTTAWA, CANADA, Beaverdale

EUROPEAN OFFICES
LONDON, W. C., ENG., 4 Southampton Row

Products.

Sole manufacturers of BEAVER BOARD, BEAVER BOARD TILE and BEAVER BLACKBOARD. The largest manufacturers of Wallboard in the world, and the only organization devoted exclusively to its manufacture and controlling every process from forest to finished board.

Beaver Board.

Beaver Board makes better walls and ceilings in certain kinds of construction, supplanting the use of lath and plaster, steel for ceilings and wood sheathing.

What It Is—The careful selection of standing timber is the initial step in the production of Beaver Board—the first requisite being the long, tough fibre peculiar only to white spruce.

Sawed logs of white spruce are shredded to fibrous form, and by a highly developed manufacturing process this pure wood fibre is compressed and built up into strong, light, resilient, four-ply panels about $\frac{3}{16}$-inch thick—dependably uniform.

Sizes—Beaver Board panels come in 32-, 36- and 48-inch widths, and in even foot lengths from 4 to 16 feet.

Strength—Beaver Board offers a resistance of approximately 300 pounds to the square inch to puncture.

Lightness—Beaver Board weighs approximately one half pound to the square foot.

Moisture-Proof—By an exclusive method of fibre treatment and a patented sizing process, Beaver Board is rendered highly resistant to the absorption of moisture—front and back—and as a result is unaffected by climatic conditions or sudden changes in temperature and humidity.

BEAVER BOARD TILE — PURE WOOD FIBRE
BEAVER BOARD — PURE WOOD FIBRE
BEAVER BLACK BOARD — PURE WOOD FIBRE

REGISTERED TRADE-MARKS

Age-Proof—Beaver Board will not crack, chip, crumble nor fall. It never needs repair and does not deteriorate with age.

Elasticity—Shocks, strains and vibrations do not affect Beaver Board. Its elasticity is sufficient to allow for the normal shrinking and swelling of timbers and the gradual settling of buildings.

Heat-, Cold- and Sound-Baffling—The wood fibres in Beaver Board cross and recross in such a way that heat and sound waves meet with great resistance, due to the minute air spaces between the fibres.

Fire-Retarding—Beaver Board is slow burning and usually takes the same insurance rates as lath and plaster.

APPLYING AND DECORATING BEAVER BOARD

Application of Beaver Board.

In new buildings the panels are nailed direct to joists, studding and headers; in remodeling, it is applied over the old material. The surface is then painted (all first-class oil or cold-water paints being used effectively on Beaver Board), and the wood trim is applied over the intersections of the panels according to a preconceived panel design.

Identification.

Beaver Board can always be positively identified by the Beaver Board registered trade-mark, which is printed every thirty-six inches on the back of every Beaver Board panel. Complete instructions for applying Beaver Board are also printed on back of each panel.

Brick or cement walls are prepared to receive Beaver Board by the use of furring strips secured to walls by wood plugs. Under proper application, Beaver Board walls and ceilings can be relied on to remain permanently solid and even.

Specifications.

Specifications for applying Beaver Board, made up in convenient form for the architect's file, will be supplied on request. These specifications are made up as the result of years of experience in wallboard construction.

Continued on next page

EMPRESS HOTEL, MOOSE JAW, SASK.

Public Buildings.

In large dining rooms, churches, theaters, lodge halls and other public buildings, it is much easier to get the desired decorative effects with Beaver Board than with other materials. The surface takes the finest kind of paint decoration—beautiful flat tones, mottled or stippled effects—with a minimum amount of paint and labor. The character of construction invites heavy beaming or any kind of paneling.

SUMMER BUNGALOW, ELMA, N. Y.

Summer Bungalows.

Above is a living room in a novel bungalow, Green & Wicks, of Buffalo, architects. Beaver Board was nailed on the outside of the studding and then covered with inch-thick yellow pine siding in clapboard fashion. Dressed studding was used and stained a grass green. The Beaver Board was painted a rich cream color. The idea has many possibilities for summer bungalow construction.

LIVING ROOM IN ROHRHEIMER COUNTRY HOME NEAR CLEVELAND, OHIO
DERCUM & BEER, Architects

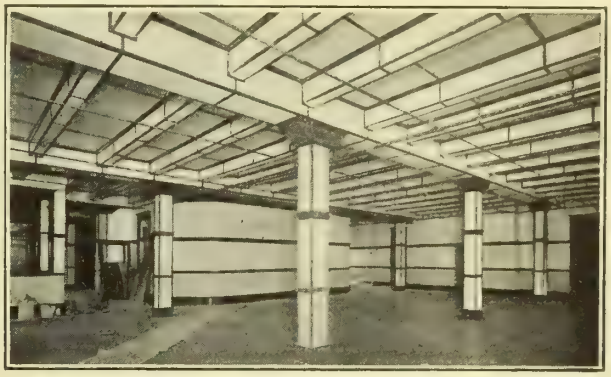
Homes.

Every consideration of convenience, quick construction, durability and good taste urged the adoption of Beaver Board for this $20,000 country house. Everything had to satisfy the judgment of Mr. Louis Rohrheimer, whose authority on decorating and furnishings is expressed in the Hotels Statler, at Buffalo, Cleveland and Detroit.

TIMOTHY SMITH DRY GOODS STORE, BOSTON, MASS.

Stores.

Beaver Board for the ceilings, from one end of the store to the other. No matter how large an expanse is covered or how constant the jar and vibration, Beaver Board ceilings will stay put. They cannot crack or fall. Beaver Board is light in weight and adds no appreciable load to the building. It is easily fitted to difficult places. Where space is a factor, partitions can be built with but one thickness of Beaver Board.



STEWART SPEEDOMETER WORKS, CHICAGO, ILL.

Factories.

Factories, garages, laundries, machine shops, and other buildings, often left unfinished because of the frailties of plaster, can be made cheerful, clean and light with Beaver Board. It conforms to the shrinking and expansion of timbers and the settling of the building. It is moisture-proof. The dependability of Beaver Board under severe conditions has always been recognized.

BEAVER BOARD TILE WAINSCOT WITH BEAVER BOARD UPPER WALLS AND CEILING

Beaver Board Tile.

Beaver Board Tile is Beaver Board with the surface blocked off by indentations to represent tile. It takes white enamel beautifully, and is as washable, sanitary and permanent as tile. Used wherever washable walls are an advantage, as in kitchens, bathrooms, lavatories, lunch rooms and butcher shops.

CORNELL WOOD PRODUCTS CO.

Manufacturers of Cornell-Wood-Board

Insurance Exchange Building
CHICAGO, ILL.

Products.

CORNELL-WOOD-BOARD, a Pure Wood Fiber Board, for Walls, Ceilings, Partitions, etc.; BLACKBOARD.

Wood-Board.

Cornell-Wood-Board is strong and tough; is a built-up structure of layers of new wood fiber and waterproof cement. It is an ideal heat and cold insulator and sound-deadener. Contains no second-hand or unsanitary material. Every fiber is thoroughly sized in the process of manufacture, and the finished board is surfaced on both sides, making it practically impervious to moisture.

Stock sizes: 32 and 48 inches wide, in even foot lengths, from 6 to 12 feet. Lengths up to 16 feet supplied on special order. Thickness, full $\frac{3}{16}$-inch. 450,000 square feet manufactured daily.

Application—For new work Wood-Board is applied directly to the joists and studding; for repairs, it may be nailed to woodwork through old plaster.

Blackboard.

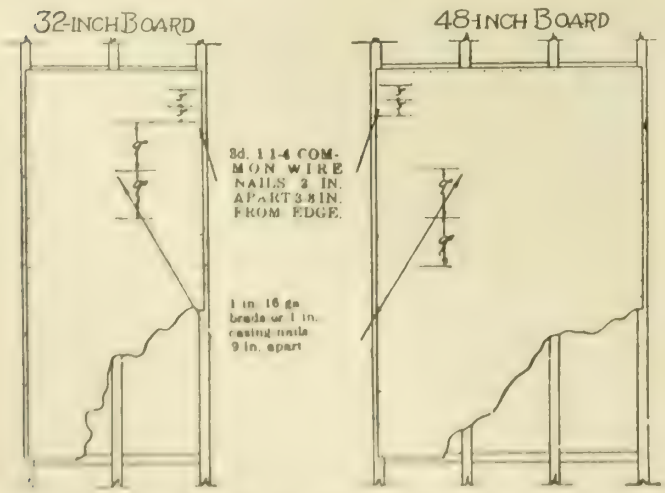
Cornell Board is the only blackboard that is not an assembled product. Ninety-four distinct processes in its manufacture from our forests to the finished product.

Application—Applied on any wall, over lath and plaster, bare studding, rough boards, brick or stone; installed quickly and efficiently. In new building construction use our special, simple and inexpensive moulding, which assures the solidity and rigidity of concrete.

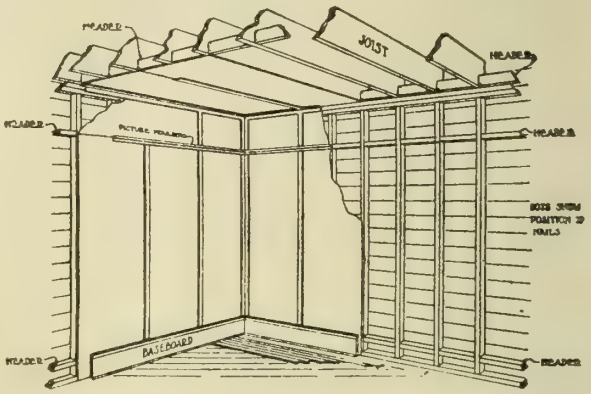
Manufactured in 3, 3½, and 4 feet widths, and in any length up to 12 feet.

Color—Made in two colors, black and green.

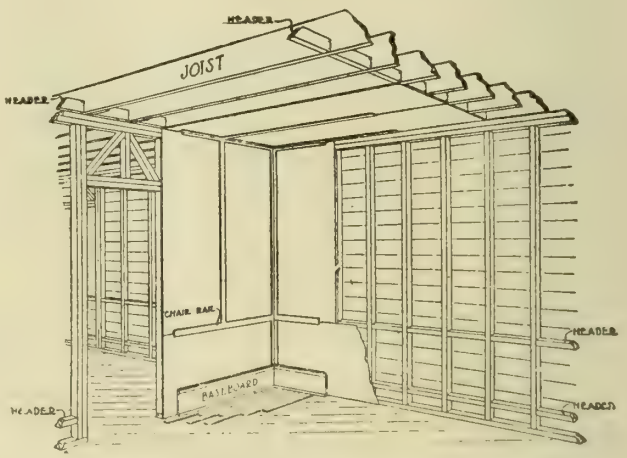
Guarantee—It will last as long as the building stands; will not warp, buckle, crack or chip.



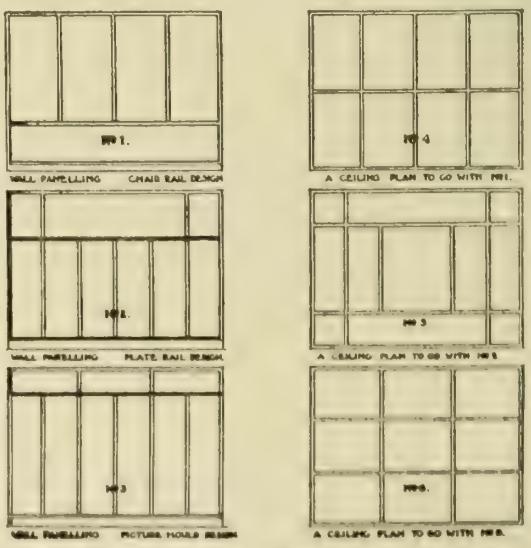
APPLICATION OF CORNELL WOOD BOARD



FRAMING PLAN FOR PICTURE-MOULD DESIGN



FRAMING PLAN FOR CHAIR-RAIL DESIGN



SUGGESTIONS FOR WALL AND CEILING PANELING WITH CORNELL WOOD BOARD

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Over twenty-five hundred Stock Designs, consisting for the most part of reproductions of the finest pieces of architectural decorative art from the Ancient, Medieval and Renaissance periods of Greece, Italy, France, Spain, England and Germany.

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Artificial Stone, Domestic and Imported Marbles, Caen Stone, Keene's Cement and Plaster.

LION STATUES AT ENTRANCE OF CONNECTICUT AVENUE BRIDGE, WASHINGTON, D. C.

TYPE OF SPECIAL WORK DONE BY THE ERKINS STUDIOS

Continued on next page

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Particular attention given to the execution of architects', landscape architects' and decorators' special designs in the above materials, at commercial prices.

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References.

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Pierre J. Cheron, Sculptor, New York, N. Y.
Montrose W. Morris, Architect, New York, N. Y.
George L. McElroy, Decorator, New York, N. Y.
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Walker & Gillette, New York, N. Y.
Hudson County Park Commission, Jersey City, N. J.
Yale & Towne Mfg. Co., Stamford, Conn.
M. Douglas Alexander, Stamford, Conn.
C. Ellison Parker Co., Decorators, Seattle, Wash.
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Mrs. W. W. Cummer, Jackson, Fla.
Prof. Karl Baumgaertel, Lewiston, Idaho
James E. Pitcairn, Builders' Specialties, Pittsburgh, Pa.
The Selden-Breck Construction Co., St. Louis, Mo.
Memphis Symphony Orchestra Association, Memphis, Tenn.
Clarke Waggaman, Architect, Washington, D. C.
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E. C. Lewis, Nashville, Tenn.
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Architectural Terra Cotta; Furniture and Pottery for Garden and Interior Decoration; Flower-Pots, Vases, Pedestals, Urns, Flower-Boxes, Jardinieres, Sundials, Benches, Tables, Statuary, Hermes, Fountains, etc.; Gas Logs; Chimney Caps.

Terra Cotta in Decoration.

The illustrations show some of the possibilities of terra cotta for garden and decorative use. The plasticity of the unburned clay permits a freedom in treatment obtainable in no other material, and to this decorative advantage is added great variety of color. Our standard finish is a stony gray, but other colors can be furnished.

Terra Cotta Catalogue.

An illustrated catalogue, of which the accompanying half-tones are a meager representation, will be mailed on request. Suggestions will also be offered to meet individual requirements or prices quoted on special designs.

Chimney Caps.

Information on this subject is contained in a special circular; but in addition to the stock patterns, special work will be executed at reasonable cost. Regular finish is in a red of medium tone, but other shades of terra cotta can be furnished.

JARS IN GARDEN
Albro & Lindeberg, Architects

No. A-48 No. J-54 No. A-12
CHIMNEY CAPS

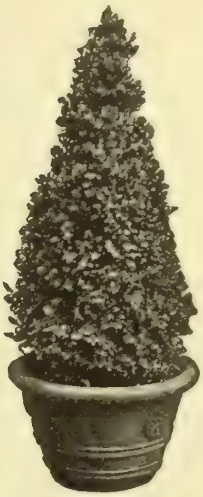
FLOWER-BOXES, HOTEL ADELPHIA, PHILADELPHIA, PA
Horace Trumbauer, Architect

Sweet's Catalogue

Continued on next page

FLOWER-POT

VASES ON TERRACE
CHARLES A. PLATT, Architect



FLOWER-POT

NO. 595. BIRD FONT
46 inches high

NO. 588. SATYR
61 inches high

NO. 589. NYMPH
61 inches high

NO. 278. JAR
36 inches high

NO. 596. VASE
25 inches wide

NO. 622. FRUIT BASKET
18 inches wide

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We execute DECORATIVE ORNAMENTS in STUCCO, FIBROUS PLASTER, WOOD and PLASTER COMPO, PAPIER-MACHÉ and CEMENT, and make a specialty of WOOD CARVING and MODELING.

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We carry a complete line of Stucco Ornaments and details made from exterior and interior composition and weatherproof materials in all styles and sizes.

Imitation Wood Composition is a perfect imitation of the natural wood, showing same grain as in wood, and makes a good substitute for hand carving.

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We are unrivaled in our technical resources for high-class decorative work, are equal to any demand, and are prepared to accept and promptly execute orders of any style and size. We feel assured that we can meet any competition where quality as well as price is considered.

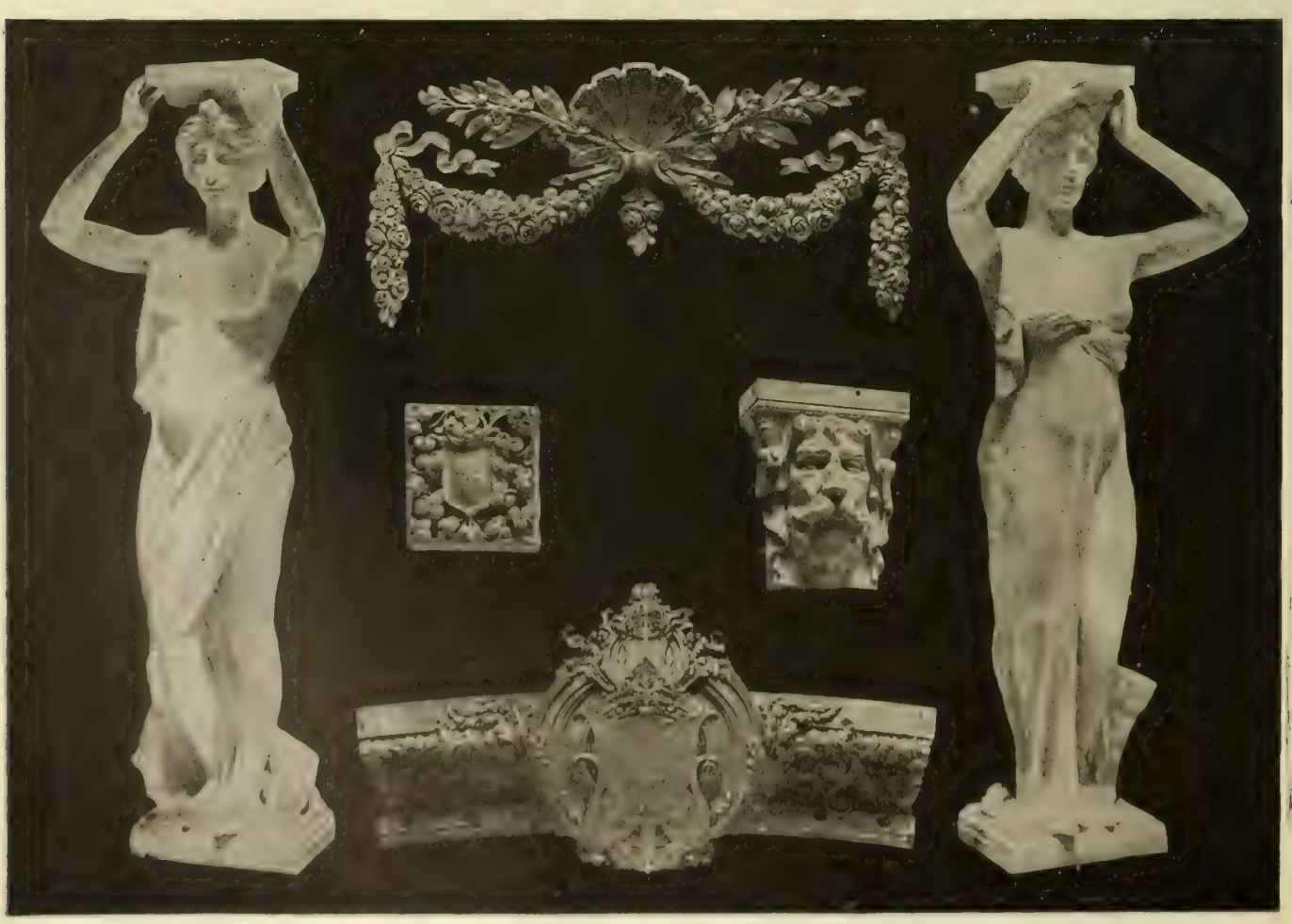
Catalogue.

Careful study has been taken, and neither expense nor sacrifice has been spared to make our Catalogue attractive and interesting as well as instructive, to architects and others.

Co-operative Service.

We are pleased at any time to furnish architects and others with estimates or any other information they desire, and to that end we invite correspondence.

Our complete illustrated Catalogue sent on request.



SOME EXAMPLES OF OUR WORK

ESTABLISHED 1890

FRANK A. SEIFERT PLASTIC RELIEF CO.

Marble Mosaic Floor Tile

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We make ORNAMENTS of every description, such as CORNICES, MOULDINGS, FRIEZES, PANELS, BRACKETS, CAPITALS, etc., in PLASTER, STAFF, COMPOSITION, or in any CEMENT that is in the market, for either Interior or Exterior purposes. Also, MARBLE MOSAIC FLOOR TILE, SANITARY COVE BASE, one-piece STAIR-TREADS and RISERS, and GARDEN and LAWN FURNITURE.

Garden and Lawn Furniture.

We are prepared to execute garden and lawn furniture in cement from special designs. No catalogue.

Marble Mosaic Floor Tile.

They are made of Portland cement and crushed granite or marble chips of the different marbles, and are pressed into eight-inch and twelve-inch square tiles, eleven and one half-inch hexagon and twelve-inch octagon tiles, one inch thick, by a press developing an enormous pressure, which insures a closely united mass that becomes as one. They are made in a plain tile as well as a geometric design.

We also make sanitary cove base, and one-piece stair-tread and riser.

Adaptability—Marble Mosaic Floor Tile can be colored in their making to any color of which Portland cement is possible. Almost any color combination can be secured.

They will outlast a marble floor for the reason that the seams, shakes, flaws, etc., of the natural marble are eliminated in the crushing of the same into chips. They are cheaper than a marble tile.

At the building they are handled, cut when necessary, and laid precisely the same as marble tile.

Prices on application.

Specialty.

We make a specialty of executing work according to architects' and decorators' designs.

Our twenty-five years' experience and hard work in this line have attained for us a reputation among architects and the building industry in general, which we prize most highly, and constantly strive to improve.

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Quality and Workmanship.

Skilled supervision from the selection of the choicest woods to the complete installation in your building.

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Genuine English Oak
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Frick Annex	Pittsburgh, Pa.	D. H. Burnham & Co.
Philadelphia Building	Pittsburgh, Pa.	McClure & Sparr
State Historical Library	Madison, Wis.	Ferry & Clas
Westinghouse Office Building	East Pittsburgh, Pa.	Thos. Rodd
United States Custom House	New York, N. Y.	Cass Gilbert
United States Custom House	San Francisco, Cal.	Eames & Young
St. Louis Public Library, Special Furniture and Bookcases	St. Louis, Mo.	Cass Gilbert
Fort Pitt Hotel	Pittsburgh, Pa.	Janssen & Abbott
Alexandria Hotel	Los Angeles, Cal.	Parkinson & Bergstrom
Copley Plaza Hotel	Boston, Mass.	H. J. Hardenbergh
Utah Hotel (lower rooms)	Salt Lake City, Utah	Parkinson & Bergstrom
Telephone Building	Chicago, Ill	Holabird & Roche
Mandel Bros. Building	Chicago, Ill	Holabird & Roche
International Silver Co., Store Fixtures	Chicago, Ill	
Charles Allis Residence	Milwaukee, Wis.	C. A. Eschweiller
L. J. Petit (President, Wisconsin National Bank), Residence	Milwaukee, Wis.	Ferry & Clas
A. O. Trostel (V. Pres., Albert Trostel & Sons Co.), Residence	Milwaukee, Wis.	F. R. Liebert
Henry Ford (Ford Motor Co.) Residence	Dearborn, Mich.	W. H. Van Tine
Davenport Hotel	Spokane, Wash.	Cutter & Malmgren
J. W. Bettendorf (President Bettendorf Co.)	Bettendorf, Iowa	
John Dupee, Residence	Coronado, Cal.	
Municipal Building	Waterbury, Conn.	Cass Gilbert

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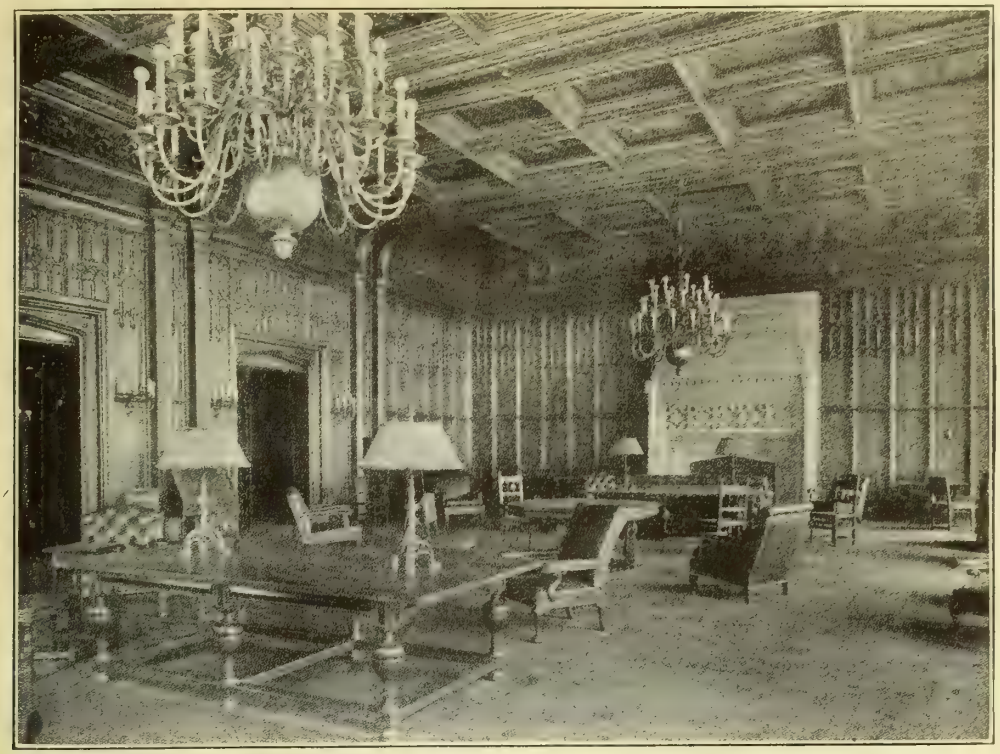

LOUNGING ROOM, SECOND FLOOR, THE UNIVERSITY CLUB, CHICAGO, ILL.
Cabinet Work executed by MATTHEWS BROTHERS MANUFACTURING COMPANY in genuine English Oak

PROMINENT EXAMPLES OF WORK EXECUTED BY US—(Continued)

BUILDING	LOCATION	ARCHITECT
Auditorium Annex, Elizabethan Room, English Oak	Chicago, Ill.	Holabird & Roche
University Club, three lower floors	Chicago, Ill.	Holabird & Roche
Library, H. C. Frick	Pittsburgh, Pa.	F. J. Osterling
J. Ogden Armour, Residence	Lake Forest, Ill.	Arthur Heun
Mrs. Emmons Blaine, Residence	Chicago, Ill.	Shepley, Rutan & Coolidge
J. M. Longyear, 1891, Residence	Marquette, Mich.	D. Fred Charlton
J. M. Longyear, 1905, Residence	Boston, Mass.	D. Fred Charlton
A. R. Peacock (Carnegie Steel Co.), Residence	Pittsburgh, Pa.	Alden & Harlow
W. P. Snyder, Residence	Pittsburgh, Pa.	Geo. S. Orth & Bro.
Col. J. M. Guffy, Residence	Pittsburgh, Pa.	Geo. K. Pearsons
J. D. Oliver (Oliver Chilled Plows), Residence	South Bend, Ind.	Chas. A. Rich
J. H. Moore, Residence	Chicago, Ill.	Jarvis Hunt
R. R. Quay, Residence	Pittsburgh, Pa.	Rutan & Russell
B. F. Jones (Jones & Laughlin Co.), Residence	Pittsburgh, Pa.	Alden & Harlow
Capt. Frederick Pabst, Residence	Milwaukee, Wis.	Ferry & Clas
Col. G. G. Pabst (President, Pabst Brewing Co.), Residence	Milwaukee, Wis.	Ferry & Clas
Security Savings Bank and Building	Los Angeles, Cal.	Parkinson & Bergstrom
Third National Bank	St. Louis, Mo.	Weary & Alford Co.
American National Bank	Indianapolis, Ind.	Weary & Alford Co.
Old National Bank	Spokane, Wash.	D. H. Burnham & Co.
First National Bank	Los Angeles, Cal.	Weary & Alford Co.
Third National Bank	Pittsburgh, Pa.	Weary & Alford Co.
Humboldt Savings Bank	San Francisco, Cal.	Weary & Alford Co.
Minot Building	Boston, Mass.	Parker, Thomas & Rice
Offices Columbian Life Ins. Co.	Boston, Mass.	Parker, Thomas & Rice
James A. Allison (Prest-O-Lite Co.), Residence	Indianapolis, Ind.	Price & McLanahan
Northwestern Mutual Life Insurance Building, Entire Interior Woodwork and Special Furniture	Milwaukee, Wis.	Marshall & Fox
First National Bank Building, Entire Interior Woodwork, Banking Fixtures and Furniture	Milwaukee, Wis.	Graham, Burnham & Co.
First National Bank	Milwaukee, Wis.	D. H. Burnham & Co.
Citizens National Bank	Los Angeles, Cal.	Weary & Alford Co.
San Diego Savings Bank	San Diego, Cal.	Weary & Alford Co.
First National Bank	Pueblo, Col.	Weary & Alford Co.
Wisconsin Hotel	Milwaukee, Wis.	Holabird & Roche
Muehlebach Hotel	Kansas City, Mo.	Holabird & Roche

L. W. FERDINAND & CO.

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20TH CENTURY LINOLEUM GLUE-CEMENT; JEFFERY'S MARINE GLUE and WATERPROOF LIQUID GLUE.

20th Century Linoleum Glue-Cement.

BRAND MARK

We recommend our Grade "A" for attaching any kind of floor covering to any kind of floor. We have never had occasion to qualify this statement; our 20 years' experience in making and selling Linoleum Cement has enabled us to produce an article that fills every requirement.

This cement is a combination of chemicals, with minimum quick drying and maximum toughness as its principal properties.

Directions for Cementing All Kinds of Floor Coverings to All Kinds of Floors.

In cementing Linoleum to the various kinds of floors, it should constantly be borne in mind that the method of applying this material is similar to that of gluing two pieces of wood together with animal glue, viz.:

First, that too much or too little cement should be avoided; if too much is used it will dry out slowly, and if too little it will not hold when dry. Experience will soon show the thickness of the coat necessary to produce the best results.

Second, as with animal glue, it is necessary that the contact should be perfect, that is, that the linoleum should be held tight to the floor during the drying out or setting process. Unless this is attended to carefully, bulges or blisters are liable to occur.

Third, it takes time, and time must be allowed for the cement to harden or set. Forty-eight hours is about the limit of time when the weights can be safely removed. Tenacity and toughness are essential in linoleum cement. A quick drying cement must be brittle and will be sure to produce unsatisfactory results sooner or later.

The linoleum should first be laid on the floor without cementing until all the stretch and roll is taken out of it.

To cement down linoleum, if the very best result is desired, the surfaces of both the floor and the linoleum should receive a fairly heavy coat of cement. Satisfactory results are, however, obtained by coating the floor only with cement and often the seams and edges alone are cemented. Where the surface of the floor is covered with cement, one gallon will lay about 12 square yards; on cement floors, if porous, a little more will be required; if hard and smooth, a little less.

After the cement has been applied and the linoleum laid, roll down thoroughly with a long handled cast iron roller such as is used for lawns. This not only takes the roll out of it, but it is quite an assistance in placing it properly in position. Roll from the center to the edges; this will force out any air which may collect under it and prevent air bubbles or blisters. It is then ready for the weights or uprights. Should any of these blisters be discovered, a small puncture in the linoleum will let out the air; sufficient cement should then be forced into the hole using for the purpose an engineer's oiler with a spring bottom and that spot must be especially weighted to attach it properly.

One of the best methods of weighting is by using sand bags about 50 lbs. in weight, which will conform, to any uneven surface of the floor, or by laying planks and covering them with some heavy substance. These planks should be laid along the edges and seams and not less than 18 inches apart over the entire surface; and can be weighted with cast iron, bricks or any material heavy enough to keep the contact perfect between the linoleum and the floor. The United States Government specifications call for 12 lbs. to the square inch for 48 hours at a temperature of 70° F.

Send for Booklet with complete directions for use.

References.

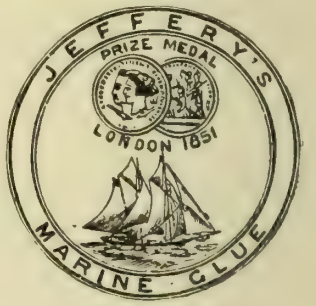
Adopted and specified by the United States Government and used in numberless Custom Houses and Post Offices through the country, as well as in Institutions, Colleges, etc. Recently supplied to the Universities of Wisconsin, Michigan and Minnesota, also to Wellesley College.

Jeffery's Marine Glue.

The purposes for which the various grades of Marine Glue are intended are detailed below:

For Deck and Hull Seams of yachts and motor boats, use No. 1 Extra Quality Black, White, Yellow or Mahogany colors. Give Black the preference, as it is more elastic and satisfactory in every way.

For ship's deck, use No. 2 First Quality Ship Glue or No. 3 Special Navy Glue.



TRADE-MARK

For Waterproofing Canvas for covering decks, roofs, tops of cabins, canvas boats, canoes and flying boats, use No. 7 Soft Quality Black, White or Yellow. It not only waterproofs the canvas, but attaches it to the wood and, with a coat of paint once a year, will last as long as the boat.

All the above put up in 1-, 2-, 3- and 5-lb. cans; also in 14-, 28-, 56- and 112-lb. boxes, of either tin or wood.

NOTE—Insist on having the *right* kind, if you hope to have satisfactory results.

They are carried in stock by the foremost dealers everywhere.

New booklet, "Marine Glue, what to use and how to use," sent on request.

BRAND MARK

Jeffery's Waterproof Liquid Glue.

This glue is used for the same purpose as No. 7 Soft Quality.

It is ready for use and needs no heating. Simply open the can and paint it on, like ready mixed paint.

Especially recommended for diagonal planking and for waterproofing the canvas covering of flying boats and for wing surfaces.

This glue will also attach canvas, cork, felt, rubber, leather and linoleum to steel, iron or wood.

BRAND MARK

THE GREENWICH LINOLEUM COMPANY

133 Fifth Avenue

TELEPHONE, GRAMERCY 2723 NEW YORK, N. Y.

SOLE SELLING AGENTS FOR

THE GREENWICH INLAID LINOLEUM COMPANY, LIMITED

Product.

GREENWICH INLAID LINOLEUM (Frederick Walton's new Patents).

Description.

The Greenwich Inlaid Linoleum is made in England, on machines invented by Frederick Walton, who is the originator of linoleum.

Greenwich Linoleum designs are perfect reproductions of mosaics.

Designs and Colors.

Greenwich Linoleum is made in a variety of designs and colors in Tile, Scroll and Parquet effects.

The colors of Greenwich Inlaid Linoleum go right through to the backing, thus ensuring the pattern being preserved and not wearing off.

Sizes.

Greenwich Inlaid Linoleum is made in a uniform width of 6 feet and in rolls measuring 25 yards in length.

Advantages.

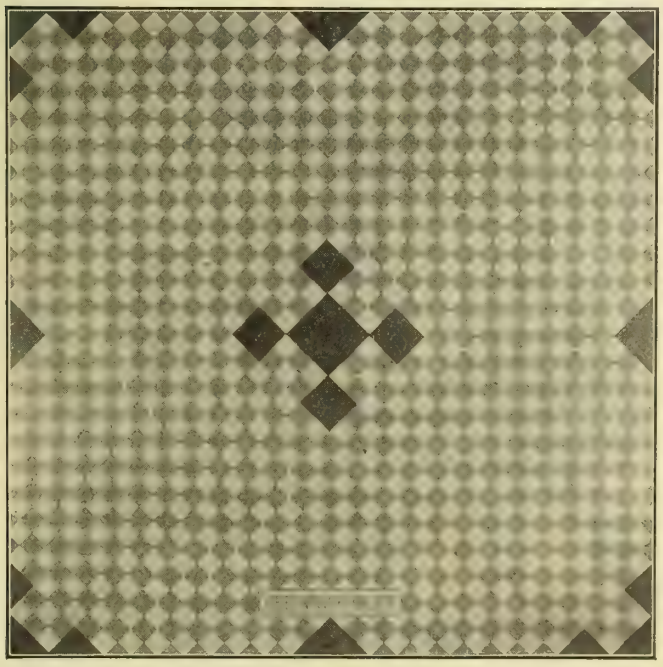
This is the most economical of inlaid linoleums—easiest to fit, wears like leather, and never looks shabby. It is sanitary, without objectionable odor, and is unaffected by climatic conditions when laid.

Field of Usefulness.

For the Home, the Office or Store; Churches, Hospitals, and other public buildings. Can be applied to concrete as well as to wood floors.

Distribution.

Large stocks are held by reputable dealers throughout the country, whose names can be obtained on application to THE GREENWICH LINOLEUM COMPANY, 133 Fifth Avenue, New York City.



PATTERN NO. 57

PATTERN NO. 74

THE IMPORT & BY-PRODUCTS CO., INC.

Manufacturers of "Hold-Tite" Linoleum Cement

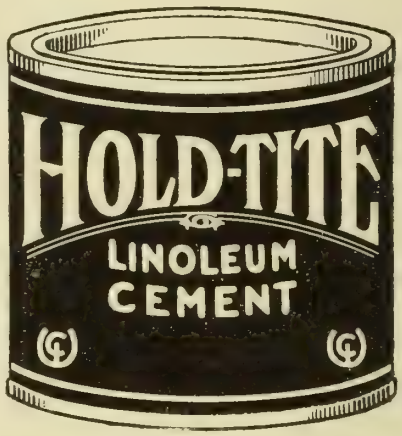
11 Broadway

NEW YORK, N. Y.

Product.

"Hold-Tite" Linoleum Cement.

TRADE-MARK



CAN OF "HOLD-TITE"

Use.

Linoleum Cement is used to fasten linoleum securely to the floor to prevent it from buckling, and to prevent wash water from getting underneath the seams and rotting the burlap back. Its use increases the life of linoleum many years.

Application.

The best method is to cement the entire back of surface of the linoleum solid to the floor, as when only the seams and edges are cemented the linoleum is not protected from buckling where no cement has been used.

How to Use.

On Wooden Floors—Apply the cement on the back of the goods at all seams and edges. This can be done with either a common brush or stick. Then brad with headless brads so that the goods will be held down tight until the cement hardens. The brads will not show.

On Iron, Steel or Concrete Floors—Apply the cement on the entire back of the goods and also on the floor at all seams and edges, so that when goods are pressed down the two cement surfaces come together, and then place weights on the seams and edges to hold the goods down until the cement hardens. These weights can be put on at night and taken off the next morning.

Should our cement become thick from exposure to the air, thin with alcohol.

Quantity Required.

It requires approximately one gallon for every ten to twelve square yards to cement linoleum solid to floor, and one gallon to every twenty to twenty-five square yards where only the seams and edges are cemented.

PRICE F. O. B. NEW YORK, N. Y.

Gallon cans	$1.30
Five-gallon cans	6.25
Ten-gallon cans	12.25
Barrels (about 50 gallons), per gal.	.90

As prices change slightly from time to time we suggest use of above quotations for estimate only. Write for firm quotations.

Form of Specification.

After the linoleum or cork carpet has been fitted to the floor and allowed to lay for a week to ten days, so that the buckling is over, apply the cement to the back of the linoleum and place on weights to hold down while the cement is drying. Twelve hours is usually sufficient time to allow the weights to remain, as the cement will then have set sufficiently to hold.

Testimonial.

Trenton, N. J.,
April 11, 1914.

Dear Sirs:

Careful tests of your Hold-Tite Linoleum Cement simply bear out our contention that all Linoleums should be cemented to prevent water rot, decay and buckling.

We recommend cementing solid to the floor; but even if the seams and edges only are cemented, and the cement properly applied according to your direction, years of wear will be added to the life of the Linoleum.

We are at all times glad to hear of the increased use of Hold Tite Linoleum Cement.

Yours truly,

Standard Inlaid Mfg. Co.
(Signed) Samuel Haverstick,
Secretary.

THOMAS POTTER, SONS & CO., INC.

Manufacturers of Oil Cloth and Linoleum

ESTABLISHED 1837

EXECUTIVE OFFICES AND PLANT
2nd Street and Erie Avenue
PHILADELPHIA, PA.

BRANCH OFFICES
NEW YORK, N. Y., 25 Madison Avenue
CHICAGO, ILL., 230 South La Salle Street
ST. LOUIS, MO., Columbia Building
CINCINNATI, OHIO, Mercantile Library Building

Products.

Battleship, Plain and Printed Linoleums; Straight Line and Granulated Inlaid Linoleums; Cork Carpet; Floor Oil Cloth and Rugs—all on burlap foundations.

Table, Shelf and Stair Oil Cloth; Enameled Oil Cloth for Upholstery and Carriage Purposes—all on cotton foundations.

TRADE-MARK

Description.

Potter's Linoleum is made of Spanish cork, oxidized American linseed oil, the best grades of driers, gums and unadulterated pigments. It is odorless, impervious to water, fireproof and being absolutely sanitary commends itself for use in hospitals where this feature is of first importance. (Note reference list.)

Colors and Sizes.

It is made in brown, green, and terra cotta (other colors on request), in all needed commercial widths, and in rolls thirty yards long.

Government Standard of Thicknesses

Heavy Battleship	6.35 mm.
Medium Battleship	4.76 mm.
Light Linoleum	3.60 mm.

Commercial Standard of Thicknesses

Heavy Battleship	6.00 mm.
Medium	4.60 mm.
"A" grade Linoleum	3.60 mm.
"B" grade Linoleum	3.00 mm.
"C" grade Linoleum	2.40 mm.

Specifications.

For the convenience of Architects and others interested, we print here the latest United States Navy Department Specifications under date of October 1, 1914—29 Li b.

(1) *Material and Seasoning*—To be manufactured from the best grades of linseed oil, driers, gums, cork, and coloring matter. An admixture of wood flour is not objectionable, provided that the requirements of these specifications are met. It shall be thoroughly seasoned before being offered for inspection or before being shipped.

(2) *Uniformity of color and grain*—Surface cleanly and freshly cut at an angle of about 45 degrees shall show no material difference in color or grain between the outer edges and the center. To be of terra cotta, red ground body throughout.

(3) *Cork*—The cork shall be clean, thoroughly ground, and of such size that when ready for use it will pass through a screen not coarser than 22 mesh.

(4) *Burlap Backing*—The linoleum compound to be provided with a burlap backing, of the best quality of hard-spun yarn weighing not less than 8 ounces nor more than 11 ounces per 36 inches by 40 inches. The burlap to be deeply embedded and keyed to the cork compound so as to be partially concealed in same. The burlap shall not be painted.

Heavy Linoleum

(5) To have a thickness, measured over the burlap by a ratchet micrometer, of not less than 0.243 inch nor more than 0.265 inch. The weight per square yard shall be not less than 9½ pounds.

Medium Linoleum

(6) To have a thickness, measured over the burlap by a ratchet micrometer, of not less than 0.185 inch nor more than 0.201 inch. The weight per square yard shall be not less than 7 pounds.

Light Linoleum

(7) To have a thickness, measured over the burlap by a ratchet micrometer, of not less than 0.126 inch nor more than 0.142 inch. The weight per square yard shall not be less than 5 pounds.

Tests for Quality

(8) Linoleum shall withstand the following tests after it has been kept at a temperature of about 70 degrees Fahr. for a sufficient length of time, so that the whole body of the linoleum has reached this temperature.

Bending Test—(a) A strip 2-inch wide with burlap on inside of curve shall bend, without the slightest signs of cracking, around a bar 3 inches in diameter for heavy, 2½ inches in diameter for medium and 2 inches in diameter for light-weight linoleum. At least one strip shall be cut longitudinally and one transversely of the roll.

Indentation Test—(b) A pressure of 80 pounds applied for 60 seconds on a flat-ended ¼-inch square steel bar, with edges rounded to prevent cutting, shall not break the surface nor make any permanent indentation in the surface of the linoleum.

Burlap Test—(c) Two-inch strips of linoleum shall be taken, one in the direction of warp and one in the direction of filling, and broken about 1 inch from the end, by cutting part way through from the face and bending back. The burlap backing shall then be stripped slowly from the remainder of

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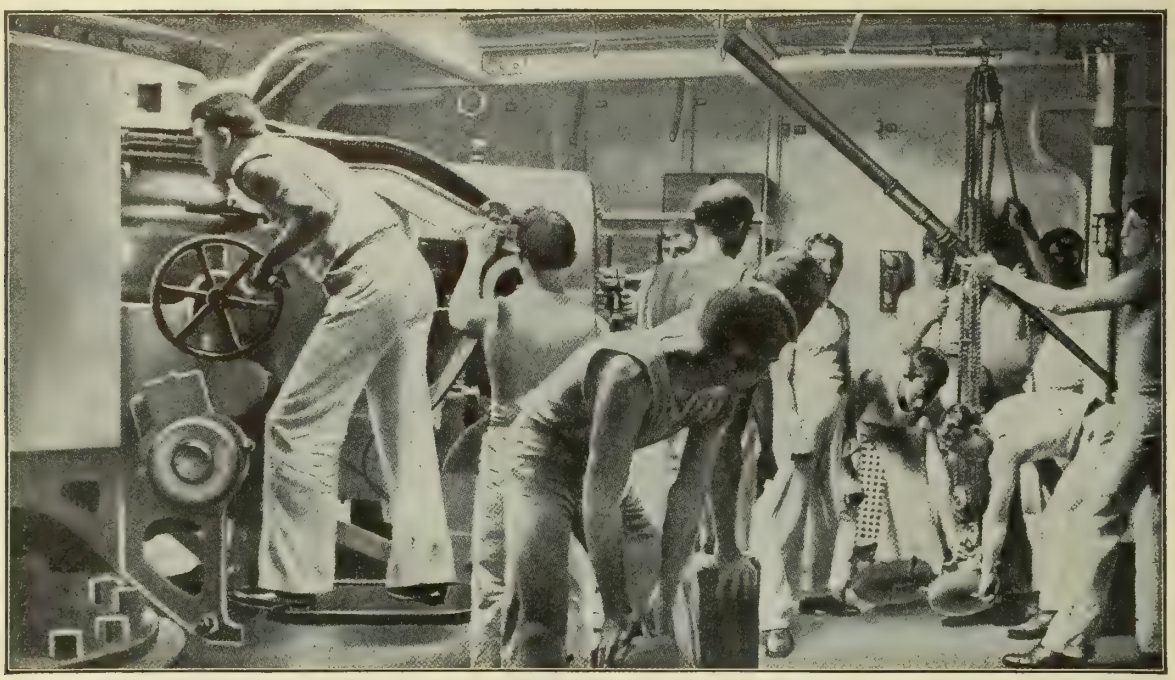


TURRET ROOM ON BOARD BATTLESHIP, FLOOR OF WHICH IS COVERED WITH POTTER'S LINOLEUM
Shows severe usage to which it is subjected

the test pieces by pulling at right angles to the back. The average pull required shall not be less than 6 pounds.

Absorption Test—(d) A sample 6 by 3 inches, prepared by removing backing and sandpapering the rough surface from which the backing is removed until the surface is absolutely smooth, will be weighed and then submerged for 24 hours in fresh water at a temperature of 70 degrees Fahr. The sample at the end of this period will be removed from the water and the surfaces, including edges, dried between blotter or filter paper. At the end of two minutes from the time the test piece has been removed from the water it shall be weighed again. The increase of weight shall not be more than that indicated in the following table:

LINOLEUM	Allowable Increase of Weight per cent
Heavy	3½
Medium	5½
Light	7½

Drying Test—(e) A piece of linoleum, but with backing removed, must not lose more than 3 per cent of its weight after being heated to 212 degrees Fahr. for 2 hours.

(9) *Number of Tests*—(a) When inspected at the factory, at least one complete set of tests, as described in paragraph 8 (a), (b), (c), (d) and (e), shall be made on each lot. See also paragraph 9 (c).

(b) For the purpose of paragraph 9 (a), a lot is defined as materials submitted for inspection at the same time, made of the same quality and proportions of cement, cork and coloring matter, calendered and seasoned at the same time and under the same conditions.

(c) In no case, except the delivery of a single roll, shall less than two sets of tests be made.

Straight Line Inlaid Linoleum.

This material is made to closely imitate tiling, the colors of which are part of the composition and go through to the burlap foundation, and has none of the objectionable features of a hard, rigid tile. It is elastic and noiseless to walk upon, in addition to being indestructible to ordinary wear.

Under our special process of manufacturing the composition, Potter's Straight Line Inlaid is impervious to moisture, and as a result is a perfect sanitary floor covering. To-day it is specified in a great many cities for use in their public buildings.

It has proven by actual test of real service to be the best wearing material for stores, restaurants, hallways and office buildings; also railroad stations and the floors of railroad cars.

Cork Carpet.

This product, owing to its resiliency and softness of tread, is especially adapted for floor coverings in libraries, telephone booths, and all other places where quiet is particularly desired.

We manufacture this in but one thickness (6.50 millimeters), seventy-two inches wide, thirty yards to the roll, and in any solid colors desired.

Guarantee.

All of our products, intended for Government use, are guaranteed to comply with the United States Navy Department specifications, as hereinbefore given. Our Attitude in this respect is clearly shown by that portion of a letter to one of our customers, which we quote:

November 30, 1914.

" * * * In all cases where we undertake to supply you goods for Government use, we will guarantee that the goods will be up to standard, and will be accepted on these lines, or if rejected by the Government, through not passing the test, we will take the goods back provided these goods have not been cut or laid

"Yours very truly,

"THOMAS POTTER, SONS & CO., INC."

Potter's Carpet

Continued on next page

Laying Heavy Linoleum.

The best results are obtained by applying a good linoleum cement to the entire surfaces of both the floor and the under side of linoleum. Lay the linoleum, and roll from center to edges with a heavy roller similar to those used for lawns. This will force out any air and prevent bubbles or blisters. Then place weights on the linoleum; after which, should any blisters appear, a small puncture in the linoleum will let out the air. Cement should then be forced into the hole, using for this purpose an engineer's oiler with a spring bottom, and that spot especially weighted. Linoleum laid in this way will neither stretch, buckle, nor crack. If, however, the question of first cost is a factor, a satisfactory result may be had by cementing only the seams and edges; but by this method it is necessary that the linoleum, after being fitted, be left on the floor several days before fastening down, to allow for stretching. Below we give two forms of specifications which may be used:

Specification for Laying Linoleum.

Cementing entire Under Surface—Linoleum to be thoroughly heated to at least 70 degrees Fahr. before unrolling. Floor to be absolutely clean, and free from dirt, tacks, nails, or any uneven board. Cut and fit linoleum to floor, leaving small margin on all sides and between pieces to allow for stretch. Apply with a brush any good "Linoleum Cement" to both the floor and under-side of the linoleum, using not less than one gallon to every ten square yards. Lay linoleum, and roll down thoroughly from center to edges. Weights of not less than twelve pound pressure to the square inch to be placed on linoleum, and to remain not less than 24 or more than 48 hours. Puncture linoleum wherever air bubbles or blisters appear. Fill the hole with cement and place a weight directly over puncture.

Cementing only the Edges and Joints—Linoleum to be thoroughly heated to at least 70 degrees Fahr. before unrolling. Floor to be absolutely clean, and free from dirt, tacks, nails, or any uneven board. Cut and fit linoleum to floor, leaving small margin on all sides and between pieces to allow for stretch. Linoleum to remain on floor unfastened for at least 48 hours, during which time, should it show signs of buckling, trim at once wherever it is binding. When thoroughly stretched, apply to the floor a thin even coat of cement (not less than one gallon to 12 square yards) extending at least two inches under all edges of the linoleum. Brad down with finishing nails, and place weight of not less than 12 pounds to the square inch over cemented portions, which weights are to remain not less than 12 nor more than 24 hours.

Method of Weighting.

The best method of weighting is by laying planks not less than eighteen inches apart over the entire surface, pressing them down by uprights wedged as hard as possible between the ceilings and the planks. Where this is impracticable, the planks can be weighted with cast iron, bricks, sand bags, or any material heavy enough to give the required pressure.

Linoleum Cement Defined.

Linoleum cement is a combination of chemicals which produces a liquid glue or cement with minimum quick drying and maximum toughness as its principal properties.

Samples.

Designs, quality samples and prices furnished on request to our Philadelphia or New York offices.

References.

The United States Government has for years purchased the following Potter products: Heavy Battleship, Medium Battleship and Light Weight Plain Linoleum. Among the modern vessels having it in use may be named the "Arkansas," "Wyoming," "Kansas," "Washington," "Tennessee," "North Carolina," "South Carolina," "Mississippi," "Michigan" and "Oklahoma." Other Governments using the Potter products on their war vessels are Argentina, Cuba, Russia, Turkey and Greece.

A few of the hospitals and other buildings using this linoleum are listed below:

University of Pennsylvania and Hospital
Jefferson Hospital
Jefferson Hospital for Diseases of the Chest
German Hospital
Chestnut Hill Hospital
Girard College and Infirmary
Hahnemann Medical College and Hospital
Kensington Hospital for Women
Southern Home for Destitute Children
Presbyterian Orphanage
Philadelphia & Reading Terminal Station
Lehigh Coal and Navigation Co. Offices
Nassau Hospital, Hempstead, L. I.
Central Islip Hospital, Islip, L. I.
Dixmont Hospital for Insane, Pittsburgh, Pa.
Thomas W. Evans' Museum and Dental Institute.
And many other institutions throughout the United States.

ESTABLISHED 1856

PAULY JAIL BUILDING COMPANY

INCORPORATED

ST. LOUIS, MO.

GENERAL EASTERN OFFICE
NEW YORK, N. Y., Metropolitan Building, 23d Street and 4th Avenue
TELEPHONE: 2583 GRAMERCY

NEW YORK, N. Y.

FACTORY AND MAIN OFFICE
ST. LOUIS, MO., 2215 to 2225 DeKalb Street
TELEPHONE: 246 SIDNEY

Products.

Builders, exclusively, of CELLS for JAILS, PRISONS, POLICE STATIONS and LOCK-UPS; AUTOMATIC SLIDING DOOR and HAND-PULL LOCKING DEVICES; PRISON PLUMBING FIXTURES; ROUND and FLAT INTERLOCKING BAR GRATING, for Window-Guards, Corridors, Gratings, etc.

Advantages.

Perfect mechanism and durability.

Specifications.

We amplify and submit with our lay-outs Specifications covering our general and specific features.

Steel.

We use five-ply steel, referred to in specification as "tool-proof," consisting of alternate layers of high carbon steel and iron. Round bars, alternate layers of hard steel encircling center core of tough iron. All layers thoroughly welded, and carbon steel layers hardened to resist action of cutting tools.

Niches.

We are the originators and builders of the Niche System of cell plumbing.

Corridor Gratings and Entrance Doors.

We advocate tool-proof corridor grating and tool-proof corridor entrance doors for all prison corridors.

Bunks.

Manufacturers of the most modern bunks for prisons and jails.

Cell Door Locking Device.

Cell doors operated by an Automatic Sliding Door Locking Device, so that any one door or all doors in one row can be operated at same time on sliding principle. Doors suspended from above on steel hangers with anti-friction bearings, consisting of hard steel balls set in hardened bushings, revolving on hardened spindles to insure the perfect distribution of weight of door. All of the locking device encased in steel plates outside of prisoners' corridor.

Automatic Corridor Door Lock.

Corridor entrance doors secured with automatic device arranged with series of hardened steel bolts to each door, placed on the inside of steel box, and released only by deadlock device, allowing door to be opened and closed automatically.

Fittings, Special Work.

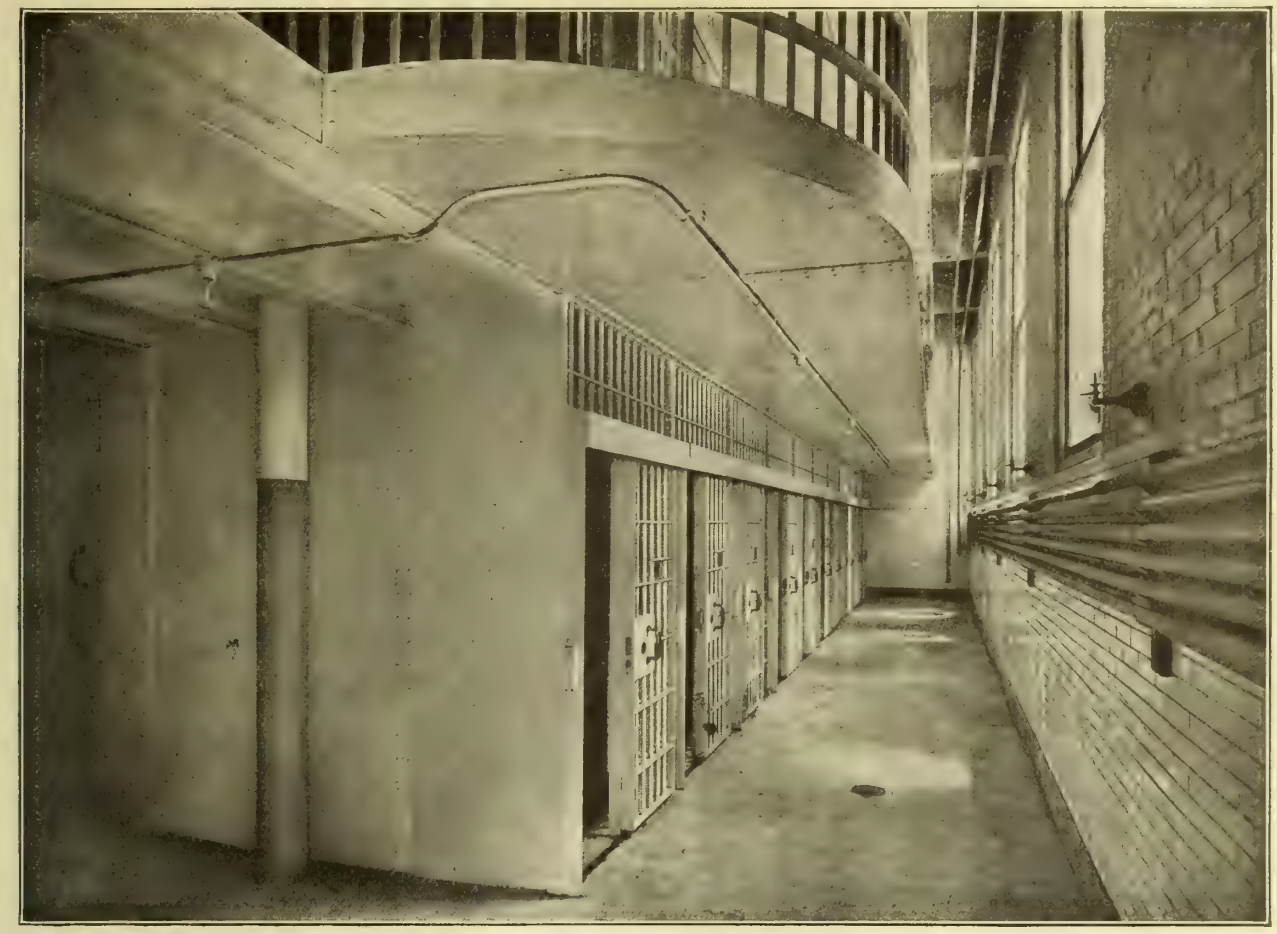
Tables for corridors, ventilating stacks for utility corridors, consultation booths, screens, glass partitions and special devices for insane and condemned cells as required.

References.

The Pauly System has the endorsement of leading architects and specialists throughout the country. Address us for additional data, lay-outs, approximate costs, etc.

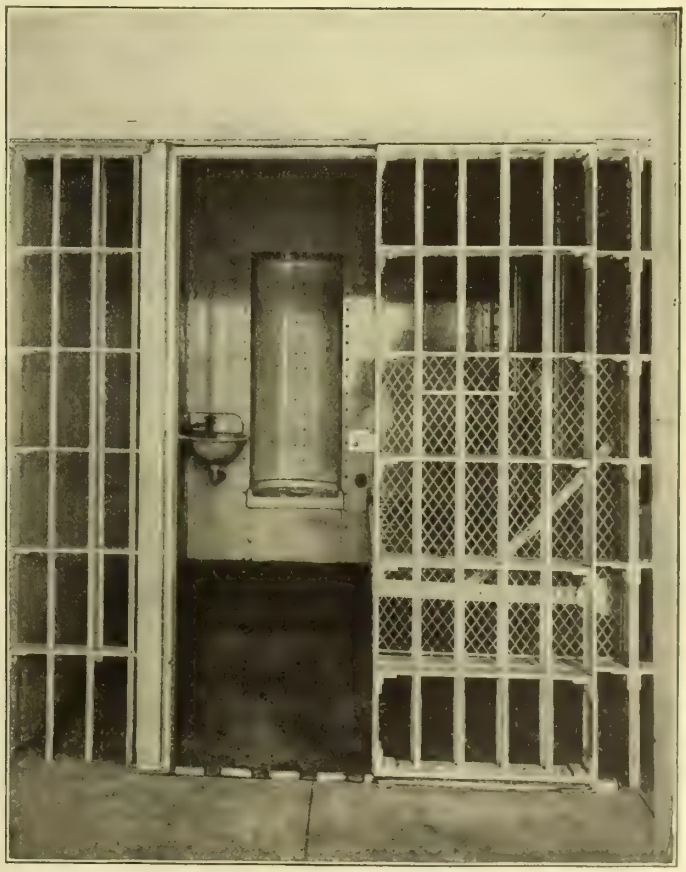
GENERAL VIEW OF PRISONERS' AND JAILER'S CORRIDOR

(Continued on next page)



POLICE STATION CELLS
Showing Hand-Pull Sliding Door with Automatic Lock

PRISONERS' CORRIDOR
Showing Automatic Device for Operating and Locking Cell Doors



TYPICAL INTERIOR VIEW OF CELL
Showing Niche Water-Closet with full Enamel Seat; also, Folding Bunk

ESTABLISHED 1866

E. T. BARNUM IRON WORKS

Steel Jail Cells and Jail Work

DETROIT, MICH.

Products.

JAIL WORK, including STEEL JAIL CELLS; ENTRANCE DOORS; STEEL LINING for Jail Walls; WINDOW GUARDS and BUNKS for Jails, Lockups and Police Stations; PRISON BAR GRATINGS; JAIL BEDSTEADS; JAIL FENCING, and SANITARY EQUIPMENT.

For Wire and Iron Work, see our name in General Index.

Descriptive.

Cells and cages for prisons, city and county jails, town and village lockups, portable convict wagons, padded cages and steel plate lining for rooms.

Tool-Proof Material.

The Barnum Laminated Tool-proof Steel, composed of five alternate layers (three layers of soft steel and two layers of crucible steel), is proof against any saw, file or drill.

The Barnum Steel-Cased Bars are proof against cutting tools.

Locking Devices.

We have both sliding and swinging door lever locking devices of improved design, and arranged to control any one or all doors in opening or closing. All operations are made from a lever box, thus permitting attendants to operate the doors without coming in contact with the prisoners.

Complete description will be furnished on request.

Equipment.

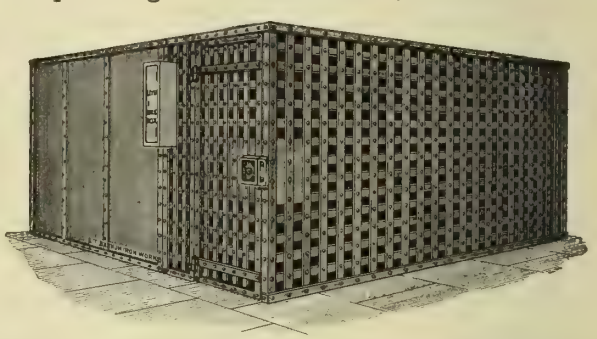
We furnish equipment complete, including entrance doors, window guards, steel lockers, bunks and beds, food openings and shelves, and other sanitary arrangements.

Steel Lining.

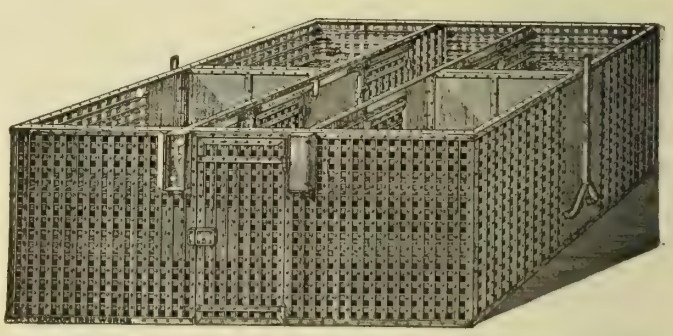
For use in insecure jail or lockup buildings we supply a specially constructed steel plate lining combined and reinforced with necessary angle and battens.

Catalogues and Service.

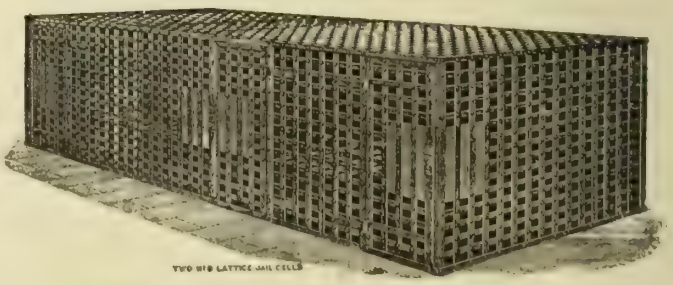
A catalogue fully illustrated and giving all necessary data will be sent on request. Our engineering and drafting department will assist on your problems; and when conditions warrant, we can send a competent expert to go over the matters in detail.



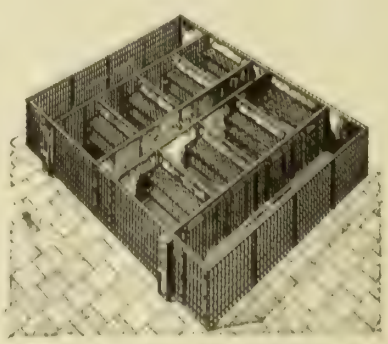
BARNUM NO. 14 TWO-CELL CAGE, WITH SIDE CORRIDOR



BARNUM NO. 6 FOUR-CELL AND CENTER CORRIDOR CAGE



BARNUM NO. 16 THREE-CELL LATTICE CAGE



BARNUM NO. 17 EIGHT CELL AND THREE CORRIDOR CAGE

THE VAN DORN IRON WORKS COMPANY

Jail and Prison Builders

CLEVELAND, OHIO

Products.

Manufacturers of VAN DORN STEEL JAIL and PRISON CELLS, WHITE DIAMOND BURGLAR-PROOF MATERIAL, PATENTED KEYLESS LOCKING DEVICE for SLIDING CELL DOORS, PATENTED INTERLOCKED and COUNTERLOCKED GRATING CONSTRUCTION, CELL APPURTENANCES, etc.

For STEEL JOIST HANGERS, POST CAPS and BASES see our name in General Index.

Experience.

The VAN DORN IRON WORKS COMPANY have been known as expert Jail Builders and manufacturers of Steel Jail and Prison Cell Work for thirty-five years; during which time they have installed work of this character in some of the largest and most important penal institutions in the country.

Over twenty thousand cells of their manufacture are in use in this country, Canada, Mexico, Cuba and the Philippines.

Burglar-Proof Material.

The Van Dorn White Diamond Material (see illustration below) is manufactured by a special patented process and offered by no other company. By this process burglar-proof work is made with an exterior coat of steel "A" uniform in thickness and hardness, absolutely saw- and file-proof, the core or center part being soft iron "B." The hard steel on the exterior of the bar makes it impossible for the prisoner to mutilate it in any way, and every inch of the bar can be tested after erection.

Tests.

The Tombs Prison of New York City, containing 352 cells, is one of the finest pieces of workmanship in the jail-cell line ever produced, and the tool-proof material of the Van Dorn product was tested by Hallsted & McNaugher, Engineers of New York, and not one bar was found defective in the least. The record is that not one bar has been cut, filed, sawed or drilled by prisoners.

In the Maryland State Penitentiary, Baltimore, which is claimed to be one of the finest and most complete penal institutions in the world, all of the cell work, window guards, doors and miscellaneous gratings are the product of this Company. The same record stands for the Maryland Penitentiary as for the Tombs Prison, and also for the Allegheny County Jail, Pittsburg, Pa., where 540 Van Dorn cells have been in use for the past eight years, the material tested by the Pittsburg Testing Laboratory Co., with no defective or rejected bars, and not one having been cut, filed, sawed or drilled.

Catalogue.

A catalogue, showing Steel Prison Construction, has just been issued, and Architects, Engineers, or any State, County or Municipality, having under consideration the construction of penitentiaries, prisons, jails, police stations, lock-ups and calabooses, should write for one, which will be gladly sent free of charge.

Co-operative Service.

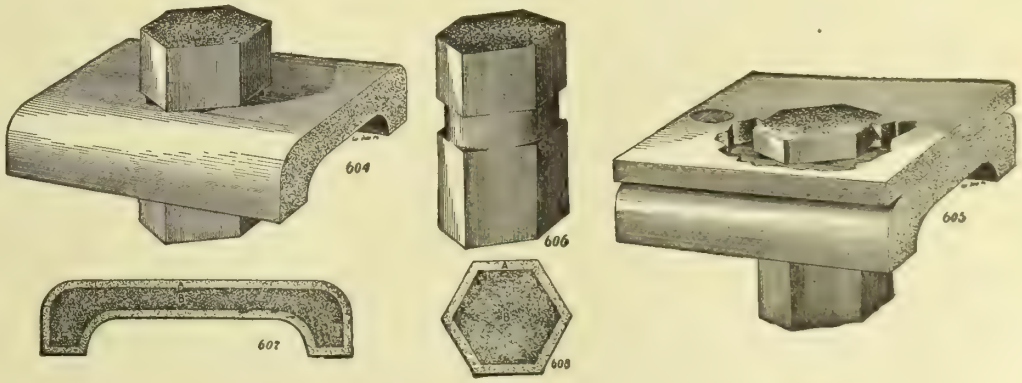
Correspondence is invited with Architects, Engineers, etc., concerning steel cell equipment, and estimates, data and all information will be furnished to meet the existing conditions.

Contracts.

The VAN DORN IRON WORKS COMPANY has recently been awarded one of the most important prison cell contracts on the Pacific Coast, that for Kern County, Bakersfield, Cal., on their special White Diamond Tool-proof Steel, and latest improved Keyless Locking Device for sliding cell doors.

Among other recent contracts executed are the following:

LOCATION	NO. OF CELLS
New York City, Tombs Prison	352
Pittsburg, Allegheny Co., Pa., County Jail	540
Baltimore, Md., State's Prison	970
Baltimore, Md., City Jails	300
Pittsburg, Allegheny Co., Pa., Workhouse	480
Allentown, Lehigh Co., Pa	120
Boston, Mass., Deer Island Reformatory	360
New York City, Precinct Stations	188
Bridewell, Md., State's Reformatory	378
Wethersfield, Conn., State's Prison	187
Pittsburg, Pa., Precinct Stations	200
Cleveland, Ohio	250
Hartford, Hartford Co., Conn	120
New Haven, New Haven Co., Conn	118
Harrisburg, Dauphin Co., Pa	140
Lincoln, Neb., State's Prison	240
Salt Lake City, Utah, City Jail	35
Moundsville, W. Va., State's Prison	848



CONSTRUCTION OF THE HEAVY VAN DORN JAIL GRATING

No. 606—Elevation of vertical ready to insert in horizontal. No. 608—Section through vertical, showing size, style and distinction of exterior burglar-proofing "A" and interior wrought core "B." No. 607—Section through horizontal. No. 604—Vertical and horizontal interlocked. No. 605—Double top and bottom counterlocking bars countersunk and riveted together between verticals

THE FOLEY GREENHOUSE MFG. CO.

Designers and Builders of Greenhouses and Conservatories

Thirty-first Street and Spaulding Avenue
CHICAGO, ILL.

Products.

MODERN IRON-FRAME CONSERVATORIES, PALM HOUSES and GREENHOUSES, for growing all kinds of flowers, fruits and vegetables for the City, Suburban or Country Home, Agricultural Colleges, Universities, etc.; also, for the Commercial Grower.

Construction.

Our structures are composed of sectional iron in units, which, when combined, will fit any ground space available, the standard units being 8 feet 4 inches for 16-inch glass, 6 lights wide, and 8 feet 3 inches for 24-inch glass, 4 lights wide. At each unit space is set a steel flat rafter attached to a combination sill and gutter, which is so constructed as to convey the rainfall or melting snow on the outside to a large gutter, and the condensation of the roof on the inside to a small gutter, both of which discharge into outlets to sewer. This is one of our special features.

The flat steel unit rafters are attached to next rafter by means of malleable iron brackets bolted through the rafter and to angle iron purlins of suitable size, spaced so as to properly sustain glazing bars of roof.

Wood Work.

Gulf red cypress is used, thoroughly air seasoned, free from all defects and milled smooth and true to detail, thus insuring very best results.

Glass.

Carefully selected "A" double-strength glass is installed, properly bedded in specially made greenhouse putty, insuring a tight roof and best results.

Paint.

Three coats of very best greenhouse paint are used. Priming coat is applied at the factory. Steel and iron receive one coat of metal paint before shipment. Second coat is applied to iron and wood work after erection. Third or finishing coat is applied after glazing and completion of construction, so as to cover all exposed putty.

Ventilation.

Ventilation is effected by our specially constructed roof sash, also by wall panels in masonry side walls, all operated by our self-locking modern operating machines.

Roof vent sash and doors are blind mortised. Wall vents are made of wood or iron as desired.

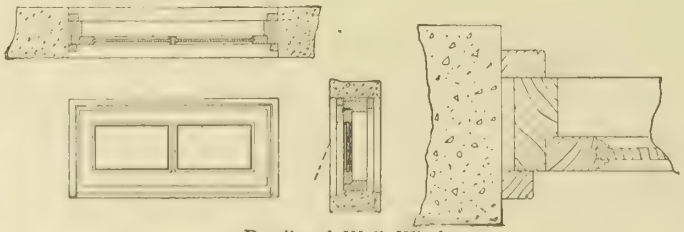
Benches and Tables.

Are constructed in various styles, such as frames made of pipe or angle iron, with pipe legs; with sides made of iron, slate or cypress; and bottoms made of tile or cypress, as desired.

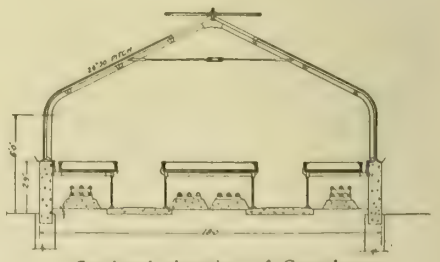
Heating.

Hot water or steam is used for heating purposes. Heating coils are usually located under benches, and are valved so as to provide proper regulation of temperature. Cast-iron sectional or return tubular firebox boilers are used, with mains and returns of ample capacity to supply coils. All systems are tested for leaks and proper circulation.

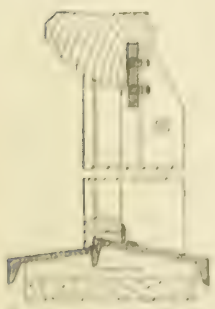
Details showing relation of Steel Work to Concrete Wall. Note arrangement for gutter



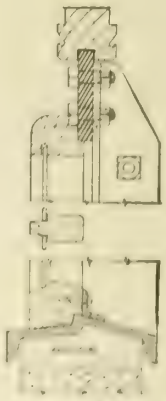
Details of Wall Window



Sectional elevation of Greenhouse



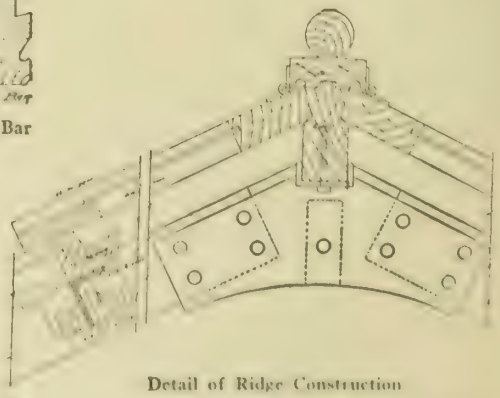
Section through Gable End



Section through Partition Wall

Rafter Cap

Roof Bar

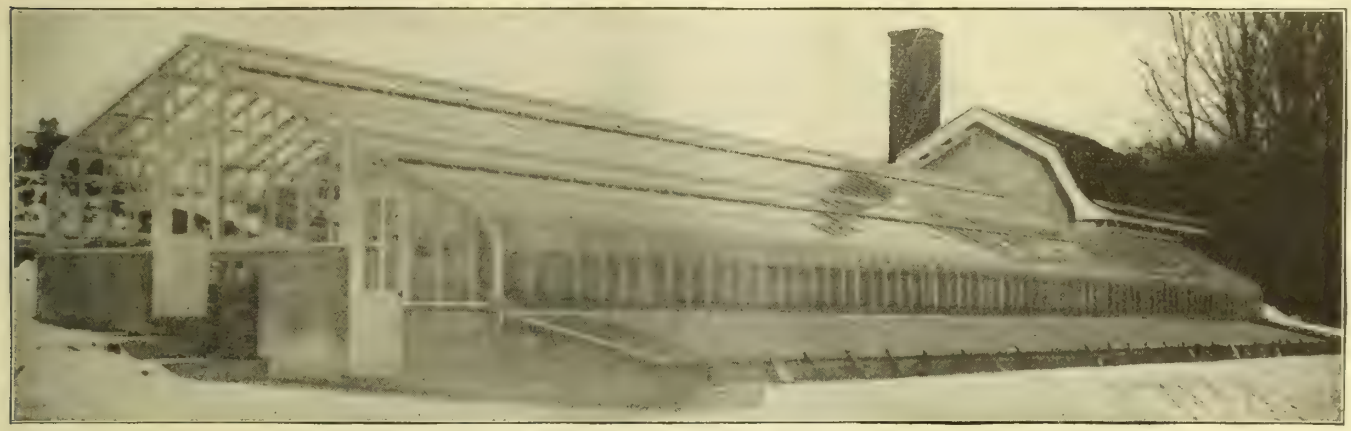


Detail of Ridge Construction

DETAILS OF A FOLEY GREENHOUSE

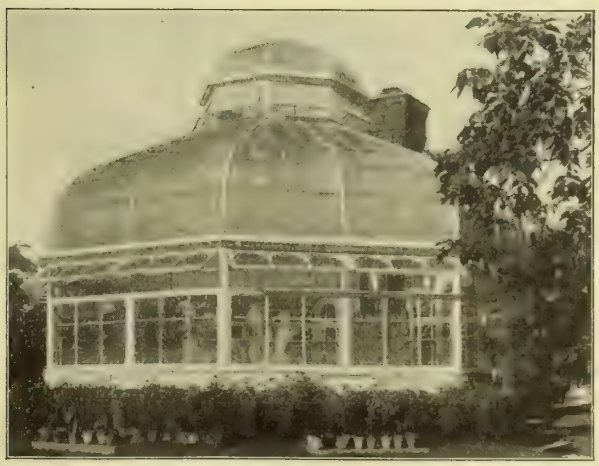
Continued on next page

Erected for Ohio State University, Columbus, Ohio. J. N. Bradford, Architect



Built at Lake Geneva, Wis., for Wm. Wrigley, Jr.

Erected for L. B. Kuppenheimer, Hubbard Woods, Ill. Howard Shaw, Architect



Conservatory of Archbishop of Chicago

Erected for Univ. of Illinois, Urbana, Ill. J. M. White, Architect

TYPICAL FOLEY GREENHOUSES

LORD & BURNHAM CO.

Greenhouse Designers and Manufacturers

FACTORIES

IRVINGTON, N. Y. DESPLAINES, ILL.

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SALES OFFICES

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MONTREAL, QUE., Transportation Building
TORONTO, ONT., Royal Bank Building

Product.

SECTIONAL IRON-FRAME GREENHOUSES.

Sectional Construction.

Our Sectional Iron-Frame Greenhouse has been developed and perfected through our constant efforts to secure greater durability and to meet the demand of gardeners for more light.

One section is formed by setting up two spans of rafters, 8 feet 4 inches apart, at either end of two lengths of cast-iron sills. The cross framing between these two spans of rafters consists of the gutters at the eaves and purlins between the eaves and ridge. These latter are placed the right distance apart to carry the roof bars.

Another section may be added by setting up one more span of rafters 8 feet 4 inches further along, with cross framing, and so on until you have the required number of sections for the length of the house.

Strength.

The strength of this construction is in its steel-bar rafters placed thin edge to the light and framed between with steel angles for purlins, and in the method of securing the rafters to the sills at the joints, where two sections of sills meet, and to the gutters in the same manner, so that the sections of sill and gutter on either side of each span of rafters are united to the rafters as if they were part of them, making the entire iron frame of rafters, sills, gutters and purlins as one piece.

Materials.

All glass is bedded in putty and supported by is clear Gulf cypress of best quality, thoroughly air-dried. This wood grows in the swamps of Florida and has proven to have no equal for withstanding the destructive conditions of constant moisture existing in greenhouses.

Glazing.

All glass is bedded in putty and supported by wooden parts which prevent breakage by expansion and contraction.

Erection.

This is the ideal greenhouse construction, so scientifically worked out that the labor of preparing materials and erecting is reduced to a minimum. It is not a house that has to be cut and fitted by hand, on the job, but the entire frame is passed through a line of machines in our factory, where it is cut, shaped, punched, fitted and primed, ready for immediate erection.

When the materials are delivered it is merely a matter of bolting up the iron parts and fastening the screws. The expense of erecting is thus greatly reduced, practically equalizing the advance in cost of the iron-frame house over the wooden structure.

Roof Line Accent.

As the rafter caps and pilasters, which are larger than the glazing bars, are united at the end of each section this point is accented, giving an effect of broad spacing throughout the entire roof and sides, not obtainable where the glazing bars are of one size and no rafters are used.

Repairing.

Aside from the usual repainting, the matter of repairs is a minor one, for the small roof bars are fastened with iron clasps and it is a simple matter to unscrew, cut out the defective part and splice in a new piece.

Benches and Tables.

Four kinds of construction are employed in our regular stock benches and tables:

Benches—(1) Indestructible all cast-iron; sides, bottoms and ends cast in separate pieces; legs of pipe. (2) Galvanized-iron frames with cypress bottoms and sides. (3) Galvanized-iron frames with tile bottoms and cypress sides. (4) All cypress.

Tables—(1) Indestructible all cast-iron; sides, bottoms and ends cast in separate pieces; legs of pipe. (2) Galvanized-iron frames with ¾-inch planed slate bottoms. (3) Galvanized-iron frames with cypress bottoms. (4) All cypress.

Ventilation.

Ventilation sash are located at ridge and, where required, on the sides. They are in continuous runs, and are opened by our patented Ventilating Machinery, with hand-wheel placed in convenient location.

Heating.

Coils of 3½-inch (I. D.) cast-iron pipes made up with caulked joints are generally located under the benches where they do not take up any growing space, and are so arranged as to secure a free circulation of air around them. Their surfaces are so distributed as to give the desired temperature with sufficient control in each compartment to produce the best growing conditions.

"Burnham" Boilers are used, with ample mains for carrying water to the coils.

The system is installed with sufficient grade to insure rapid circulation and even distribution. The coils are equipped with automatic air headers to prevent all air locks.

"H" Catalogue

Continued on next page

Illustrations.

Fig. 1 shows a curved-eave, even-span, straight-roof Sectional Iron-Frame house, fitted with cast-iron sills, for masonry walls; two lines of ventilation at the ridge and two at the sides below the sill.

Fig. 2 shows a curved-eave, even-span, straight-roof house with gutter at eave and ventilation beneath, hinged to it.

Fig. 3 shows a Curvilinear Roof. Aside from the location of the gutter at the eave and the side ventilation above the sill, the construction is the same as for section A (Fig. 1).

Fig. 4, same as Fig. 1, except that the gutter is located at the eave, it being straight instead of curved.

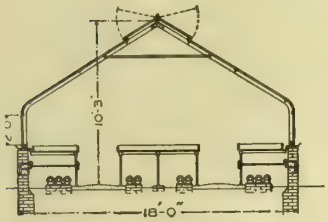

Fig. 1. Section A

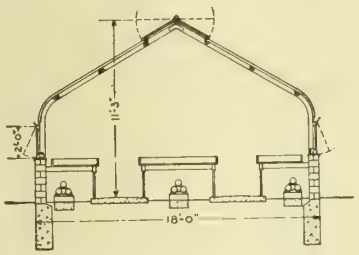

Fig. 2. Section B

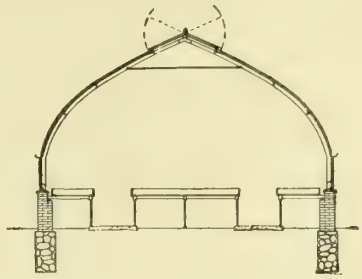

Fig. 3. Section C

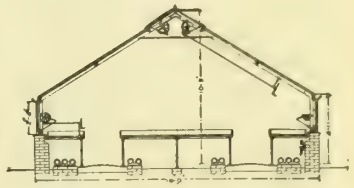

Fig. 4. Section D

DETAILS OF GREENHOUSE CONSTRUCTION

Fig. 5. Combination sill and gutter used on curved-eave house.

Fig. 6 shows Cast-Iron Sill. It is secured to the rafter by brackets. It is cast with a rabbet which acts as a stop for the side sash, and flanges overhang the sides of the walls for weather protection.

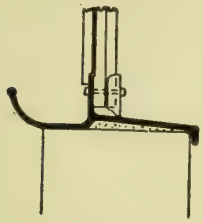

Fig. 5. COMBINATION SILL AND GUTTER

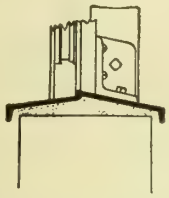

Fig. 6. CAST-IRON SILL

Fig. 7 shows Cast-Iron Gutter. Cast in lengths of 8 feet 4 inches and in ample sizes. It is secured to the rafter by gutter brackets. The flange at the bottom of the gutter acts as a stop for the side sash, the flange at the top secures the glass, and the sash bars are fastened to it by special clasps. Side sash are hinged directly to under side of gutter.

Figs. 8 and 9 show Sash-Bar Clasps. They are bolted to the gutters and screwed to the roof bars, forming a rigid fastening and carrying off the condensation, insuring a dry, lasting joint of wood to iron.

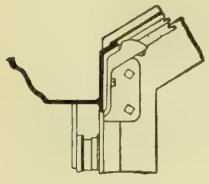

Fig. 7. CAST-IRON GUTTER

Fig. 8. SASH-BAR CLASP

Fig. 9. SASH-BAR CLASP

Fig. 10 shows Angle Steel Purlin. It is secured to the rafters by iron brackets and screwed to the sash bars.

Fig. 11 shows Steel Rafter with Cap. The Cap is grooved to fit over the rafter, forming an insulation from both heat and cold, and preserving a perfect alignment between rafter and sash bars.

Fig. 12 shows Sash Bar. The cypress bars are $\frac{13}{16}$ x $1\frac{7}{8}$ inches, spaced to receive glass 16 inches wide, five bars between each pair of rafters. They have drip groove on each side to carry off condensation moisture. Curvilinear bars and rafter cap are cut from the solid to prevent springing.

Fig. 10. PURLIN

Fig. 11. RAFTER WITH CAP

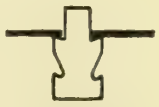

Fig. 12. SASH BAR

Fig. 13 shows Bar used for Gable and Partition.

Fig. 14 shows Ridge and Ridge Bracket. The ridge is of cypress and in two pieces, tongued and grooved to fit. The lengths are joined by metal tongues. It is milled to receive vent sash. It is bolted to the rafters by the ridge bracket.

Fig. 15 shows Drip Header. It caps the purlin and forms a seat for vent sash. Made with gutter which discharges sash condensation on roof. Roof bars are fastened to it by sash-bar clasps.

Fig. 13. BAR USED FOR GABLE AND PARTITION

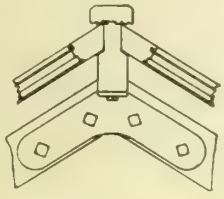

Fig. 14. RIDGE AND RIDGE BRACKET

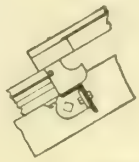

Fig. 15. DRIP HEADER

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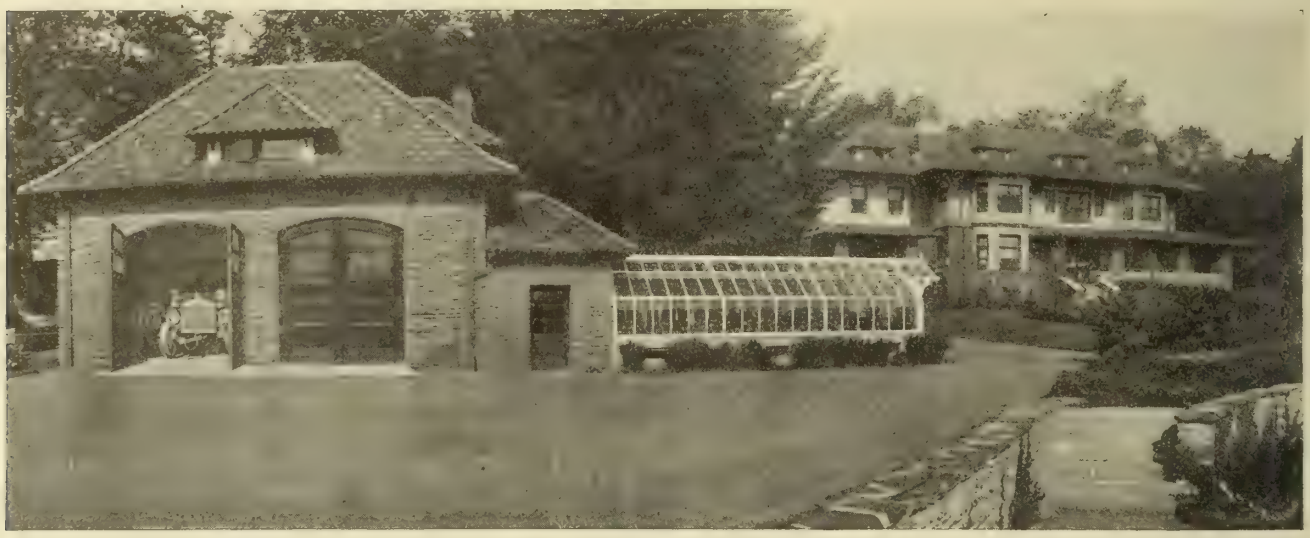


GARAGE AND GREENHOUSE COMBINATION ON GROUNDS OF E. H. MULFORD, GREENWICH, CONN.
W. H. Rowe, Architect

Workroom placed between greenhouse and garage is entirely independent of latter, preventing any possible fumes of gasoline or oil from reaching the plants. Cellar for boiler to heat both is directly under the workroom

GLIMPSE ON THE GROUNDS OF ARNOLD SCHLAET AT SAUGATUCK, CONN.
Wm. B. Tubby, Architect

THREE CURVED-EAVE GREENHOUSES ERECTED AT SANTA BARBARA, CAL.
[illegible] Peirce, Architect
The [illegible] each were shipped from coast to coast

Continued on next page

ERECTED FOR JOSEPH KILGOUR AT TORONTO, ONT., CAN.
DARLING & PEARSON, Architects
Based on the English way of doing things; a charming linking of the residence, conservatory and greenhouse. The part nearest the residence is the Conservatory, or Show-house, opening directly off the breakfast room. Next comes the Palm-house; the parts beyond are used for utilitarian growing houses

IMPROVED CURVED-EAVE CONSTRUCTION
Showing gutter at eave instead of on the sill. The ventilation sash are hinged to the gutter instead of being placed in the wall as in the older curved-eave houses. The sides are also higher, giving additional room for tall growing plants

ORNAMENTAL RANGE ON THE GROUNDS OF THE LATE THOMAS SPERRY, CRANFORD, N. J.
Joining the wing houses by connecting passages obviates the necessity of awkward roof lines, and further emphasizes the pleasing lines of the fourteen-sided Palm-house

HITCHINGS & CO.

Iron-Frame Greenhouses and Equipment

GENERAL OFFICES AND FACTORY

ELIZABETH, N. J.

NEW YORK OFFICE, 1170 Broadway
Telephone, 9384 MADISON SQUARE

BOSTON OFFICE, John Hancock Building, 49 Federal Street
PHILADELPHIA OFFICE, Pennsylvania Building, 15th and Chestnut Streets

Products.

GREENHOUSES for general purposes, for Palms, Orchids, Ferns, Roses; also, GRAPERIES, ORCHARD HOUSES, CONSERVATORIES, and SUN-PARLORS.

Also, HOT-WATER and STEAM-HEATING APPARATUS; VENTILATING and SASH OPERATING APPARATUS.

Description.

Hitchings' All-Steel Frame Greenhouses are made either with the curved eave, having the gutter and sill combined, or with the gutter at the eave line; and the regular angle eave with the gutter at that point. The sills, the non-freezable gutters and roof bar brackets are cast iron; the combined rafters and posts and the purlins are wrought steel.

All wooden portions are manufactured from air-dried Gulf Cypress.

In curvilinear roofs and for the curved eaves, the glazing bars are sawn from the solid wood to fit the curve. The glass is bent to the radius of the curve.

Glass on curved eave houses is either sixteen or twenty-four inches wide.

Advantages.

Adaptability to the architect's designs. Can be erected rapidly.

Extreme lightness of construction, reducing the shade to a minimum, making best possible growing houses. Great durability.

Illustrations.

Fig. 1 shows a section of our curved eave house. Iron frame with ventilation through the side walls under the benches. The gutter is at the sill.

Fig. 2 shows our rocker arm sash operating apparatus. The upper and lower tiers of sash are operated in tandem with one hand wheel by means of a perpendicular connecting rod operating on both shafts.

Fig. 3 is a section of our new semi-curvilinear type of house; having the gutter at the eave instead of at the sill. The curve is of long radius, giving high sides and ventilation over the benches by means of sash hinged to the gutter.

Fig. 4 is one of the semi-curvilinear houses with the gutter at the eave as described in Fig. 3.

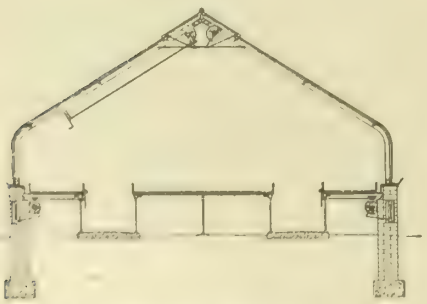


FIG. 1. SECTION OF CURVED EAVE HOUSE.

FIG. 2. ROCKER ARM SASH OPERATING APPARATUS

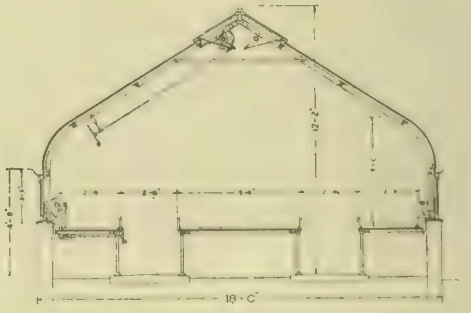


FIG. 3. SECTION OF SEMI-CURVILINEAR HOUSE

FIG. 4. SEMI-CURVILINEAR HOUSE WITH GUTTER AT EAVES

KING CONSTRUCTION CO.

Conservatories and Glass Construction

NORTH TONAWANDA, N. Y.

Products.

IRON-FRAME GREENHOUSES, COMMERCIAL GREENHOUSES, CONSERVATORIES, PALM HOUSES, GLASS HOUSES, SUN PARLORS, FRUIT HOUSES, GRAPERIES and GREENHOUSE ACCESSORIES.

Also, HEATING PLANTS and VENTILATING APPARATUS.

Advantages.

King greenhouses are so constructed that they are extremely strong without the necessity of heavy shadow-casting frames and supports. They also have splendid architectural possibilities, and are easy to heat and operate. King channel bar construction makes possible the graceful sweeping lines so effective in greenhouse design.

Types of Construction.

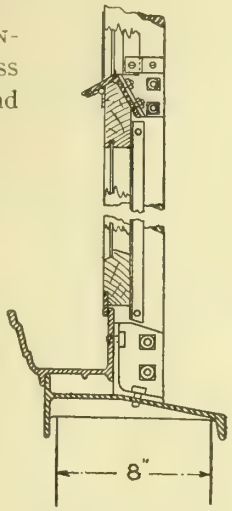
King Channel Bar—For the more elaborate forms of ornamental construction. Combines rare beauty with extreme practicality.

King Iron Frame—For curved- and straight-eaves conservatories, palm houses, etc.; also, for large vegetable houses. (The largest greenhouse in the world is of this type.)

King Pipe Frame or Semi-Iron—For less expensive glass-house construction.

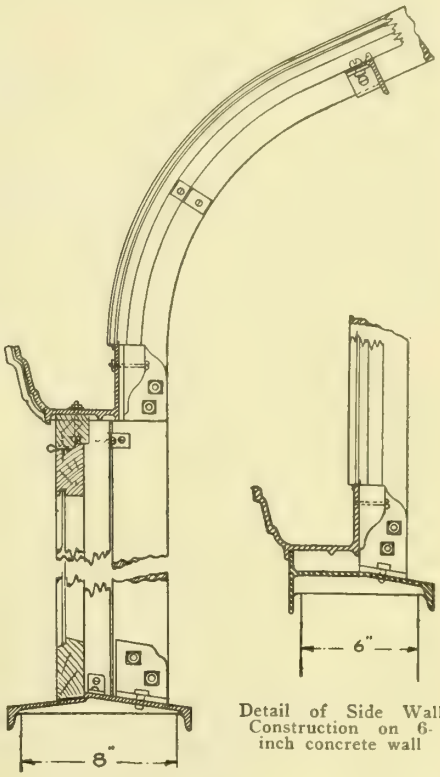
Plans and Estimates.

Plans and estimates will be furnished on request without in any way obligating the inquirer.



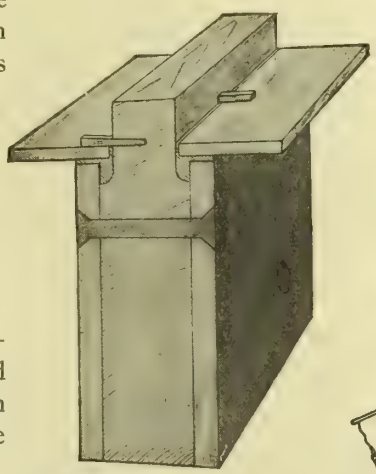
Details of Side Wall construction. Gutters are exposed to interior heat

Cross-section of Principal Rafter. Top edge of wood sash bars set flush with top edge of steel rafter, reducing shade to minimum

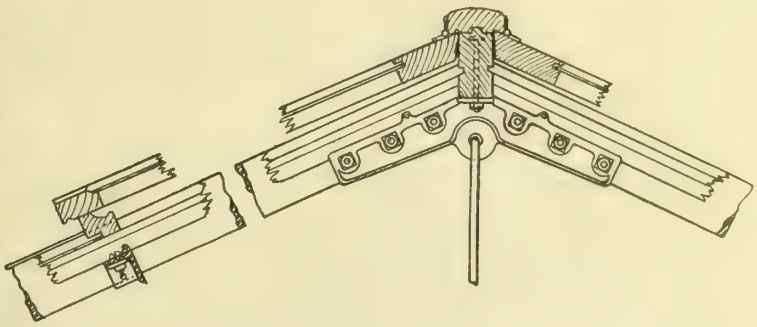


Gutter at Eave with Side Ventilators at either side

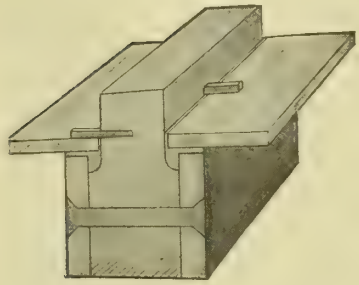
Detail of Side Wall Construction on 6-inch concrete wall



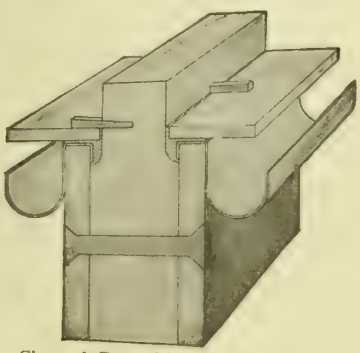
Detail of Channel Bar, showing greater depth for wider span, avoiding interior post supports



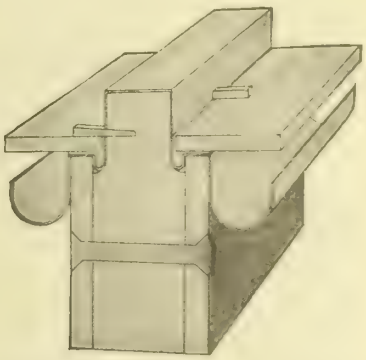
Detail at Ridge showing Ventilators on either side



Detail of Channel Bar—Steel riveted side bars with redwood core bar



Channel Bar with condensation drip pans of zinc



Channel Bar with drip pans in one piece, covering tongue of redwood core bar

CONSTRUCTION DETAILS OF KING GREENHOUSES

WILLIAM H. LUTTON COMPANY

Designers and Builders of Modern Greenhouses

OFFICE AND WORKS
JERSEY CITY, N. J.
EXHIBITION ROOMS
NEW YORK, N. Y., Country Life Permanent Exhibition, Grand Central Terminal, 42nd Street

Products.

Greenhouses, Conservatories, Moving Picture Studios, Porch Enclosures, etc.

Also, Heating and Ventilating Installations, Boilers, etc.

Construction.

The Lutton type of Greenhouse Construction is the result of years of careful study and practical experience, and has been indorsed by architects and engineers throughout the country. For years we have manufactured and erected greenhouses, in which every piece of metal entering the construction, except the cast-iron sills and wall ventilating panels has been heavily galvanized (unless otherwise instructed). The interiors of our galvanized houses are usually finished with a special Aluminum Paint, producing a bright and very durable finish.

We also manufacture standard iron frame greenhouses of all types and sizes, for both private and commercial use.

Iron Work.

Cast-Iron Sills—These cap the masonry foundation walls and are in lengths of about 8 feet 3 inches, connected together by wrought iron plates placed on under side of sills. (See Sections Nos. 1 and 5.)

Gutters—The installation of gutters on Curved Eave Houses is no longer considered necessary, but we are prepared to furnish our regulation cast-iron gutters when desired. (See Section No. 5.)

Rafters—All intersecting and gable rafters are

RANGE OF MODERN GREENHOUSES ERECTED FOR E. W. C. ARNOLD, BABYLON, L. I., N. Y.
Rear view, showing galvanized V-Bar Construction on Tapestry Brick Foundations

GREENHOUSE AND GARAGE ERECTED FOR RUFUS W. SCOTT, GERMANTOWN, PA.
[illegible] Ogst & Zittell, Supervising Architects

Continued on next page

manufactured from structural steel and galvanized. They extend from sill to ridge in one continuous piece, bent at the eave line to the proper radius, secured at the ridge with iron brackets and firmly bolted to sills. (See Section No. 3.)

Sash Bars—Our V Section Sash Bar (see Section No. 2), employed in the roof, sides and gables, is only one of the many improvements which we have recently introduced. The compact arrangement of the cypress core and the galvanized V section produce a bar which has a very neat and attractive appearance. The use of this V section reduces the percentage of shade to a minimum. The glass does not touch the metal, but is glazed against the wood, practically eliminating the breakage due to expansion and contraction. Also note the groove on each side, designed to carry off the condensation.

Woodwork.

All woodwork employed in the construction of our greenhouses is manufactured from selected air-dried Red Gulf Cypress smoothly milled and finished.

Glass.

All glass is "A" quality hand-made glass. We usually employ glass 24 by 24 inches in size, except when otherwise instructed.

Hardware.

All nails, screws and bolts entering into the construction are galvanized to prevent any accumulation of rust. All door furniture is of solid polished bronze.

Wall Ventilating Panels.

All panels and frames are constructed of solid cast iron throughout, operated by worm and gear apparatus, located beneath the bench. The use of wall vents allows the fresh air to come in contact with the heating pipes, thus removing the chill before reaching the plants. (See Sections Nos. 1 and 5.)

Benches.

We manufacture several types of plant benches suitable for greenhouse work. The most popular style

VIEW FROM INTERIOR OF A LUTTON V-BAR GREENHOUSE
Note the absence of heavy shadow-casting members and the unobstructed vision

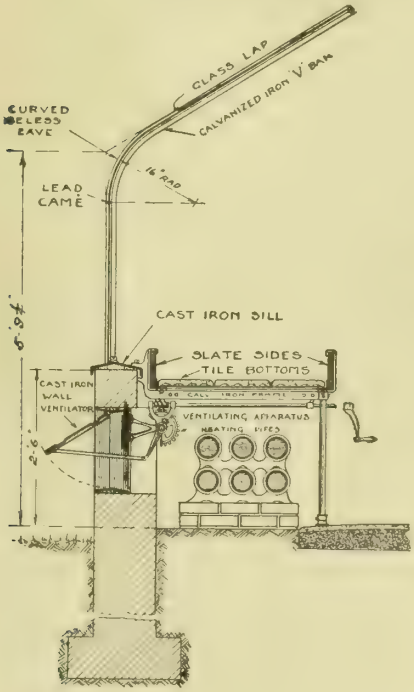
has the framework constructed of galvanized iron, with the bottoms of porous tiles and the sides of gray quarry slate seven inches high, sand rubbed on all edges and sides. (See Section No. 1.)

Heating.

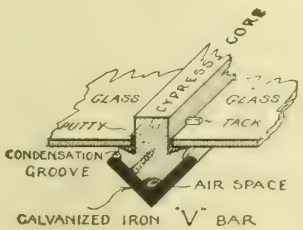
Where practical, we always recommend a *hot-water* system, using one of our modern Sectional Boilers of sufficient size to insure economy and ease of operation.

A Full-Size Lutton Greenhouse on Exhibition.

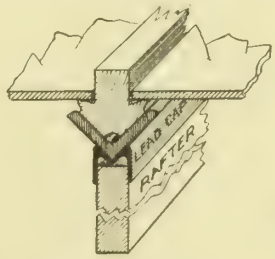
For the benefit of those desiring to inspect our improved type of Greenhouse Construction, we have erected a full-size greenhouse, embodying the features herein described, at the Country Life Permanent Exposition, Grand Central Station, 42nd Street, New York City. This Exposition is open to the public every day in the year except Sundays, and the architect interested in suburban work will there find many interesting features exhibited for his particular benefit. Here he can inspect for himself and point out to his client the many important improvements to be found in the Lutton type of greenhouse.



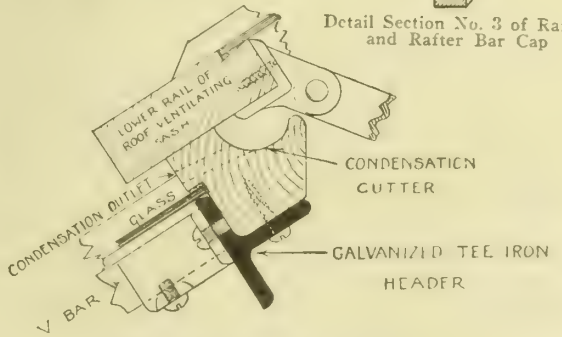
Detail Section No. 1 of Side Construction without Gutter



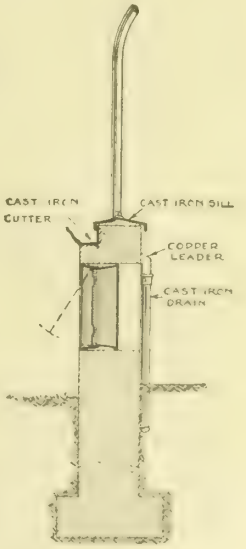
Detail Section No. 2 of Bar



Detail Section No. 3 of Rafter and Rafter Bar Cap



Detail Section No. 4 of Roof Header



Detail Section No. 5 of Side Construction with Gutter

SOME LUTTON GREENHOUSE CONSTRUCTION DETAILS

PIERSON U-BAR CO.

Builders of U-Bar Greenhouses

1 Madison Avenue

NEW YORK, N. Y.

Products and Services.

We manufacture, erect and equip U-Bar Greenhouses. The Equipment consists of Ventilating Apparatus, Benches, Tables, Complete Heating Plant, etc.

Description.

In the U-Bar Construction we encase the wooden sash-bar with a galvanized steel U-shaped bar, the combined members being no larger than the smallest wooden sash-bar used in other forms of construction.

Owing to their strength we are enabled to eliminate all the heavy iron rafters and many lateral supports, and to place the bars farther apart, permitting the use of glass twenty-four inches wide. By bending the bars at the eave line and using curved glass at this point we eliminate all cumbersome gutters, plates, posts, and other shading members, resulting in a structure of extreme lightness and of great strength.

Advantages.

The steel covering of the wooden bars eliminates interior woodwork with its tendency to decay. The galvanizing of all steel members prevents rusting; the use of the wooden core-bar prevents injurious expansion and contraction of the structure and consequent glass breakage. All these features combine to produce a structure of wonderful durability and low cost of maintenance.

The extreme lightness of construction, the wide glass, the absence of all heavy shading members, assure unusual productiveness.

The curved eave line, the aluminum finish of the interior, and the absolute simplicity of the construction produce a structure unmatched in attractiveness and adaptability.

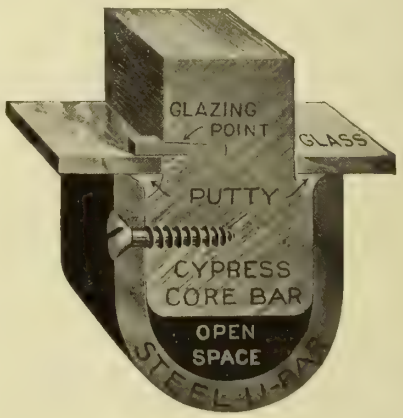
U-Bar Sizes.

The cut on this page shows the exact size of the U-Bar used in general work.

There are two other sizes used to meet the wide span roof conditions.

The Core-Bar.

It is Red Gulf Cypress, free from sap and knots, and is milled from thoroughly air-dried stock. All



EXACT SIZE OF U-BAR USED FOR GENERAL PURPOSES

GREENHOUSE ERECTED FOR C. V. BROKAW, GLEN COVE, L. I.

Continued on next page

curved portions are cut from the solid block to prevent warping out of shape.

The Steel U-Bar.

It encases the lower part of the cypress core-bar, the latter being screwed to the U-Bar with screws placed alternately on either side at frequent intervals, thus securing the binding of the core-bar and U-Bar together.

Core-Bar Decay Prevented.

Before encasing in the steel U-Bar, the core-bar is treated to prevent its decay. After encasing and before the glass is set it is painted with white lead and oil; after the glass is set the exposed portion of the core-bar is again painted, thus giving it a thorough protection against the weather. The open space below the core-bar insures a circulation of air as an additional protection against its decay. The steel U-Bar fully protects the core-bar from the destructive conditions existing in the interior of greenhouses.

Rust Prevention.

To prevent all possibility of rusting, the steel U-Bar is heavily galvanized by the hot process after all shaping, drilling and fitting are done.

Glazing Method.

The glass is bedded in putty and laid with lapped joints of about ¼ inch directly upon the edges of the steel U-Bar, and is secured to the projecting core-bar with wedge-shaped zinc glazing nails. The core-bar provides the best-known medium for adhesion of the putty and fastening for the glass and makes possible the most satisfactory system of glazing.

Expansion and Contraction.

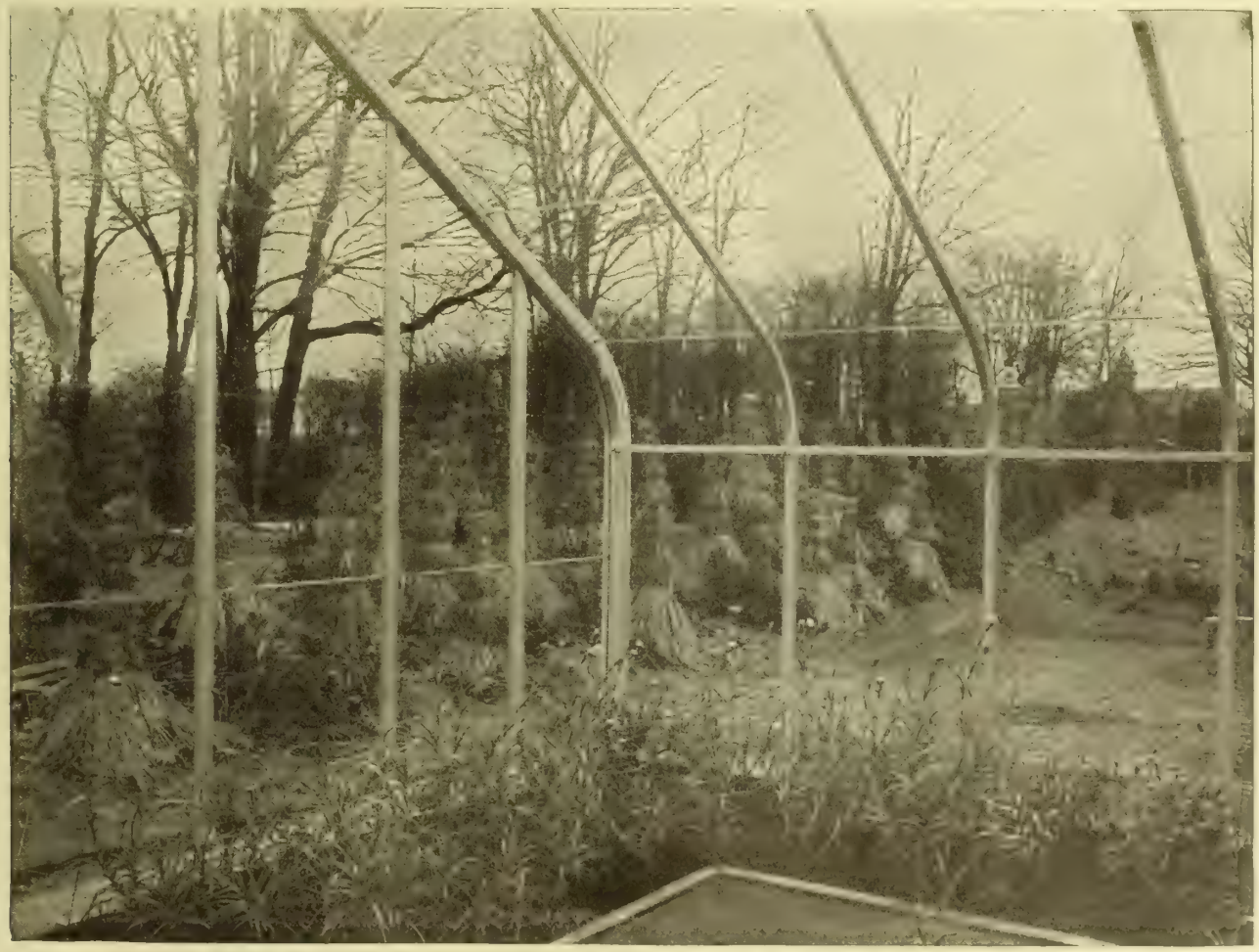
Another object of extending the core-bar above the steel U-Bar is to guard against exposing the metal surfaces of the U-Bar to the uneven outside temperature, thus preventing destructive expansion and contraction and consequent loosening of the putty bed, leakage, and breaking of glass.

Aluminum Interior Finish.

After the glazing is done and the squeezed-out putty is cut off from the inside and its exposed edges painted, the steel U-Bar is given a coat of aluminum paint, which makes a durable, bright, attractive finish to which neither dirt nor mildew adheres nor moisture affects, thus eliminating the expense and annoyance of frequent interior painting.

Catalogue.

Send for catalogue.



INTERIOR OF A U-BAR GREENHOUSE—PART VIEW, SIDE AND GABLE

Lightness and simplicity are the characteristics of the U-Bar construction. Looking out from the inside you get the full force of the extreme lightness of its all-steel frame

JOHN C. MONINGER CO.

Greenhouses and Conservatories

908 Blackhawk Street
CHICAGO, ILL.

2309 Union Central Building
CINCINNATI, OHIO

807 Marbridge Building
NEW YORK, N. Y.

Products.

Designers, Manufacturers and Builders of CONSERVATORIES and GREENHOUSES of every description.

Services.

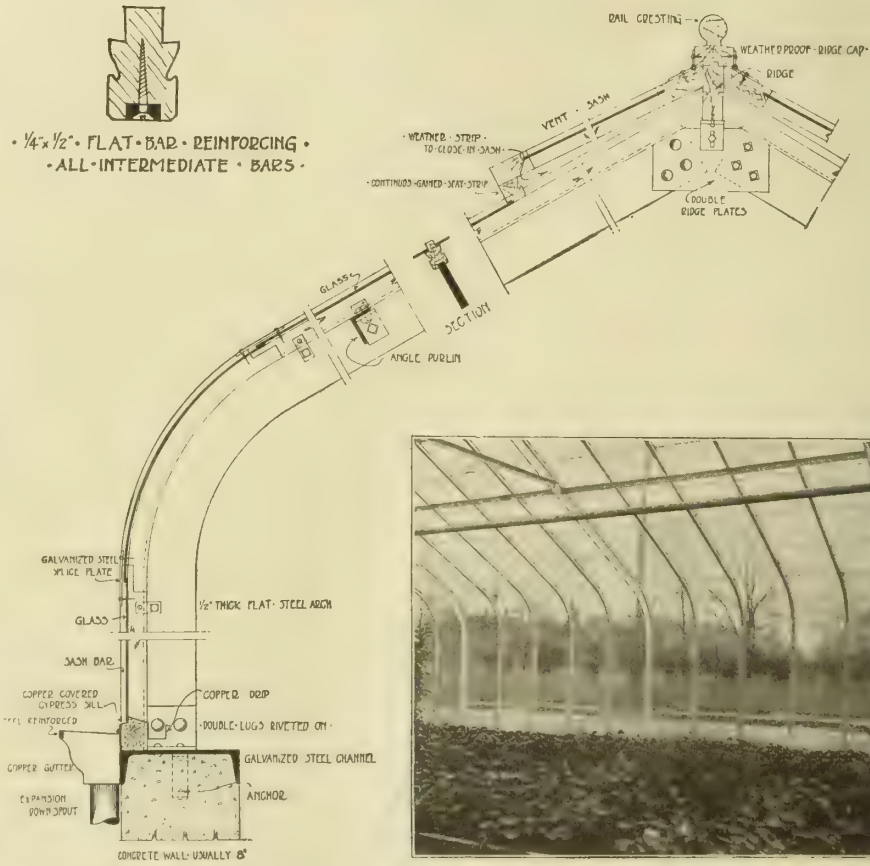
This firm is an old, well-established one, with factories and yards covering an entire city block. Their experience in this field is entirely at the disposal of architects and engineers. Estimates and sketches are furnished free.

Construction.

Buildings are modern, of the best construction. Structural work is all steel, castings being avoided as much as possible. Woodwork is of the very highest grade red gulf cypress, smooth and free from all defects.

Information.

Further information will be furnished upon request.



Details of Construction

Interior View

Exterior View

CONSERVATORIES ERECTED FOR MR. JOY MORTON, AT LISLE, ILL.
FRANK W. PERKINS, Architect

ESTABLISHED 1859

LOUIS BOSSERT & SONS

Manufacturers of Mouldings, Sashes, Blinds, Doors and All Types of Interior and Exterior House Trim; Redibilt Houses

BROOKLYN, N. Y.

Products.

Sole manufacturers of REDIBILT HOUSES: BUNGALOWS; GARAGES; BOAT and PLAY HOUSES; CHURCHES; SCHOOLS; REAL ESTATE OFFICES; BANKS; RAILWAY STATIONS; BARRACKS; and both PERMANENT and EMERGENCY BUILDINGS, of every description.

Also, HARDWOODS of all kinds; N. C. and WHITE PINE LUMBER; FIR, SPRUCE and Y. P. TIMBER; FLOORING, ROOFING, SIDING; SHINGLES; SASH, BLINDS (including Excelsior Patent Sliding), DOORS, MOULDINGS, in every style; INTERIOR and EXTERIOR HOUSE TRIM; BALUSTERS, RAILS and STAIRS; PORCH and INTERIOR COLUMNS; WOOD GRILLES and SCROLL SAWING; WINDOW FRAMES; WOOD CABINETS and WARDROBES; PACKING, BEER and SODA WATER BOXES; WOOD POSTS; PORTABLE WOOD HOUSES, etc.

Patents.

Applications have been filed for patents covering all details of the Redibilt Houses.

Experience.

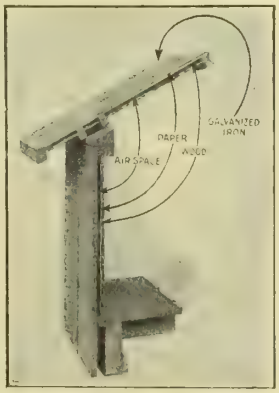
LOUIS BOSSERT & SONS have been engaged in manufacturing bungalows twenty-five years, and are the first to reduce building construction to an exact time-, labor- and money-saving science, a method which gives a *permanent* structure that can be disassembled and re-erected at a trifling expense. This feature is not to be confused with portable or ready-cut lumber ideas.

Bossert Redibilt Houses.

Material—(a) Side sections made of 7/8-inch sheathing or shingles on the outside; then a 5/8-inch air chamber lined with paper; inside finished with 3/8-inch clear N. C. pine ceiling.

(b) Roof units are similarly constructed with a 1/2-inch dead air chamber, two thicknesses of lumber lined with paper, covered on the outside by heavy gauge galvanized iron sheeting or shingles.

(c) Floor units are made of No. 1. T & G, N. C. pine or fir, sanded and laid so that no joints or cracks will show.



SECTIONAL VIEW OF BOSSERT AIR CHAMBER UNITS

Interior Partitions—Made of 7/8-inch No. 1 N. C. pine, T & G ceiling beaded on two sides, set in a frame to bolt to side sections, and to one another; they go to plate only; and are extended to roof only when specially ordered.

Doors and Windows—Fitted and hung at factory. Double-hung windows held in place by *patented spring* that allows window to be lifted and lowered without dropping.

Foundations and Cellars—Nothing heavier than ordinary posts (included in price) is needed for the foundation. The added cost of a cellar, however, is very slight.

WESTBURY TYPE OF TWO-STORY DWELLING
A suburban Redibilt House, with large rooms well lighted and ventilated

GARAGE AT BEECHWOOD, SCARBOROUGH-ON-HUDSON

Bricked-In Fireplaces—May be fitted and built into Redibilt Houses with ease and at small expense.

Heating—Air chambers in walls and roof offer highest efficiency for heat resistance.

Painting—Two coats of any two selected colors are applied. Inside is oiled, which brings out the grain of the wood.

Sizes—Houses limited only in size to a width of thirty feet, but any *length*.

Installation—Sections of the building are ready to be assembled at site and in a short time.

Prices—The first cost is about the *complete cost*, the item of labor being practically neglible. The sections are built and fitted at the factory. Write for particulars.

Co-operative Service and Special Designs.

Architects, contractors and owners are cordially invited to visit this Company's plant, where they may observe the houses completely erected, and receive explanations of the building methods. Special designs of architects need very little alteration, if any, in order to be executed under the Bossert plans. Correspondence solicited.

The Architectural Staff are ready to adopt and execute individual designs for the home, or to offer original suggestions to intending purchasers.

E. F. HODGSON CO.

Manufacturers of Portable Houses

116 Washington Street
BOSTON, MASS.

Product.

HODGSON PORTABLE HOUSES.

Description.

The Hodgson Portable Houses have been used in all climates for the last twenty years, and have proved to be practical for many purposes throughout the year. The sides and roofs are of clear red cedar, the floors of rift hard pine. They are made in sections, each section being complete with doors and windows fitted with locks, etc. They are neatly finished inside and painted three coats outside. The sections are securely fastened together with wedge key bolts, there being no threads to rust, and they are quickly assembled by unskilled labor.

They are attractive in appearance, practical for the purpose intended, and durable. They save much expense and annoyance of building.

Hodgson houses are used on the estates of the Ameses, Hunnewells, Fricks, Rockefellers, McAlpins, Carnegies, Astors, Fennos, Lowells, Vanderbilts, Bancrofts, Gardners, Belmonts, Goulds, Cranes, Iselins, Forbeses, etc., being used for overflow houses, play houses, garden houses, chauffeurs' houses, servants' houses, garages, poultry houses, kennels, etc.

It is impossible in this space to give detail and the many uses our portable houses have been put to.

We would be pleased to supply our catalogue, and when you are planning a country estate you will find your client will be interested in our houses for many different purposes.

HODGSON PORTABLE COTTAGE

Cottages are made in units of 6 feet and either 10 feet or 12 feet wide. They have different styles of porches, screened rooms, sun parlors, ells, valley roofs, etc., so that it is possible to make up many arrangements of rooms, porches, etc., and to add to them at any time. They are used as summer cottages, week-end or overflow houses, chauffeurs' and servants' quarters, etc. Prices vary from $150 for one room to $1000 for several rooms

HODGSON PORTABLE CHURCH

Hodgson Portable Churches are made on the unit system, and are found to be very valuable in emergency cases and in trying out certain localities to determine whether it is wise to build permanently. They can easily be moved to new locations at little expense. Prices vary according to size: one to hold 100 to 150 people, costing $1500 to $2000; 500 to 600 people, about $3,000. We quote prices delivered and erected

HODGSON PORTABLE CLUB HOUSE

Hodgson Club Houses are made in sizes from one small room for a few members, costing about $150, to extensive buildings, with all necessary rooms to care for a large number of members, costing several thousand dollars. They are used as permanent buildings; also as temporary buildings, perhaps after a fire or while a club house is being built

HODGSON PORTABLE GARAGE

Portable Garages are made in many sizes and styles and serve every purpose. The prices run from $150 for a small car garage to $1000 for a garage for four cars. These garages are used on many summer and country estates, and will save the purchaser much expense and bother in erecting a more elaborate building

HODGSON PORTABLE KENNEL

Made in many sizes and styles

HODGSON PORTABLE POULTRY HOUSE

Made in many sizes and styles

J. E. PORTER CO.

Manufacturers of Complete Barn Equipment

700 Fremont Street

OTTAWA, ILL.

Products.

Sanitary Steel Cow Stalls and Stanchions; Horse Stall Partitions; Mangers and Feed Racks; Calf, Cow, Bull and Hog Steel Pens; Litter, Feed, Milk and Merchandise Carriers; Feed Trucks; Steel Overhead Track, with all Fixtures; Swinging Steel Cranes; Hay Carriers, Forks, Slings, and Pulleys; Barn Door Hangers and Track.

Sanitary and Practical Construction.

All Porter products are primarily practical and sanitary. Stalls furnished in 1⅝ inch O. D. or 1⅞ inch O. D. steel tubing; also, gray enamel or galvanized finish. Fittings of refined malleable iron, easily assembled with carriage bolts. Standard width of stall, 3 feet 6 inches. Can be varied to suit conditions.

Stanchions give animals maximum freedom, being flexible at top and bottom connections; are easily operated; keep cows in proper positions. Stock must be comfortable to give best results, and Porter equipment means quality and service at reasonable expense.

Carriers are adapted for many installations, such as handling feed, litter, coal and other material.

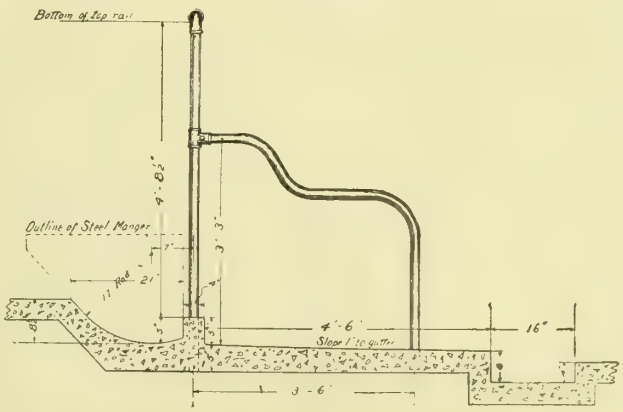
"Hummer" Barn Door Hangers are made of pressed steel, and have roller bearing wheels. Track is a single piece of high carbon steel without welds or rivets. It also serves to protect the top of the door from action of weather.

Free Service.

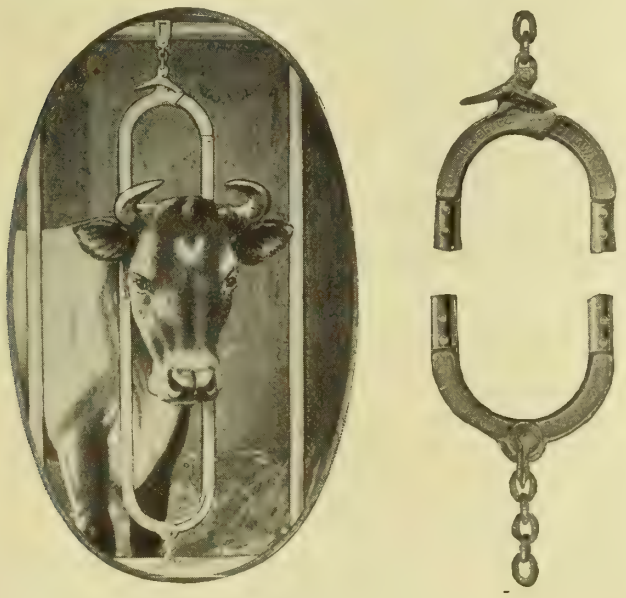
Porter planning department will gladly offer suggestions to parties contemplating building or remodeling barns. Detailed floor plans furnished upon receipt of proper information; no obligation or expense incurred.

Architects' inquiries are solicited, and complete catalogues forwarded upon request.

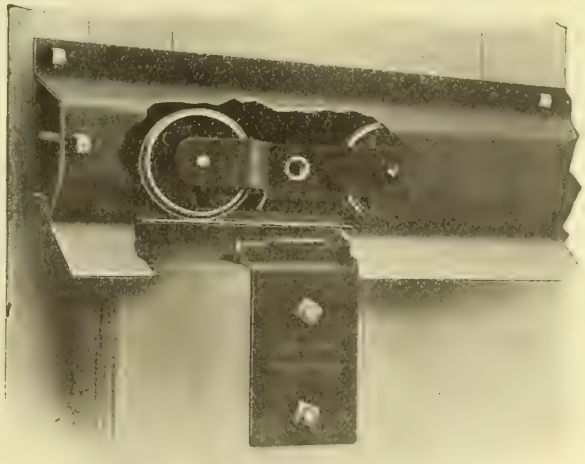
AN EFFICIENT INSTALLATION IN A BARN AT ILLINOIS STATE HOSPITAL



STALL SECTION



TUBULAR COW STANCHION
Strong and practical



"HUMMER" BARN DOOR TRACK AND HANGER

HUNT-HELM-FERRIS & CO.

Manufacturers of Star Barn Equipment

HARVARD, ILL.

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BOSTON, Ames Plow Co.
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PORTLAND, ORE., Monroe & Crisell
SAN FRANCISCO, Beck Hardware Co.
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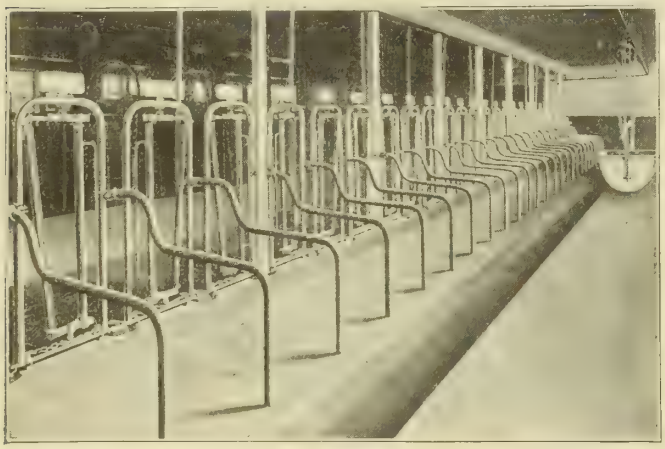
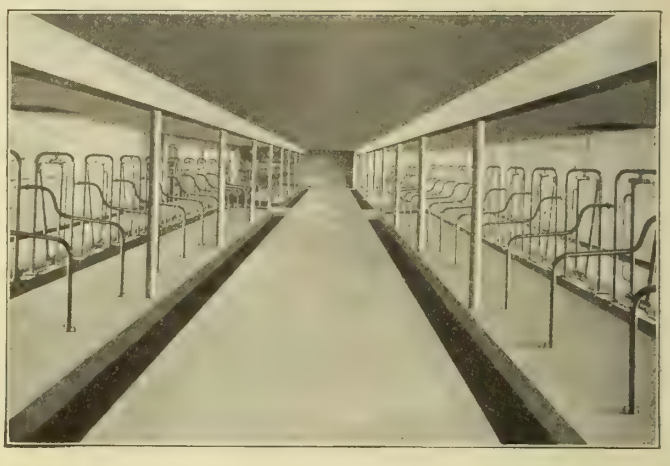
Products.

Dairy Barn Equipment: Stalls and Stanchions; Steel Manger Partitions and Mangers; Water Bowls; Feed and Litter Carriers; Hay Carriers, and Door Hangers.



STAR STEEL STALLS AND STANCHIONS



STAR STEEL STALLS AND STANCHIONS

Service and Co-operation.

Complete catalogues free upon request. Barn Plan Department furnishes expert advice and blue-prints to architects and builders.

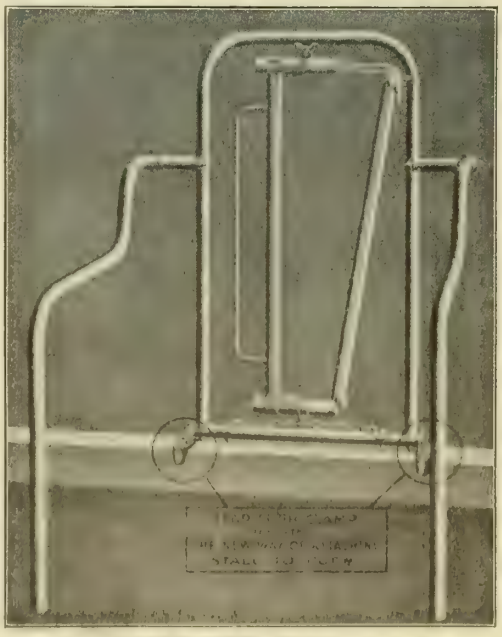
Star Steel Stalls.

Conform to any floor arrangement, and to any arrangement of posts.

Unit System—Each stall an independent unit. Can be put in or taken out at will. Made of best wrought steel tubing, one and five eighth inches outside diameter, bent cold; every piece tested. Fewest possible parts. Stall arch made of one piece without clamps or couplings. Front detachable. May be shifted backward or forward, to regulate length of stall and line cows up evenly at the gutter. Width as desired (three feet six inches is the preferred width in common use).

Stalls assembled before shipment; all parts carefully fitted and bolted into place; a finished product. Saves work of assembling; prevents loss of parts in transit.

No direct connections between steel and concrete; attached to curb by clamp. Rear



STAR STEEL STALL

Four adjustments: Length, width, neck space and tension of double chain fastening of stanchion

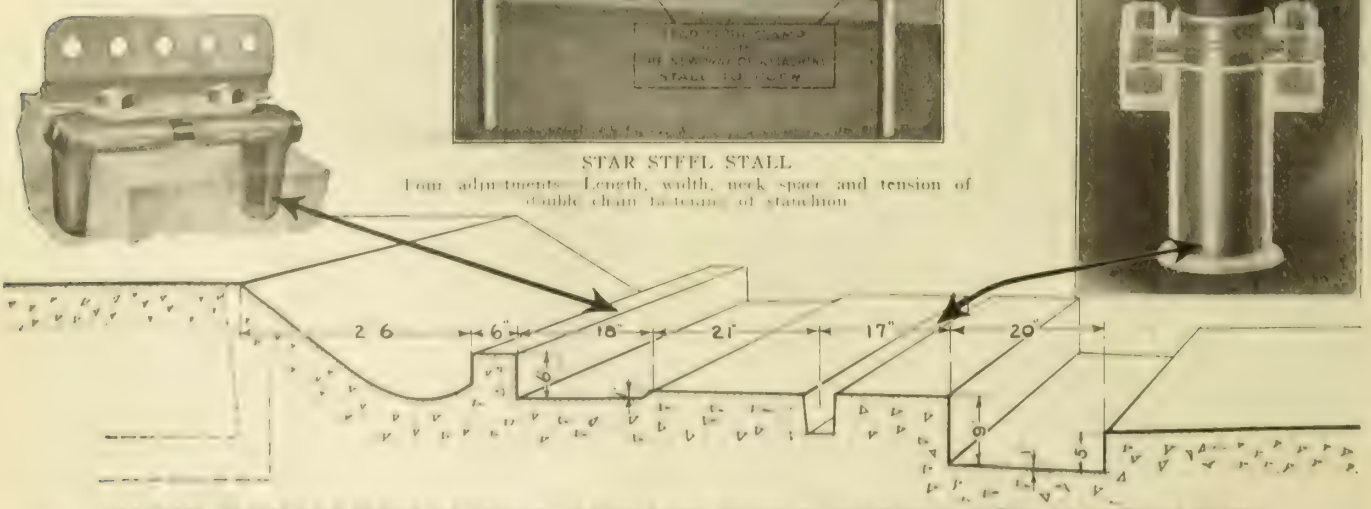


DIAGRAM OF HALF OF FLOOR OF TYPICAL DAIRY BARN SHOWING PREFERRED WIDTH OF VARIOUS PARTS

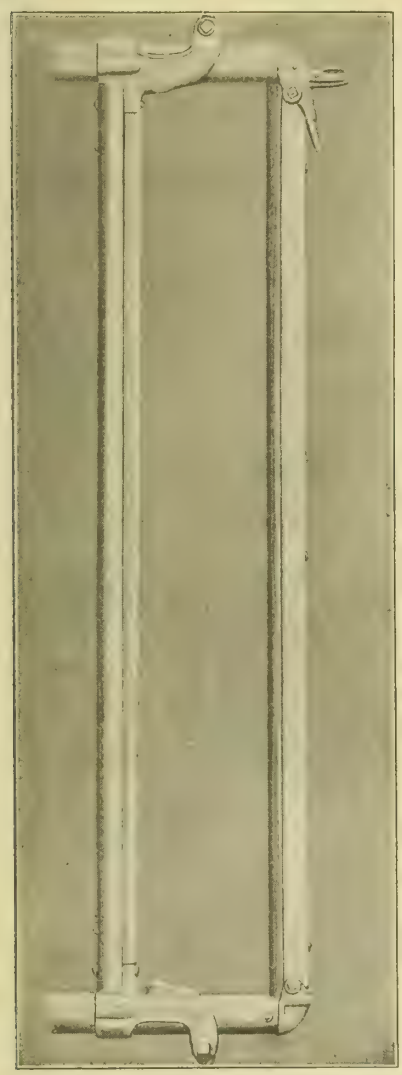
Sweet's Catalogue

Continued on next page

end of partitions anchored in malleable sockets. Build the floor today, set the stalls in place when you wish. Any piece or part can be easily removed and replaced if necessary.

Finish—Battleship gray enamel, applied by dipping, and baked on, after grease and scale have been removed by "chemical" process.

Sure Stop—Automatic, attached to side of stanchion. Prevents cow putting head through wrong opening. Simple, trouble-proof, needs no attention.



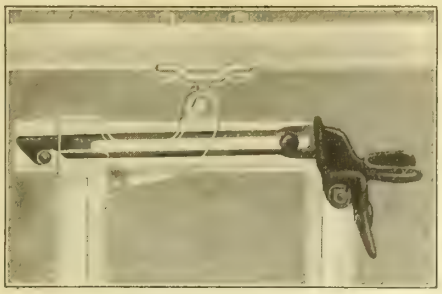
GIANT STAR STANCHION

Adjustable, wood-lined, cow-proof, strong and easily operated.

Uprights of U-bar steel, "throat" side turned with hard maple lining wedged into U-bar, completely filling it. The screws which hold lining penetrate wood 1¼ ins.

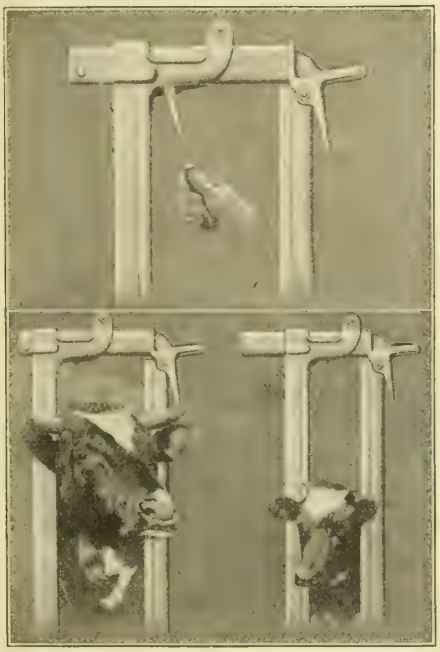
Instantly adjustable in neck width from 5½ to 9½ ins., to fit any animal.

Lock protected and cow-proof, but the stanchion can be opened and unlocked with one hand. Lock fitted with malleable guide, which slides in steel tube that forms top of stanchion. Guide insures register of locking parts, and prevents stanchion from opening too far; takes the strain off hinge, preventing hinge breakage



PROTECTED LOCK OF GIANT STANCHION

Guide prevents stanchion opening too wide and takes strain off hinge. Lock enclosed and protected—cow-proof. Easily opened. Fork attachment holds stanchion in place while open



BULL AND CALF IN GIANT STANCHION

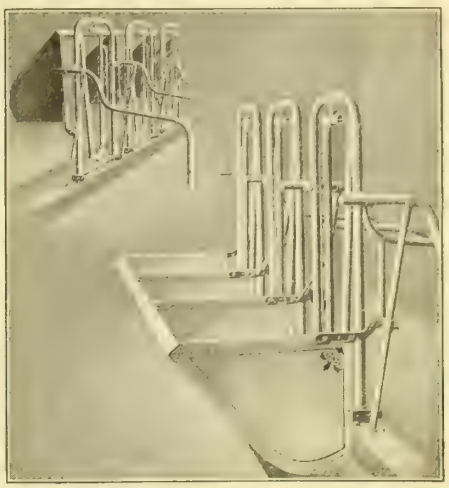
Showing method of adjustment of Giant Star Stanchion

CROSS-SECTION OF GIANT STANCHION

Actual size of U-bar upright, showing method of retaining hard maple lining

CHAIN FASTENING OF STANCHIONS

Noiseless, adjustable double chain fastening at bottom. "Play" is backward and forward, enabling cow to get up easily. No "play" from side to side, so cows cannot reach each others feed. Fastening permits stanchion to hang low enough for comfort without need of making a cut-out in curb. Cut-outs are expensive to make, and permit cow to work feed back into the stall and waste it

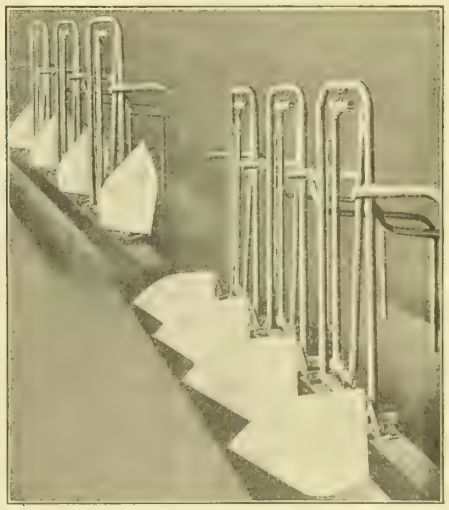


STAR SANITARY SELF-CLEANING MANGERS

No. 18-gauge galvanized steel. Top edge reinforced with 2 x 2-in. angle steel; bottom edge reinforced with 1¼ x 1¼-in. angle steel.

Edge of partitions curled to give stiffness. Angle-steel flange riveted to the partition and bolted to the front.

Made in sections of two to four mangers, with balancing springs and all attachments



STAR ALL-STEEL PARTITIONS FOR CONCRETE MANGERS

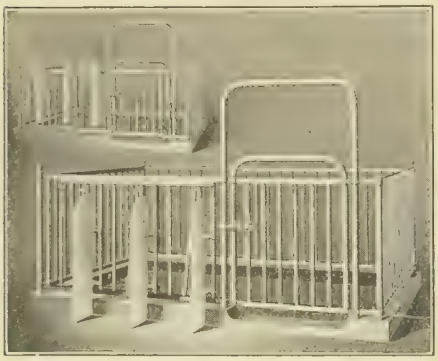
Sheared out of $^{3}/_{16}$-in. sheet steel, and measure 22 in. from curb to nose. Fitted with clamp to attach to curb or posts. Automatic spring bolt sets hinge and holds partition up or down as desired

Manger partition divides concrete manger into individual feed boxes so that diet of cows may be regulated. Less costly than complete steel mangers, do the work fully as well, take up less room and are easier to handle

DIAGRAM SHOWING USE OF WOOD TEMPLATE FOR SHAPING MANGER TROUGH

Furnished free with shipments of stalls

Continued on next page



STAR STEEL CALF PEN

Top and bottom rails, 1⅝-ins. square steel tubing. Uprights, 1 1/16-ins. outside diameter round steel tubing, set 5 inches apart on center, with ends inserted in top and bottom rails. Height, 47 inches.

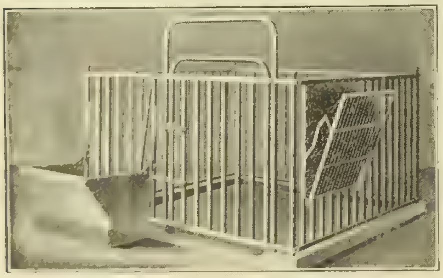
Half-inch bolts running through uprights keep top and bottom rails from spreading.

Gates 3½ ft. wide, built into continuous arch of 1⅝-ins. outside diameter tubing, swung on three-leaf offset hinges in another arch of same construction and design.

Single barrel spring bolt automatic lock. Opens by turning 4-in. wheel.

Stanchions included without charge 20 or 25 ins. apart. Open and close all at once or one at a time. Fitted with spring latches.

Feed Guards made of No. 18-gauge galvanized steel. Edges reinforced. When raised for cleaning are held up by gravity catch which engages top rail



STAR STEEL BULL PEN

Same as calf pen, except that it measures 58 ins high, and top and bottom rails are 1½ x 2½-ins. rectangular steel tubing. Uprights 1⅝-ins. outside diameter round tubing, spaced 6 ins. on center.

Same style gate as calf pen, double barrel automatic lock, opened by turning wheel.

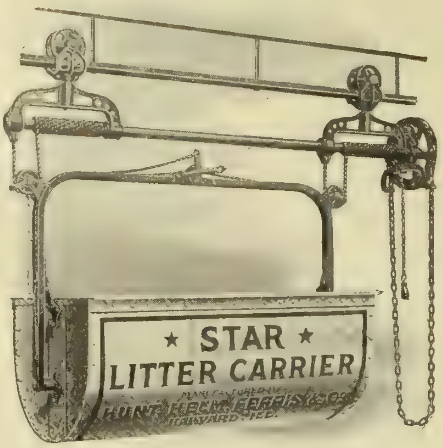
Rigid stanchion of steel U-bar, wood-lined and filled. Adjustable to any desired neck [illegible]

Self-cleaning manger. Held up by balanc[illegible]

STAR STEEL COW PEN

[illegible] Bull Pen 58 inches high.

All [illegible]



STAR LITTER CARRIER

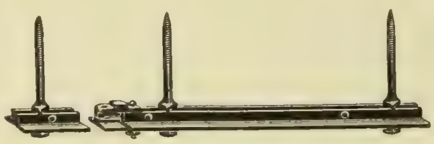
Hoisting device is simple windlass with main shaft on roller bearings at all four points of support.

Drive wheel pinned to end of shaft. No cogs or gears.

Tub is made of No. 18-gauge steel, reinforced with angle-iron. Made in four sizes, fitted with rigid bail. Locks at both ends, dumps either way.

Roller bearing tracker wheels, 5 ins. diameter. Placed opposite each other in pairs, giving an even bearing on both sides of track.

Carrier designed for heavy work and built accordingly. Heavy construction and absence of complicated parts make it practically trouble proof; nothing about it to get out of order



STAR DOUBLE ANGLE STEEL TRACK

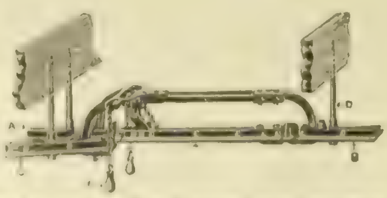
Made of 1-in. angle steel, separated by steel spools. Continuous vertical slot in track permits track supports to be located at any point.

Track is supported by lag screws fitted with shoulder, and provided with threads where head would ordinarily be. Track slips over lag screw; is brought up snug against the shoulder, and held by a burr and washer. Firm, rigid construction, permitting track being accurately leveled.

Hangers furnished in several lengths; longer hangers being used when necessary for track to clear beams supporting joists.

Removable sections of track, either in short pieces 18 ins. long, to permit the operation of sliding doors; or reinforced sections, 3 to 4 ft. long, to be taken out for other reasons.

Curves bent on four-foot radius. Ninety degree curves take place of eight feet of track



STAR TWO-WAY AUTOMATIC SWITCH

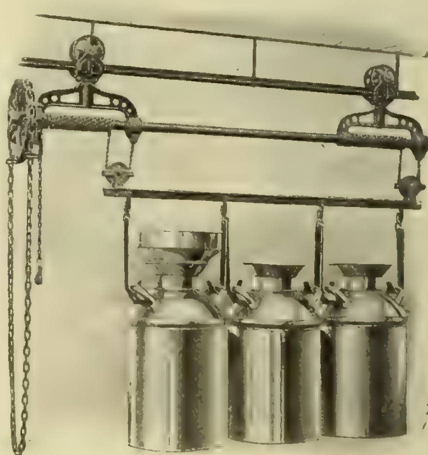
Three-way switch also furnished. By use of curves and switches Star steel track conforms to any arrangement

STAR SWINGING BOOM

Made of two parallel lengths of 2-in. angle steel, clamped together at intervals of two feet. Completely assembled with track supports, braces and guy wires, in lengths of 15, 20, 30, 35 and 40 ft. Telescoping removable section connects track on boom with that inside barn. Guy wires to be fastened at a point at least half as far above boom as boom is long.

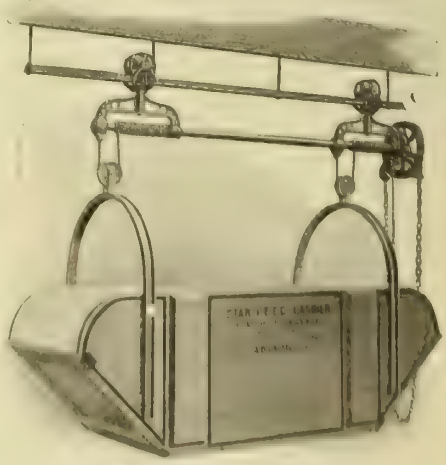
Use of swinging boom does away with posts which would otherwise be necessary to support the litter carrier track in barnyard.

Boom can be swung back against barn, leaving barnyard entirely free of obstruction



STAR MILK CAN CARRIER

Operates on same track as litter carrier



STAR FEED CARRIER

Same as litter carrier, except provided with different style box. Capacity, 16 bushels

Continued on next page

STAR WATER BOWLS FOR DIRECT PRESSURE SYSTEMS

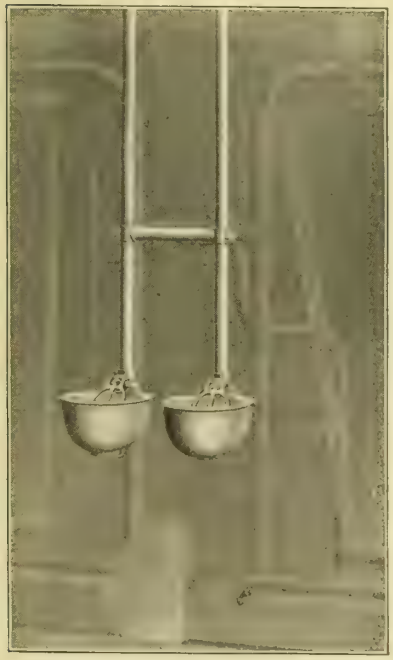
Operate under any pressure. Valves open to permit flow of water by pressure upon a leaf, or paddle, which hangs diagonally into bowl.

When pressure on leaf is withdrawn valve closes automatically.

Valve is easy to get at in case replacements are necessary.

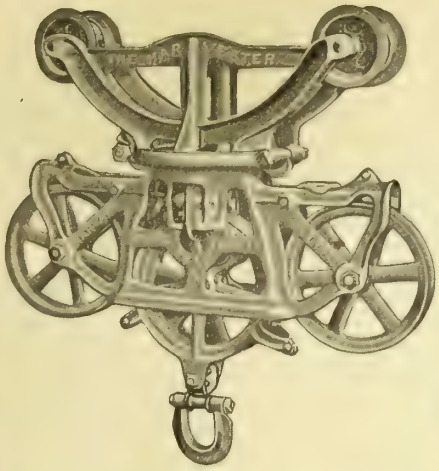
All objectionable features of indoor water systems are overcome and new advantages added in Star Water Bowl.

Water in plain sight of cow; nothing but fresh water enters bowl. No communication between bowls; made without a cover; leaf or paddle may be raised for convenience in cleaning. Used with 1-inch pipe; connected from either above or below. Attachments provided to hold bowls in place. Specify make of equipment to which stalls are to be fastened, so that proper attachments may be sent



INSTALLATION OF STAR WATER BOWLS

Arranged so as not to interfere with raising of mangers or manger partitions



NO. 493 HARVESTER HAY CARRIER

Made in a dozen different styles to handle hay with either forks or slings. Above is shown the popular No. 493 reversible fork carrier, made with 7-in. sheaves, either plain or roller bearing. May be fitted with sling pulleys if desired.

Carrier has an extra long wheel base and runs smoothly and easily.

Nuts on all frame bolts are locked with Star Nut Locks. This prevents frame bolts from working loose and keeps the frame rigid and strong.

Lock is made without springs. Being built on the double grapple principle, it permits pulley to enter at any angle and holds it securely

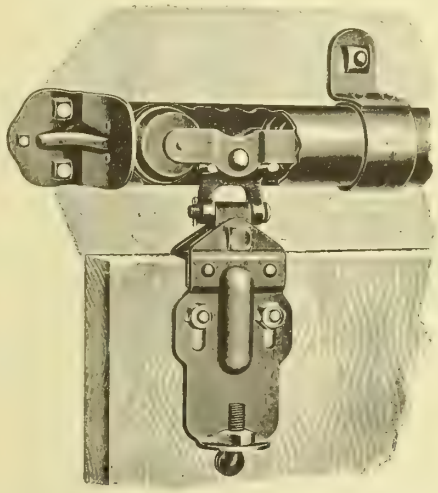
STAR DOUBLE FLANGE TRACK FOR HAY CARRIER

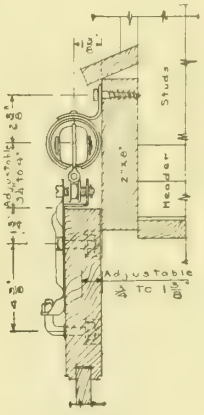
Track has depth as well as breadth, and will test one third stronger than any other track Continuous slot in top of track permits hangers to conform accurately to any arrangement of rafters.

Hay carrier track is more easily installed before roof is closed in.

STAR FEED TRUCK

Sides made of redwood with slanting ends. Bottom made of No. 18-gauge galvanized stock, without seams. Box measures 68 x 26 ins., 24 ins. high, balanced on 12-in. wheels; space necessary for clearance, 36 ins. Rear swivel wheel permits it to be turned in its own length





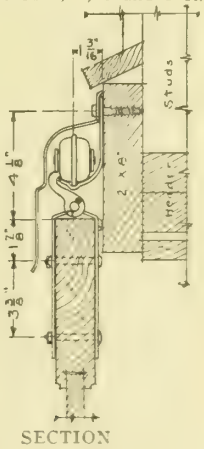
SECTION

CANNON BALL BARN DOOR HANGER

Ten styles, with steel ball wheels of special design, mounted on strong steel truss frame. Wide tread and an even bearing on both sides of slot in track.

All roller bearing, flexible, noiseless and run without friction.

Track is waterproof, bird-proof and self-cleaning. Furnished in 3, 4, 6 and 8 ft. lengths



WEATHER-PROOF CANNON BALL HANGER SECTION

Ten styles, equipped with steel ball wheels. The bead of wheels runs in a groove; wide tread and even bearing on both sides of the groove. Cover, which extends below top of door, prevents rain, snow, sleet or dust from being driven into barn.

Roller bearing, flexible, noiseless and bird-proof

JAMES MANUFACTURING COMPANY

James Sanitary Dairy Barn Equipment

246 Cane Street
FORT ATKINSON, WIS.

Products.

The James Line of Sanitary Steel and Wood Cow Stalls; Steel and Wood Stanchions; Sanitary Steel Calf Pens, Bull Pens, Cow Pens and Box Stalls; Manure, Feed and Milk Can Carriers; Feed Trucks; Watering Buckets; Concrete Filled Steel Supporting Columns; Ventilators for Dairy Barns, Factories, etc.; and miscellaneous Barn Equipment and Supplies.

Also, Cork Brick, Hog and Sheep Pens, and Fixtures for Horse Barns.

Co-operative Barn Designing Service.

The James Co-operative Service Bureau is established as a "Clearing House" of ideas on barn building and equipment, especially dairy barns for dairy farmers and large country estates; the specific purpose being to furnish architects any information they may need relating to the practical end of dairy barn designing.

Dairy farmers are finding it profitable to install equipment of a permanent nature requiring a considerable investment; hence the necessity of securing the services of an experienced architect to design the barn with the assistance of dairy barn experts, making certain at the time the barn is built that all dimensions are correct to accommodate properly the modern equipment that will sooner or later be installed.

Many other items peculiar to the dairy business, varying according to the particular phase of the business being conducted, also enter into the problem.

Our Service Department is under the personal supervision of W. D. James, General Manager of the Company, known among dairymen as a leading authority on dairy barns. Mr. James was born and raised on a dairy farm. Many years of practical experience as a dairyman have made him thoroughly familiar with every detail of the dairy business, from the cleaning of the barn to the handling of the profits. His personal contact with dairymen from all over the country at agricultural fairs and dairy shows and his visits to dairy farms have given him an intimate knowledge of the varied barn needs of dairy farmers in every section. For years architects building barns for dairy farmers throughout the United States have been submitting their floor plans to Mr. James for his criticism and suggestions, and many hundreds of barns of all kinds and sizes have been designed with his cooperation.

This, together with his experience as an inventor and manufacturer of dairy barn equipment, makes his advice and suggestions of great practical value.

Associated with him in the Service Department is a staff of competent draftsmen.

The James Service Bureau is, therefore, in a unique position to furnish complete information relating to the practical, every-day interior working conditions in the modern dairy barn.

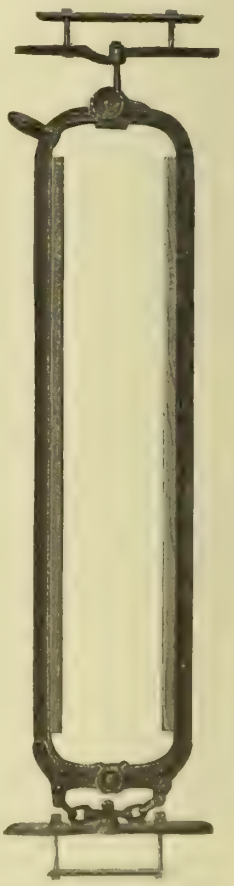
Architects are cordially invited to avail themselves of any information in our possession. No obligation of any nature is incurred by so doing, nor is any charge made for the service, the Service Bureau being established to aid in the improvement of dairy barns and to put us in touch with prospective users of barn equipment, cooperating with the architect making the plans to the full extent of our wide experience.

James Cow Stalls and Stanchions.

The James line includes both steel and wood stalls and stanchions, to be used preferably with cement floors. High-carbon steel tubing, 1⅝-inch or 1⅞-inch outside diameter, is used for frame work and partitions. Mangers are of the best Apollo bloom No. 20 galvanized sheets, and all couplings and fittings of the best malleable iron. Stalls and stanchions are furnished with a baked enamel finish.

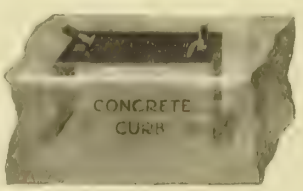
Stall 14-A comprises steel framework with the best malleable sanitary clamps; the 14-J stanchion, wood lined, with alignment device, double chain hanger, James anchor, and the James lock; the James sure-stop swinging post and lock-open device; the James triple-curve stall partition with its sure holding flange for cement floors; and the James sanitary self-cleaning manger with manger lifting springs, which makes it convenient to water cows in the manger bottom. All other James steel stalls are identical in construction, the only difference being that some of the special features are omitted. Prices range from $4.25 up.

Steel stanchions of high-carbon steel tees are lined with best quality birch.



NO. 1-J. ALIGNMENT, DOUBLE CHAIN HANGING, WOOD LINED STEEL STANCHION

Weight approximately 27 lbs. Price with fittings for wood frame, $1.90 each. For stanchion adjustable in width of neck space, and other stanchions, see catalogue.



JAMES STANCHION ANCHOR

Shows method of attaching stanchion to concrete curb; a bolt may be easily inserted or taken out. A similar anchor is used for the stall post.

Carbon steel tees used in stanchions are 1¼ by 1¼ by ⅛ inches. Stanchion lock, lock open clip and hinge of best malleable iron, riveted to tees with ¼ inch rivets. All steel stall equipments are made up according to width of stalls, number in row, etc., to meet requirements of space and kind of cows.

Continued on next page

Special Features.

The James Stalls and Stanchions are far more than mere cow ties; special patented features save time, feed, labor and money, sufficient to pay for the equipment with one year's use.

The Alignment Device adjusts length of stall to fit the cow, aligning all cows evenly at the rear; the litter falls in gutter, keeping the stalls and cows clean.

The Sure-Stop Swinging Post and Lock-Open Clip prevent cow putting her head in the wrong place, steer the cow right into the open stanchion. When stanchion is closed, Sure-Stop swings out of the cow's way, affording her maximum freedom.

The Double Chain Hanger permits building the manger curb level, sufficiently high so the cow can not nose her feed out of the manger back under her feet; yet stanchion hangs low enough not to interfere with the cow's comfort when lying down. Chains being attached at sides, hinge is relieved of undue strains. Hinge is of unusually strong construction.

The Self-Cleaning Manger permits feeding cows according to their individual needs; does away with the labor required in keeping rigid mangers clean; prevents waste of feed and effects other savings. Manger has no bottom; a trough in the concrete floor serves this purpose. When the manger is raised the trough can be used for watering cows.

NOTE—Awarded Grand Prize (highest award possible) at Panama-Pacific International Exposition.

Bull Pens, Carriers, Watering Buckets, Ventilators, etc.

Bull pens, calf pens, and cow pens are of high carbon steel tubing, with all clamps and fittings of best malleable iron, shipped in panels.

Lack of space prevents a statement of the other special features embodied in James stalls and stanchions, and in pens, ventilators, carriers, watering buckets, horse stable equipment, etc. Those interested are urged to send for our free book, "The James Way."

Prices.

The prices given in connection with illustrations will give an approximate idea of cost. Prices are f.o.b. Ft. Atkinson, Wis., and subject to change without notice.

Catalogue.

The James catalogue is a splendidly illustrated and carefully prepared book of 272 pages, size 7 by 10 inches, and bound in boards. This book, "The James Way," not only gives full information regarding James equipment, but also contains much information relating to the practical conditions necessary in the dairy barn.

Installation.

Neither skilled nor experienced labor is needed for the erection of James equipment.

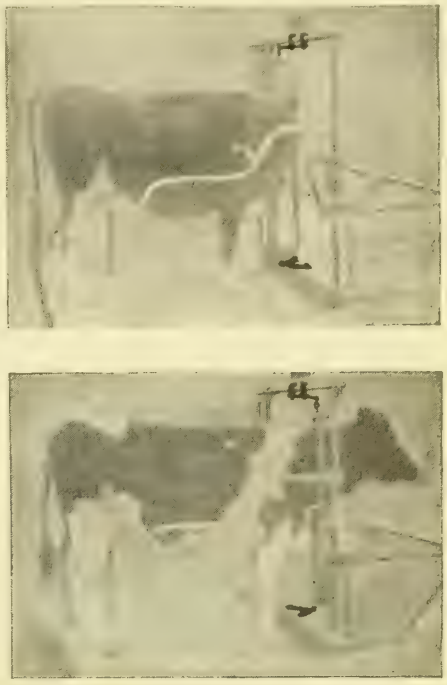
James stall posts and stanchions bolt to anchors set in the concrete curb, and James pens are erected by setting corner and gate posts in tubular anchors, bolting the pen panels to the posts, as shown on following page. Pens are shipped assembled in panels. Stalls are shipped assembled, knocked down for convenience in handling and erection; all fittings are properly attached at the factory.

The installation of James carriers, water buckets, etc., is equally simple. Complete instructions for installation with floor plans accompany every order.

If James equipment is to be used a manger pattern and instruction sheet, and anchors—the only part of equipment required at time cement is laid—should be secured from us before the cement floor is put in.

Anchors.

Stocks of anchors are carried at various points throughout the country, so that, in emergency, delivery of same can be made quickly.

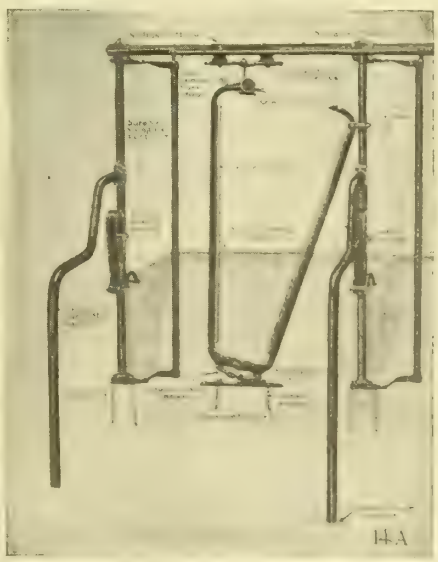


ALIGNMENT DEVICE

Showing alignment adjusted back for a short cow, and adjusted for ward for a long cow. Has seven adjustments, a total of 10½ inches in all, providing for seven sizes of cows

SANITARY FITTING

Edges overlap, preventing accumulation of dust



14-A STALL

Weight about 115 lbs.; price, $11.00. Additional end to finish row of stalls, $3.50

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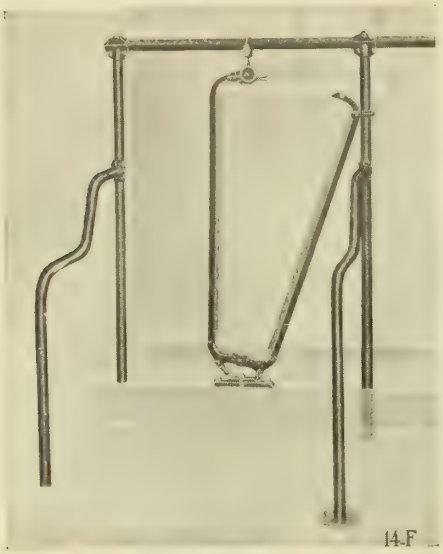
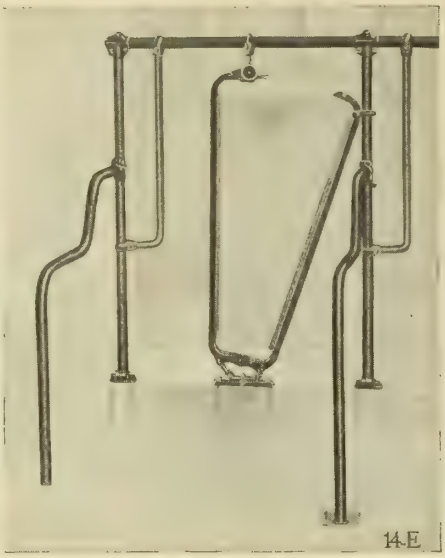
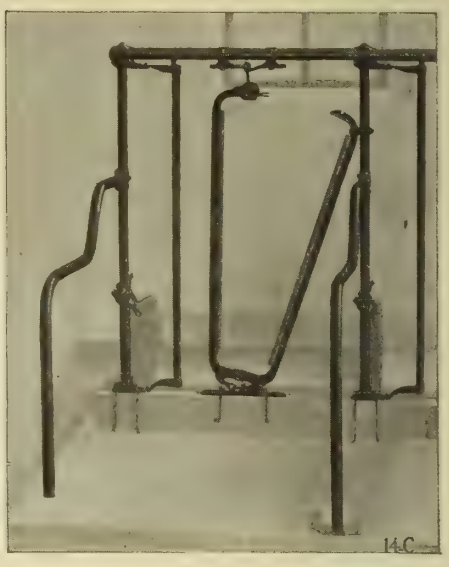


14-F STALL
Weight, about 71 lbs.; price, $4.25. Additional end to finish row of stalls, $2.00

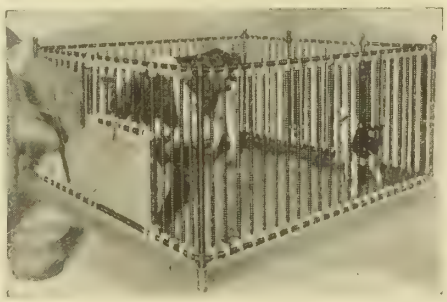


14-E STALL
Weight, about 75 lbs.; price, $5.25. Additional end to finish row of stalls, $2.00

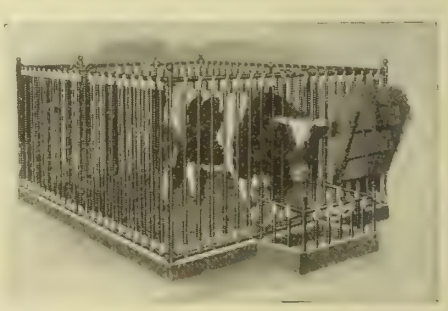


14-C STALL
Weight, about 101 lbs.; price, $8.85. Additional end to finish row of stalls, $3.85

JAMES SANITARY STEEL CALF PEN



JAMES SANITARY STEEL COW PEN

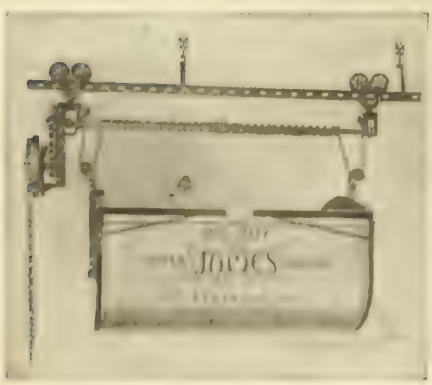


JAMES SANITARY STEEL BULL PEN

CORNER POST OF PEN, SET IN TUBULAR ANCHOR

INSTALLATION JAMES STEEL PENS AND STANCHIONS

Prices on pens, etc., quoted on application



JAMES "BIG BOY" LITTER CARRIER
No. 2. Price $25.00, without track or hangers. Weight, 200 lbs. Capacity, 16 bushels

JAMES FEED CAR
Price, without track or hangers, $24.50
Weight, 250 lbs. Capacity, 16 bushel

JAMES FEED TRUCK
16 bushel truck, $16.00 Weight, 200 lbs.
25 bushel truck, $22.50 Weight, 265 lbs.

Continued on next page

OUTSIDE SUPPORT FOR CARRIERS
Prices quoted on application

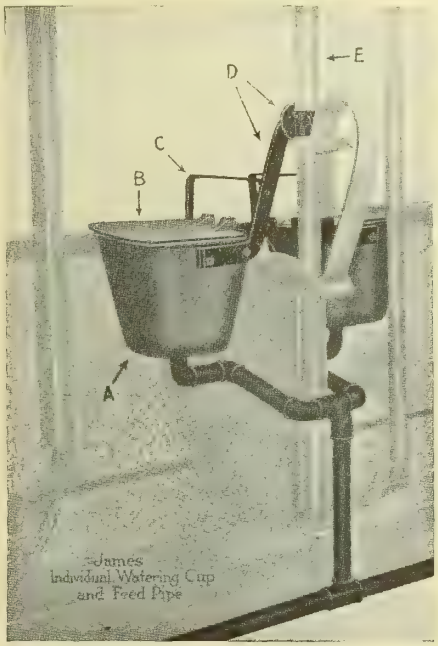
Carrier Track and Hangers.

Price of track with splice bars and bolts, per foot, 12 cents. Hangers with nailing plates, including nails, $1.68 per dozen. Hangers with extension bolts, either with nailing plates or ceiling plates, additional.

FROM GUTTER TO FIELD WITH BUT ONE HANDLING

JAMES SWINGING STEEL CRANE
30-foot, $25.00; 35-foot, $28.00; 40-foot, $32.00, complete

JAMES INDIVIDUAL WATERING CUPS
Complete with fittings for attaching to 1⅝-inch or 1⅞-inch O. D. piping (with pipe assembled to connect with feed pipe), per bucket, $2.35
Galvanized supply tank, 10 x 24 x 14 inches, with cover, $3.00. Supply tank fittings, including ball valve and float, $2.50



DETAILS OF JAMES INDIVIDUAL WATER CUP

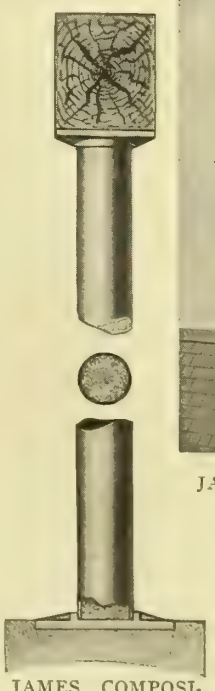
A. Cast iron, 8½ by 9½ by 9½ inches.
B. Malleable cover.
C. Guard to prevent cover tipping back.
D. Fitting to attach to stall post (E).

James Composition Columns.

Outer shell of high grade new steel, rolled especially to withstand high pressure, filled with red granite, torpedo washed sand and Portland cement.

PRICES, COLUMNS
Including Cap and Base

Diam.	3½-in.	4½-in.	5 in.
7-ft.	$3.20	$5.25	$5.50
7½-ft.	3.50	4.95	5.95
8-ft.	3.80	4.55	6.40
8½-ft.	4.10	4.20	6.80



JAMES COMPOSITION COLUMNS

JAMES HORSE STALL FIXTURES
Complete information on application

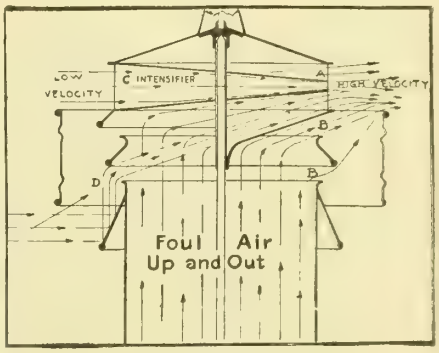
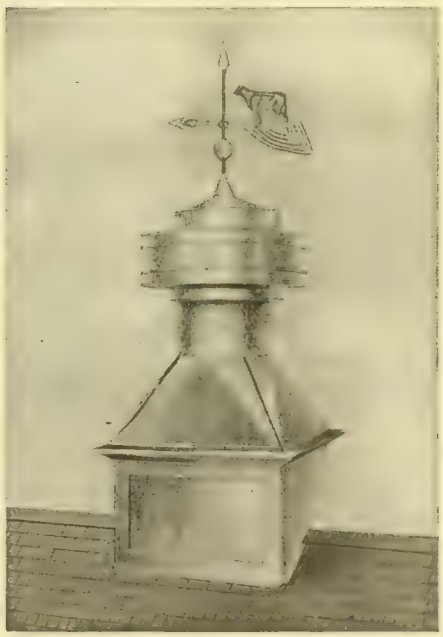


DIAGRAM OF JAMES VENTILATOR WITH REVOLVING HEAD
Top revolves on a hardened steel point, the vane keeping opening "C" always toward the wind. The tapering intensifier "speeds up" the wind, so that it leaves "A" at highest velocity. This creates suction in the vicinity of "A," exerting a powerful pull on the air in the flue

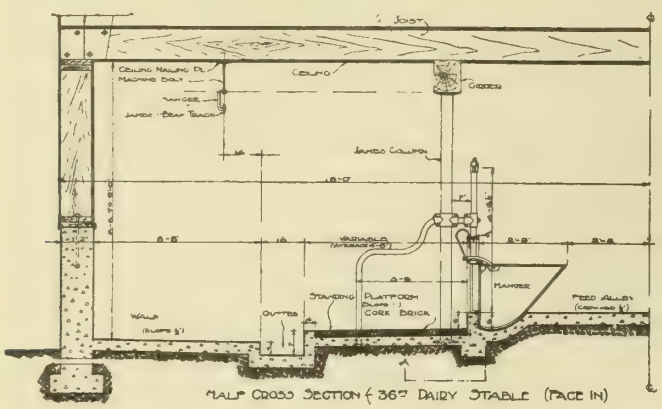


JAMES VENTILATOR WITH REVOLVING HEAD

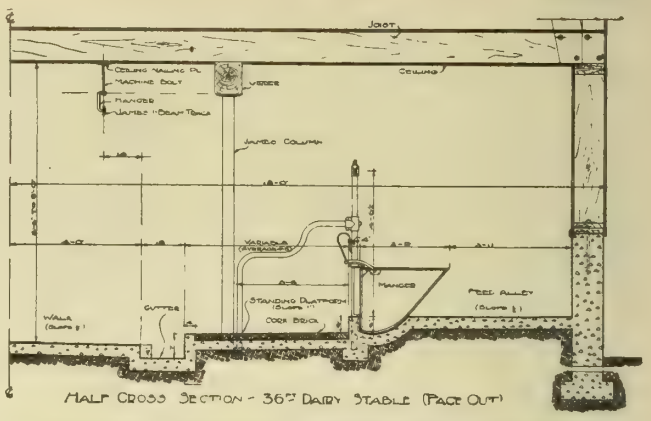
PRICES — 24-inch diameter barrel, height 10 feet 8 inches, $40.00; 30-inch diameter barrel, height 12 feet 3 inches, $45.00

Other types of ventilators for factories, etc. Full information and prices on application

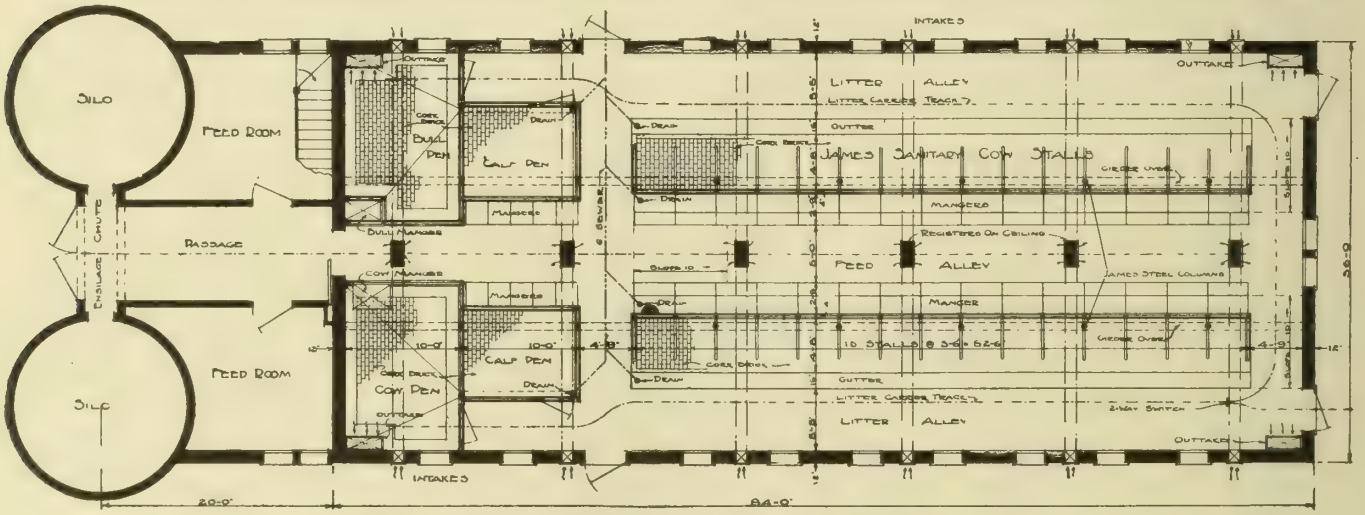
Continued on next page



CROSS SECTION OF TYPICAL DAIRY BARN, FACING COWS TO CENTER



SAME BARN ARRANGED TO FACE COWS TO THE WALL



FIRST FLOOR PLAN OF TYPICAL DAIRY BARN

PARTIAL LIST IMPORTANT INSTALLATIONS

Public and Religious Institutions

Society of the Divine Word, Techny, Ill.
State Hospital, Peoria, Ill.
Notre Dame University, South Bend, Ind.
State Tuberculosis Hospital, Rockville, Ind.
Syracuse University, Syracuse, N. Y.
Home for Feeble Minded, Lapeer, Mich.
State Hospital, Morris Plains, N. J.
Jewish Protectory, Hawthorne, N. Y.
Women's Relief Corps Home, Oxford, N. Y.
Department of Charities and Correction, Cleveland, Ohio
State Hospital, Athens, Ohio
State Farm, Lassiter, Va.
McKane County Home, Smithport, Pa.
Hospital for Chronic Insane, Wauwatosa, Wis.
Wheelock Indian Academy, Millerton, Okla.
U. S. Indian School, Pipestone, Minn.
U. S. Experimental Farm, Beltsville, Md.
Indian School, White Earth, Minn.
Indian School, Flandreau, S. Dak.
Indian Agency, Crow Creek, S. Dak.
U. S. Experimental Farm, Corozal, Panama
Lower Brule Indian Agency, Chamberlain, S. Dak.
Kickapoo Indian School, Horton, Kan.
State Hospital, Norfolk, Neb.
State Hospital, Yankton, S. Dak.
Panama-Pacific Exposition Dairy Barn, San Francisco, Cal.
Training School, Vineland, N. J.
State Hospital, Vineland, N. J.

Institutions for Well-Known Business and Professional Men

L. S. Clough, Warren, Pa.
Colonies Du Pont (E. I. Du Pont de Nemours Powder Company), Wilmington, Del.
Robert Jemison, Birmingham, Ala.
Union Stock Yards, Chicago, Ill.
W. E. Flanders, Detroit, Mich.
John D. Rockefeller, Pocantico Hills, N. Y.
James J. Hill, Northwest, Minn.

C. C. Weber (Deer and Weber), Minneapolis, Minn.
Mayo Wood Farm, Rochester, Minn. (Drs. Mayo, owners)
Elbert Hubbard, East Aurora, N. Y.
Wm. R. Wood (Hotel Gotham), New York, N. Y.
James A. Gamble, Cincinnati, Ohio
E. L. Philipp, Governor of Wisconsin
F. K. Babson, Chicago, Ill.
H. W. Gossard, Chicago, Ill.
S. P. Stevens (Reid, Murdock & Co.), Chicago, Ill.
E. J. Tilden (Libbey, McNiel and Libbey), Chicago, Ill.
P. M. Sharples (Sharples Separator Co.), West Chester, Ill.
E. A. Stuart, Pres. Pacific Coast Condensed Milk Co.
Horlick's Condensed Milk Co., Sherman, N. Y.
Borden's Condensed Milk Co., Walkill, Edmiston and Earlville
E. N. Belding (Belding Silks), Rockville, Conn.
M. P. Moeller (Moeller Organ), Hagerstown, Md.
C. H. Jones, Pres. Commonwealth Shoe Co., Boston, Mass.
Ed. C. Lasater, Falfurrias, Tex.
Maxwell Norman, Boston, Mass.
Geo. S. Baldwin, Appleton, Wis.
L. M. Bowers, Chairman Executive Committee Colorado Steel & Iron Co., Binghamton, N. Y.
Geo. C. Eastman, Rochester, N. Y.
Leroy B. Williams, Syracuse, N. Y.
August A. Busch, St. Louis, Mo.
Wm. J. Lemp, St. Louis, Mo.
E. A. Lemp, St. Louis, Mo.
Billy B. Van (Actor), George's Mills, N. H.
Gustave Pabst, Milwaukee, Wis.
Fred Pabst, Milwaukee, Wis.
Oliver Cabana (Liquid Veneer), Buffalo, N. Y.
Post Land Co. (Postum Cereal Co.), Battle Creek, Mich.
W. W. Wentworth (Battle Creek Sanitarium), Battle Creek, Mich.
Postal Farms (Griswold Hotel), Detroit, Mich.
Morton Plant, Branford, Conn.
F. A. Sieberling (Goodyear Rubber Co.), Akron, Ohio
Ohio C. Barber, President Diamond Match Co., Barberton, Ohio
Col. F. O. Lowden, Oregon, Ill.
Fred Harvey, Kansas City, Mo.
Anaconda Copper Mining Co., Bozeman, Mont.

Send for Catalogue

THE LOUDEN MACHINERY COMPANY

Barn Equipment For Horse Barns, Cow Barns, Hog Houses, Sheep Sheds, Poultry Shelters

66 West Broadway
FAIRFIELD, IOWA

Products.

For Cow Barns—Steel Cow Stalls, Tubular Steel Stanchions, Steel Wood-Lined Stanchions; Steel Animal Pens; Litter Carriers, Feed Carriers, Feed Trucks; Hay Forks, Slings, Carriers, Hoists, Track and Fittings; Barn Door Hangers; Garage Door Hangers.

For Horse Barns—Automatic Feed-Saving Hay Racks, Sanitary Grain Boxes, Special Wrought Iron Stall Guards; Litter, Feed and Harness Carriers and other Special Equipments.

Automatic Hay Racks for feeding Horses, Cattle and Sheep, Sanitary Feed Mangers; Cupolas and Ventilators for Barns.

Cow Stalls.

For the framework of Louden Sanitary Cow Stalls, high carbon steel tubing is used; standard size, 1⅝-inch outside diameter; heavy size, 1⅞-inch outside diameter.

Stall partitions are of same material. Stalls are fitted throughout with overlapping dustproof connections of refined malleable iron. (See illustration.)

Stalls may be fitted for cement or wood floor.

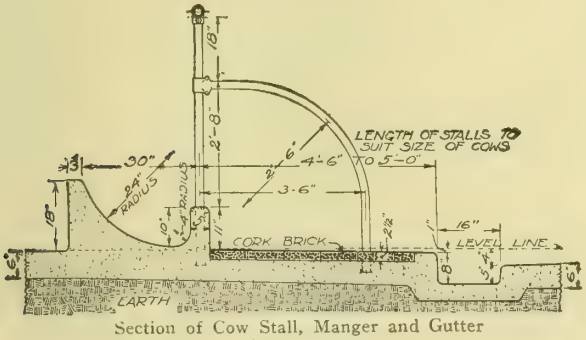
Stalls are finished with heavy coat of aluminum paint. Can be galvanized at extra cost.

May be fitted with tubular steel or steel wood-lined stanchions.

Stanchions.

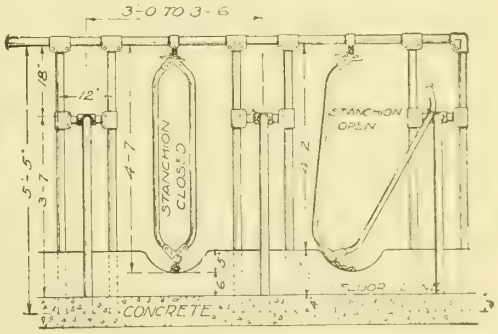
Louden Cow Stanchions may be hung in either wood or steel frame. Made in two styles, tubular steel

Fig. 812. LOUDEN COW STALLS
Standard size tubing, 1⅝-inch, Outside diameter
Heavy size tubing, 1⅞-inch, Outside diameter

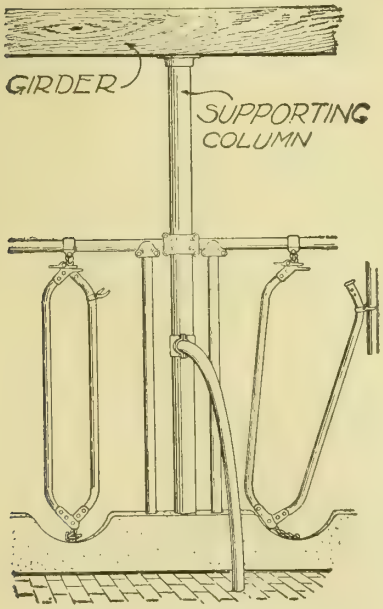


Section of Cow Stall, Manger and Gutter

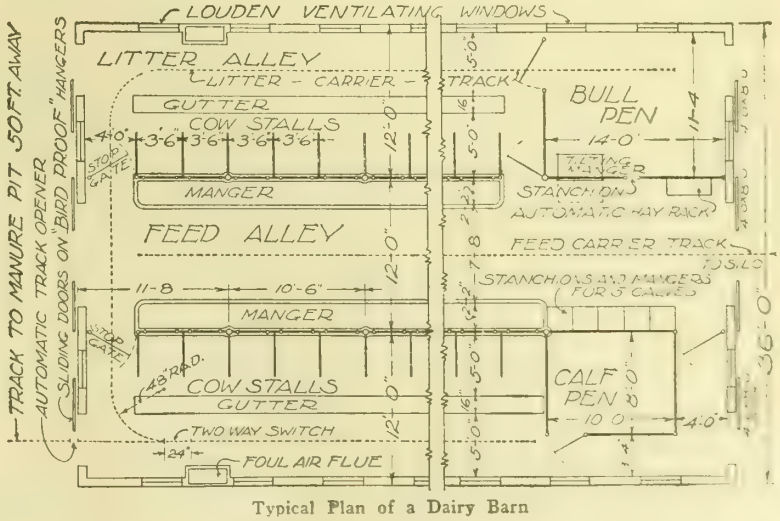
Louden Overlapping, Dustproof "T" Connection



Elevation of Louden Cow Stall No. 812



Method of connecting Louden Steel Stall Frame to Pipe Uprights



Typical Plan of a Dairy Barn

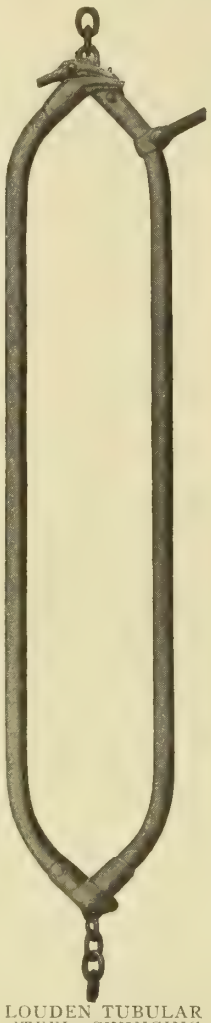
PLANS AND DETAILS OF APPLICATION OF LOUDEN COW STALLS

Continued on next page

and wood-lined. Each is fitted with latch and hinge of the best malleable iron. Width of each stanchion is seven inches inside. Length, not including chains, four feet.

Special Features—By means of Louden Adjustable Stanchion Holders, stanchions may be adjusted forward or backward to align cows evenly on gutter.

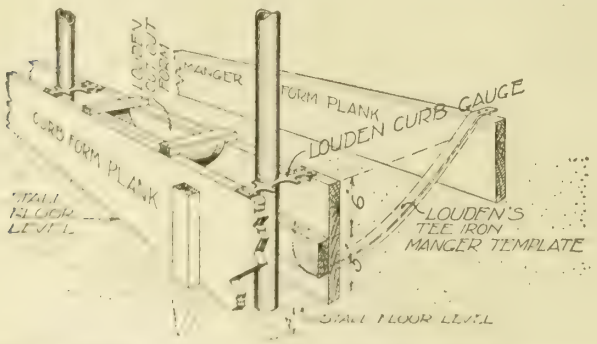
Louden Stanchions may be used either with or without built-up curb. Built-up curb should be used, however, on account of the fact that it allows curb to be built ten or twelve inches high, and still permits stanchion to swing near floor, giving the cow the utmost comfort and freedom, but not permitting her to nose feed out of her manger.



LOUDEN TUBULAR STEEL SWINGING STANCHION

Spring Balance Mangers and Manger Divisions.

Louden Spring Balance Mangers and Manger Divisions are built of best No. 18 galvanized steel sheets, heavily reinforced with angle-iron. Brace rod across top of each section adds rigidity, and prevents feed being nosed out of manger. They are fitted with coil springs which make them easily raised and lowered. The attachment of the springs is such that they can be adjusted to help hold the division down when feeding, and thus prevent the cows from nosing them out of position. With the different sizes of springs and with the complete and convenient adjustment, any size or weight of manger division may be balanced to perfection. Can be furnished with any Louden Stall.



DETAIL SHOWING LOUDEN SYSTEM OF MANGER CONSTRUCTION

Calf, Cow and Bull Pens.

Louden Calf Pens—(See Fig. 1021.) Top and lower rails and gate posts are of 1⅝-inch outside diameter steel tubing. Uprights are of 1⅜-inch outside diameter steel tubing. Pens may be furnished with or without individual mangers to raise and lower.

Louden Cow Pens—May be used on either cement or wood floor. The top rail, gate, manger and corner posts are of 1⅝-inch outside diameter steel tubing. May be furnished with or without tilting feed manger. The feed manger furnished with cow pen is made of galvanized iron, strongly reinforced. Height of cow pen, four feet six inches.

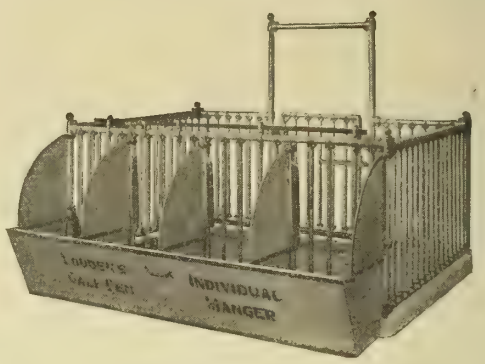


FIG. 1021. LOUDEN CALF PEN WITH INDIVIDUAL SPRING BALANCE MANGER

Mangers are fitted with Antisucking Guards. All stanchions in straight panel may be opened or closed with a single effort, by means of a lever bar. May also be operated singly

Louden Bull Pens—Top rails, corner posts and gate posts are of 1⅞-inch outside diameter steel tubing. Uprights are of 1⅝-inch outside diameter steel tubing. Uprights set in cement when used on cement floor. Pen is five feet two inches high. A tilting manger made of two-inch material reinforced with angle-iron may be furnished if desired.

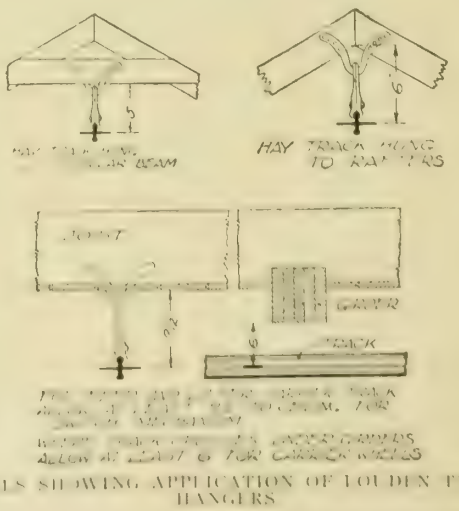
Carriers.

Litter Carriers—Louden Litter Carriers may be had for either steel or wire track, in five different styles. Solid steel track carriers are strongly recommended.

Steel track carriers are fitted with worm-gear for raising and lowering—the most powerful hoisting device to be obtained. It has an actual lifting power of forty to one. Worm-gear is free from ratchets, brakes or clutches. Box remains stationary at any height, whether loaded or empty. The tub is made of No. 18 galvanized steel sheets, heavily reinforced with angle-iron at ends. It is forty-eight inches long, twenty-four inches wide, and twenty-two inches deep.

Specify—"Louden 'Emancipator' Litter Carrier with track, switches, curves, and fixtures as per plan submitted."

Feed Carriers—Louden Feed Carriers are fitted with same gears as the Louden Litter Carriers. Box is made of wood, reinforced with angle-iron. Size (double end carrier) six feet long, twenty-eight inches wide, twenty inches deep. We also manufacture a Single-End Feed Carrier, sloping at one end only, and



DETAILS SHOWING APPLICATION OF LOUDEN TRACK HANGERS

Continued on next page

a special Side Distributer Carrier for feeding stock cattle in troughs or bunks.

Hay Carriers, Tracks, Forks, Slings and Pulleys—Louden Hay Carriers may be had in various designs for fork or sling use, and for either steel or wood track. Each carrier is compact, durable, and simple in construction. The track wheels are thoroughly braced, and will not spread with the heaviest load. Every load will register properly, regardless of twisted ropes or swinging load. Carriers operate on steel track.

For Fork Outfit, specify—"Louden Junior Hay Carrier (Fig. 430), with Louden Grapple Fork, Track and Fixtures."

For Sling Outfit, specify—"Louden Iowa Sling Carrier (Fig. 821), with standard 5-foot Slings, Track and Fixtures."

The Window Ventilator.

The Window Ventilator is fitted with metal shields so arranged that the window may tilt inward when open, preventing cold air from striking the stock directly, and forcing it up toward the ceiling, from which point it is deflected to every part of the building. This is an inexpensive device, and one which adds much to the sanitary conditions in any dairy or farm barn. We furnish shields and fixtures only. We do not furnish sash.

Fig. 987. LOUDEN WINDOW VENTILATOR

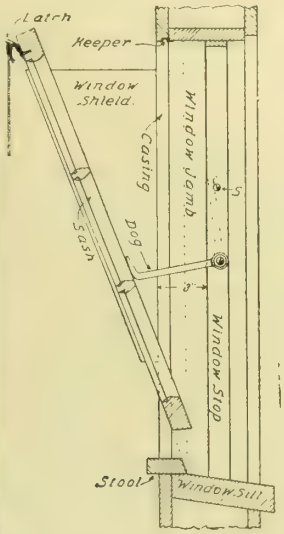


Fig. 989. VERTICAL SECTION OF LOUDEN WINDOW VENTILATOR

Barn Door Track and Hangers.

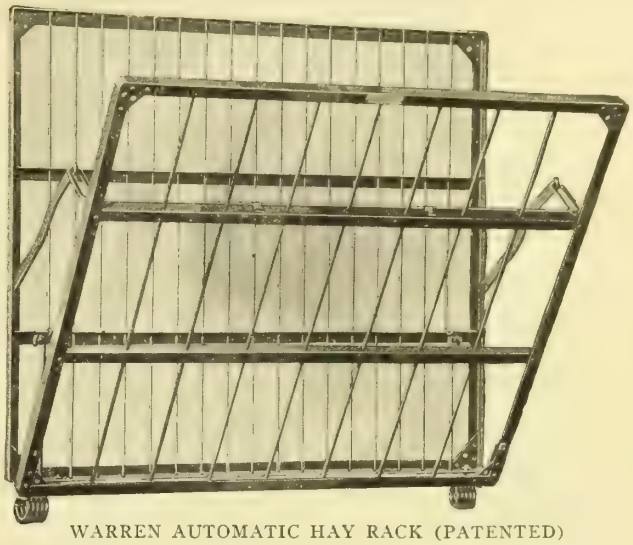
Louden Bird and Weatherproof Track completely encloses the trolleys, shutting out snow, sleet, rain, and the troublesome English sparrow. The tube is made of a single No. 14-gauge sheet of steel pressed into shape. To this is doubly electrically welded a steel shed cover. The upper edge of the cover fastens to barn wall, while the lower edge extends down far enough to keep rain and snow away from the top of the door.

On the back side of the tube there are embossed buttons or protuberances which hold the track away from the barn wall. This prevents any accumulation of moisture behind the track. Track is amply strong for big heavy doors. Trolleys are roller bearing. Wheels travel on level tread. Strong, efficient, artistic.

Steel Folding Hay Racks.

The framework is made of 1 by 1 inch steel angles reinforced and securely braced. No. 4 galvanized rods are used as uprights and form the openings in the front section of the rack through which the animal feeds, and No. 6 in the back frame.

The heavy coil springs, which form the hinges upon which the movable portion of the rack operates, are made of special tempered steel and every pair is guaranteed unconditionally against defect or breakage.



WARREN AUTOMATIC HAY RACK (PATENTED)

Heavy springs keep the rack tightly closed on the hay, allowing the animal to feed freely through the openings, but preventing the hay from being pulled out in too large quantities and wasted. The Warren Hay Rack is used extensively in feeding cattle and sheep, and is of exceptional service when attached to steel pens.

Suitable styles and sizes to accommodate practically every plan are carried in stock.

Galvanized Tilting Feed Mangers.

The Warren Sanitary Feed Manger is constructed of No. 18-gauge cold-rolled steel, reinforced at the top with a heavy steel band. The ends are attached by double seaming machinery and hot galvanized completely after all made up, by which process all seams are welded. This not only adds materially to the strength and rigidity of the manger, but renders it rustproof and water-tight.

The manger is hung on pivots in a heavy 1½ by ¼-inch steel frame. All corners are rounded in both body and frame.

Installation.

Complete instructions for the installation of Louden Equipment accompany each shipment.

Where Louden Spring Balance Mangers or Manger Divisions are to be used, our templets for shaping mangers should be secured before the cement is put in, to assure that mangers or divisions will fit properly. Send for Standardized Manger Circular.

Co-operative Service.

Suggestions in regard to arrangement, floor construction, lighting and ventilating systems, etc gladly furnished.

Estimates and Catalogues.

Complete catalogues mailed on request. Itemized quotations and specifications cheerfully submitted.

ESTABLISHED 1887

SCHOULER CEMENT CONSTRUCTION CO.

(SUCCESSORS TO W. W. SCHOULER)

"Schouler" Patent Stall Floor, Sliding Door Guide and Weather-Strip

OFFICE, STOREHOUSE AND YARD
154-156 Frelinghuysen Avenue, Lehigh Valley R. R. Siding
TELEPHONE, 10 WAVERLY NEWARK, N. J.

Products.

"SCHOULER'S" PATENT SANITARY STALL FLOOR; "SCHOULER'S" PATENT DOOR GUIDE and WEATHER-STRIP for Sliding Doors; CONCRETE and CEMENT SIDEWALKS and FLOORS for Stables, Barns, Factories, Garages, etc.; REINFORCED CONCRETE CONSTRUCTION, STABLE FIXTURES, including DUPLEX GUTTER TRAP.

BUILDINGS with HOLLOW CONCRETE WALLS, at less than the price of brick walls.

We contract for the installation of our products where desired.

Sanitary Stall Floor.

This system is designed for use in connection with concrete or artificial stone floors. It consists of a series of wooden slats with spaces between, held in position by a patent slat holder. The spaces between the slats are wholly unobstructed by bolts or otherwise, thus giving a free passage for liquids. The slat holders consist of two iron bars embedded in the floor crosswise, near the head and foot of the stall, each having a row of hooks. These hooks point toward the head of the stall; the slats are fitted with a device on the under side, are placed on the hooks, drawn back and held firmly in place by a locking bar at the head of the stall. An open gutter can be used with a 10-foot stall if desired, but with a 9-foot stall a covered one is preferable. The details are shown in Fig. 1.

By lifting locking bar "C" the slats can be instantly pushed forward slightly and lifted out; thus sanitary conditions are more completely assured by this system than by any other. Its economy is unchallenged, both in first cost and in maintenance. The slats being interchangeable, they may be so altered in position as to avoid undue wear on the center ones.

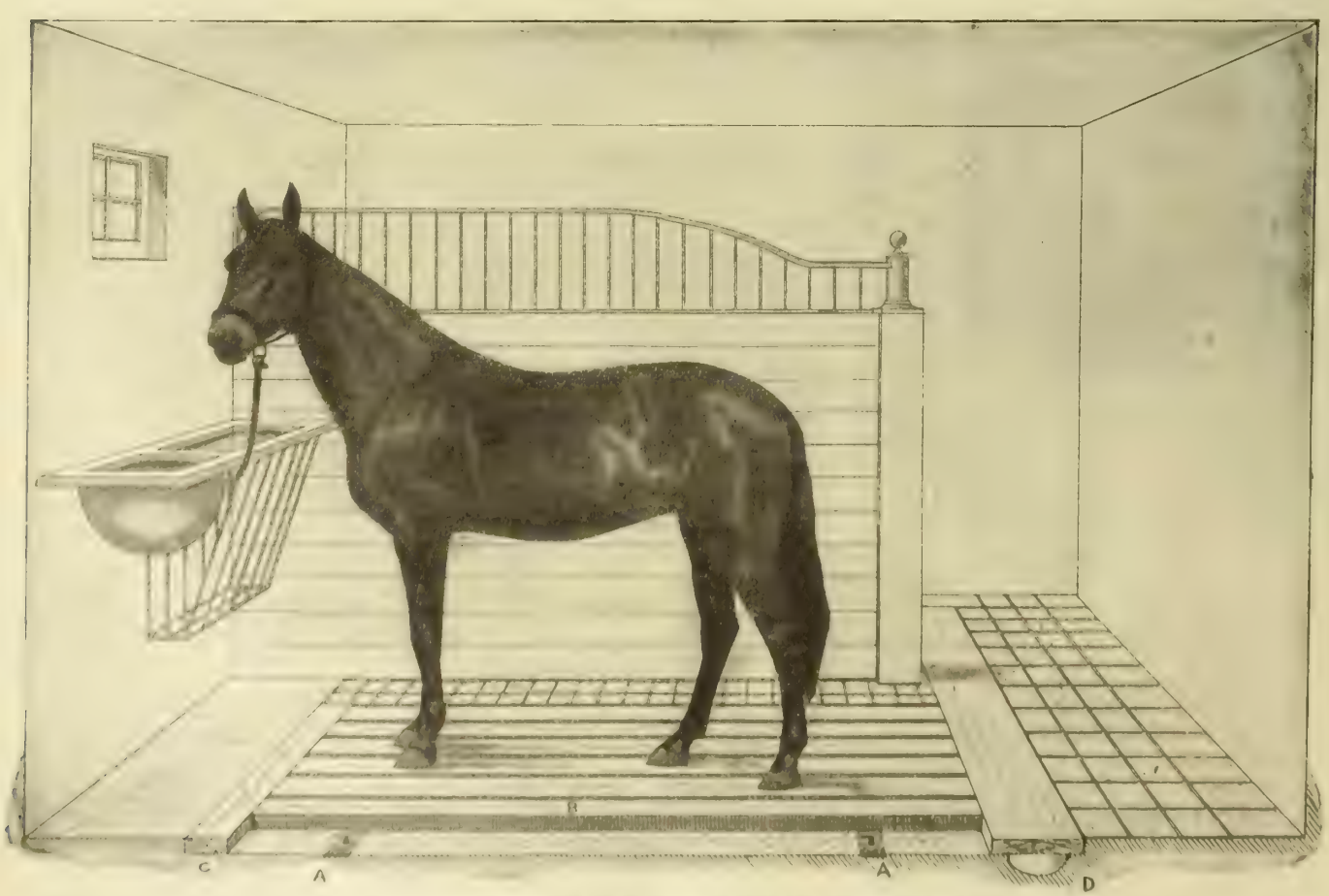


Fig. 1.—"SCHOULER'S" PATENT SANITARY STALL FLOOR.

A, Slat Holders; B, Slats (one shown flat, the rest being removed); C, Locking Bar; D, Gutter.

Continued on next page.

Sanitary Stall Floor—Continued.

Price per set, f.o.b. Newark: For single stalls, $10; for box stalls, $20. These are standard sizes, 7 ft. 4 in. by 3 ft., and are kept in stock. Special sizes can be made to order in about ten days. Sets may be ordered direct or through local contractors. Maple is used in regular sets; oak, yellow pine or spruce to order.

Over 20,000 are now in use.

Discount on application.

Sliding Door Guide and Weather-Strip.

This consists of a heavy steel groove, embedded in the floor flush with the surface, in which slides a steel plate attached to the bottom of the door. The groove acts as a guide, and the door, sliding smoothly, is kept in place on the overhead track. The door may be hung clear of the sill, to avoid possible obstruction, without danger of wind, rain, snow or dust penetrating the building, as the steel plate acts as a weather-strip and effectually closes the space (Fig. 2). The opening in the guide runs entirely through to the seepage bed below, thus carrying away all the water.

This device is invaluable in garages, barns, stables, factories, freight stations, and wherever outside sliding doors are used. It is adapted to any size door, and in connection with flooring of concrete, asphalt, brick or wood it is the only successful appliance for the purpose. It can be installed by any competent workman.

Price, f.o.b. Newark, $1.00 per lineal foot.

This device is also made with two slots for use where doors slide past each other. Price, $1.60 per foot.

Over 100,000 in use.

Discount to the trade.

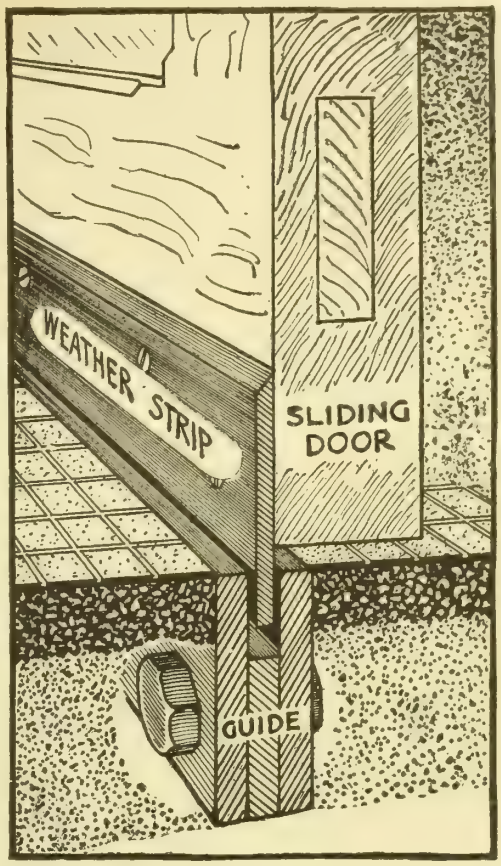


Fig. 2. END VIEW OF "SCHOULER'S" PATENT SLIDING-DOOR GUIDE AND WEATHER-STRIP

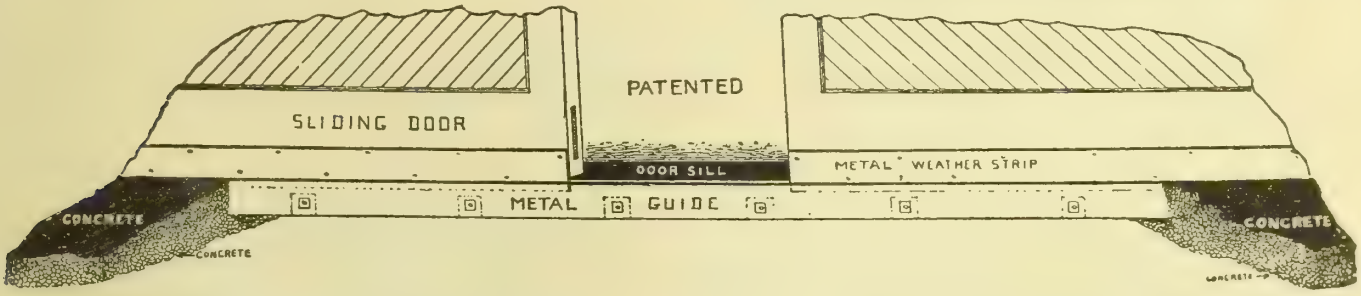


Fig. 3. SIDE VIEW OF "SCHOULER'S" PATENT SLIDING-DOOR GUIDE AND WEATHER-STRIP

References

We refer to the following persons (and many others) who are using "Schouler's" patent devices. In these installations the cement floor work was done by us.

OWNER	LOCATION	ARCHITECT
F. W. Vanderbilt	Hyde Park, N. Y.	Burnet & Hopkins, New York, N. Y.
R. Van Cortlandt	Mt. Kisco, N. Y.	Burnet & Hopkins, New York, N. Y.
R. C. Lounsbury	Bedford, N. Y.	Burnet & Hopkins, New York, N. Y.
Jas. E. Speyer	Ossining, N. Y.	Burnet & Hopkins, New York, N. Y.
J. C. Colgate	Bennington, Vt.	Burnet & Hopkins, New York, N. Y.
H. McK. Twombly	Madison, N. J.	Burnet & Hopkins, New York, N. Y.
Percy R. Pyne	Bernardsville, N. J.	Burnet & Hopkins, New York, N. Y.
U. S. Naval Academy	Annapolis, Md.	Burnet & Hopkins, New York, N. Y.
W. D. Guthrie	Locust Valley, L. I.	C. P. H. Gilbert, New York, N. Y.
Acker, Merrall & Condit (200 stalls)	536 West 46th Street, N. Y.	Buchman & Fox, New York, N. Y.
Paul D. Cravath	Locust Valley, L. I.	Babb, Cook & Willard, New York, N. Y.
John F. Dryden	Bernardsville, N. J.	George B. Post, New York, N. Y.
Chas. Head	Manchester-by-the-Sea, Mass.	H. D. Hale, Boston, Mass.
Meadow Brook Stable (125 stalls)	Newark, N. J.	T. C. Hughes, Newark, N. J.
Newark City Stables	Newark, N. J.	Thos. Cressy, Newark, N. J.
W. V. S. Thorne	Morristown, N. J.	Delano & Aldrich, New York, N. Y.
J. B. Duke	Somerville, N. J.	
Senator Frelinghuysen	Raritan, N. J.	
Sheffield Farms-Slawson-Decker Co. (200 stalls)	New York, N. Y.	F. A. Rooke, New York, N. Y.
J. Griswold Webb	Clinton Corners, N. Y.	E. Burnett, New York, N. Y.
E. R. Squibbs & Sons	New Brunswick, N. J.	D. B. Provost, Elizabeth, N. J.
H. M. Tilford	Monroe, N. Y.	Alfred Hopkins, New York, N. Y.
Lederle Laboratories	Pearl River, N. Y.	W. E. Austin, New York, N. Y.
Schmalz Bakery	Hoboken, N. J.	

THE T. C. BEACH GARAGE EQUIPMENT CO.

Manufacturers of Automobile Turntables, Automatic Air Outfits, Etc.

50 Church Street
NEW YORK, N. Y.

Products.

"Ideal" Ball-Bearing Turntables, for Pleasure Cars, Commercial Trucks, etc.

"Ideal" Self-Contained Automatically Controlled Compressed Air Outfits.

Turntables.

The "Ideal" Turntable is a ball-bearing turntable, constructed in such manner that the strain of the load is evenly distributed on the points of support, consisting of a combination of center bearing working in conjunction with large ball-bearing wheels, which are located in their proper position with reference to the center bearing by a construction which insures their permanent alignment. The turntable as a whole is mounted on a track base so constructed as to insure ease of operation and durability. Another feature of this type of turntable is its simplicity and the small expense necessary to make the installation.

Construction.

The "Ideal" has a steel frame of approved construction, supplied with different kinds of tops, viz.: heavy sheet steel, reinforced concrete, or plank, and is furnished of any capacity required.

Installation.

The installation is very simple and inexpensive. By following the blue-prints and directions furnished, contractors have no trouble in properly preparing the foundation and pit and erecting the table. Anchor bolts, track base, etc., for foundation are included and furnished. We also furnish a 3-inch channel curb rolled to proper diameter for edge of floor at pit when desired.

For Pleasure Cars, the regular sizes of table diameters that we furnish, and the maximum wheel base each will accommodate, are as follows:

12 ft.	13 ft.	14 ft.	15 ft.	16 ft.
118 in.	130 in.	142 in.	156 in.	170 in.

For Motor Trucks tables are furnished of any diameter and capacity required.

THE "IDEAL" BALL-BEARING TURNTABLE INSTALLED

Compressed Air Outfits.

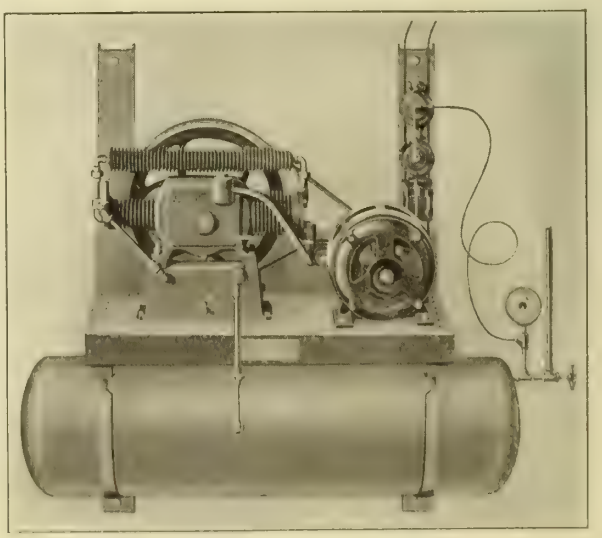
The "Ideal" Self-Contained Automatically Controlled Compressed Air Outfit consists of a two-stage compressor, oil trap and separator, safety valve, check valves, motor (for any current), automatic controller, pressure gauge, valves and piping as shown, large size seamless steel tank, washed with block tin both inside and out, and tested to 400 pounds pressure—all assembled and mounted in the most compact and convenient form, with metal base and frame complete ready to install, it being necessary only to attach to the wall with four bolts and make connection with the electric current supply.

General Information.

The Two-Stage or Compound Air Compressors are the most economical and efficient method of producing high pressure air for tires, cleaning, dusting, etc., saving quite a large percentage in power required over single-acting compressors of same capacity. In selecting an Air Plant the cost of power to operate should be taken into consideration as well as the cost of the equipment.

Installation.

The fact that our Air Outfit is self-contained and assembled as one unit simplifies and reduces very much the cost of installation. Arranged as it is to be bolted to the wall it occupies no floor space.



COMPRESSED AIR OUTFIT

SPECIFICATIONS — TWO SIZES

No. 234	No. 244
Cylinders, 3 and 1½—3-inch stroke	Cylinders, 4 and 2—4-inch stroke
Capacity, 5,000 cu. in. per minute	Capacity, 15,000 cu. in. per minute
Required power, ½ horse-power	Required power, 1 horse-power
Shipping weight, 450 pounds	Shipping weight, 640 pounds

THE CANTON FOUNDRY AND MACHINE CO.

SOLE MANUFACTURERS OF

"Universal" Serpentine Track Automobile Turntables

CANTON, OHIO

Products.

"Universal" Automobile Turntables, for both Pleasure Car and Truck use. Each style can be had either with or without Washrack Extension.

Also, Sidewalk Doors, Conductor Connections and Boots, "Canton" Improved Coal Chutes, Coal Hole Rings and Covers, Area Gratings, Sidewalk Gutter Boxes, Sidewalk Ventilators, Crosswalk Gutter Plates, Water Meter Covers, Corner and Jamb Wheel Guards, Ash-Pit and Stack Doors, Cast-Iron Columns, House Mover Jacks, Catch Basin and Manhole Covers, Valve Covers for street and inside use, and other Street Castings.

Auto Turntables, Description.

Mechanically perfect in construction, and fifty per cent easier to turn than any other make of table.

The weight of the table and the load it supports rest on ball-bearings, which run in a serpentine, circular track, 6 feet in diameter, filled with 2-inch balls that continually revolve in pockets. The weight of the table is carried on those ball-bearings that rest on the high points of the serpentine track, thus reducing friction to a minimum and causing the "Universal" to turn so easily.

The superstructure is of structural steel, built in truss form, to give the greatest possible strength; top of table made of $\frac{3}{16}$-inch steel plates, reinforced so that the whole construction is strong and durable. All parts are made of iron and steel; simple in construction, nothing intricate.

"Universals" may be placed on upper floors as readily as on ground floors, as they require a pit of but 12 inches in depth to contain tables of any diameter. The caster wheels at periphery of table are used only to prevent the table from tilting. A heavy load does not substantially increase the friction.

Advantages.

Removable ribbed steel plates on top, which are adjustable by means of truss bolts to take care of any wear; water drains to rim, then through grooves back to center of pit or outlet; cannot tilt, always perfectly poised; easily turned.

Quickly and easily erected by one man from knock-down shipment; always ready; but 12 inches in depth.

Durability.

There are no intricate parts; not an ounce of superfluous metal; strength exactly where needed; nothing to break or wear out.

DATA, "UNIVERSAL" AUTOMOBILE TURNTABLES

	For Pleasure Cars				For Trucks	
Wheelbase, inches.	108	132	144	156	156	168
Diameter, feet....	12	14	15	16	16	18
Supporting Capacities, lbs....	8000	8000	8000	8000	10 tons	10 tons
Shipping Weights, lbs.....	4550	5300	5600	6000	8500	10,000

Angle Iron Supporting Band for concrete floors comes fastened to the outer circle of the table.

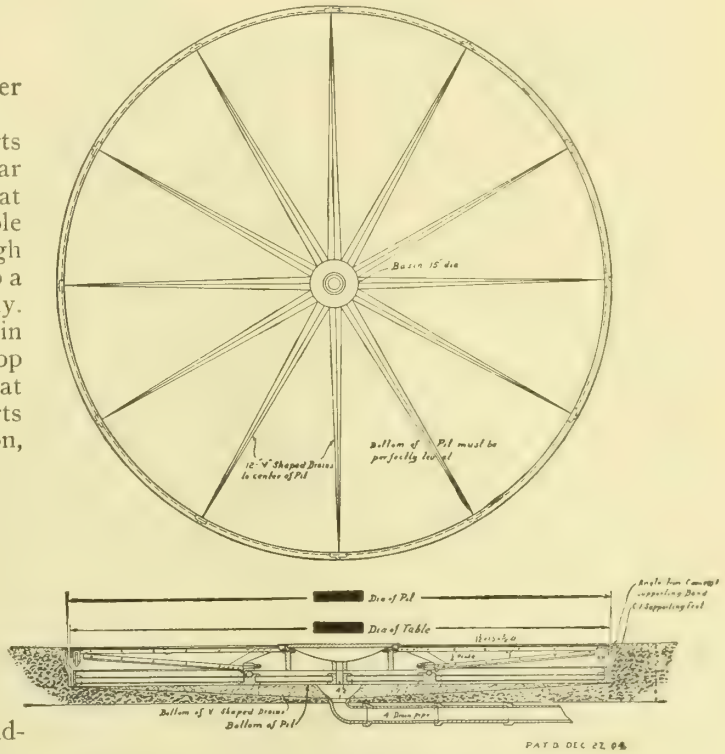
Specifications.

We furnish, with each order, blue-print and complete specifications and directions for building pit and erecting table. Any careful mechanic can erect. There is nothing technical about it.

Catalogues.

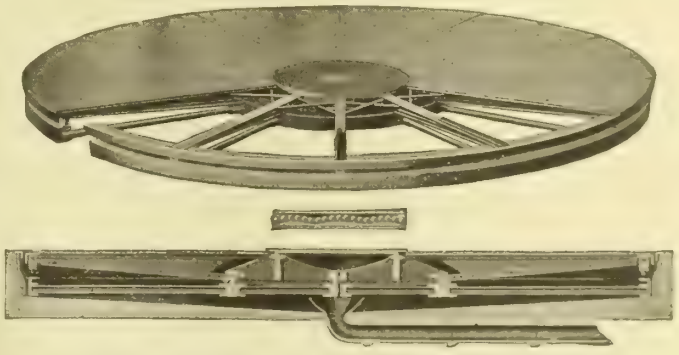
For further information on Auto Turntables, get Catalogue "C-99."

For complete line of our Builders' Accessories, get Catalogue "B-8."



FOUNDATION PLAN FOR "UNIVERSAL" AUTOMOBILE TURNTABLE

Patented December 27, 1904; June 29, 1909; October 4, 1910; January 2, 1912



TOP AND SECTIONAL VIEW, SHOWING DETAILS OF CONSTRUCTION OF THE "UNIVERSAL"

Concrete any depth and grooved to water drain

C. F. ERNST'S SONS

MANUFACTURERS OF

Combined Automobile Turntable and Wash-Rack

61-85 Lathrop Street
BUFFALO, N. Y.

MILWAUKEE SALES OFFICE: W. F. Mueller, Farwell Avenue and Brady Street

Products.

The "Ernst" Combined Automobile Turntable and Wash-Rack; Special Heavy Automobile Truck Turntable.

Description.

This apparatus is patented and made in two models, Nos. 1 and 2. Model No. 1 (Fig. 1) consists of a heavy cast-iron drum (size of which is governed by diameter of table) with hardened steel resistance pin in center, surmounted by heavy cast-iron top supported by, and revolving on, large hardened steel balls, bearing in grooves cut in two heavy steel ball-runs, set in each casting. Steel floor beams made secure by heavy cast-iron clamping piece held in place by large Norway iron kingbolt and nut at center.

All bearings are protected from water and sand. No outer bearing or track to produce friction or cause table to turn hard.

Model No. 1 is made in three sizes, identical in construction, the sizes of parts simply increasing according to total size of turntable. Used as a wash-rack.

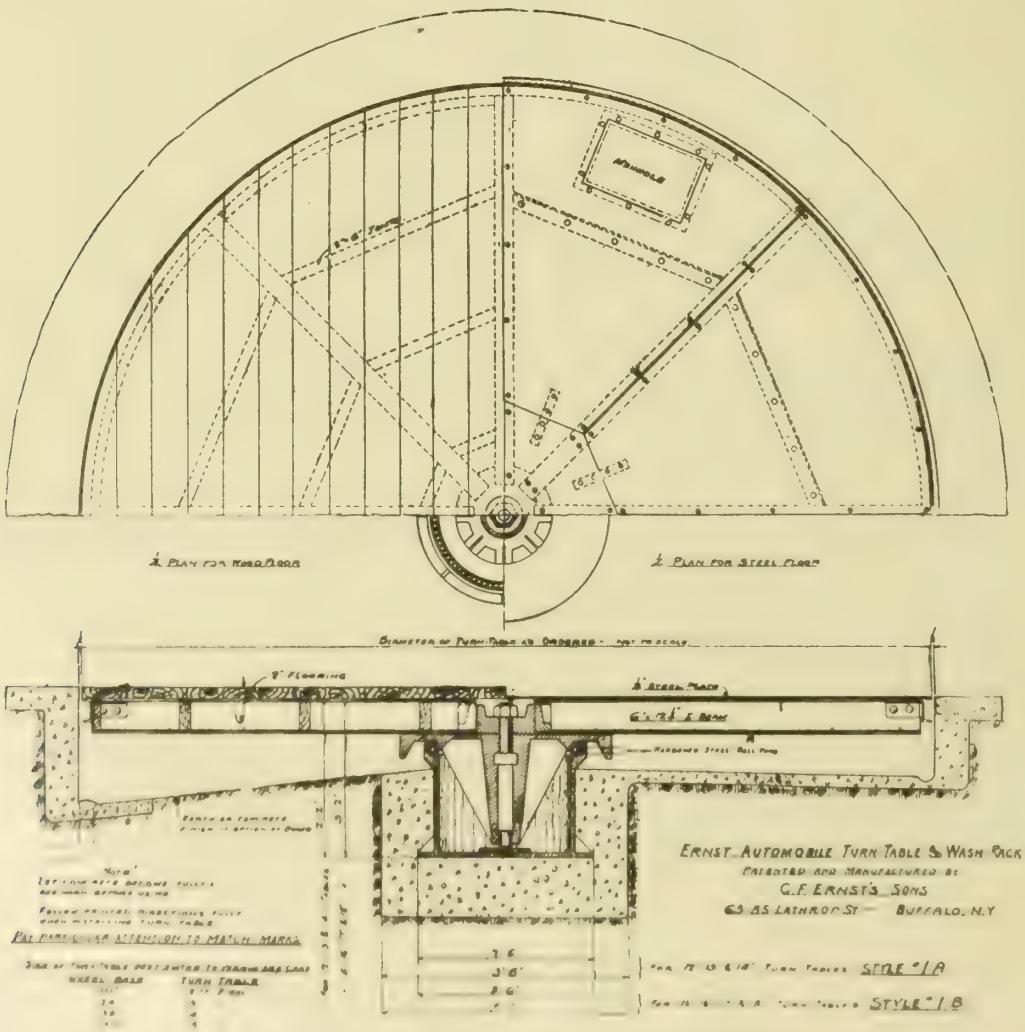


Fig. 1. Sectional Drawing of "Ernst" Turntable, Models Nos. 1A, 1B and 1C

Available Weights Ready for Wood Top

12 ft. 2000 lbs., 13 ft. 2000 lbs., 14 ft. 2000 lbs., 15 ft. 3000 lbs., 16 ft. 3000 lbs.

Sweet's Catalog

Continued on next page

Turntable, Model No. 2.

Made in three styles—2-A, 2-B and 2-C (Fig. 3). Designed for installation in upper floors of buildings. in ground floor where there is a basement, and in places where required depth for Model No. 1 can not be obtained. All styles are identical in construction. Used as a wash-rack. Framing shown in illustration below is changeable to suit ideas of architect or owner.

Special Heavy Turntable.

We manufacture a Special Turntable adapted for heavy automobile truck use, and would be glad to furnish detail drawings and quote prices on same upon application.

Guarantee.

If the "Ernst" Turntable, after being installed and used for sixty days, is not absolutely satisfactory, we will pay cost of its removal and putting floor in good condition, purchaser to keep turntable until money is paid.

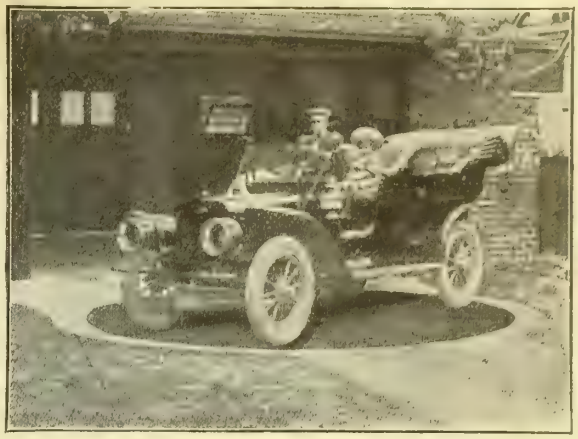


FIG. 2. "ERNST" TURNTABLE INSTALLED OUTSIDE GARAGE

A satisfactory installation all the year round. Above turntable in use over eight years

References.

Our product is in use in garages from Maine to California. Lists of users sent on application.

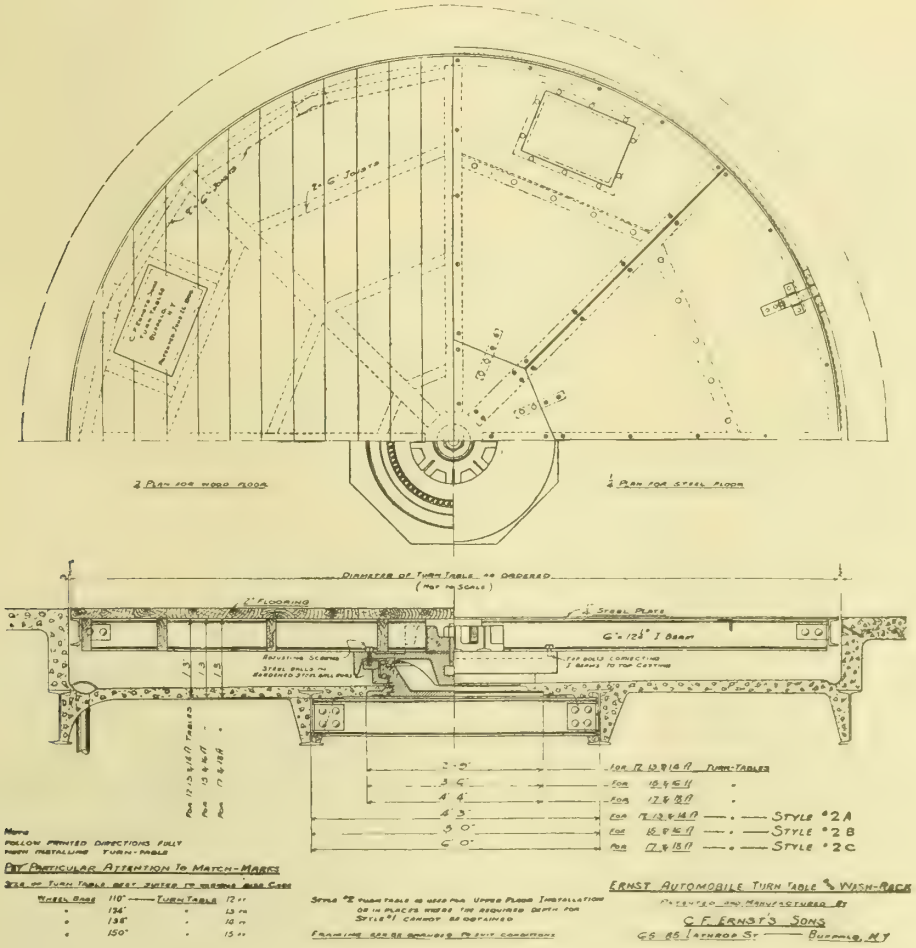


FIG. 3. DETAIL DRAWING OF "ERNST" TURNTABLE, MODELS 2-A, 2-B AND 2-C

Cars can be washed in one half the time on turntable, allowing more space for storage

SHIPPING WEIGHTS WITH STEEL TOP

12 ft.....3200 lbs., 13 ft.....3500 lbs., 14 ft.....4000 lbs., 15 ft.....5750 lbs., 16 ft.....6050 lbs.

ESTABLISHED 1865 INCORPORATED 1870

GILBERT & BARKER MANUFACTURING COMPANY

Gasoline and Oil Storage Systems
Gas- and Oil-Fired Furnaces

SPRINGFIELD, MASS.

Products and Services.

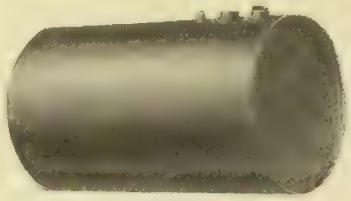
GASOLINE and OIL STORING and HANDLING EQUIPMENTS of all sizes, both MEASURING and NON-MEASURING, for the storing, pumping, distributing, and filtering of oils of all kinds, and for hazardous liquids.

OIL-FIRED and GAS-FIRED FURNACES; PROCESS FOR BURNING FUEL OIL; etc.

Engineers and Contractors for HEAT-TREATING and HARDENING PLANTS, and for OIL and GASOLINE STORAGE and HANDLING SYSTEMS.

Underground Storage Tanks.

All our Underground Storage Tanks are made of the best open-hearth soft steel, galvanized in the plate, by the hot process. All seams and flanges are welded by the oxy-acetylene process, making the tank practically one strong piece of metal. After being tested under air pressure and known to be absolutely tight, tanks are coated with coal tar put on hot as an additional protection.



UNDERGROUND TANK

STANDARD SIZES

Barrels	Gallons	Inside, Inches
1	65	30 x 22
2	120	30 x 40
3	170	36 x 39
4	220	36 x 51
5	285	36 x 65
6	345	36 x 79
8	460	36 x 105
10	550	36 x 126
12	650	42 x 109
15	800	42 x 134
20	1065	46 x 148

Tanks made in this way have been in the ground for over thirty years and show no signs of decay.

Measuring Pump.

For the public or private garage where gasoline is required by the gallon, half-gallon, quart or pint. The quantity stops, which permit of measuring quantities less than one gallon, are swung on a heavy threaded rod and can be sealed by the local sealer.

The pump is well built; cylinder made of seamless brass tubing; has brass valves, stuffing box and gland. All iron parts coming in contact with gasoline are galvanized. Pump is locked in handle by a strong, reliable lock.

T-G
GALLON PUMP

Can be fitted with one-way discharge, for filling cans, or two-way discharge which permits of hose connection. Pump is nicely finished in red enamel, baked on.

Sidewalk Pump.

In connection with an underground tank, the sidewalk pump makes an ideal outside filling arrangement. It pumps the gasoline from the tank, filters and measures it accurately, counts each gallon as delivered into the automobile tank, and registers all the gasoline pumped up to 100,000 gallons. For filling cans a swinging nozzle is provided.

The base of the housing is made of extra heavy grey iron, the doors of pressed steel, thoroughly protecting the working parts from the weather. A length of specially constructed metal hose fitted with a long-spout, quick-acting nozzle is coiled in one door. Pump is fitted with tumbler lock and so arranged that either or both doors may be secured.

This sidewalk pump is handsomely finished in red enamel, baked on, and artistically lettered on each door. It is topped with a large electric-lighted globe, also lettered.

T-S
SIDEWALK
PUMP

Long Distance Pump.

A well-made long distance brass pump mounted on a galvanized iron base, especially adapted for the private garage. Has brass piston rod, stuffing-box, gland and valve parts. Piston leather packing specially treated. It will deliver approximately a gallon for every six strokes. May be used to deliver into tank of automobile by attaching a hose to nozzle. Finished in red enamel, baked on.

These products are included in the list of inspected mechanical appliances issued by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.

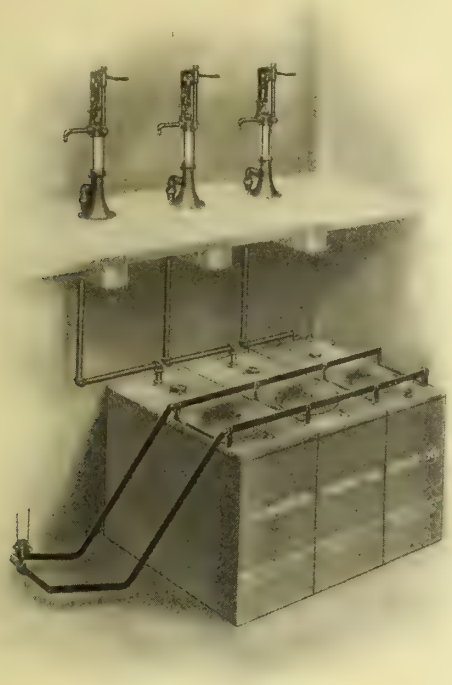
A GILBERT & BARKER LONG DISTANCE PUMP AND UNDERGROUND STORAGE TANK
An ideal outfit for the private garage

Continued on next page

Pumps for Lubricating and Other Oils.

The Gilbert & Barker Quart Self-Measuring Pump (T-16) handles light or heavy lubricating, non-lubricating, and paint oils. It measures, accurately, quarts, pints or half-pints directly into can or oiler without the use of measures. Each measurement can be sealed by the local sealer of weights and measures.

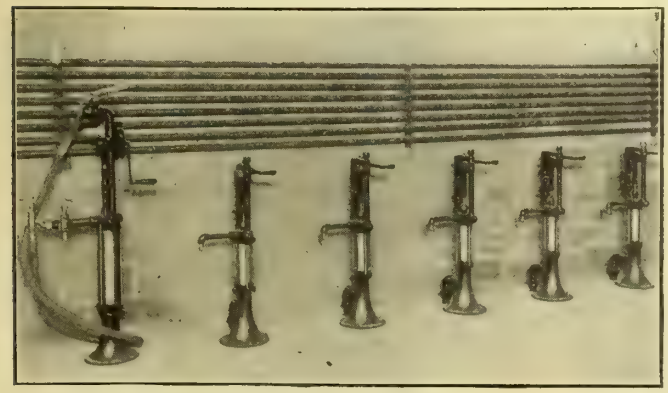
The pump is well built; cylinder made of seamless brass tubing; has brass valves, stuffing-box and gland. Pump is locked in handle by a strong, reliable



GILBERT & BARKER QUART LUBRICATING OIL OUTFIT
Tanks arranged in a battery

lock. The discharge pipe is fitted with a special lubricating nozzle which cuts off dripping. A discharge register counts each full stroke from one to ten and then repeats. It can be equipped with a 1000-gallon meter, when so desired.

Pump is neatly finished in olive green enamel, baked on.



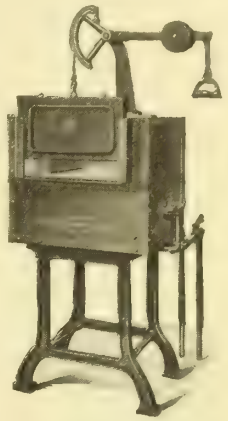
A RECENT INSTALLATION
Showing six pumps for handling gasoline and lubricating oils in garage

Furnaces and Fuel Oil Burning Apparatus.

We are Engineers and Contractors for heat-treating and hardening plants, and are experts on liquid and gaseous fuel problems. The services of our engineers are at your disposal in an advisory capacity, to recommend and lay out for you a complete plant, from storage tank to furnaces.

The furnaces are made of the best material throughout and are put together by skilled workmen. The present type of Gilbert & Barker furnace is the result of our fifty years of experience in the handling of liquid and gaseous fuels, and the design and construction of furnaces for all classes of heat-treating work.

Our furnaces consist of many different types, such as are used for the various classes of heat-treating work. The heating chambers are just large enough to accommodate the work that is to be done, thus no unnecessary space is heated.



TYPE C FURNACE
SEMIMUFFLE

SIZES OF TYPE C

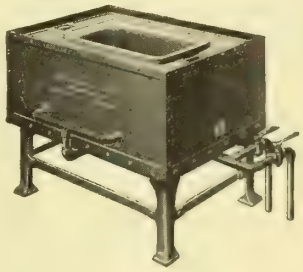
No.	Heating Chamber			Mouth		Floor Space	
	Depth, Inches	Width, Inches	Height, Inches	Width, Inches	Height, Inches	Width, Inches	Height, Inches
C- 1	8	6	5	6	5	27	18
C- 2	10	8	5	8	5	29	18
C- 3	8	10	5	10	5	31	16
C- 4	12	10	6½	10	6½	31	22
C- 5	15	10	6½	10	6½	31	26
C- 6	15	12	6½	12	6½	33	26
C- 7	18	12	6½	12	6½	33	28
C- 8	24	12	6½	12	6½	33	36
C- 9	18	15	6½	15	6½	38	27
C 10	24	15	6½	15	6½	38	36
C 11	18	18	7½	18	7½	45	32
C-12	24	18	7½	18	7½	48	38
C-13	30	18	7½	18	7½	48	45
C-14	36	24	12	24	7½	57	51

Other sizes to order.

Pot Furnaces.

Pot Furnaces, for lead hardening, oil tempering, salt bath, etc.

We are ready at all times to give expert advice and assistance to concerns interested in this work.



TYPE F POT FURNACE

SIZES OF TYPE F

No.	Inside of Pot			Floor Space	
	Width, Inches	Depth, Inches	Height, Inches	Width, Inches	Depth, Inches
F-1	6	2	5	22	16½
F-2	8	5	6	25	22
F-3	8	8	6	25	25
F-4	14	8	8	31	25
F-5	12	8	8	28	25
F-6	14	12	8	31	29
F-7	20	15	8	37	35
F-8	25	15	8	45	35
F-9	34	21	10	51	48

Other sizes to order.

WAYNE OIL TANK & PUMP CO.

Storage and Distributing Systems for Gasoline, Kerosene, Lubricating and Paint Oils, Varnishes, etc.

FORT WAYNE, IND.

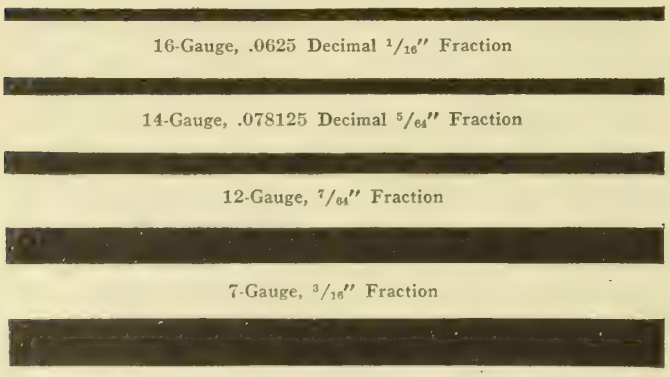
SALES OFFICES IN ALL PRINCIPAL CITIES

Products.

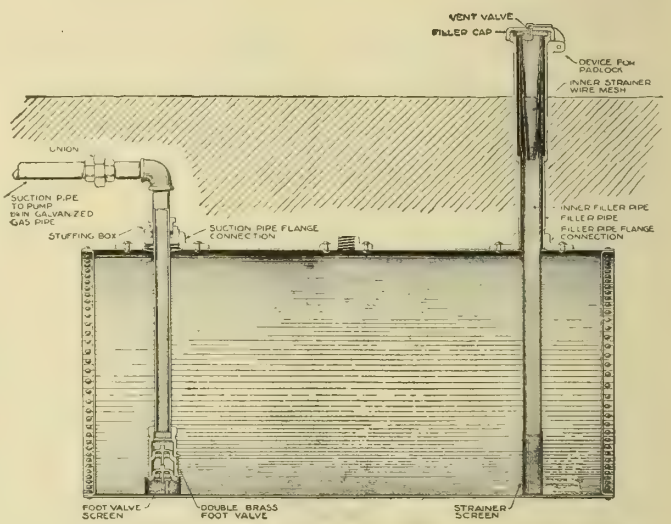
GASOLINE and OIL STORAGE and DISTRIBUTING SYSTEMS, PORTABLE and STATIONARY, for Private and Public Garages, Factories, Mills, Railroads, Oil Houses, etc., including TANKS, CABINETS, PUMPS, FILTERS, RECORDING METERS, VALVES, FILL PIPES, HOSE, GAUGES, NOZZLES, SPLASH PANS, COMPUTERS, FILLER BOXES, FILLING DEVICES, COMBINATION SKID and BARREL DRAINERS.

Tanks.

Tanks are made standard in 16-, 14- and 12-gauge galvanized steel, of one barrel (65 gallons) to 20 barrels (1100 gallons) capacities. Made to order, of larger capacity or heavier metal. Every principle of safety in the storage of oils and volatiles is embodied in them. The metal is all rolled before punching, which is accurately done by machine, and all seams lap-riveted metal-to-metal. No filling of any kind is used. Tank seams made from 16-, 14- and 12-gauge metal are flushed with solder; heavier metal tanks are caulked. Has been designed to meet most exacting conditions of Board of Fire Underwriters.



GAUGES OF METAL USED IN TANKS



SECTIONAL VIEW SHOWING METHOD OF ARRANGEMENT AND CONSTRUCTION OF WAYNE LONG DISTANCE UNDERGROUND GASOLINE STORAGE TANKS

DIMENSIONS OF STANDARD TANKS

Capacity, bbls.	Capacity, gallons	Diameter, inches	Length, inches	Capacity, bbls.	Capacity, gallons	Diameter, inches	Length, inches
1	65	27	29	8	445	39	95
2	120	32	42	9	500	39	107
3	170	39	38	10	550	39	117
4	220	39	48	12	640	46	93
5	280	39	61	15	800	46	115
6	340	39	74	18	1000	46	143
7	400	39	86	20	1100	46	158

Equipment.

Standard equipment includes Tank, Gauge Stick for Tank, Fill Pipe Complete.

Fig. No. 62. LONG DISTANCE PUMP
Ready for operation

Fig. No. 21. MODEL "D" ROLL TOP CABINET FOR LUBRICATING OILS
Open for operation

MODEL "C" INSTALLED FOR HANDLING GASOLINE
Tank and Pump may be placed to suit convenience of owner

Swift's Cleanser

Continued on next page

Pumps.

After the tank is located outside at the safest, handiest point for filling and the most convenient point inside selected for pumping, we will furnish measuring and metering pumps equal to the situation.

Pump No. 62, Model "G," Long Distance type. At the most convenient point for filling the automobile, the pump is held perfectly rigid by four heavy lag screws. Both pump and fill pipe cap lock. Gasoline hose enables pumping direct from underground tank to car—an additional fire safeguard.

Height: Plunger down 27 inches; plunger extended 40 inches. Diameter of base, 8 inches.

Pump No. 280, Long Distance type for curb installation. Has a telescoping housing that occupies no more space open than when closed. Has electric light, hose, filter, and meter designed for retailing gasoline. Has overhead drain and twenty-gallon discharge register.

Pump No. 26, Model "C," Long Distance type. (See illustration at bottom of page opposite.) Discharges a quart at a stroke. Rapid. Brass fitted throughout. Especially adapted to the private garage.

Fig. No. 62. LONG DISTANCE PUMP

Fig. No. 22. MODEL "H," LONG DISTANCE GALLON PUMP Height, 60 ins. Floor space, 1 sq. ft. Shipping weight, 190 lbs.

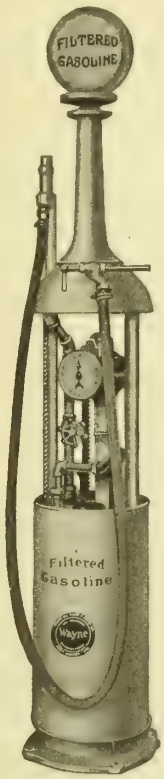


Fig. No. 280. CURB PUMP

Valves.

The suction line is provided with a set of double brass valves, on which the accuracy of the measuring pump depends. Poppet and seat are carefully machined, then hand ground, and set in a heavy body of solid brass. Each works independently.

Discharge Pipe.

Discharge pipe terminates in a lever shut-off nozzle that makes it evaporation-proof. An automatic check valve in the discharge pipe furnishes double protection against fire and evaporation.

Wayne Filler Boxes and Filling Devices.

Wayne Filler Boxes are designed for use where the standard fill pipe with vented lock cap is not advisable.

Fig. No. 101—The box is set through the floor or in the concrete and the fill pipe is screwed into it. Body is heavy cast iron and the cap cast brass. The cap is seated on a gasket to make an air-tight joint, and it has a squared recess in the center to engage a special wrench furnished for the purpose. Box sets flush with floor and offers no obstruction.

Fig. No. 101. AIR-TIGHT FILL BOX

Outside diameter of top, on 12-inch size, 4⅝ inches; diameter of screw cap, 3⅝ inches; outside diameter of body, 3½ inches, tapped for 2-inch pipe. Height over all, 4½ inches.

Outside diameter of top, 3-inch size, 5¾ inches; diameter of screw cap, 4¾ inches; outside diameter of body, 4⅝ inches, tapped for 3-inch pipe.

Fig. No. 102—This square fill box with drain opening in the bottom is designed to be set in the sidewalk, floor, etc., where a watertight box is not necessary. The regular fill pipe and cap should be used with this fill box. Fill pipe and cap terminate in the fill box and there find protection, and the surface of the walk or floor is not marred. Cover is fitted with pin lock and key. Made 12 by 12 inches and 12 by 14 inches (opening). Smaller fill box is 15 inches square, outside dimension; body 11½ inches square, outside dimension; and 10½ inches deep, over all. Larger fill box is 14¼ by 17¼ inches, over all; body is 12¾ by 14½ inches, outside dimensions, and 5 inches deep.

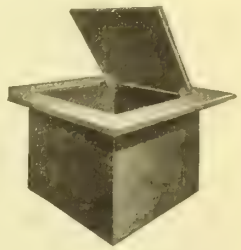


Fig. No. 102. SQUARE STREET BOX

Fig. No. 103—This round fill box is designed for use in streets and alleys, as a protection to the fill pipe and cap. It may be set in the ground wherever necessary. This fill box has an extreme outside diameter of 10 inches; the body is 9½ inches; top is $5\frac{1}{16}$ inches deep, over all, and is made of cast iron; inside opening 9 inches. This box is provided with heavy cast-iron hinged cover, with latch and keys. The regular fill pipe and cap must be used in connection with this fill box.

Fig. No. 103. ROUND STREET BOX

Fig. No. 65. WAYNE METHOD OF STORING VOLATILE LIQUIDS FOR FACTORY USE

LANSING-COMPANY

Manufacturers of Automobile Turntables

LANSING, MICH.

BRANCH OFFICES

CHICAGO, 169 West Lake Street
NEW YORK, 288-289 West Street
KANSAS CITY, 1413-1415 West 10th Street
MINNEAPOLIS, 517-519 North 3rd Street
PHILADELPHIA, North American and Willow Streets
SAN FRANCISCO, 338-348 Brannan Street
BOSTON, 78 Cambridge Street, Charlestown District

Products.

"LANSING-BEACH" PATENT STANDARD TYPE COUNTERBALANCED, BALL-BEARING MOTOR CAR TURNTABLES, HEAVY-DUTY MOTOR TRUCK TURNTABLES, and PITLESS ELECTRIC MOTOR-OPERATED TURNTABLES.

LANSING COMPANY "KEEP YOUR PRODUCT ON WHEELS"
TRADE-MARK

Motor Car Turntables.

The "Lansing-Beach" standard type motor car turntables are furnished with steel frame and steel top, with steel frame for reinforced concrete top, or with steel frame for plank top; or, if desired, the mechanism alone is furnished on which contractors may build wood frame and top.

The "Lansing-Beach" standard type motor car turntable is centrally supported, and is operated more easily than any other. It has no wheels, trucks, rollers or tracks to rust, clog, or prevent in various ways successful operation.

This type of turntable is particularly adapted to second-floor conditions. When it is so used, it requires a pit only five to eight inches deep.

Motor Truck Turntables.

The "Lansing-Beach" heavy-duty motor truck turntables are furnished with steel frame for reinforced concrete top or with steel frame and steel top.

They are built on the same general principles as the standard type, but are much heavier. As they are properly proportioned to compensate the heavier part of the load, which is carried over the rear wheels of the motor truck, the position of the truck on the turntable does not affect the ease of operation.

The fact that several large users of motor trucks have recently installed our heavy-duty turntables, indicates that they realize that it is economy to have them in their equipment; for the heavy-duty turntables are always available and easily operated. They are valuable also as a factor of safety. One cannot afford to take chances of having expensive motor trucks damaged while they are being backed into a garage or out of it.

Pitless Electric Motor-Operated Turntables.

The "Lansing-Beach" electrically operated turntable occupies no more space than the car does. It can be stopped and started at will. It enables the driver to drive into a garage, turn the car around by pressing a button, and then alight, knowing that the car is in position to leave the garage front first.

This type requires no pit, no preparation of the floor, no expense for installation except that of bringing wire connection from the lamp socket.

Advantages.

The working mechanisms are all adjusted at the factory and shipped completely assembled. The erection and the testing of each turntable assure accurate operation. A templet and a blue-print are furnished to show proper installations of anchor bolts, and full directions for erection are given.

Use.

As wash racks, our turntables give splendid service. They are arranged to drain from center to rim.

Co-operative Service.

There are cogent reasons why the LANSING-COMPANY should be able to serve you best in the selection of a turntable. The company specializes in the building of turntables of various types. Each type is best suited to meet the requirements for which it is designed, whether they are requirements for turning the lightest pleasure cars or the heaviest motor trucks.

REGULAR SIZES OF THE LANSING-BEACH TURNTABLES

Table diameters in feet.....	10	12	13	14	15	16
Maximum wheel base inches....	92	118	131	144	156	170

Turntables are also furnished with larger diameters of 18, 20, 22 and 24 feet.

Weights, carrying capacities and prices are proportionate to the requirement.

Showing general construction, with half of top complete

Sectional view showing relation of table to floor and pit

THE "LANSING-BEACH" AUTOMOBILE TURNTABLE

GILLIS & GEOGHEGAN

Telescopic Hoists (Continued from Page 1433)

Model E Telescopic Hoist, Electric (Patent Applied For).

This is a moderately priced hoist which operates by electric power, and provides for hoisting and lowering, between cellar and sidewalk, ash cans, kegs, barrels, ice, etc. When not in use no part shows above sidewalk. Hoist is compact, very easy to erect, no pit is required, and blue-prints are furnished showing erection in detail. It is subjected to working test before shipment; and all parts are painted one coat except machined parts, which are coated with grease.

A One-Man Hoist—One man unaided can perform entire operation of ash removal.

Safety First—Position of operator at sidewalk level protects public against danger of open hatch and prevents injury to operator due to anything falling into hatch.

Motor—Hoist has a one horse-power totally enclosed motor (series-wound for direct current, squirrel-cage for alternating current), with brake, automatic upper limit, and single-speed controller; giving one hoisting and one lowering speed. All moving parts, bearings, gears, etc., are lubricated by oil. Gears run in oil, and bearings are fed by splash system.

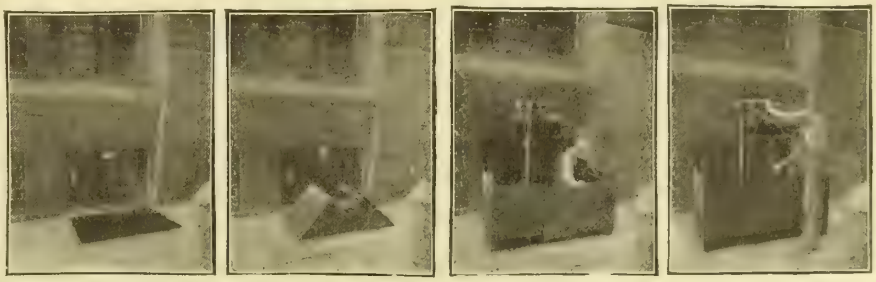
Speed—Hoist raises maximum load of 500 lbs. at actual speed of 30 feet per minute.

FIG. 16. MODEL E TELESCOPIC HOIST IN OPERATION
Hoisting head revolves on ball bearings to deposit can on sidewalk

PRICES

Model E Telescopic Hoist (Electric), f.o.b. car, New York, N. Y.	$275.00
Model E Telescopic Hoist (Electric), erected complete, New York, N. Y.	300.00
Model E Telescopic Hoist (Electric), G & G Door Opening and Closing Device with Spring Guard Gate, and pair of Sidewalk Doors to cover opening 4 by 4 feet, f.o.b. car, New York, N. Y. (Iron Ladder 80 cents per lineal foot)	385.00
Model E Hoist, Device and Doors, as above, erected complete in New York, N. Y., with waterproof electric alarm bell ten feet above sidewalk level to warn pedestrians, with batteries and wiring attached, as required by Department of Public Works (Iron Ladder $1.00 per lineal foot erected)	445.00

NOTE—Above prices for direct-current. For alternating current, add $15.00 to each price. Small additional charge is made if distance from area floor to sidewalk exceeds 15 feet. (For prices of ash cans see page 1433.)



View of hatch, sidewalk doors closed and *automatically* locked

Sidewalk doors automatically open; alarm bell rings

Doors fully opened and *automatically* locked, ash man ascends ladder

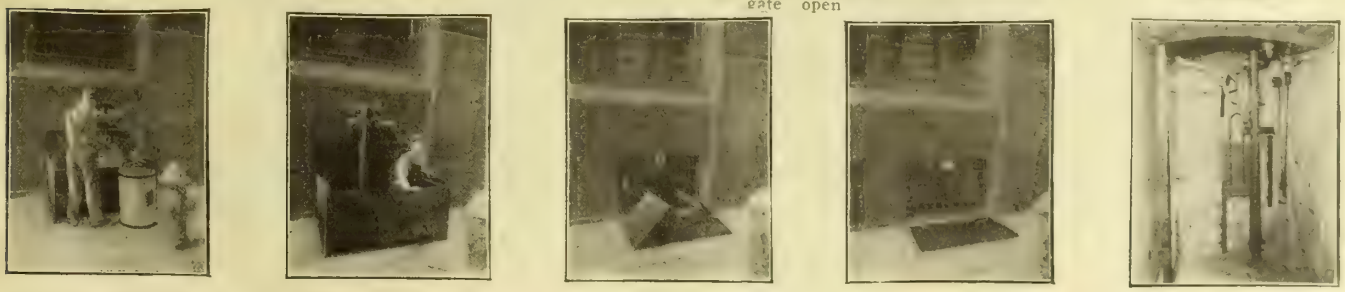
"Hooking" a G & G standard hoisting can with swing ball

Raising filled can without leaving sidewalk

Swinging hoisting head to deposit can on sidewalk, can pushes gate open

Can deposited on sidewalk without lifting

Four filled cans raised without leaving sidewalk



Lowering empty cans.

Operator descending iron ladder to cellar level

As hoisting head is lowered, doors automatically close

Sidewalk doors closed and locked automatically

Hoist in area, compact, out of the way

FIG. 17. OPERATING THE G & G TELESCOPIC HOIST (MODEL E) IN CONNECTION WITH THE G & G SIDEWALK DOOR OPENING AND CLOSING DEVICE WITH SPRING GUARD GATE. INSTALLED AT GERMANIA FIRE INSURANCE CO. BUILDING, 62 WILLIAM STREET, NEW YORK
Note that one man, unaided, performs entire operation. Sidewalk doors are self-locking, whether open or shut

BOTANICAL DECORATING CO.

208 West Adams Street

CHICAGO, ILL.

Products.

ARTIFICIAL FLOWERS and FLORAL DECORATION of every CHARACTER, PERIOD or STYLE for every purpose where ARTIFICIAL DECORATION is desirable.

Service.

A full line of Flowers, Plants, Leaves, Vines, Hanging Baskets, and Electric Fountains.

Our Electric Fountains require no plumbing, as they are operated by pump and motor and use the same water over and over.

Replenishing of the water is necessary only to replace the negligible quantity lost through evaporation.

We are prepared to show entire decorative schemes, floral designs, and layouts for cafés, ballrooms, theaters, halls, buildings, department stores, etc., etc.

We are glad to furnish tentative schemes for permanent artificial decorative treatment after data supplied us by architects, builders or owners.

Catalogue.

We issue a Catalogue in colors. It will be sent to you on application.

EXAMPLE OF INTERIOR FLORAL DECORATION

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